

ANNALS
OF THE
SOUTH AFRICAN MUSEUM.

(VOL. VI.)

I.—*South African Crustacea* (Part IV.*).—By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S.

THE scope of the present contribution is enlarged by including several species of Amphipoda—a group of which very few members have been hitherto recorded from South African waters. Seven of the species now noticed claim to be new, one of them even demanding the institution of a new genus. But, as in many other groups of Crustacea, so in this, the novelty of the characters is less striking than the close general relationship between the forms found here and others earlier known and described from many very remote localities. In regard to the new species of the curious genus *Trischizostoma*, it is desirable to call attention to the important contemporary discussion of that genus by Mrs. E. W. Sexton, working at the Plymouth Laboratory. As an example of widely ranging genera the coincidence may be noted that the description of the remarkable prawn, *Leontocaris paulsoni*, from the Cape, had only been a few months published in Part III. of this series when Mr. Stanley W. Kemp was able to announce a second species of this highly specialised genus from the west coast of Ireland, taken at a depth of 500 fathoms in lat. 53° N., outside the “Porcupine Bank.”

Besides the numerous specimens due to Dr. Gilchrist's “Marine Investigations,” the present report deals with a large collection submitted to me from the Durban Museum. When sending this valuable

* The other three Parts have been published in “Marine Investigations in South Africa.”

consignment, Mr. J. F. Quekett wrote, saying, "The spirit specimens are from Durban, except two from Algoa Bay, which are so marked. The dried specimens are mostly from Agulhas Bank, Cape Colony, but the Mantis shrimps are from here." There is, therefore, some vagueness in regard to the place of origin of the dried specimens. It has not appeared necessary to mention them all on the present occasion. Also some Penæidea and Caridea have been left over for future consideration. The collection furnishes an interesting new species of the genus *Mamaia*; this again showing close relationship to European and Japanese kindred. When its description and illustration were already in the hands of the printer, a second and in some respects finer specimen was sent me by Mr. F. W. FitzSimons, Director of the Port Elizabeth Museum. This and a fresh example of another interesting species from the same source and locality will be further noticed in their turn.

Along with two new species of Isopoda the report discusses in various groups some established species on which it appeared that fresh light could be thrown or desired. In the Palæmonidæ the new generic name *Macroterocheir* is proposed in place of what seems to be the illegitimate use of the term *Macrobrachium*. The name *Squilla oratoria*, de Haan, is upheld as prior to Berthold's *S. affinis*. Lastly, it should be noted that some references are given to William Stimpson's report on the Brachyura and Anomura collected by the North Pacific Exploring Expedition, 1853-1856. Stimpson died in 1872, pathetically believing that his manuscript and drawings for that work had been destroyed in the great fire at Chicago during the preceding year. His report, however, was subsequently found to be safe at the Navy Department, and was transferred to the Smithsonian Institution, which has now earned the thanks of the scientific world by publishing it under the able editorship of Miss M. J. Rathbun.

BRACHYURA GENUINA.

OXYRRHYNCHA.

FAMILY MAMAIIDÆ.

1905. *Mamaiidæ*, Stebbing, S.A. Crust., pt. 3, p. 22, and Proc. Biol. Soc. Washington, vol. xviii., p. 157.

In the restricted sense this family corresponds with Alcock's sub-family Maiinæ.

GEN. MAMAIA, Stebbing.

1905. *Mamaia*, Stebbing, S.A. Crust., pt. 3, p. 23, and Proc. Biol. Soc. Washington, vol. xviii., p. 157.

Under the above references the reasons for discarding the long-accepted generic name *Maia* and accepting the new form *Mamaia* are discussed at length. Under the old name an excellent definition of the genus is supplied by Alcock, Journ. Asiat. Soc. Bengal, vol. lxiv., pt. 2, pp. 237, 238, 1895, and Deep-sea Brachyura of the Investigator, p. 55, 1899.

MAMAIA QUEKETTI, n. sp.

Plate XXVII.

This species appears to make a near approach to the rare form named *Maja* (*Maja*) *spinigera* by de Haan (Crust. Japon., decas quarta, p. 93, 1839; pl. 24, fig. 4, *Pisa* (*Paramaja*) *spinigera*, 1837; and *M.* (*Maja*) *spinig.*, Errata, p. 244, 1849). It differs in that the frontal spines are more divergent, and instead of one-fourth the length of the rest of the carapace only between a fifth and a sixth of that length. The lateral spines are also less than a fourth of the length named. In the middle line of the carapace there is a longitudinal series of conspicuous spines, three before the middle and three behind it, with a little transverse pair between the last two, whereas in de Haan's species there are in this series only two spines instead of five behind the middle. Moreover, in the present species at the middle there is a stout bifid spine, with apices placed transversely, of which there is no hint in de Haan's figure or description. The transverse pair of spines on the posterior margin of the carapace are here smaller and wider apart than those shown in de Haan's figure. The oblique set of spines on the branchial regions are also somewhat differently arranged.

The chelipeds of de Haan's species in the male are described by Ortmann (Zool. Jahrb., vol. vii., p. 51, 1893) as longer than the cephalothorax, palm flattened, otherwise formed as in the female. In the present species, represented only by the male sex, the chelipeds are stouter than the next limbs and as long; they have the elongate hand and fingers quite smooth, but the two preceding joints conspicuously roughened with lines of tubercles, not smooth as in de Haan's female specimen.

The conspicuous spine at the distal end of the merus or fourth joint in all the walking legs, clearly shown in de Haan's figure, and

described both by him and by Alcock, is not found in the African specimen.

There are numerous groups of curved setæ on the frontal horns and in two lines to the middle of the carapace, thence diverging to the branchial regions. Many also are conspicuous at the bases of the lateral spines and about the walking legs, only leaving the dark ungues uncovered.

The length of the carapace is 100 mm., of which a straight line between the frontal horns measures 15 mm., the inner side of the horn being 18 mm. in length. The extreme breadth of the carapace is 85 mm., or 69 mm. without the projecting lateral spines.

Locality. Durban. The specimen from the Durban Museum was entrusted to me by the curator, J. F. Quekett, Esq., out of respect to whom the specific name is given.

Locality. Port Elizabeth. The specimen received from Mr. FitzSimons under the circumstances above mentioned, has a carapace 130 mm. long, allowing 5 mm. for the broken tip of the least damaged frontal horn. The extreme breadth is 105 mm., or 90 mm. not including the lateral spines. The right cheliped measures 150 mm., of which 35 belong to the fifth joint, and 55 to the hand and fingers. Between these fingers when closed there is proximally a prolonged and rather conspicuous gap. In this specimen it is easy to see how strongly the orbits are excavated backwards. The eye-stalks appear to be more strongly curved than in *Mamaia squinado*. They are rather bulbous at the base, but then narrow, with the visual area narrowly oval. The stout bifid spine at the centre of the carapace might in this example equally well be described as a closely contiguous pair of transversely placed spines. They are very prominent. In the other specimen unfortunately the bird's-eye view taken by the camera does not at all clearly show these sharp projections.

GEN. PLATYMAIA, Miers.

PLATYMAIA WYVILLE-THOMSONI, Miers.

1886. *Platymaia wyville-thomsoni*, Miers, Challenger Brachyura, Reports, vol. xvii., p. 13, pl. 2, fig. 1.
 1902. *Platymaia turbynei*, Stebbing, S.A. Crust., pt. 2, p. 3, pl. 5.
 1904. *Platymaia wyville-thomsoni*, Doflein, Valdivia Brachyura, p. 89, pls. 2, 20-23, &c.

It is desirable here to call attention, not only to Herr Doflein's identification of *P. turbynei* with the species named by Miers, but also to the very elaborate and valuable study of the species in the Brachyura of the Valdivia expedition.

FAMILY BLASTIDÆ.

1902. *Blastidæ*, Stebbing, S.A. Crust., pt. 2, p. 2.

1905. *Blastidæ*, Stebbing, S.A. Crust., pt. 3, pp. 22, 25.

For Alcock's equivalent sub-family Pisinae see Journ. Asiat. Soc. Bengal, vol. lxiv., pt. 2, pp. 160, 165, 200, 1895, and Deep-sea Brachyura of the Investigator, p. 49, 1899.

GEN. HALIMUS, Latreille.

1829. *Halimus*, Latreille, Règne Animal, éd. 2, vol. iv., p. 60.

1831. *Halimus*, Latreille, Cours d'Entomologie, p. 362.

1834 (or earlier). *Halimus*, Guérin, Iconographie, Crust., pl. 9, fig. 2.

1834. *Halimus*, Milne-Edwards, Hist. Nat. Crust., vol. i., p. 340.

1895. *Hyastenus*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxiv., pt. 2, pp. 200, 206.

1897. *Halimus*, M. J. Rathbun, Proc. Biol. Soc. Washington, vol. xi., p. 157.

1904. *Hyastenus*, Doflein, Valdivia Brachyura, p. 85.

Miss Rathbun has explained that when Latreille defined this genus he did not name the species belonging to it. Guérin, who is quoted by Milne-Edwards in 1834, assigned to the genus the single species *Halimus aries*, Latreille, which must therefore be regarded as the type, since there was at the time no competitor in the field. Milne-Edwards assigned to the genus the additional species *H. auritus* (Latreille). Unluckily the first species was included in White's genus *Hyastenus*, 1847, thus constituting *Hyastenus* a synonym of *Halimus*.

The points on which Latreille relied for defining his genus were that the ocular peduncles, though short, are always exposed, and that the second antennæ have the third joint of the peduncle at least as long as the preceding joint, and carrying a long setaceous flagellum. He considered the genus to be near *Micippe*, Leach, and discusses it between Leach's genera *Camposcia* and *Hyas*.

For the modern definition see the references to *Hyastenus*, Alcock.

HALIMUS DIACANTHUS (de Haan).

1839. *Pisa (Naxia) diacantha*, de Haan, Crust. Japon., decas quarta, p. 96, pl. 24, fig. 1 (1838), and pl. G.

1895. *Hyastenus diacanthus*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxiv., pt. 2, pp. 208, 210.

1902. *Halimus diacanthus*, M. J. Rathbun, U.S. Nat. Mus., vol. xxvi., p. 29.
1903. *Hyastenus diacanthus*, Nobili, Boll. Mus. Zool. Torino, vol. xviii., N. 455, p. 27.

The synonymy of the species down to 1895 is supplied in the reference to Alcock, the transference to *Hyastenus* commencing with A. Milne-Edwards in 1872. The distribution of the uncinata setæ is discussed by C. W. S. Aurivillius in his treatise on the masking habits of the Oxyrrhyncha, p. 51, pl. 2, fig. 5, 1889. Among the numerous Indian species Alcock distinguishes the present one as belonging to a group in which the carapace when denuded is smooth and polished, with a few large spines; in common with *H. spinosus*, A. Milne-Edwards, it has the "carapace triangular, with a large epibranchial spine and at least one large subhepatic tubercle on either side," and is distinguished from the species mentioned by having a single acuminate tubercle in the middle line on the gastric region, and none on the intestinal, whereas *H. spinosus* has "a large intestinal and two large gastric spines in the middle line."

The specimen from Durban agrees with the description of *H. spinosus*, in that the gastric hump has two spines in the middle line and that there is a spine on the intestinal hump, but they are of insignificant size, the hinder one on the gastric region being hidden in the fur and scarcely even palpable. They do not seem characters sufficient for bestowing specific rank. The carapace, including the straight divergent horns, is 80 mm. long, and, including the lateral epibranchial spines, its breadth is 48 mm. The length of a horn on the free inner margin is 25 mm. The specimen is a female, and the slender chelipeds are considerably shorter than the next peræopods.

CYCLOMETOPA.

FAMILY XANTHIDÆ.

1898. *Xanthidæ* (part), Alcock, Journ. Asiat. Soc. Bengal, vol. lxvii., pt. 2, pp. 67, 69.
1898. *Xanthinæ* (sub-fam.), Alcock, *loc. cit.*, p. 77.

Alcock defines his family Xanthidæ as one "in which the fold of the antennules is transverse or obliquely transverse, and the anterior boundary of the buccal cavern is raised and sharply defined, so that the external maxillipeds commonly shut close against it unless they

fall short of it." He divides it into three sub-families—Xanthinæ, Actæinæ, and Chlorodinæ—which I prefer to treat as families, accepting for the first the name Xanthidæ in a restricted sense. For this Alcock's definition is: "Carapace usually much broader than long, usually transversely oval, sometimes transversely hexagonal. The front is contained from $3\frac{1}{2}$ to $5\frac{1}{2}$ times in the greatest breadth of the carapace."

It is subdivided into six so-called alliances, the fourth of which, called Xanthoida, contains among others the typical genus *Xantho*, Leach, followed by *Leptodius*, which is presently reduced to a sub-genus of *Xantho*.

The remarks made by Miers in his *Alert and Challenger* reports on the species which have been referred to *Leptodius*, A. Milne-Edwards, 1863, will incline many to agree with Dr. Ortmann, when he says (*Zool. Jahrb.*, vol. vii., p. 443, 1893): "I am unable sharply to distinguish the three genera *Xantho*, *Xanthodes*, and *Leptodius*." The last is chiefly distinguished by the spoon-shaped tips to the chelipeds. But Ortmann observes that a typical *Xantho* (*rivulosus*) has them, and Alcock remarks that in *Leptodius crassimanus* the spooning of the figures is indistinct. The latter species is, perhaps for that reason, referred to *Xantho* by Miss Rathbun in 1906.

GEN. XANTHO, Leach.

1814. *Xantho*, Leach, *Edinburgh Encycl.*, vol. vii., p. 430.
 1898. *Xantho*, Alcock, *Journ. Asiat. Soc. Bengal*, vol. lxxvii., pt. 2, p. 112 (including *Leptodius*).

XANTHO HYDROPHILUS (Herbst).

1790. *Cancer hydrophilus*, Herbst, *Naturg. Krabben u. Krebse*, vol. i., pt. 8, p. 266, pl. 21, fig. 124.
 1801. *Cancer Eudora*, Herbst, *Naturg. Krabben u. Krebse*, vol. iii., pt. 2, p. 10, pl. 51, fig. 1.
 1826? *Cancer inæqualis*, Audouin, *Savigny's Crust. Égypte*, pl. 5, fig. 7.
 1834. *Chlorodius exaratus*, Milne-Edwards, *Hist. Nat. Crust.*, vol. i., p. 402.
 1834. [?] *Chlorodius eudorus*, Milne-Edwards, *loc. cit.*, p. 402.
 1835. *Cancer (Xantho) affinis*, de Haan, *Crust. Japon.*, decas secunda, p. 48, pl. 13, fig. 8 (f. 6 in text).
 1843. *Xantho affinis*, Krauss, *Südafrik. Crust.*, p. 30.

1868. *Leptodius exaratus*, A. Milne-Edwards, Nouv. Archiv. du Mus., vol. iv., p. 71.
1884. *Leptodius exaratus*, Miers, Crust. H.M.S. Alert, p. 214.
1886. *Leptodius exaratus*, Miers, Challenger Brachyura, Reports, vol. xvii., p. 137.
1893. *Xantho exaratus*, Ortmann, Zool. Jahrb., vol. vii., p. 445.
1898. *Xantho (Leptodius) exaratus*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxxvii., pt. 2, p. 118.
1906. *Leptodius exaratus*, M. J. Rathbun, U.S. Fish. Comm. for 1903, pt. 3, p. 847.
1906. *Leptodius exaratus*, Nobili, Bull. Sci. France-Belgique, vol. xl., p. 121.
1907. *Chlorodius exaratus*, Stimpson, North Pacific Expl. Exp. 1853-56, Smithsonian Misc. Coll., vol. xlix., p. 52, pl. 6, figs. 3-4, 6-9 (posthumous publication).

A full synonymy of this species from Audouin down to 1898 is supplied under the reference to Alcock, apart from some of the names which Miers gives in his Challenger report as possibly only varieties, and not including *Xantho rivulosus* (Risso), Milne-Edwards, of which Bell (Brit. Stalk-eyed Crust., p. 55, 1853) says, "There can be no doubt that this is the *Cancer hydrophilus* of Herbst."

The Durban specimen corresponds with Alcock's description, having "front not very prominent, but projecting beyond the inner angle of the orbit, from which it is separated by a notch; bilaminar, the lobes cut square, but with a slightly concave margin." The fingers of the chelipeds are black; those of the walking legs are granular, furred along both edges as far as the claw.

The specimen, a male, has the carapace 22 mm. long by 30 mm. broad.

A long discussion of this species, with nine named varieties, by the distinguished carcinologist, William Stimpson, appears in the work which, as already mentioned, has just been published by the Smithsonian Institution thirty-five years after its author's death.

FAMILY PORTUNIDÆ.

1899. *Portunidæ*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxxviii., pt. 2, pp. 4, 5.

Alcock divides the family into four sub-families, of which the first, called Lupinæ, is thus defined: "The chelipeds are longer, usually

much longer, than any of the legs, the first three pairs of which have a tendency to be slender and the last pair of which end in typical swimming-paddles; the antero-lateral borders of the carapace are cut into from 5 (very rarely 4) to 9 distinct teeth. The carapace *may* be subrotund, but it is usually conspicuously broad."

The sub-family is subdivided into three alliances—Lupoida, Podophthalmoida, and Lupocycloida—the first of which includes, among others, the genera with which we are here concerned.

GEN. CHARYBDIS, de Haan.

1902. *Charybdis*, Stebbing, South African Crustacea, pt. 2, p. 9.

The synonymy has been already given under the reference cited.

CHARYBDIS NATATOR (Herbst).

Plates XXVIII. and XXIX.

1794. *Cancer natator*, Herbst, Naturg. Krabben u. Krebse, vol. ii., pt. 5, p. 156, pl. 40, fig. 1.
 1834. *Thalamita natator*, Milne-Edwards, Hist. Nat. Crust., vol. i., p. 463, pl. 17, figs. 13, 14.
 1835. *Portunus (Charybdis) granulatus*, de Haan, Crust. Japon., decas secunda, p. 42, pl. 1, fig. 1.
 1843. *Charybdis granulatus*, Krauss, Südafrik. Crust., p. 24.
 1899. *Charybdis (Goniosoma) natator*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxxviii., pt. 2, pp. 50, 61.
 1907. *Charybdis natator*, M. J. Rathbun, notes to Stimpson's North Pacific Crust., Smithsonian Misc. Coll., vol. xlix., p. 82.

Under the last reference but one will be found a full synonymy of the species to date, and a description with which the specimen from the Durban Museum seems fully to agree, except in a single particular, probably connected with the exceptional size of the example captured at Durban. Alcock states that the fingers of the chelipeds are about as long as the hand, and says with regard to eleven specimens in the Indian Museum that in the largest specimens the carapace is about 70 mm. long and about 100 mm. broad. Our specimen is 80 mm. long and 113 mm. broad. The hand measured along the lower margin is 133 mm. in length, of which 58 mm. belongs to the thumb, leaving 75 mm. for the palm. On the upper margin the palm is only 60 mm. long, and the movable finger is 63 mm., but in general effect the palm of this specimen might be

regarded as decidedly longer than the fingers. The transverse granulation along the lower surface of the hand is a very notable character.

CHARYBDIS SEXDENTATA (Herbst).

1783. *Cancer sexdentatus*, Herbst, Naturg. Krabben u. Krebse, vol. i., pts. 2-5, p. 153, pl. 7, fig. 52 (not pl. 8, fig. 53).

1798. *Portunus annulatus*, Fabricius, Supplem. Ent. Syst., p. 364.

1899. *Charybdis (Goniosoma) annulata*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxxviii., pt. 2, pp. 49, 54.

The synonymy of this species, not unattended by doubts, is supplied with Alcock's usual care in the place above cited. But he does not include *Talamita sexdentata*, Rüppell, Krabben des Rothen Meeres, p. 4 (*Thalamita*, p. 28), pl. 1, fig. 1, 1830, nor *Portunus (Charybdis) 6-dentatus*, de Haan, Crust. Japonica, decas secunda, p. 41, pl. 12, fig. 1, 1835. In his key to the Indian species of *Charybdis* the present species, in common with *C. cruciatus*, belongs to a group in which "the antennal flagellum is completely excluded from the orbital hiatus; the ridge that bounds the dorsum of the carapace posteriorly forms a curve with the postero-lateral borders; no spine on posterior border of arm." Furthermore, these two and some other species have "no distinct transverse ridges on the carapace behind the level of the last spine of the antero-lateral borders," not more than three *large* spines on the anterior border of the arm; the orbits have no decided dorsal inclination and their major diameter is never more than one-third the width of the interorbital space. But whereas in *C. cruciatus* the first spine of the antero-lateral border is anteriorly truncated and notched, in the present species it is acute, and here the sixth pleon segment of the male has the sides parallel, not, as in the other species, convergent.

From other species with which this is perplexingly surrounded it appears to be sundered by the comparative sharpness of the frontal teeth, the comparative smallness of the last antero-lateral tooth, the character of the last peraeopods, which have the merus or fourth joint nearly twice as long as broad and the hind margin of the propodite or sixth joint serrated in a large part of its extent. The sixth pleon segment is not quite so long as broad. According to Alcock "the major diameter of the orbit is only a fourth the width of the interorbital space." This appears to suit our specimens, but I am not quite clear as to how the measurements are taken.

The male specimen from the Durban Museum has a carapace

45 mm. long by 63 mm. broad. In the female the carapace is 40 mm. long by 55 mm. broad. Another female, with carapace 41 mm. by 48 mm., has the two middle frontal teeth blunt, more advanced than their neighbours. Herbst's *Cancer fasciatus*, on his pl. 49, fig. 5, might well have been drawn from such a specimen as this.

Alcock ends his account of the species by saying: "But for high contrary authority, I should consider this species to be identical with the *Cancer sexdentatus* of Herbst's pl. 7, fig. 52." He gives *Cancer fasciatus*, Herbst, vol. iii., pt. 1, p. 62, pl. 49, fig. 5 (1799) as a very doubtful synonym, subsequently referring it by preference to *Charybdis* (*Goniosoma*) *merguiensis*, de Man. Those who wish further to understand the difficulties of identification should study Dr. de Man's chapter on "*Goniosoma merguense*, n. sp.," in the J. Linn. Soc. London, Zool., vol. xxii., p. 82, 1888.

Since the above account was written, Stimpson's report on North Pacific Crustacea has appeared. At p. 81 it records from Hong Kong *Charybdis sexdentata* (Herbst) de Haan, with references to the *sexdentatus* or *sexdentata* of Herbst, Rüppell, and de Haan. Miss M. J. Rathbun, the editor, gives in a footnote as the correct name of the species *Charybdis japonica* (A. Milne-Edwards), without further explanation. In part 2, p. 10, of the present series I have already explained that Henri Milne-Edwards, in his Hist. Nat. Crust., vol. i., p. 463, 1834, under his *Thalamita annulata* (Fabricius), has erroneously quoted *Cancer sexdentatus*, Forsk., as a synonym of *Portunus annulatus*, Fabricius, although Forskäl did not name any *Cancer sexdentatus*, Herbst's species of that name being the true predecessor of *Charybdis annulata* (Fabricius).

GEN. LUPA, Leach.

1813. *Lupa*, Leach, Edinb. Encycl., vol. vii., p. 390.
 1897. *Portunus*, M. J. Rathbun, Proc. Biol. Soc. Washington, vol. xi., pp. 155, 160.
 1902. *Lupa*, Stebbing, S.A. Crust., pt. 2, p. 11.
 1907. *Portunus*, M. J. Rathbun, notes to Stimpson's North Pacific Crust., Smithsonian Misc. Coll., vol. xlix., p. 76.

I feel bound to reiterate my protest against my friend's use of the name *Portunus*, based on Latreille's supposed restriction of that genus in 1810, when he mentioned *P. pelagicus* as a typical species of it. Lamarek in 1801, Syst. Anim. sans Vert., p. 151, mentions by name only *P. depurator*, Fab., which, on Miss Rathbun's principle, may therefore claim to be the typical species, although no doubt

Lamarck gives references to others. But Latreille himself in 1802, *Hist. Nat. Crust. et Ins.*, vol. iii., p. 23, defines *Portunus*, with "Exemple. *Portunus depurator*, Fab.," and without mention of any other species. Judging by his later writings, I cannot suppose that either in 1802 or 1810 he had any intention to restrict the genus when naming an "exemple" or "type." But if he did it accidentally, surely the accident happened in 1802, and made *P. depurator* the typical species. In his *Cours d'Entomologie*, pp. 349, 350, in 1831 Latreille's references to *Portunus puber* and *Lupa pelagica* make it clear that he was himself unaware of having done anything to make the latter species a *Portunus* in preference to the former.

LUPA PELAGICA (Linn.).

1758. *Cancer pelagicus*, Linn., *Syst. Nat.*, ed. 10, p. 626.

1798. *Portunus pelagicus*, Fabricius, *Suppl. Ent. Syst.*, p. 367.

1813. *Lupa pelagica*, Leach, *Edinb. Encycl.*, vol. vii., p. 390.

1899. *Neptunus pelagicus*, Alcock, *Journ. Asiat. Soc. Bengal*, vol. lxxviii., pt. 2, p. 34.

1907. *Portunus pelagicus*, M. J. Rathbun, notes to Stimpson's North Pacific Crust., *Smithsonian Misc. Coll.*, vol. xlix., p. 76.

A dry specimen of this well-known species from the Durban Museum measured 150 mm. in extreme breadth of the carapace.

CATOMETOPA.

FAMILY GRAPSIDÆ.

1900. *Grapsidæ*, Alcock, *Journ. Asiat. Soc. Bengal*, vol. lxxix., pt. 2, pp. 283, 389.

GEN. GRAPSUS, Lamarck.

1801. *Grapsus*, Lamarck, *Syst. Anim. sans vertèbres*, p. 150.

1900. *Grapsus*, Alcock, *Journ. Asiat. Soc. Bengal*, vol. lxxix., pt. 2, pp. 389, 390.

Lamarck's original definition of the genus is: "Four antennæ, short, articulated, concealed beneath the carapace. The eyes at the angles of the carapace, with short peduncles. Body depressed, almost square, carapace transverse, deflexed in front. Ten feet, unguiculate: the anterior pair chelate." He bases it upon *Cancer grapsus*, Linn., for which he substitutes the new designation *Grapsus*

pictus. He gives after the Linnean name references to Petiver, Catesby, and Herbst, and adds to the synonymy "*Cancer tenuicrustatus*, Herbst, *Caner.* 2, p. 113, t. 33, 34, with a reference to Seba. He includes as a second species in the genus "*Grapsus depressus*, n., Herbst, t. 3, f. 35, a. b.," since referred to *Plagusia*.

In his key to the Indian genera of Grapsidæ, Alcock distinguishes *Grapsus* and *Geograpsus* as having the front less than half the greatest breadth of the carapace, while it is more than half that breadth in *Metopograpsus* and *Pachygrapsus*. In the definition of *Grapsus*, however, he speaks of the front as "about half the breadth of the anterior border of the carapace." In a dried specimen of *G. strigosus* from the Durban Museum the front is somewhat more than half the greatest breadth of the carapace.

GRAPSUS STRIGOSUS (Herbst).

1799. *Cancer strigosus*, Herbst, *Naturg. Krabben u. Krebse*, vol. iii. pt. 1, p. 55, pl. 47, fig. 7.
 1802. *Grapsus strigosus*, Bosc, *Hist. Nat. Crust.*, vol. i., p. 203.
 1838. *Goniopsis strigosa*, McLeay, *Illustrations Zool. South Africa* p. 66.
 1838. *Goniopsis flavipes*, McLeay, *loc. cit.*, p. 66.
 1843. *Goniopsis strigosa*, Krauss, *Südafrik. Crust.*, p. 46.
 1900. *Grapsus strigosus*, Alcock, *Journ. Asiat. Soc. Bengal*, vol. lxi., pt. 2, p. 393.
 1907. *Grapsus strigosus*, Stimpson, *North Pacific Crust.*, *Smithsonian Misc. Coll.*, vol. xlix., p. 118.

The dried specimen already referred to has a carapace 28 mm. long and 30 mm. broad. The largest of 76 specimens observed by Alcock measured 59 mm. in length by 63 mm. in breadth.

Concerning *G. flavipes*, McLeay, Krauss says that it is only distinguished by blood-red bands, and otherwise entirely agrees with the description of *G. strigosus*, in company with which it is found.

The Durban Museum specimen agrees in the colouring of the walking legs with Herbst's figure. In the chelipeds the tooth at the inner angle of the wrist is straight, in accordance with Alcock's description.

Miss Rathbun, in notes to Stimpson (*loc. cit.*, p. 119), makes Stimpson's *Grapsus longipes* a synonym of *G. strigosus*, to which Stimpson himself admitted that it was closely allied.

FAMILY GECARCINIDÆ.

1900. *Geocarcinidæ*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxi., pt. 2, pp. 283, 440.

The primary genus of this family is Leach's *Gecarcinus*, not, as the name is sometimes printed, *Geocarcinus*.

GEN. CARDISOMA, Latreille.

1825. *Cardisoma*, Latreille, Encycl. Méth., vol. x., p. 685.

1900. *Cardiosoma*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxi., pt. 2, p. 444.

CARDISOMA CARNIFEX (Herbst).

1796. *Cancer carnifex*, Herbst, Naturg. Krabben u. Krebse, vol. ii., pt. 6, p. 163, pl. 41, fig. 1.

1825. *Cardisoma carnifex*, Latreille, Encycl. Méth., vol. x., p. 685.

1900. *Cardiosoma carnifex*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxi., pt. 2, p. 445.

1906. *Cardiosoma carnifex*, Nobili, Bull. Sci. France-Belgique, vol. xl., p. 156.

On this species Alcock (*loc. cit.*) gives a fund of valuable information. In the ample synonymy he includes *Cancer hydromus* [err. for *hydrodromus*], Herbst, with a reference to Herbst's work, immediately following that for *C. carnifex*, namely, p. 164, pl. 41, fig. 2. But according to Ortmann, Zool. Jahrb., vol. x., p. 302, 1897, the species in question should be called *Potamon hydrodromum*, and Miss M. J. Rathbun in her fine Monograph of the Potamonidæ, Nouv. Arch. du Muséum, vol. vi., p. 287, 1904, gives the name as *Potamon (Potamon) hydrodromus* (Herbst), with a full synonymy which appears to be conclusive. In 1894 Ortmann, Zool. Jahrb., vol. vii., p. 735, gives the species *Cardisoma guanhumii*, Latreille, with *carnifex* (Herbst) as a variety. But, if the two forms are specifically identical, it is Latreille's *guanhumii* that must take the subordinate position, since the employment of the name by the Maregrave de Liebstad in 1648, being pre-Linnean, does not count in a question of priority. The carapace of the dried specimen from the Durban Museum is 70 mm. in greatest breadth, with a length of 65 mm. The specimen is a female, with the right cheliped much larger than the left.

OXYSTOMATA.

1841. *Oxystomata*, de Haan, Crust. Japonica, decas quinta, p. 111.
 1896. *Oxystoma*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxx., pt. 2, p. 135.
 1902. *Oxystomata*, Stebbing, South African Crustacea, pt. 2, p. 16.

FAMILY RANINIDÆ.

1896. *Raninidæ*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxx., pt. 2, pp. 136, 288.

Alcock characterises the family as follows: "Carapace remarkably elongate, but not covering the abdominal terga, the first four or five of which lie exposed in the dorsal plane of the body. The last pair of legs also is raised in the dorsal plane of the body. The antennæ are large. The antennules also are large, and do not fold into fossettes. The vasa deferentia protrude through the bases of the fifth pair of legs; *the oviducts pierce the bases of the third pair of legs*. The sternum is broad anteriorly, very narrow or linear posteriorly. The afferent branchial openings are not found in front of the bases of the chelipeds, and afferent currents probably reach the branchial chamber between the posterior border of the carapace and the bases of the last pair of legs. The external maxillipeds completely cover the buccal cavern, and their palp is concealed in repose: their exopodite is but little longer than the ischium. The branchiæ are less than nine in number on either side."

GEN. RANINA, Lamarck.

1801. *Ranina*, Lamarck, Syst. Anim. sans vertèbres, p. 156.

Lamarck includes the genus in his section Cancræ Macrouri. He defines it as having "Four short antennæ: the inner pair with the last joint bifid. The body oblong, wedge-shaped, truncate anteriorly; tail small, ciliated on the edges. Ten feet; the anterior pair ending in claws; the four hinder pairs ending in swimming-blades." He assigns to it the single species *Ranina serrata*, a new name for "*C. Raninus*, L., Rumph. Mus., t. 7, fig. T, V. Herbst, Cancr. t. 22, f. 1." Latreille regards the genus as the last of the Brachyura, and so leading on to the Macrura.

RANINA SCABRA (Fabricius).

1705. *Cancer Raniformis*, Rumph., Amboinsche Rariteit-Kamer, p. 13, pl. 7, figs. T, V.
1758. *Cancer raninus*, Linn., Syst. Nat., ed. 10, p. 625.
- 1775-1781-1793. *Cancer raninus*, Fabricius, Syst. Ent., p. 400; Mantissa, i., 314; Spec. Ins., i., 496; Ent. Syst., ii., 438.
1776. *Hippa scabra*, Fabricius, Mantissa, i., 330 (*vide* Herbst).
1789. *Cancer raninus*, Dixon, A Voyage round the World, Appendix, No. 1, p. 353, 2 pls. (unnumbered).
1791. *Cancer raninus*, Herbst, Naturg. Krabben u. Krebse, vol. i., pt. 2, p. 3, pl. 22, fig. 1.
1791. *Cancer scaber*, Herbst, *loc. cit.*, p. 11.
1793. *Hippa scabra*, Fabricius, Ent. Syst., ii., 476.
1798. *Albunea scabra*, Fabricius, Suppl., Ent. Syst., p. 398.
1801. *Ranina serrata*, Lamarck, Syst. Anim. sans vertèbres, p. 156.
1802. *Ranina serrata*, Bosc, Hist. Nat. Crust., ii., p. 15, pl. 9, fig. 2.
1803. *Ranina serrata*, Latreille, Hist. Nat. Crust. et Ins., vol. vi., p. 133, pl. 51, fig. 1.
1825. *Ranina dentata*, Latreille, Encycl. Méth., vol. x., p. 268.
1825. *Ranina serrata*, Desmarest, Consid. gén. Crust., p. 140.
1837. *Ranina dentata*, Milne-Edwards, Hist. Nat. Crust., ii., 194, pl. 21, figs. 1-4.
1841. *Ranina dentata*, de Haan, Crust. Japonica, decas quinta, p. 139, pl. 34, pl. 35, figs. 1-4.
1893. *Ranina scabra*, Stebbing, Hist. Crust., Internat. Sci. Ser., vol. lxxiv., p. 140.

Those whose ears are titillated by tautology will no doubt prefer to call this species *Ranina ranina* (Linn.). Those who agree with our scientific forefathers in thinking that, if a specific name be promoted to generic rank, the species from which the name is borrowed must itself be renamed, should in the present instance accept the designation *Ranina scabra* (Fabricius). Its author, no doubt, was in the first instance unaware that his *Cancer raninus* and his *Hippa scabra* were one and the same species. Indeed, de Haan seems to have been the first writer to call explicit attention to this fact. Bosc, in 1802, noticed that Herbst's figure was borrowed from "Dickson," who had represented it in his Voyage, pl. 15 and 16 of the French edition. De Haan gives a reference to "Portlock et Dickson, *Voyage Round the World*, App. N. 1," as though they had used the name *Albunea scabra*. Yet Bosc, in taking note of Lamarck's *Ranina serrata*, evidently did not recognise its identity with *Albunea scabra*, since he says that the species "was forgotten

by Fabricius in his Supplement, although it is found in the previous editions of his Entomology, under the Linnean name—that is, *Cancer raninus*.” The suspicion arises that the latter was intentionally omitted, because Fabricius had discovered that between *raninus* and *scabra* there was no difference. Milne-Edwards adopts the name *Ranina dentata*, from Latreille, “Encyclop. t. x., p. 268,” but this specific name was obviously due to a lapse of memory on Latreille’s part, probably occasioned by the accident that Bose, Latreille himself, and Desmarest translated Lamarck’s *serrata* by the French words *dentelée* or *dentée*. Latreille himself, in his “Cours d’Entomologie,” p. 368, 1831, says of his tribe Notopterygia: “This tribe is composed of the genus *Ranina*, of Lamarck, and has for type the *albunea scabra* of Fabricius, or the *cancer raninus* of Linné.” *R. cristata*, Desjardins, “Ann. Soc. Entom., 1835,” is explained by de Haan to be the male of the present species.

The specimen sent from the Durban Museum was a comparatively small one, as the carapace measured only 75 mm. in length.

FAMILY CALAPPIDÆ.

1896. *Calappidæ*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxx., pt. 2, pp. 136, 137.

Alcock gives the following character: “Carapace of the ordinary brachyurous shape. The afferent branchial openings are found in front of the bases of the chelipeds. The antennæ are small. The legs are normal in position. The vasa deferentia perforate the bases of the fifth pair of legs. The branchiæ are nine in number on either side. The external maxillipeds either completely cover the buccal cavern and have their palp hidden in repose (*Matutinæ*), or do not close the buccal cavern and have their palp always exposed (*Calappinæ*).”

GEN. CALAPPA, Fabricius.

1798. *Calappa*, Fabricius, Suppl. Ent. Syst., p. 345.

1896. *Calappa*, Alcock, Journ. Asiat. Soc. Bengal, vol. lxx., pt. 2, p. 139.

CALAPPA HEPATICA (Linn.).

1758. *Cancer hepaticus*, Linn., Syst. Nat., ed. 10, p. 630.

1785. *Cancer hepaticus*, Herbst, Naturg. Krabben u. Krebse, vol. i., pt. 6, p. 198.

1785. *Cancer tuberculatus*, Herbst, *loc. cit.*, p. 204, pl. 13, fig. 78.
1798. *Calappa tuberculata*, Fabricius, *Suppl. Ent. Syst.*, p. 345.
1825. *Calappa tuberculata*, Desmarest, *Consid. gén. Crust.*, p. 109, pl. 10, fig. 1.
1837. *Calappa hepatica*, de Haan, *Crust. Japonica*, decas tertia, p. 70.
1843. *Calappa tuberculata*, Krauss, *Südafrik. Crust.*, p. 52.
1896. *Calappa hepatica*, Alcock, *Journ. Asiat. Soc. Bengal*, vol. lxxv., pt. 2, p. 142.

The dried specimen from the Durban Museum has a carapace 45 mm. long and 70 mm. broad, the length being thus rather considerably more than half the extreme breadth. It agrees well in general character with Desmarest's figure, and in particular the right cheliped shows the curious external curved basal process of the finger, which Desmarest represents in his fig. 1*a*.

Krauss remarks that at low tide he found this species in little pits on the sand-banks of the Bay of Natal, in which it sits quite motionless with the chelipeds pressed close to the thorax; whether it maintains its peaceful position when the tide comes in he could not ascertain on account of its rare occurrence.

MACRURA ANOMALA.

Other members of this division have been discussed in these Marine Investigations, Crustacea, pt. 2, p. 17, 1902, and pt. 3, p. 68, 1905.

GALATHEIDEA.

1901. *Galatheidea*, Alcock, *Catal. Indian Deep-Sea Crust.*, *Macrura* and *Anomala*, p. 235.

FAMILY GALATHEIDÆ.

1901. *Galatheidæ*, Alcock, *loc. cit.*, p. 236.
1902. *Galatheidæ*, Stebbing, *S.A. Crustacea*, pt. 2, p. 29.
1902. *Galatheidæ*, Benedict, *Proc. U.S. Nat. Mus.*, vol. xxvi., p. 243.
1905. *Galatheidæ*, MacGilechrist, *Ann. Nat. Hist.*, Ser. 7, vol. xv., p. 245.

3. { Lateral margin of carapace with spine behind
 the cervical groove *G. spinosa*, A. M.-E., 1880.
 { Lateral margin of carapace without spine be-
 hind the cervical groove *G. rostrata*, A. M.-E., 1880.

GALACANTHA ROSTRATA, A. Milne-Edwards.

1880. *Galacantha rostrata*, A. M.-E., Bull. Mus. Comp. Zoöl., vol. viii., p. 52.
 1886. *Munidopsis rostrata*, S. I. Smith, Rep. U.S. Fish. Comm. for 1885, p. 649 (45), pl. 6, f. 1.
 1900. *Galacantha rostrata*, M.-E. and Bouvier, Crust. Décap. Travailleur et Talisman, p. 308, pl. 6, f. 9.

Other references and synonyms may be gathered from those already given for the genus. Professor S. I. Smith gives the figure of a male 75 mm. in length. In the lateral view of the carapace he shows a little median denticle in advance of the great gastric spine and another at the base of its hinder slope, neither of which is observable in the South African specimen. The latter is a female with eggs, measuring 88 mm. from tip of rostrum to end of telson, with the carapace 44 mm. long from tip of rostrum to the hind margin, 31.5 mm. broad just behind the cervical groove, 39 mm. between the tips of the hinder spines of the lateral margin. The second antennæ are 135 mm. long, and the right cheliped 56 mm. There was no notable difference in length between the chelipeds.

The lateral spines of the rostrum are well developed and slightly divergent. As in the var. *investigatoris*, the sixth pleon segment and the telson are tuberculate, though less strongly than the anterior part of the pleon. The fingers of the ambulatory legs are delicately serrate on the concave margin and hairy on the convex one.

Locality. Cape Point N.E. by E. $\frac{1}{4}$ E., 46 miles; depth, about 900 fathoms; bottom, green mud.

This specimen appears to be the largest *Galacantha* hitherto recorded.

PAGURIDEA.

1905. *Paguridea*, Alcock, Indian Decap. Crust., Anomura, p. 1.

GEN. CLIBANARIUS, Dana.

1852. *Clibanarius*, Dana, U.S. Expl. Exp., Crust., vol. xiii., p. 461.
 1905. *Clibanarius*, Alcock, Indian Decap. Crust., Anomura, p. 40.

CLIBANARIUS VULGARIS, Dana.

1791. *Cancer clibanarius*, Herbst, Krabben u. Krebse, vol. ii., pt. 1, p. 20, pl. 23, fig. 1.
 1852. *Clibanarius vulgaris*, Dana, U.S. Expl. Exp., Crust., vol. xiii., p. 462.
 1905. *Clibanarius clibanarius*, Alcock, Indian Decap. Crust., Anomura, p. 43, pl. 4, fig. 1.

In naming the species Alcock follows Hilgendorf, Henderson, and Miss Rathbun. His key to the Indian species of the genus distinguishes the present by the following combination of characters: finger of the third peræopods decidedly longer than the sixth joint; eye-stalks much shorter than the peduncles of the first antennæ; inner lower border of the fourth joint in the first peræopods (the chelipeds) simply serrulate.

The Durban Museum specimen is a small one, 50 mm. in length. It agrees well with Colonel Alcock's full account of the species.

Locality. Durban.

GEN. PAGURUS, Fabricius, sensu restricto.

1905. *Pagurus*, Alcock, Indian Decap. Crust., Anomura, p. 78.

PAGURUS MEGISTOS (Herbst).

1804. *Cancer megistos*, Herbst, Naturg. Krabben u. Krebse, vol. iii., pt. 4, p. 23, pl. 61, fig. 1.
 1811. *Pagurus megistos*, Olivier, Encycl. Méthod., vol. viii., p. 639.
 1811. *Pagurus punctulatus*, Olivier, Encycl. Méth., vol. viii., p. 641; Atlas (1818), pl. 312, fig. 1.
 1847. *Pagurus megistos*, White, List of Crust. in Brit. Mus., p. 60.
 1905. *Pagurus punctulatus*, Alcock, Indian Decap. Crust., Anomura, p. 81, pl. 8, fig. 1.
 1907. *Dardanus megistos*, M. J. Rathbun, notes to Stimpson's North Pacific Crust., Smithsonian Misc. Coll., vol. xlix., p. 205.

A very full synonymy, excellent description and figure, are supplied in Alcock's work. In the Museum specimen from Durban the eye-stalks are purplish blue, and the long bristles which beset the chelipeds and walking-legs are, after years in spirit, still a rich red. The numerous ocellate markings are also conspicuous.

The species is interesting in connexion with that eastern ingenuity which appears to have imposed upon Herbst, or his draughtsman, to give this fine Pagurid a broad symmetrical tail-fan. The handsome

composite coloured drawing in Herbst's plate 61, fig. 1, represents certainly no known crustacean, and Milne-Edwards (Hist. Nat. Crust., vol. ii., p. 237, 1837) speaks of it as an imaginary species, writing the name as *Cancer megistus*, Herbst, and *Pagurus megistus*, Olivier, while recognising its approximation to Olivier's *P. punctulatus*. Miers (Crust. of H.M.S. Alert, p. 555, 1884) on the same ground rejects Adam White's identification. But in this matter injustice has been done to Herbst. For not only is his description of the species free from acceptance of the faulty tail-piece, but he seems to be unaware of it, for he says: "The hind body is thick, and has above six plates; these are pale red with white brown-ringed spots; the double claw at the end is again dark red with white spots." No one would speak of the uropods displayed in the figure as a double claw. Moreover, Herbst's description is included in a special section of his work devoted to the "Weichschwänze," or soft-tailed crustaceans, which he notes as having been grouped by Fabricius under the name *Pagurus*. This fourth part of his third volume was the last which Herbst lived to publish, and in the second section of it, which contains his *Cancer megistos*, he admits that the subject is in need of further study. Alcock remarks that "this is the largest species of the true Paguridæ of the Indian fauna," so that Herbst's name for it was quite appropriate, and it seems fair that it should be reinstated.

Henderson (Trans. Linn. Soc. London, Zool., Ser. 2, vol. v., pt. 10, p. 419, 1893), though retaining the name *P. punctulatus*, says, "the *Cancer megistos* figured by Herbst is undoubtedly a representation of the present species, but the draughtsman has supplied it with an altogether fanciful abdomen."

The two descriptions given by Olivier differ in that his *P. punctulatus* from the Isle of Timor has a little median tooth on the front of the carapace of which the *P. megistos* specimen from the Cape is devoid, and in that to this latter he attributes eye-peduncles little elongate, while in the Timor specimen they are said to be thick and tolerably long.

PAGURUS ARROSOR (Herbst).

1796. *Cancer arrosor*, Herbst, Naturg. Krabben u. Krebse, vol. ii., pt. 6, p. 170, pl. 43, fig. 1.
 1802. *Pagurus strigosus*, Bosc., Hist. Nat. Crust., vol. ii., p. 77, pl. 11, fig. 3, and *P. arrosor*, p. 80.
 1803. *Pagurus striatus*, Latreille, Hist. Nat. Crust. et Insectes, vol. vi., p. 163, and *P. arrosor*, p. 170.

1811. *Pagurus incisus*, Olivier, Encycl. Méth., vol. viii., p. 641.
1826. *Pagurus incisus*, Audouin, Savigny's Crust. d'Égypte, pl. 9, fig. 1.
1888. *Pagurus striatus*, Henderson, Challenger Anomura, Reports, vol. xxvii., p. 55.
1900. *Pagurus arrosor*, A. Milne-Edwards and Bouvier, Crust. Decap. Travailleux et Talisman, p. 178.
1905. *Pagurus arrosor*, Alcock, Indian Decap. Crust., pt. 2, p. 168.
1907. *Dardanus arrosor*, M. J. Rathbun, notes to Stimpson's North Pacific Crust., Smithsonian Misc. Coll., vol. xlix., p. 206.

As usual an elaborate synonymy is supplied by Alcock, of which only a small part is here given. Various authors, beginning with Latreille (vaguely) in 1803, have recognised the prior claim of Herbst's specific name *arrosor*, and have nevertheless set it on one side. Latreille took the same liberty with Bosc's *strigosus*, probably on the ground that the word as used by the Romans meant lean or meagre, not, as Bosc no doubt intended, full of *strigæ*. The latter sense would have been appropriate, because in this species the chelipeds and walking-legs are thickly traversed by scales or scutes resembling the marks left on a plot of grass freshly mown by a scythe. It is, however, worth remembering that this kind of ornamentation is shared by some of the species in two other genera, *Aniculus*, Dana, and *Nematopagurus*, Milne-Edwards and Bouvier.

Since this species is met with in all the tropical and subtropical seas, it is not surprising that some forms should have received varietal names. One of these was at first regarded as an independent species by A. Milne-Edwards, under the name *Aniculus petersi*, 1850. In 1892 Ortmann named a variety *pectinata*, and in 1906 Moreira adds a var. *divergens* (Arch. Mus. Nat. Rio de Janeiro, vol. xiii., p. 13, pl. 4, fig. 1), in describing which he speaks of *Pagurus insignis*, de Saussure, as one of the varieties of *P. arrosor*.

The species is said to attain a length of 7 or 8 inches. Milne-Edwards and Bouvier remark in regard to the collections they were examining, that it seems to attain its greatest dimensions towards Spain, and to become more and more reduced in proceeding to Senegal. The largest specimen sent by Dr. Gilchrist from South Africa is 87 mm. long, with a carapace 35 mm. in length. With this was a very small specimen. Some small specimens from Durban belong to the Durban Museum.

Locality (of large specimen). Great Fish Point Lighthouse, N. $\frac{1}{2}$ W., $2\frac{1}{2}$ miles; depth, 30 fathoms; bottom, mud.

GEN. DIOGENES, Dana.

1852. *Diogenes*, Dana, U.S. Expl. Exp., Crust., vol. xiii., pt. 1, pp. 435, 438.
 1905. *Diogenes*, Alcock, Indian Decapod Crust., pt. 2, pp. 25, 59, 164.

Dana gave the following definition: "Ophthalmic ring bearing a rostrum. Fourth pair of feet subcheliform. Left hand the larger; fingers acuminate, calcareous at tips." He distinguished this genus and *Eupagurus* (which he called *Bernhardus*) from *Paguristes* by the character that they were without appendages behind the bases of the fifth leg, whereas such appendages are present in *Paguristes*.

DIOGENES COSTATUS, Henderson.

1893. *Diogenes costatus*, Henderson, Tr. Linn. Soc. London, Zool., Ser. 2, vol. v., pt. 10, p. 418, pl. 39, figs. 7, 8.
 1905. *Diogenes costatus*, Alcock, Indian Decapod Crust., pt. 2, pp. 61, 70, pl. 6, figs. 7, 7a.

The present species belongs to the group in which "the rostrum is a slender simple (non-serrated) spicule" (Alcock). It appears to be very nearly allied to *D. pugilator* (Roux), known in the south of England as well as the Mediterranean and elsewhere, and to the oriental *D. avarus*, Heller. But the last species has a much more narrowly elongate left cheliped.

In the specimen here attributed to *D. costatus* the carapace has the antero-lateral margins serrulate, the rostrum shorter than the subtriangular spinulose ophthalmic scales, the antennal aciele a simple spine, strongly spinose along the inner edge, but differing from the figures in Henderson and Alcock by having a denticle on its outer edge. In describing the left cheliped Alcock says "merus a little shorter than the carpus," the reverse of which is the case in his figure and in our specimen. Both he and Henderson lay stress on the fact that the outer surface of the palm "is traversed by a ridge which, beginning at the lower proximal angle, runs up parallel with the carpal articulation (where it is granular), and then curves round and is continued obliquely almost to the finger-cleft" (Alcock). They do not refer to what is shown in their figures, the fact that the fixed finger has on its inner margin a marked prominence fitting a corresponding cavity in the inner margin of the movable finger. The little right cheliped shows a considerable gap in the closure of the setose hand and finger.

Henderson says "the ambulatory legs are almost smooth, with the anterior margins pubescent and very faintly toothed." In our specimen the anterior margin of the carpus in the first pair of walking-legs makes an exception to this statement by being very distinctly denticulate. Alcock says of both pairs of walking-legs, that "the anterior edge of the carpus and propodite is spinulose and setose, the spinules of the carpus being the most distinct." In these limbs and the two following pairs there appear to be on the under side of the basal joints little pads of a rasp-like character, like those on the hands of the fourth and fifth legs and on the uropods.

Length of carapace about 9 mm.

Locality. Great Fish Point Lighthouse, N. $\frac{1}{2}$ W., $2\frac{1}{2}$ miles; depth, 30 fathoms; bottom, mud. The shell occupied is covered by a branching coral.

MACRURA GENUINA.

TRIBE ERYONIDEA.

FAMILY ERYONIDÆ.

GEN. POLYCHELES, Heller.

1902. *Polycheles*, Stebbing, Marine Investigations, Crustacea, pt. 2, p. 35.
 1905. *Polycheles*, Bouvier, Bull. Mus. Océanogr. Monaco, No. 28, p. 3.

POLYCHELES BEAUMONTII (?) (Alcock).

1894. *Pentacheles Beaumontii*, Alcock, Ann. Nat. Hist., Ser. 6, vol. xiii., p. 236.
 1894. *Pentacheles Beaumontii*, Alcock, Illustrations Zool. Investigator Crustacea, pl. 8, fig. 3.
 1901. *Pentacheles Beaumontii*, Alcock, Catal. Indian Deep-Sea Macrura, p. 175.

Faxon, in 1895, is inclined to regard this species as, at most, but a geographical race of the *Polycheles granulatus*, which he himself described in 1893. The South African specimens differ in some particulars from both accounts, but until more material is available I am unwilling to take the responsibility of instituting a new species.

The whole dorsal surface of the carapace is tomentose, the pubescence though short sufficing to conceal most of the dentation. The two rostral teeth are very small. The frontal margin has a tooth on the inner and two teeth on the outer side of the orbital notches, and there is a tooth or spine at the frontal end of the impacted eye-stalk. The teeth of the lateral margin are in groups of 3 and 4 in front of the cervical sulcus and 18 behind it, some of the last set being very small. The teeth of the median carina are small and obscure, but those behind the sulcus seem to be rather numerous.

In the pleon the carinæ of the first three segments are produced forward in very small teeth, the fourth not being produced, the fifth forming a single cusp, the sixth being, as Alcock observes, without the vestige of a carina. This at least is true of the male, but in the female the front and hind margins of the segment are a little pinched. Three ridges converge on the back of the telson towards its acute point, the centre ridge commencing with a small hump.

The first antennæ have two spines on the outer side of the large first joint.

The elongate first pereopods have in the fourth joint six unequal but conspicuous teeth distributed over the middle part of one margin. In the male specimen the third joint measures 27, the fourth 38, the fifth 33, the sixth 50 millimetres, giving a total length, including the first two joints, of more than six inches. The fingers measure 27 mm. They are strongly curved at the tips. The palm to the hinge of the movable finger is 23 mm., ending in a sharp tooth, which is not adjacent to the finger.

The fifth pereopods of the female are distinctly chelate, but those of the male should perhaps not be called chelate at all. They have a process of the sixth joint subequal to the finger in length, but the grasping edge of the finger is turned not towards this process, but away from it.

The first pleopods of the male differ little from those figured by Professor Smith for *P. sculptus*.

The male specimen has a total length of 140 mm., of which the carapace is 64 and the pleon 76 mm. The carapace at the cervical groove is 51 mm. broad. The second antennæ are 90 mm. long.

Locality. The male specimen was obtained from a depth of 900 fathoms, Cape Point N.E. by E. $\frac{1}{2}$ E. 43 miles; the female, which is a little smaller, from 890 fathoms, Cape Point E. $\frac{3}{4}$ N. 41 miles, in each case the bottom being green mud.

POLYCHELES NANUS (Smith).

1884. *Pentacheles nanus*, S. I. Smith, Ann. Rep. U.S. Fish. Comm., 1882, p. 359.
1886. *Pentacheles nanus*, S. I. Smith, Ann. Rep. U.S. Fish. Comm., 1885, p. 651 (47), pl. 7, figs. 1, 1a.
1895. *Polycheles nanus*, Faxon, Mem. Mus. Comp. Zool. Harvard, vol. xviii., p. 121, pl. 33, figs. 1, 1a, 1b.

On the middle line of the carapace, between the rostral spines and the cervical sulcus, there are two single spines one behind the other, then a pair followed by two others in single file, whereas in Professor Smith's specimen there was only one spine behind the pair. The dorsal part of the fifth pleon segment is unfortunately missing, but the fact of its loss is an indirect testimony to its original prominence. In other respects the pleon agrees with the original description, which is as follows: "The pleon is more deeply sculptured than in *P. sculptus*, and the dorsal carina very much higher, the recurved carinal teeth of the third, fourth, and fifth somites are very much longer and more slender, and reach far over the somites in front. The edges of the sulcated carina on the sixth somite, instead of being low and uniform, as in *P. sculptus*, are very high and broken into several prominent teeth on each side, with a stouter and higher tooth at the posterior end of the sulcus." The edges of the side-plates and the median elevation on the telson with its smaller secondary prominence also agree with Professor Smith's account.

According to Faxon, the fifth peræopods are chelate in both sexes; the pleurobranchiæ four, one on each of the second to the fifth peræopods, the arthrobranchiæ eight, two to each of the first to the fourth peræopods, which also have each a podobranchia; the third maxilliped has a very minute epipod, and the first to the fourth peræopods have rudimentary epipods, represented by a plate-like expansion of the base of the stem of the podobranchia.

The single South African specimen is a female, as evidenced by the sexual openings at the base of the third peræopods. Adherent to various parts of the body were several small oval eggs, but whether actually belonging to the specimen was not quite evident.

Length of specimen 65 mm., the carapace being 30 mm. long, and at the cervical groove 22 mm. broad, the pleon 35 mm. long.

Locality. Cape Point N.E. by E. $\frac{3}{4}$ E. 38 $\frac{1}{2}$ miles ; depth, 750–800 fathoms ; bottom, green mud.

Both Smith and Faxon suggest the possibility that *P. nanus* may be only a dwarf deep-water variety of *P. sculptus*.

TRIBE SCYLLARIDEA.

1893. *Scyllaridea*, Stebbing, Hist. Crust., Internat. Sci. Ser., vol. lxxiv., p. 191.

This tribe, by Boas and many other writers called Loricata, comprises the two families Scyllaridæ and Palinuridæ. Borradaile, in his recent classification (Ann. Nat. Hist., Ser. 7, vol. xix., p. 407, 1907), retains the name Scyllaridea, but makes it one of the two "super-families" in his tribe Palinura, the Eryonidea being the other super-family. The *Macroures cuirassés* of Milne-Edwards, for which de Haan gives the Latin *Loricata*, included the Galatheidæ and the Eryonidæ as well as the two families above mentioned.

FAMILY SCYLLARIDÆ.

1837. "*Scyllariens*" (tribe), Milne-Edwards, Hist. Nat. Crust., vol. ii., p. 279.

1841. *Scyllaroidea* (fam.), de Haan, Crust. Japon., decas quinta, p. 148.

1847. *Scyllaridæ*, White, List of Crust. in Brit. Mus., p. 67.

1852. *Scyllaridæ*, Dana, U.S. Expl. Exp., Crust., vol. xiii., pt. 1, p. 515.

1888. *Scyllaridæ*, Bate, Challenger Macrura, Reports, vol. xxiv., p. 57.

1891. *Scyllaridæ*, Ortmann, Zool. Jahrb., vol. vi., p. 38.

1900. *Scyllaridæ*, M. J. Rathbun, Proc. U.S., Nat. Mus., vol. xxii., p. 309.

1901. *Scyllaridæ*, M. J. Rathbun, U.S. Fish. Comm. for 1900, vol. ii., p. 97.

1906. *Scyllaridæ*, M. J. Rathbun, U.S. Fish. Comm. for 1903, pt. 3, p. 896.

The genera now assigned to this family are *Scyllarus*, Fabricius, *Scyllarides*, Gill, *Ibacus*, Leach, *Thenus*, Leach, *Parribacus*, Dana, and *Pseudibacus*, Guérin-Méneville, with which Miers considers *Evivacus*, S. I. Smith, to be synonymous (Pr. Zool. Soc. London,

p. 543, 1882). With the first name it is necessary to deal warily. When Fabricius published it, in 1793, he appointed only two species, the first being *Scyllarus arctus*, with a long list of earlier references, while the second was a new species confessedly founded on an ill-preserved specimen. In 1893, when dealing with the genus *Arctus*, Dana, I ventured to remark that "it rather looks as if Dana had stolen the type species of *Scyllarus* on which to found his new genus." With greater boldness his own countryman, Gill, in 1898, took the step of cancelling Dana's *Arctus* as a synonym of *Scyllarus*, and of instituting the newly named genus *Scyllarides* for those species which Dana had separated from *Arctus* under the wrongful name of *Scyllarus*. The true and re-established *Scyllarus* has the rostrum very short and truncate, the exopod of the third maxillipeds without a flagellum, and the pairs of branchiæ nineteen in number.

GEN. SCYLLARIDES, Gill.

1898. *Scyllarides*, Gill, Science, n.s., vol. vii., p. 98.

1901. *Scyllarides*, M. J. Rathbun, U.S. Fish. Comm. for 1900, vol. ii., p. 97.

Here the rostrum is very salient, the exopod of the third maxillipeds has a flagellum, and the pairs of branchiæ are twenty-one in number.

The species allotted to the genus by Dana were "*Sc. sculptus, latus, squamosus, equinoxialis, Haanii, Sieboldi.*" Ortmann, in 1897 (Zool. Jahrb., vol. x., pp. 268-270), makes *S. sieboldi*, de Haan, a synonym of *S. squamosus*, and institutes a new species, *S. elisabethæ*. In 1899 Whitelegge (Records of Australian Museum, vol. iii., pt. 6. p. 155, pl. 29) gave a new description and figure of *S. sculptus*, Latreille. In 1906 Miss Rathbun, discussing the Brachyura and Macrura of the Hawaiian Islands, makes *S. sieboldi*, de Haan, and *S. haanii*, de Siebold, MS., de Haan, both synonyms of *Scyllarides squamosus* (Milne-Edwards).

Of these species the first in the field is *S. æquinoctialis*, Lund, 1793, followed by *S. latus*, Latreille, 1803. For the differences between them Ortmann (*loc. cit.*) and Milne-Edwards (Hist. Nat. Crust., vol. ii., pp. 284, 285) should be consulted. That a good series of specimens would unite them is not impossible. As synonyms of *Scyllarides latus*, Miss Rathbun, in 1900, gives *Scyllarus herklotsii*, Pel, in Herklots, and *Scyllarus dehaani*, Herklots, 1851. To *S. squamosus*, Milne-Edwards, 1837, we have seen that Miss Rathbun and Ortmann agree in giving *S. sieboldi*, de Haan, 1841, as

a synonym. But Ortmann who, in 1891, considered the differences between *S. sieboldi* and its contemporary species *S. haanii* as "quite small and scarcely visible," in 1897 reinstates *S. haanii* as an independent species. There are indeed in de Haan's figure of *S. haanii*, von Siebold, several points which separate it from its companion species. Instead of the antero-lateral angles of the carapace being square as in *S. æquinoctialis* or obtuse as in *S. sieboldi*, they are acutely advanced, and the constriction at the cervical groove is more pronounced than in the other species. On each branchial region there is a curved line of upraised tubercles at some distance from the lateral margin, and the lateral lobes of the second pleon segment have their margins cut into eight upward, outward, and downward pointing teeth not found elsewhere. The nearest ally of this species appears to be *S. sculptus*, Latreille, figured in the "Encyclopédie Méthodique," pl. 320, fig. 2, 1818, and mentioned without special description in vol. x., p. 416, 1825. In 1837 it was described for the first time by H. Milne-Edwards, Hist. Nat. Crust., vol. ii., p. 283. On the presumption that the specimens which I have received from South Africa belong to the species which Ortmann has very briefly described under the name *S. elisabethæ*, from the Cape and Port Elizabeth, I propose to compare that species with *S. sculptus* as re-figured and re-described by Whitelegge.

SCYLLARIDES ELISABETHÆ (Ortmann).

Plate XXX.

1897. *Scyllarus elisabethæ*, Ortmann, Zool. Jahrb., vol. x., p. 270.

The characters given by Ortmann are: carpus (fifth joint) of the first and second peræopods above without keels, at most with blunt longitudinal rolls, as distinguished from the two sharp longitudinal keels in *S. squammosus*; keels of the fourth joint with no marked wing-like elevation; sixth joint of the second peræopod above completely rounded, without edge (features attributed in common to *S. æquinoctialis* and *S. elisabethæ* as distinguished from *S. latus* and *S. haanii*); ante-penultimate joint of the second antennæ having at its front outer corner a straight tooth (a feature distinguishing three of the species just mentioned from *S. latus*, in which the tooth in question is hook-shaped upward curved); pleon humped, especially on the third and fourth segments; cephalothorax with a distinct lateral notch behind the eyes (as opposed to *S. æquinoctialis*, in which the pleon is scarcely humped, and the lateral notch of the carapace evanescent).

In these characters there is nothing tangible, I think, by which *S. elisabethæ* could be separated from *S. sculptus*. It may be observed in passing that, if the figures of *S. latus* by Savigny and Guérin-Ménéville can be trusted, the curvature of the tooth on the ante-penultimate joint of the second antennæ is of little or no importance. It is, however, to this joint that attention should be directed. In the South African specimens the outer border is cut into five well-marked teeth, well though not quite regularly spaced and graduated, the front one very large and the hindmost very small, but the longest interval being between the second and third, and the last two teeth rather abruptly smaller than the first three. In Whitelegge's figure of *S. sculptus* the first three teeth of this border are crowded together, and near to the front one there is a large one on the distal border, which is entirely unrepresented in *S. elisabethæ*. Latreille's figure of *S. sculptus* (Encycl. Méth., Atlas, pl. 320, fig. 2, 1818) also shows the crowding together of the spines on the outer margin, with very irregular sculpture of the distal border.

In the present species the antero-lateral angles of the carapace are more sharply produced forward than in any hitherto figured member of the genus. Behind the front tooth the lateral margin is cut into six teeth, successively smaller, passing in a gentle curve to the constriction at the cervical sulcus, at which there is a tooth standing out very distinct from those before and behind it, but not so large as the front lateral tooth. In *S. sculptus*, according to Whitelegge, the tooth at this point is equal to or larger than that at the antero-lateral angle. Also in *S. sculptus* numerous more or less acute spines and spiniform tubercles are described by Whitelegge as occupying the dorsal surface of the carapace. In the present species there are four or five bluntish teeth on each half of the frontal margin, two that are definitely spiniform on each side of the orbit, with a very little one to the rear of the inner orbital pair. Along the centre line are two on the gastric region followed by a widely separated transverse pair and then by a transverse pair near together just behind the faintly marked median groove.

The first pleon segment is described by Whitelegge as having the coxal plate in *S. sculptus* bilobed; in the present species it forms a single lobe. Similarly the second segment is here not bilobed. It has the upper margin more or less strongly denticulate, curving back to a strong tooth within which six or seven graduated teeth form the curved lower or hind margin. The four following segments have the upper or front margin faintly crenulate, curving back to a strong tooth, within which the hind border is cut into some seven

teeth, regularly graduated in the third and fourth segments but irregularly in the fifth; in the sixth segment the outer tooth is followed not by a convex hind border but by an oblique truncate crenulate lateral margin. The telson is squarish, distally truncate, but with the corners rounded.

The fifth peræopods are simple in the male specimen, but in the two female specimens which still possess them they are, as might be expected, chelate. The tooth-like prolongation of the sixth joint, however, is here so short in comparison with the finger that it would scarcely have been thought of as chela-forming but for its fuller development in other species, such as *S. æquinocialis*. It may be noticed that in de Haan's plates *S. sieboldi* is the figure of a female, *S. haani* of a male, to judge by the fifth legs.

A dried specimen, female, some of the legs missing, from Algoa Bay, measures 93 mm. across the front of the carapace. Another dried specimen, also a female, probably from the same locality, measures 60 mm. across the front, with a length of 130 mm., or, including the second antennæ, 165 mm. These are from the Durban Museum. The following were collected by Dr. Gilchrist.

A male specimen from Cape St. Blaize W. $\frac{1}{4}$ N. $5\frac{1}{2}$ miles, depth 28 fathoms, bottom fine dark sand, measures 80 mm. across the front, 180 mm. in length, or with antennæ 225 mm.

A female specimen, from St. Sebastian Bay, depth about 20 fathoms, measures across the whole front 70 mm., between the orbits 38 mm., the carapace 70 mm. long, or with rostral process 75 mm., the pleon 105 mm. long; total length of the specimen, including the second antennæ, 220 mm.; second pleon segment 60 mm. broad, sixth 42 mm. broad, telson 33 mm. broad and 27 mm. long.

This, which is the subject of the photographic plate, was received at 10.30 a.m. on Sunday morning, March 26, 1905. Mr. J. Stuart Thomson, writing from the Cape, March 8, 1905, explained its place of origin, and added, "We received it yesterday in the fresh condition, and have had it frozen, as we thought you might find it interesting." The post-office at Tunbridge Wells, entering into the spirit of the transaction, gave it a special delivery on Sunday, and the messenger contributed his own advice that the cooking might safely be delayed till a more secular opportunity. As received, the colouring was dorsally a fine bright red, enhanced by the grey pattern on the lower part of the second antennæ, on the middle of the carapace, and the middle of its distal border, the latter part, however, having in the actual centre a bright red spot. The first pleon segment has an alternation of four grey and five red patches,

the following segments being also diversified with red and grey. The second and third joints and the flagella of the first antennæ were a bright pale red; the underside of the second antennæ pale yellowish and red intermingled; the under surface of the body and legs yellowish, but the legs conspicuous with three purple-red bands respectively on the fourth, fifth, and sixth joints, the fingers being red at the base, horn-coloured at the tips, and yellow in between. The localities mentioned by Dr. Ortmann are the Cape and Port Elizabeth.

FAMILY PALINURIDÆ.

This family has been already considered in these notices of South African Crustacea, pt. 1, p. 29, 1900, and pt. 2, p. 37, 1902.

GEN. PANULIRUS (Gray, MS.), White.

1847. *Panulirus* (Gray, MS.), White, List of Crust. in Brit. Mus., p. 69.
 1852. *Panulirus*, Dana, U.S. Expl. Exp. Crust., vol. xiii., p. 519.
 1888. *Panulirus*, Bate, Challenger Macrura, p. 77.
 1891. *Senex*, Ortmann, Zool. Jahrb., vol. vi., p. 22.
 1897. *Panulirus*, Ortmann, Zool. Jahrb., vol. x., p. 260.
 1905. *Panulirus*, Bouvier, Bull. Mus. Océanogr. Monaco, No. 29.
 1906. *Panulirus*, Nobili, Mem. Soc. Española Hist. Nat., vol. i., p. 300.
 1906. *Panulirus*, Nobili, Bull. Sci. France-Belgique, vol. xl., p. 59.

PANULIRUS PENICILLATUS (Olivier).

1837. *Palinurus penicillatus*, Milne-Edwards, Hist. Nat. Crust., vol. ii., p. 299.
 1841. *Palinurus penicillatus*, de Haan, decas quinta, p. 157, pls. L and M, fig. 5.
 1891. *Senex penicillatus*, Ortmann, Zool. Jahrb., vol. vi., p. 28.

Several additions to the synonymy, which begins with *Astacus penicillatus*, Olivier, Encycl. Méth., vol. vi., p. 343, 1791, will be found under the references to Milne-Edwards and Ortmann. The species was transferred to *Palinurus* by Olivier in 1811, and to *Panulirus* by White in 1847. There seems no reason to doubt that the dried specimen from the Durban Museum belongs to this species. It has an individual peculiarity. The little group of spines on the segment of the first antennæ is reduced to three, a small pair in front with a larger spine immediately behind the left member of

the anterior pair, but no trace of any spine behind the right-hand member.

The third maxillipeds have the characteristic short exopod, without flagellum. The pleon segments have no interrupted furrows. The free lateral portions of the first four segments are denticulate above, and each forms a strong backward curving apical tooth. The fifth peræopods have the chela-forming processes on the distal end of the sixth joint and base of the finger, which are characteristic of the female.

The length of the specimen is 210 mm. from the front to the end of telson. It is supposed to have come from the Agulhas Bank.

PANULIRUS BÜRGERI (de Haan).

1841. *Palinurus bürgeri*, de Haan, Crust. Japon., decas quinta, pp. 157, 159, 238, pls. 43 and 44, fig. 1.

1866. *Palinurus burgeri*, Heller, Novara-Reise Crust., p. 95.

1891. *Senex bürgeri*, Ortmann, Zool. Jahrb., vol. vi., p. 32.

1892. *Palinurus burgeri*, de Man, in Weber's Zool. Ergebn. Niederl. Ost-Indien, vol. ii., p. 354.

1897. *Panulirus bürgeri*, Ortmann, Zool. Jahrb., vol. x., p. 268.

1905. *Panulirus bürgeri*, Bouvier, Bull. Mus. Océanogr. Monaco, No. 29, p. 4.

The modified vowel in *bürgeri* is used on de Haan's plate, which is perhaps earlier than the text, and is also found in the index, though in the text itself of the description the form is *burgeri*. Dr. de Man calls attention to the circumstance that Heller (*loc. cit.*) and Alphonse Milne-Edwards (Nouv. Arch. Mus., vol. iv., p. 89) describe the transverse furrows on the pleon segments of this species as interrupted in the middle, which according to de Haan is not the case, although in the specimen from Makassar de Man found some interruption on the second and third segments and an indication of it on the fourth segment. One of the marks which de Haan uses for distinguishing this species from *P. dasypus*, Latreille, is the character that in the latter the furrows are interrupted, while in *P. bürgeri* they are continuous. Heller uses the same distinction, but evidently by a slip of the pen has transposed the characters.

The South African specimen of this rare and beautiful species shows, I think, all the requisite characters for its identification. The third maxillipeds are without exopod. The exopod of the second maxillipeds is without any distinguishable flagellum. The second and third joints of these maxillipeds are so closely united that the place of origin of the exopod is only with difficulty made out, and its appear-

ance is very different from the corresponding appendage in *P. regius* (Brito Capello) as figured by Dr. Nobili in the Mem. Soc. Española, vol. i., pl. 8, fig. 1a, 1906. The epistome agrees with de Haan's account in having three spines, with no intermediate spinules.

The plate of the first antennæ is armed with four large spaced spines, within which are two that are much smaller. Four of these intermediates are mentioned by de Haan, but only two are shown in his figure. Both within and without the square there are some insignificant spicules. The ornamentation of the carapace and pleon agrees remarkably well with de Haan's description and figure. The transverse furrows on the pleon are continuous and straight, except the one on the sixth segment, which is lobed as in the figure.

The first antennæ are 155 mm. long. The carapace in the middle line measures 52 mm., and the pleon 105 mm.

Locality. Fishing ground, Algoa Bay. One specimen, a male.

After the account of the specimen in spirit sent by Dr. Gilchrist had long been written, a specimen from Port Elizabeth was forwarded to me by Mr. FitzSimons. This example is considerably larger, the carapace in the middle line measuring 67 mm. Being dry, it had suffered considerably in transit. The appendages are so brittle that they seem ready to break in pieces at a look, unless it is a cautiously respectful one. From a comparison, however, of the two specimens, I should now say that the exopod of the second maxillipeds appears to have a short second joint in line with the long first one. In the dry specimen the marginal spaces between the three teeth of the epistome are denticulate, and in the other specimen a little denticle can be felt rather than seen in each space. On the plate of the first antennæ the dry specimen has between its four large spines five little ones. In general its ornamentation is like that of the other example, and the sex is the same.

TRIBE CARIDEA.

In regard to the species described and figured in part 3, p. 107, pl. 24B, of this series, it is desirable here to notice that, as Mr. Stanley W. Kemp has shown, in "Fisheries, Ireland Sci. Invest., 1905, I. [1906]," the name *Acanthephyra batei* was preoccupied, and further that the form is probably to be regarded only as one of the many varieties or synonyms of *Acanthephyra purpurea*, A. Milne-Edwards. Nobili, Bull. Sci. France-Belgique, vol. xl., extr. p. 22, 1906, suggests that the species referred in pt. 3, p. 87, to *Sergestes bisulcatus*, Wood-Mason, belongs rather to *S. prehensilis*, Bate.

FAMILY GLYPHOCRANGONIDÆ.

1882. *Rhachocarinæ*, S. I. Smith, Bull. Mus. Comp. Zoöl., vol. x., p. 41.
1884. *Glyphocrangonidæ*, S. I. Smith, Rep. U.S. Fish. Comm. for 1882, p. 364.
1888. *Nikidæ* (part), Bate, Challenger Macrura, Reports, vol. xxiv., p. 503.
1898. *Processidæ* (part), Ortmann, in Bronn's Thierreich, vol. v., pt. 2, p. 1124.
1901. *Glyphocrangonidæ*, Alcock, Catal. Indian Deep-Sea Macrura, p. 124.

Alcock divides the family into two groups, assigning to *Glyphocrangon* the species which have the eyes large and deeply pigmented (purple in spirit), and which have eleven branchiæ on either side, and to a sub-genus *Plastocrangon* those in which the eyes are small and unpigmented (pale yellow in spirit), and which have only nine branchiæ on either side, there being no arthrobranchiæ pertaining to the first and second peræopods.

GEN. GLYPHOCRANGON, A. Milne-Edwards.

1881. *Glyphocrangon*, A. M.-Edwards, Ann. Sci. Nat., Zool., Ser. 6, vol. xi., p. 3.
1882. *Rhachocaris*, S. I. Smith, Bull. Mus. Comp. Zoöl, vol. x., p. 41.
1884. *Glyphocrangon*, S. I. Smith, Rep. U.S. Fish. Comm. for 1882, p. 364.
1888. *Glyphocrangon*, Bate, Challenger Macrura, Reports, vol. xxiv., p. 503.
1895. *Glyphocrangon*, Faxon, Mem. Mus. Comp. Zoöl, vol. xviii., p. 137.
1901. *Glyphocrangon*, Alcock, Catal. Indian Deep-Sea Macrura, p. 125.

The establishment of *Rhachocaris* as a separate genus was due to errors in the original account of *Glyphocrangon*. According to Bate there are six pleuro-branchiæ, belonging respectively to the third maxillipeds, and each of the five peræopods, and four arthro-branchiæ, belonging to the third maxillipeds and each of the first three peræopods. Professor Smith, on the other hand, affirms that there are only five pleuro-branchiæ, one for each of the five peræopods, and six arthro-branchiæ, two on the third maxillipeds and one on each of

the first four peræopods, the first and second maxillipeds having each an epipod. With this branchial formula Alcock's account agrees, except as to the species referred to his sub-genus *Plastocrangon*. It may be noticed that in the original description of *G. longirostris* (Smith), from a specimen 54 mm. long, the eyes, with a diameter about one-fifth the length of the rostrum, were (in spirit) devoid of coloured pigment, thus making an approach to *Plastocrangon*, but in larger specimens subsequently described the eyes (in spirit) were dark purplish brown, and nearly a third of the rostrum's length in diameter. If the branchial formula which Bate has recorded should prove to be correct for the species which he describes, or for any of them, it is obvious that such species would form a division apart both from *Glyphocrangon* and *Plastocrangon*.

GLYPHOCRANGON SCULPTUS (Smith).

1882. *Rhachocaris sculpta*, S. I. Smith, Bull. Mus. Comp. Zoöl. Harvard, vol. x., p. 49, pl. 5, fig. 3, pl. 6, figs. 3, 3a-d.
 1884. *Glyphocrangon sculptus*, Smith, Rep. U.S. Fish. Comm. for 1882, p. 365.
 1886. *Glyphocrangon sculptus*, Smith, Rep. U.S. Fish. Comm. for 1885, p. 655 (51), pl. 8, fig. 3, pl. 9, figs. 1, 2.

The South African specimens which I assign to this species have a character which, if not peculiar to it, is certainly uncommon. The side-plate of the fifth pleon segment is distally tripartite, having (as Smith notes) three acute points instead of the usual two.

The rostrum is apically strongly upcurved, with a pair of teeth in front of the eyes and another pair just behind them. The four principal dorsal carinæ of the carapace are formed by rows of tooth-like tubercles. The large antero-lateral tooth is followed by two teeth, successively much smaller, constituting a carina which reaches the cervical sulcus; the continuation of this carina behind the sulcus is feebly undulating. The median carina of the pleon is rather variable on the sixth segment, the proximal division varying between two acute points and two that are more or less blunt.

The eyes in the preserved specimens are not dark purple but deep orange. In the second antennæ the small tooth of the scale is about at the middle of the outer margin. There are nine stout spines, besides some that are slighter, on the middle lobe of the first maxilla. On the terminal joint of the second maxillipeds there are six stout spines and a great many slender ones.

The first peræopods have the third joint produced into a tooth.

The second peræopod on the left side has the fifth joint (the carpus) divided into twenty compartments. That on the right side also appears to agree with Professor Smith's reckoning, according to which it should have twenty-three compartments. The fingers of the fourth and fifth peræopods are cleft, but the divisions seem to be of equal length and closely contiguous.

The branchiæ agree with the formula given by Smith and Alcock for *Glyphocrangon*.

The specimen specially examined for this description measured 75 mm. in length. It contained the Bopyrid *Bathyggyge grandis*, Hansen, on the right side of the carapace. Another specimen was of just the same length. A third was 77.5 mm. long. A fourth was smaller than the other three. These four were dredged at the same station, Cape Point N.E. by E. $\frac{1}{4}$ E. 40 miles; depth 800-900 fathoms; bottom, green mud. A specimen 88 mm. long was obtained at about 800 fathoms depth, Cape Point N. 70° E. 40 miles. At each of two other stations, but at the same locality and depth as the station first mentioned, a single specimen was obtained, each measuring 75 mm. in length.

GLYPHOCRANGON LONGIROSTRIS (Smith).

1882. *Rhachocaris longirostris*, S. I. Smith, Bull. Mus. Comp. Zoöl. Harvard, vol. x., p. 51, pl. 5, fig. 1, pl. 6, fig. 1.
 1884. *Glyphocrangon longirostris*, Smith, Rep. U.S. Fish. Comm. for 1882, p. 365.
 1886. *Glyphocrangon longirostris*, Smith, Rep. U.S. Fish. Comm. for 1885, p. 655 (51), pl. 8, figs. 1, 2, pl. 9, figs. 3, 4, 5.

Eyes long retaining a purple hue. Between this and the preceding species there are two tolerably clear distinguishing features. Behind the large antennal and antero-lateral spines, the carina ends in a single anterior tooth, the after part having no further dentation. The side-plate of the fifth pleon segment has its lower margin cut only into two teeth, not three. What may be the true systematic value of these two characters remains somewhat uncertain. In his later account of the species Professor Smith says, when speaking of the teeth or spines on the lower margin of the pleon segments, "there is usually no posterior spine on the fifth." As apparently he had only four specimens in all, it may be surmised that one out of the four had a posterior or third tooth on the fifth pleon segment. The proximal division of the median carina of

the sixth pleon segment in this form is simple, without division into two, whether teeth or tubercles.

By depending on a minute system of comparative measurements one might perhaps in this genus find several species upon specimens very closely connected in their actual origin.

A specimen 79 mm. long was procured at a depth between 750 and 800 fathoms, Cape Point N.E. by E. $\frac{3}{4}$ E. $38\frac{1}{2}$ miles; bottom, green mud. At the same locality, but in a different haul, a specimen measuring (with tip of rostrum broken) 92 mm. was obtained, this being a female with eggs, very much more bulky than the preceding. At a neighbouring station, Cape Point N. 77° E., depth 660 to 700 fathoms, bottom green mud, a similar female specimen was obtained, measuring 107 mm. in length. Lastly, a quite slender specimen, 74 mm. long, was obtained on similar ground, between 720 and 800 fathoms, Cape Point by D.R. N.E. $\frac{3}{4}$ E. 40 miles.

Practically all the specimens, both those assigned to *G. sculptus* and those to *G. longirostris*, were obtained in the same vicinity, on ground of one character, and at considerable depths. Professor Smith describes a female of *G. sculptus* 108 mm. long, and the same sex of *G. longirostris* 107 mm. in length. Should one of the species have to be cancelled, it is the latter that must fall, since *G. sculptus* has page precedence.

FAMILY PALÆMONIDÆ.

1905. *Palæmonidæ*, Coutière, Ann. Sci. Nat. Zool., Ser. 8, vol. xii., p. 249

In his treatise here cited, on "Les Palæmonidæ des eaux douces de Madagascar," Professor Coutière supplies a long bibliography of this family from de Haan in 1836 down to the year 1900.

GEN. MACROTEROCHEIR, nom. nov.

1891. *Palæmon* (*Macrobrachium*), Ortmann, Zool. Jahrb., vol. v., pp. 696, 733.

1897. *Macrobrachium* (sub-gen.), Ortmann, Revista do Museu Paulista, N. 2, p. 199.

1905. *Palæmon* (*Macrobrachium*), Coutière, Ann. Sci. Nat., Ser. 8, vol. xii., pp. 252, 267, 273, 287.

Spence Bate, in the Challenger Macrura, p. 788, 1888, reduces to a synonym of *Bithynis*, Philippi, the genus which, in 1868 (Proc.

Zool. Soc. London, p. 363), he had named *Macrobrachium*. In reviving the name for a sub-genus or "group," Ortmann does not appear to have included under it any of the species originally assigned to it by Bate himself. The first of these was *M. americanum*, which in Ortmann's system becomes *Palæmon* (*Brachycarpus*) *jamaicensis* (Herbst), and is named *Bithynis jamaicensis* by Miss Rathbun in 1901. Bate's *M. formosense* and *M. longidigitum* are referred to *Eupalæmon*, *M. africanum* is made a synonym of *Bithynis gaudichaudii* (Milne-Edwards). *M. gangeticum*, insufficiently described, is not mentioned, but would probably be referred to *Eupalæmon*. Under the circumstances the retention of the hybrid name *Macrobrachium* does not seem justifiable, and I have substituted for it a name implying that in this genus one member of the pair of large chelipeds decidedly exceeds the other in size.

Coutière says: "The group *Macrobrachium* is well characterised in general by the palm [of the second peræopods] compressed, oval, broader than the carpus at its distal end, which gives the most differentiated species of this group the aspect of Astacidæ (*P. lepidactylus*). The carpus and meropodite, each distally inflated, are in general nearly equal." He adds the caution that young forms, and also the adults of certain species, resemble species of *Parapalæmon* and *Eupalæmon* by the feeble compression and small breadth of the palm.

MACROTEROCHEIR LEPIDACTYLUS (Hilgendorf).

1878. *Palæmon lepidactylus*, Hilgendorf, Monatsb. Akad. Berlin, p. 838, pl. 4, figs. 14-16.

1891. *Palæmon lepidactylus*, Ortmann, Zool. Jahrb., vol. v., p. 735.

1905. *Palæmon* (*Macrobrachium*) *lepidactylus*, Coutière, Ann. Sci. Nat. Ser. 8, vol. xii., p. 272, pl. 10, pl. 11, figs. 13, 13a.

Coutière includes in the synonymy *Palæmon lepidactyloides*, de Man, 1892 (in Max Weber's Zool. Ergebn. Niederl. Ost-Indien, vol. ii., p. 497, pl. 29, fig. 51). The careful comparison which he institutes of a large number of specimens makes it fairly certain that there is no need for two specific names.

In a large dried specimen from the Durban Museum the rostrum has 13 teeth above and 2 below, its apex fully reaching the end of the peduncle of the first antennæ, the teeth not nearly reaching the middle of the carapace. The great left-hand cheliped has a total length of about 190 mm., the movable finger being 45 mm.

and the dorsal margin of the palm 40 mm. In bulk this appendage appears nearly to equal all the rest of the animal, which has a length of 140 mm., the carapace including rostrum being 60 mm. The outer ramus of the uropods is rather longer than the inner. The broad brushes of hairs within the concave finger and thumb of the smaller cheliped are a striking feature.

Another dried specimen measures 113 mm. in length, with large cheliped 134 mm. long, finger 33 mm. and back of palm 31 mm.; upper teeth of rostrum 13. From Umgeni lagoon (Natal). Durban Museum. A third specimen, from the Durban Museum and Durban waters, 140 mm. long, with 12 upper teeth on the rostrum, has the large cheliped on the right side, with the finger 38 mm. long, and back of palm only 25 mm.

GEN. EUPALÆMON, Ortmann.

1891. *Palæmon* (*Eupalæmon*) (group), Ortmann, Zool. Jahrb., vol. v., pp. 696, 697.
 1897. *Eupalæmon* (sub-gen.), Ortmann, Revista do Museu Paulista, N. 2, p. 196.
 1905. *Palæmon* (*Eupalæmon*), Coutière, Ann. Sci. Nat., Ser. 8, vol. xii., pp. 252, 266, 273, 287.

EUPALÆMON RUDIS (Heller).

1862. *Palæmon rudis*, Heller, Verh. Zool. bot. Gesell. Wien, p. 527.
 1866. *Palæmon rudis*, Heller, Reise Novara Crust., p. 114.
 1878. *Palæmon Mossambicus*, Hilgendorf, Monatsb. Ak. Wiss. Berlin, p. 839, pl. 4, fig. 17.
 1891. *Palæmon* (*Eupalæmon*) *rudis* (?), Ortmann, Zool. Jahrb., vol. v., pp. 699, 716.
 1891. *Palæmon* (*Macrobrachium*) *mossambicus*, Ortmann, Zool. Jahrb., vol. v. p. 741.
 1905. *Palæmon* (*Eupalæmon*) *rudis*, Coutière, Ann. Sci. Nat., Ser. 8, vol. xii., pp. 273, 288, pl. 12, figs. 23, 24.

The first of the above references I have not seen, and for the identification of Hilgendorf's species with the earlier name given by Heller I have been guided by Professor Coutière's discussion. He gives the following characters as distinctive of *E. rudis*. In common with other members of the group, sub-genus, or genus, it has the second pair of feet cylindrical, rarely unsymmetrical, fifth joint longer than the fourth, palm not depressed, cylindrical. In common with *E. idæ* (Heller) it has the carapace scabrous, but it has

the fifth joint of the second pair of feet shorter than the chela, not longer as in *P. idæ*, and for further distinction the fingers are not short but as long as the palm, armed with two rows of tubercles, and the chela covered with hairy felt. Hilgendorf himself recognised the close approximation of his species to Heller's *P. rudis*, but found the chelæ free from felt.

A specimen from Durban agrees with the characters given by Coutière, except that the felting appears to be almost completely worn off. The rostral carina, which reaches slightly beyond the outer tooth of the antennal plate, has 12 teeth above and 4 below. The flagellum of the second antennæ is 180 mm. long, the body of the creature having a length of 125 mm. The long chelipeds are almost exactly equal, the fourth joint 50, the fifth 70, and the sixth 110 mm. long. The finger has a length of 58 mm. The apices of finger and thumb are curved and cross one another, the inner margins otherwise in closure being closely applied.

Locality. Durban. Two much smaller specimens from the same waters appear to agree well with the one above noticed in general character.

SCHIZOPODA.

1885. *Schizopoda*, Sars, Challenger Schizopoda, Reports, vol. xiii.

FAMILY LOPHOGASTRIDÆ.

1885. *Lophogastridæ*, Sars, Challenger Schizopoda, Reports, vol. xiii., p. 13.

1905. *Lophogastridæ* (sub-order), H. J. Hansen, Bull. Mus. de Monaco, No. 30, p. 5.

1906. *Lophogastridæ*, Ortmann, Proc. U.S. Mus., vol. xxxi., p. 23.

GEN. GNATHOPHAUSIA, von Willemoes Suhm.

1875. *Gnathophausia*, von Willemoes Suhm, Trans. Linn. Soc. London, Ser. 2, vol. i., pt. 1, p. 28.

1885. *Gnathophausia*, Sars, Challenger Schizopoda, Reports, vol. xiii., p. 20.

1905. *Gnathophausia*, Holt and Tattersall, Ann. Rep. Fish. Ireland, 1902-3, pt. 2, App. 4, p. 123.

1906. *Gnathophausia*, Ortmann, Proc. U.S. Mus., vol. xxxi., p. 27.

Sars, who, by an obvious misprint, makes the date of the genus 1879 instead of 1875, gives a synopsis of nine species. Ortmann,

twenty-one years later, offers a synopsis still including the same number of species. The two lists are not in entire agreement, but very near to one another, although in the interval several species had been recorded in addition to those mentioned by Sars. Ortmann, however, disposes of them as follows. He regards *G. bengalensis*, Wood-Mason, 1891, as a synonym of *G. calcarata*, Sars, *G. brevispinis*, Wood-Mason and Alcock, 1891, and *G. dentata*, Faxon, 1893, as synonyms of *G. gracilis*, Suhm, and *G. drepanephora*, Holt and Tattersall, 1905, as the young stage of *G. gigas*, Suhm. He reduces *G. sarsi*, Wood-Mason, 1891, to a variety of *G. zoëa*, Suhm, and makes *G. willemoesi*, Sars, a synonym of that species, finally restoring the impaired total by himself instituting a new species, *G. scapularis*.

GNATHOPHAUSIA CALCARATA, G. O. Sars.

1883. *Gnathophausia calcarata*, Sars, Forh. Selsk. Christiania, No. 7, p. 5.
1885. *Gnathophausia calcarata*, Sars, Challenger Schizopoda, Reports, vol. xiii., p. 35, pl. 4.
1906. *Gnathophausia calcarata*, Ortmann, Proc. U.S. Mus., vol. xxxi., pp. 27, 30, pl. 1, fig. 2a-f.

The specimen has the antennal scale shaped exactly as figured by Sars for this species. There are, however, seven unequal teeth on the outer margin, where Sars speaks of five or six and Ortmann of three to six. The rostrum is broken, but the remaining proximal portion is consistent with an elongate termination. The lower hind angles of the carapace are produced as long serrate spines. The epimeral plate of the sixth pleon segment appears to be intermediate between those represented in Ortmann's figures 2c and 2d. Ortmann had the advantage of examining 40 specimens, ranging from 42 mm. to about 115 mm. in length, and he found considerable variation due to age in the ventral epimeral plate of the sixth pleon segment, so that it was only in old specimens that the bifid points of the epimera have the inner point much shorter than the outer. In *G. ingens* (Dohrn) the inner point is slightly the longer, but Ortmann supposes it possible that in very old females *G. calcarata* may assume this character, in which case the latter name would become a synonym of *G. ingens*, there being no other stable distinction between the two.

Length of specimen 62 mm., but had the rostrum been complete and as long as the rest of the carapace, the total length would have been at least 80 mm.

Locality. Cape Point, by D. R. N.E. $\frac{3}{4}$ E. 40 miles; depth, 720 to 800 fathoms; bottom, green mud.

STOMATOPODA.

FAMILY SQUILLIDÆ.

GEN. SQUILLA, Fabricius.

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

1902. *Squilla*, Stebbing, South African Crustacea, pt. 2, p. 43.

SQUILLA NEPA, Latreille.

1825. *Squilla nepa*, Latreille, Encycl. Méth. Hist. Nat., x., p. 471.

1894. *Squilla nepa*, Bigelow, Proc. U.S. Mus., vol. xvii., pp. 511, 535, fig. 21.

1903. *Squilla nepa*, Nobili, Boll. Mus. Zool. Torino, vol. xviii., N. 452, p. 23, and N. 455, p. 38.

A discussion of the synonymy is supplied in Dr. Bigelow's treatise. The question is rather complicated, for Latreille, by giving a reference to Herbst's figure of *Mantis digitalis* (Naturg. Krabben und Krebse, pl. 33, fig. 1), appears to identify his species with that represented by Herbst. The latter authority, however, does not claim a new species. He adopts the preoccupied *Mantis* as a substitute for *Squilla*, and then very sensibly remarks, "As I have given the generic name *Mantis* to this whole family, I have not been able to give that name to this single species. He thought it was out of the question to call a species *Mantis mantis*, and therefore in place of *Squilla mantis*, Auctorum, wrote *Mantis digitalis*. It is fairly certain that he confused a new species with the old one, but it cannot be positively affirmed that his figure represents Latreille's *Squilla nepa*. Dr. Bigelow points out that Latreille's original description covers two distinct forms, already carefully distinguished by Berthold in 1845, as respectively *S. nepa*, Latreille, and *S. affinis*. In regard to these he says, "As Berthold was the first to separate these species, we should undoubtedly follow his nomenclature, regarding the small-eyed form as *S. nepa*, Latreille, and giving his name *S. affinis* to the other. Berthold's description of the latter is very complete, is accompanied by measurements and figures, and was published years before de Haan's. I cannot see that de Haan had any warrant for replacing Berthold's name for this species by one of his own, and the latter should be dropped." As against this

last conclusion, however, it has to be considered that, though de Haan's description of his *Squilla oratoria* was not published till 1849, the named drawing of it (pl. 51, fig. 2) in the Atlas of the Crustacea Japonica antedates Berthold's paper. While giving the reference to Berthold's *S. affinis* as a synonym of *S. oratoria*, de Haan, the Dutch writer clearly makes this claim, when he says, "the name of the species on the long since published plate holds good." Certainly the distinguishing marks of *S. affinis*, so far as they are explained by Berthold and accepted by Dr. Bigelow, seem to be made sufficiently clear in de Haan's figure of *S. oratoria*. The principal points are that this species has large triangular eyes, with corneal axis oblique and at least as long as the peduncular axis, the median carina of the carapace not bifurcated for more than one-fourth of its length, and the finger of the raptorial claw with outer margin little or not at all sinuate. Dr. Nobili (*loc. cit.* 1903) describes a form from Nias and Singapore under the name *Squilla affinis*, Berthold, var. *intermedia*.

Squilla nepa, as described by Dr. Bigelow, has very small eyes, the corneal axis at right angles to the peduncular and about three-fourths its length, the median carina of the carapace bifurcate for nearly or more than half its length, and the finger of the raptorial claw deeply sinuate on its outer margin. The specimen sent me from the Durban Museum agrees with these and other characters given by the same author. The first three exposed thoracic segments are variously bilobed at the sides. The distal border of the telson has between the six marginal spines on each half three submedian, ten intermediate, and one lateral denticle.

Length of specimen, from front of rostrum to a point level with apex of hindmost telsonic spines, 145 mm. A second specimen, dried, is 155 mm. long, with intermediate spines 8 and 9 in number.

Locality. Durban.

ISOPODA GENUINA.

TRIBE FLABELLIFERA.

FAMILY EURYDICIDÆ.

1880. *Cirolanidæ*, Harger, Rep. U.S. Fish. Comm. for 1878, p. 304.
 1890. *Cirolanidæ*, Hansen, Vid. Selsk. Skr., Ser. 6, vol. iii., p. 275.
 1905. *Eurydicidæ*, Stebbing, in Herdman's Rep. Ceylon Pearl Fisheries, pt. iv., Isopoda, p. 10.

GEN. CONILORPHEUS, Stebbing.

1905. *Conilorpheus*, Stebbing, in Herdman's Rep. Ceylon Pearl Fisheries, pt. iv., Isopoda, pp. 11, 13.

For the reception of a second species the character of the genus must be slightly modified. In the type species, *C. herdmani*, the inner plate of the first maxillæ carries four plumose setæ. The form about to be described, however, has only three such setæ in accord with the more general custom of the family. Here also the process of the peduncle of the uropods is not exceptionally elongate.

In the Isopoda of the Pearl Fisheries Report a synoptic table of the Eurydicidæ distinguishes the genus *Hansenolana*, with head and trunk broad, from *Conilera* and *Conilorpheus*, with head and trunk narrow. But for the last genus the distinction must now be limited to the narrowness of the head, since the trunk of the new *Conilorpheus* is of considerable breadth.

CONILORPHEUS SCUTIFRONS, n. sp.

Plate XXXI.

The single specimen was difficult to figure and dissect on account of its condition. The front part as far as the fourth peræon segment was tolerably firm, but in preparation for sloughing, as the new mouth-organs could be seen within the old. The after-part of the specimen, on the contrary, was soft and papyraceous, evidently the result of recent exuviation.

The species is at once distinguished from *C. herdmani* by the width of the frontal plate, the broad trunk, the tuberculate ornamentation of peræon and pleon, and the narrower apex of the telsonic segment.

The head is less than half the width of the peræon, the rostral point obtuse, with the frontal lamina extending from below much in advance of it. The anterior margin of the plate is divided into three lobes, of which the middle one is the most advanced, the sides each with a small notch contributing to form a square escutcheon on a curved base narrowly attached to the epistome.

The first segment of the peræon is large, nearly encasing the head; its hinder angles are rounded. The next three segments are short, transversely marked with conspicuous lines; their side-plates are squarish. The fifth, sixth, and seventh segments are large, with more elongated side-plates, and each having a submarginal row of tubercles or denticles. Each of these little processes is furnished with a setule, to which is probably due the sharpened appearance

suggestive of a denticle, although the same object more highly magnified is quite obtuse. The third and fourth segments of the pleon, and the fifth, which is overlapped by the fourth, are similarly ornamented.

The telsonic segment has some fourteen tubercles symmetrically arranged, six in a triangular group near the base, and the rest in pairs. Its sides are strongly convex till near the depressed terminal portion, which is narrow, fringed with plumose setæ, and at the rounded apex carries six spines.

The eyes are oval, not very large, as wide apart as the dimensions of the head permit. The antennæ are short. In the first pair the second joint is stout, but only a little longer than the first or the narrow third; the tapering flagellum is eight-jointed, not quite so long as the peduncle. In the second pair the first three joints are short, the fourth stouter than the fifth but slightly shorter, the flagellum subequal in length to the peduncle, thirteen-jointed.

The cutting edge in the mandibles has slender teeth; there is a spine-row of four slender curved spines; the molar-plate is small, fringed with only about ten teeth. The smooth first joint of the palp is about as long as the curved and spinose third joint. The inner plate of the first maxillæ carries three setæ, the outer plate eleven spines, some of which are a little denticulate. The inner plate of the second maxillæ has several seta-like spines; the middle and outer plates have each four or five, one maxilla having the smaller number, the other the larger, on both plates. The maxillipeds have the second joint considerably longer than broad, not including the hook-bearing plate, which carries also three setæ. The large fifth joint is fringed with five setæ on the outer margin of one maxilliped, with only four in its companion.

The first gnathopod is robust, with four stout spines on the hind margin of the fourth joint, fifth joint triangular, sixth very convex in front, the finger stout, with a dark-coloured blunt nail, narrower than the trunk, of which the hind margin forms a squared tubercle just in advance of the nail. The second gnathopod and first peræopod are successively smaller, and differ from the first gnathopod by having the fifth joint more overlapped by the fourth, more squared, the sixth joint less widened, and the peculiarities of the finger less demonstrative. The following pairs of peræopods are of more slender structure, successively longer, with several slender spines, especially on the apices of the fourth and fifth joints. In all the finger has a small process with intervening setule in advance of the nail.

As in the type species, so here, the first pleopod has the inner

plate much narrower than the outer, and the second pleopod has the masculine appendix attached just above the middle of the inner margin of the inner ramus. It descends a little below the ramus, and here has the apex not acute, but rounded. The outer ramus of the uropod is fringed with setæ and has five spines on each margin. It is shorter than the inner ramus and only about half as broad. The inner ramus is fringed with about a dozen spines and numerous plumose setæ.

Length, about 7 mm.

Locality. Between Bird Island and mainland, in 10–16 fathoms.

The specific name alludes to the escutcheon-shaped frontal lamina.

FAMILY SPHÆROMIDÆ.

1902. *Sphæromida*, Stebbing, S.A. Crust., pt. 2, p. 64.

1904. *Sphæromida*, Stebbing, Gardiner's Fauna of Maldives and Lacc. Arch., vol. ii., pt. 3, p. 710.

1905. *Sphæromida*, Stebbing, Herdman's Rep. Ceylon Pearl Fisheries, pt. iv., Isopoda, p. 29.

1905. *Sphæromida*, H. Richardson, Bulletin U.S. Nat. Mus., No. 54, p. 270.

1905. *Sphæromida* (part), H. J. Hansen, Quart. J. Microsc. Sci., vol. xlix., pt. 1, p. 69.

1906. *Sphæromida*, Nobili, Bull. Mus. d'Hist. Nat., No. 5, p. 268.

The present occasion is not appropriate for giving a full bibliography of recent contributions to this family. Dr. Hansen has made it the subject of a highly important revision, dividing it in the larger sense into three sub-families—Limnoriinæ, Sphærominæ, Plakarthriinæ. In the second of these, with which we are here concerned, he distinguishes three groups—Sph. hemibranchiatae, eubbranchiatae, and platybranchiatae. It is to the purpose here to notice that in the first group Hansen accepts *Sphæroma terebrans*, Bate, *Exosphæroma gigas* (Leach), *E. lanceolatum* (White), and possibly *E. scabriculum* (Heller), but he regards my *E. validum*, and *E. setulosum* as respectively the young male and the female of a species of *Cymodoce*, to which genus he likewise refers my *E. amplifrons*. *Parasphæroma prominens*, Stebbing, is placed by Hansen in the third group.

With regard to Heller's species Hansen says: "In a species from Simon's Bay, at Cape, closely allied to or identical with *Sphæroma scabriculum* (Hell.), the end of abdomen in the female is as in *Exo-*

sphæroma, while in the male a notch, as in the male *Dynamenella* (compare the diagnosis below) is observed; the specimen described by Heller is evidently a male. The female of the species seen by me cannot be separated from *Exosphæroma*, while the structure in the male alluded to is very curious. For various reasons I omit this form from the conspectus, hoping to obtain more material of allied species" (*loc. cit.* p. 102). In a further note Hansen says: "The genera *Exosphæroma*, *Isocladus*, and *Zuzara* (with *Cyclodura* as a synonym) are so closely allied that the females can scarcely be separated, while it is easy to refer the adult males to their respective genera. When more species are known it will probably be necessary to unite them, preserving the name *Zuzara* for the genus. If that be not done, it will be necessary to establish a new genus for *Sphæroma scabriculum* (Hell.), and perhaps some other species" (*loc. cit.* p. 103).

GEN. SPHÆROMA, Bosc.

1802. *Sphæroma*, Bosc, Hist. Nat. Crust., vol. ii., p. 182.
 1905. *Sphæroma*, Stebbing, Herdman's Rep. Ceylon Pearl Fisheries, pt. iv., Isopoda, p. 31.
 1905. *Sphæroma*, Hansen, Quart. J. Microsc. Sci., vol. xlix., pt. 1, p. 115.

SPHÆROMA TEREBRANS, Bate.

1866. *Sphæroma terebrans*, Bate, Ann. Nat. Hist., Ser. 3, vol. xvii., p. 28, pl. 2, fig. 5.
 1904. *Sphæroma terebrans*, Stebbing, Spolia Zeylanica, vol. ii., pt. 5, p. 16, pl. 4.
 1905. *Sphæroma terebrans*, H. Richardson, Bulletin U.S. Nat. Mus., No. 54, p. 282.
 1905. *Sphæroma terebrans*, Hansen, Quart. J. Microsc. Sci., vol. xlix., pt. 1, p. 116.

There is a divergence of opinion between Miss Richardson and myself as to the distinctness of her species *S. destructor* from Bate's *S. terebrans*. Under the references given above, the arguments will be found fully stated for the opposing views. Hansen offers no decision.

Two specimens not distinguishable, as it seems to me, from those which Dr. Willey found in Ceylon, have been sent me from South Africa. Their depredations had been carried on at Gamtoos River bridge.

FAMILY LIMNORIIDÆ.

1850. *Limnoriadæ*, White, List of British Crust. in Brit. Mus., p. 68.
 1880. *Limnoriidæ*, Harger, Rep. U.S. Fisheries, part 6, p. 371.

GEN. LIMNORIA, Leach.

1814. *Limnoria*, Leach, Edinb. Encycl., vol. vii., p. 433.
 1904. *Limnoria*, Stebbing, Gardiner's Fauna Maldive and Laccadive Arch., vol. ii., pt. 3, p. 713.

Under the last reference a key is given to the four species of this genus.

LIMNORIA LIGNORUM (J. Rathke).

1799. *Cymothoa lignorum*, J. Rathke, Naturh. Selsk. Skr., vol. v., p. 101, pl. 3, fig. 14.
 1814. *Limnoria terebrans*, Leach, Edinb. Encycl. vol. vii., p. 433.
 1857. *Limnoria lignorum*, White, Popular Hist. Brit. Crust., p. 227, pl. 12, fig. 5.
 1904. *Limnoria lignorum*, Stebbing, Gardiner's Fauna Maldive and Laccadive Arch., vol. ii., p. 714.

Harger (*loc. cit.* p. 373) gives a synonymy of this species to the date of his work. The specimens sent me from the Cape, together with some of the timber they had been perforating, were obtained by Thomas Reeve, Esq., at Port Elizabeth. I have ascertained by dissection that they agree with the description and figures of the European species by Sars in his Crustacea of Norway. The maxillipeds have the lanceolate epipod shorter than the second joint, and the uropods have the little outer ramus unguiform. Harger figures these characters also for his North American specimens.

TRIBE VALVIFERA.

FAMILY ASTACILLIDÆ.

1897. *Astacillidæ*, Sars, Crustacea of Norway, vol. ii., p. 88 (*Arcturidæ*, p. 86).
 1901. *Astacillidæ*, Ohlin, Svenska Exp. till Magellanslånd, vol. ii., p. 265.
 1905. *Arcturidæ*, H. Richardson, Bulletin U.S. Nat. Mus., No. 54, p. 323.

1905. *Astacillidæ*, Stebbing, Herdman's Rep. Ceylon Pearl Fisheries, pt. iv., Isopoda, pp. 43, 46.

This family, as at present constituted, includes the genera *Astacilla*, Cordiner, 1793, *Arcturus*, Latreille, 1804, *Arcturella*, Sars, 1897, *Antarcturus*, zur Strassen, 1902, *Pleuoprion*, zur Strassen, 1903. *Arcturides*, Studer, has been transferred by Ohlin to a different family. In establishing *Arcturella* for his own *Astacilla dilatata*, Sars speaks of that as being "as yet the only known species of the genus." But I am inclined to think that both *Leachia nodosa*, Dana, 1849, and its close ally, *Arcturus corniger*, Stebbing, 1873, ought to be also referred to it, as well as *Arcturus damnoniensis*, Stebbing, already transferred by Norman in 1904. In 1902 zur Strassen transferred all the species from tropical and southern waters at that date reposing in the genus *Arcturus*, a score in number, to his new genus *Antarcturus*. If this cleavage be accepted, it will probably be followed by further generic subdivision, when some of the species have been described in more detail. Miss Harriet Richardson has given an analytical key to the North American genera of the family, among which *Arcturella* and *Antarcturus* are not included. In *Astacilla* and *Arcturella* the marsupium of the female is formed by a single pair of plates attached to the fourth peræon segment. In *Pleuoprion* Miss Richardson gives the character, "marsupium as in the genus *Arcturus*." But here a difficulty arises. According to Sars and Richardson, in *Arcturus* the marsupium is composed of three pairs of plates issuing from the second, third, and fourth segments of the peræon. Studer and Beddard, on the other hand, assign to this marsupium four pairs of plates, Studer in 1884 carefully figuring and describing the four pairs in the female of his *Arcturus furcatus*. This is in agreement with the new species about to be described. Unfortunately several species may have been assigned to *Arcturus* or *Antarcturus* without determination of this character. In such cases as those of Beddard's *Arcturus spinifrons* and *Arcturus myops*, when only males or what appeared to be males were obtained, such determination was obviously out of the question. Neither for *Antarcturus oryx* nor for *Pleuoprion chuni*, the typical species of his new genera, does zur Strassen give the number of the marsupial plates. It is therefore with some reserve that this character is employed in the following key:—

- | | | |
|----|---|------------------------|
| 1. | { Marsupium formed by one pair of plates—2. | |
| | { Marsupium formed by more than one pair of plates—3. | |
| 2. | { Fourth peræon segment much elongated | 1. <i>Astacilla</i> . |
| | { Fourth peræon segment not much elongated | 2. <i>Arcturella</i> . |

A. furcatus, Studer, in which, as already explained, the marsupium is so constituted.

The species *A. myops*, Beddard, with eyes that appear to be sightless, and *A. oculus*, Beddard, with eyes that are pedunculate, though the stalks are unjointed, in these respects stand apart from the rest of the group. *Arcturus longicornis*, Haswell, supposed to come from Tasmania, has a preoccupied name, and the same author's *Arcturus brevicornis*, from Australia, appears to be awaiting closer identification.

The species referred or referable to *Antarcturus* appear to be the following: *A. coppingeri*, Miers, 1881, *A. furcatus*, Studer, 1884 (1882), *A. glacialis*, *A. spinosus*, *A. anna*, *A. cornutus*, *A. spinifrons*, *A. purpureus*, *A. brunneus*, *A. abyssicola*, *A. myops*, *A. studeri*, *A. oculus*, *A. americanus*, *A. stebbingi*, all these thirteen instituted by Beddard in 1886, *A. tenuispinis* and *A. multispinis*, both established by Benedict in 1898, *A. patagonicus* and *A. kophameli* by Axel Ohlin in 1901, *A. caribbæus*, Richardson, 1901, *A. oryx*, zur Strassen, 1902, *A. polaris*, *A. adareanus*, and *A. franklini*, described by T. V. Hodgson in 1902, *A. simplicissimus*, *A. dentatus*, *A. alcicornis*, *A. nodosus*, *A. serrulatus*, published by Whitelegge in 1904, with *A. kladochoros* about to be described. To this formidable list should probably be added *A. floridanus*, Richardson, 1900, but, as this species was taken at Fernandina in Florida, above 30° North latitude, it far invades the zone which zur Strassen supposed to be devoid of Arcturi in the unrestricted sense of the term.

ANTARCTURUS KLADOPHOROS, n. sp.

Plate XXXII.

The species is not more spinose than several other members of the genus, some of which much surpass it in the length and strength of the spines they display. But none hitherto described have spines of the peculiar branching character here found, except *A. alcicornis*, Whitelegge, 1904, which, however, otherwise differs from the present species in several respects.

The head is squarely excavate in front, each of the lateral lobes carrying three or four small spines in advance of the dark red prominent faceted eyes, between which rise two simple and two multifid spines, while from the rear rise two long processes, blunt at the apex and branching into two spines and two blunt processes. The peraeon segments increase in width to the third and in length to the fourth, this last being twice as long as the third, but tapering backwards.

As in the head so in the peræon, the middle of the back is comparatively smooth, but other parts are armed with a multitude of very unequal spines, the largest occupying prominences on the flanks of the first four segments. In the first three there are also small subdivided spines nearer the middle, and the fourth has a notable pair of backward curving spines near its hind margin. The remaining segments of the peræon and the whole pleon are pretty well covered with little spines, some of which are much smaller than others. The pleon has two decided, but apparently quite unsutured, transverse dorsal furrows in advance of the telsonic segment. The latter carries no very strong spines, and slopes rather abruptly down to a smoothly rounded apex. The dividing line between the head and first peræon segment is well marked.

As noted by Beddard for other species, the side-plates of the fourth peræon segment here evidently help to support the ovigerous lamellæ. They here form a narrow strip directed obliquely backward, with a dentate process directed forward from the fore margin. In advance of these the segment displays a pair of little rounded wings.

The first antennæ have a spine-like tooth on the short broad first joint; the two following joints are much narrower than the first but not much shorter, together scarcely as long as the one-jointed flagellum, which has a couple of filaments at four or five points of the margin, and an apical group of four.

The second antennæ have a tooth process on the short first joint, a close set group of six such processes on the longer second, and seven or eight more sparsely arranged on the much longer third joint; the fifth joint is a little shorter than the fourth, both being very long and slender, with a few setules; the flagellum is five-jointed, about three-fifths as long as the last joint of the peduncle and longer than its first three joints combined. On one of these appendages there is a little apical tooth, which may represent a sixth joint.

The upper lip is somewhat unsymmetrical, with a decided emargination. The mandibles are robust, with the cutting plate quadri-dentate, the accessory plate at least in one mandible tridentate, the spine-row consisting of few spines, the molar powerful. The first maxillæ have three plumose setæ on the inner plate, and eleven spines on the outer plate of one maxilla, while on that of its partner there seemed to be only ten. The lower lip and second maxillæ are of the usual character. The maxillipeds have the second joint surmounted by a broad plate which seems to form two leaves; to what extent these are separated remains doubtful; on neither could

any coupling-hooks be perceived; the fifth joint of the palp is well developed, but blunt, not at all finger-like. The epipod is broad throughout, not lanceolate.

The first gnathopods are small, with a denticle high up on the second joint, the fourth joint short and bulb-like, the sixth nearly as long as the second, the finger broad, with its nail almost hidden among long serrate setæ. They carry marsupial plates folded within the following pair. The second gnathopods and first peræopods are similar to the second peræopods, but shorter and with small dentate side-plates. All three pairs carry very extensive marsupial plates. The second to the fifth joints are furnished with a variety of spine processes, the fourth having a specially blunt apical process. The fifth joint is as long as the second in the second peræopods, but exceeds it in length in the two preceding pairs of limbs; the sixth joint is slender, not so long as the fifth, and ends in a slender nail-like finger which is itself tipped by a long spine; the third to the sixth joints carry numerous long setæ.

The last three pairs of peræopods are as usual distinct in character from the preceding limbs, but similar one to another, although successively shorter. In the third peræopods the second joint is considerably longer than the sixth, but little or not at all longer than that joint in the two following pairs. This second joint is notable for its variety of spine-processes, among which are one or two that are blunt; the third joint is also armed, but the remainder are content with a few needle-like and feathered spinules and setules; the finger is rather robust, with a little tooth on the inner margin in advance of the nail.

The first pleopods have the peduncle armed along one margin with a long row of thirteen or more little glittering teeth, and on the opposite or inner margin with about eight hooked spines.

The uropods are diversified with numerous little denticles on the outer surface; the distal part of the hinge margin is fringed with plumose setæ. The exposed ramus is very small, rather broader than long, with a little subapical spinule; the concealed ramus is about as long, but less than half as broad, and has four graduated slightly curved spines on the distal margin.

The length of the specimen was 17 mm., not including the second antennæ, which also measured 17 mm.

The spots and dendritic markings, and the extraneous substances, including foraminifera, entangled among the processes of the body and limbs, cause some difficulty in distinguishing the number and shapes of the various ornaments.

Locality. Cape St. Blaize, N. by E. 73 miles; at a depth of 125 fathoms; bottom, sand and shells.

The specific name, meaning branch-bearing, from κλάδος, a branch, refers to the peculiar processes on the head and trunk.

In *A. alpicornis* Whitelegge describes two prominent spines on the frontal region of the head, each with an accessory spine immediately below, a stoutish bifurcated spine on each side of the first peræon segment, and four short antler-like spines on each of the second and third segments. Thus the pair of long antlered processes on the back of the head in the South African species are evidently not present in the Australian. In the latter the third joint of the first antennæ is only one-third as long as the second; the maxillipeds have large lanceolate epipods and the first two joints of the palp subequal; the first gnathopods have the finger curved; the sixth joint in the first and second peræopods is said to be progressively shorter than that of the second gnathopods, whereas in the African species this joint is as long in the first peræopods as in the preceding limbs, and the other differences are sufficiently shown by the drawings here given. Whitelegge's specimen, with second antennæ wanting, was an adult female, body about 10 mm. long. He describes at the same time four other new species of *Arcturus* from South Australia, three of which also have dentate limbs.

TRIBE EPICARIDEA.

1893. *Epicaridea*, Stebbing, History of Crustacea, p. 392.
 1897. *Epicaridea*, Hansen, Bulletin Mus. Comp. Zool. Harvard, vol. xxxi., p. 111.
 1898. *Epicaridea*, Sars, Crustacea of Norway, vol. ii., p. 193.
 1905. *Epicaridea* (or *Bopyroidea*), H. Richardson, Bulletin U.S. Nat. Mus., No. 54, p. 497.
 1906. "*Bopiridi*," Nobili, Acc. R. Sci. Torino, vol. xli. (extr.),

FAMILY BOPYRIDÆ.

1893. *Bopyridæ*, Stebbing, History of Crustacea, p. 408.
 1898. *Bopyridæ*, Sars, Crustacea of Norway, vol. ii., p. 195.
 1900. *Bopyridæ*, Bonnier, Travaux de la Station zool. de Wimereux, vol. viii., p. 218.

The name is still elastic. The limits of the family, which have been variously stretched and contracted, approach a settlement in

M. Jules Bonnier's authoritative work. Therein he accepts two divisions of the Epicaridea, called respectively Cryptoniscinæ and Bopyrinæ, thus using terminations commonly regarded as indicative of sub-families under which to group numerous families. To his Bopyrinæ he assigns the Dajidæ, Phryxidæ, Bopyridæ, and the Entoniscidæ, of which the first three were provisionally retained by Sars in the family Bopyridæ. The family is restricted by Bonnier to parasites in the branchial cavity of decapod crustaceans.

GEN. BATHYGYGE, Hansen.

1897. *Bathygge*, Hansen, Bulletin Mus. Comp. Zool. Harvard, vol. xxxi., p. 122.

1900. *Bathygge*, Bonnier, Travaux de la Station zool. de Wimereux, vol. viii., p. 290.

1905. *Bathygge*, H. Richardson, Bulletin U.S. Nat. Mus., No. 54, pp. 499, 537.

Hansen does not separate the generic from the specific characters. Bonnier says that the pleon of the female suffices to characterise the genus, as it has no side-plates, and the uropods, like the pleopods, are biramous.

BATHYGYGE GRANDIS, Hansen.

Plate XXXIII.

1897. *Bathygge grandis*, Hansen, Bull. Mus. Comp. zool., vol. xxxi., p. 122, pl. 6, figs. 2-2c.

1900. *Bathygge grandis*, Bonnier, Travaux zool. Wimereux, vol. viii., p. 291, fig. in text.

1905. *Bathygge grandis*, Richardson, Bull. U.S. Nat. Mus., No. 54, p. 537, fig. in text.

Hansen's account, on which the other two depend, was based on a male specimen and the fragment of a female. The latter consisted of the pleon with the terminal part of the peræon bearing three legs on one side and two on the other. They had occupied the branchial cavity of *Glyphocrangon spinulosa*, Faxon, taken from a depth of 676 fathoms, in lat. 21° 15' N., long. 106° 23' W.

That the South African specimens here figured belong to Hansen's genus and species seems exceedingly probable, although, as Hansen had only a portion of a female at his disposal and has not figured that portion, some element of doubt remains. The carapace of the African *Glyphocrangon* on the right side was enormously distorted by the swollen marsupium of its female tenant. Her eggs form

an immense mass, and owing to the very distended condition of the marsupium its first plates are more visible on the dorsal than on the ventral aspect. Also one or two of the lateral lobes are forced back over the head. As in Bonnier's genus *Orbione*, the peræon is of great breadth, the general outline of the body being almost circular. The rather small pleon is turned sharply to the left, with the first three segments very distinct. The remainder may be equally so, but their smaller size and pale colour make the observation difficult. The maxillipeds make a near approach to those figured by Bonnier for *Pleurocrypta hendersoni* and *P. porcellana*, and by Hansen for *Cryptione elongata*. The little unjointed palp is here rather thickly fringed with setæ on the inner margin. My dissection was not sufficiently successful to show the articulations displayed in Hansen's figure, so that my drawing does not distinguish the maxilliped itself from that hind border of the head which carries at its angle the two fleshy lobes represented.

The limbs of the peræon, though longer, are less robust in the female than in the male. The sixth joint is oblong with a slight curvature, the small palm having a little emargination almost masked by the tightly clasped finger.

Concerning the pleon, Hansen says: "Pleural plates not developed. The pleopods quite soft, of medium size, decreasing conspicuously in size from before backwards and attached to the lateral margin; each pleopod consists of a short peduncle and two lamellar oblong rami; the outer ramus much larger than the inner one. The uropods biramous; the outer ramus a little smaller than the outer of the fifth pleopod, the inner ramus very short, almost rudimentary. The pleopods are curled to such a degree that it would have been impossible without much construction to draw a sketch of the abdomen." Rashly, perhaps, in face of the last clause, I offer an outline of the pleon in dorsal view, so far as I have been able to make it out, for comparison with the verbal description.

The male was attached to the left side of the female, as shown in the figures, with his pleon adjacent to her third peræon segment, and his head placed on the right side of her uropods. The relatively great size of this sex, the incisions separating the segments of the peræon, the pleon without pleopods or uropods, the antennæ and mouth organs, the limbs with deeply concave palm, are all in agreement with Hansen's figures and description. Here the front margin of the head is evenly rounded, not flattened, as in Hansen's specimen; but the difference is trivial. Here the pleon on the underside shows a partial longitudinal and two transverse folds. Also there

is a little projecting point at the middle of the apical margin, and the sides are crenulate as if in reminiscence of earlier segmentation. But these characters, which Hansen does not notice, only became conspicuous after the pleon had been detached. The stilet-like mandible shows a microscopic serration at the distal end. The almost linear maxilliped has a terminal seta.

The male has a faint greenish tinge, as contrasted with the pallid colour of the female. The relation of these tints to the colours of the living animals is uncertain.

Size. The female measures 11 mm. in length, and about the same in breadth. The male attains the unusual length of 8 mm., with a breadth of 2.5 mm.

Locality. Cape Point N.E. by E. $\frac{1}{4}$ E. 40 miles; depth, 800-900 fathoms; bottom, green mud. In *Glyphocrangon sculptus* (S. I. Smith).

AMPHIPODA.

GAMMARIDEA.

FAMILY LYSIANASSIDÆ.

For the families in this tribe a general reference may be given to Das Tierreich, Lieferung 21, 1906. But continually additions are being made to the number of genera and species.

GEN. TRISCHIZOSTOMA, Boeck.

1853. *Guerinia* (preocc.), Hope MS., Costa, Fauna Reg. Napoli, Apr., 1853, p. 1.

1861. *Trischizostoma*, Boeck, Forh. Skand. Naturf., Möde 8, p. 637.

1893. *Guerinia*, Della Valle, Fauna und Flora des Golfes von Neapel, vol. xx., p. 775.

1905. *Guerinella*, Chevreux, Bull. Mus. Monaco, No. 35, p. 7.

1906. *Trischizostoma*, Stebbing, Das Tierreich, Amphipoda, p. 12.

The rather rare crustaceans for which Hope and Costa, in 1853, established the genus *Guerinia* present some remarkable and some still perplexing features. The original generic name being pre-occupied must be relinquished. In my opinion its place should be taken by *Trischizostoma*, which was independently defined by Boeck in 1861. That author thought it advisable to assign it to a distinct tribe, Prostomatae, which, however, he subsequently reduced to a family, Prostomatidæ. In the meantime Lilljeborg had named a

sub-family Trischizostomatina, for which Sars, in 1882, substituted the family name Trischizostomidæ, improved by Bovallius, in 1886, into Trischizostomatidæ. In the preface to the report on the Challenger Amphipoda (1888), I remarked that "the Prostomatidæ are in close relationship with the Lysianassidæ, and might, in my view, well be included in the older family." This opinion has been fully confirmed by Professor Sars in his "Crustacea of Norway," vol. i., p. 30 (1890). It is unfortunate that Boeck, Bovallius, and Sars, when discussing and figuring the species called *T. raschii*, by Boeck, appear to have been in ignorance of Costa's *Guerinia nicaensis*, so that they have expressed no opinion as to the identity or distinctness of the Norwegian and Mediterranean forms, which until recently I have regarded as specifically one. Della Valle, on the other hand, has separated them not only specifically but generically, substituting the name *Guerina* for the preoccupied *Guerinia*. He admits the great superficial similarity of the two forms, but in his contrasted generic definitions makes out a strong case for keeping them apart. Thus, *Guerina* has the mandibles with moderately broad trunk, the first maxillæ without inner plate and with the palp reduced to a little simple tubercle, the second maxillæ with the inner plate short, carrying a single setule, the maxillipeds with the first joint of the palp longer than the second, the first and second peræopods with the second joint much dilated. *Trischizostoma* has the mandibles with very narrow trunk, the first maxillæ with inner plate and with minute, slender, two-jointed palp, the second maxillæ with the plates subequal, the inner carrying various little setules, the maxillipeds with the first joint of the palp considerably shorter than the second, the first and second peræopods with the second joint not dilated.

Before attributing overwhelming weight to these differences, one must remember that the Scandinavian authors had, among adult examples of their genus, only females to examine, while the three specimens assigned by Della Valle to his genus were, he says, probably all males. The mouth-organs are very delicate in structure, and, as often happens in tubiform arrangements, not very easy to separate. When successfully drawn apart their appearance, after flattening out, is in some respects extremely different from that which they bore in their natural position. There is also scarcely any doubt that some of the details differ with the age of the specimen.

Some additional light may be thrown on the question by specimens from South Africa, which certainly require a new specific name, but

may rest contentedly in *Trischizostoma*, unless that genus be separated from *Guerina*. They have the monstrous eyes and huge peculiar first gnathopods which are so remarkable alike in *T. raschii* and *G. nicænsis*. They have the mandibles of the latter, the first maxillæ of the former. As to the first joint of the palp in the maxillipeds, they agree better with the latter than the former. But they differ from both in the shape of the side-plates to the second gnathopods and the first and second peræopods, in the second joint of the fifth peræopods and still more in the flattened leaf-like appearance of the sixth joint, and lastly in having the telson divided for two-fifths of its length. The specimens are certainly of the male sex, and perhaps not fully adult, as the torsion of the first gnathopods had not been effected or not completed. To have three genera for three (or possibly only two) species, which share characters so very notable, while the real or supposed differences refer chiefly to degraded mouth-organs, seems to me to be for the present unadvisable.

In the new species the first maxilla has a well-pronounced inner plate of slight texture, an outer plate with five spine-teeth on the apex, four of them much curved, and a small one- or two-jointed palp tipped with a long seta. For *T. raschii*, Boeck describes the first maxilla as consisting apparently only of the outer plate; Bovallius endows it further with a one-jointed palp, Sars alone awarding to it a slender unarmed inner plate together with "a very minute, but distinctly biarticulate" palp. The supposed absence of the inner plate cannot, therefore, be relied on for distinguishing Costa's species from Boeck's. It is clear that this small pellucid structure sometimes escapes observation under the difficulties of dissection. That the small palp is at first one-jointed, and later on biarticulate, is far from impossible. Bovallius gives the telson of the young male, "probably just out from the incubatory pouch of the mother," as having the apical margin excavate. Boeck also speaks of the telson as apically divided, but probably by a misprint, as his Latin text says that it is apically rounded. That the new species with an incised telson should stand in the same genus with one (or two) species in which the telson is whole-rimmed, agrees with what is found in another Lysianassid genus, *Onisimus*, Boeck.

TRISCHIZOSTOMA REMIPES, n. sp.

Plate XXXIV.

The head is almost entirely covered by the large dark eyes, broadest above, meeting in the medio-dorsal line, and leaving

unoccupied a small down-bent frontal space. The last two segments of the peræon are the shortest. The small first side-plates are all but completely concealed by the large second pair, which are horizontally ovoid with almost vertically truncate hind margin; the third are much shorter, but nearly as deep, subquadrate; the fourth similar to the third, with more rounded outline, and faintly emarginate behind. These are much at variance with the corresponding parts as figured by the authors named in the generic discussion. The fifth and sixth side-plates are bilobed. The postero-lateral angles of the third pleon segment are minutely dentate, with sinuous outline above the denticle. The fourth segment has a deep dorsal depression; the fifth is much shorter than the fourth or the sixth.

The first antennæ have a short stout peduncle, not longer than the long and broad first joint of the flagellum, which is thickly fringed with filaments and followed by ten slender joints, together scarcely as long as the accessory flagellum. This is scarcely shorter than the first joint of the primary, and is composed of one long laminar joint followed by a short linear one and a minute apical joint; in comparison with the primary flagellum it is much larger than that figured by Della Valle for *G. nicaensis*.

The second antennæ have the first three joints of the peduncle short, the fourth rather longer than any of them, but less than half as long as the slender fifth; the twenty-five jointed flagellum is scarcely as long as the peduncle.

The upper lip and the forward lobes of the lower lip are apically narrow, but below the apices they show considerable breadth when flattened out.

The mandibles in the rear part of the trunk afford a substantial base for the very large palp, but the front part of the trunk is feebly laminar, with truncate cutting edge and a microscopically tridentate accessory plate. Whether in the female the cutting edge becomes narrower remains to be seen. The second joint of the palp carries twenty-one long spines, and the rather shorter third joint twelve that are shorter, serrate, and more widely spaced. But these numbers are not constant, since in the smaller specimen examined they were respectively thirteen and seven.

The first maxillæ have been already described. It may be added that the outer plate is slightly contracted a little below the apex, and what I have suggested in the generic discussion as a possibility seems to be here clearly the case in regard to the palp. The smaller specimen shows a one-jointed palp surmounted by a single seta; the

larger specimen has a two-jointed palp carrying two setæ, one much longer than the other.

The second maxillæ appear to be of great tenuity, the plates apically rounded, the inner slightly the shorter, tipped with one curved setule, the outer carrying two such setules.

The maxillipeds have both the inner and outer plates of considerable breadth, though in position for forming the oral tube they seem very narrow. The first joint of the palp is relatively much longer than that which authors show in *T. raschi*. In our smaller specimen it is at least as long as the second joint, but in the larger specimen it is a little shorter than that joint, which is there the longest of the four, not the shortest, as in Della Valle's *G. nicænsis*. The third joint has a few spines and some fur-like armature on one margin; the fourth joint, subequal to it in length, is narrow and straight, having the apical part furnished with very fine outstanding hairs.

The first gnathopods scarcely, if at all, differ from those in the northern and Mediterranean forms. The enormous hand, as mounted for the microscope and figured in the plate, does not show the true extent at right angles to the spinose palm, because it refused to be fully flattened out. Possibly it was preparing for the curious torsion by which, in adults of this genus hitherto known, the great curved finger of the first gnathopods looks as if it were attached to the wrong end of the palm. The second gnathopods have the third joint much shorter than the fifth, in this respect strikingly differing from *G. nicænsis*, in which these proportions are reversed; the small finger is almost concealed among the spines of the sixth joint.

The second peræopods are somewhat shorter than the first, and have neither the second nor the fourth joint notably expanded. In the third and fourth pairs the second joint is broadly oval, larger in the fourth than the third pair. In the fifth pair the second joint is narrower, with the upper part forming a kind of neck; the fourth, fifth, and sixth joints are longer than in the preceding pairs, the fifth longer than the fourth and wider, with its lower front corner squared like the corresponding angle in the other peræopods; the sixth joint is longer than the fifth and slightly wider, forming a narrowly oval blade-like lamina, quite different from the sixth joint in the other peræopods and from that of the last pair in forms previously described. The finger is small. To this pair, as to the other peræopods and to the second gnathopods, there are attached large much-pleated branchial vesicles.

The pleopods have two little serrate coupling spines on the second joint of the peduncle, and several cleft spines on the inner ramus.

The uropods in the smaller specimen have their apices almost on a level; in the larger those of the first pair do not reach quite so far back as the other two; the outer branch in the first and second pairs is shorter and more serrate than the inner; the third pair have the branches laminar, much longer than the peduncle, the outer slightly the longer, with a little second joint, liable to wear and tear, which led Bovallius to believe that it was only a character of the young. All the margins appear to have a microscopic serration.

The telson is longer than broad, narrowing distally, the cleft between the rounded apices reaching up two-fifths of the length in the larger specimen, a little less in the smaller.

Length of smaller specimen 10 mm., of the larger 13 mm., 11 mm. from front of head to end of third pleon segment, and about 2 mm. from third pleon segment to end of telson.

Locality. The smaller specimen was taken off Buffalo Bay, S.W. by W. $\frac{3}{4}$ W. $3\frac{1}{2}$ miles, in 32 fathoms; the larger in lat. $33^{\circ} 9' 30''$ S., long. $28^{\circ} 3' 00''$ E., in 47 fathoms. From this latter station a very small specimen shows quite conspicuously the character of the last peræopods.

The specific name, meaning oar-footed, refers to the blade-like character of the fifth peræopods.

GEN. HIPPOMEDON, Boeck.

1871. *Hippomedon*, Boeck, Forh. Selsk. Christian, 1870, p. 102.

1906. *Hippomedon*, Stebbing, Das Tierreich, Amphipoda, pp. 58, 719.

HIPPOMEDON LONGIMANUS, Stebbing.

1888. *Platamon longimanus*, Stebbing, Challenger Amphipoda, Reports, vol. xxix., p. 643, pl. 13.

1906. *Hippomedon longimanus*, Stebbing, Das Tierreich, Amphipoda, p. 60.

In the South African specimen, as in the larger North Atlantic Challenger specimen, no trace of eyes was apparent.

The colour in spirit is pale greenish, with speckling observable under the microscope.

Length, 11 mm.

Locality. Table Mountain E. 41 miles; depth, 245 fathoms;

bottom, green sand. The Challenger specimen about 17 mm. long, was taken off Cape Finisterre at a reputed depth of 1,125 fathoms.

GEN. TRYPHOSA, Boeck.

1871. *Tryphosa*, Boeck, Forh. Selsk. Christian., 1870, p. 117.

1906. *Tryphosa*, Stebbing, Das Tierreich, Amphipoda, pp. 68, 720.

TRYPHOSA ONCONOTUS, n. sp.

Plate XXXV.

There are two features of rather particular interest in this species—the dorsal hook on the fourth pleon segment, and the accessory lobe on the branchial vesicles. The first of these may be compared with the furcate dorsal process on the same segment in *Pontoporeia femorata*, Kröyer, and with the arrangement in *Guernea coalita* (Norman). Hansen, in his description of the adult female, shows that the latter species is in fact provided with a sort of hook, the fourth pleon segment having, behind the dorsal depression, a high rounded carina, which is produced in front into a small rounded process. In *Acanthogammarus belkinii* (Garjajeff) each of the first four pleon segments has a dorsal process projected forwards.* The suggestion may be ventured that in all these cases a facility is provided for the male to hold the female firmly, in agreement with the explanation of the modified sixth pair of side-plates in the female of *Melita palmata* (Montagu). The accessory lobe with which the branchiæ are provided in the new species is not perhaps very unusual. Such a lobe is described and figured by Sars in the Crustacés d'eau douce de Norvège for *Gammaracanthus lacustris*.

Head with lateral angles acutely produced. Side-plates of pereon well developed, first not distally narrowed, first and second with minute denticle at lower hind angle, fourth excavate behind. Postero-lateral angles quadrate in second pleon segment, rounded in first and third. Fourth pleon segment with deep dorsal depression followed by an upturned triangular process directed forward so as sometimes to overlap the hind margin of the third segment.

Eyes not perceptible. First antennæ short, peduncle consisting of one rather bulky joint followed by two small ones, flagellum scarcely longer than peduncle, with nine joints, the first considerably the largest; accessory flagellum three-jointed. Second antennæ not

* In the Amphipoda *Gammaridea* of *Das Tierreich*, the name of Garjajeff's above-mentioned species is erroneously given as *balkirii*.

twice as long as the first, fourth joint about equal to the first three combined, fifth rather shorter, flagellum fifteen-jointed, longer than the peduncle.

The lips showed no exceptional character, unless the difficulty of detaching them from the oesophagus could be so accounted.

The mandibles have a prominent molar with denticulate circular crown. On the left mandible a very small strap-shaped accessory cutting plate is seen, and a spine-row of two very small spines. The inner plate of the first maxillæ carries two unequal setæ, the serrate spines on the outer plate and the spine-teeth on the long second joint of the palp are all very short. In the second maxillæ the outer plate is somewhat longer and broader than the inner. Both the inner and outer plates of the maxillipeds are rather long, the outer fringed on the inner margin with nine spine-teeth, of which the lower ones are distant and very small. This plate reaches beyond the second joint of the palp.

The gnathopods are not powerful. In the first pair the third joint is about as long as the fourth, the fifth rather longer than the sixth, which widens slightly to the very oblique palm. This is a little overlapped by the finger when closed. The tip of the finger has a small cap, which is also the case in the first and second peræopods. In the second gnathopods the third joint is considerably longer than the fourth, and the fifth than the rather stout sixth, of which the palm is faintly excavate. The small finger is apically bidentate. Whether the branchial vesicles of these limbs have an accessory lobe was not made out. The lobes attain their greatest development in the third and fourth peræopods. The marsupial plates of the specimen figured were very narrow.

The first and second peræopods are similar, slender throughout. The three following pairs have the second joint strongly expanded, but only feebly serrate. In the third and fifth pairs this joint is proximally almost as broad as the length, in the fourth pair its breadth is much more uniform and considerably less than the length. The fourth joint in the third pair is nearly as broad as long, otherwise all joints but the second are moderately narrow.

The pleopods have two little coupling hooks, a few cleft spines, and the branches about seventeen-jointed. The uropods have but few spines on the rami, which in each pair are subequal, longer than the peduncle only in the third pair; in this the outer branch has a well-marked second joint, and the inner branch is longer than the first joint of the outer.

The telson is divided nearly to the base, with a spine in the apical

notch of each division, and two spines near each outer margin, with a feathered setule near the upper one.

The specimen figured measured 7 mm. in length. Another specimen, measuring only 4.5 mm., had the marsupial plates less developed and the telson less narrowed apically.

Locality. Table Mountain E. 41 miles; depth, 245 fathoms; bottom, green sand. The specific name, from *ὄγκος* (hook), and *ῥῶτος* (back), refers to the dorsal process on the fourth segment of the pleon.

One specimen presents an appearance probably abnormal. The upper hind margin of the third pleon segment was in contact with the telson. When these parts were pulled asunder it was found that all the three terminal segments of the pleon were enclosed within the third segment, which showed through its pellucid integument the dorsal outline of the fourth in its natural condition, that is, with a rounded boss, deep cavity, and uplifted triangular process. The segments resisted endeavours to draw them into the open in a way that proved their position to be no result of accidental intrusion. The specimen measured 4 mm. from front of head to end of third pleon segment. The principal flagellum of the first antennæ is six-jointed, the flagellum of the second nine-jointed.

GEN. AMARYLLIS, Haswell.

1880. *Amaryllis*, Haswell, P. Linn. Soc. N.S. Wales, vol. iv., p. 253.
1906. *Amaryllis*, Stebbing, Das Tierreich, Amphipoda, p. 23.

Dr. Chilton has recently pointed out that the species which he described in 1885 as *Glycerina affinis* is in fact *Amaryllis macrophthalmus*, Haswell.

AMARYLLIS MACROPHthalmus, Haswell.

1880. *Amaryllis macrophthalmus*, Haswell, P. Linn. Soc. N.S. Wales, vol. iv., p. 253, pl. 8, fig. 3.
1885. *Glycerina affinis*, Chilton, P. Linn. Soc. N.S. Wales, vol. ix, p. 1036, pl. 47, fig. 1, a, b.
1902. *Amaryllis macrophthalmus*, G. M. Thomson, Ann. Nat. Hist., Ser. 7, vol. x., p. 463.
1905. *Amaryllis macrophthalmus*, Chilton, Tr. N.Z. Inst., vol. xxxviii., p. 267.
1906. *Amaryllis macrophthalma*, Stebbing, Das Tierreich, Amphipoda, p. 24.

The report on this species in the Challenger Amphipoda was based on a very small and obviously young specimen from Patagonia, com-

pared with a large female specimen from Australia. The specimens obtained by Dr. Gilchrist in South Africa include fully developed males and other individuals of which it is desirable that some notice should be taken.

In the mature male the eyes are very conspicuous by their dark colour and considerable size. They are rather broader above than below and are almost contiguous on the top of the head. The first antennæ have the first joint large with two blunt apical teeth, the second and third joints short, the principal flagellum rather stout, 28-jointed, the calceoli small, its first joint by far the largest, furnished with a brush of filaments; the secondary flagellum 8-jointed. The second antennæ have the first three joints very short, the fourth large, the fifth short, carrying a slender, calceoliferous, 74-jointed flagellum, which reaches beyond the pleon, making the whole of this pair between two and three times as long as the first pair.

The upper and lower lips are not easily detached one from the other. The upper lip appears to have a bilobed margin. The mandibular processes of the lower lip are long and narrow. In the mandibles the spines of the spine-row are excessively short, and the molar is a thin backward-directed roughly triangular plate, fringed with setules. The second joint of the palp is the longest, and this in its upper half is fringed with some 14 slender spines. M. Bonnier found no armature on this joint in his *A. pulchella*, nor did I in *A. bathycephalus*, *A. haswelli*, or the small specimen of *A. macrophthalmus*. It may be noted that the triturating organs, or cardiac folds of the stomach, are more circular than usual, and are fringed with slender spines. But this is no speciality of the male.

The first and second peræopods are distinguished by having the fourth and fifth joints fringed along the hind margin with long stiff setæ, which are not seen in the female or young male.

In the third segment of the pleon the postero-lateral notch is higher up than in the young. The third uropods have the subequal lanceolate rami fringed with long plumose setæ on the inner margin, and the inner ramus is fringed on the lower part of the outer margin.

A specimen, about 7 mm. long, presumably not fully adult, showed the following differences. The eyes were much more slender, uniform in breadth, pale in colour. The first antennæ have the two distal teeth of the first joint acute, the principal flagellum 26- or 27-jointed, with the first joint of much less length than in the other specimen, and the secondary flagellum seven-jointed. The second antennæ are no longer than the first, with a flagellum of

46 joints, most of them broader than long. The second joint of the mandibular palp had only four spines. The first and second peræopods were without the fringe of setæ. The third uropods showed little armature. But the telson was distinguished by a small tooth, produced backward, at the outer angle of each lobe, while in the more mature specimen the outer angle does not reach the rest of the apical margin.

Locality. Dredged between Bird Island and the mainland in 4-16 fathoms.

FAMILY AMPELISCIDÆ.

GEN. AMPELISCA, Krøyer.

1842. *Ampelisca*, Krøyer, Naturhist. Tidsskr., vol. iv., p. 154.

1906. *Ampelisca*, Stebbing, Das Tierreich, Amphipoda, pp. 98, 721.

AMPELISCA CHILTONI, Stebbing.

1888. *Ampelisca chiltoni*, Stebbing, Challenger Amphipoda, Reports, vol. xxix., p. 1042, pl. 103.

1905. *Ampelisca chiltoni*, Chilton, Trans. N.Z. Inst., vol. xxxviii., p. 267.

1906. *Ampelisca chiltoni*, Stebbing, Das Tierreich, Amphipoda, p. 102.

It should be noticed that this species bears great resemblance to the large Arctic form, *A. eschrichtii*, Krøyer, from which it is distinguished by having the postero-lateral angles of the third pleon segment subquadrate and minutely produced, instead of strongly produced and insinuate, and by having dorsal spinules on the telson, which are wanting in the northern form. *A. fusca* is another closely allied species, but with the first antennæ more strongly developed, and the hind lobe of the second joint in the fifth peræopods narrower and more strongly produced downwards than in *A. chiltoni*.

A specimen measuring 23 mm. from front of head to apex of telson, had first antennæ 7 mm. long and second antennæ 16 mm. This was a female carrying eggs, some of which were brown, others yellow. The back was sharply carinate from the sixth peræon segment to the fourth of the pleon, the latter segment having a strongly sinuous medio-dorsal outline. The branchial vesicles are pleated. The lenses of the eyes retain for long a scarlet rim in methylated spirit.

Locality. The specimen above described was taken in False Bay, Paulsberg, W.N.W. 1 mile; depth 24 fathoms. Another specimen,

taken in False Bay, Cape Point Lighthouse, W. $6\frac{1}{2}$ miles; depth, 37 fathoms, was 22.5 mm. long. The species was also dredged in 47 fathoms, lat. $33^{\circ} 9' 30''$ S., long. $28^{\circ} 3' 00''$ E. Dr. Chilton, in his report on "Crustacea from the Coast of Auckland," says of this species: "One imperfect specimen dredged off Great Barrier Island, at a depth of 120 fathoms, appears to belong to this species. I have also two specimens dredged off the Poor Knights Islands, in 40 fathoms, and two others collected in Kaipara Harbour by Dr. Cockayne, that certainly belong to it."

AMPELISCA FUSCA, Stebbing.

1888. *Ampelisca fusca*, Stebbing, Challenger Amphipoda, Reports, vol. xxix., pp. 1052, 1651, pl. 105.
 1893. *Ampelisca fusca*, Della Valle, Fauna und Flora des Golfes von Neapel, vol. xx., p. 483.
 1906. *Ampelisca fusca*, Stebbing, Das Tierreich, Amphipoda, p. 102, figs. 22-24.

The dark colour of the Challenger specimens, to which the specific name alludes, was probably due to the preservative employed. The specimens more recently received from the Cape show no such obfuscation, but retain, for a considerable period, brilliant colouring, red spots and broader markings on a green ground. The eyes have a bright red pigment and the antennæ a banded appearance. In the Challenger report the first antennæ are described as longer than the second, but the comparative dimensions are at any rate sometimes inverted. Also in the new specimens the fingers of the first and second peræopods have a less comparative length, and the fifth peræopods differ a little from the earlier account. The lower lobe of the second joint has its setigerous hind margin straight, or sometimes tending to be concave rather than convex, and the sixth joint is not so much narrowed apically as in my figure of it. Otherwise the agreement between the two sets of specimens is so minute as to leave no room for supposing any specific difference between them. One of the specimens measured 15 mm. in length.

Locality. Dredged Vasco de Gama Point, S. 75 E. $13\frac{1}{2}$ miles, at 166 fathoms.

AMPELISCA BREVICORNIS (Costa).

1853. *Araneops brevicornis*, A. Costa, Rend. Soc. Borbon., n. ser., vol. ii., p. 171.
 1891. *Ampelisca lævigata*, Sars, Crustacea of Norway, vol. i., p. 169, pl. 59, fig. 1.

1906. *Ampelisca brevicornis*, Stebbing, Das Tierreich, Amphipoda, p. 100.

The specimen here in question corresponds in all essentials with that species which Sars describes and figures under the name "*Ampelisca levigata*, Lilljeborg," 1855. Costa's name for it, though devoid of descriptive value, has the priority. Among the marked features of this species are the extremely small ocular lenses, the concave lower margin of the head, the strongly bisinuate margins and sharply produced postero-lateral angles of the third pleon segment, the fourth pleon segment with level carina behind the saddle-shaped dorsal depression, and the dorsal rows of setules on the telson. Our specimen, which is a male, considerably exceeds the size given by Sars, being 17 mm. long, whereas Sars says, "length of adult female 12 mm., of male about the same." Its colouring (in spirit) is a uniform pale green. The first antennæ are 8 mm. long, the second joint of the peduncle the longest, fringed below with numerous tufts of setules, the third joint very short, widening distally, the long slender flagellum more than twice as long as the peduncle, reaching a little beyond the peduncle of the second antennæ, and having the first joint peculiarly shaped, at first narrowing rapidly and fringed below with a brush of filaments, and again slightly widening to the apex. The second antennæ are 17 mm. long, the penultimate joint of the flagellum much longer than the ultimate, both fringed above with little tufts of setules.

Locality. Fresh Bay, Roman Rock, N.W. $\frac{3}{4}$ W. $\frac{3}{4}$ mile; depth, 18 fathoms; sand and shells and rough ground. A much smaller specimen, but similar in colouring, was taken at the Station, Table Mountain, E. 41 miles; depth, 245 fathoms; bottom, green sand.

GEN. BYBLIS, Boeck.

1871. *Byblis*, Boeck, Forh. Selsk. Christian., 1870, p. 228.

1906. *Byblis*, Stebbing, Das Tierreich, Amphipoda, p. 111.

The new species differs from the ten species of this genus distinguished in *Das Tierreich* in that the third uropods reach beyond the first and second pairs by the whole extent of the rami, and in that the telson, which is considerably longer than broad, is very deeply cleft. The character of the third uropod and that of the telson must, therefore, in each case be modified by insertion of the word *usually* in the generic definition. It is a matter of convenience, and not of necessity, to use these parts in discriminating *Byblis* from

Ampelisca and *Haploops*. They can easily be discarded, should they through fresh discoveries cease to be useful for their original employment.

BYBLIS ANISUROPUS, n. sp.

Plate XXXVI.

The first four segments of the peræon are short, the side-plate of the first broadly produced forward with fringed margin, that of the fourth segment narrowly produced backward; the three following segments are much larger. The first three segments of the pleon are large, with the postero-lateral corners rounded; the fourth segment is dorsally raised in a sharp nasiform projection above the compound segment which has a dorsal depression and the dorso-lateral edge rounded on each side as it approaches the telson.

The lower corneal lenses project beyond the margin of the head. Both pairs are backed by dark masses of pigment, and to the rear of the upper pair are also small patches of pigment, perhaps such as have suggested the idea of a third pair of eyes in *Ampelisca rubella*, Costa.

The first antennæ have a short peduncle, the joints successively decreasing, with a flagellum of 17 or 18 joints, more than twice as long. The second antennæ are longer than the whole body, the peduncle rather longer than the first antennæ, the gland-cone of the second joint acutely projecting, the fifth joint long, but shorter than the fourth, the flagellum of about 45 joints with long setæ.

Upper lip with emargination scarcely perceptible. Spine-row of mandibles containing 8 furcate spines, the right mandible without accessory cutting plate. The inner plate of first maxillæ with one seta on each side a little below the apex; the outer plate carrying 11 spines in one of the pair, but apparently only ten in the other; the long second joint of the palp having 4 spines on its indented apical margin.

The gnathopods have the usual abundant furniture of the fifth and sixth joints, the fifth being considerably longer in the second pair than in the first. The finger has a fringe of spinules on the inner margin.

In the first and second peræopods the fifth joint is short and stout, decidedly shorter than the tapering sixth, and equal in length to the finger. The third peræopods have the second joint strongly convex in front, considerably broader than long. In the fourth pair this joint is but little broader than long. In the fifth pair the second joint is produced nearly to the end of the fourth, behind which it is

greatly widened, with the setose lower margin sinuous; the fourth joint is produced some way down behind the fifth, which is short and broad, but longer than the sixth, this in turn being longer than the spine-like and spine-tipped finger.

The pleopods have two slender coupling hooks on the peduncle and four cleft spines on the first joint of the inner ramus.

The first uropods have the peduncle longer than the rami, of which the outer is the longer, armed with two little spines; the inner ramus has a single spine near the middle. The second uropods have rami longer than their peduncle, the outer unarmed, the inner not much shorter and carrying two little spines. In length they are intermediate between the rami of the first pair. The third uropods have the rami considerably larger, longer than their peduncle, the outer fringed with setæ, the inner a little shorter, armed with some setæ and a row of spines. The telson, subequal in length to the peduncle of the third uropods, is considerably longer than broad, cleft for about five-sixths of its length, tapering from near the base to the slightly divergent spine-tipped apices, and furnished on the surface with setæ and spinules. It differs in shape, armature, and extent of cleavage from species of the genus hitherto described.

Length of the specimen figured, 7 mm.; another specimen measured 10 mm.

Locality. Lat. 33° 9' 30" S., long. 28° 3' 00" E.; depth, 47 fathoms.

The specific name alludes to the inequality of the uropods, of which the third pair, contrary to the custom in the genus, reach beyond the other two pairs by the whole extent of the rami.

FAMILY PHOXOCEPHALIDÆ.

GEN. HARPINIA, Boeck.

1876. *Harpinia*, Boeck, Skand. Arkt. Amph., vol. ii., p. 218.

1906. *Harpinia*, Stebbing, Das Tierreich, Amphipoda, pp. 140, 723.

HARPINIA EXCAVATA, Chevreux.

1887. *Harpinia excavata*, Chevreux, Bull. Soc. Zool. France, vol. xii., p. 568.

1900. *Harpinia excavata*, Chevreux, Résult. Camp. Monaco, vol. xvi., p. 37, pl. 6, fig. 1.

1906. *Harpinia excavata*, Stebbing, Das Tierreich, Amphipoda, pp. 142, 723.

In the earlier account of this species Chevreux says that the

palm of the second gnathopod carries a long sharp tooth at its hinder angle, and a second tooth, stout and short, at its middle. In the later account, which is fortified by a figure, this palm is described as deeply excavate, forming with the hind margin a sharp, very salient angle, armed with a long spine. Nothing is said about a second median tooth. It is with this later account that our specimen agrees. A distinguishing feature of the species is the great length of the sixth joint in the long fourth peræopods. In the fifth peræopods the second joint has the front margin protruding below and there furnished with a few long plumose setæ, and behind the broad expansion of this joint is crenulate with great minuteness. These characters it shares to some extent with *H. abyssi*, Sars, but in that species the postero-lateral angles of the third pleon segment are rounded, while here they are produced into a strong tooth. According to Chevreux the inner branch of the third uropods is almost as long as the two-jointed outer branch. In the South African specimen it is in fact quite as long.

Length of specimen, 5 mm.

Locality. Table Mountain, E. 41 miles; depth, 245 fathoms; bottom green sand.

GEN. PONTHARPINIA, Stebbing.

1897. *Pontharpinia*, Stebbing, Trans. Linn. Soc. London, Ser. 2, vol. vii., p. 32.

1906. *Pontharpinia*, Stebbing, Das Tierreich, Amphipoda, p. 145.

Among the characters of this genus given in *Das Tierreich* I have included the following: Hood obtuse, eyes distinct, palp of mandible slender, with third joint shorter than second, first and second gnathopods similar. The new species which I now propose to include in the genus has the hood produced to an extremely acute apex, uncinately deflexed; the mandibular palp is not specially slender and its third joint is equal in length to the second; also the first and second gnathopods (in the female) are dissimilar. The species *Phoxus uncirostratus*, Giles, referred by Della Valle and A. O. Walker respectively to *Phoxocephalus* and *Leptophoxus*, is set down in *Das Tierreich* as an uncertain member of *Pontharpinia*. *Phoxus geniculatus*, Stimpson, ought, as I now think, to have received the same treatment. Giles says concerning his species: "although I carefully dissected the head of one specimen, I could make out no trace of eyes." Stimpson attributes "eyes white" to his species, and in the one here to be described they are dark

reddish, still after long preservation in spirit. In general appearance there is an extraordinary resemblance between the specimen from South Africa and the figure which Dr. Giles gives of his species from the Bay of Bengal. Besides the want of eyes, however, that species offers another distinction shown in a detail figure and clearly noted in the description, namely, that in the third uropods "the inner ramus is considerably shorter than the first joint of the outer." In our species the inner ramus is nearly as long as the first joint of the outer. In regard to the mouth-organs of the Indian species, some of the detail figures and statements must be attributed to the use of inadequate apparatus. The palp of the mandible, for example, is said to be two-jointed. The palp of the first maxilla is figured as one-jointed. It is not easy to believe that such differences could coexist with the remarkable likeness which the head and peræopods show to those of our species. Stimpson's description of his Japanese species is very brief, but contains one noteworthy expression—"rami of the posterior caudal styles unequal, the outer ones long, three-jointed"—with which I may compare my own preliminary note on the South African specimen, uropod 3, outer branch much longer than inner, the spination giving it an almost three-jointed appearance. Stimpson gives white as the colour of his species, and Giles describes his as of a uniformly dirty-white colour. The African specimen attracted attention by the conspicuous red of some parts, while others were white. But this is not necessarily differential, if we consider the account given by Dr. Giles of his species *Parapleustes pictus*, in which the red and white are variously distributed in different specimens, which were "found crawling upon a *Penatula*, the pink and white colours of which are almost exactly imitated in the amphipod" (J. Asiat. Soc. Bengal, vol. lix., p. 71).

PONTARPINIA STIMPSONI, n. sp.

Plate XXXVII.

Head elongate, rostral part broad till near the apex, which is drawn out to a very fine point curving downwards. Of the peræon segments the second is the shortest. First side-plate with rounded front produced forward, fourth much the largest. Third pleon segment with postero-lateral corners rounded and a row of setæ carried obliquely from the corners almost across the surface; fifth and sixth segments small.

Eyes small, irregularly oval, dark red, placed wide apart just behind the post-antennal corners. First antennæ with first joint large,

much longer than second and third joints combined, carrying a subapical feathered seta; second joint small, much larger than third; primary and accessory flagella on one side respectively with 18 and 15 joints, on the other side each with 17 joints, the primary nearly as long as the peduncle, the accessory a little shorter. Second antennæ with first two joints obscure, the third having at the end of the lower margin a small squared process fringed below with setæ and marked off above by a suture; the fourth joint longer, armed with spines and setæ, the fifth narrow, shorter than the third; the flagellum 21-jointed, rather longer than the peduncle.

The left mandible having cutting edge and accessory plate obscurely dentate, spine-row of 10 small spines, feeble molar carrying one or two spines, palp with rather broad second joint unarmed, not longer than the third joint which carries a few spines near the base and several fringing the obliquely truncate apex. The right mandible appears to differ only by want of an accessory plate. The palps *in situ* lie close together under the rostrum. Lower lip with inner plates conspicuous, the outer lobes wide apart. The first maxillæ with short, wide inner plate carrying three setæ on inner margin of the rounded apex; outer plate apically armed with 11 spines, some of them denticulate, the two-jointed palp long, fringed with 7 slender spines along the apical margin, which is so oblique as almost to look like part of the inner lateral edge. The second maxillæ with both plates broad, spinose, the outer the longer, with short spines along its outer margin. The maxillipeds have the inner plates fringed along the broadly truncate apex and distal part of inner margin with long setæ, without visible spine-teeth. The outer plates are narrow, not reaching the end of the palp's first joint, and carry four spines on the inner margin. The palp is very elongate, the second joint the largest, the third narrowly oval, produced slightly beyond the base of the narrow curved finger, which ends in a thin nail or spine.

The first gnathopods have a fusiform fifth joint, longer than third and fourth joints combined, but shorter and much narrower than the sixth, which is much longer than broad, widening to the squared space which with its palmar spine defines the otherwise convex palm. The finger is slender, curved, matching the palm, with small hyaline cap over the pointed apex. The second gnathopods agree with the first in regard to shape of palm and finger, but differ strikingly in some respects, the sixth joint being very much larger, nearly as broad as long, with the palm more oblique, while the fourth and fifth

joints are about equal in length and together form a sort of cup for the sixth joint.

The first and second peræopods are alike, having the fourth joint broad, nearly twice as long as the fifth, which is oval with the narrow end below, carrying two stout spines; the narrower but longer sixth joint is likewise armed with some stout spines, and the finger is very slender. The third peræopods have the second joint only moderately expanded, the hind margin straight, the front irregularly convex, fringed with setæ; the fourth joint as broad as the second, as broad as long, and like the two following joints well furnished with spines; the fifth joint rather longer, less broad; the sixth again longer, but narrow; the finger smoothly slender, curved at the tip. In the fourth peræopods the second joint is broadly oval, fringed with setæ in front, the fourth and following joints considerably larger than in the preceding pair, though rather similar in pattern, but only the fourth joint and not the fifth narrowing downwards. The small fifth peræopods have the hind margin of the second joint serrate; all the other joints are very small, from the fourth to the end successively shorter, the third, fourth, and fifth pressing close to the margin of the second. The branchial vesicles are simple. The marsupial plates in the specimen were narrow, probably not at full development.

The pleopods have groups of spines on the surface of the peduncles. The coupling spines are small, the rami subequal, the outer with about 18, the inner 14 joints. The first uropods have the peduncle subequal to the outer ramus, which carries four spines at and near the apex, while the rather shorter inner ramus has five spines along the inner margin and a stout one at the apex; the second are shorter, with spines along the inner margin of peduncle and each ramus; the third have the peduncle not longer than that of the second pair, but the narrow two-jointed outer ramus considerably longer than that of the first pair, the second joint rather long, half the length of the first, the inner ramus nearly as long as the first joint of the outer, both rami tipped and otherwise armed with many long setæ.

The telson is not longer than broad, the two halves closely united, with a spine at the outer part of each broadly rounded apex, and two feathered setæ high up on each outer margin. The telson is not so long as the peduncle of the third uropods.

Length, about 8 mm.

After long preservation in spirit the specimen above described was conspicuous among many different species by its crimson colouring,

generally diffused except on the end of the rostrum, the third to the sixth pleon segments, the flagella of the antennæ, the terminal part of the fourth peræopods, and the peduncles of the first and second uropods. A study of the figure will show that the colour distribution is probably adapted to the animal in a resting position. The parts naturally concealed under those circumstances are also uncoloured, namely, the mouth-organs, gnathopods, and first peræopods.

Locality. Dredged in lat. 33° 9' 30" S., long. 28° 3' 00" E., at 47 fathoms depth; and between Bird Island and mainland, 10–16 fathoms.

The specific name is intended to call attention to the species too briefly described by the eminent American naturalist.

FAMILY LILJEBORGIIDÆ.

GEN. LILJEBORGIA, Bate.

1861. *Iduna*, Boeck (preocc.), Forh. Skand. Naturf., Möde 8, p. 656.
 1862. *Liljeborgia*, Bate and Westwood, Brit. Sess. Crust., vol. i., p. 202.
 1862. *Liljeborgia*, Bate, Catal. Amph. Brit. Mus., p. 118.
 1906. *Liljeborgia*, Stebbing, Das Tierreich, Amphipoda, p. 230.

The name of this genus, coined in compliment to Professor Liljeborg, is often erroneously printed *Lilljeborgia*. But the fact that the Professor changed the spelling of his own name from Liljeborg to Lilljeborg does not justify a change in the scientific term.

LILJEBORGIA DUBIA (Haswell).

1880. *Eusirus dubius*, Haswell, P. Linn. Soc. N.S. Wales, vol. iv., p. 331, pl. 20, fig. 3.
 1888. *Liljeborgia haswelli*, Stebbing, Challenger Amphipoda, Reports, vol. xxix., p. 985, pl. 92.
 1906. *Liljeborgia dubia*, Stebbing, Das Tierreich, Amphipoda, p. 233.

The dorsal tooth of the sixth and seventh peræon segments doubtfully mentioned in *Das Tierreich* was not visible in the South African specimen, a small one, about 8 mm. long.

Locality. False Bay, Paulsberg W.N.W. 1 mile; depth, 24 fathoms; bottom, sand and shells.

FAMILY TIRONIDÆ.

GEN. TIRON, Lilljeborg.

1865. *Tiron*, Lilljeborg, N. Acta Soc. Upsal., Ser. 3, vol. vi., p. 19.

1906. *Tiron*, Stebbing, Das Tierreich, Amphipoda, pp. 275, 727.

The three species which the genus now includes may be distinguished as follows:—

- | | | |
|----|---|--|
| 1. | { First three segments of pleon dorsally unidentate; outer plate of maxillipeds with concave margin | 1. <i>T. thomsoni</i> , A. O. Walker. |
| | | { First three segments of pleon dorsally pluridentate; outer plate of maxillipeds with margin not concave—2. |
| 2. | { Sixth joint of peræopods extremely short; telson armed with numerous spines . . . | 2. <i>T. australis</i> , n. sp. |
| | | { Sixth joint of peræopods not extremely short; telson not armed with numerous spines . . |

The new species has interesting peculiarities of the first maxillæ, and is further distinguished from *T. acanthurus* by a different shape of the second joint in the fifth peræopods, but these features are less easy to observe than those above given.

TIRON AUSTRALIS, n. sp.

Plate XXXVIII.

The general appearance closely agrees with that of *T. acanthurus*, the head having a deflexed rostrum, the first three segments of the pleon being postero-dorsally pluri-denticulate, and the fourth and fifth each produced into a dorsal tooth, but here the tooth of the fourth segment is much the shorter. The sixth segment has a scarcely perceptible tooth, flanked on each side by two spines. The anterior side-plates are finely crenate, the first and fourth smaller than the second and third.

The upper eyes are closely adjacent at the top of the head, each composed of about ten cones, of which each lateral eye has only four.

The first antennæ have the third joint shorter than the second, and the second much shorter than the first. The flagellum is somewhat longer than the peduncle, 9-jointed in the female specimen, 7-jointed in the male, the first joint in the latter being distinguished by its superior length and setose armature. The accessory flagellum

is 6-jointed in the female, 5-jointed in the male specimen. The second antennæ have an 8-jointed flagellum, shorter than the peduncle.

The mandibles differ slightly one from the other, the accessory plate on the left being, as so often, the stronger; it is succeeded by a row of 10 spines, the number on the right mandible being apparently only 8. The molar is strong, the palp slender, its third joint half as long as the second, and armed only with three apical setæ. In the first maxillæ the inner plate is fringed with 9 plumose setæ, of which three at the apex are separated by a clear unarmed space from the other six. This is the case in both members of the pair, and could be seen in readiness for reproduction at the next exuviation. On the outer plate only 10 spines could be distinguished. The palp has a large second joint, much widened in its distal half, the apical margin fringed with 5 furcate spine-teeth and an outer spine-tooth which is serrate instead of furcate, with the serration on its inner side. In the furcate teeth the shorter tooth is the outer. The second maxillæ have the inner plate shorter but broader than the outer, with an oblique fringe of slender spines near the inner margin.

The gnathopods are scarcely distinguishable from those of *T. acanthurus*, the fifth joint long and slender, slightly tapering distally.

The peræopods are all alike in the shortness of the sixth joint, against which the small finger folds back closely, so that it becomes difficult to distinguish. Apparently it has a dorsal denticle. In all the pairs the fourth joint is larger than the fifth, this in the first and second pairs being but little longer than the sixth, but in the following pairs more and more surpassing it. In the third and fourth pairs the second joint is widely expanded, more so distally than proximally, but in the fifth peræopod this joint is widest proximally, and is roughly squared above, so as to differ much from the rounded appearance presented by the homologous joint in *T. acanthurus*. The marsupial plates of the female specimen are extremely narrow, their ovigerous function being probably aided by the long branchial vesicles.

The first and second uropods have the peduncle longer than the rami, which are nearly equal to one another in the first pair, but more unequal in the second, in neither very elongate. In the third pair the rami are much longer than the peduncle, the inner the shorter, fringed with long setæ, the outer carrying numerous spines.

The telson is subequal in length to the outer ramus of the third

uropod, cleft nearly five-sixths of its length, tapering, with a row of five or six spines standing up along the surface of each division, with accompanying setæ or setules, of which there are some also on the outer margins.

The male specimen is about 6 mm. long; the considerably larger female was about 8 mm. in length.

Locality. Lat. 33° 9' 30" S., long. 28° 3' 00" E., dredged in a depth of 47 fathoms.

The specific name directs attention to the southern origin of this form, which presents so many points of resemblance to the northern *T. acanthurus*, from which, however, it is separated by some very marked differences. A comparison with *Pseudotiron bouvieri*, Chevreux, from the Mediterranean, is also of interest, but there the organs of vision and the minute third joint of the mandibular palp supply characters of generic distinction.

FAMILY GAMMARIDÆ.

GEN. CERADOCUS, Costa.

1853. *Ceradocus*, Costa, Rend. Soc. Borbon., n. ser., vol. ii., p. 170.

1906. *Ceradocus*, Stebbing, Das Tierreich, Amphipoda, p. 430.

CERADOCUS RUBROMACULATUS (Stimpson).

1855. *Gammarus rubromaculatus*, Stimpson, P. Ac. Philad., vol. vii., p. 394.

1906. *Ceradocus rubromaculatus*, Stebbing, Das Tierreich, Amphipoda, p. 430.

Locality. Lat. 33° 49' S., long. 25° 56' E. Two specimens were dredged from a depth of 24 fathoms, on rocky ground. One of the specimens has the second gnathopods very unequal and dissimilar, but, as noticed in the report on the Amphipoda of the Challenger, this appears to be the case not unfrequently in this species.

GEN. ELASMOPOIDES, n.

Most of the superficial characters as in *Elasmus*, but (in female) first antennæ not longer than second, accessory flagellum elongate. Palp long in mandibles and maxillipeds. Inner plate on inner margin fringed with numerous setæ in first and second maxillæ. Second gnathopod powerful in female.

ELASMOPOIDES CHEVREUXI, n. sp.

Plate XXXIX.

Head not rostrate, obtusely produced at the sides. Back smooth, with saddle-shaped depression of fourth pleon segment. First side-plate the largest, broadly rounded at the produced front, fourth shallowly excavate behind, fifth and sixth each with a small front lobe curving backward. First three segments of the pleon with postero-lateral angles acute, a little produced, those of the third segment least so. Eyes dark, of peculiar shape, the broad lower part occupying the lateral lobes of the head, a narrower upper part ascending at right angles to the lower, so that the eyes are not far apart at the top.

First antennæ having two ridges on first joint, one ending in a spine, the other in a little tooth, second joint as long as first, third quite short, flagellum longer than peduncle, 42-jointed, accessory flagellum more than half as long as primary, 23-jointed. Second antennæ subequal in length to first, fifth joint of peduncle a little shorter than fourth, flagellum shorter than peduncle, 25-jointed.

Upper lip with front margin almost symmetrically rounded. Lower lip with principal lobes broad, inner plates well developed. Mandibles with cutting edge strongly toothed, secondary plate on left mandible stronger than that on right, teeth not prominent, spines of spine-row numerous, molar prominent, second and third joints of palp elongate, each with two rows of slender spines; the articular condyle between the molar and the palp very conspicuous. First maxilla with inner plate large, oblong, fringed on inner margin with very numerous setæ, outer plate with the spines crowded together, probably 11, some of them furcate; second joint of palp long, fringed with 7 apical spines, some of which are moderately stout, and 6 sub-apical, all slender. Second maxilla having the outer plate rather longer but narrower than the inner, fringed round the apex, the inner plate with a fringe along inner margin continued only a little way round the broad apex, and an oblique row of seta-like spines extending from near the apex to the proximal end of the marginal fringe. Maxillipeds with inner plates broad, fringed on inner and distal margins, the latter having three small spine-teeth at its inner part, outer plates not reaching middle of palp's long second joint, fringed with numerous spines and spine-teeth; fourth joint of palp long, finger-like, curved, finely spinulose on inner margin, as long as the third, shorter than the second joint.

First gnathopods. Second joint with a row of setæ on distal part

of front margin, third and fourth joints very short, fifth and sixth joints subequal in length, spinose on both margins, the broad hinder prominence of the fifth having pectinate spines as well as long smooth ones, the sixth with gently convex front margin, the long, finely denticulate palm forming a much stronger convexity with the hind margin, from which it is marked off by palmar spines and the cessation of the denticulation; finger smooth, curved, matching the palm.

Second gnathopods much stronger than the first; second to fourth joints nearly as in preceding pair, fifth joint short, cup-shaped, sixth massive, widening to the palm, which is finely denticulate on either side of a somewhat semicircular cavity of variable depth and defined by a strong tooth, within which the finger closes, inner edge submarginally setiferous, outer edge proximally indented at four points for minute spines; finger strong, curved, inner margin with a small projection over the palmar gap.

First and second peraeopods, slender, similar, but the first decidedly longer than the second, the second joint slightly curved, carrying long setae at some points of the hind margin; the finger short, abruptly truncate at junction with the small nail.

Third to fifth peraeopods stoutly built, fourth the longest, fifth longer than third; second joint with hind margin strongly dentate, especially and irregularly in the fifth pair, fourth and fifth joints broad, with numerous spines, the sixth narrow but also spinose, all these joints having the front margin flattened; finger not very large, with regular curve to the nail.

Pleopods. Peduncle large, with apical process, the coupling hooks slender; the rami narrow, outer the shorter, having in the first pair 24 joints, while its considerably longer companion is 23-jointed, with 4 cleft spines on inner margin of the first joint.

First uropods with peduncle subequal to inner ramus, outer rather shorter, all with spines at intervals; second pair with rather shorter but stouter peduncle, as long as the inner ramus, the outer notably shorter; third pair with short peduncle, carrying on the surface facing inwardly a row of spinules and a tubercle beset with spines and spinules; the rami broad, equal, strongly spined apically and on other parts; they are longer than their peduncle, but shorter than the other rami.

The telson is nearly as long as the peduncle of the third uropods, cleft to the base, the almost cylindrical halves somewhat divergent, with the truncate apices beset with terminal spines, the sides smooth except for a group of little spinules high up on the outer margin.

Length, from front of head to end of third pleon segment, 12.5 mm.; total length to end of telson about 15 mm.

Locality. Dredged in lat. 33° 9' 30" S., long. 28° 3' 00" E., at 47 fathoms' depth, the bottom consisting of sand, shell, and rock.

The specific name is chosen out of respect to Monsieur Ed. Chevreux, who during many years by pen and pencil and active research has rendered distinguished service to our knowledge of the Amphipoda.

FAMILY AORIDÆ.

GEN. AORA, Kröyer.

1845. *Aora*, Kröyer, Naturhist. Tidsskr., Ser. 2, vol. i., p. 328.

1906. *Aora* Stebbing, Das Tierreich, Amphipoda, p. 587.

AORA TYPICA, Kröyer.

1845. *Aora typica*, Kröyer, Naturhist. Tidsskr., Ser. 2, vol. i., p. 328, pl. 3, figs. 3 a-l.

1906. *Aora typica*, Stebbing, Das Tierreich, Amphipoda, p. 587, fig. 101.

Both sexes of this widely distributed species have been taken in South African waters. It has passed under a variety of generic and specific names in the writings of several authors, myself included. It is satisfactory to find that the Rev. Canon Norman (Ann. Nat. Hist., Oct., 1907) agrees with the decision set forth in *Das Tierreich* that there is really only one species at present known in the genus.

Locality. The specimens with which we are here concerned were obtained, with other rarer Amphipoda, at a station described as Table Mountain E. 41 miles; depth, 245 fathoms; bottom, green sand. As the species is familiar close inshore, and no closing apparatus was used in its capture, there is no guarantee that it was not taken at the surface rather than at any considerable depth.

FAMILY PHOTIDÆ.

GEN. EURYSTHEUS, Bate.

1857. *Eurystheus*, Bate, Ann. Nat. Hist., Ser. 2, vol. xix., p. 143.

1906. *Eurystheus*, Stebbing, Das Tierreich, Amphipoda, pp. 610, 738.

EURYSTHEUS HOLMESI, n. sp.

Plate XL.A.

Fourth pleon segment dorsally tridentate, the median tooth smaller than the others, fifth segment with a dorso-lateral tooth on each side. Head with lateral lobes not strongly produced, the apex acute. First side-plate produced a little forwards, second to fourth with lower angles rounded, fifth as deep as fourth in front, its hind lobe shallow, sixth also bilobed with smooth lower margins. First to third pleon segments with postero-lateral angles produced to a small point.

Eyes red (in spirit), placed close to apex of the lateral lobes of the head. First antenna with stout first joint, shorter than second, equal in length to the third; accessory flagellum 6-jointed, rather longer than third joint of peduncle, principal flagellum imperfect. Second antenna with fourth and fifth joints subequal, each shorter than the 10-jointed flagellum.

Mouth-organs characteristic of the genus. Epistome pointed. Mandibular palp with 3rd joint widened, setose. Inner plate of first maxilla apparently with few setæ. Fourth joint of palp in the maxillipeds narrow.

First gnathopod slight in structure, 5th joint a little longer than the somewhat fusiform 6th. Finger in the specimen examined apparently dwarfed and malformed on one gnathopod, both hand and finger missing on the other by mutilation.

Second gnathopod large and powerful. The second joint not very elongate, channeled in front, fourth short, oblong, fifth cup-shaped, on the outer side very short, and not very long on the inner, sixth muscular, much longer than broad, front margin smooth, hind short, carrying slender spines at five points and ending in a tooth, which is slightly overlapped by the apex of the elongate finger. The long palm from a smooth curve near the finger-hinge develops a tooth followed after a short interval by one less large, and after a longer interval by a third more prominent, whence a long slope leads to the small palm-defining tooth. The finger on the proximal half of its inner margin has four or five minute teeth or serrations.

The first and second peræopods are of the usual form, with cement glands well developed. The third and fifth pairs are much shorter than the fourth, all three being distinguished in the second joint by the irregular denticulation of the hind margin, which is slightly sinuous in the fourth and fifth pairs, but forms a strongly produced lobe proximally in the third pair.

The pleopods are furnished with coupling hooks and cleft spines. The rami are slender, about ten-jointed.

The uropods in each pair have the rami nearly equal to one another and to the peduncle, the first pair being the longest, and the third much the shortest. The telson is broader than long, shorter than the peduncle of the third uropods, its sides very convex above, the distal margin truncate on the ventral surface, dorsally having a rounded emargination and spines on each blunt apex.

Length, from head to fourth pleon segment, 5 mm.

Locality. Dredged between Bird Island and mainland, in 10–16 fathoms.

The quadridentate palm of the second gnathopods and the peculiar hind margin in the last three peræopods are very distinctive marks of this species. The superior length of the fourth peræopods is rather unusual.

The specific name is chosen in compliment to Dr. S. J. Holmes, Ph.D., in recognition of his careful and beautifully illustrated work on *The Amphipoda of Southern New England* and other valuable labours in this branch of research.

EURYSTHEUS ATLANTICUS (Stebbing).

Plate XL.B.

1888. *Gammaropsis atlantica*, Stebbing, Challenger Amphipoda, Reports, vol. xxix., p. 1101, pl. 114.
 1893. *Protomeдея ? atlantica*, Della Valle, Fauna und Flora des Golfes von Neapel, vol. xx., p. 441.
 1906. *Eurystheus atlanticus*, Stebbing, Das Tierreich, Amphipoda, p. 611.

The single specimen from which this species was originally described was a female. The sexes agree in most particulars, especially in the peculiar lageniform eyes adjoining the margin of the head and occupying its much-produced lateral angles. The second gnathopod, however, is a distinguishing feature, being in the male more massive, with a more strongly sculptured palm, in which the defining tooth is separated by a pronounced excavation from the irregularly crenate remainder of the margin. The finger also in the male does not overlap the palmar tooth as in the female, and, being widened at the middle, it has the inner edge not concave. The second joint in the third peræopods is broadly oval, nearly as broad as long, with the convex hind margin smooth.

The first and second uropods are strongly spined. The telson is but little longer than broad, apically acute.

Locality. Dredged between Bird Island and mainland, in 10-16 fathoms, and in lat. 33° 9' 30" S., long. 28° 3' 00" E. ; 47 fathoms.

EURYSTHEUS AFER (Stebbing).

1888. *Gammaropsis afra*, Stebbing, Challenger Amphipoda, Reports, vol. xxix., p. 1097, pl. 113.
 1893. *Protomedeia? afra*, Della Valle, Fauna und Flora des Golfes von Neapel, vol. xx., p. 440.
 1906. *Eurystheus afer*, Stebbing, Das Tierreich, Amphipoda, p. 612.

Between this and the preceding species the most obvious distinctions are in the shape of the head, here much less produced, and in the eyes, here obliquely oblong instead of lageniform.

Locality. The two species (or perhaps varieties) occurred in the same dredgings. *E. atlanticus* appears to be more brilliantly coloured, or to be more retentive of its colouring than *E. afer*.

FAMILY COROPHIIDÆ.

GEN. CAMACHO, Stebbing.

1888. *Camacho*, Stebbing, Challenger Amphipoda, Reports, vol. xxix., p. 1178.
 1906. *Camacho*, Stebbing, Das Tierreich, Amphipoda, p. 664.

CAMACHO BATHYPOLOUS, Stebbing.

1888. *Camacho bathyploous*, Stebbing, Challenger Amphipoda, Reports, vol. xxix., p. 1179, pl. 127.
 1904. *Camacho bathyploüs*, Coutière, Bull. Soc. philomatique (Extrait, p. 8).
 1906. *Camacho bathyploous*, Stebbing, Das Tierreich, Amphipoda, p. 665.

The South African specimen, though smaller than that obtained by the Challenger, is in more perfect condition. Both are females.

The eyes are small, but distinct. In the earlier specimen they had disappeared. The second antennæ have the fourth and fifth joints of the peduncle long, subequal, the flagellum 11-jointed, not so long as the last joint of the peduncle. In the first and second gnathopods the fifth joint is less elongate than in the Challenger

specimen. The first and second peræopods have the fourth joint much longer than the fifth or sixth, the sixth tapering, rather longer than the fifth, the finger needle-like. The third, fourth, and fifth peræopods all have the second joint narrow. The third pair correspond with the detached unnumbered peræopod figured in the Challenger report. The fourth and fifth pairs are much longer than the third pair, and have the fifth joint much shorter than the fourth or sixth.

The marsupial plates, especially those of the first and second peræopods are long, strongly fringed, and are evidently assisted in their function by the long narrow branchial vesicles.

Length of the specimen 11 mm.

Locality. Lat. $33^{\circ} 9' 30''$ S., long. $28^{\circ} 3' 0''$ E. Depth, 47 fathoms; bottom, sand, shell and rock. The Challenger specimen, 16 mm. long, was taken off New Zealand in lat. $40^{\circ} 28'$ S., long. $177^{\circ} 43'$ E., at a reputed depth of 1,100 fathoms.

Professor Coutière discusses the relationship of *Camacho bathyploous* and Bonnier's *Chevreuxius grandimanus* to his own *Grandidierella mahafalensis* from Madagascar. A second species of *Grandidierella* is now known, but not yet published.

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<i>fusca</i> (<i>Ampelisca</i>)	70	Limnoriidae	50
		longimanus (<i>Hippomedon</i>)	64
Galacantha	19	longimanus (<i>Platamon</i>).....	64
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Gammaridae	81	longirostris (<i>Rhachocaris</i>).....	38
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Gecarcinidae.....	14	Lupa.....	11
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<i>granulatus</i> (<i>Polycheles</i>).....	25	nanus (<i>Pentacheles</i>)	27
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hepatica (<i>Cancer</i>)	17	Oxystomata	15
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<i>holmesi</i> (<i>Eurystheus</i>), Plate XLA	85	Paguridae	20
<i>Hyastenus</i>	5	Paguridea.....	20
hydrophilus (<i>Cancer</i>).....	7	Pagurus.....	21
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		<i>Palinura</i>	28
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<i>incisus</i> (<i>Pagurus</i>)	23	pelagica (<i>Lupa</i>)	12
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EXPLANATION OF PLATES.

The Plates are numbered in the first line consecutively to those of "South African Crustacea," Part III.

PLATE I. (XXVII.)

Mamaia quckettii, n. sp.

Dorsal view of male, from photograph.

PLATE II. (XXVIII.)

Charybdis natator (Herbst).

Dorsal view of male, from photograph.

PLATE III. (XXIX.)

Charybdis natator (Herbst).

Ventral view of the same specimen, from photograph.

PLATE IV. (XXX.)

Scyllarides elisabethæ (Ortmann).

Dorsal view of female, from photograph.

PLATE V. (XXXI.)

Conilorpheus scutifrons, n. sp.

n.s. Line indicating natural size of male specimen figured below in lateral view complete, and in dorsal view, with the body separated between the fifth and sixth segments of the peræon.

c. Dorsal view of head, with first and second antennæ (eyes omitted).

mx. 1, mx. 2, mxp. First and second maxillæ and maxilliped, more enlarged than the other appendages.

gn. 1, 2; prp. 1, 2, 3, 5. First and second gnathopods, and first, second, third, and fifth peræopods.

plp. 2, urp. Second pleopod and uropod.

T. Apex of telsonic segment, enlarged on the same scale as the mouth-organs.

PLATE VI. (XXXII.)

Antarcturus kladophoros, n. sp.

- n.s. Line indicating natural size of the female specimen figured above in lateral view.
- c.p. Dorsal process of head much magnified.
- oc., a.i., a.s. Part of head with eye, and second antenna incomplete; first antenna, detached, with higher magnification of its apex.
- fl. a.i. Flagellum of second antenna.
- l.s., l.i., mxp. Upper lip with epistome, lower lip, maxilliped. These are more highly magnified than the other appendages, except the uropod.
- gn. 1, prp. 2, 3, plp. First gnathopod; second and third peraeopods, and first pleopod.
- urp. Uropod, with greater enlargement of the rami.
- Pl. Dorsal view of pleon.

PLATE VII. (XXXIII.)

Bathyggyge grandis, Hansen.

- n.s. ♀, n.s. ♂. Lines indicating natural size of the female and male specimens figured for the female in dorsal and ventral view, and for the male in dorsal.
- mxp, ♀, prp. ♀, Pl. ♀. Maxilliped, a peraeopod with higher enlargement of apical portion, and pleon of the female. The remaining figures refer to the male.
- a.s., a.i., m., mxp. First and second antennæ, mandible and maxilliped.
- gn. 1, prp. 2. First gnathopod and second peraeopod, each with higher enlargement of distal portion.
- Pl. Pleon.

PLATE VIII. (XXXIV.)

Trischizostoma remipes, n. sp.

- n.s. Line indicating natural size of specimen figured below in lateral view.
- a.s., a.i. First and second antennæ.
- l.s., m., mx. 1, mx. 2, mxp. Upper lip, mandible, first and second maxillæ, maxillipeds. These are more highly magnified than the other appendages.
- gn. 1, gn. 2, prp. 2, 5. First and second gnathopods; second peraeopod (part), and fifth peraeopod.
- Pl., urp. 1, 2, 3. Dorsal view of pleon from the fourth segment, with telson, first and second uropods on the right, and the pair of third uropods.

PLATE IX. (XXXV.)

Tryphosa onconotus, n. sp.

- n.s. Line indicating natural size of specimen figured below in lateral view.
- a.s., a.i. First and second antennæ.
- m., mx. 1, mx. 2, mxp. Mandible, first and second maxillæ, maxilliped, more enlarged than the other appendages.
- gn. 1, gn. 2, prp. 2, 3, 4, 5. First and second gnathopods (with apical portion of each to the same scale as the mouth-organs), second, third, fourth, and fifth peraeopods.

urp. 1, 2, 3. First, second, and third uropods.

Pl., T. Pleon from end of second segment in lateral view; telson in dorsal view, on the scale of the uropods and also on that of the mouth-organs.

PLATE X. (XXXVI.)

Byblis avisuropus, n. sp.

n.s. Line indicating natural size of specimen figured above in lateral view.

C. Lateral view of head, with bases of antennæ.

a.s. First antenna.

l.s., l.i., m., mx. 1, mx. 2, mxp. Upper and lower lips, mandible, first and second maxillæ, and maxillipeds, more highly magnified than the other appendages. Enlargement of armature of mx. 1 higher than any of the other figures except telson.

gn. 1, gn. 2, prp. 2, 3, 4, 5. First and second gnathopods; second, third, fourth and fifth pereopods, with distal parts of gn. 2, and prp. 3 and 5 more highly magnified.

urp. 1, 2, 3, T. First, second, and third uropods; dorsal view of telson to the same scale, and also on a higher scale than all the other figures except armature of mx. 1.

PLATE XI. (XXXVII.)

Pontharpinia stimpsoni, n. sp.

n.s. Line indicating natural size of female specimen figured above in lateral view.

C. Dorsal view of head.

a.s., a.i. First and second antennæ.

m., l.i., mx. 1, mx. 2, mxp. Mandible, lower lip, first and second maxillæ, and maxilliped. These parts, with the tip of finger of gn. 2, and the telson are magnified on a higher scale than the other appendages.

gn. 1, gn. 2, prp. 1, 3, 4, 5. First and second gnathopods; first, third, fourth, and fifth pereopods.

urp. 1, 2, 3, T. First, second, and third uropods; telson on the same scale as the limbs, and also on the scale of the mouth-organs, in dorsal view.

PLATE XII. (XXXVIII.)

Tiron australis, n. sp.

n.s. ♂, n.s. ♀. Lines indicating natural size of the adjoining figure of male specimen in lateral view, and of an unfigured female specimen.

a.s., a.i. First and second antennæ.

m., mx. 1, mx. 2, mxp. Mandible, first and second maxillæ, and part of maxilliped. Apex of palp of first maxilla more highly magnified than the other figures. All the mouth-organs more highly magnified than the other appendages.

gn. 1, gn. 2, prp. 1, 2, 3, 4, 5. First and second gnathopods, and the five pereopods.

urp. 1, 2, 3, T. First, second, and third uropods, and the telson. Telson further enlarged, but to a lower scale than that of the mouth-organs.

PLATE XIII. (XXXIX.)

Elasmopoides chevreuxi, n. g. et sp.

- n.s. Line indicating natural size of female specimen figured above in lateral view.
- l.s., l.i., m., mx. 1, mx. 2, mxp. Upper and lower lips, mandible, first and second maxillæ, and maxillipeds. These parts are more highly magnified than the other appendages, except the finger of prp. 2.
- gn. 1, gn. 2, prp. 2, 5. First and second gnathopods; second and fifth pereopods; the finger of prp. 2 more highly magnified than any of the other figures.
- urp. 3, T. Third uropod, and dorsal view of telson in attachment to sixth pleon segment.

PLATE XIV. (XL.A.)

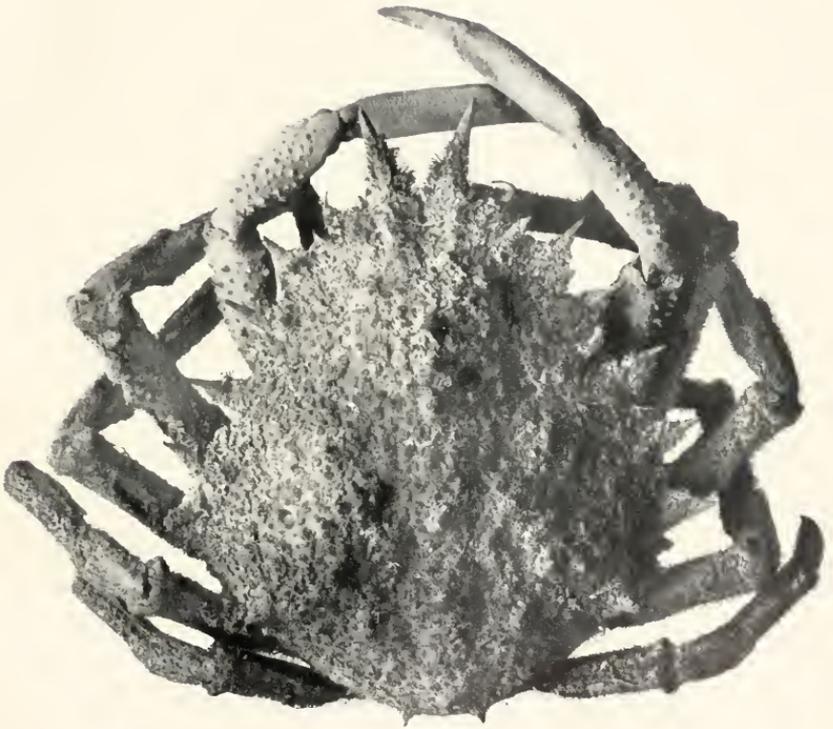
Eurystheus holmesi, n. sp.

- n.s. Line indicating natural size of male specimen figured below in lateral view.
- gn. 1, gn. 2, prp. 3, 4, 5. First and second gnathopods, and third, fourth, and fifth pereopods.
- urp. 1, 2, 3. First uropod in attachment to fourth pleon segment in lateral view; second and third uropods in attachment respectively to fifth and sixth pleon segments, and the telson, in dorsal view.

PLATE XV. (XL.B.)

Eurystheus atlanticus (Stebbing).

- gn. 1, gn. 2, prp. 3. First gnathopod with higher magnification of the finger, second gnathopod, second and third joints of the third pereopod.
- urp. 1, 2, 3, T. First, second, and third uropods; telson attached to sixth pleon segment in dorsal view. All the parts figured from a male specimen.



Johnson, Bird & Co. phot.

West, Newman proc.

MAMAIA QUEKETTI, N. SP.





Johnson. Bird & Co. phot.

West. Newman proc.

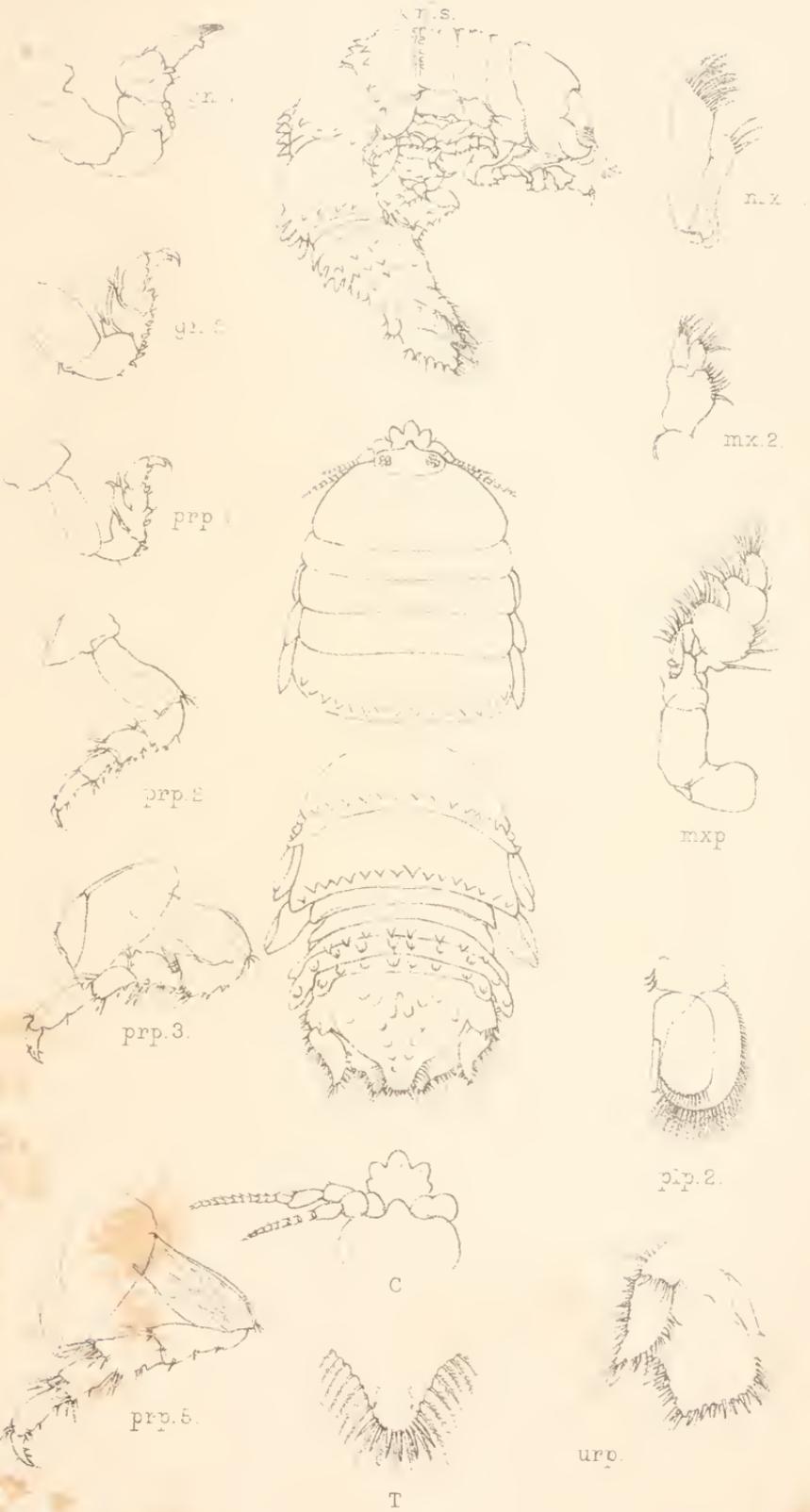
CHARYBDIS NATATOR (*Herbst.*).



Johnson, Bird & Co. phot.

West, Newman proc.

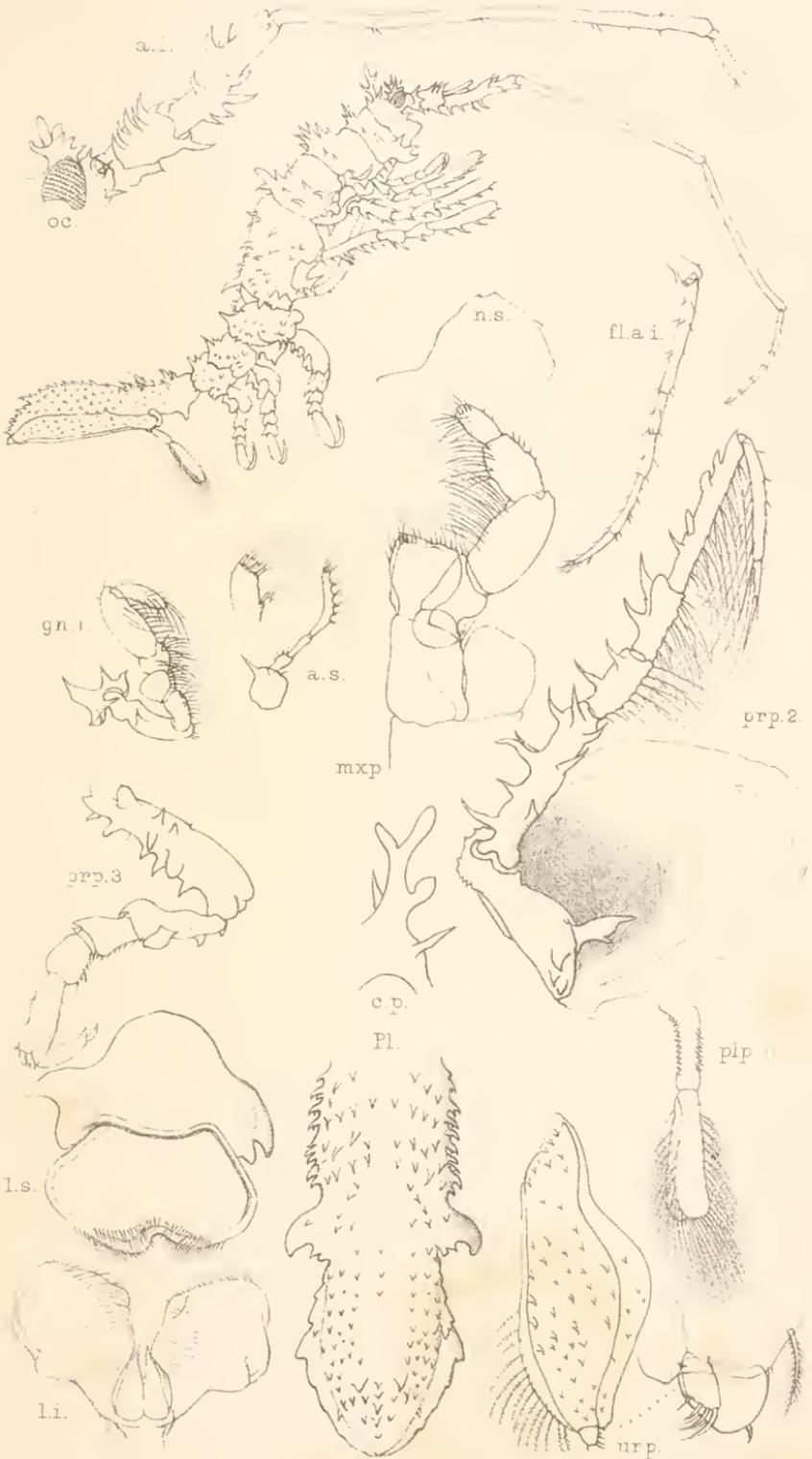
SCYLLARIDES ELISABETHÆ (*Ortmann*).



Del. T. R. Stebbing.

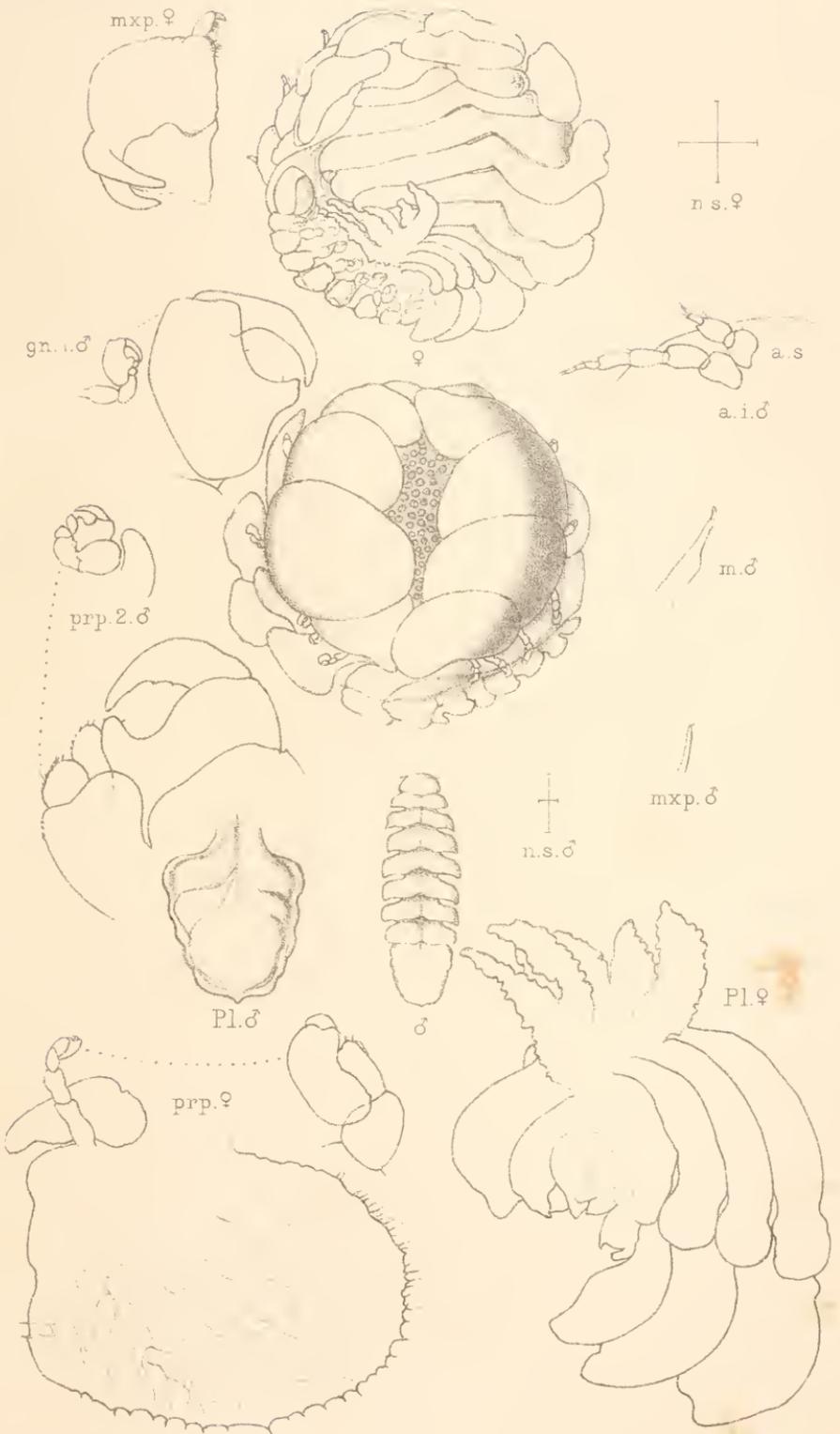
West, Newman imp.

CONILORPHEUS SCUTIFRONS *n. sp.*



Del. T.R.R. Stebbing

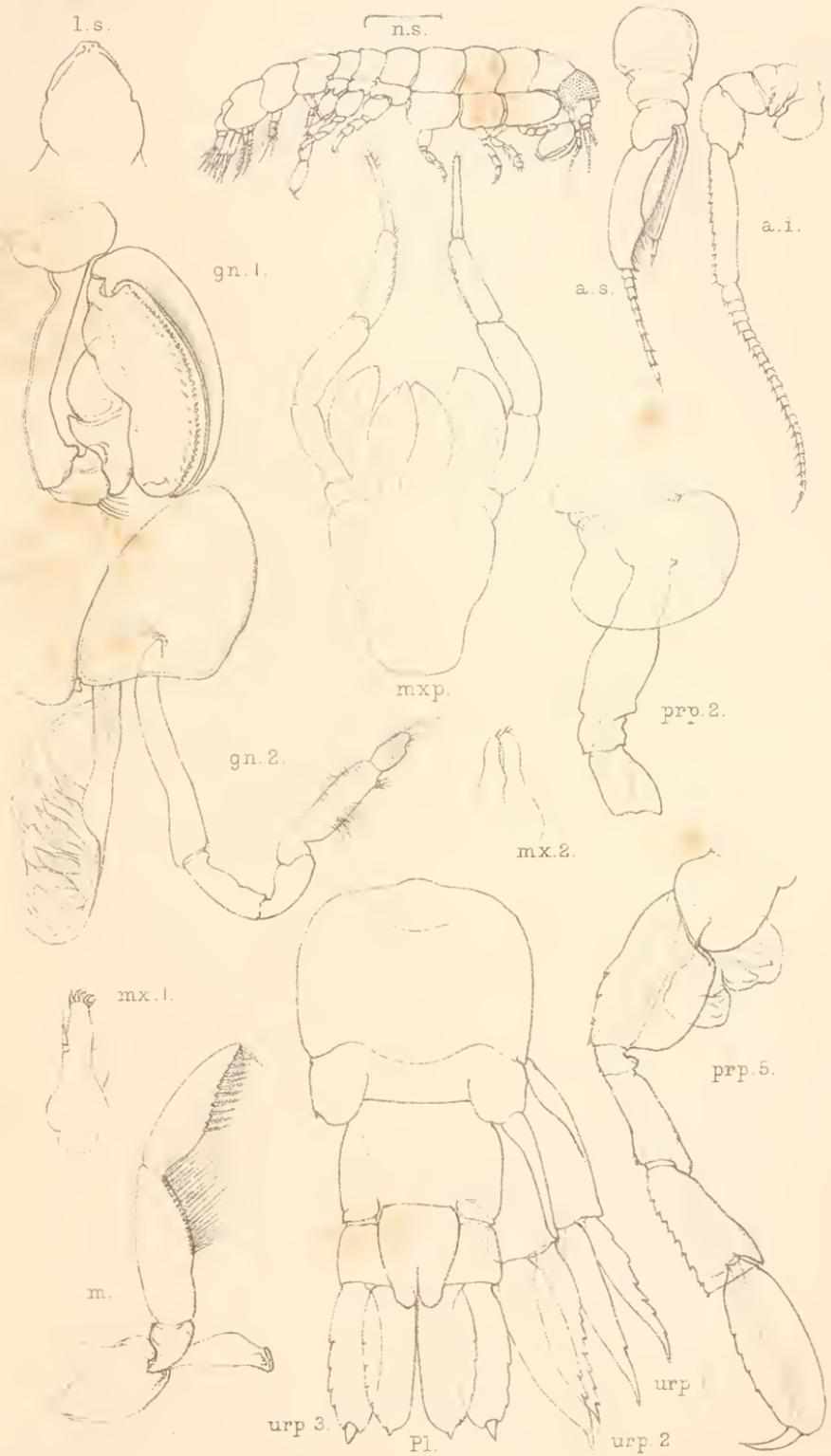
Nat. Hist. Mus. Cape Town



Del. T.H.R. Stebbing

West, Newman imp.

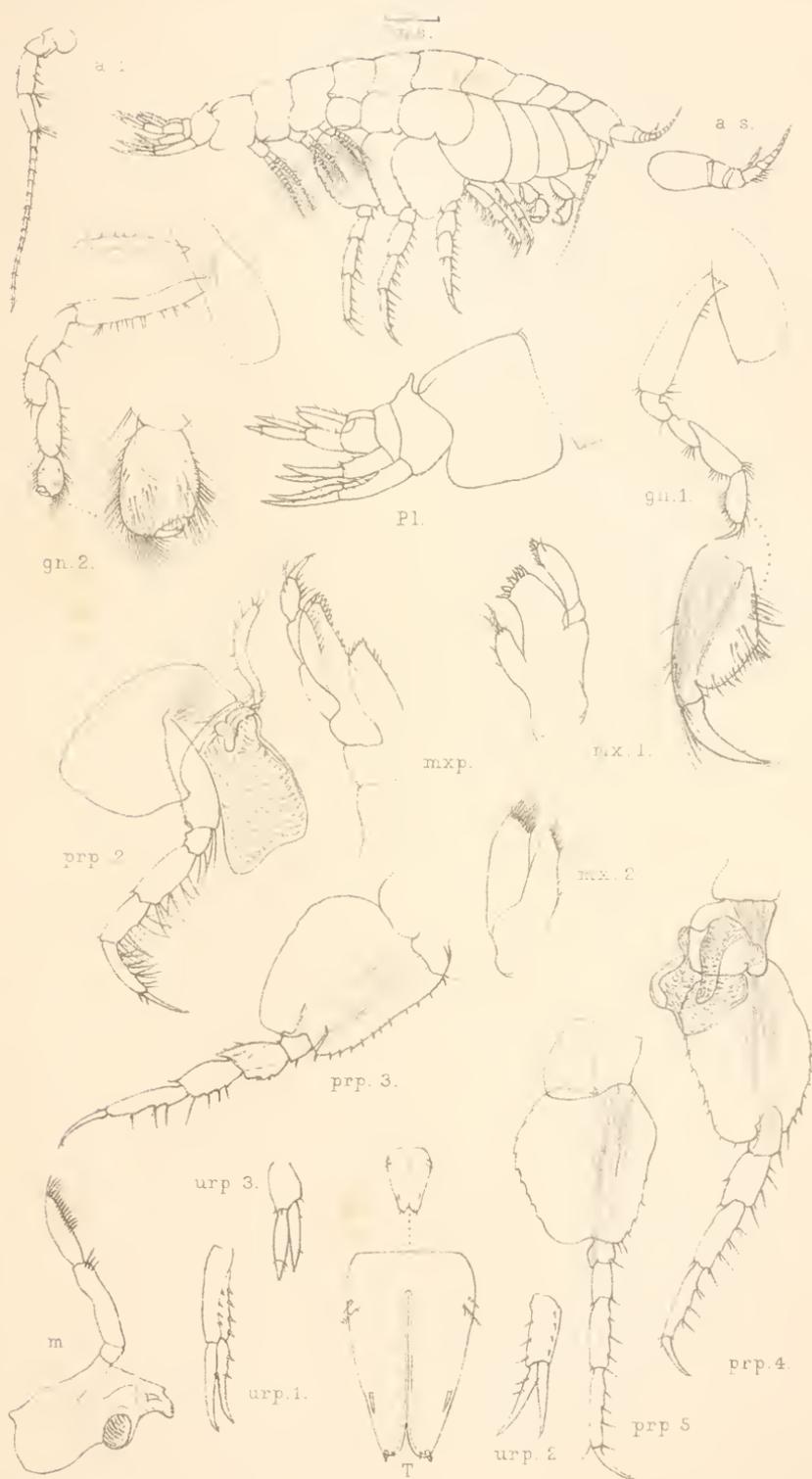
BATHYGYGE GRANDIS Hansen.



Del. T.R.R. Stebbing

Drawn Newman, sp.

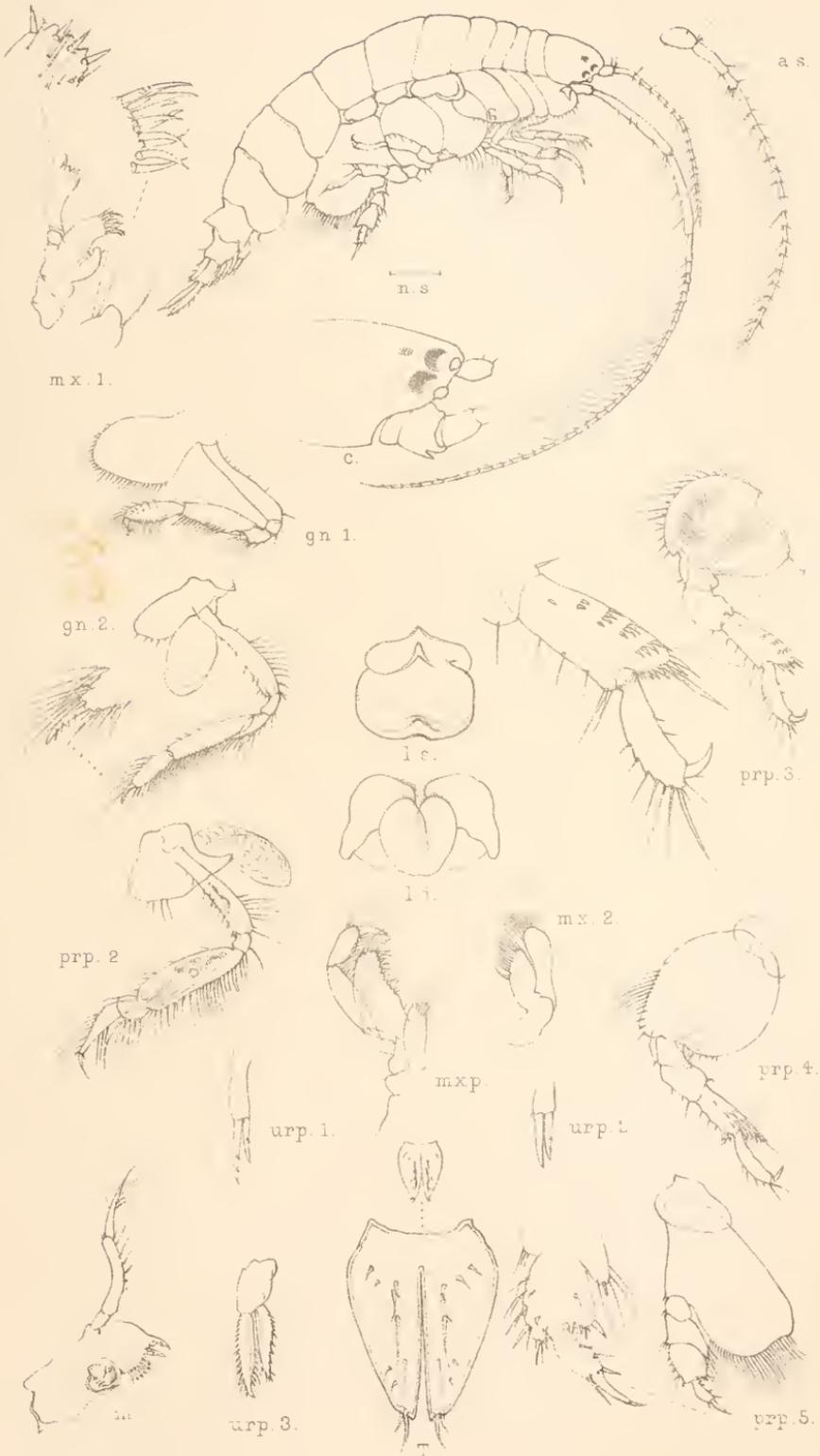
TRISCHIZOSTOMA REMIPES n.sp



Des. T. R. R. Stebbing

West. Newman in f.

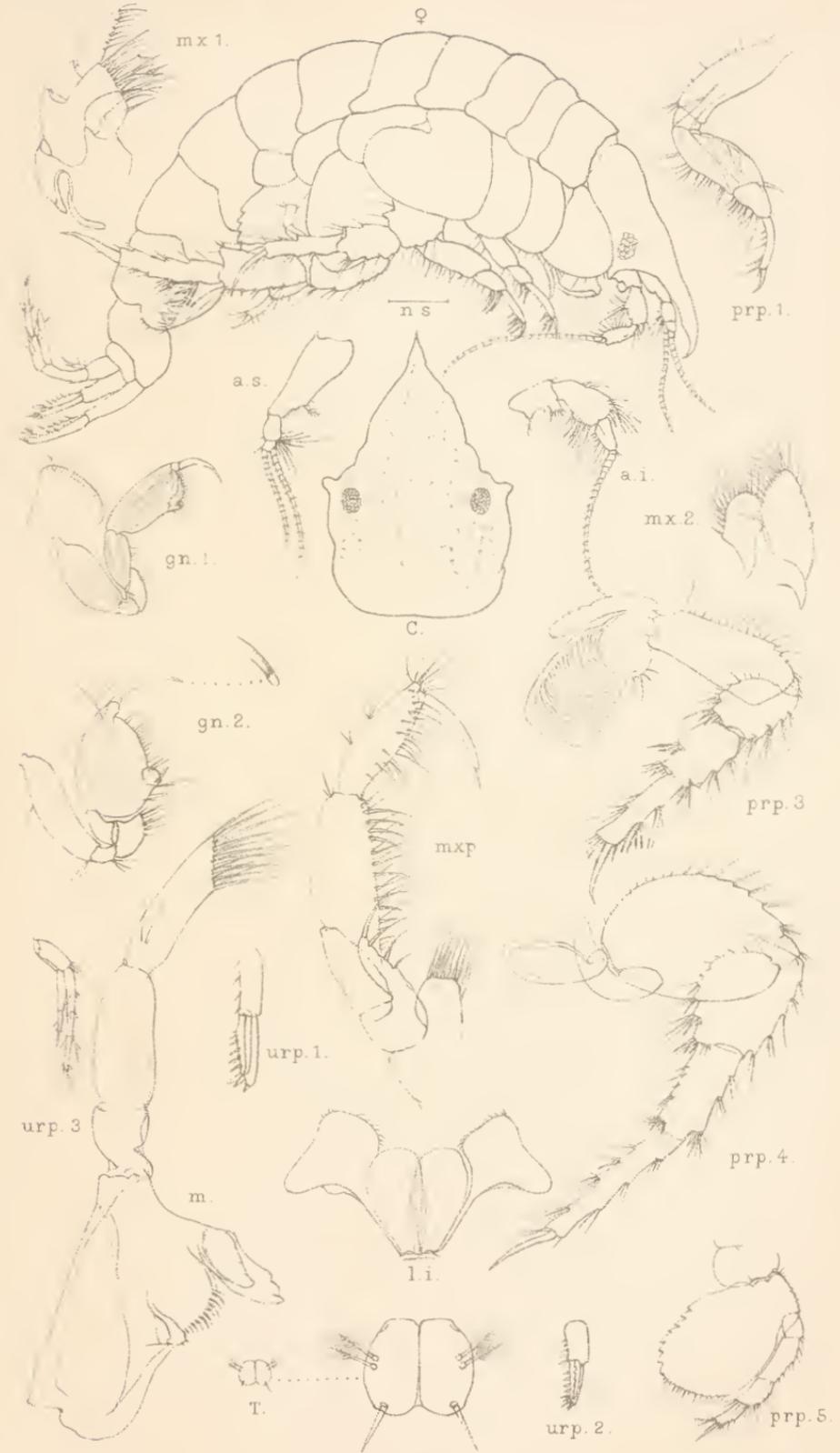
TRYPHOSA ONCONOTUS n.sp.



Del. T.R.R. Stebbing.

West, Newman imp.

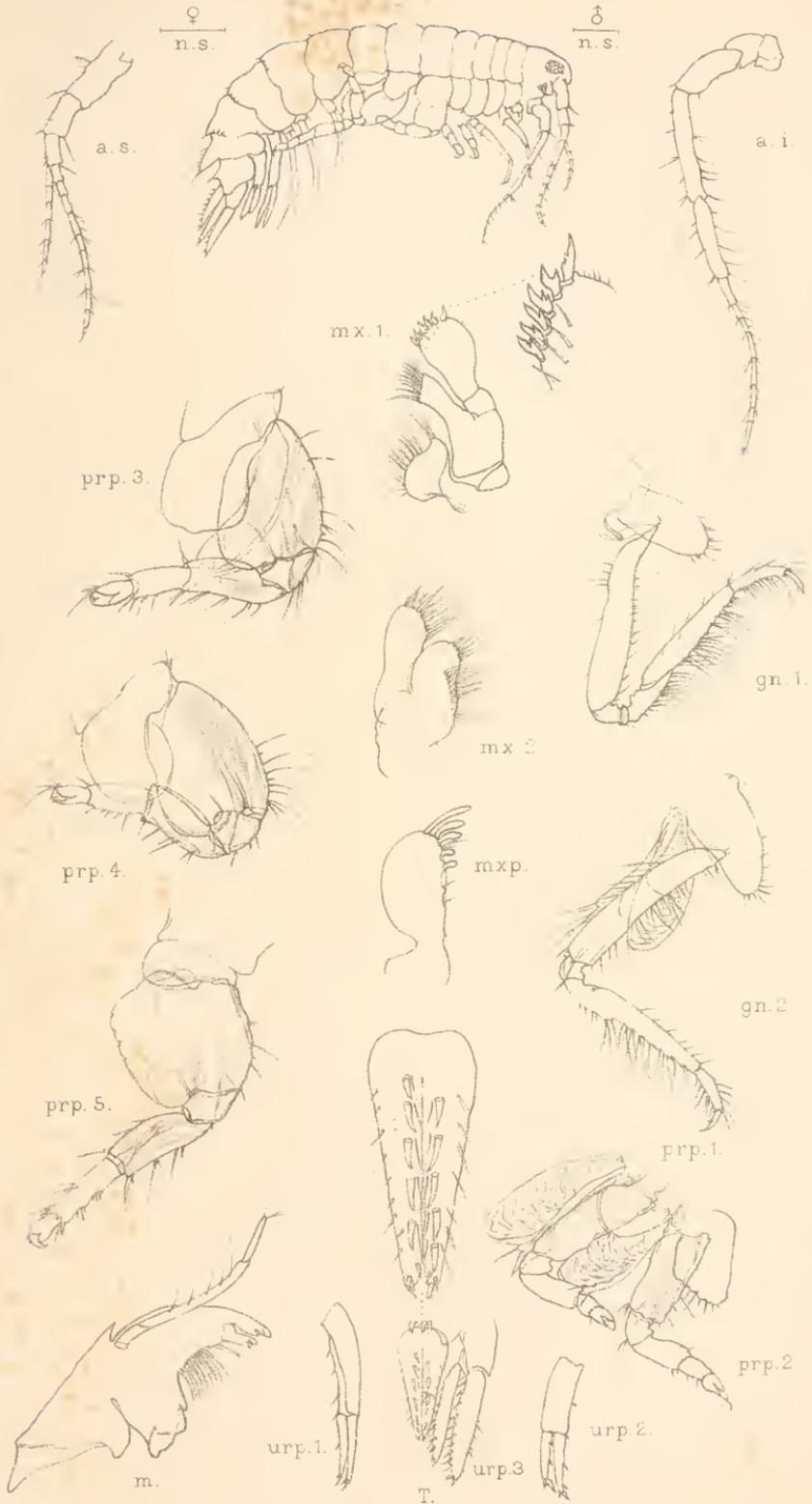
BYBLIS ANISUROPUS n. sp.



Del. T.R.R. Stebbing.

West, Newman imp.

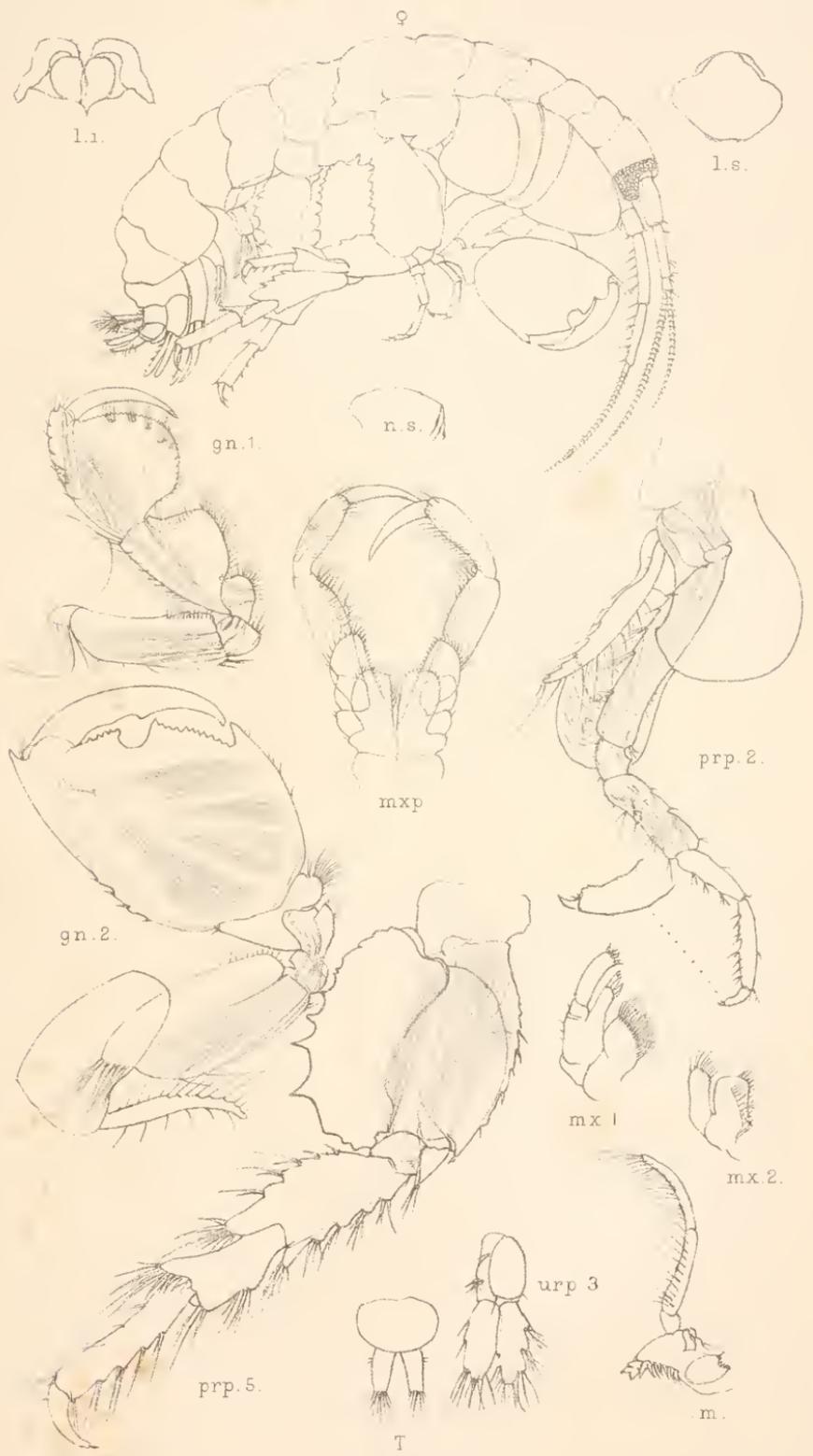
PONTHARPINIA STIMPSONI n. sp.



Del. T. R. R. Stebbing.

West Newman imp.

TIRON AUSTRALIS, n. sp.



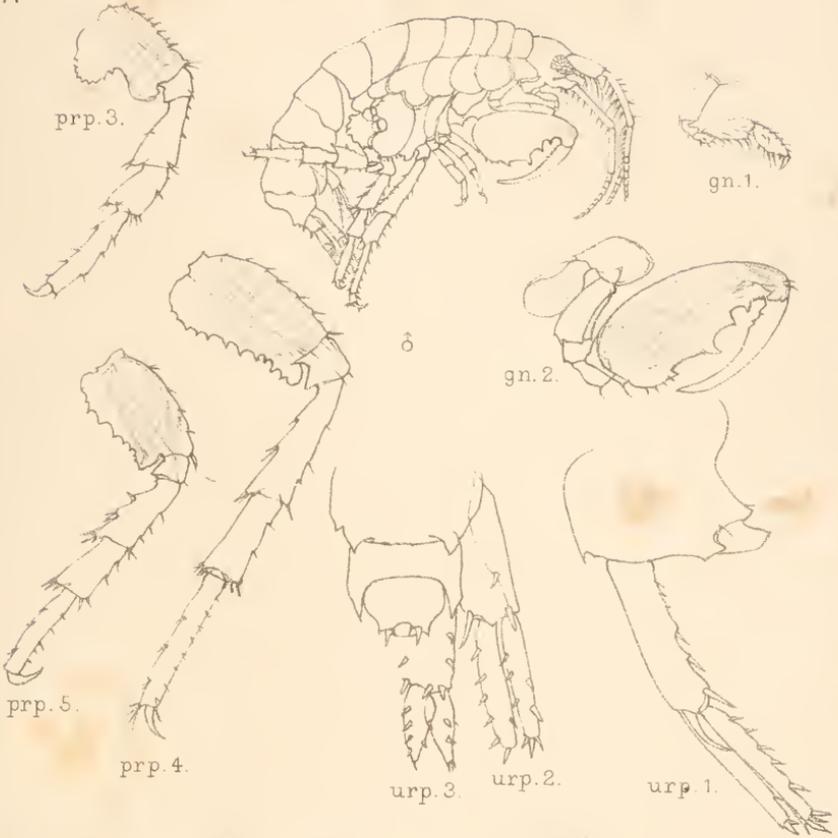
Del. T. R. R. Stebbing.

West, Newman imp.

ELASMOPOIDES CHEVREUXI n. g. et sp.

A

n.s. ♂



B

gn. 1.

gn. 2.

♂

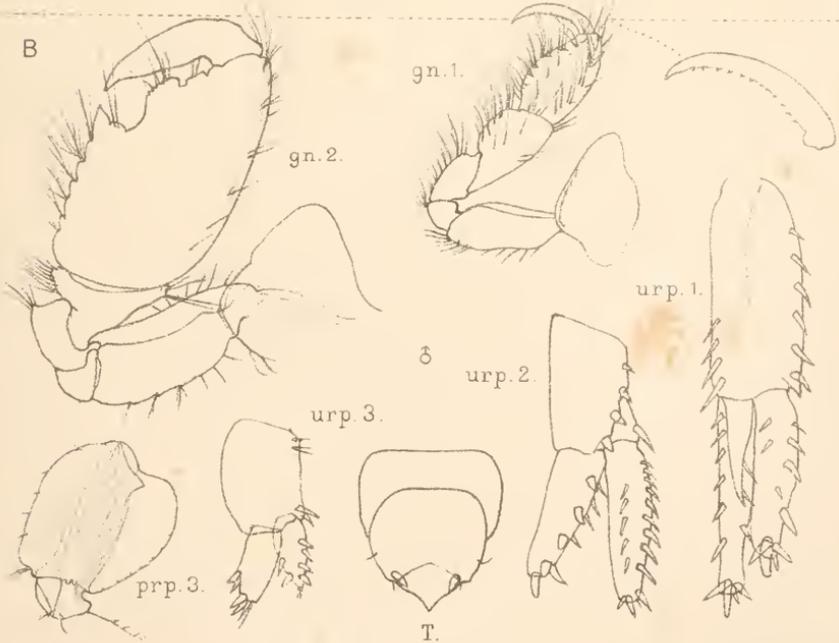
urp. 2.

urp. 1.

urp. 3.

prp. 3.

T.



Del. T.R.R. Stebbing

West, Ne. v. r. p.

A. EURYSTHEUS HOLMESI n.s. B. EURYSTHEUS ATLANTICUS (Stebbing)

