

No. VI.—ISOPODA FROM THE INDIAN OCEAN AND BRITISH
EAST AFRICA.

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(Plates 5—11.)

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IN two of the earlier reports specimens collected by Mr Cyril Crossland in British East Africa have been discussed in combination with those obtained by Mr Stanley Gardiner from the Indian Ocean in 1905. This procedure, in itself by no means unsatisfactory, I am following not quite by intention. The report on Mr Crossland's Isopoda from the Red Sea was already out of my hands before I became aware that specimens which he had collected on a previous expedition at Zanzibar and Wasin in 1901—2 were included with those due to the voyage of the "Sealark." Though the distances are considerable between some of the collecting stations of the three expeditions, there is probably little to interfere with the wide distribution either of the free-swimming Isopoda or of those partially parasitic on fishes. It is reasonable, therefore, when circumstances permit it, to group together in a single survey the gatherings from the extensive area with which these exploring agencies have been concerned.

Only four out of the thirty-four species here under discussion are of relatively important size. Many of them are rather perplexingly small. Several are represented in the collections by single specimens.

The diversity, however, is not only specific, seeing that they are spread over five tribes, thirteen families, and no fewer than twenty-nine genera. Four of the genera and fourteen of the species are set forth as new. Among these *Kalliapseudes makrothrix* from Wasin, *Pontogelos aselgokeros* from Mauritius, representatives of new genera, and the new species *Apanthura xenocheir* from Egmont Reef, have rather striking peculiarities which will repay attention.

Besides the Isopoda Mr Crossland's collection included one gathering of Leptostraca. At Wasin from a depth of ten fathoms he obtained six specimens of *Paranebalia longipes* (v. Willemoes Suhm). By Professor Sars in the "Challenger" Reports, vol. xix., 1887, and by Dr J. Thiele in the "Valdivia" Reports, vol. viii., 1904, this member of the family Nebaliidæ has been treated with admirable fullness of description and illustration. As the Wasin specimens comprised none of the rare males, there is no need here to add anything further to the literature of the subject.

ISOPODA ANOMALA.

Tribe *CHELIFERA*.Family *Apseudidæ*.

	Collected at	By
<i>Apseudes</i> sp. ? juv., p. 85.	Wasin.	Crossland.
<i>Kalliapseudes</i> , n. g., p. 86.		
<i>Kalliapseudes makrothrix</i> , n. sp., p. 86, pl. 5.	Wasin.	Crossland.
<i>Parapseudes hirsutus</i> , n. sp., p. 89, pl. 6 B.	Egmont Reef.	Gardiner.

Family *Tanaidæ*.

<i>Heterotanais anomalus</i> (?) Sars, p. 90.	Zanzibar.	Crossland.
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ISOPODA GENUINA.

Tribe *FLABELLIFERA*.Family *Anthuridæ*.

<i>Cyathura pusilla</i> juv. (?) Stebbing, p. 91.	Wasin.	Crossland.
<i>Calathura sladeni</i> , n. sp., p. 91, pl. 7 A.	Cargados Carajos and Saya de Malha.	Gardiner.
<i>Apanthura xenocheir</i> , n. sp., p. 94, pl. 7 B.	Egmont Reef.	Gardiner.

Family *Eurydicidæ*.

<i>Eurydice truncata</i> (Norman), p. 95.	S. of Saya de Malha Bank.	Gardiner.
<i>Eurydice humilis</i> , n. sp., p. 96, pl. 8 A.	Off Salomon Atoll.	Gardiner.
<i>Pontogelos</i> , n. g., p. 97.		
<i>Pontogelos aselgokeros</i> , n. sp., p. 97, pl. 8 B.	Mauritius.	Gardiner.
<i>Cirolana minuta</i> , Hansen, p. 98.	Praslin Reef, Coetivy, Diego Garcia.	Gardiner.

Family *Corallanidæ*.

<i>Alcirona maldivensis</i> , Stebbing, p. 99.	Cargados Carajos.	Gardiner.
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Family *Argathonidæ*.

<i>Argathona reidi</i> , n. sp., p. 100, pl. 9 A.	Zanzibar.	Crossland.
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Family *Ægidæ*.

<i>Ega ommatophylax</i> , Stebbing, p. 101, pl. 9 B.	Mauritius.	Gardiner.
<i>Rocinela orientalis</i> , Schiödte and Meinert, p. 101.	Zanzibar.	Crossland.

Family *Cymothoidæ*.

<i>Nerocila trichiura</i> (Miers), p. 102.	Great Chagos.	Gardiner.
<i>Cymothoa eremita</i> (Brünnich), p. 102.	Zanzibar.	Crossland.
<i>Meinertia carinata</i> (Bianconi), p. 103.	Seychelles.	Gardiner.

Family *Sphæromidæ*.

<i>Cymodoce pubescens</i> (Milne-Edwards), p. 104.	Zanzibar, Wasin.	Crossland.
<i>Cymodoce zanzibarensis</i> , n. sp., p. 105, pl. 9 D.	Zanzibar, Wasin.	Crossland.
<i>Cymodoce bicarinata</i> , Stebbing, p. 106.	Zanzibar.	Crossland.
<i>Cilicæa latreillii</i> , Leach, p. 106.	Wasin.	Crossland.
<i>Paracilicæa</i> , n. g., p. 106.		
<i>Paracilicæa hanseni</i> , n. sp., p. 107, pl. 9 C.	Zanzibar.	Crossland.

Tribe *VALVIFERA*.Family *Idoteidæ*.

<i>Idotea metallica</i> , Bosc, p. 108.	Collected at Between Saya de Malha and Coetivy.	By Gardiner.
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Tribe *ASELLOTA*.Family *Jæridæ*.

<i>Janira crosslandi</i> , Stebbing, p. 108, pl. 6 A.	Egmont.	Gardiner.
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Family *Stenetriidæ*.

<i>Stenetrium chiltoni</i> , Stebbing, p. 110.	Amirante.	Gardiner.
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Tribe *EPICARIDEA*.Family *Bopyridæ*.

<i>Kepon halimi</i> , n. sp., p. 112, pl. 10 c.	Cargados Carajos.	Gardiner.
<i>Dactylokepon</i> , n. g., p. 113.		
<i>Dactylokepon richardsonæ</i> , n. sp., p. 113, pl. 11 c.	Seychelles.	Gardiner.
<i>Dactylokepon catoptri</i> , n. sp., p. 113, pl. 10 b.	Amirante.	Gardiner.
<i>Trapezicepon amicornum</i> (Giard and Bonnier) with parasite, p. 114, pl. 11 b.	Amirante.	Gardiner.
<i>Ergyne savignyi</i> , n. sp., p. 115, pl. 10 a.	Cargados Carajos.	Gardiner.
<i>Cancricepon</i> sp., p. 116.	Amirante.	Gardiner.
<i>Gigantione rathbunæ</i> , n. sp., p. 117, pl. 11 a.	Salomon Atoll.	Gardiner.
<i>Cryptoniscian larvæ</i> , pp. 97, 115.	Off Salomon Atoll and Amirante.	Gardiner.

LEPTOSTRACA.

Family *Nebaliidæ*.

<i>Paranebalia longipes</i> (v. Willemoes Suhm) Preface.	Wasin.	Crossland.
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Tribe *CHELIFERA*.Family *Apseudidæ*.

1880. *Apseudidæ*, Sars, Arch. Naturv. Christian., vol. vii., p. 6.
 1886. *Apseudidæ*, Sars, Arch. Naturv. Christian., vol. xi., p. 265.
 1886. *Apseudidæ*, Norman and Stebbing, Trans. Zool. Soc. London, vol. xii., pt. 4,
 p. 77.
 1895. *Apseudidæ*, Hansen, Plankton Exp., Tanaidacea, vol. ii., G. c., p. 49.
 1896. *Apseudidæ*, Sars, Crustacea of Norway, vol. ii., p. 5.
 1901. *Apseudidæ*, Whitelegge, Mem. Australian Mus., vol. iv., pt. 3, p. 204.
 1905. *Apseudidæ*, H. Richardson, Bull. U.S. Nat. Mus., No. 54, p. 37.

Gen. *APSEUDES*, Leach.

1814. *Apseudes*, Leach, Edinb. Encycl., vol. vii., p. 404.

1. *Apseudes* sp. ?juv.

At Wasin from a depth of ten fathoms Mr Crossland obtained a specimen of this genus only 2 mm. in length. The important first gnathopods were unfortunately missing

and the uropods imperfect. The outer branch of the latter in being four-jointed agrees with Hansen's description of his *Apseudes intermedius*, though his figure represents this branch as five-jointed. The Wasin species has the telsonic segment parallel-sided, without the two blunt processes on each side that occur in Hansen's species. Our specimen has a six-jointed flagellum to the second antennæ, and respectively one, three, and four spines on the fourth, fifth, and sixth joints of the second gnathopods. Hansen founded his species on two female specimens with half developed marsupium, their length being 2.3 mm., flagellum of second antennæ four-jointed, spines one, two, and four on the above-named joints of the second gnathopods. Though the very small size suggests specific identity between the Cape Verde specimens and the present form from East Africa, details of structure do not warrant their union.

KALLIAPSEUDES, n. g.

Plumose setæ extensively developed on large fourth joint of second antennæ, on fifth joint of first gnathopods, and on palps of mandibles and maxillipeds. Maxillipeds with the terminal sixth joint the longest. Finger of second gnathopods not apically narrowed, its round end encircled by setæ. Fingers of first and second peræopods very elongate, curved, acute, of third and fourth short, straight, apically blunt, of fifth like those of the first and second pairs, but much shorter. Pleopods with inner ramus much longer and broader than the outer.

The generic name is compounded of κάλλος, beauty, and *Apseudes*, the designation of the closely allied genus, from which it is however strikingly distinguished by the group of characters above given. It is possible that others may be added, whenever opportunity offers for a more satisfactory examination of the mouth-organs, but the palps of the maxillipeds are of themselves sufficient to mark a new genus.

2. *Kalliapseudes makrothrix*, n. sp. (Plate 5.)

Cephalic segment areolated, front obtuse, lateral angles without eyes or separated eye-lobes. Penultimate and antepenultimate segments of peræon the longest, pleon not much narrower than peræon, its first five segments with rounded setiferous lateral margins, these and the peræon segments furnished each with a medio-ventral spine. The telsonic segment broader than long, the lateral margins convex to the insertion of the uropods, then narrowing to a bluntly triangular area, a little more than a third of the total length.

First antennæ. The large first joint more than twice as long as the two successively smaller following joints combined; flagellum not more than half as long as peduncle, its first joint common to the two flagella, but more produced on the inner than the outer side, the outer flagellum with six, the inner with three, additional joints.

Second antennæ. These just reach the flagella of the first pair, by the broad bases of which their peduncles are almost completely concealed. The first joint is produced on the inner side to a setiferous process, possibly an epipod in coalescence. A corresponding process is found in some species of *Apseudes*, but apparently less developed than here. The second joint, broader than long, has on the outer side a narrow exopod bearing four

setæ. The third joint is extremely short, while the fourth is exceptionally long and provided with a fringe of very long plumose setæ, the fifth joint is short, and might pass for a member of the five-jointed flagellum, which by its help would just equal the length of the fourth joint of the peduncle.

The mandibles proved to be exceedingly brittle, but most of their characters could be made out. They have the long narrow trunk and strongly projecting molar as in *Apseudes*. Each has a pellucid curved strap-like plate, strongly projecting and carrying apically four to five spines, representing the spine-row. Between this and the stout dentate cutting edge one mandible has a delicate slightly denticulate accessory plate, which is not represented on the other mandible, where the cutting edge is surmounted by a rather conspicuous tooth on the upper margin. The palp, which is a very distinctive feature, was unfortunately in each case broken, so that the jointing remained obscure. Possibly there is a coalescence of the first and second joints, with a third joint about half the length of these two combined. In any case the palp is very large and closely fringed on the inner margin with very long plumose setæ, a feature not found in other members of the family.

The first and second maxillæ were not very clearly made out, except as regards the outer plate, which in each is distally widened, in the first maxillæ carrying some eleven short apical spines, in the second short apical setæ.

The maxillipeds are six-jointed, with a large epipod, the plate of the second joint fringed on the inner and distal margin with short spines, the third joint short, the three following rather long, successively longer and all three closely fringed with long plumose setæ, the longest at the apex of the last joint. The latter characters make these appendages apparently unique in this family, so far as at present known.

The first gnathopods are of the usual pattern, the second joint carrying a very small two-jointed setiferous exopod, the third and fourth joints coalesced, short, the fifth very long, fringed with closely set plumose setæ of great length, an exceptional feature, the two following joints forming a chela, with the thumb broader than the movable finger, their acute apices crossing when their straight denticulate inner margins are closed together. The front margin of hand and finger is convex, and near to that of the hand there is an open fringe of plumose setæ. Hind margin of hand sinuous.

Second gnathopods stouter than first; exopod of the stout second joint apparently a single-jointed rudiment, third joint short, fourth nearly as long and stout as the second, fifth short, with two stout spines on hind margin, sixth joint shorter than fifth, broader than long, with four stout spines on hind margin and one on apex of front, these spines being minutely pectinate on both edges; the finger nearly as long as the hand, slightly curved, broader at the rounded apex than at the pellucid base, and apically surrounded by a bush of setiform spines or spiniform setæ, presenting as a whole a very singular character.

First and second peræopods closely alike, distinguished from the others by the great length of the slender, curved finger, which is twice as long as the sixth joint, that and the bulkier fifth having each four conspicuous but slender spines on the hind margin.

Third and fourth peræopods closely alike, the finger narrow, straight, blunt-ended,

less than half as long as the sixth joint, tipped with a spine and setæ; the sixth joint as long as the fifth, carrying various spines chiefly on the distal half, and having on the outer margin near the base the plumose cilium spoken of by Professor Sars as an auditory appendage characteristic of these limbs; high up on the outer margin of the second joint there are two similar but much smaller cilia.

Fifth peræopods. These have the finger shaped as in the first and second pairs, but very much shorter, with a little distinct nail preceded by a setule; the sixth joint, scarcely so long as the finger and shorter than the preceding joint, has four conspicuous curved spines on the inner margin, which is fringed with a row of spinules.

The five pairs of pleopods are uniform in character, the second joint of the peduncle having its inner margin and the branches of their free margins, except the broad base of the inner one, fringed with plumose setæ; the outer branch not longer than the peduncle, but the inner much longer and broader than either, with a long plumose spine, bent at the base and tipped with two setules, issuing from the top of the inner margin.

The uropods have a peduncle reaching the end of the telsonic segment, supporting a short slender three-jointed ramus, of which the first two joints are very small, and a long inner ramus of twenty-two joints varying in length and all together about equal to the length of the pleon.

The specimen, not including antennæ or uropods, measured 5.25 mm. in length.

Locality. Wasin, E. Africa, 10 fathoms, mud.

The specific name, from the Greek *μακρόθριξ*, long-haired, alludes to the luxuriant development of setæ on several of the appendages.

Along with this specimen there was an *Apseudes*, 2 mm. long, and a *Cyathura*, 3 mm. long, both probably not adult.

Gen. *PARAPSEUDES*, Sars.

1880. *Parapseudes*, Sars, Arch. Naturv. Christiania, vol. vii., p. 16.

1886. *Parapseudes*, Sars, Arch. Naturv. Christiania, vol. xi., p. 303.

1905. *Parapseudes*, H. Richardson, Bull. U.S. Nat. Mus., No. 54, p. 47.

The earlier forms assigned to this genus are the little *P. latifrons* (Grube), scarcely more than 3 mm. long, from the Mediterranean, and *P. goodei*, Richardson, of which the length is not mentioned, from Bermudas. It is said to have a close resemblance to Grube's species.

In the amended definition of 1886 Sars gives the following characters:—Body short, depressed, broadest anteriorly. Carapace without definite sculpture; rostral lamina not delimited at the base. Eye-lobes definitely separated, with well developed visual elements. First antennæ with the two flagella subequal in length; the second with the lamellar appendage very small. Mandibular palp very small and sparingly furnished with setæ. Chelipeds about as in *Apseudes*, but scarcely differing in the two sexes. Fossorial feet [second gnathopods] with coxal joint simple, lamellar, without process. Peræopods comparatively very strongly developed, not very different from the fossorial feet, and, like these, armed with numerous strong spines on the inner margin. Pleon with only four

pairs of pleopods, these having the outer branch two-jointed; the fifth segment without appendages. The uropods as in *Apseudes*.

The principal change consists in the omission of the statement that the first and second gnathopods were devoid of a rudimentary epipod, Sars having found on renewed investigation that these rudiments were in fact present in the new genus as in the old.

The specimen now to be described is unfortunately devoid of the first gnathopods, and the presence of a rudimentary epipod on the second could not be definitely determined. The solitary specimen at command was still smaller than *P. latifrons*, which Sars speaks of as the least member of the present family, and this minuteness has left me uncertain whether the characters of the pleopods suit the requirements of the genus. I think that they do so, at least in regard to the fifth pair being absent. The agreement of the armature of the first and second peraeopods with that of the second gnathopods is well marked.

3. *Parapseudes hirsutus*, n. sp. (Plate 6 B.)

Head with rostral lamina produced into an apical point and slightly delimited at the base. General shape strongly tapering from broad head to narrow pleon. First five segments of pleon very short, first overlapped by lateral corners of last peræon segment, second and fifth horizontally produced into small lateral processes, the telsonic segment widened near the base, below the tuberculiform widening descending squarely to the insertion of the uropods, the remainder forming an equilateral triangle which reaches the end of the peduncle of the uropods. Three pairs of plumose setæ are arranged on the back of this segment, the whole animal being dorsally decorated with such setæ in a very conspicuous manner.

The first antennæ have a long setose first joint, followed by two short ones; the principal flagellum of seven joints and the not much shorter accessory of five joints are not nearly so long as the peduncle. The first joint of the principal flagellum is apparently in coalescence with that of the accessory, which in turn is not very distinctly marked off from the next following joint. The much shorter second antennæ are wide apart, being inserted just under the first pair. They have a small narrow scale or exopod on the second joint; the three-jointed flagellum is much shorter than the peduncle. The eyes are dark, the lobes ending in a pointed apex.

The mouth-organs, as will be seen by the figures, are in substantial agreement with those known for the genus *Apseudes*. The mandibular palp shows no falling off in setose armature, and the second joint is unusually broad. Between the palp and the cutting edge of the mandible the upper or outer margin shows a fine denticulation. On one member of the pair the cutting edge and the accessory plate are equal.

The second gnathopods have four stout spines on the inner margin of the fifth joint and six on that of the sixth joint; upon the apex of this joint there are some microscopically serrate spines.

The first two peræopods are very similar in their armature to the second gnathopods. In the three following pairs the strength of the marginal spines is less conspicuous, but

about the apex of the sixth joint in the third peræopods the serrate spines are more numerous. The third and fourth pairs have a minute character bringing the species into accord with *P. latifrons*. In that species Professor Sars notices, in speaking of the third and fourth peræopods, that "the auditory cilium characteristic of these feet is inserted in advance of the middle of the sixth joint's outer margin and less strongly developed than in the genus *Apseudes*." His figures of the third peræopod of *Apseudes robustus* show that the cilium in question is there very near the base of the joint. In our *Parapseudes* it will be seen that, though varying in position on the different limbs, it is always at a considerable distance from the base of the sixth joint.

The presence of the pleopods could not be made out.

Both branches of the uropods appear to begin with an ill-defined minute joint, perhaps only a cuticular fold, followed in the inner branch by eight unequal but fairly long joints, and in the outer by three such joints, most of the joints carrying long setæ.

Length, in bent position, 2 mm. Hansen's *Apseudes intermedius* measured 2.3 mm., for females with half-developed marsupium, therefore perhaps not full-grown. Our specimen contained eight large eggs in the marsupium, and was probably fully adult. It resisted efforts to straighten it out for exact measurement.

Locality. Egmont, breakers on reef edge.

The specific name alludes to the prominence of its setose furniture.

Fam. **Tanaidæ.**

Gen. *HETEROTANAIS*, Sars.

1880. *Heterotanaïs*, Sars, Arch. Naturv. Christian., vol. vii., p. 28.

4. (?) *Heterotanaïs anomalus*, Sars.

1880. *Heterotanaïs anomalus*, Sars, Arch. Naturv. Christian., vol. vii., p. 30.

An ovigerous specimen, a little under 2 mm. in length, was taken at Zanzibar by Crossland. As no male accompanied it, the identification with the Mediterranean species can only be regarded as conjectural.

Tribe *FLABELLIFERA*.

Fam. **Anthuridæ.**

1814. Anthuridæ, Leach, Edinb. Encycl., vol. vii., p. 433.

1900. Anthuridæ, Stebbing, Willey's Zoological Results, pt. 5, p. 618.

1901. Anthuridæ, Whitelegge, Mem. Australian Mus., vol. iv., pt. 3, p. 216.

1904. Anthuridæ, Stebbing, Gardiner's Maldive and Laccadive Arch., vol. ii., pt. 3, p. 699.

1904. Anthuridæ, Stebbing, Spolia Zeylanica, vol. ii., pt. 5, p. 8.

1905. Anthuridæ, Stebbing, Herdman's Ceylon Pearl Fish., pt. 4, Rep. 23, p. 8.

1905. Anthuridæ, H. Richardson, Bull. U.S. Nat. Mus., No. 54, p. 62.

Under the last reference and that for 1900 a sufficiently full account will be found of the bibliography of this family.