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COPEPODA

BY

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Department of Agriculture (Fishery Branch), Dublin.

WITH THIRTY TEXT-FIGURES

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In the present paper the Pelagic Copepoda taken during the Great Barrier Reef Expedition are treated of from a systematic standpoint, with only brief references to their habitat, relative abundance, and seasonal and vertical distribution, since it is proposed that these latter points should be dealt with more fully in a separate paper.

The material examined consisted of samples from about 70 stations, the majority of the samples being from townettings taken weekly inside the reef from July, 1928, to July, 1929, at a fixed position, 3 miles east of the Laboratory on Low Island, referred to subsequently as 3 mi. E., where the depth was 32 metres, oblique hauls being made with both stramin and finer meshed nets from near the bottom to the surface. A few hauls were made further to seaward, usually at greater depths, in the channels running through the reef, viz. Trinity Opening, Stn. 8, 45 m., Stn. 11, 61 m., and Stn. 26, 57 m.; off Cape Bedford, Stn. 43, 30 m.; off Lizard Island, Stn. 44, 31 m.; Cook's Passage, Stn. 46, 33 m.; and Papuan Pass, Stn. 49, 46 m. Two stations were made just beyond the edge of the reef, Stn. 19, 225 m., and Stn. 29, 205 m., and in the deep water outside the reef were Stn. 50, in more than 400 m., and Stns. 20, 28 and 45, in more than 600 m.

The nets used in making the collection were mainly of two grades, stramin and coarse silk, 58 strands to the inch. A net of 1 metre square of coarse silk with 40 meshes to the inch was used on a few occasions for vertical hauls. It has not been thought necessary to specify in every case with what nets the specimens were taken, but in some instances the abbreviations S. = stramin net, C. = coarse silk net, international pattern, N. = coarse silk Nansen net, and 1 m. C. = coarse silk, 1 metre square, have been used.

On the stations at 3 mi. E. and in the reef passages oblique hauls were made with both stramin and coarse silk nets. On the deeper stations outside the reef these nets were used for vertical hauls. A full description of the nets and methods of collection and a detailed list of stations are given in Vol. II, No. 2 of this series of reports, but for the purposes of the present paper it will be sufficient to give particulars of the stations which were not situated at 3 mi. E. :

Station Number.	Date.	Position.	Depth in metres.
8	24th Aug., 1928	16° 30′ S. 145° 52′ E. (in Trinity Opening)	45
11	6th Sept., 1928	16° 24′ S. 145° 52′ E. (in Trinity Opening)	61
19	20th Oct., 1928	16° 20′ S. 146° 3′ E. (outside Trinity Opening)	225
20	,, ,,	16° 19′ S. 146° 7′ E.	>600
26	19th Nov., 1928	16° 24′ S. 145° 53½′ E. (in Trinity Opening)	57
28	23rd Nov., 1928	16° 19′ S. 146° 5′ E. (outside Trinity Opening)	>600
29	24th Nov., 1928	16° 17′ S. 146° 2′ E.	*ca.* 200
43	26th Feb., 1929	15° 16′ S. 144° 26½′ E. (off Cape Bedford)	30
44	27th Feb., 1929	14° 44′ S. 145° 27½′ E. (off Lizard Island)	31
45	28th Feb., 1929	14° 31′ S. 145° 35′ E. (outside Cook's Passage)	>600
46	,, ,,	14° 32′ S. 145° 32′ E. (inside Cook's Passage)	33
49	17th Mar., 1929	15° 47′ S. 145° 47′ E. (inside Papuan Pass)	46
50	18th Mar., 1929	,, ,, (outside Papuan Pass)	>400

The following report, it should be understood, refers for the most part to small samples from the townettings, not to the total gatherings. For the first 14 stations, Stn. 1–14, these samples contained both large and small species. For the remainder of the stations on the reef only the large species were sampled, except for the serial townettings on Stns. 62, 65 and 68, which were examined in their entirety. The whole contents of the gatherings made outside the reef were examined, except that from Stn. 45, 1 m. stramin, 500–0 m., the container of which was broken in transit, most of the contents being lost.

No attempt has been made to provide a synonymy, but a reference is given under each species to some reliable figure and description, to prevent any doubt as to the species referred to.

The total number of species here recorded in 193 ; made up of—

Calanoida	127 species.
Harpacticoida	6 ,,
Cyclopoida	60 ,,
Total	193 species.

These species fall into three groups : (1) The reef forms, which have their centre of distribution in the shore waters of low salinity, though also often found outside the reef. (2) The open sea epiplankton. (3) The deep water fauna.

The first group has probably been fairly completely sampled, as gatherings were made systematically throughout the year at the station at 3 mi. E. The second group will no doubt receive large additions from future collecting, as most of the records from outside the reef came from vertical hauls, made from a considerable depth, which only sampled the upper waters in passing. The third group is also clearly incomplete, as its area was only sampled on six stations outside the reef, with thirteen hauls, the deepest not going below 600 m. ; and although these stations furnish 74 species, omitting those known to be epiplanktonic, this number is only a small proportion of the general deep-water fauna, most species of which have a world-wide distribution.

The following is a list of the species taken, assigned as far as possible to these three groups. In some cases these assignments are necessarily provisional and in others arbitrary, the boundaries between the three classes not being always clearly defined. Species described as new, numbering 14 (and one variety), are given in heavy type.

LIST OF SPECIES.

CALANOIDA.

Coastal.

Calanus pauper
Undinula vulgaris
Eucalanus subcrassus
Paracalanus aculeatus
,, parvus
Acrocalanus gibber
Clausocalanus arcuicornis
Calocalanus pavoninus, n. sp.
Undinopsis tropicus
Euchaeta concinna
Scolecithrix danae
Centropages furcatus
,, gracilis
,, orsinii
Temora discaudata
Candacia aethiopica
,, discaudata
Calanopia elliptica
Labidocera acutifrons
,, acuta
,, laevidentata
,, sp. ?
,, detruncata
Pontella cristata
,, fera
,, danae
Pontellopsis regalis
,, krameri
,, macronyx
Acartia pacifica
Tortanus gracilis

Open sea.

Calanus tenuicornis
,, minor
,, gracilis
Undinula darwini
Eucalanus elongatus
,, attenuatus
,, mucronatus
,, crassus
Rhincalanus cornutus
,, nasutus
Mecynocera clausi
Paracalanus denudatus
Acrocalanus longicornis
,, gracilis
,, monachus
Clausocalanus furcatus
,, farrani
,, paululus
Calocalanus pavo
,, styliremis
,, contractus
,, plumulosus
Ctenocalanus vanus
Tanyrhinus naso, n. g. and n. sp.
Aetideus armatus
Euaetideus acutus
,, giesbrechti
Euchaeta longicornis
,, media
Euchaeta consimilis, n. sp.
Euchaeta wolfendeni
Euchaeta russelli, n. sp.
Scolecithrix bradyi
Centropages calaninus
Temora turbinata
Lucicutia flavicornis
,, gemina
,, clausi
,, ovalis
Heterorhabdus papilliger
Haloptilus spiniceps
,, acutifrons
,, mucronatus
,, longicornis
Euaugaptilus palumboi
Candacia curta
,, bispinosa
,, simplex
,, truncata
,, catula
,, longimana
Calanopia aurivillii
Labidocera minuta

Deep water.

Spinocalanus abyssalis
Chiridius gracilis
Pseudotharybis zetlandica
Gaetanus miles
,, pileatus
,, minor
Undeuchaeta plumosa
Xanthocalanus squamatus, n. sp.
Racovitzanus antarcticus
Scolecithrix ctenopus
Scolecithricella dentata
,, ovata
,, profunda
,, vittata
,, tenuiserrata
,, nicobarica
Scaphocalanus echinatus
Lophothrix latipes
Scottocalanus longispinus
Scottocalanus sedatus, n. sp.
,, **australis,** n. sp.
Scolecocalanus galeatus, n. g. and n. sp.
,, **lobatus,** n. sp.
Macandrewella asymmetrica, n. sp.
,, **sewelli,** n. sp.
,, **mera,** n. sp.
Temoropia mayumbaensis
Metridia venusta
Pleuromamma abdominalis
,, xiphias
,, gracilis
,, piseki
Heterorhabdus spinifrons
Haloptilus angusticeps
Augaptilus longicaudatus
,, spinifrons
Euaugaptilus filigerus

CALANOIDA.

Coastal.	Open sea.	Deep water.
	Pontella securifer	
	Pontellina plumata	
	Acartia pietschmanni	
	Acartia australis, n. sp.	
	Acartia danae	
	,, negligens	

HARPACTICOIDA.

Clytemnestra scutellata	Clytemnestra rostrata	Aegisthus mucronatus
Euterpina acutifrons	Setella gracilis	
	Microsetella norvegica	

CYCLOPOIDA.

Oithona similis	Oithona plumifera	Mormonilla phasma
,, rigida	,, tenuis	,, minor
Oncaea clevei	,, setigera	Pontoeciella abyssicola
Corycaeus speciosus	,, robusta	Conaea rapax
,, lubbocki	,, attenuata	Lubbockia aculeata
,, erythraeus	Oncaea venusta	,, squillimana
,, asiaticus	,, mediterranea	Pachysoma tuberosum
,, andrewsi	,, media	**Corissa parva,** n. g. and n. sp.
,, subtilis	,, ornata	
,, agilis	,, conifera	
,, catus	,, conifera var. **furcula,** nov.	
Corycella gibbula	Sapphirina metallina	
,, concinna	,, angusta	
Saphirella tropica	,, bicuspidata	
	,, scarlata	
	,, nigromaculata	
	,, stellata	
	,, auronitens	
	,, opalina	
	,, iris	
	,, ovatolanceolata	
	Copilia vitrea	
	,, mirabilis	
	,, quadrata	
	,, lata	
	Corycaeus crassiusculus	
	,, vitreus	
	,, robustus	
	,, typicus	
	,, flaccus	
	,, limbatus	
	,, longistylis	
	,, lautus	
	,, furcifer	
	,, minimus	
	,, pumilus	
	,, pacificus	
	Corycella carinata	
	,, curta	

NOTES ON SPECIES.

Calanoida.

Calanus tenuicornis, Dana.

Giesbrecht, 1892.

Occurrence.—Not taken inside the reef or in the reef passages. Common outside the reef on Stns. 19 and 20, scarcer on Stns. 28 and 45, not found on Stn. 50.

Length : ♀, 1·78–1·84 mm.

Calanus minor (Claus).

Giesbrecht, 1892.

Occurrence.—Occurred only occasionally, usually singly, inside the reef, but regularly in small numbers on the stations outside over deep water.

Length : ♀, 1·50–1·80 mm. ; ♂, 1·48–1·52 mm. The most frequent size of female was about 1·7 mm. Few males were found.

Calanus pauper, Giesbr.

Giesbrecht, 1892.

Occurrence.—Judging by the samples from which small species were available in their true proportions, this species was very plentiful inside the reef. It occurred all through the year. In townettings taken outside the reef it was very scarce.

Length : ♀, 1·38–1·68 mm. ; ♂, 1·35–1·52 mm.

Remarks.—Only two females with attached spermatophores were found, both on Stn. 55, 26th April, 1929, and in each case the spermatophore was attached to the right side of the cephalothorax, a little anterior to the middle, in a position in which it seemed impossible for it to function.

Calanus gracilis, Dana.

Giesbrecht, 1892.

Occurrence.—With the exception of one immature specimen in the reef passage, Stn. 11, all the examples were from outside the reef, where it occurred on Stns. 19, 20, 28 and 50 in small numbers.

Length : ♀, 2·48–2·95 mm. ; ♂, 2·65 mm.

Undinula vulgaris (Dana).

Calanus vulgaris, Giesbrecht, 1892.

Occurrence.—One of the most plentiful species in the collections from inside the reef, with a maximum from August to November, and a minimum in March. Females with attached spermatophores were taken from August to February and from May (few) to July, and adult males in every month. The number of females carrying spermatophores often reached 50% of the females present, and the males frequently were equal in numbers to the females. Outside the reef it was very scarce.

Length : ♀, 2·40–3·05 mm. ; ♂, 2·25–2·50 mm.

Undinula darwini (Lubb.).

Calanus darwinii, Giesbrecht, 1892.

Occurrence.—Like *Calanus minor*, this species only occurred very occasionally inside the reef, being taken on five stations between 31st August and 15th October. Three of these stations also yielded *Calanus minor*, which suggests that an influx of oceanic water had occurred. It was also taken in small numbers on three stations, 19, 20 and 45, outside the reef. This is probably its normal habitat.

Length : ♀, 2·16–2·20 mm.

Eucalanus elongatus (Dana).

Giesbrecht, 1892.

Occurrence.—Taken in very small numbers on most of the stations over deep water, Nos. 20, 28, 45 and 50 ; never inside the reef.

Eucalanus attenuatus (Dana).

Giesbrecht, 1892.

Occurrence.—A few were taken from time to time, usually singly, on the stations inside the reef. It also occurred in small numbers on all the stations at the edge of the reef and over deep water. It is evidently an oceanic species, like *E. elongatus*, but much more numerous.

Eucalanus mucronatus, Giesbr.

Giesbrecht, 1892.

Occurrence.—Rarely taken inside the reef, but regularly present in small numbers on the stations outside the reef.

Eucalanus crassus, Giesbr.

Giesbrecht, 1892.

Occurrence.—Very rarely taken inside the reef, on Stations 18, 35, 42, 43 and 44. Found in small numbers on all the stations outside the reef.

Eucalanus subcrassus, Giesbr.

Giesbrecht, 1892.

Occurrence.—Inside the reef this was, next to *Undinula vulgaris*, the most plentiful of the larger species. It occurred throughout the year on the stations at 3 mi. E., but in September, October and November, the months of maximum salinity on the reef, it became very scarce. Outside the reef it was very scarce, though usually present.

Length : ♀, 1·84–2·92 mm. ; ♂, 1·68–2·70 mm.

Remarks.—Females, apparently fully mature and with functional spermathecae, measured from 1·84–2·92 mm. in length ; one with an attached spermatophore measured 2·04 mm. Males fully developed measured 1·68–2·70 mm. Immature females apparently in stage V were found as large as 2·36 mm. and males similarly undeveloped up to 2·43 mm. The appendages of these specimens in stage V are, in the female, identical in jointing and setae with those in stage VI, but they are slightly less strongly chitinized, and the abdomen lacks the characteristic form of the adult, the genital segment being

less swollen. In the male in stage V the rigid form of the body found in the adult and the thickened first joint of the antennules are lacking; the thorax does not show the projecting lateral margin of the third segment and is without the lateral setae which are found on the third and fourth segments of the adult; the fifth feet show signs of immaturity in the shorter joints, with more rounded contours than in the adult. Seymour Sewell (1929) has given an account of the development of this species, but, probably because all his specimens represented a single brood taken on one station, the range of sizes found by him was comparatively small. viz. ♀, V 1·5–1·8 mm., ♀ VI, 1·9–2·1 mm., ♂ V, 1·35–1·5 mm., ♂ VI, 1·55–1·8 mm.

Rhincalanus cornutus (Dana).

Giesbrecht, 1892.

Occurrence.—Taken only three times at 3 mi. E., once in February and twice in May, but occurred regularly in small or moderate numbers both on Stns. 19 and 29 just outside the reef and also on the stations over deep water.

Rhincalanus nasutus, Giesbr.

Giesbrecht, 1892.

Occurrence.—Never taken inside the reef, in the reef passages nor on Stns. 19 and 29 just outside the reef. Present on all the stations over very deep water, but in very small numbers.

Mecynocera clausi, Thompson.

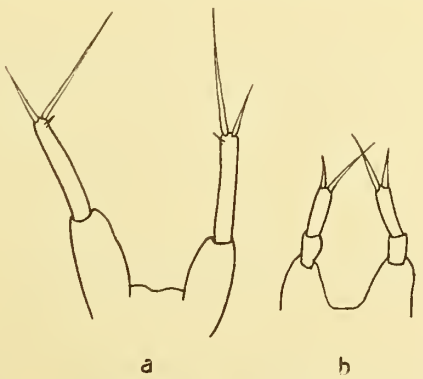
Giesbrecht, 1892.

Occurrence.—Occurred occasionally in the samples of small species preserved from inside the reef and the reef passages. Found regularly at the edge of the reef and over deep water, except on Stn. 29, from which only stramin townettings were available.

Paracalanus aculeatus, Giesbr. (Text-fig. 1.)

Giesbrecht, 1892.

Occurrence.—This is probably the most abundant species in the collections made at 3 mi. E., occurring in large numbers in all the fine-meshed nets from which samples



Text-fig. 1.—*Paracalanus aculeatus*. Female: *a*, fifth feet, × 400. *Paracalanus denudatus*. Female: *b*, fifth feet, × 400.

of the smaller species were available, and occasionally also amongst the larger species and in the stramin net gatherings. A large range of sizes was met with amongst the females from 3 mi. E. On Stns. 1–10 (27th July to 4th September) the range was from ·90–1·10 mm. with a maximum between ·96 and 1·02 mm., but from 5th September onwards only specimens between ·78 and ·90 mm. were found, and not till Stn. 61 (14th June) were specimens above ·9 mm. again seen.

Outside the reef, in the deep-water hauls, a few specimens of the typical reef form of *P. aculeatus* were taken, mostly of large size, ·96–1·23 mm.

The fifth feet of the female (Text-fig. 1, *a*) closely resembled those figured by Seymour Sewell (1929) for his *P. aculeatus* forma *major*.

Paracalanus denudatus, Sewell. (Text-fig. 1.)

Sewell, 1929.

Occurrence.—In hauls outside the reef.

Remarks.—Most of the specimens of *Paracalanus* of the *aculeatus* section taken in the hauls outside the reef were of a small size, ·73–·96 mm., and slender form, closely resembling *P. denudatus*, with which I provisionally identify them, and with which they agreed in the jointing of the antennules, the last joint of which was almost as long as the two preceding joints taken together. They differed from *P. denudatus* in their larger size and in having slightly shorter terminal spines on the exopodites of the swimming-feet, the proportions of the terminal joint to the end spine being in the case of the second, third and fourth feet respectively 100 to 128, 100 to 104 and 100 to 85. These figures are nearer to those given by Seymour Sewell (1929) for *P. aculeatus* than to those for *P. denudatus*. The armature on the face of the swimming-feet is greatly reduced, consisting of a few fine spinules on the endopodites and a transverse row of four fine spinules on the first joint of the exopodite of the second foot. The spinulation of the outer edge of the third joint of the exopodites is reduced to 6–7 fine spines on the second foot, 8–11 on the third foot and none on the fourth foot. The fifth feet (Text-fig. 1, *b*) are 3-jointed, sometimes 2-jointed, and small in comparison with those of *P. aculeatus*. The furcal rami are a little longer and narrower and closer together than in *P. aculeatus*.

Paracalanus parvus (Cls.).

Sars, 1903.

Occurrence.—Frequent inside the reef, but not nearly as common as *P. aculeatus*. Outside the reef it occurred in very small numbers in most of the townettings, but, owing to its small size, the collections probably do not indicate its true numbers.

Length : ♀, ·72–·90 mm.

Acrocalanus longicornis, Giesbr.

Giesbrecht, 1892.

Occurrence.—Taken occasionally at 3 mi. E., either singly or in small numbers. Occurred more regularly outside the reef, but was always scarce.

Length : ♀, 1·24–1·44 mm.

Acrocalanus gibber, Giesbr.

Giesbrecht, 1892.

Occurrence.—More numerous than *A. longicornis* at 3 mi. E., though never common, but scarcer than that species on the stations outside the reef.

Length : ♀, 1·02–1·15 mm.

Acrocalanus gracilis, Giesbr.

Giesbrecht, 1892.

Occurrence.—Found more often than *A. longicornis* at 3 mi. E., but not so often as *A. gibber*. On the stations outside the reef it was usually present in small numbers.

Length : ♀, 1·20–1·30 mm.

Remarks.—Occasionally female specimens were found with a minute unjointed fifth foot.

Acrocalanus monachus, Giesbr.

Giesbrecht, 1892.

Occurrence.—Taken only three times at 3 mi. E., but rather more numerous than *A. gracilis* on the stations outside the reef.

Length : ♀, ·92–·96 mm.

Clausocalanus furcatus (Brady).

Giesbrecht, 1892.

Occurrence.—Occurred frequently, but always in very small numbers, on the stations at 3 mi. E. Moderate or common on most of the stations outside the reef.

Length : ♀, 1·00–1·19 mm.

Clausocalanus farrani, Sewell.

Sewell, 1929.

Occurrence.—Only occurred outside the reef, where it was very scarce except on Stn. 19, on which 32 specimens were found. This suggests that its habitat is sub-oceanic.

Length : ♀, 1·09–1·22 mm.

Remarks.—This species was recently described by Seymour Sewell (1929) from the "Investigator" collections in the Indian Ocean. The specimens here recorded are slightly larger than those of the original description, but in other respects the resemblance is very close. The flattened outline of the forehead, with rostral points directed straight downwards, serves to indicate the species without examination of the appendages. The fifth feet, as in the type, and also in *C. arcuicornis* forma *minor* Sewell, are comparatively long and have divergently-forked tips, finely serrated on the inside of the forks. The serrations in my specimens are so minute that they cannot be seen except under very high magnification.

Clausocalanus paululus, Farran.

Farran, 1926.

Occurrence.—Taken outside the reef only, on three out of six stations. Considering its very small size the species must have been fairly common, as probably most of the specimens went through the meshes of the net.

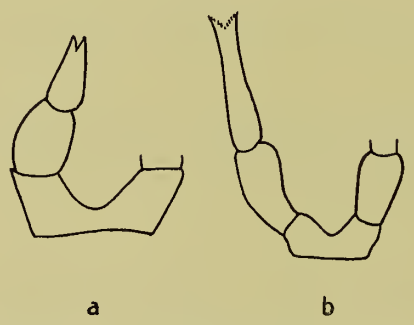
Length : ♀, ·72–·75 mm.

Remarks.—These specimens agreed in size and proportions and in the form of the fifth feet with those originally described from the Bay of Biscay (Farran, 1926). One specimen carried, attached to its genital segment, a bunch of three spermatophores measuring from ·144–·168 mm. in length.

Clausocalanus arcuicornis (Dana). (Text-fig. 2.)

Giesbrecht, 1892.

Occurrence.—The larger form only occurred once inside the reef, on Stn. 13, but was found in small numbers on all the stations outside. The common form inside the



Text-fig. 2.—*Clausocalanus arcuicornis*. Female, fifth feet, × 285. *a*, of large form ; *b*, of small form.

reef was the smaller one, which was found in small numbers on almost all the stations from which small specimens were available. It was occasionally observed outside the reef in company with the larger form.

Remarks.—The specimens which are here included under this name fall into two distinct size groups as regards the females, the larger measuring 1·38–1·62 mm., the smaller 1·08–1·28 mm. The larger specimens are the more robust and have a shorter abdomen, which is contained from 3·7 to 4 times in the length of the cephalothorax. The cephalon is rounded and the rostrum bent slightly backwards. The fifth feet (Text-fig. 2, *a*) are similar to those of the large (1·6 mm.) Atlantic form.

The smaller have a proportionally longer abdomen, contained 2·5 to 2·7 times in the length of the cephalothorax. The cephalon is rounded and the rostrum bent slightly backwards, as in the larger form, but the fifth feet (Text-fig. 2, *b*) are markedly different, resembling closely Sewell's (1929) figure of the fifth feet of *Clausocalanus arcuicornis* forma *minor*. At first sight the smaller form has some resemblance to *Clausocalanus pergens*, which it resembles in the proportions of cephalothorax and abdomen, but it differs in its larger size and in its fifth feet, which end in a divergent fork with fine denticulations on its inner margin. The fifth feet of *C. pergens* end in two closely-set points.

It is not possible to correlate these two size groups with the two forms *major* and *minor* which Sewell has described from the Indian Ocean. In them the abdomen of the larger form is proportionately considerably longer than that of the smaller. Here the reverse is the case. It may be noted that Sewell's figure, but not his description, of the form *minor* agrees fairly well with the smaller Barrier Reef form. In the figure the abdomen is shown as contained about 2·7 times in the length of the anterior division, but in the description it is said to be 3·17 times.

Calocalanus pavo (Dana).

Giesbrecht, 1892.

Occurrence.—Occasionally inside the reef and in the reef passages, and regularly in small numbers in the fine-meshed nets fished outside the reef.

Length : ♀, 1·15 mm.

Calocalanus styliremis, Giesbr.

Giesbrecht, 1892.

Occurrence.—Outside the reef, over deep water : very scarce.

Length : ♀, ·62–·68 mm. Possibly its scarcity is due in part to its small size.

Calocalanus contractus, Farran.

Farran, 1926.

Occurrence.—Found twice inside the reef, but regularly in the fine-meshed nets fished outside the reef. Much less scarce than *C. styliremis*.

Length : ♀, ·66–·84 mm.

Calocalanus plumulosus (Cls.).

Giesbrecht, 1892.

Occurrence.—Only once found inside the reef, Stn. 10, one specimen, but regularly outside over deep water in small numbers.

Length : ♀, 1·05 mm.

Calocalanus pavoninus, n. sp. (Text-fig. 3.)

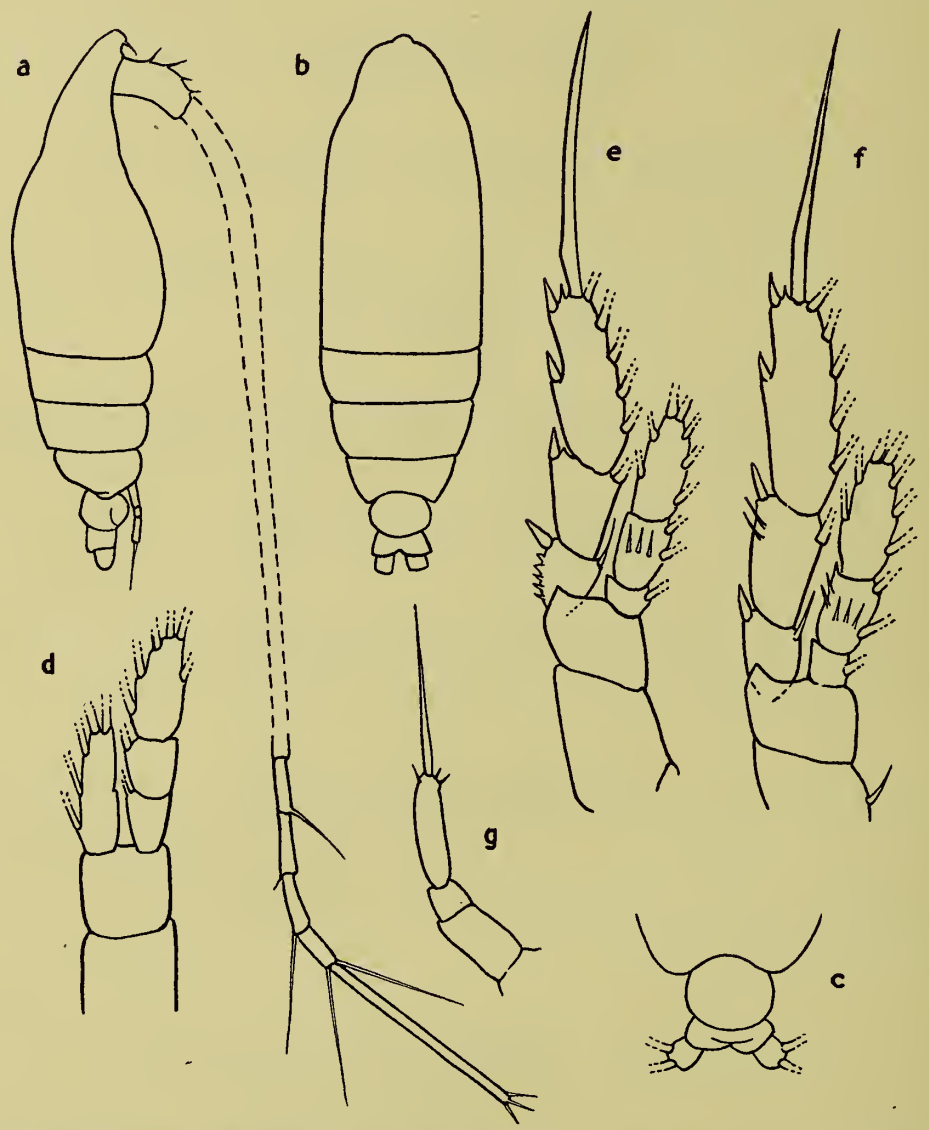
Occurrence.—A few specimens on Stns. 7 and 13 at 3 mi. E. and possibly on others also, since its specific distinctness was not at first recognized.

Description.—Female (Text-fig. 3, *a*, *b*), length ·71 mm., cephalothorax ·61 mm., abdomen ·10 mm. ; width of cephalothorax in dorsal view ·22 mm., or contained $3\frac{1}{4}$ times in the total length ; cephalon not separated from first thoracic segment. Dorsal outline of cephalothorax in lateral view not forming a uniform curve, but bent inwards in a marked re-entrant angle opposite the insertion of the mandible. Abdomen (Text-fig. 3, *c*) 2-jointed ; genital segment slightly wider than long in dorsal view, anal segment about twice as wide as long. Furcal rami about as wide as long, a little shorter than the anal segment.

Antennules about twice as long as the whole animal. Length of joints in ·01 mm. :

	1–2.	3.	4.	5.	6.	7.	8–9.	10.	11.	12.	13.	14.
Length .	10·5	3	2·5	2·5	2·5	2·5	5·5	3·5	3·5	3·5	4	4·5

	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.
Length .	5·5	6·5	6·5	8	8	8	8·5	9·5	8	5·5	32



Text-fig. 3.—*Calocalanus pavoninus*, n. sp. Female : *a*, lateral view, × 98 ; *b*, dorsal view, × 98 ; *c*, abdomen, × 150 ; *d*, first foot, × 435 ; *e*, second foot, × 435 ; *f*, third foot, × 435 ; *g*, fifth foot, × 435.

Joints 13 to 20 each with a longitudinal row of very fine spinules along the upper margin, as in *C. pavo*.

Mouth-parts apparently as in *C. styliremis* and *C. contractus*. First foot (Text-fig. 3, *d*) with 3-jointed exopodite and 1-jointed endopodite. Second to fourth feet (Text-fig. 3, *e*, *f*) with 3-jointed exopodites and endopodites ; there is a transverse row of three or four

spinules across the second joint of the endopodite of the second to fourth feet. The exopodites, as far as could be made out, were without spinules except for a close-set uniform row of teeth-like spinules on the outer edge of the first joint of the exopodite of the second foot, and two moderately long spinules near the outer edge of the second joint of the exopodite of the third foot. The fourth feet were not found entire. Fifth feet (Text-fig. 3, *g*) long and slender, reaching almost to the end of the anal segment, 3-jointed, the second joint about as wide as long, the third joint about four times as long as wide, and terminated by a strong spine with 2–3 fine spinules at its base.

Remarks.—This species was at first mistaken for *C. contractus*, to which it is closely allied. It is separated, however, by the emarginate dorsal outline of the cephalon in lateral view, by the presence of a single terminal seta on the fifth feet and, in the only instance in which an unbroken antennule was found, by the long terminal joint, longer than the three preceding joints taken together. In practice *C. pavoninus* can be distinguished from *C. contractus*, which it resembles somewhat in form and size, by the single stout seta on the end of the fifth foot, and from *C. styliremis* by the small size and very squat form of the latter.

Ctenocalanus vanus, Giebr.

Giesbrecht, 1892.

Occurrence.—Only taken outside the reef in hauls with 150 m. of warp or more. On every such station it occurred in small numbers in the fine-meshed nets.

Length : ♀, ·81–1·10 mm. ; ♂, 1·20 mm.

Spinocalanus abyssalis, Giesbr.

Giesbrecht, 1892.

Occurrence.—Only taken outside the reef in hauls with 250 or 500 m. of warp. Very few specimens.

Length : ♀, ·85–·90 mm.

Remarks.—All the specimens seemed to belong to the form which I described from the Bay of Biscay (1926) as var. *pygmaeus*, from specimens measuring ·95–1·08 mm.

Tanyrhinus, n. gen.

Body resembling *Calanus* in general form. Cephalon separated from first thoracic segment. Fourth and fifth thoracic segments separate. Rostrum of a single stout point. Abdomen 4-jointed. Antennules 23-jointed, joints 8–9 and 24–25 being fused. Second antenna as in *Mimocalanus*, with 2 setae on the inner margin of the second joint of the exopodite. Mandible with large 2-branched palp ; endopodite 2-jointed, longer than the exopodite. Maxilla as in *Mimocalanus* and *Spinocalanus*. Second maxilla as in *Paracalanus*, except that the fourth lobe is larger than the fifth. Maxillipede of *Mimocalanus* type, with well-developed setae on the outer margin of the last two joints. Swimming-feet with jointing and setae as in *Spinocalanus*, except that the first and second joints of the exopodite of the first foot are without setae. Fifth feet absent.

The systematic position of this genus, in the neighbourhood of *Spinocalanus*, *Mimocalanus* and *Monacilla*, is indicated by the presence of five setae on the inner edge and

three spines on the outer edge of the third joint of the exopodite of the second to fourth feet and the absence of the fifth feet. The separation of the cephalon and first thoracic segment and of the fourth and fifth thoracic segments are characters in which it approaches *Mimocalanus* and *Monacilla*. The unusually long third joint of the exopodite of the first foot is unusual, as is also the well-developed single rostrum, on which no trace of rostral filaments could be detected. The presence of a 2-pointed asymmetrical rostrum in *Monacilla tenera*, with one of the points much stronger than the other, suggests that a single rostral process might arise by the suppression of the smaller point.

Tanyrhinus naso, n. sp. (Text-fig. 4.)

Occurrence.—One specimen outside the reef, on Stn. 28, C. 600–0 m.

Description.—Female (Text-fig. 4, *a*, *b*), length ·89 mm., cephalothorax, in the middle line, ·67 mm., abdomen ·22 mm. Cephalon narrow and pointed in dorsal view but somewhat flattened laterally, with stout conical rostrum (Text-fig. 4, *c*) extending between the bases of the antennules. Abdominal segments and furca (Text-fig. 4, *d*) in the proportion 21.12.13.16.16. Antennules (Text-fig. 4, *c*) 23-jointed, reaching to about the anal segment, length ·69 mm. Length of joints in ·01 mm. :

Text-fig. 4.—*Tanyrhinus naso*, n. sp. Female : *a*, dorsal view, × 68 ; *b*, lateral view, × 68 ; *c*, front of cephalon and rostrum ; *d*, abdomen, × 240 ; *e*, antennule, × 166 ; *f*, antenna ; *g*, mandible palp ; *h*, second maxilla ; *i*, maxillipede ; *j*, first foot ; *k*, second foot ; *l*, fourth foot (*f*–*l* × 260).

	1.	2.	3.	4.	5.	6.	7.	8–9.	10.	11.	12.	13.
Length .	5·1	4·5	2·0	1·9	1·8	1·9	1·9	3·2	2·0	2·0	2·3	2·3

	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24–25.
Length .	2·5	2·5	2·8	2·7	3·1	3·4	3·4	3·7	3·8	5·0	6·4

Setae on seventh, fourteenth, eighteenth and twenty-first joints stronger than the rest ; distal setae on the posterior margin of twenty-second and twenty-third joints and a median seta on the posterior margin of the last joint. Antenna (Text-fig. 4, *f*) with endopodite equal in length to the exopodite, which has two setae on the inner margin of the second joint. Mandible (Text-fig. 4, *g*) with endopodite longer than the exopodite. Maxilla as in *Paracalanus*. Second maxilla (Text-fig. 4, *h*) as in *Spinocalanus*. Maxillipede (Text-fig. 4. *i*) with oblique segmentation between first and second joints.

First foot (Text-fig. 4, *j*) with endopodite long and narrow ; exopodite without outer edge spines on first and second joints ; third joint almost as long as first and second taken together. with four inner edge setae. Second to fourth feet (Text-fig. 4, *k*, *l*), exopodite with 1.1.3 outer edge spines and 1.1.5 inner edge setae ; terminal spines about four-fifths as long as the third joint, with narrow laminae and moderately coarse serrations.

Aetideus armatus, Boeck.

Sars, 1903.

Occurrence.—On Stn. 19 outside the reef, one female in the 1 m. silk net, 180–0 m., and another, dead when caught, in coarse silk net 180–0 m.

Length : ♀, 1·33–1·44 mm.

Euaetideus acutus (Farran).

Aetideus acutus, Farran, 1929.

Occurrence.—Several specimens were taken on the deep-water stations 19, 20, 28, 45 and 50, outside the reef.

Length : ♀, 1·56–1·62 mm. ; ♂, 1·23–1·30 mm. These are slightly smaller than the specimens originally described from New Zealand (Farran, 1929), but agree closely otherwise.

Euaetideus giesbrechti (Cleve).

Aetideus giesbrechti, Sars, 1925.

Occurrence.—One male, stage V, length 1·63 mm., was taken on Stn. 45, C. 500–0 m. Though the specimen was immature, there seems no risk of error in referring it to this species, which has already been recorded from New Zealand (Farran, 1929).

Chiridius gracilis, Farran.

Farran, 1908. With, 1915.

Occurrence.—One female on Stn. 28, S. 600–0 m., and an immature male, probably of the same species, in the coarse silk net at the same depth.

Length : ♀, 2·70 mm.

Undinopsis tropicus, Wolfenden.

Wolfenden, 1905.

Occurrence.—This species, benthic by day, was moderately common in the serial night hauls (Stn. 65) at 3 mi. E., when it was taken in the net with 10 m. of warp, with a maximum in the net with 20 m. of warp. One specimen was found near the bottom, 40 m. of warp, in the serial hauls by day at 3 mi. E. (Stn. 62), two females in the stramin net, 32–0 m., on Stn. 21 at 8.40 p.m., and one immature specimen in a haul with 150 m. of warp over a depth of 400 m. on Stn. 50—a daylight haul. In these movements it agrees with the closely allied species *U. bradyi*.

Length : ♀, 1·55–1·63 mm. ; ♂, 1·26–1·28 mm.

Remarks.—These specimens are slightly larger than those from the Maldive Archipelago (♀, 1·2 mm.) for which Wolfenden (1905) proposed the name *U. tropicus*, but are much smaller than the North Atlantic species *U. bradyi*, which measures, ♀, 2·4–2·6 mm.

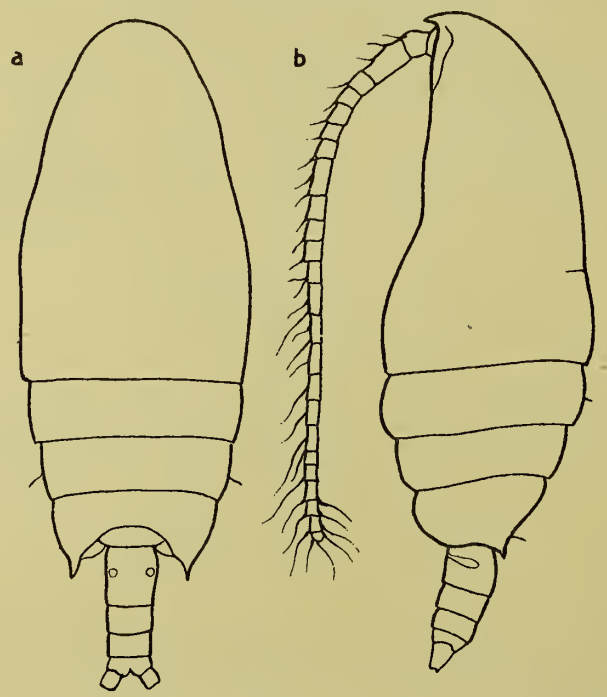
Pseudotharybis zetlandica, T. Scott. (Text-fig. 5.)

T. Scott, 1909.

Occurrence.—One specimen in the bottom stramin net on Stn. 29, 205 m.

Length : ♀, 3·18 mm.

Remarks.—Although this specimen (Text-fig. 5, *a*, *b*) is smaller than that originally described by T. Scott (1909) from off the North coast of Scotland (3·8 mm.), and differs somewhat in the shape of the body from the figure given by Scott, there does not seem to be sufficient reason for separating it. The original specimen was taken from deep water, 1140 m., and we may assume that it came from a townetting taken at or close to the bottom, as several other specimens have since then been taken in townets attached to trawls in deep water off the west coast of Ireland. The numerous strong setae on the



Text-fig. 5.—*Pseudotharybis zetlandica*. Female : *a*, dorsal view, × 28 ; *b*, lateral view, × 28.

antennules, such as are found in *Undinopsis* and *Bryaxis*, both bottom-living genera, are possibly an adaption to life on the bottom. The Irish specimens, which measured 4·4 mm., were similar in form to that here recorded.

Gaetanus miles, Giesbr.

Giesbrecht, 1892.

Occurrence.—One specimen on Stn. 28, C. 600–0 m.

Length : Stage V, 2·52 mm. ; antennules, 6·84 mm. There is no described species but *G. miles* to which this immature specimen can be referred.

Gaetanus pileatus, Farran.

Giesbrecht, 1924.

Occurrence.—One dead specimen, female, on Stn. 28, S. 600–0 m.

Gaetanus minor, Farran.

Giesbrecht, 1924.

Occurrence.—Three females and one stage IV on Stn. 28, C. 600–0 m.

Length : ♀, 2·10 mm.

Undeuchaeta plumosa (Lubb.).

Undeuchaeta minor, Giesbrecht, 1892.

Occurrence.—On Stn. 28, one female and two specimens stage V in the coarse silk net, 600–0 m., and five females and one specimen stage V in the stramin net, 600–0 m.

Length : ♀, 3·25–3·50 mm.

Euchaeta longicornis, Giesbr.

Giesbrecht, 1892.

Occurrence.—Characteristic of oceanic waters, as it only occurred outside the reef, but apparently not a deep-water form, as on Stn. 50 eight females were taken in a vertical haul from 150 m. and one in another haul from 170 m. It also occurred in four hauls from deeper water, on Stns. 20, 28, 45 and 50, from one to four specimens in each, but was probably taken during the ascent of the net.

Length : ♀, 2·67–2·76 mm.

Euchaeta media, Giesbr.

Giesbrecht, 1892.

Occurrence.—One female on Stn. 28, S. 600–0 m. Probably taken near the surface when hauling.

Length : ♀, 3·80 mm.

Euchaeta concinna, Dana. (Text-fig. 6.)

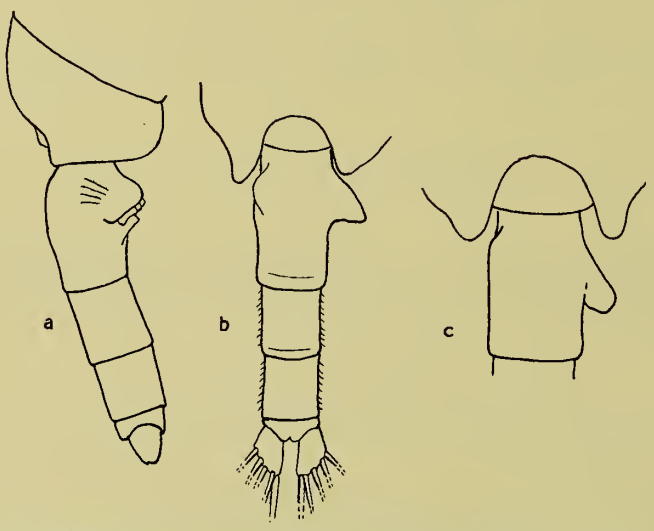
Giesbrecht, 1892.

Occurrence.—One of the most characteristic species of the fauna inside the reef occurring frequently and sometimes very plentifully at 3 mi. E., where it showed a marked maximum from May to October. Absent outside the reef.

Length : ♀, 3·25–3·40 mm. (Text-fig. 6, *c*) ; ♂, 2·54–2·76 mm. As Dana's original description is not accompanied by figures I have taken Giesbrecht's (1892) figures as indicating the species.

Euchaeta consimilis, n. sp. (Text-fig. 6.)

Occurrence.—Stn. 28, C. 600–0 m., ♀ 1. Stn. 29, stramin bottom net, 205 m., ♀ 1. Stn. 50, S. 400–0 m., ♀ 2.



Text-fig. 6.—*Euchaeta consimilis*, n. sp. Female abdomen : *a*, lateral view, × 55 ; *b*, dorsal view, × 55. *Euchaeta concinna*. Female : *c*, genital segment, × 55.

Description.—Outside the reef the place of *E. concinna* was taken by a few specimens, females, of a smaller species, length 2·36–2·67 mm., which closely resembles it, but seems to deserve recognition as being specifically distinct. The grounds for separating the smaller species lie in the size, coupled with a difference in distribution and a difference in the form of the projection on the right side of the genital segment when seen in dorsal view (Text-fig. 6, *b*). The appendages do not differ from those of *E. concinna*. This species is very closely allied to *E. concinna* as identified and figured by Giesbrecht (1892), and it seems probable that it has been regarded as an extreme form of it by others. Wolfenden's (1905) figure of a specimen of *E. concinna* from the Maldive Archipelago undoubtedly refers to *E. consimilis*, and A. Scott (1909) has included both Giesbrecht's and Wolfenden's references in his list of synonyms, from which it might be inferred that they were accepted by him as identical. Dana's (1849) original description of *E. concinna* could be taken as referring to *E. consimilis*, but Giesbrecht, who was the next to use the name, gave figures which showed that he had the larger species before him, and unnecessary confusion would be caused by the rejection of his identification. Seymour Sewell (1929) mentions that *E. concinna* is the most common species of the genus in Indian waters, and

records the measurements of a large number of specimens from a single station. These cover, for the females, a range of ca. 2·5–3·5 mm. He comments on the degree of variation in the size of the projection on the right side of the genital segment, and may have regarded the present species as a form of *E. concinna*.

A few specimens of *E. consimilis*, apparently identical with that here described, were found in a small collection of copepods made at Christmas Island in 1908 by the late Dr. C. W. Andrews. *E. concinna* appeared to be absent from this collection.

Euchaeta wolfendeni, A. Scott.

A. Scott, 1909.

Occurrence.—One specimen was taken at 3 mi. E. on Stn. 6. Outside the reef it was found on Stn. 19, S. 180–0 m., 2 specimens; C. 180–0 m., 2 specimens; and on Stn. 20, N. 250–0 m., 8 specimens.

Length: ♀, 2·55–2·64 mm.

Remarks.—This seems to be an epiplanktonic species like *E. longicornis*, but much scarcer. The specimen on Stn. 6 had probably drifted in. Sars (1925) claims that *E. wolfendeni* is a synonym of his *E. pubera*, but, as Seymour Sewell (1929) has pointed out, Sars' figures of *E. pubera* are not at all like *E. wolfendeni*.

Euchaeta russelli, n. sp. (Text-fig. 7.)

Occurrence.—This is the characteristic *Euchaeta* of the waters outside the reef, as *E. concinna* is of the shoal-water inside. Males, females and immature specimens were taken in considerable numbers on every haul made outside the reef. The most productive haul was on Stn. 29, stramin bottom net at 205 m., which gave 140 females.

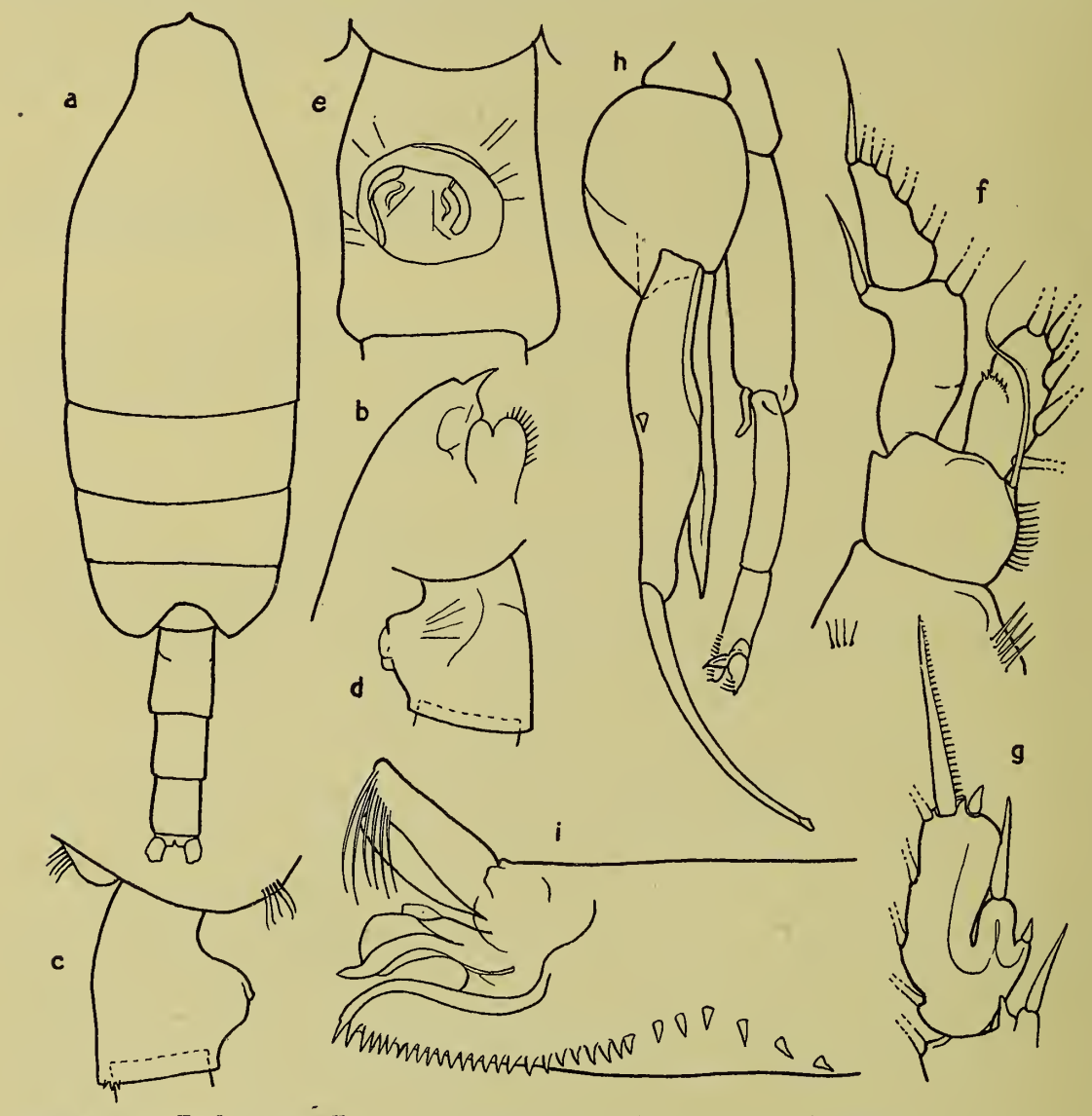
Description.—Female (Text-fig. 7), length, 4·24–4·38 mm. Cephalothorax $2\frac{1}{2}$ times as long as the abdomen, in the proportion, in mid-dorsal line, of 3·08 to 1·24. Frontal prominence slight. Last thoracic segment with bluntly rounded lateral margins, which bear each a postero-ventral tuft of hairs. There is a medio-dorsal tuft of hairs just posterior to the hinder margin of the last segment of the carapace. Abdominal segments and furca in the proportion 60.40.35.2.20, the anal segment being almost concealed beneath the preceding segment. Genital boss (Text-fig. 7, *c*, *d*) slightly projecting. Genital opening (Text-fig. 7, *e*) enclosed by a pair of low, curved lateral plates, that on the left side being shorter and more opaque than that on the right. Within these plates are a pair of ridges not visible in lateral view. There is a faint transverse dorso-lateral ridge to the left of the middle line at the anterior third of the genital segment. On the postero-ventral margin of the genital segment is a small median tuft of fine hairs. The posterior margins of the genital and second abdominal segments bear a few fine spinules, otherwise the abdomen is smooth. The furca is setose. Terminal furcal setae of about equal thickness and length, about two-thirds of the abdomen, except the second from within, which is about twice as long as the rest. Appendicular seta basally as thick as the other furcal setae and about twice as long as the abdomen.

Antennules reaching to the posterior margin of the genital segment. Other cephalic appendages closely resembling those of *Euchaeta hebes*.

First foot (Text-fig. 7, *f*) with the segmentation between the first and second joints of the exopodite faintly indicated, outer edge seta very minute. Second foot with terminal spine about equal to the third joint of the exopodite. First outer edge spine of

the third joint of the exopodite very short; second outer edge spine long, slightly longer than the outer edge spine of the second joint and almost reaching to the end of the third outer edge spine.

Male, length 3·74–4·08 mm. Cephalon to abdomen in the proportion 9 to 4. Fifth feet (Text-fig. 7, *h*, *i*) of the same type as in *Euchaeta hebes*, but with the comb-like



Text-fig. 7.—*Euchaeta russelli*, n. sp. Female, *a*, dorsal view, × 27; *b*, rostrum, × 52; *c*, *d*, genital segment, lateral view, × 52; *e*, genital segment, ventral view, × 96; *f*, first foot, × 125; *g*, third joint of exopodite of second foot, × 77. Male: *h*, fifth feet, × 51; *i*, terminal joint of exopodite of left fifth foot, × 320.

ridge on the second joint of the exopodite of the left foot more regular, and running along the margin of the joint.

Remarks.—A. Scott (1909), in dividing the original Genus *Euchaeta* into two sections, *Euchaeta* and *Pareuchaeta*, took as one of the distinguishing marks of *Euchaeta* the presence of long widely separated spinules on the innermost seta of the sixth lobe of the first maxillipede, more properly known as the second maxilla. In *Pareuchaeta* this seta

bears a uniform closely set fine spinulation. In his figures of these setae he designates them, by an obvious oversight, as those of the second maxillipede. The other distinguishing character which he indicates is the spinous prolongation in *Euchaeta* of the tip of the third joint of the exopodite of the male left fifth foot.

Sars (1925), in his diagnosis of the two genera, introduces a third character, the appendicular seta on the furca of the female. In *Euchaeta* this seta is long and thickened; in *Pareuchaeta* it is more slender than the terminal furcal setae. Relying apparently on the first and last of these three characters he includes the species *hebes* in the genus *Euchaeta*, although the third joint of the left fifth foot exopodite of the male is not prolonged into a point. The present species occupies a similar position to *E. hebes* as in it the thickened appendicular seta is present, and also the long spinules on the innermost seta of the sixth lobe of the second maxilla, but the spinous prolongation of the left fifth foot of the male is absent.

Xanthocalanus squamatus n. sp. (Text-fig. 8.)

Occurrence.—One specimen, somewhat injured, on Stn. 19, outside the reef, in a vertical haul from 180 m., over a depth of 225 m., consequently not far from the bottom.

Description.—Female (Text-fig. 8, *a*), length, 3·2 mm. Body stout, ovate, with short, stout abdomen. Fifth thoracic segment (Text-fig. 8, *b*) produced laterally into sharp points. Length of cephalothorax to end of lateral points 2·7 mm., cephalon 1·75 mm., abdomen ·63 mm. The abdomen is sparingly clothed with small transparent scales or scale-like spinules which seem to be easily rubbed off.

Length of joints of the antennule in ·01 mm., measured along the posterior edge:

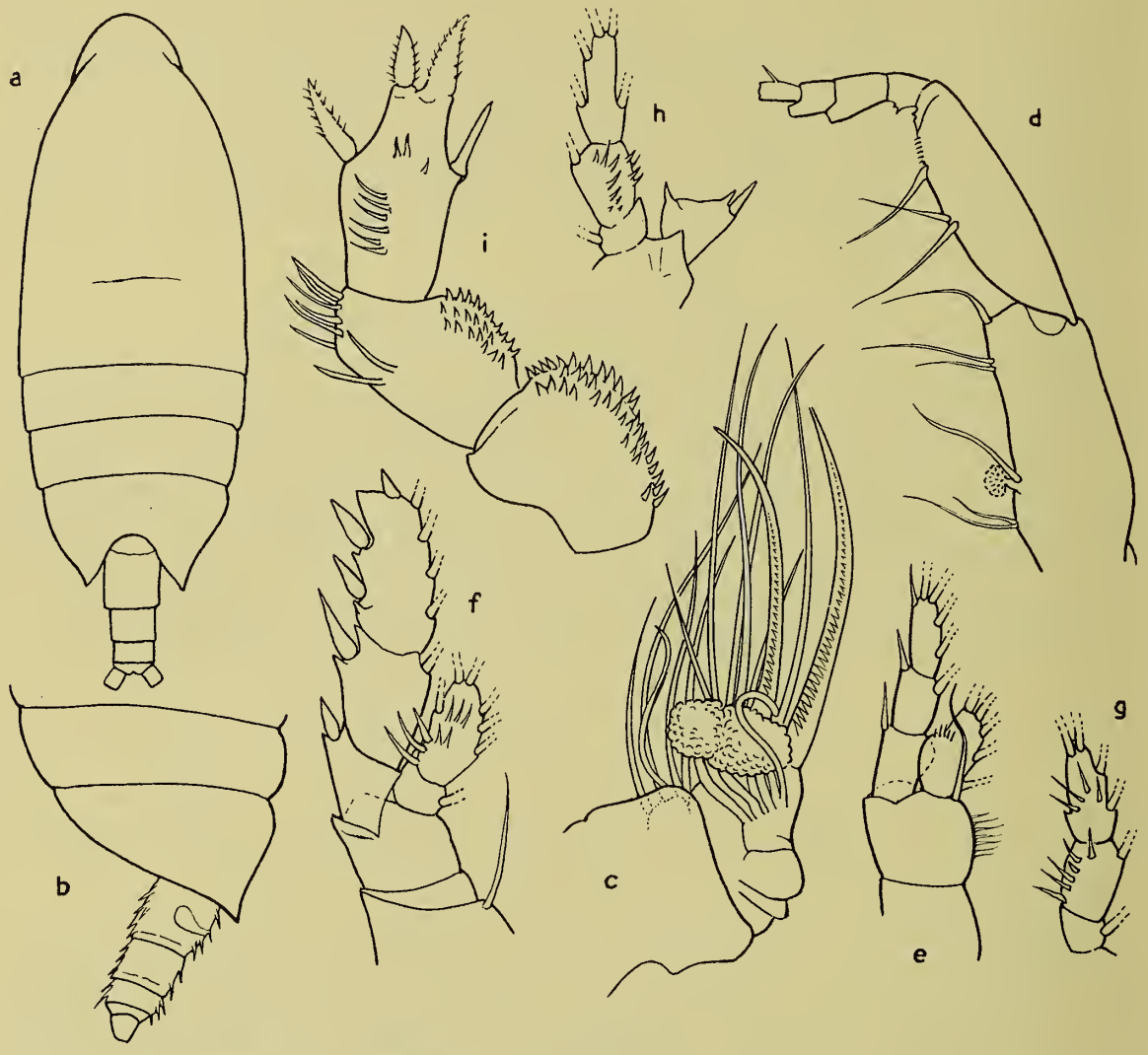
	1.	2.	3.	4.	5.	6.	7.	8–9.	10.	11.	12.	13.
Length .	23	13·5	9·4	8·8	9·4	9·4	8·8	14·2	6·7	8·1	10·5	12·1

	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.
Length .	12·6	15·5	16·1	16·1	15·1	12·8	12·1	10·8	7·7	13·5	14·8	*x*

Joints 8 and 9 fused, terminal joint missing.

Aesthetascs are present on joints 2, 3, 8–9, 12, 14 and 19, noticeable setae on the anterior margins of joints 1 (2), 2 (4), 4 (2), 7 (1), 14 (1), 18 (1) and 21 (1), and minute setae on the other joints. Antenna with endopodite about half as long as the exopodite. Mandible palp with equal rami. Maxilla not examined in detail. Second maxilla (Text-fig. 8, *c*) with stout toothed spines on the fourth and fifth lobes, terminal setae scoleciform, their ends coalescing in a spongy rounded bilobed mass, except the most distal, which is not involved. Maxillipede (Text-fig. 8, *d*) with a short-stalked sheaf-like seta on the proximal third of the first joint. First foot (Text-fig. 8, *e*) with outer edge spines on all joints of the exopodite. Second foot (Text-fig. 8, *f*), exopodite without spinules, endopodite with an oblique and a transverse row of spinules on the second joint. Third foot, exopodite without spinules, endopodite (Text-fig. 8, *g*) with an oblique row of spinules on the second joint and a curved transverse row on the third joint. Fourth foot with minute spinulation on the face of the third joint of the exopodite; endopodite (Text-fig. 8, *h*) with both large and small spinules on the face of the second joint, and a row of spinules on its outer margin.

Fifth foot (Text-fig. 8, *i*) 3-jointed; inner margin of first and second joints closely beset with short, stout spinules, outer edge of second joint with a distal group of long cultriform spinules; a smaller group of similar spinules is present on the face of the third joint. The third joint with outer edge spine, two terminal spines and an inner edge spine. The outer edge and the two terminal spines have serrated margins, the



TEXT-FIG. 8.—*Xanthocalanus squamatus*, n. sp. Female: *a*, dorsal view, × 28; *b*, abdomen, lateral view, × 39; *c*, second maxilla, × 88; *d*, maxillipede (setae on terminal joints not shown), × 88; *e*, first foot, × 88; *f*, second foot, × 88; *g*, endopodite of third foot, × 88; *h*, endopodite of fourth foot, × 88; *i*, fifth foot, × 300.

inner edge spine is smooth and subulate. The innermost of the two terminal spines is not articulated, but is formed by a prolongation of the joint.

REMARKS.—The small size of this species, its acute fifth thoracic segment and its short scale-clad abdomen separate it from any previously described species. *X. agilis*, described by Giesbrecht (1892) from the Mediterranean, has a short abdomen, densely covered with shaggy hairs, but it is not said that they are scale-like, and the prolongations of its fifth thoracic segment are longer and are rounded at the ends.

Racovitzanus antarcticus, Giesbr.

Giesbrecht, 1902.

Occurrence.—Three females and one male, all dead when taken and in a very battered condition, were found on Stn. 28, C. 580–0 m. The occurrence of this Antarctic species is noteworthy, as it implies a northerly drift at a considerable depth from the area south of 66° 30′ S., where it is frequent at depths below 400 m.

Length : ♀, 1·77–1·88 mm. ; ♂, 1·80 mm.

Scolecithrix danae (Lubb.).

Giesbrecht, 1892.

Occurrence.—Taken from time to time inside the reef in small numbers, most frequently in September. It occurred also in Trinity Opening, Stn. 26, and outside the reef on Stns. 19 and 50.

Length : ♀, 2·16 mm.

Scolecithrix bradyi, Giesbr.

Giesbrecht, 1892.

Occurrence.—In contrast to *S. danae*, this species was only taken outside the reef, where it occurred in small numbers on Stns. 19, 20, 28, 45 and 50, in vertical hauls.

Length : ♀, 1·08–1·20 mm. ; ♂, 1·0 mm.

Scolecithrix ctenopus, Giesbr. (Text-fig. 9.)

Scolecithricella ctenopus, Sewell, 1929.

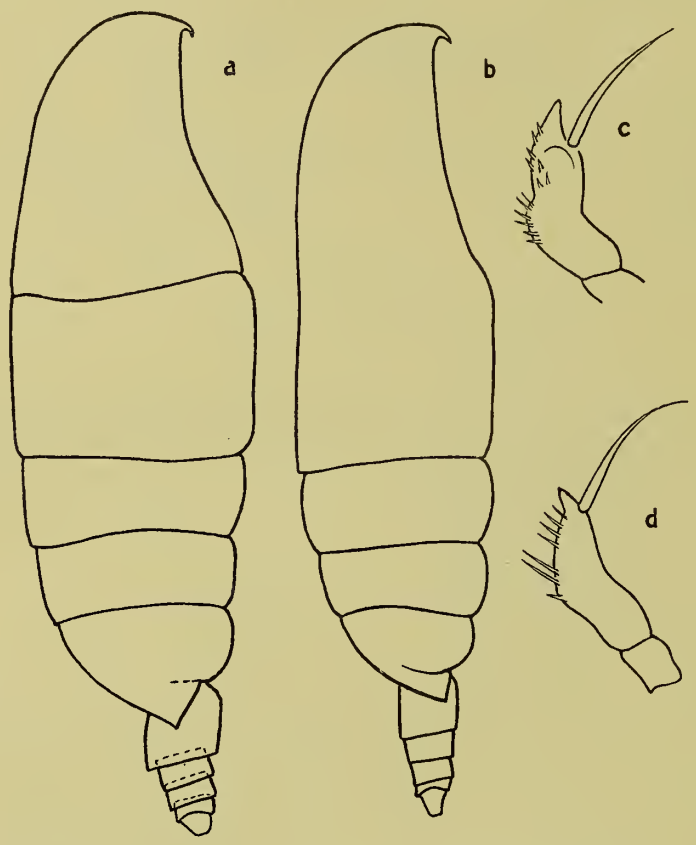
Occurrence.—Stn. 28, C. 600 m., one female. Stn. 45, C. 500 m., one female.

Remarks.—This species was described by Giesbrecht in 1888, and figured in 1892, from a male, length 1·3 mm., taken in the tropical Pacific. The male was again recorded and figured by T. Scott (1894) from five specimens, length 1·83 mm., taken in the Gulf of Guinea from 20–50 fathoms. No female was found by Scott, but the female of a closely allied species, length 1·54 mm., was taken in two hauls, from 135 fathoms and 300 fathoms, and was described as new species, *S. longicornis*.

A. Scott (1909) recorded both *S. ctenopus* and *S. longicornis* from the Malay Archipelago, one male of the former being taken in a haul of 900–0 m., and four females of the latter in hauls from 1000–0 m., and 10–0 m. Seymour Sewell (1929) has taken a male in the Indian Ocean, which he refers to *S. ctenopus*, comparing it with Giesbrecht's and Scott's figures of that species, and, in company with it, a female, length 1·26 mm., which he describes and figures as *S. ctenopus*, commenting on the closeness of similarity which it has to the female *S. longicornis*.

The question now arises whether these two species may not be two forms of a variable species. The differences, in the female, which tell against this view are the indication of segmentation between the cephalon and thorax which is found in *S. ctenopus*, but is apparently absent in *S. longicornis*, and the shorter and stouter abdomen found in *S. ctenopus*.

Of the two females in the Barrier Reef collection, the larger, length 1·47 mm., from Stn. 28, appears to be, without doubt, the same as that figured by Sewell as *S. ctenopus*. It differs only in having the segmentation between the cephalon and thorax more complete, and in having the fifth feet of a single free joint with a median constriction but no definite segmentation. The other specimen, from Stn. 45, is smaller, 1·25 mm., more slender in body, with no indication of segmentation between the cephalon and thorax and with an abdomen proportionally more slender. The fifth feet are of the same type as those of the larger specimen, but do not show the marked constriction of the single free joint.



TEXT-FIG. 9.—*Scolecithrix ctenopus*. Female : *a*, lateral view (Stn. 28), × 75 ; *b*, lateral view (Stn. 45), × 75 ; *c*, fifth foot (Stn. 28), × 390 ; *d*, fifth foot (Stn. 45), × 390.

The other appendages are almost identical with those figured by Sewell and with those of the larger specimens.

For the present it seems advisable to regard *Scolecithrix ctenopus* and *S. longicornis* as belonging to one variable species, and to record these two specimens under the former, earlier name. Text-fig. 9 shows each of the specimens in lateral view and their fifth feet.

Scolecithricella dentata (Giesbr.).

Scolecithrix dentata, Giesbrecht, 1892.

OCCURRENCE.—Taken only outside the reef, one mature female on Stn. 19, 180–0 m., and two, stage V on Stns. 20, 250–0 m., and 21, 600–0 m.

Length : ♀, 1·35 mm.

Scolecithricella ovata (Farran).

Scolecithrix ovata, Sars, 1924.

Occurrence.—Outside the reef only. One mature female on Stn. 20, 600–0 m., and two, stage V, on Stn. 45. 500–0 m.

Length : ♀, 1·75 mm. Fifth foot of typical form on one side : on the other the smaller of the two inner edge spines is absent. Terminal spines of exopodites of second feet with thirty-six serrations.

Scolecithricella profunda (Giesbr.).

Scolecithrix profunda, Giesbrecht, 1892.

Occurrence.—One female on Stn. 28, 600–0 m.

Length : ♀, 2·04 mm. Though widespread, this seems to be a very scarce species. Scott records it from the Malay Archipelago (1909), and it has twice been recorded from the Mediterranean, by Giesbrecht (1892), who first described it from a Mediterranean specimen, and by Sars, who has figured it (1924) under the name of *S. abyssalis*. The form of the fifth feet with rounded distal margins distinguishes it from *S. abyssalis*.

Scolecithricella vittata (Giesbr.).

Scolecithrix vittata, Giesbrecht, 1892.

Occurrence.—Two specimens from outside the reef, Stn. 20, N. 250–0 m., and Stn. 28, C. 600–0 m.

Length : ♀, 1·66–1·74 mm.

Scolecithricella tenuiserrata (Giesbr.).

Scolecithrix tenuiserrata, Giesbrecht, 1892.

Occurrence.—Taken in very small numbers, eight females and four immature specimens, on three stations outside the reef : Stn. 19, C. 180–0 m. ; Stn. 20, N. 250–0 m. ; and Stn. 50, C. 150–0 m.

Length : ♀, 1·00–1·12 mm.

Remarks.—The abdomen in the females was relatively slightly shorter than the measurement given by Giesbrecht (1892) for his Mediterranean specimens, being contained about 3·75 times in the length of the cephalothorax instead of 3·6 times. It was also noticeably stouter than is shown in Giesbrecht's figure. The anal segment was almost concealed by the preceding segment. The thumb-like projection on the first basal joint of the fourth foot is very noticeable without dissection.

Scolecithricella nicobarica (Sewell). (Text-fig. 10.)

Scolecithrix nicobarica, Sewell, 1929.

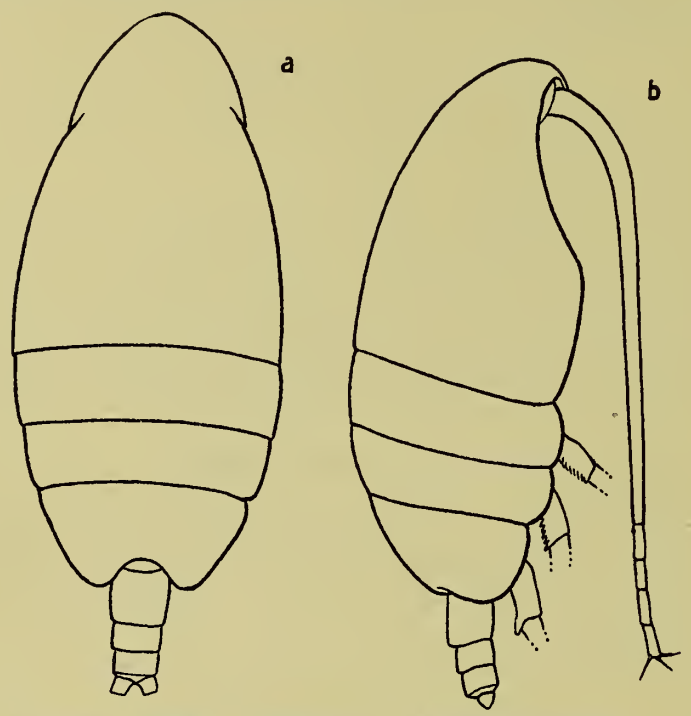
Occurrence.—Four females and two specimens in stage V on Stn. 45, C. 500–0 m.

Length : ♀ (Text-fig. 10, *a*, *b*), 1·35–1·37 mm.

Remarks.—Though these specimens are slightly larger than those described by Sewell (1929) from the Indian Ocean, their very stout form, with fourth and fifth thoracic

segments completely joined and slightly hollowed on their postero-lateral margin, their short abdomen, only one-fourth of the length of the cephalothorax, and the spinulation of the swimming-feet, especially the outer margins of the first basal joints of the second and third feet, make the identification fairly certain.

Though the fifth feet are absent in this species, it resembles *S. tenuiserrata* so closely in other respects that I regard it as congeneric.



TEXT-FIG. 10.—*Scolecithricella nicobarica.* Female : *a*, dorsal view, × 66 ; *b*, lateral view, × 66.

Scaphocalanus echinatus (Farran).

Farran, 1905.

OCCURRENCE.—Two specimens, one dead when taken, from deep water outside the reef on Stn. 28, C. 600–0 m.

Length : ♀, 1·80 mm. The dead specimen had the inner edge spine of the fifth feet more coarsely toothed (*ca.* 8 teeth) than usual.

Lophothrix latipes (T. Scott).

Sars, 1905.

OCCURRENCE.—Two specimens, females, from deep water on Stn. 28, C. 600–0 m., and Stn. 50, S. 400–0 m.

Length : ♀ 2·88 mm.

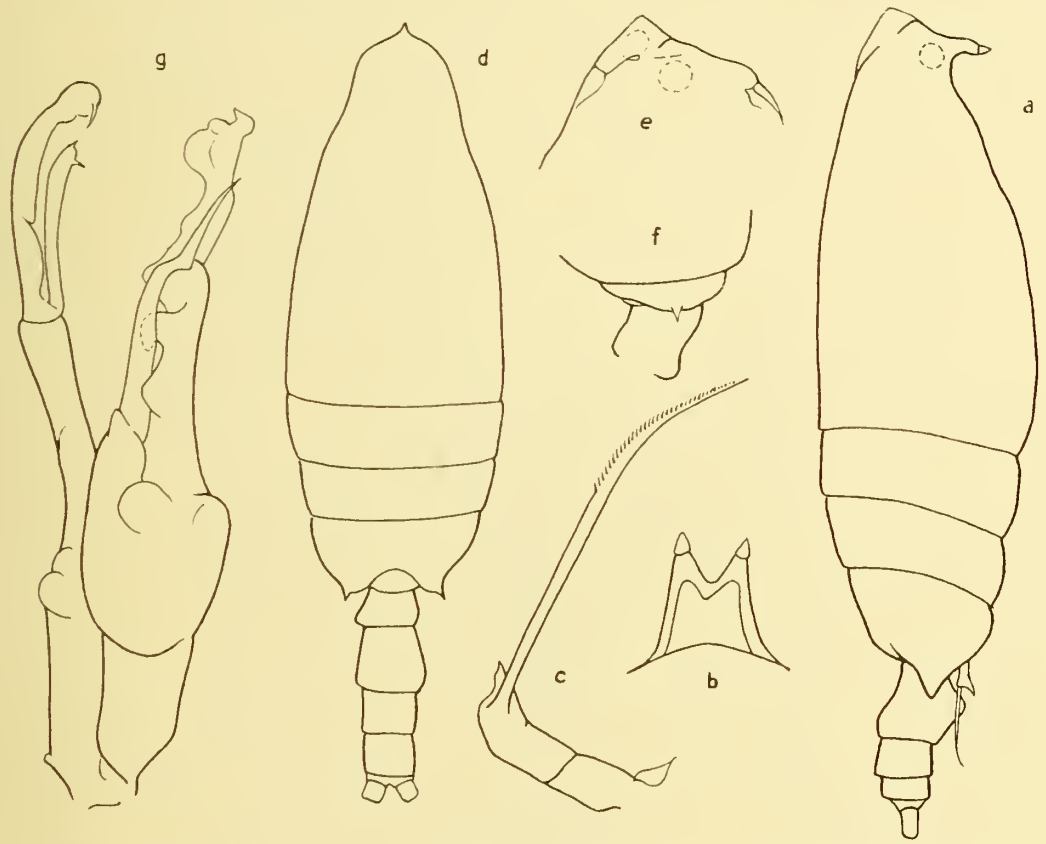
Scottocalanus longispinus, A. Scott. (Text-fig. 11.)

A. Scott, 1909.

OCCURRENCE.—Two females and one male on Stn. 28, 600–0 m.

Length : ♀, 4·32 mm. ; ♂, 4·1 mm.

Remarks.—The female (Text-fig. 11, *a*) appears to be the same as that described by A. Scott (1909) from the "Siboga" collections. It is distinguished by the form of its rostrum (Text-fig. 11, *b*), its fifth thoracic segments produced laterally into triangular points, its short abdomen with the genital segment longer than the three following segments combined, and its fifth feet (Text-fig. 11, *c*) with long slender setae. In company with the two females was a male (Text-fig. 11, *d*), which presumably belongs to the same species. The fifth thoracic segment (Text-fig. 11, *f*) bears short backwardly-directed spines as in *S. thomasi*. The rostrum (Text-fig. 11, *e*) ends in two long transparent filaments, as in



Text-fig. 11.—*Scottocalanus longispinus*. Female : *a*, lateral view, × 25 ; *b*, rostral plate, × 100 ; *c*, fifth foot, × 100. Male : *d*, dorsal view, × 25 ; *e*, head, lateral view, × 45 ; *f*, fifth thoracic segment, lateral view, × 45 ; *g*, fifth feet, × 57.

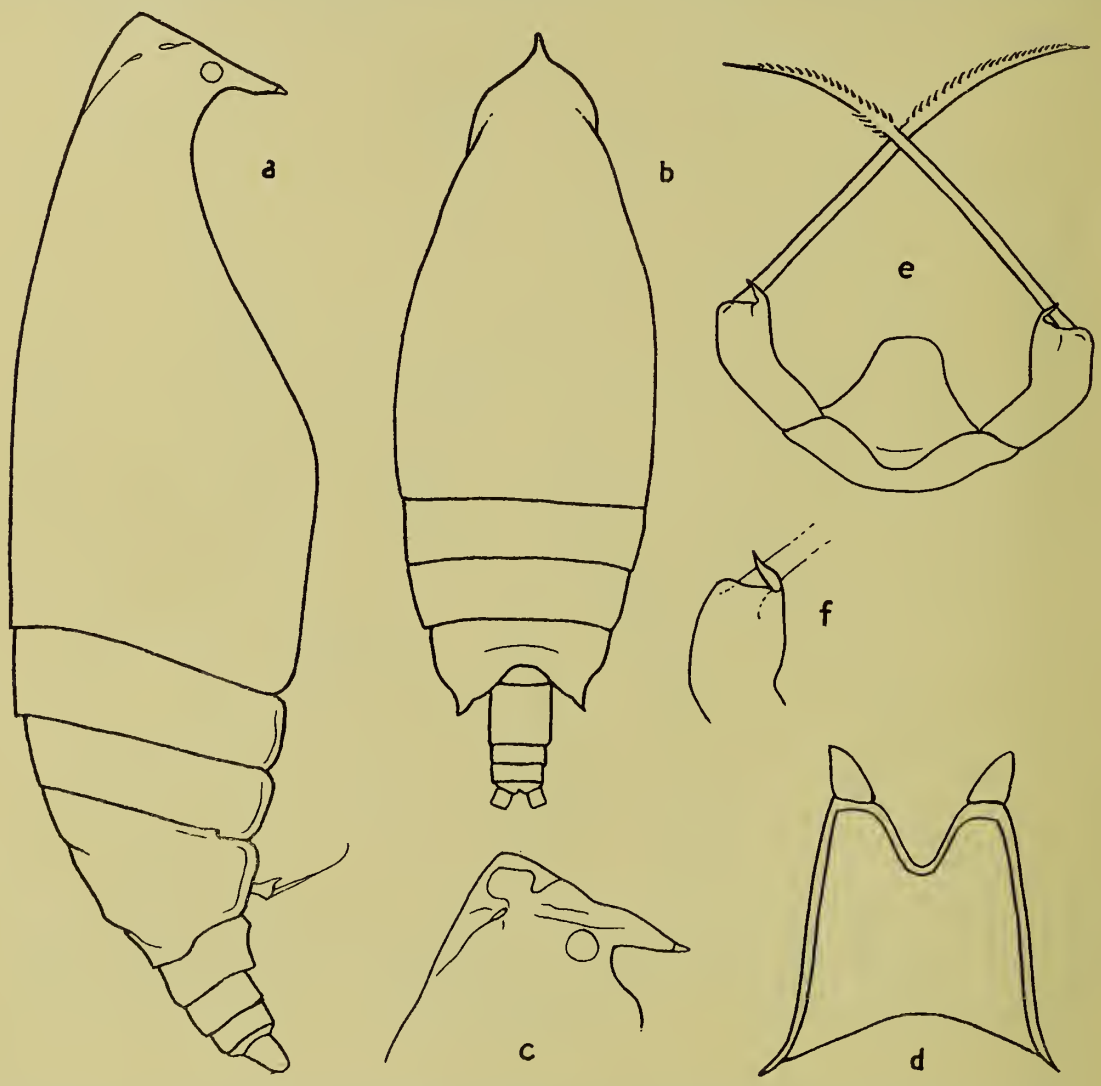
S. persecans, as figured by A. Scott (1909). The fifth feet (Text-fig. 11, *g*), while of the general form found in the genus, differ in most of the details from those of any other described species.

Scottocalanus sedatus, n. sp. (Text-fig. 12.)

Occurrence.—Two females on Stn. 28, 600–0 m.

Description.—Female, length 3·18–3·20 mm. These specimens (Text-fig. 12, *a*, *b*) agree in size and general form with *Scottocalanus setosus* as described by A. Scott (1909), but the following points of difference seem to justify the description of a new species. The last thoracic segment is not terminated by so well developed a point as in *S. setosus*

either in dorsal or lateral view. The fifth feet (Text-fig. 12, *e*, *f*) differ in bearing a longer seta, which is 2·2 times the length of the jointed portion and three times the length of the terminal joint. The terminal joint of the fifth feet ends in a small spine, which is directed obliquely outwards. The rostral points (Text-fig. 12, *d*) are proportionately much smaller than in *S. setosus*. They agree in size with those of the specimens I have identified as *S. longispinus*, but the rostral plate is much less strongly chitinized than in



Text-fig. 12.—*Scottocalanus sedatus*, n. sp. Female : *a*, lateral view, × 46 ; *b*, dorsal view, × 33 ; *c*, head, lateral view, × 77 ; *d*, rostral plate, × 130 ; *e*, fifth feet, × 130 ; *f*, end of second joint of fifth foot, × 182.

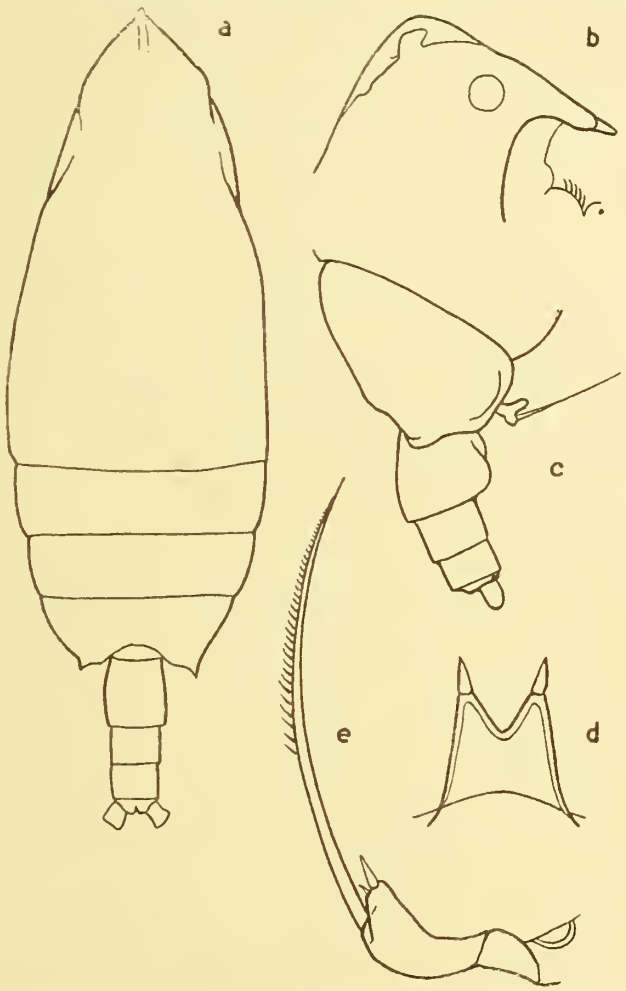
that species. The setae on the furca are symmetrical, at any rate in their basal portions ; the extremities are broken.

Remarks.—Of the other species with sharp thoracic points, *S. thomasi* can be distinguished by its rostrum, which is very broad, with a shallow notch, and *S. securifrons* and *S. cuneifrons* by their more contracted fifth thoracic segment and by the genital segment slightly overlapping the following segment ventrally. No distinctive characters were noticed in any of the appendages except the fifth feet.

Scottocalanus australis, n. sp. (Text-fig. 13.)

Occurrence.—Three females on Stn. 28, outside the reef, 600–0 m., in company with the two preceding species.

Description.—Female (Text-fig. 13, *a*), length 3·96 mm. Abdomen moderately long, being, when contracted, contained 3·8 times in the total length of the cephalothorax. Crest (Text-fig. 13, *b*) low. Fifth thoracic segments (Text-fig. 13, *c*) ending laterally in rounded lappets somewhat similar to those in *S. dauglishi*, but smaller. Genital segment



Text-fig. 13.—*Scottocalanus australis*, n. sp. Female : *a*, dorsal view, × 30 ; *b*, rostrum, lateral view, × 51 ; *c*, abdomen, × 42 ; *d*, rostral plate, × 120 ; *e*, fifth foot, × 120.

about equal to the two following segments, not much swollen ventrally and not overlapping the following segment. Rostral plate (Text-fig. 13, *d*) slightly chitinized and deeply notched, with comparatively slender rostral spines, which are shorter than the depth of the notch. Fifth feet (Text-fig. 13, *e*) bearing a seta which is about three times as long as the basal portion and four times as long as the terminal joint. The terminal joint ends obliquely, and bears at its extremity a moderately slender spine at the base of which is a minute spinule.

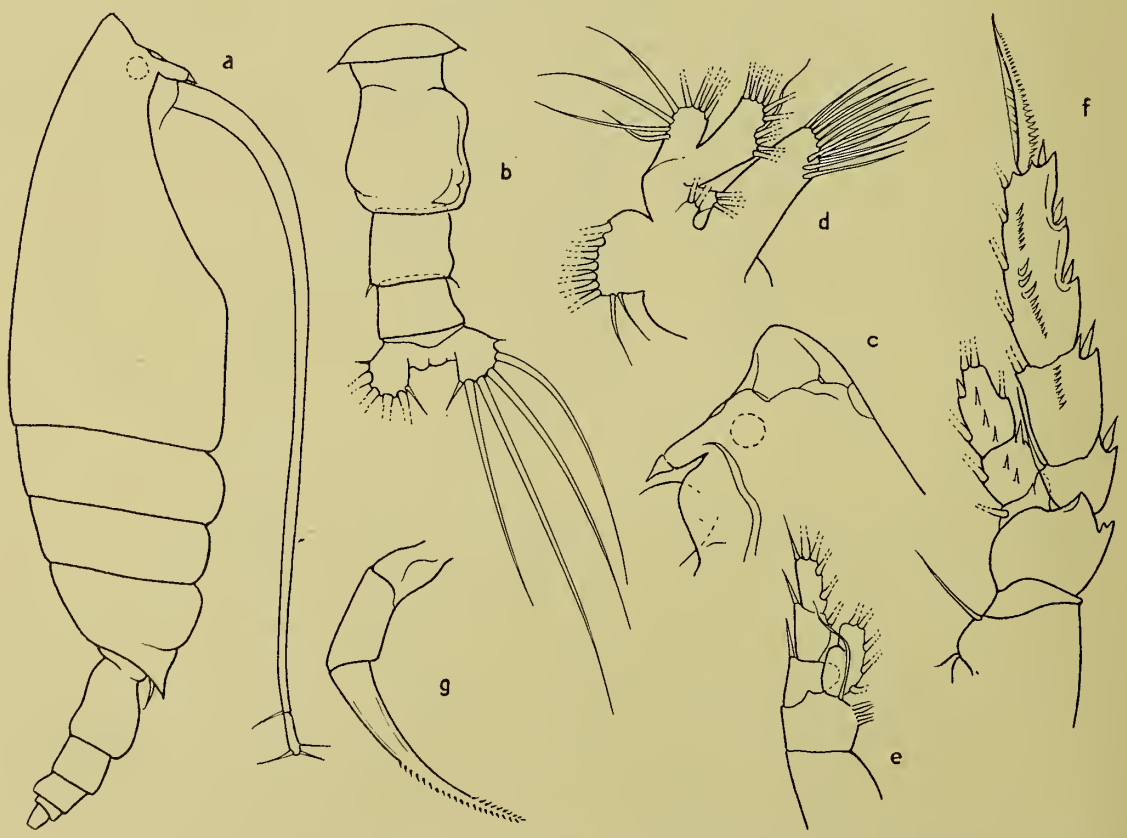
Comparing these specimens with the females of the other species of *Scottocalanus* with rounded fifth thoracic segments, viz. *S. persecans*, *S. helenae* (= *S. thori*), *S. farrani*,

S. terranovae, *S. dauglishi*: *S. persecans* has only been described very briefly by Esterley, but it appears to differ in its fifth feet; *S. helenae* has a more chitinized rostral plate, with stouter rostral spines, and the fifth thoracic segments are slightly notched at their lateral extremities; *S. farrani* has a rostral plate very similar to that of *S. helenae* and fifth feet with shorter setae; *S. terranovae* has a longer and narrower rostral plate, with much smaller rostral spines; *S. dauglishi* has a larger lappet on the fifth thoracic segment, and its genital segment partially overlaps the following segment. The female of *S. investigatoris* has not yet been described, and may possibly be represented by the present specimens.

Remarks.—Willey (1919) refers to what he regarded as not fully developed female specimens of *Scolecithrix cuneifrons* from the Gulf of St. Lawrence, but, from the figure which he gives, it would appear that they are in fact adults of a smaller species, which, in the form of the fifth thoracic segment, resembles the present species rather closely.

Scolecocalanus, n. gen.

Description.—Form of body and appendages as in *Scottocalanus* except that the rostral spines are larger and more tapered, the second and third joints of the exopodite of the fourth foot bear a longitudinal row of spinules on their anterior face, and the left fifth foot only is present and consists of a short basal joint bearing a long curved spine. There is an indication of a lenticular thickening at the base of the rostrum, as in *Macandrewella*, with which this genus has some affinities.

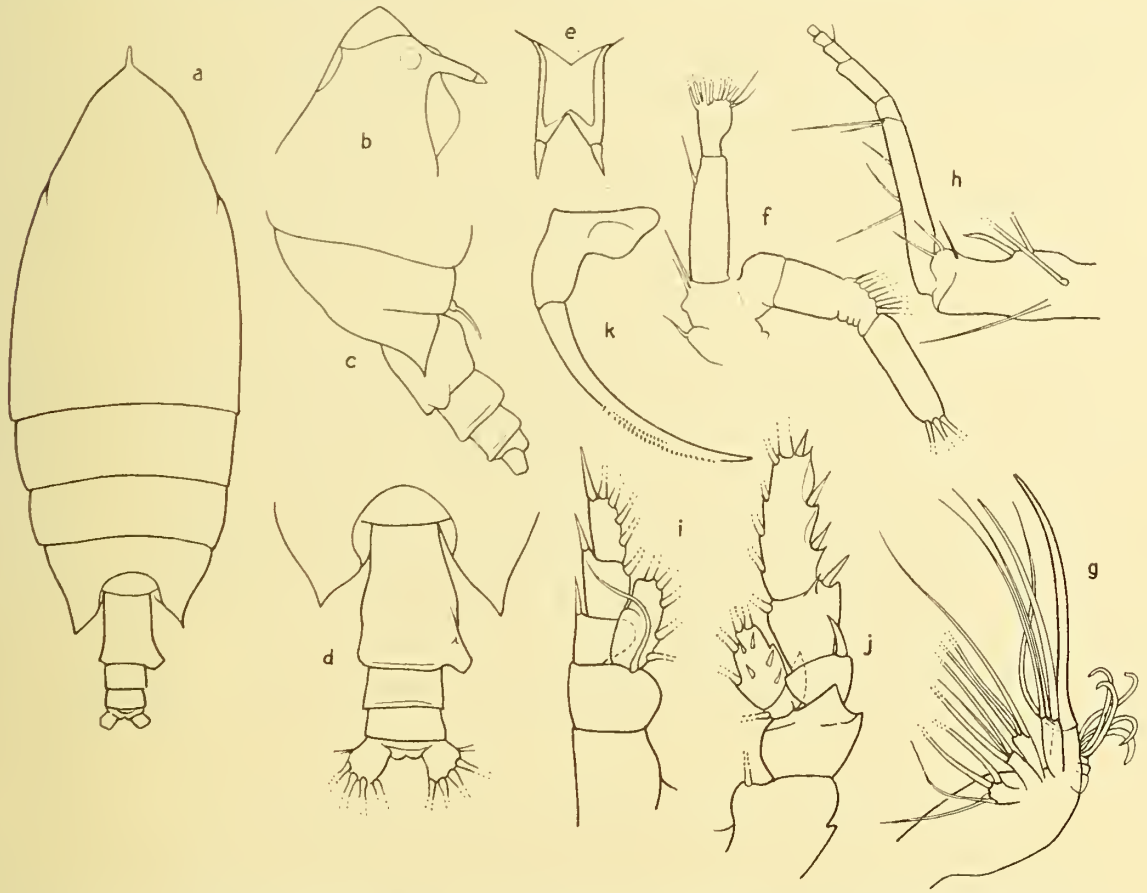


Text-fig. 14.—*Scolecocalanus galeatus*, n. sp. Female: *a*, lateral view, × 24; *b*, abdomen, dorsal view, × 43; *c*, head, lateral view, × 45; *d*, maxilla, × 100; *e*, first foot, × 59; *f*, third foot, × 59; *g*, fifth foot, × 100.

Scolecocalanus galeatus, n. sp. (Text-fig. 14.)

Occurrence.—One female on Stn. 29, stramin bottom net, 209 m.

Description.—Female (Text-fig. 14, *a*) length 4·56 mm., with a high crest (Text-fig. 14, *c*). Fifth thoracic segments produced laterally into sharp points. Segmentation between fourth and fifth thoracic segments faintly indicated. Abdomen (Text-fig. 14, *b*) long, $3\frac{3}{4}$ times in the total length of the cephalothorax. Genital segment equal to the three following segments without the furca, narrowed anteriorly and slightly asymmetrical, the right side being slightly swollen and carrying a postero-dorsal tooth or hook.



Text-fig. 15.—*Scolecocalanus lobatus*, n. sp. Female : *a*, dorsal view, × 25 ; *b*, head, lateral view, × 35 ; *c*, abdomen, lateral view, × 35 ; *d*, abdomen, dorsal view, × 43 ; *e*, rostral plate, × 100 ; *f*, antenna, × 59 ; *g*, second maxilla, × 100 ; *h*, maxillipede, × 59 ; *i*, first foot, × 75 ; *j*, second foot, × 59 ; *k*, fifth foot, × 155.

Antennules reaching to the middle of the genital segment, 23-jointed, joints 8–9 and 24–25 being fused. There is a partial fusing of the ninth and tenth joints. Antennae, mouth-parts and swimming-feet without diagnostic characters, being practically identical with those found in *Scottocalanus*, with the exception of the longitudinal row of spinules on the anterior face of the second and third joints of the endopodite of the fourth foot (Text-fig. 14, *f*). These spinules are also found in the genus *Macandrewella*.

Fifth foot (Text-fig. 14, *g*) present only on the left side and consisting of a short basal joint bearing a stout curved spine, which bears on its outer side, on the distal three-fourths,

a close-set row of fine cultriform spinules diminishing towards the tip of the spine, and a similar but finer row on the distal half of the inner side.

Scolecocalanus lobatus, n. sp. (Text-fig. 15.)

Occurrence.—Four females on Stn. 28, 600–0 m.

Description.—Female (Text-fig. 15, *a*), length 3·66 mm., with a moderately high crest (Text-fig. 15, *b*). Fifth thoracic segment produced laterally into acute points, partially separated from the fourth segment. Abdomen (Text-fig. 15, *c*, *d*) contained about 4·1 times in the length of the cephalothorax. Genital segment longer than the remaining abdominal segments and the furca taken together, with a dorso-lateral backwardly-directed lobe on its hinder margin. Rostral plate (Text-fig. 15, *e*) forked and ending in a pair of tapering rostral spines, which are about as long as the depth of the notch. Appendages (Text-fig. 15, *f*, *g*, *h*, *i*, *j*) similar to those of the preceding species, but the fifth foot (Text-fig. 15, *k*) is apparently without spinules on its inner side.

This species can be distinguished from *S. galeatus* by its smaller size, its less prominent crest, and the presence of a lobe on the genital segment.

Macandrewella.

A. Scott first proposed this genus in 1909 for *M. joanae* from the "Siboga" collections, and he included in it a male which had been described by Giesbrecht from the Red Sea under the name of *Scolecithrix chelipes*. Sewell described a third species, with both males and females, from the Indian Ocean. Three more species, apparently all different, were found in the Barrier Reef collections from outside the reef. One was common and readily recognizable by its asymmetrical fifth thoracic segment; the others, represented respectively by one and twelve specimens, resembled each other, and were separable mainly by the form of the genital segment.

The three genera *Scottocalanus*, *Macandrewella* and *Scolecocalanus* seem to form an allied group with *Scolecocalanus* in a middle position.

Macandrewella asymmetrica, n. sp. (Text-fig. 16.)

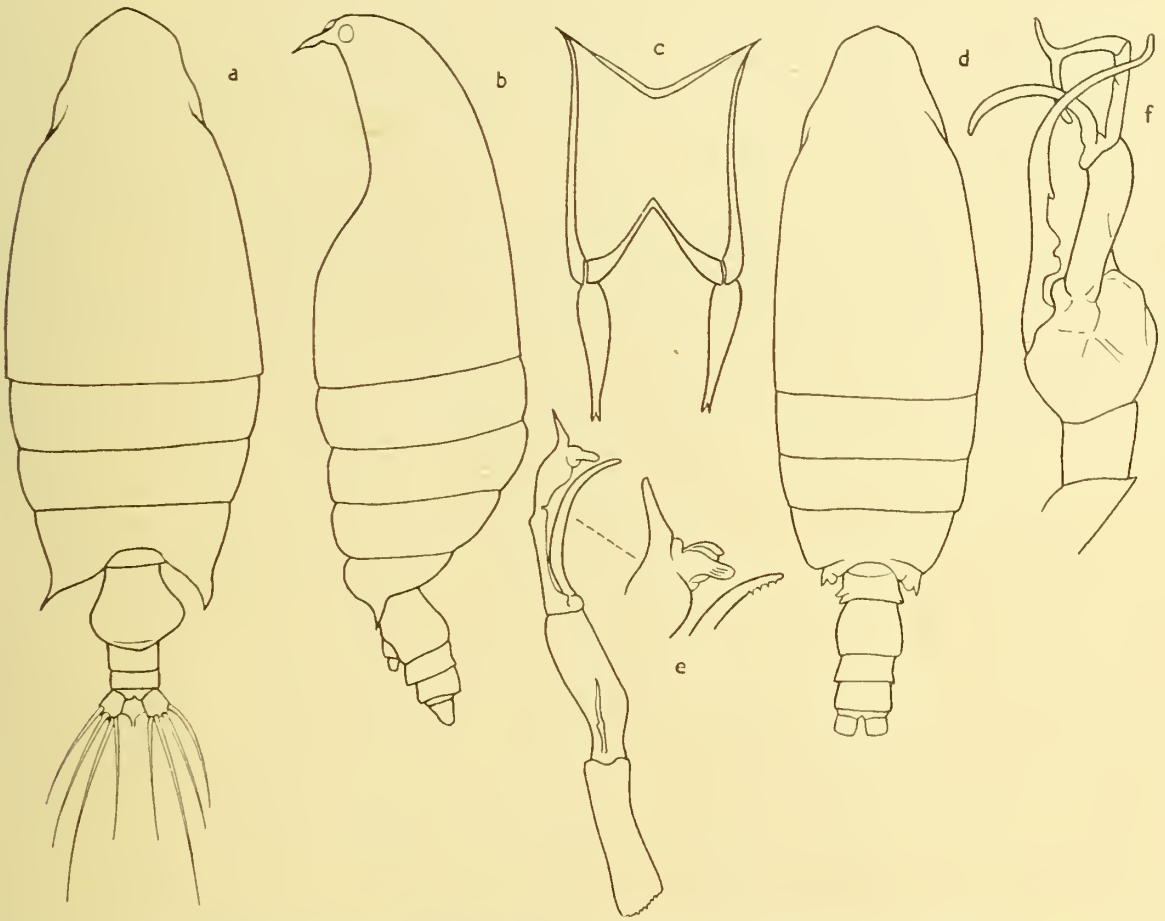
Occurrence.—Occurred in large or small numbers on four of the deep-water stations outside the reef. Absent from Stn. 28 and possibly from Stn. 45, on which one doubtful immature specimen was taken.

Stn. 19, S. 180–0 m., ♀ 17, ♂ 31, V 13; C. 180–0 m., ♀ 3, ♂ 5, V 80; 1 m. C. 180–0 m., ♀ 10, ♂ 11, V 36. Stn. 20, N. 250–0 m., ♀ 4, ♂ 2. Stn. 29, bottom stramin net, 205 m., ♀ 51, ♂ 258, V 11. Stn. 45, S. 500–0 m., V ? 1. Stn. 50, S. 400–0 m., ♀ 2, ♂ 4; C. 150–0 m., V ? 1. Most numerous at the lesser depths, especially on Stn. 29 when the net was actually at the bottom.

Description.—Female (Text-fig. 16, *a*, *b*), length 3·50–3·70 mm. Cephalon fused with first thoracic segment. Fourth and fifth thoracic segments separated ventrally. Fifth thoracic segment ending on either side in a sharp point, that on the right directed straight backwards, that on the left bent outwards at an angle of about 45°. Rostrum (Text-fig. 16, *c*) consists of a swollen plate, as in *Scottocalanus*, deeply notched at the tip and produced into sensory filaments, which are more than half as long as the rostral

plate : at the base of the rostral plate there is a median lenticular thickening. Genital segment asymmetrical, with swollen lateral projection on the right side, slightly overlapping the following segment dorsally and with a ventral backwardly-directed thumb-like process projecting from the genital boss. Furcal rami about as broad as long, with symmetrical setae.

Antennules reaching to the hinder end of the genital segment ; joints 8, 9 and 24–25 fused, partial fusion of joints 9 and 10. Proportional length of joints approximately as in *Scottocalanus*.



Text-fig. 16.—*Macandrewella asymmetrica*, n. sp. Female : *a*, dorsal view, × 25 ; *b*, lateral view, × 25 ; *c*, rostral plate, × 253. Male : *d*, dorsal view, × 25 ; *e*, left fifth foot, × 43 ; *f*, right fifth foot, × 43.

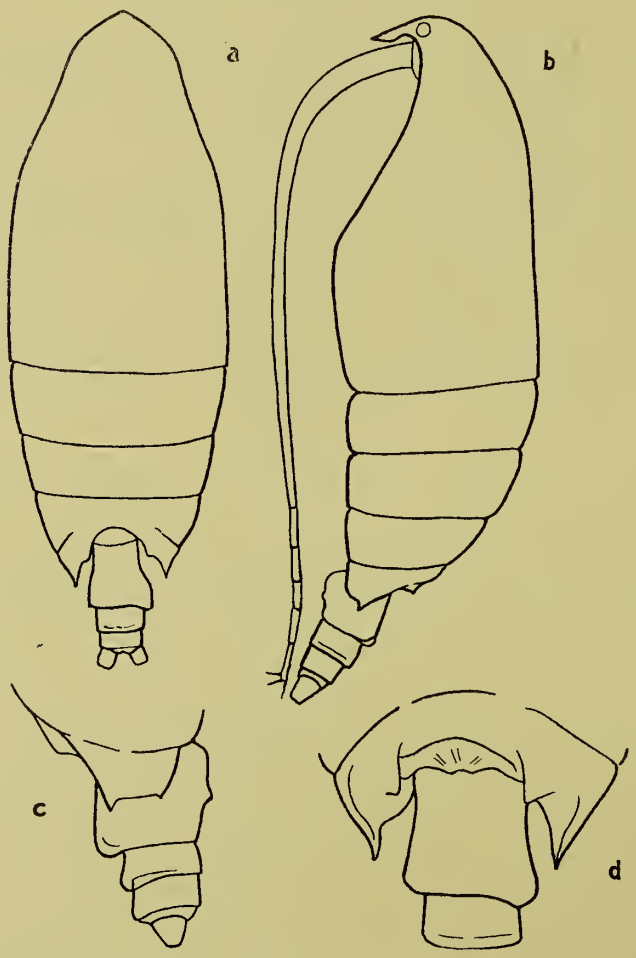
First foot with outer edge spines on the first and second joints of the exopodite ; outer margin of the third joint straight. Second foot with outer margin of first basal joint notched and bearing a small tooth ; first joint of the exopodite with a curved outer edge spine, second joint with a transverse distal row of fine spinules, third joint with a few small spinules surrounding the proximal half of the face of the joint. Third foot with a small tooth on the outer margin of the first basal joint, second joint of the exopodite with a transverse distal row of fine spinules, third joint with a few very minute spinules on the face of the joint. Fourth foot with the outer margin of the first basal joint smooth, the face of the exopodite without spinules. Fifth feet absent.

Male (Text-fig. 16, *d*), length 3·7 mm. Cephalothorax in mid-dorsal line 2·8 mm., abdomen ·85 mm. Fifth thoracic segment ending laterally in short sharp points. The fifth pair of feet are very like those figured by Scott for *M. joanae* and differ only in small details, which can be best seen by comparison of the figures (Text-fig. 16, *e* and *f*, and Scott, 1909, pl. xxiii, fig. 14). This resemblance justifies the inclusion of this species in the genus *Macandrewella*, although the fifth thoracic segment of the female lacks the characteristic facies found in other species.

Macandrewella sewelli, n. sp. (Text-fig. 17.)

Occurrence.—In deep water outside the reef. Stn. 19, C. 180–0 m., ♀ 1 ; Stn. 29, stramin bottom net, 205 m., ♀ 5 ; Stn. 45, S. 500–0 m., ♀ 1 ; Stn. 50, S. 170–0 m., ♀ 1 ; S. 400–0 m., ♀ 4.

Description.—Female (Text-fig. 17, *a*, *b*), length 3·12–3·2 mm. Cephalon not separated from first thoracic segment ; fourth and fifth thoracic segments separate but in dorsal view the separation is almost indistinguishable. Fifth thoracic segment ending laterally in a sharp point directed slightly inwards ; dorsal and internal to these points there is a rather bluntly pointed ridge on each side. In front, ventrally, the fifth thoracic



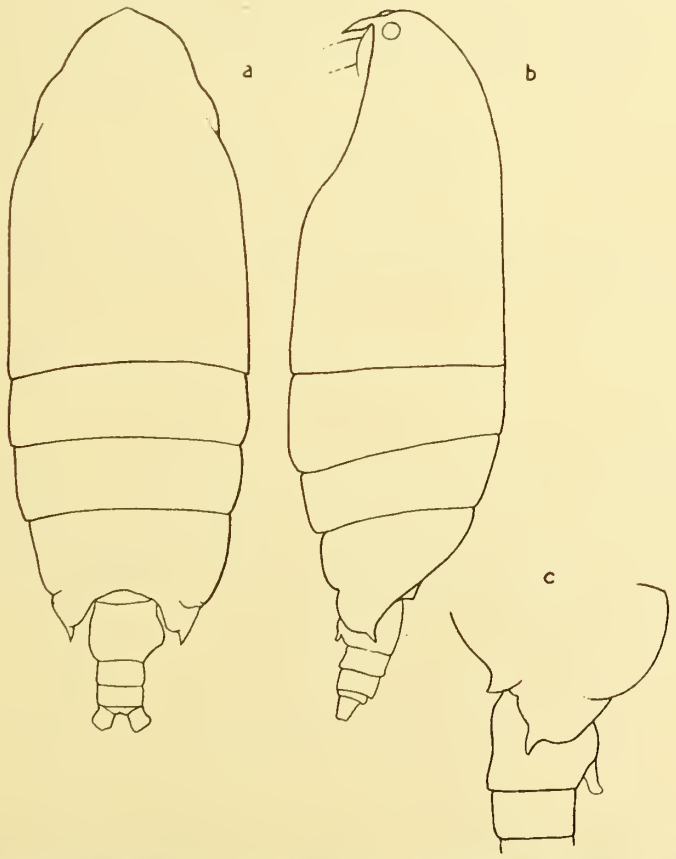
Text-fig. 17.—*Macandrewella sewelli*, n. sp. Female : *a*, dorsal view, × 28 ; *b*, lateral view, × 28 ; *c*, abdomen, lateral view, × 33 ; *d*, fifth thoracic and genital segments, dorso-lateral view, × 48.

segment is slightly produced into a blunt angle, which is sometimes rounded off and sometimes bears a small projection, as is shown in Text-fig 17. *c*. Abdomen (Text-fig. 17, *c, d*) about one-fourth of the length of the cephalothorax in the mid-dorsal line; abdominal segments and furca in the proportion 38 : 18 : 14 : 2 : 13. The abdomen is symmetrical except for a low dorso-lateral lobe on the right side of the hinder margin of the genital segment. Anal segment almost concealed by the preceding segment. Front of genital segment without the finger-like process which occurs in some other species of the genus. Furcal rami as broad as long, with four long subequal terminal setae, sometimes branched. Rostrum of a swollen forked plate ending in a short tapered filament on each side. Distinctly marked lenticular spot at the base of the rostrum. Antennules reaching to the end of the genital segment, with joints 8–10 and 24–25 fused, but with an indication of segmentation between joints 9 and 10. Antennae as in *M. joanae* with endopodite proportionally shorter than in *M. scotti*, but with the basal fringe of setae figured by Sewell for that species.

Macandrewella mera, n. sp. (Text-fig. 18.)

Occurrence.—One female in the stramin bottom net at Stn. 29, 209 m.

Description.—Female (Text-fig. 18, *a, b*), length 3·84 mm. Cephalothorax, in mid-dorsal line, 3·00 mm., in lateral view, 3·3 mm. Abdomen ·70 mm. Fourth and fifth thoracic segments not completely separated, fifth segment ending laterally in short



Text-fig. 18.—*Macandrewella mera*, n. sp. Female : *a*, dorsal view, × 25 ; *b*, lateral view, × 25 ; fifth thoracic and genital segments, lateral view, × 43.

sharp points directed slightly inwards. Dorsal to the point on the right side the margin of the segment (Text-fig. 18, *c*) is produced into a short tooth, which bears a few spinules on its margin. Rostrum an inflated bifurcate plate, ending in a pair of short filaments. There is a well-marked lenticular spot at the base of the rostrum.

Abdominal segments in the proportion of 40 : 17 : 12 : 3 : 15. Genital segment asymmetrical, with a swelling on the right side ; ventrally it bears a thumb-like projection directed backwards from the genital plate. Furcal setae similar on both rami, their lengths in mm. from without inwards being ·68, ·78, 1·08, ·56, ·13.

Cephalic appendages and swimming feet similar to those of *M. asymmetrica* and *M. sewelli* ; some small differences were noticed in the size and arrangement of the spinules on the faces of the endopodites of the swimming-feet, but it is unlikely that they have any specific value. Fifth feet absent.

Remarks.—Of the five females that have been referred to the genus *Macandrewella* the ventral thumb-like process on the genital segment is present in *M. joanae*, *M. mera* and *M. asymmetrica*, but absent in *M. scotti* and *M. sewelli*. The genital segment is described as symmetrical in *M. joanae* and *M. scotti*, but is asymmetrical in the three species here described. In *M. asymmetrica* and *M. mera* the asymmetry consists in a lateral swelling on the right side. In *M. sewelli* there is a dorso-lateral projection partially overlapping the following segment. *M. joanae* differs from all the other species in having a minute pair of fifth feet, an elongated seta on the right furca, and in the presence of spinules on the face of the third joint of the exopodite of the fourth feet. There is a marked similarity between the fifth thoracic segments of all except *M. asymmetrica*, in which the lateral thoracic points suggest at first sight the genus *Gaidius* rather than *Macandrewella*.

Centropages calaninus (Dana).

Giesbrecht, 1892.

Occurrence.—A single specimen, male, on Stn. 20, 250–0 m., outside the reef.

Length : ♂, 1·92 mm.

Centropages furcatus (Dana).

Giesbrecht, 1892.

Occurrence.—The most frequent species of *Centropages* in the collection, occurring on eighteen stations either at 3 mi. E. or in the reef passages. It also occurred in small numbers outside the reef, probably having been taken near the surface during the hauling of the deep-water nets, as follows : Stn. 19, S. 180–0 m., 1. Stn. 45, 500–0 m., 6. Stn. 50, S. 170–0 m., 1 ; S. 400–0 m., 2 ; C. 150–0 m., 72.

Length : ♀, 1·68–1·83 mm. ; ♂, 1·60 mm.

Centropages gracilis (Dana).

Giesbrecht, 1892.

Occurrence.—A scarce species only occurring on three stations at 3 mi. E. and on one, Stn. 19, just outside the reef.

Length : ♀, 1·92–2·04 mm.

Centropages orsinii, Giesbr.

Giesbrecht, 1892.

Occurrence.—Taken on five stations inside the reef and two, Stns. 45 and 50, outside, eighteen specimens in all.

Length : ♀, 1·20–1·56 mm. ; ♂, 1·20–1·38 mm. A wide range of sizes was noticeable in both sexes.

Temora discaudata, Giesbr.

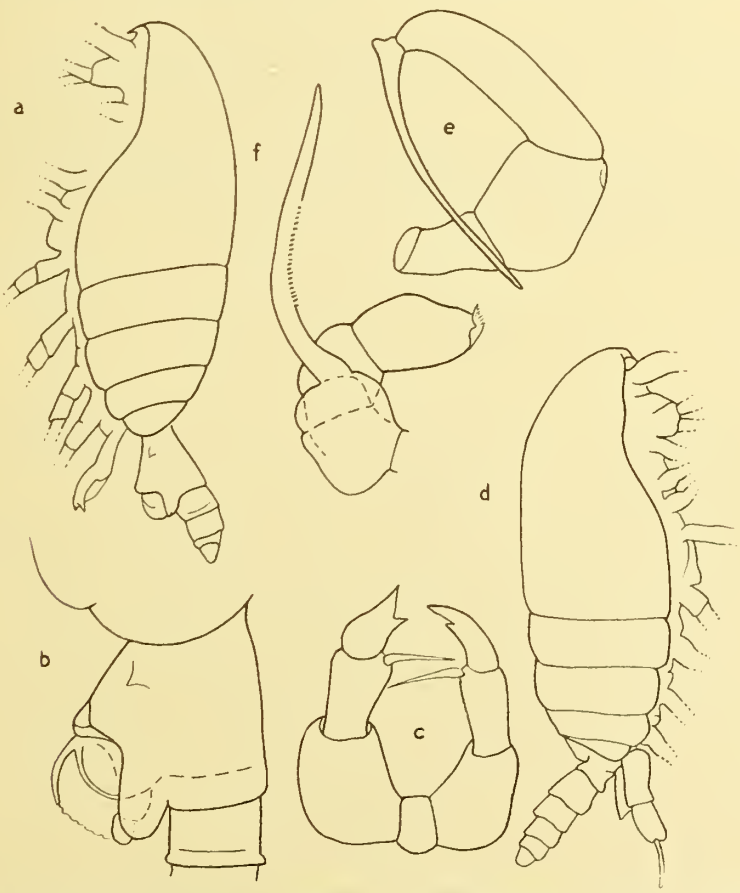
Giesbrecht, 1892.

Occurrence.—On the stations at 3 mi. E. this was a frequent species from the end of December to the end of May, but was very scarce before and after these dates, though outside the reef it seems to have been present in small numbers on all occasions when townettings were made there. Its period of scarcity coincided with that of high surface salinity over the reef.

Temora turbinata (Dana).

Giesbrecht, 1892.

Occurrence.—Not found inside the reef and only taken on two of the deep-water stations outside—Stn. 45, one female, and Stn. 50, two males and one female.



Text-fig. 19.—*Temoropia mayumbaensis*. Female : *a*, lateral view, × 84 ; *b*, genital segment, lateral view, × 247 ; *c*, fifth feet, × 247. Male : *d*, lateral view, × 84 ; *e*, right fifth foot, × 247 ; *f*, left fifth foot, × 247.

Temoropia mayumbaensis, T. Scott. (Text-fig. 19.)

T. Scott, 1894.

Occurrence.—Taken in small numbers on three of the deep-water stations—Stn. 20, 250–0 m., Stn. 28, 600–0 m., and Stn. 45, 500–0 m.

Length : ♀ (Text-fig. 19, *a*), ·70–·92 mm. ; ♂ (Text-fig. 19, *d*), ·84 mm.

Remarks.—There seem to be distinct differences, probably of specific value, between the fifth feet of the various forms which have been recorded under this name. The fifth feet of the present specimens resemble rather closely those originally figured by T. Scott (1894) from the Gulf of Guinea and also those of a specimen from the "Siboga" Expedition, a preparation of which was kindly lent to me by the late Mr. A. Scott. In these the endopodite consists of a single unjointed spine without an accessory seta, the joints are thick and massive, and the terminal joint on the right side is widely notched. The left foot is slightly more slender than the right and has a narrower terminal notch.

The male also shows a fairly close agreement with Scott's figures. The notched and ciliated tip of the left fifth foot, which is shown in his figure as flattened out, is shown in Text-fig. 19, *f*, as turned back over the terminal joint.

Metridia venusta, Giesbr.

Giesbrecht, 1892.

Occurrence.—Only three specimens were seen : Stn. 28, 600–0 m., two females, apparently dead when taken, and Stn. 45, 500–0 m., one female.

Length : ♀, 2·65–3·05 mm.

Pleuromamma abdominalis (Lubb.).

Steuer, 1932.

Occurrence.—(Typical form) Stn. 28, C. 600–0 m., ♀ 1 ; S. 600–0 m., ♀ 8, ♂ 5. Stn. 45, C. 500–0 m., ♀ 1. Stn. 50, S. 400–0 m., ♀ 2, ♂ 1.

Var. *abyssalis* : Stn. 19, C. 180–0 m., ♀ 2 ; C. (1 m.), 180–0 m., ♀ 1. Stn. 28, C. 600–0 m., ♀ 5, ♂ 1 ; S. 600–0 m., ♀ 5, ♂ 2. Stn. 29, bottom stramin net, 205 m., ♀ 1. Stn. 45, C. 500–0 m., ♀ 2, ♂ 4. Stn. 50, S. 400–0 m., ♀ 1, ♂ 6.

Remarks.—The specimens of *P. abdominalis*, which were taken only in vertical hauls from deep water outside the reef, fall, both males and females, into two size-groups, females 2·52–2·76 mm. and 2·95–3·06 mm., and males 2·40–2·68 mm. and 2·76–3·21 mm. The larger males were asymmetrical and of the typical *P. abdominalis* form ; the smaller agreed with the var. *abyssalis*, which has been described in detail and discussed by Steuer (1932) in his monograph of the genus. The female of the var. *abyssalis* has not yet been described, and I assume that it is represented by the smaller specimens which did not show any appreciable difference in form of body or appendages from the larger females of the typical form. There was no indication that the smaller group was more abyssal in its habitat than the larger.

Pleuromamma xiphias (Giesbr.).

Steuer, 1932.

Occurrence.—Only taken on stations on which nets were fished down to 400 m. or more. Stn. 28, S. 600–0 m., ♀ 4, V 3; C. 600–0 m., V 3. Stn. 45, S. 500–0 m., V 1; C. 500–0 m., V 1. Stn. 50, S. 400–0 m., ♂ 1, V 4.

Length: ♀, 4·08–4·40 mm.

Pleuromamma gracilis (Lubb.).

Steuer, 1932.

Occurrence.—A few specimens were taken on three of the deep-water stations outside the reef: Stn. 20, N. 250–0 m., ♀ 1. Stn. 28, C. 600–0 m., ♀ 14. Stn. 45, C. 500–0 m., ♀ 2.

Length: ♀, 1·61–1·72 mm.

Remarks.—The slender abdomen of the female, the subequal spines on the fifth feet and the small size mark these specimens as belonging to Steuer's (1932) forma *minima*.

Pleuromamma piseki, Farran.

Pleuromamma gracilis forma *piseki*, Steuer, 1932.

Occurrence.—Taken outside the reef in about the same numbers as *P. gracilis*, and in company with it on two stations. Stn. 19, C. 180–0 m., ♀ 2. Stn. 28, C. 600–0 m., ♀ 8. Stn. 45, S. 500–0 m., ♀ 1; C. 500–0 m., ♀ 1.

Length: ♀, 1·71–1·84 mm.

Remarks.—A few immature specimens were taken which may have belonged either to *P. gracilis* or *P. piseki*. Four males were found on Stn. 28 and one on Stn. 45, but it is doubtful to which species they should be referred.

Lucicutia flavicornis (Claus).

Giesbrecht, 1892.

Occurrence.—Taken only outside the reef, probably at moderate depths, in moderate numbers. Stn. 19, N. 180–0 m., 3; 1 m. C. 180–0 m. 1. Stn. 20, N. 250–0 m., 10. Stn. 28, N. 600–0 m., 13. Stn. 45, N. 500–0 m., 14. Stn. 50, N. 150–0 m., *ca.* 40.

Remarks.—Most of the specimens were of small size, ♀ 1·3–1·4 mm., but on Stn. 20 there were a few distinctly larger, ♀ 1·63–1·80 mm., ♂ 1·68 mm., in company with the smaller specimens. The antennules seemed to be proportionately longer and also the longest furcal seta, but the other appendages agreed very well with those of *L. flavicornis*, and without further knowledge of the range of variation in this species it would be unwise to regard them as being more than well-grown specimens.

Lucicutia gemina, Farran.

Farran, 1926.

Occurrence.—Taken in company with *L. flavicornis* on three stations outside the reef. Stn. 20, N. 250–0 m., ♀ 1. Stn. 28, N. 600–0 m., ♀ 1. Stn. 45, N. 500–0 m., ♀ 1.

Length: ♀, 1·42–1·60 mm.

Remarks.—These specimens appear to be identical with those described from the Bay of Biscay, being distinguishable from *L. longicornis* by their smaller size and shorter antennules and from *L. flavicornis* by their longer furca with the rami close together and with a very small innermost seta, the outer margin of the exopodite of the fifth foot without serrulations and the noticeably smaller genital boss.

Lucicutia clausi (Giesbr.).

Giesbrecht, 1892.

Occurrence.—Taken in small numbers on two stations outside the reef: Stn. 19, C. 180–0 m., ♀ 1. Stn. 28, C. 600–0 m., ♀ 3, ♂ 2.

Length: ♀, 1·80–1·98 mm.; ♂, 1·85–1·92 mm.

Lucicutia ovalis, Wolfenden.

Wolfenden, 1911.

Occurrence.—Very few specimens were taken on four stations outside the reef: Stn. 19, C. 180–0 m., ♀ 1. Stn. 20, C. 250–0 m., ♂ 1. Stn. 28, C. 600–0 m., ♀ 1. Stn. 45, C. 500–0 m., ♀ 2.

Length: ♀, 1·25–1·41 mm.; ♂, 1·21 mm.

Remarks.—Readily recognizable by its small size, stout curved form, with large genital boss and short furca with short terminal setae.

Heterorhabdus papilliger (Claus).

Sars, 1925.

Occurrence.—In moderate numbers in four hauls made outside the reef—Stns. 19, 20, 28 and 45. Though these hauls were made vertically from deep water, the specimens were probably taken in the upper layers.

Length: ♀, 1·72–1·80 mm.; ♂, 1·80 mm.

Heterorhabdus spinifrons (Claus).

Sars, 1925.

Occurrence.—In three hauls from deep water outside the reef.: Stn. 28, C. 600–0 m., ♀ 10; S. 600–0 m., ♂ 1. Stn. 45, C. 500–0 m., ♀ 1, imm. 1.

Length: ♀, 2·14 mm.; ♂, 3·14 mm.

Remarks.—Probably a deep-water species here as elsewhere, as it did not occur in hauls from less than 500 m.

Haloptilus spiniceps (Giesbr.)

Hemicalanus spiniceps, Giesbrecht, 1892.

Occurrence.—Three adult females and one immature specimen were taken outside the reef on Stn. 19, S. 180–0 m.

Length: ♀, 4·02 mm.

Haloptilus acutifrons (Giesbr.).

Hemicalanus acutifrons, Giesbrecht, 1892.

Occurrence.—One immature specimen outside the reef on Stn. 45, S. 500–0 m.
Length : ♀ V. 2·02 mm.

Haloptilus mucronatus (Claus).

Sars, 1925.

Occurrence.—One female was taken inside the reef. 3 mi. E., on Stn. 24, and two immature specimens on Stn. 50, S. 500–0 m., outside the reef.

Haloptilus angusticeps, G. O. Sars.

G. O. Sars, 1925.

Occurrence.—One immature female, stage V, which appeared to belong to this species was taken on Stn. 45, S. 500–0 m., outside the reef.
Length : ♀ V, 3·03 mm.
Remarks.—The specimen agreed closely in general appearance with Sars' (1924) figure of the adult. The anterior caecum occupies almost the whole cephalon and the spines of the second maxilla were subequal. The endopodite of the maxilla was, however, only 2-jointed, with four and five spines on the joints, while the adult has a 4-jointed endopodite. This difference may be due to the immaturity of the specimen. The species was originally recorded from the Mediterranean and Madeira.

Haloptilus longicornis (Claus).

G. O. Sars, 1903.

Occurrence.—Occurred in moderate numbers in almost every townetting taken outside the reef.
Length : ♀, 1·98–2·45 mm.

Augaptilus longicaudatus (Claus).

Giesbrecht, 1892.

Occurrence.—Three specimens, a male and two females, were taken on three stations outside the reef.
Length : ♀, 3·72 mm.

Augaptilus spinifrons, G. O. Sars.

G. O. Sars, 1925.

Occurrence.—A single female was taken on Stn. 28, outside the reef, N. 600–0 m.
Length : ♀, 3·0 mm.
It had previously been recorded only from the Azores and off Gibraltar.

Euaugaptilus filigerus (Claus).

Augaptilus filigerus, Giesbrecht, 1892.

Occurrence.—Two females from deep water outside the reef. Stn. 28, S. 600–0 m., ♀ 1. Stn. 45, N. 500–0 m., ♀ 1.

Length: ♀, 5·4 mm.

Euaugaptilus palumboi (Giesbr.).

Augaptilus palumboi, Giesbrecht, 1892.

Occurrence.—Two specimens, both immature, were taken on the same stations as *E. filigerus*.

Candacia aethiopica, Dana.

Candace aethiopica, Giesbrecht, 1892.

Occurrence.—Very scarce. Three specimens on two stations, 6 and 14, at 3 mi. E., and one outside the reef. Stn. 19, 1 m. C., 180–0 m.

Length: ♀, 2·40–2·52 mm.

Candacia discaudata, A. Scott.

A. Scott, 1909.

Occurrence.—The most plentiful species of *Candacia* in the collection, both on the reef, which seems to be its main habitat, and in hauls made outside over deep water.

Inside the reef it was taken on forty-three stations. Outside the reef it was scarce, occurring in small numbers on Stns. 45 and 50 only.

Length: ♀, 1·60–1·82 mm.; ♂, 1·52–1·82 mm.

Remarks.—Although only described in 1909 by A. Scott, this appears to be one of the most characteristic copepods of inshore waters from India to Australia. After *C. pachydactyla*, *C. simplex* and *C. truncata* it was commonest on the Malay Peninsula, and Sewell (1912, 1914) found it numerous on the Burman coast and the Ceylon pearl paars. Carl (1907) records it from Amboyna.

Candacia curta, Dana.

Candace curta, Giesbrecht, 1892.

Occurrence.—On two stations outside the reef. Stn. 28, N., 600–0 m., ♂ 2; S. 600–0 m., ♀ 1. Stn. 29, bottom stramin net, 205 m., ♀ 1.

Length: ♀, 2·35 mm.; ♂, 2·28 mm.

Candacia bispinosa, Claus.

Candace bispinosa, Giesbrecht, 1892.

Occurrence.—Once at 3 mi. E., Stn. 51, once in the reef passages, Stn. 11, and several specimens on most of the stations outside the reef—Stns. 19, 28, 45, 51.

Length: ♀, 1·56–1·72 mm.; ♂, 1·68–1·76 mm.

Candacia simplex, Giesbr.

Candace simplex, Giesbrecht, 1892.

Occurrence.—On two stations outside the reef: Stn. 19, N., 180–0 m., ♀ 1; S. 180–0 m., ♀ 2, ♂ 1. Stn. 28, N. 600–0 m., ♀ 4; S. 600–0 m., ♀ 1, ♂ 1.

Length: ♀, 1·62–1·92 mm.; ♂, 2·04–2·20 mm.

Candacia truncata, Dana.

Candace truncata, Giesbrecht, 1892.

Occurrence.—On four stations outside the reef and once, one specimen, probably drifted in, at 3 mi. E., Stn. 24: Stn. 19, N. 180–0 m., ♀ 1, ♂ 1; S. 180–0 m., ♀ 7, ♂ 7. Stn. 20, N. 250–0 m., ♀ 3, ♂ 3. Stn. 28, N. 580–0 m., ♀ 2; S. 600–0 m., ♀ 2, V 2. Stn. 45, N. 500–0 m., ♀ 1.

Length: ♀, 1·85–2·04 mm.

Candacia catula, Giesbr.

Candace catula, Giesbrecht, 1892.

Occurrence.—One specimen, a male, on Stn. 28, S. 600–0 m.

Length: ♂, 1·32 mm.

Candacia longimana, Claus.

Candace longimana, Giesbrecht, 1892.

Occurrence.—On three stations outside the reef, two to five specimens on each: Stn. 19, S. 180–0 m., ♀ 2, ♂ 3. Stn. 20, N. 250–0 m., ♀ 1, ♂ 1. Stn. 50, S. 400–0 m., ♀ 1, ♂ 1.

Length: ♀, 2·95–3·25 mm.; ♂, 2·45–3·24 mm.

Calanopia elliptica (Dana).

A. Scott, 1909.

Occurrence.—Its main habitat is inside the reef, where it occurred in 33 townettings at 3 mi. E. It was also found on two stations, 45 and 50, outside the reef.

Length: ♀, 1·75–1·97 mm.; ♂, 1·60–1·80 mm.

Calanopia aurivillii, Cleve.

A. Scott, 1909.

Occurrence.—Much scarcer than *C. elliptica*, occurring on only five stations, 4, 7, 10, 62, 65, inside the reef, and on three over deep water: Stn. 19, N. 180–0 m., ♂ 2. Stn. 45, N. 500–0 m., ♀ 27, ♂ 11, V 1. Stn. 50, S. 170–0 m., ♀ 2, ♂ 1; N. 150–0 m., ♀ 4, ♂ 1. It is evidently more oceanic in its habitat than *C. elliptica*.

Length; ♀, 1·27–1·32 mm.; ♂, 1·17–1·18 mm.

Labidocera acutifrons (Dana).

Giesbrecht, 1892.

Occurrence.—Taken at four stations, 14, 15, 16 and 18, at 3 mi. E., one or two specimens on each station. There seems to have been an incursion of the species between 26th September and 15th October from some source not explored.

Length : ♀, 3·36–3·55 mm. ; ♂, 3·30–3·48 mm.

Labidocera acuta (Dana).

Giesbrecht, 1892.

Occurrence.—Occasionally at 3 mi. E. up to the end of December, 1928. After that date it became frequent, occurring on almost every station. It was taken twice in the reef passages, and on one station (Stn. 50) over deep water.

Labidocera minuta, Giesbr.

Giesbrecht, 1892.

Occurrence.—Taken on three stations at 3 mi. E., four specimens in all, and on two (Stns. 45 and 50) over deep water in moderate numbers. It seems probable that its normal habitat is outside the reef. It should be noted that the hauls outside the reef, being vertical hauls from deep water, were not adapted to the capture of surface-living forms, such as *Labidocera* and *Pontella*.

Length : ♀, 1·76–2·26 mm. ; ♂, 1·68 mm.

Labidocera laevidentata (Brady).

A. Scott, 1909.

Occurrence.—This scarce species was only found on two occasions at 3 mi. E., Stns. 22 and 48, three specimens in all.

Length : ♀, 1·95 mm.

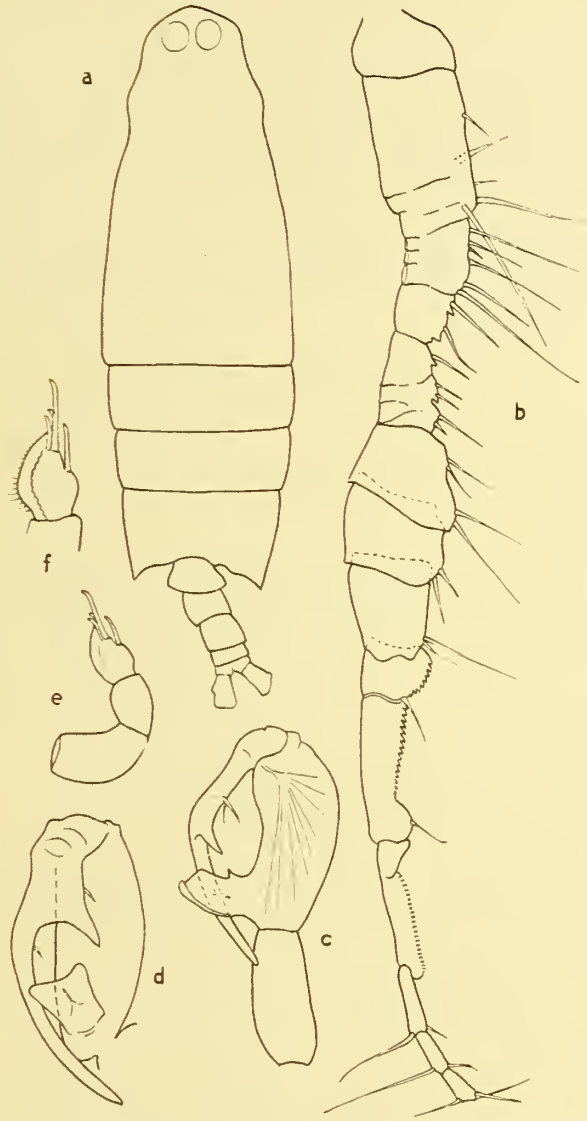
Labidocera, sp. (Text-fig. 20.)

Occurrence.—Six specimens, all males, on four stations at 3 mi. E.—Stns. 2, 3, 6 and 63.

Length : ♂ (Text-fig. 20, *a*), 3·12–3·18 mm.

Remarks.—I have not been able to identify these with any described males, though in some respects they come very near to the description of *L. pavo* from Ceylon given by Sewell (1914). They are, however, much larger and the antennules are different, joints 18 and 19 being each equal to 16 and 17 taken together, and the teeth on the upper edge of joint 19 are continued to the distal end of the joint. In the right fifth foot (Text-fig. 20, *c*, *d*) the terminal claw is flattened basally in a plane at right angles to that of the preceding joint.

I have not put a name to these specimens as they may turn out to be the males of some female already described.



Text-fig. 20.—*Labidocera*, sp. Male : *a*, dorsal view, × 29 ; *b*, antennule, × 59 ; *c*, right fifth foot, × 51 ; *d*, the same, another view, × 60 ; *e*, left fifth foot, × 51 ; *f*, terminal joint of same.

Labidocera detruncata (Dana).

Giesbrecht, 1892.

Occurrence.—Two specimens, a male and a female, were found in the surface haul of the serial townettings on Stn. 16 at 3 mi. E.

Length : ♀, 2·46 mm. ; ♂, 2·40 mm.

Pontella securifer, Brady.

Giesbrecht, 1892.

Occurrence.—One specimen, a female, on the outer part of the reef on Stn. 26, Trinity Opening.

Length : ♀, 4·14 mm.

Pontella cristata, Krämer.

Krämer, 1896.

Occurrence.—One specimen, a male, taken at 3 mi. E. on Stn. 16, in the serial townetting at 10 m., and an immature female in the surface townetting on the same station.

Length : ♀, 4·14 mm.

Remarks.—This species, originally described by Krämer in 1896 from the coast of New South Wales, is easily recognized by the distinctive form of the male fifth feet.

Pontella fera, Dana.

Giesbrecht, 1892.

Occurrence.—One specimen, a female, on Stn. 36, 3 mi. E.

Length : ♀, 2·76 mm.

Pontella danae, Giesbr.

Giesbrecht, 1892.

Occurrence.—One specimen, a male, at 3 mi. E. in the serial townet at 40 m. on Stn. 16.

Length : ♂, 4·08 mm.

Pontellopsis regalis (Dana).

Monops regalis, Giesbrecht, 1892.

Occurrence.—One specimen, a female, at 3 mi. E. in the surface net on Stn. 16.

Length : ♀, 3·47 mm.

Pontellopsis krameri (Giesbr.).

Monops krameri, Giesbrecht, 1896.

Occurrence.—Taken on three stations inside the reef, Stns. 16, 35 and 41, and on Stn. 50 over deep water, six specimens in all. No males were seen.

Length : ♀, 1·92–2·16 mm.

Pontellopsis macronyx, A. Scott.

A. Scott, 1909.

Occurrence.—Four specimens, all males, were taken on three stations (Stns. 5, 14, and 16) at 3 mi. E.

Length : ♂, 1·68–2·04 mm.

Pontellina plumata (Dana).

Giesbrecht, 1892.

Occurrence.—Taken in small numbers on four stations (Stns. 19, 20, 28, 45) outside the reef and on three successive stations (Stns. 14, 15 and 16), at 3 mi. E. These last suggest that a chance incursion from outside had occurred.

Length : ♀, 1·68–1·72 mm. ; ♂, 1·45–1·50 mm.

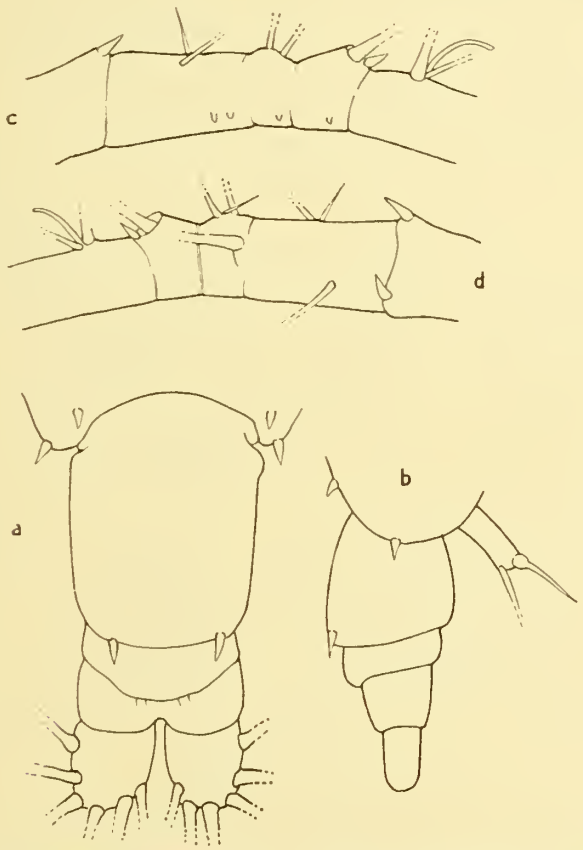
Acartia pietschmanni, Pesta. (Text-fig. 21.)

Steuer, 1923.

Occurrence.—One female on Stn. 50, outside the reef. Two immature females on Stn. 16 at 3 mi. E. and one immature female on Stn. 26, Trinity Opening.

Length : ♀, 1·24 mm.

Remarks.—The adult female from Stn. 50 (Text-fig. 21, *a–d*) had all the characters of this species, viz. fifth thoracic segment with two widely separated marginal teeth on



Text-fig. 21.—*Acartia pietschmanni*. Female : *a*, abdomen, dorsal view ; *b*, abdomen and fifth foot, lateral view ; *c*, basal joints of antennule, dorsal view ; *d*, same, ventral view.

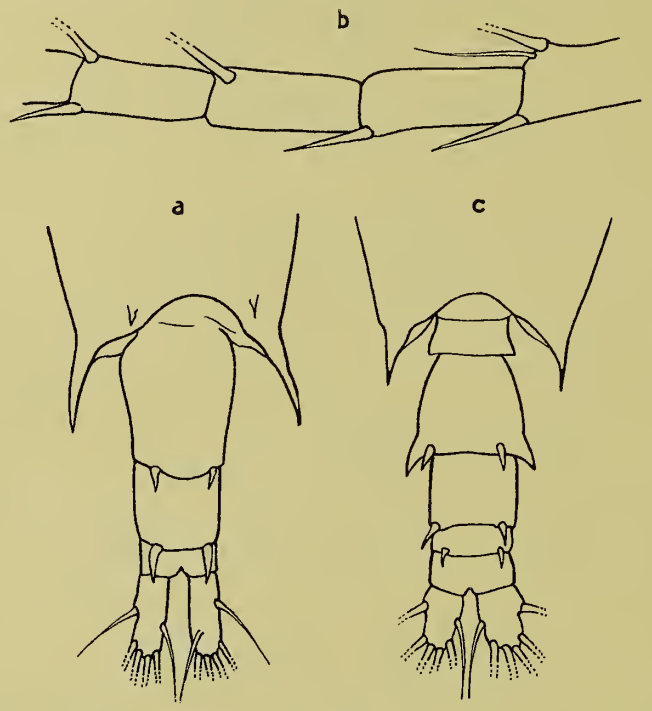
each side, genital segment with a spine on either side of the posterior dorsal margin, second abdominal segment with four minute granules on the posterior dorsal margin, antennules with a distal spine on the anterior margin of the first and fourth joints, some minute spinules near the posterior margin of the third and fourth joints, claw of fifth feet with a swollen base as in *A. clausi*. In addition there was a small distal spine on the ventral side of the first joint of the antennules near the posterior margin. In the immature specimens in Stage V the spines on the thoracic and genital segment and also the fifth feet were as in the adult ; in one specimen the spines on the genital segment were doubled. The spinules on the antennules and on the second abdominal segment were absent and the spines on the antennules much reduced or absent.

Acartia pacifica, Steuer. (Text-fig. 22.)

Steuer, 1923.

Occurrence.—Evidently one of the normal inhabitants inside the reef, as out of the period from which small specimens were available, viz. August and September, 1928, it was always present at 3 mi. E. in small or moderate numbers during the first half of August. It also occurred in the same locality in June and July, 1929, in the serial townettings. It was only once taken outside the reef, one specimen on Stn. 28.

Length : ♀ (Text-fig. 22, *a*), 1·32–1·34 mm. ; ♂ (Text-fig. 22, *c*), 1·26–1·30 mm.



Text-fig. 22.—*Acartia pacifica*. Female : *a*, abdomen, dorsal view ; *b*, antennule, 15th–18th joints. Male : *c*, abdomen, dorsal view.

Remarks.—The female is distinguishable by acute lateral prolongations of the fifth thoracic segment, comparatively long furcal rami, a pair of large spines on the posterior margin of the second abdominal segment and a pair of smaller spines on the posterior margin of the genital segment. There are slender spines on the fifteenth, sixteenth and eighteenth joints of the antennule (Text-fig. 22, *b*), and the terminal spine of the fifth foot has a small lobe at its base.

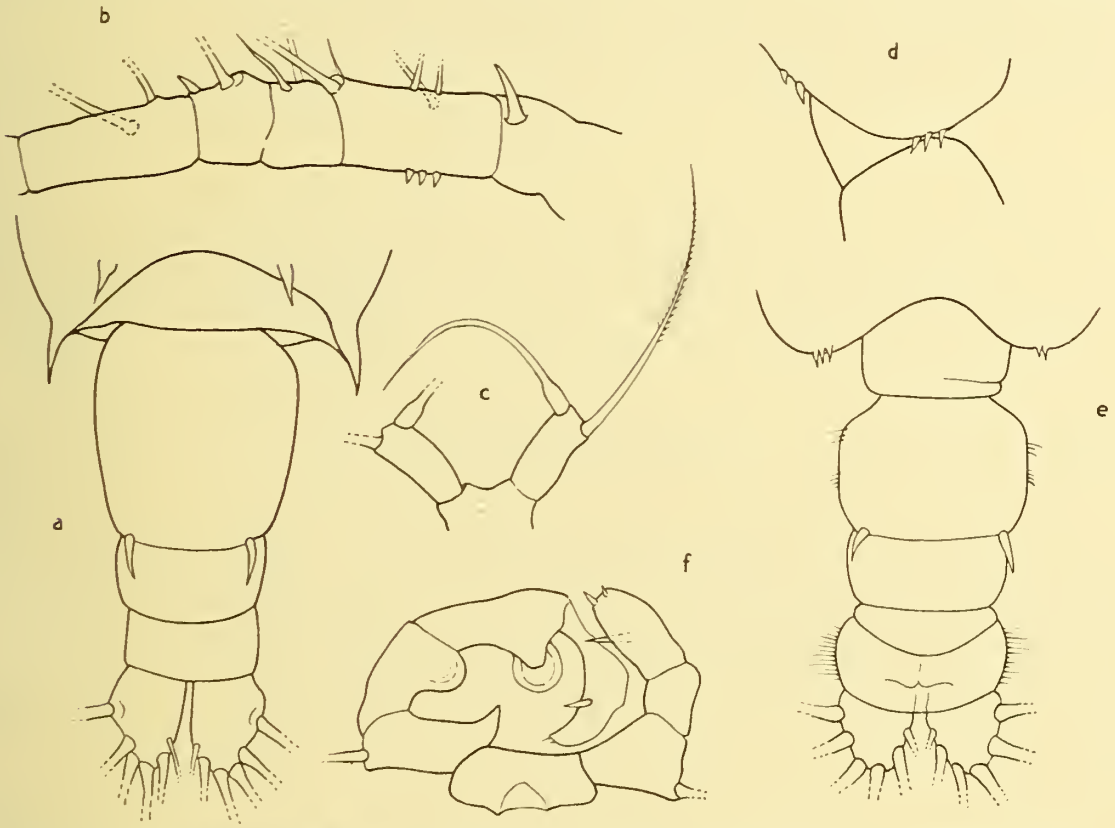
Acartia australis, n. sp. (Text-fig. 23.)

Occurrence.—Not taken at 3 mi. E. but occurred twice in Trinity Opening (Stns. 8, 26) and on three stations outside the reef : Stn. 28, N. 500–0 m., ♂ 5, ♀ 6 ; Stn. 45, N. 500–0 m., ♂ 5, ♀ 6 ; Stn. 50, S. 170–0 m., ♀ 1.

Description.—Female, length 1·30–1·34 mm. Form of the body as in *A. erythraea*, the fifth thoracic segment (Text-fig. 23, *a*) being prolonged laterally into an acute point, dorsal to which, on each side, on the margin of the segment, is a well-developed spine. On each side of the dorsal hinder edge of the genital segment is a strong spine more than

half as long as the following segment. Proportional length of the abdominal segments and furca 15 : 5 : 4 : 6, the furca being $1\frac{1}{3}$ times as long as wide. Second and third abdominal segments without spines or spinules.

First joint of the antennules (Text-fig. 23, *b*) with a stout, slightly curved, spine on its ventral face, nearer the upper than the lower margin. Second joint (aa 2–4) with three sharp spinules on its lower margin. On the upper edge of the fourth joint (aa 7–8) is a small spine at the distal end. The segmentation between the third and fourth joints



Text-fig. 23.—*Acartia australis*, n. sp. Female : *a*, abdomen, dorsal view ; *b*, antennule, basal joints ; *c*, fifth feet. Male : *d*, fifth thoracic segment, lateral view ; *e*, abdomen, dorsal view ; *f*, fifth feet.

is not clearly defined. Rest of antennule without spines or spinules. Fifth feet (Text-fig. 23, *c*) almost exactly as in *A. bispinosa*, with basal joint about twice as long as wide, a long curved spine basally thickened and about three times as long as the basal joint, and a feathered seta as long as the spine.

Male, length 1·13 mm. Fifth thoracic segment (Text-fig. 23, *d*) rounded laterally and ending in two or three small marginal spines on each side, dorsal to which on the lateral margin are a small and a very small spine. Genital segment (Text-fig. 23, *e*) very slightly setose laterally and with a stout spine dorsally on either side of the posterior margin. The two following segments are without setae or spines, but the anal segment has its sides setose. Furca about as wide as long. Fifth feet (Text-fig. 23, *f*) resemble those of *A. bispinosa*, with rounded lobes on the inner margin of the third and fourth joints.

Remarks.—This species falls into Steuer's sub-genus *Odontacartia*, and of the seven species included by Steuer (1923) in the subgenus it is most closely allied to *A. bispinosa* and *A. erythraea* but, amongst other differences, those two species have two spines on the first joint of the antennules.

Acartia danae, Giesbr.

Giesbrecht, 1892.

Occurrence.—Once at 3 mi. E. Stn. 14, ♀ 1, once inside Cook's Passage, Stn. 46, ♀ 1, and in moderate numbers on the stations outside the reef.

Length : ♀, 1·15–1·19 mm. ; ♂, ·9 mm.

Acartia negligens, Dana.

Giesbrecht, 1892.

Occurrence.—Taken frequently both on the stations on the reef, mainly on those from which small specimens were available, and also on the stations outside the reef. It was the most plentiful species of *Acartia* in the collection, but was never abundant.

Length : ♀, 1·70–2·07 mm. ; ♂, 1·44–1·50 mm.

Tortanus gracilis (Brady).

Steuer, 1926.

Occurrence.—On the stations inside the reef it was only found singly or in small numbers and then only between 26th February and 18th July, 1929, being absent from the samples from 27th July, 1928, to 18th February, 1929. The only occasion on which it was taken in considerable numbers was on the serial station 62 in June, 1929, where it amounted to a little over 1% of the total number of copepods. On the stations outside the reef only four specimens were taken, one on Stn. 45, and three in three separate hauls on Stn. 50. It seems to be a local reef species, occasionally extending its range to the waters outside.

Length : ♀, 1·70–2·07 mm. ; ♂, 1·44–1·50 mm. The largest female specimens were taken on the outside stations. They measured 1·98–2·07 mm. None of the reef specimens exceeded 1·98 mm.

Harpacticoida.

Clytemnestra rostrata, Brady.

Giesbrecht, 1892.

Occurrence.—One female, length ·87 mm., was taken outside the reef on Stn. 50, 150–0 m.

Clytemnestra scutellata, Dana.

Giesbrecht, 1892.

Occurrence.—Eleven specimens in all were seen, six of them from outside the reef, Stns. 19, 20 and 28, and five from the serial townettings on Stns. 62, 65 and 68 at 3 mi. E.

Length : ♀, ·80–1·10 mm. ; ♂, ·80–1·20 mm. The reef specimens, with the exception of a male of 1·15 mm., were all between ·8 and ·9 mm. The specimens from outside the reef measured from 1·05–1·20 mm.

Euterpina acutifrons (Dana).

Euterpe acutifrons, Giesbrecht, 1892.

Occurrence.—Occurred in very small numbers inside the reef. Probably it was too small to be taken, except accidentally, in the townets which were used.

Setella gracilis, Dana.

Giesbrecht, 1892.

Occurrence.—Taken in small or moderate numbers on sixteen stations inside the reef and on all the stations outside. The serial townettings indicated that it was mainly a surface form.

Length : ♀, 1·25–1·52 mm. ; ♂, 1·08–1·20 mm.

Microsetella norvegica (Boeck).

Microsetella atlantica, Giesbrecht, 1892.

Occurrence.—Three specimens were seen, one from inside the reef and two from outside.

Length : ♀, ·50 mm. : ♂, ·51 mm.

Remarks.—Like *Euterpina acutifrons*, this species is too small to be taken normally in the nets used, and the numbers seen had probably little or no relation to those actually present.

Aegisthus mucronatus, Giesbr.

Giesbrecht, 1892.

Occurrence.—One dead specimen, a female, was taken on Stn. 28, N. 600–0 m.

The body, without the furca, measured 2·16 mm., the broken furca 5·64 mm.

Cyclopoida.

Oithona plumifera, Baird.

Rosendorn, 1917.

Occurrence.—Occurred practically in every townetting in the collection ; occasionally the most abundant species in the fine-meshed nets, but usually in somewhat smaller numbers than *Paracalanus aculeatus*.

Length : ♀, 1·10–1·22 mm.

Remarks.—All these specimens have been recorded as *O. plumifera*, as all that were examined had only three setae on the endopodite of the mandible and a very minute seta on the endopodite of the first maxilla, although the presence of plumose setae on the basals of the swimming-feet could not always be made out.

Oithona tenuis, Rosendorn.

Rosendorn, 1917.

Occurrence.—A few specimens were found in four townettings from 3 mi. E., Stns. 10, 11, 13, 15, but its main habitat seems to be outside the reef, where it occurred on all the stations in small or moderate numbers.

Length : ♀, 1·16–1·25 mm.

Oithona setigera (Dana).

Rosendorn, 1917.

Occurrence.—Two specimens only were found in townettings inside the reef, but outside the reef it was moderately common on all the stations.

Length : ♀, 1·32–2·04 mm.

Remarks.—The wide range of sizes present suggests that there may be a large and a small form, the latter very scarce, but enough specimens were not available to show that two definite size-groups were present.

Oithona similis, Claus.

Rosendorn, 1917.

Occurrence.—Found both inside the reef, two stations, Stns. 11 and 16, and outside, three stations, Stns. 19, 20 and 28, but in very small numbers.

Length : ♀, ·90–·93 mm.

Oithona robusta, Giesbr.

Rosendorn, 1917.

Occurrence.—Only taken on the stations outside the reef, in small numbers.

Length : ♀, 1·56–1·60 mm.

Oithona attenuata, Farran.

Rosendorn, 1917.

Occurrence.—Apparently very scarce. Two specimens were found inside the reef, at Stns. 10 and 68, and five outside, on Stn. 50.

Length : ♀, 1·78 mm.

Oithona rigida, Giesbr.

Rosendorn, 1917.

Occurrence.—This seems to be a moderately common form, as it occurred in small numbers, both inside the reef and outside it, in most of the gatherings with nets capable of retaining it from which adequate samples were available.

Length : ♀, ·70–·86 mm.

Mormonilla phasma, Giesbr.

Giesbrecht, 1892.

Occurrence.—Five specimens, females, were taken outside the reef, on Stn. 28, N. 600–0 m.

Length : ♀, 1·28–1·40 mm.

Mormonilla minor, Giesbr.

Giesbrecht, 1892.

Occurrence.—Six specimens, females, were taken in the same haul as *M. phasma*, Stn. 28.

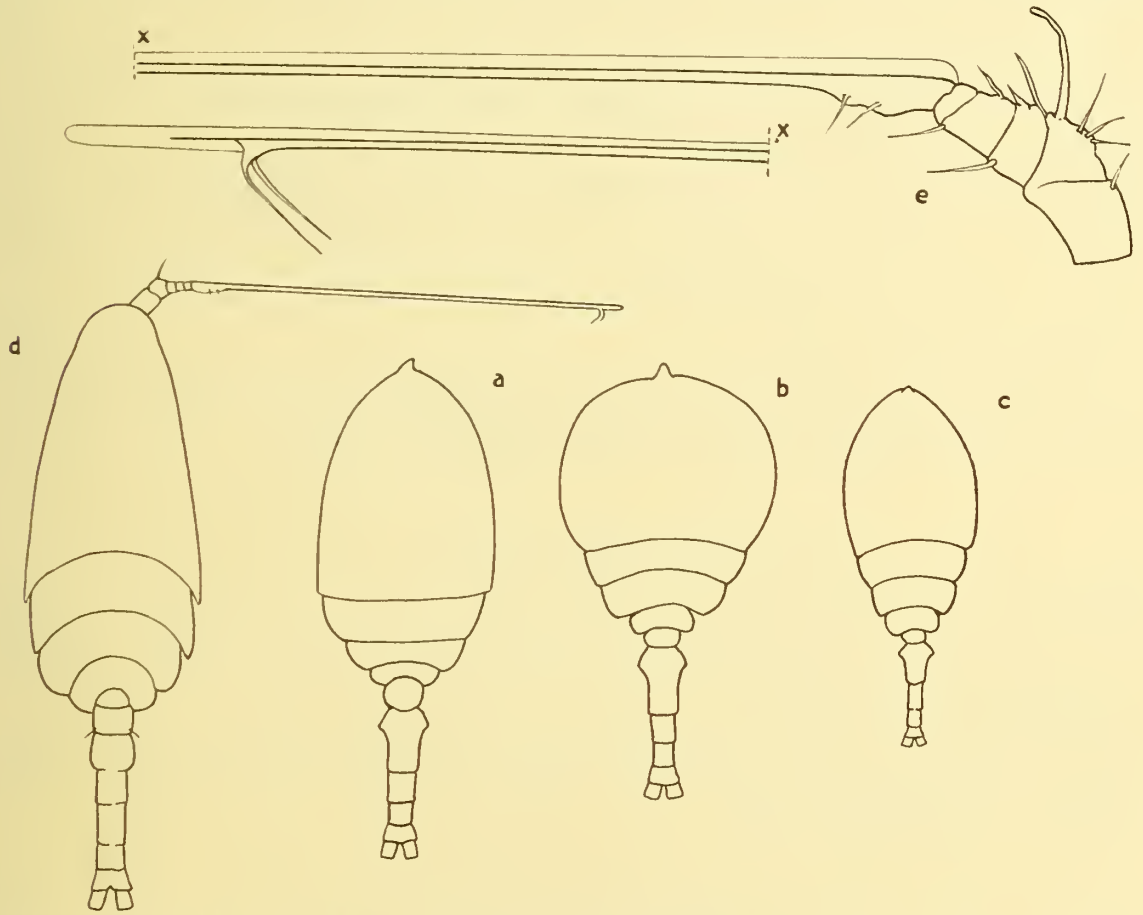
Length : ♀, 1·08–1·12 mm.

Pontoeciella abyssicola. T. Scott. (Text-fig. 24.)

Giesbrecht, 1899.

Occurrence.—Stn. 19, N. 180–0 m., ♂ 1. Stn. 20, N. 250–0 m., ♂ 2, ♀ 2. Stn. 28, N. 580–0 m., ♀ 2. Stn. 45, N. 500–0 m., ♀ 1. Stn. 48 (3 mi. E.), C. 38–0 m., ♀ 1.

Remarks.—The specimens, as regards the form of the cephalothorax, belonged to three different types, which I have figured. Stn. 20, two immature specimens, length ·85 mm., with medium cephalon, width 37% of the total length of the animal. Stn. 28, two females (Text-fig. 24, *b*), length ·83 mm., width of cephalon 41% of total length;



Text-fig. 24.—*Pontoeciella abyssicola*. Female: *a*, dorsal view (Stn. 45), × 69; *b*, dorsal view (Stn. 28), × 69; *c*, dorsal view (Stn. 24), × 69. Male: *d*, dorsal view, × 80; *e*, antennule, × 267.

one of these had an abnormal third foot on one side with two outer edge spines on the second joint of the exopodite. Stn. 45, one female (Text-fig. 24, *a*), length ·93 mm., width of cephalon 37% of total length. The right first foot of this specimen had a double outer edge spine on the third joint as figured by Giesbrecht (1899). The corresponding left foot had only a single spine in this position. Stn. 48, one female (Text-fig. 24, *c*), length ·70 mm., width of cephalon 33% of total length. All these specimens had a projection on the outer edge of the first joint of the endopodite of the fourth foot similar to what is found on the corresponding joints of the first to third feet. In the specimen

from Stn. 48 it was not strongly marked ; in that from Stn. 28 it was very distinct. In Giesbrecht's figure of the fourth foot (1899) it is barely indicated. These specimens support the view held by Giesbrecht that this species shows great variation in the relative width of the carapace. The variation also extends, apparently, in small details to the form of the appendages.

The male (Text-fig. 24, *d*) of this species, which has been briefly described and in part figured by T. Scott (1894), differs from the female in some points which call for special notice. The siphon is absent. The antennules (Text-fig. 24, *e*) are apparently 6-jointed, but the segmentation is obscure. The terminal joint is produced into a long and slender flagellum about $3\frac{1}{2}$ times as long as the basal portion. The aesthetasc on the penultimate joint is fused with the terminal flagellum and extends a short distance beyond it. The antennae are reduced as compared with those of the female. No traces of mandible or first maxilla were seen. The second maxilla and maxillipede are of the same form as in the female, but weaker and more slender. The swimming-feet agree, with trifling differences, with those of the female. The fifth foot consists of a single seta. The abdomen is five-jointed. The furca is as in the female, the outer edge seta being short, transparent, ending in four serrations and situated ventrally. Giesbrecht, who had not seen the male, suggested, as did Scott himself, that it was doubtful whether Scott's specimens were mature or not.

The males in the present collection, which are evidently mature, confirm Scott's description in most points, but show that he has figured part of the fourth thoracic segment as belonging to the abdomen and has omitted the fifth feet.

Oncaea venusta, Philippi.

Giesbrecht, 1892.

Occurrence.—Inside the reef this species occurred on seven stations, usually single specimens of large size. On the deep-water stations outside it was taken on five stations.

Length : ♀, ·84–1·33 mm.

Remarks.—No clear division either in form or size could be made out between the larger and smaller sizes, except that the smaller, ·84–·91 mm., had a distinct reddish tinge on the mouth-parts and legs.

Oncaea mediterranea, Claus.

Giesbrecht, 1892.

Occurrence.—Only one specimen was found inside the reef, Stn. 14. On three stations outside the reef thirteen specimens in all were noted.

Length : ♀, ·98–1·25 mm.

Oncaea media, Giesbrecht.

Giesbrecht, 1892.

Occurrence.—Rather scarce. Occurred in small numbers on four stations outside the reef. One specimen was found at 3 mi. E., Stn. 14, and two in the samples examined from the serial stations, Stns. 62 and 68, at the same place.

Length : ♀, ·72–·78 mm.

Oncaea ornata, Giesbr.

Giesbrecht, 1891.

Occurrence.—Two specimens, females, on Stn. 28, N. 600–0 m.

Length : ♀, ·85 mm.

Oncaea clevei, Fruchtl.

Fruchtl, 1923.

Occurrence.—Allowing for its minute size it was very abundant on almost all the stations taken inside the reef and in the reef passages. It was also taken on the stations outside the reef, but in much smaller numbers except on Stn. 50, N. 150–0 m., where it was plentiful.

Length : ♀, ·63–·68 mm. ; ♂, ·53–·55 mm.

Remarks.—F. Fruchtl (1923) has pointed out that this small species, which Cleve (1901), and doubtless others also, had taken for a small form of *O. conifera*, is in reality a distinct species, differing from others in the *conifera* group in having no terminal process on the exopodite of the fourth foot.

Oncaea conifera, Giesbr. (Text-figs. 25 and 26.)

Giesbrecht, 1892.

Occurrence.—Form (*a*) : Stn. 19, C. 180–0 m., ♀ 4. Stn. 20, N. 250–0 m., ♀ 5, ♂ 5. Stn. 28, C. 600–0 m., ♀ 12. Stn. 45, C. 500–0 m., ♀ 4. Stn. 50, C. 150–0 m., ♀ 2.

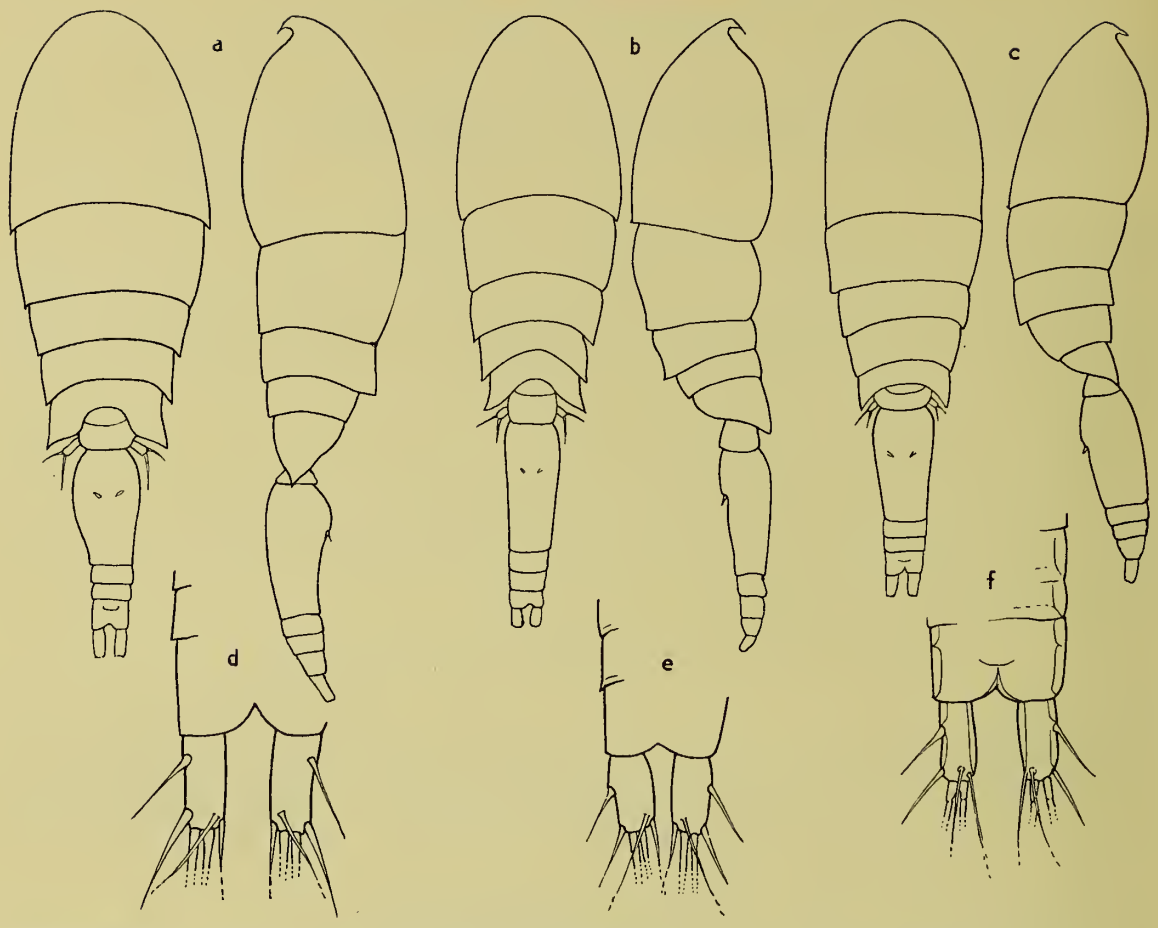
Form (*b*), var. *furcula* : Stn. 20, N. 250–0 m., ♀ 4, ♂ 1. Stn. 28, C. 600–0 m., ♀ 2, ♂ 2. Stn. 45, C. 500–0 m., ♀ 2, ♂ 2.

Form (*c*) : Stn. 28, C. 600–0 m., ♀ 1. Stn. 45, N. 500–0 m., ♀ 4.

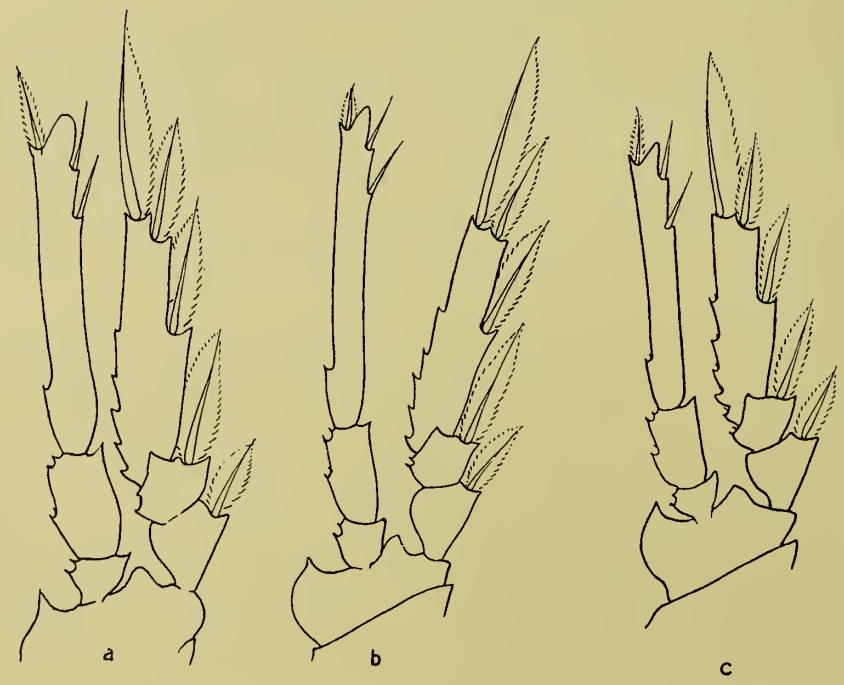
Remarks.—The specimens in the collection fall into three clearly-marked groups, one of which appears to be entitled to varietal rank. The females may be distinguished as follows :

(*a*) Length 1·15–1·20 mm. (Text-fig. 25, *a*, *d* : Text-fig. 26, *a*). Dorsal projection of second thoracic segment well marked. Abdomen, including fifth thoracic segment, included $1\frac{3}{4}$ times in the length of the anterior division. Lateral extensions of fourth thoracic segment parallel-sided in dorsal view. Greatest width of cephalothorax included $3\frac{1}{4}$ times in total length. Genital segment slightly swollen anteriorly and tapered, in lateral view, to nearly half its anterior width, longer than the rest of the abdomen by the length of the furca. Integument of the abdomen moderately thin. Fifth feet about two-thirds as long as furca. Furca equal to the anal segment, which is about equal to the two preceding segments.

(*b*) Length 1·08–1·14 mm. (Text-fig. 25, *b*, *e* ; Text-fig. 26, *b*). Distinctly more slender in general form than (*a*). Dorsal projection of second thoracic segment slight. Lateral extensions of fourth thoracic segment inclining outwards. Abdomen, including fifth thoracic segment, included $1\frac{2}{3}$ times in the length of the anterior division. Greatest width of cephalothorax included $3\frac{2}{3}$ times in total length. Genital segment slender, longer than the rest of the abdomen by more than the length of the furca and anal segment. Furca about equal in length to the anal segment, which is only slightly longer than either of the pre-anal segments. The furcal rami are oval rather than parallel-sided, often bent upwards dorsally, very fragile and often broken off. Swimming-feet more slender than in (*a*) or (*c*).



TEXT-FIG. 25.—*Oncaea conifera.* Female, dorsal and lateral views : *a*, form *a* (length 1·2 mm.), × 75 ; *b*, form *b*, var. *furcula* (length 1·1 mm.), × 75 ; *c*, form *c* (length 1·0 mm.), × 75 ; *d*, furca (form *a*), × 247 ; *e*, furca (form *b*, var. *furcula*), × 247 ; *f*, furca (form *c*), × 247.



TEXT-FIG. 26.—*Oncaea conifera.* Female : *a*, fourth foot (form *a*), × 247 ; *b*, fourth foot (form *b*, var. *furcula*), × 247 ; *c*, fourth foot (form *c*), × 247.

The male of this form may be distinguished by its more slender build and more acute cephalon in lateral view.

(*c*) Length ·96–1·02 mm. (Text-fig. 25, *c*, *f*: Text-fig. 26, *c*). Dorsal projection of second thoracic segment slight. General form as in (*a*), but stouter than (*b*). Lateral projections of fourth thoracic segment parallel-sided in dorsal view. Abdomen, including fifth thoracic segment, included $1\frac{2}{3}$ times in the anterior division. Greatest width of cephalothorax included about $3\frac{1}{2}$ times in total length. Genital segment stout and very slightly tapered in lateral view, longer than the rest of the abdomen by the furca and two-thirds of the anal segment. Fifth feet about half as long as the furca. Furca about equal to the anal segment, which is about three-fourths the length of the two preceding segments. Integument of abdomen very thick: pairs of lateral pores pierce it in the genital segment towards the distal end, in the second abdominal segment and in the anal segment. Sometimes these pores are unpaired, one or more of them being absent.

The characters of (*b*), which may be designated as var. *furcula*, are the most clearly marked, and show more decided differences than either (*a*) or (*c*) from *O. conifera* as described by Giesbrecht (1892).

Text-figs. 25 and 26 show the dorsal and lateral views, the furca and the fourth foot of each of these forms.

Conaea rapax, Giesbr.

Giesbrecht, 1892.

Occurrence.—Several specimens, both male and female, on one station, Stn. 28, N. 600–0 m., outside the reef.

Length: ♀, ·96 mm.; ♂, ·87 mm.

Lubbockia aculeata, Giesbr.

Giesbrecht, 1892.

Occurrence.—A single female on Stn. 45, N. 500–0 m.

Length: ♀, 2·10 mm.

Lubbockia squillimana, Claus.

Giesbrecht, 1892.

Occurrence.—Taken in small numbers on all the stations outside the reef, in hauls ranging in depth between 150–0 m. and 600–0 m. Only females were found.

Pachysoma tuberosum, Giesbr.

Giesbrecht, 1892.

Occurrence.—One specimen, a female, on Stn. 19, N. 180–0 m.

Length: ♀, 1·95 mm.

Sapphirina metallina, Dana.

Lehnhofer, 1929.

Occurrence.—Only taken outside the reef, Stns. 19, 20, 28 and 50, in all twelve males and three females.

Length: ♀, 1·92–2·04 mm.; ♂, 1·92–1·98 mm.

Sapphirina angusta, Dana.

Lehnhofer, 1929.

Occurrence.—Taken twice inside the reef, Stn. 38, one female, and Stn. 57, five males, and twice over deep water, Stns. 19 and 50, one male on each.

Length : ♂, 3·36–4·92 mm.

Sapphirina bicuspidata, Giesbr.

Lehnhofer, 1929.

Occurrence.—One male taken over deep water on Stn. 20.

Length : ♂, 2·9 mm.

Sapphirina scarlata, Giesbr.

Lehnhofer, 1929.

Occurrence.—One male taken over deep water on Stn. 19.

Length : ♂, 3·6 mm. Proportional length of antennule joints 1 + 2 : 3 + 4 + 5 = 1·77 : 1·00.

Remarks.—The total length is intermediate between the lengths given by Lehnhofer (1929) for *S. nigromaculata* and *S. scarlata*, but is within the range of sizes given by Giesbrecht for *S. scarlata*. The proportional lengths of the antennule joints agree with *S. scarlata*. The spine on the second joint of the antennule is slightly larger than is figured by Lehnhofer.

Sapphirina nigromaculata, Claus.

Lehnhofer, 1929.

Occurrence.—Two males taken over deep water on Stns. 49 and 50.

Length : ♂, 2·05–2·16 mm.

Sapphirina stellata, Giesbr.

Lehnhofer, 1929.

Occurrence.—Taken twice inside the reef, Stns. 14 and 38, and once outside, Stn. 19, three males in all.

Length : ♂, 1·75–2·10 mm.

Sapphirina auriniteus, Giesbr.

Lehnhofer, 1929.

Occurrence.—Once inside the reef, Stn. 24, one male, and once outside, Stn. 20, one female.

Length : ♀, 1·60 mm., with narrow furca measuring ·16 × ·096 mm. ; ♂, 2·04 mm. with furca of typical form, ·21 × ·17 mm.

Sapphirina opalina, Dana.

Lehnhofer, 1929.

Occurrence.—Two specimens inside the reef, Stn. 35, ♀ 1, and Stn. 38, ♂ 1. Two females, one of them immature on Stn. 45. outside the reef.

Length : ♀, 3·30 mm. ; ♂, 3·9 mm.

Sapphirina iris, Dana.

Lehnhofer, 1929.

Occurrence.—Taken on two successive stations inside the reef, Stn. 40, S., ♂ 1, N., ♂ 1, and Stn. 41. N.. ♀ 1, and on one station outside, Stn. 50, ♀ 1.

Length : ♀, 5·78–6·00 mm. ; ♂, 5·3 mm. All specimens were of the *longifurca* type.

Sapphirina ovatolanceolata.

Giesbrecht, 1892.

Occurrence.—The male of this species is the commonest *Sapphirina* in the collection. It was taken on six stations inside the reef, Stn. 23, N.. ♂ 2 : Stn. 35, S.. ♂ 5 ; N., ♂ 1 ; Stn. 52. S., ♂ 1 ; Stn. 57. S., ♂ 5 ; Stn. 58, S., ♂ 1 ; Stn. 60, S., ♂ 8 ; N., ♂ 1 ; and on three stations outside, Stn. 19. 28 and 50. 6 specimens in all. Only one female was found, on Stn. 45, outside the reef.

Length : ♀, 2·64 mm. ; ♂, 2·52–3·24 mm.

Remarks.—Lehnhofer (1929). following Steuer. has united this species with *S. gemma*, having found a continuous series, through intermediate forms, from one to the other. The female agreed with Giesbrecht's figure of *S. ovatolanceolata*, the cephalon being broader than the first thoracic segment. The cephalothorax, broad anteriorly and tapering to a narrow fourth thoracic segment, which is only half as wide again as the fifth segment, is a noticeable character.

Corissa, n. gen.

In many respects this genus, represented by a single specimen, comes very near to *Vettoria*, Wilson (*Corina*, Giesbrecht). The points which appear to be of generic importance in distinguishing the specimen from *Vettoria granulosa* are the 3-jointed abdomen, instead of 2-jointed, the form of the furcal rami, narrow and elongate, and the position of the inner edge seta of the furca on its inner margin, a dorsal position being more usual in the Corycaeidae. The mandible and second maxilla approach more nearly to those found in *Sapphirina* than to those of *Vettoria* as described by Giesbrecht, but Giesbrecht's description based on one specimen of ·68 mm. in length, is, he admits, defective.

The swimming-feet agree in the arrangement of spines and setae with those of *Vettoria granulosa* except that in the second and third feet the third joint of the endopodite has an additional outer edge seta. The form of the 2-jointed endopodite of the fourth foot is identical in the two species. The presence of a single seta representing the fifth foot, instead of three, as in *Vettoria*, is a further point of difference.

Corissa parva, n. sp. (Text-fig. 27.)

Occurrence.—One female on Stn. 20 outside the reef, Nansen net, 250–0 m.

Description.—Female (Text-fig. 27, *a*, *b*), length ·87 mm. Anterior division ·60 mm., posterior ·27 mm. Cephalon separated from thorax. Fifth thoracic segment much narrower than the fourth. Abdomen (Text-fig. 27, *c*) 3-jointed, the proportional length of the abdominal segments and furca being 25 : 5 : 8 : 28. Genital openings dorso-lateral with a short seta posterior to each. Genital segment broadened in its anterior three-fifths, the swollen broadened portion being sharply marked off from the rest. Anal segment wider than the preceding segment. Furca long and narrow, broadest at its anterior end and tapered to about half its greatest width, with one inner edge, one outer edge and three terminal setae, the innermost being longest and about two-thirds of the total length of the furca. Cephalon with a small lateral lenticular swelling near its posterior margin on either side and two contiguous cuticular lenses occupying the whole frontal width.

Antennules (Text-fig. 27, *d*) 5-jointed ; proportional length of joints 19 : 36 : 30 : 14 : 24 ; segmentation between fourth and fifth joints imperfect.

Antennae (Text-fig. 27, *e*) long and slender, 4-jointed with terminal hook, first joint with slender distal spine, second joint with spine at the proximal two-fifths, third joint with two short setae, fourth joint ending in two setae and a strong claw ; proportional length of joints and claw 36 : 80 : 10 : 60 : 20.

Mandible (Text-fig. 27, *f*) a broad, scythe-shaped claw, setose on its anterior margin.

First maxilla (Text-fig. 27, *f*) a short clavate process, with three spines. Second maxilla (Text-fig. 27, *g*) with a broad basal and a curved terminal claw, setose on the outer margin of the curve.

Maxillipede with a short stout basal joint, a slightly longer and thicker second joint and a stout terminal spine, or tapered third joint, with a thickened base and a basal seta.

Swimming-feet slender, with 3-jointed exopodites and endopodites, except for a 2-jointed endopodite on the fourth foot, the arrangement of spines and setae being shown in Text-fig. 27, *i–l*. The outer edge spines of the exopodites are lancet-shaped, with very tenuous denticulate margins. The terminal spines of the exopodites have finely denticulated outer edges. Fifth foot of a single seta on each side of fifth thoracic segment.

Copilia vitrea (Haeckel).

Lehnhofer, 1926.

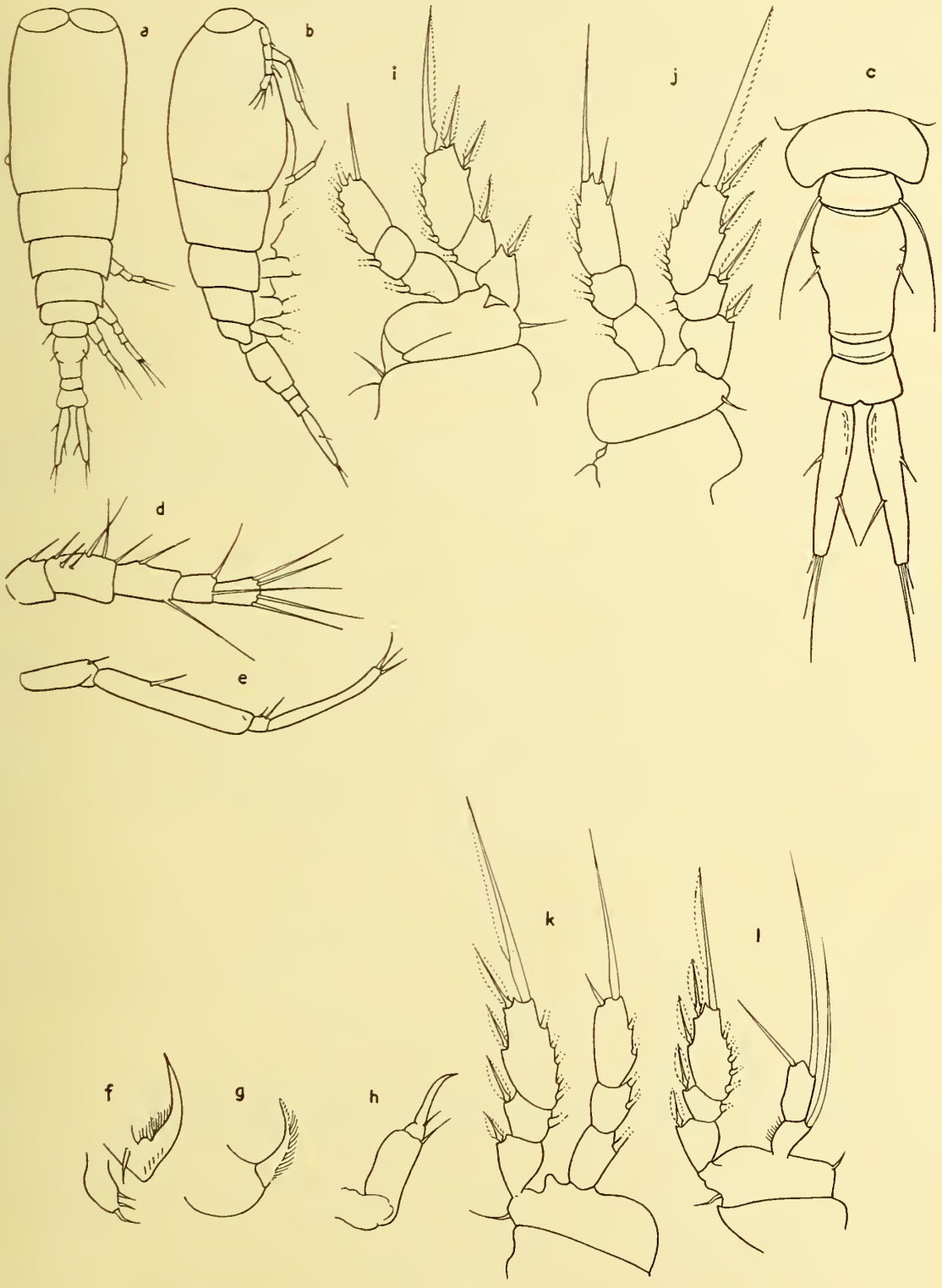
Occurrence.—On two stations over deep water outside the reef : Stn. 20, ♂ 1 ; Stn. 28, ♀ 2.

Copilia mirabilis, Dana.

Lehnhofer, 1926.

Occurrence.—The commonest species of *Copilia*. Found in small numbers in almost every townetting taken outside the reef, as well as on one station, Stn. 43, off Cape Bedford and on two at 3 mi. W., Stns. 29 and 51.

Remarks.—Males both of the typical form and of the form *platyonyx* occurred, sometimes in the same townetting.



TEXT-FIG. 27.—*Corissa parva*, n. sp. Female : *a*, dorsal view, × 87 ; *b*, lateral view, × 87 ; *c*, abdomen, × 237 ; *d*, antennule ; *e*, antenna ; *f*, mandible and maxilla ; *g*, second maxilla ; *h*, maxillipede ; *i*, first foot ; *j*, second foot ; *k*, third foot ; *l*, fourth foot (*d–l*, × 320).

Copilia quadrata, Dana.

Lehnhofer, 1926.

Occurrence.—Next to *C. mirabilis* this was the commonest species of the genus. It occurred on all the stations outside the reef, but only from one to three specimens on each ; and also on one station in the reef passages, Stn. 29.

Copilia lata, Giesbr.

Lehnhofer, 1926.

Occurrence.—On two stations outside the reef : Stn. 19, ♂ 1 ; Stn. 20, ♂ 2.

Corycaeus speciosus, Dana.

Dahl, 1912.

Occurrence.—From one to three specimens were found on eight of the fourteen stations at 3 mi. E. from which small specimens were available. It occurred on five other stations inside the reef and in moderate numbers on the stations outside the reef.

Corycaeus crassiusculus, Dana. (Text-fig. 28.)

Corycaeus crassiusculus, Dahl, 1912.
C. danae, Giesbrecht, 1892.

Occurrence.—On four stations outside the reef : Stn. 19, ♀ 8, ♂ 3 ; Stn. 20, ♀ 1 ; Stn. 28, ♀ 4 ; Stn. 48, ♀ 1. One specimen, ♀, in the serial townets at Stn. 62.

Length : ♀, 1·68–1·70 mm. ; ♂, 1·58 mm.

Remarks.—The female is figured (Text-fig. 28, *c*, *d*) for comparison with that of *C. vitreus*. In the specimen figured the abdomen is straight, but in several others it was flexed ventrally, as shown in M. Dahl's figure (1912, pl. iii, fig. 2).

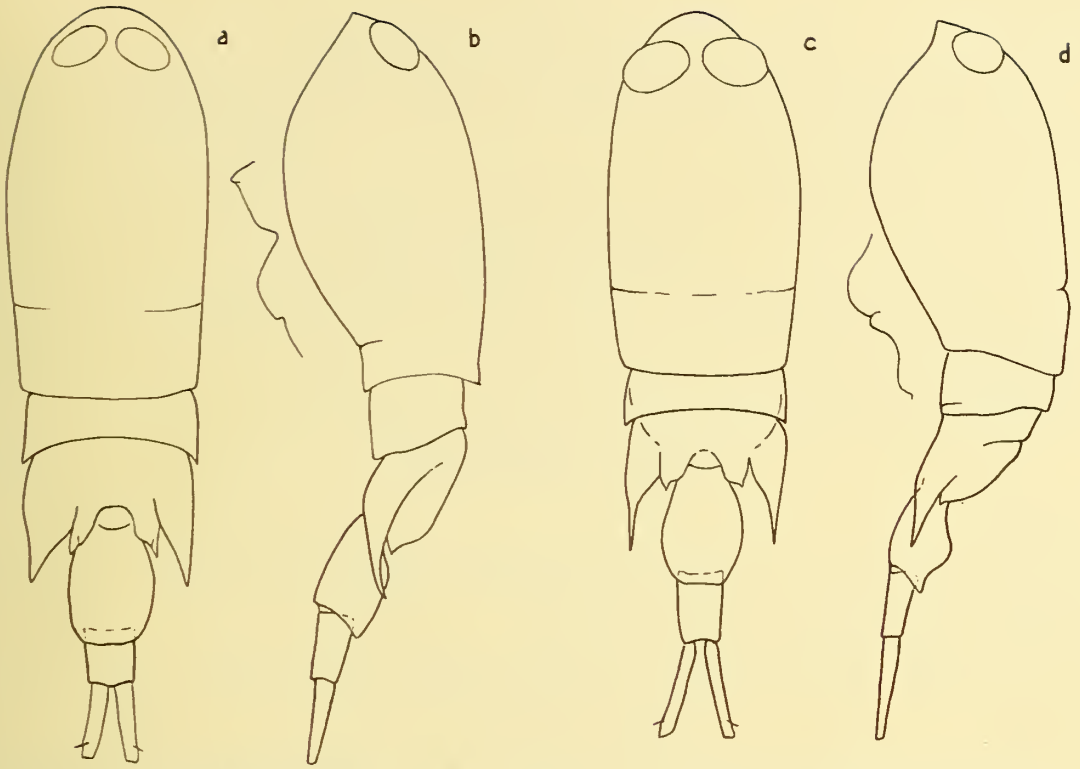
Corycaeus vitreus, Dana. (Text-fig. 28.)

Dahl, 1912.

Occurrence.—Once inside the reef, Stn. 3, ♂ 1. Outside the reef on two stations : Stn. 19, 1 m. C. 180–0 m., ♂ 4 ; S. 180–0 m., ♂ 1, ♀ 1. Stn. 28, N. 600–0 m., ♂ 1.

Length : ♀, 1·68 mm. ; ♂, 1·62–1·70 mm.

Remarks.—Dana's (1852, 1855) original description and figure of the male of this species being inadequate, I have accepted without question the redescription and figures given by M. Dahl (1912) of the specimen from the Plankton Expedition. The characters which are given to separate it from the males of *C. clausi* and *C. crassiusculus* are the short cephalon, very broad in front and tapering posteriorly, the short anal segment and the fine transparent edge to the longest furcal seta. In company with males there was taken on one station a single specimen which appears to be the undescribed female of this species (Text-fig. 28, *a*, *b*). In form it is more robust than *C. crassiusculus*. The abdomen is shorter and broader in dorsal view, though scarcely differing when seen from the side. The furcal rami are noticeably broader and more tapered. There is a membranous edge to the longest furcal seta, but it is narrow and tenuous and difficult to make out, and is



Text-fig. 28.—*Corycaeus vitreus*. × 58. Female : *a*, dorsal view ; *b*, lateral view, × 58. *Corycaeus crassiusculus*. Female : *c*, dorsal view, × 58 ; *d*, lateral view, × 58.

equally present in the furcal seta of *C. crassiusculus*. This specimen appears to be identical with the females which I formerly recorded (1929) with some hesitation from off New Zealand as *C. crassiusculus*.

Corycaeus robustus, Giesbr.

Dahl, 1912.

Occurrence.—One female on Stn. 20, outside the reef.

Length : ♀, 2·18 mm.

Corycaeus typicus, Kröyer.

Dahl, 1912.

Occurrence.—On four stations outside the reef : Stn. 19, C. 180–0 m., ♀ 11 ; N. 180–0 m., ♀ 2. Stn. 20, N. 250–0 m., ♀ 16, ♂ 10. Stn. 28, N. 580–0 m., ♀ 3, ♂ 1. Stn. 50, N. 150–0 m., ♀ 2.

Length : ♀, 1·57–1·59 mm. ; ♂, 1·41–1·49 mm.

Corycaeus flaccus, Giesbr.

Dahl, 1912.

Occurrence.—On two stations outside the reef : Stn. 19, N. 180–0 m., ♀ 17 ; Stn. 28, N. 580–0 m., ♀ 2.

Length : ♀, 1·66–1·75 mm.

Corycaeus limbatus, Brady.

Dahl, 1912.

Occurrence.—On four stations outside the reef : Stn. 19, ♀ 2 ; Stn. 20, ♀ 1 ; Stn. 28, ♀ 2 ; Stn. 45, ♀ 1.

Length : ♀, 1·32–1·45 mm.

Corycaeus longistylis, Dana.

Dahl, 1912.

Occurrence.—On one station outside the reef : Stn. 19, S. 180–0 m., ♀ 1 ; 1 m. C. 180–0 m., ♂ 2.

Length : ♀, 2·60 mm. ; ♂, 2·16–2·24 mm.

Corycaeus lautus, Dana.

Dahl, 1912.

Occurrence.—On one station outside the reef : Stn. 19, S. 180–0 m., ♀ 2, ♂ 1 ; 1 m. C. 180–0 m., ♀ 6, ♂ 8.

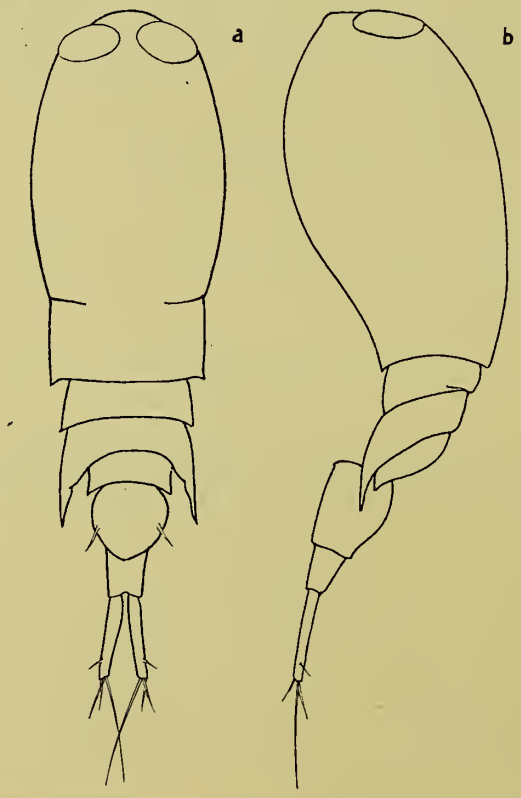
Length : ♀, 2·84 mm. ; ♂, 2·16–2·22 mm.

Corycaeus furcifer, Claus.

Dahl, 1912.

Occurrence.—On four stations outside the reef : Stn. 19, N. 180–0 m., ♂ 1 ; Stn. 20, N. 250–0 m., ♀ 1 ; Stn. 28, N. 600–0 m., ♀ 3 ; Stn. 45, N. 600–0 m., ♀ 2, ♂ 2.

Length : ♀, 1·70–1·74 mm. ; ♂, 1·23–1·27 mm.



Text-fig. 29.—*Corycaeus minimus*. Female : *a*, dorsal view, × 120 ; *b*, lateral view, × 120.

Corycaeus minimus, F. Dahl. (Text-fig. 29.)

Dahl, 1912.

Occurrence.—Two females were taken on Stns. 20 and 28, outside the reef.

Length : ♀, ·75–·78 mm.

Remarks.—These two specimens (Text-fig. 29, *a*, *b*) come very near to Dahl's description of *C. minimus indicus*, with which they agree in the following points : The furca is slightly divergent ; the third thoracic segment is longer than in the typical form ; there is a minute rudimentary hook on the ventral side of the genital segment ; the anal segment is as wide at the base as it is long and is slightly tapered distally. They differ in the slightly longer furca, twice as long as the anal segment and $7\frac{1}{2}$ to 8 times as long as wide. As compared with M. Dahl's figure, the genital segment is broader and more globular in dorsal view. Klevenhusen (1933) has described, from the Atlantic, a form of *C. minimus* with a ventral hook on the genital segment.

Corycaeus lubbocki, Giesbr.

Dahl, 1912.

Occurrence.—Taken in moderate numbers on almost all the stations inside the reef from which small specimens were available. A few were taken outside the reef on Stns. 19, 45 and 50.

Length : ♀, ·98–1·05 mm.

Corycaeus erythraeus, Cleve.

Corycaeus dubius, Farran, 1911 ; Dahl, 1912.

Occurrence.—Inside the reef this species was rather more numerous than *C. lubbocki*. It occurred on the same stations and also in some additional gatherings. Outside the reef it was taken on Stns. 19, 20, 45 and 50, in small numbers on the first three, but in comparative abundance on Stn. 50.

Length : ♀, ·96–1·05 mm. ; ♂, ·84–·91 mm.

Remarks.—Gurney (1927) has described and referred to *C. erythraeus*, Cleve, a species which occurred in considerable numbers in the Suez Canal and at Suez. The correctness of his identification can hardly be doubted, since *C. erythraeus* was first described from the Red Sea. It is evident from Gurney's description that there is no essential difference between *C. erythraeus* and *C. dubius*.

Corycaeus asiaticus, F. Dahl.

Corycaeus asiaticus, Dahl, 1912.
C. murrayi, Farran, 1911.

Occurrence.—As in the case of *C. lubbocki* and *C. erythraeus*, this species occurred on all the stations inside the reef from which small specimens were available, but it was less than half as common as *C. erythraeus*. Outside the reef it was taken in small numbers on Stns. 19 and 45, and was plentiful on Stn. 50.

Length : ♀, 1·26–1·38 mm. ; ♂, 1·16–1·26 mm.

Remarks.—The wings of the fourth thoracic segment in the female of these specimens ended in an acute point and no seta could be seen on the genital segment.

Corycaeus andrewsi, Farran.

Dahl, 1912.

Occurrence.—Two females were taken in a surface haul on Stn. 4 inside the reef.

Length : ♀, ·81–·88 mm.

Corycaeus subtilis, M. Dahl.

Dahl, 1912.

Occurrence.—On three stations inside the reef, Stn. 55 ; ♀ 1, Stn. 62, ♀ 2 ; Stn. 68, ♀ 6 ; and on two over deep water, Stn. 19, ♀ 1 ; Stn. 50, ♀ 5. Taking into consideration its very small size it is evidently not an uncommon species.

Length : ♀, ·72–·82 mm.

Corycaeus agilis, Dana.

Dahl, 1912.

Occurrence.—On five stations inside the reef and two, Stns. 20 and 50, over deep water. Scarce except on Stn. 50, on which 22 females and 2 males were observed.

Length : ♀, ·95–·97 mm. ; ♂, ·68 mm.

Corycaeus pumilus, M. Dahl.

Dahl, 1912.

Occurrence.—Taken only over deep water, on Stns. 45 and 50, 13 ♀ and 2 ♂ in all.

Length : ♀, ·66–·76 mm. ; ♂, ·70 mm.

Remarks.—These specimens differed in some respects from the type described by M. Dahl (1912), but came nearer to it than to *C. medius*, Gurney, from the Suez Canal. The greater length of the anterior segment, cephalon and first thoracic segment, equal to three-fifths of the total length, agrees with *C. pumilus*, as does the short abdomen, $2\frac{1}{2}$ times in the anterior division of the body. A difference from *C. pumilus* is the great length of the inner furcal seta, which is more than 4 times as long as the furca, 3 times as long as the second seta and 9 times as long as the third, which is short and spiniform and about half as long as the furcal rami.

In the form of the abdomen and terminal setae it agrees fairly well with *C. medius*.

As *C. pumilus* was only described from three specimens, it seems possible that Dana's description of the longest furcal seta as not twice as long as the furca may have been based on an imperfect specimen. Out of the nine females in the collection measured only two had the furcal setae intact.

Corycaeus catus, F. Dahl.

Dahl, 1912.

Occurrence.—Found in moderate numbers in most of the townettings inside the reef from which small specimens were available. One or two specimens were also found in eight out of the remaining reef samples. It was taken on four stations over deep water —Stns. 19, 28, 45 and 50—being common on two of them—Stns. 45 and 50.

Length : ♀, ·92–1·01 mm. ; ♂, ·78–·87 mm.

Corycaeus pacificus, F. Dahl.

Dahl, 1912.

Occurrence.—A very scarce species, taken only in two of the stations over deep water, Stns. 19 and 28, four females.

Length : ♀, 1·04–1·08 mm.

Remarks.—Though this species comes very near in size and general form to the preceding *C. catus*, it can be separated under a sorting lens by its slightly larger size and longer furca. Under a microscope can be observed the additional characters of blunted short points to the wings of the fourth thoracic segment, the shorter and broader third thoracic segment, and the very small size of the seta on the genital segment.

Corycella gibbula (Giesbr.).

Corycaeus gibbulus, Dahl, 1912.

Occurrence.—Taken both inside the reef and over deep water. It occurred in eight out of the fourteen stations on the reef from which small specimens were available, and on five out of six stations over deep water.

Length : ♀, ·88–·98 mm.

Corycella carinata (Giesbr.).

Corycaeus carinatus, Dahl, 1912.

Occurrence.—Only taken on the stations over deep water, where it occurred on five of the six stations outside the reef.

Length : ♀, ·80–·85 mm.

Remarks.—All the specimens agreed with the form which I have figured from Christmas Island (Farran, 1911).

Corycella concinna, Dana.

Corycaeus concinnus, Dahl, 1912.

Occurrence.—Found on six of the fourteen stations inside the reef from which small specimens were available, and on five of the six hauls over deep water. Slightly more numerous than *C. gibbula* over the reef, but scarcer outside it.

Length : ♀, ·88 mm.

Corycella curta, Farran.

Corycaeus curtus, Dahl, 1912.

Occurrence.—One specimen, a female, was taken outside the reef on Stn. 28.

Length : ♀, ·76 mm.

Saphirella tropica, Wolfenden. (Text-fig. 30.)

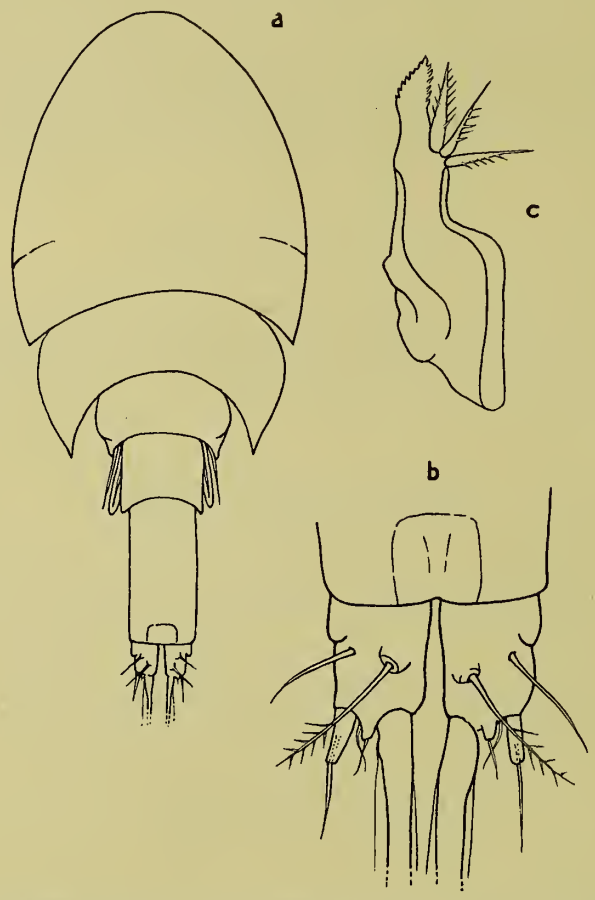
Wolfenden, 1905.

Occurence.—One specimen in the lowest of the serial hauls on Stn. 65 at 3 mi. E., where the depth is 32 m.

Length : 1·12 mm.

Remarks.—This specimen, the carapace of which is finely pitted, agrees in most points with the figures which Wolfenden (1906) has given of *S. tropica* from the Maldive Archipelago, and shows distinct differences from *S. indica*, Sewell.

Wolfenden's fig. 16 on plate xcix is duplicated. The two figures closely resemble the second maxilla and the maxillipede of the Barrier Reef specimen, though only one is represented in the explanation of plates, under the designation of " Mandible Palp ? "



Text-fig. 30.—*Saphirella tropica*. *a*, dorsal view, × 84 ; *b*, furca, dorsal view, × 277 ; *c*, mandible, × 277.

Wolfenden's fig. 17, designated " Maxilla and ? anterior footjaw ", appears to represent the mandible and part of the first maxilla, but does not correspond very well with my specimen. The figure of the mandible here given (Text-fig. 30, *c*) is taken from a specimen, found in a collection of Copepoda from Christmas Island in the Indian Ocean, which was identical with the Barrier Reef specimen.

Sewell (1924) has given a critical account of previous records of the genus, and accepts the reasonable view of Canu (1888) that it represents the first copepodite stage of a parasitic form. His opinion that the mandible is absent and that the appendage usually described as the mandible is part of the maxilla is more open to question.

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