THE

TRANSACTIONS

OF

THE LINNEAN SOCIETY OF LONDON.

REPORT ON ENTOMOSTRACA FROM THE GULF OF GUINEA.

BY

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I. *Report on Entomostraca from the Gulf of Guinea, collected by John Rattray, B.Sc.*
By Thomas Scott, *F.L.S., Naturalist to the Fishery Board for Scotland.*

Read 2nd February, 1893.

(Plates I.–XV.)

The following Report contains a Catalogue, more or less descriptive, of all the Entomostraca obtained in the tow-net gatherings collected by Mr. John Rattray, in the Gulf of Guinea, while engaged as naturalist on board the Telegraph Steamer 'Buccaneer.'

It is not necessary that I should enter into any explanation of the causes of the delay in the publication of the Report on the Entomostraca further than to state that the collections were handed over to me early in 1891, and since then all the leisure that could be spared has been devoted to their examination and to the preparation of the following Catalogue.

In the preparation of the Report the author has to acknowledge the valuable aid he has received from Professor G. S. Brady, F.R.S. He is also under great obligations to the Senatus of the University of Edinburgh for the privilege of consulting the numerous works on Natural History in the University Library, and to Mr. Webster, the Librarian, who has always been ready to help in hunting up any literature wanted.

My thanks are also due to Dr. T. Wemyss Fulton, of the Fishery Board for Scotland, for the active interest he has taken in the preparation of the Report; among other things he obtained for me the privilege of consulting the valuable Natural History Works in the Library of the Royal Society of Edinburgh.

The Government Grant Committee of the Royal Society of London allocated to me the sum of £20 in 1891, and again in 1892, for the purposes of this investigation; and this enabled me to retain the services of my son, Mr. Andrew Scott, for the preparation of the drawings that accompany and illustrate the Report, which, by their acknowledged

accuracy as well as their beauty, add greatly to its value. My son also prepared the greater number of the dissections represented by the drawings, which were necessary for the satisfactory diagnosis of the various species recorded.

The Entomostraca described in the following Catalogue include species belonging to the orders Copepoda, Cladocera, and Ostracoda. The first is represented by one hundred and forty-eight species, the second by two species, and the third by twenty-four species.

The great tendency to, and multiplicity of, variation observed, especially in certain groups, has caused considerable difficulty in deciding the value that should be placed on the amount of variation met with. Though care has been taken to avoid as far as possible attaching a higher value to these variations than they deserved, it has been necessary in not a few instances to give them specific and even generic rank, in order to dispose of them in anything like a satisfactory manner.

A considerable number of more or less immature forms occurred in nearly all the tow-nettings, and were the cause of much trouble during the examination of the material; the liability of mistaking an immature specimen of one species for a member of another, and a different one, is considerable, and has to be kept constantly in view during the examination of such small organisms.

Since writing this Report I have, through the kindness of Dr. T. Wemyss Fulton, of the Fishery Board for Scotland, been favoured with a perusal of Dr. Giesbrecht's excellent work on the Mediterranean Copepoda, which has enabled me to make some alterations that will bring it more into conformity with recent views on the nomenclature of that important group of the Crustacea; while the Introductory Remarks by Mr. Rattray, which follow, will add to its completeness.

Introductory Remarks. By John Rattray, B.Sc., F.R.S.E.

For the opportunity of taking part in this expedition, of the results of which a report on the Entomostraca is now presented, I have exclusively to thank Dr. John Murray, of H.M.S. 'Challenger' Commission. J. Y. Buchanan, Esq., formerly chemist on board H.M.S. 'Challenger,' accompanied the expedition, and all my work was carried on under his immediate supervision on board the S.S. 'Buccaneer' (Captain Thomson, R.N.R.), then in the service of the India Rubber, Gutta Percha, and Telegraph Works Co., Ld., of Silvertown, Essex, and at that time engaged in sounding-operations preliminary to the laying down of a telegraph-cable on the West Coast of Tropical Africa.

Sailing from Liverpool in the S.S. 'Nubia' in the beginning of December 1885, the 'Buccaneer' was joined by Mr. Buchanan and myself at Sierra Leone on December 23, and sailed at once northwards, touching on Dec. 24 at Bullama and Bassao, between the Isles de Los and Dakar, near Cape Verd, arriving at Dakar on the evening of the same day to complete preliminary arrangements for the sounding expedition, which started thence on December 29.

So far as relates to the Biological collections, the equipment provided consisted of a supply of botanical paper with botanical press for the preservation of such larger plant specimens as might be procured on any short expeditions that might be possible on shore. Such chances were found only at rare intervals: thus gatherings were made on the outward voyage at Madeira, in the vicinity of Funchal (Dec. 10), at Teneriffe, in and around Santa Cruz (Dec. 12 and March 28, 1886), at Sierra Leone (Dec. 21), at Conakoy, Isles de Los (March 17, 1886), at Dakar (Dec. 26–29), at Accra, North Coast of Gulf of Guinea (Jan. 16), at São Thomé, Gulf of Guinea (Jan. 25 and 31 and Feb. 1, 1886), at Principé Island, Gulf of Guinea (Jan. 27), and at St. Paul de Loanda, E. coast of Gulf of Guinea (Feb. 10–17). On Dec. 13 some algæ and shells were procured at Las Palmas, Gran Canaria, a landing for a few hours only being possible. During the brief calls at Bullama and Bassao on Dec. 24, the time was entirely occupied in the collecting of marine specimens either floating on the very muddy waters of these parts or occurring on the beach; the visits paid to Libreville, Gaboon River, on January 28, and to Bananah Creek, Congo River, on February 7, were so brief that no landing could be effected. So far as relates to Phanerogams, the best gatherings were made in and about Santa Cruz and at São Thomé; a considerable number of Thalamifloræ were found at both; Papaveraceæ and Coniferæ especially at Santa Cruz; Malvaceæ especially at São Thomé. At the latter Leguminous, Rosaceous, Crassulaceous, Myrtaceous, Onagraceous, Samydaceous, and Cucurbitaceous Calycifloræ were well represented; at the former were gathered some Ficoideæ and Umbelliferæ not obtained at the latter. At St. Paul de Loanda, Leguminous and Myrtaceous Calycifloræ only were found, *e. g.* especially *Indigofera*, *Dialium*, *Cæsalpinia*, *Crotalaria*, *Tamarindus*, and *Psidium*. Of Epigynous Monopetaloid Compositæ more were obtained at Santa Cruz than at São Thomé; but, on the other hand, more hypogynous specimens at the latter than at the former, the Jasminaceæ, Apocynaceæ, and Convolvulaceæ predominating. Again, Apetalæ, Nyctaginaceæ, Amarantaceæ, Urticaceæ, Euphorbiaceæ, and Monocotyledones—especially Connaceæ, Cyperaceæ, and Gramineæ—were found most abundantly at São Thomé. Most Filices were obtained from Principé Island, including particularly species of *Nephrolepis*, *Nephrodium*, *Polypodium*, and many young forms. At Dakar and at St. Paul de Loanda the coast-flora was poor, owing to the vast stretches of sand; at the former were observed species of *Argemone*, *Urena*, *Vigna*, *Cassia*, *Albizzia*, *Sesbunia*, *Jussiæa*, *Heliotropium*, *Clerodendron*, *Hyptis*, *Scirpus*, *Chloris*, *Pennisetum*, *Penicillaria*, *Andropogon*, *Cenchrus*, not obtained at the latter, which, on the other hand, yielded species of *Sesuvium*, *Sida*, *Tribulus*, *Monetia*, *Indigofera*, *Psidium*, *Pluchea*, *Dichoma*, *Ipomœa*, *Boerhaavia*, *Bougainvillea*, *Centema*, *Pupalia*, *Phyllanthus*, *Euphorbia*, *Panicum*, *Sporobolus*, *Eragrostis*, *Aristida*, &c., not found at Dakar.

Much difficulty was experienced in protecting specimens against the hot moist atmosphere of the tropics, and recourse was ultimately had to having them deposited near the furnaces of the steamer. This at length proved effective, but was accompained by the accumulation of much dust, which might, however, have been largely avoided by wrapping in fine muslin, had that been available.

Among Algæ specially noteworthy were the exuberant growths of Corallinæ near Las Palmas, attached to a soft sandstone on a narrow isthmus joining the volcanic sections of the island, and of *Padina* (Adanson) on the beach, about 3 miles from Dakar, at the far side of the bay surrounding Goree Island.

For the preservation of zoological specimens the following means were at hand:— methylated spirit, absolute alcohol, glycerine, benzole, ether, chloroform, acetic acid, ammonia, hydrochloric acid, sulphuric acid, nitric acid, corrosive sublimate, caustic potash, osmic acid, chromic acid, picric acid, iodine, picrocarmine, hæmatoxylin, Canada balsam; with accessories such as slides, cover-glasses, watch-glasses, porcelain dishes, spirit-lamp, camel-hair brushes, needles, spatulas, two nets of varying degrees of fineness, a tank-box, shrimp-trawls, mud-bags, and specimen bottles. Some 200 bottles of 4-oz. capacity, in addition to several boxfuls of others of larger sizes. At the end of the work all the available bottles were filled, and as many others as could be obtained empty from the supplies of the ship.

Many micro-preparations were made of the products of the soundings, of which 411 were taken during the cruise, and of the contents of the tow-nets at various points. Larger specimens, such as species of Pisces, were procured from native fishermen at St. Paul de Loanda, and for these the tank-box proved very useful. Larger Crustacea, of which a few were found on shore, were preserved in spirit at once. Numerous shells of Mollusca were obtained dry; but one of the most important departments of the work was the preservation of the more delicate Arthropoda (Copepoda, Amphipoda, Schizopoda, &c.), Ascidia, ova, fish-larvæ, *Sagitta*, &c., found in the tow-net gatherings. For these the methods adopted were essentially those practised at the zoological stations of Naples * and elsewhere. For delicate objects, Prof. E. R. Lankester had recommended, in a letter to Dr. John Murray, two plans: (α) corrosive sublimate followed by dilute then stronger alcohol, and (β) $\frac{1}{10}$ per cent. osmic acid, or this mixed with very dilute chromic acid or acetic acid, giving a short exposure of 1 to 2 minutes according to size: this to be followed by alcohols of increasing strength. The latter method was recommended for *Clione* and other Pteropoda; it was adopted but rarely, owing to the difficulty of prosecuting many different methods in a limited amount of space (the laboratory at command being quite small, but very compact) the combined chrom-osmic or aceto-osmic plans were not tried at all: the former method was freely used. For the Radiolaria the osmic acid process also proved of use, it had been recommended by Hartwig and by Haeckel; but a glycerine medium to follow it was not employed because of the unsuitability of its refractive index to that of the Radiolarian skeleton.

For preserving the products of the tow-net pure alcohol was never adopted *ab initio*, but acidulated alcohol was tried, following the directions of Paul Mayer and Whitman, viz. 70 or 80 per cent. alcohol with a small addition of pure hydrochloric acid and a trace of picric acid. The specimens were subsequently washed with strong spirit to remove the acid, and preserved in spirit. Again, the picrosulphuric acid method following

* Mayer, Mittheil. zool. Stat. Neap. ii. (1881) p. 1; Journ. Roy. Micr. Soc. n. s. ii. (1882) p. 866.

Kleinenberg's * formula, as adopted by Mayer †, that is, without the addition of creosote, was often used, because of its reported high degree of penetrability for chitinized structures. The fixing agent was simply added to the sea-water, and this was subsequently succeeded by increasing strengths of spirit. Mayer's ‡ picro-hydrochloric acid method was only employed a few times.

Corrosive sublimate was extensively used, and was found to be of special service on account of the rapidity of its action. Lang's § methods were simplified and accelerated by adding a little of the solid salt to the sea-water; the hot solution of the salt was never adopted, though it has been recommended for *Sagitta*, Copepoda, *Saphirina*, and other Arthropod larvæ. In a few cases, following Carnoy ‖, a trace of acetic acid was added to the corrosive solution. The mercuric salt was removed by subsequent washing —the mode of filtration was found of advantage from its speed and cleanliness—and successive treatment with progressive strengths of spirit. The animals were in all cases, where preservation was required, killed as rapidly as possible after capture, with a view to the obtaining of good results for structural purposes.

Tow-net collections were made throughout the whole course of the voyage; the total number of these was, however, somewhat less than the total number of soundings, because (1) soundings were sometimes taken with much speed in shallow depths, and the delay of the steamer was therefore brief; (2) tow-net gatherings could not continuously be obtained by night and by day, save only at intervals. During work only one net was really lost through the snapping of gear belonging to the net itself, a few others, usually in deep water, were lost on account of the breaking of the cable upon which they were attached.

The majority of the gatherings were made in the upper strata of the water, or say down to 25 fathoms; but deep-sea nets were repeatedly used. The deepest were wrought at 360 and 460 fathoms on January 22, in lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E.

Prof. Chrystal's double-hooped net was used at a depth of 260 fms., but the collection obtained was small. On Feb. 5, in lat. 4° 26′ 7″ S., long. 10° 1′ 8″ E., two nets were set adrift at 235, 185, and 85 fathoms attached to balloon buoys in a S. ½ W. current of 0·54 knots; and, again, similarly on Feb. 22, in lat. 5° 59′ 4″ S., long. 3° 49′ 4″ E., a series of nets were exposed at 30, 40, 70, 100, 130, 160, 190, and 200 fms.,—the temperatures at these respective depths being 61°·3 F., 59°·3 F., 57°·5 F., 55° F., 52°·5 F., 49° F., and 46°·7 F.; but in heaving up, after an exposure of 7 hours, the cable snapped, and all but the uppermost were lost. Three more deep-sea nets were lost by the breaking of a steel rope attached to an anchor-dredge in lat. 5° 54′ S., long. 11° 48′ W., when, out of 1780 fms. of rope, 1675 fms. were lost together with the anchor-dredge, weighing 5 cwt. 2 qrs. 14 lbs. These accidents were specially to be regretted by reason of the opportunities

* Foster and Balfour, Embryol.

† Journ. Roy. Micr. Soc. n. s. ii. (1882) p. 867.

‡ Mittheil. zool. Stat. Neap. 1881, p. 5.

§ Zool. Anzeig. 1878, p. 79.

‖ La Biol. Cellulaire, p. 95.

they presented for ascertaining something of life at these depths. In lat. 0° 7′ 8″ S., long. 14° 28′ 6″ W., nets were employed at intervals down to 100 fms. on March 10; and again on March 11, down to 75 fms., in lat. 0° 0′ 7″ N., long. 13° 4′ W.

The time of exposure of tow-nets varied with circumstances and opportunities from 20 minutes to 7 hours (the latter when sent adrift from the ship). Inshore nets taken at Conakoy, Isles de Los, Bullama, Bassao, Dakar, Accra, off Little Bassam, in the vicinity of the submarine gully known as the "bottomless pit," Porto Novo, Libreville (Gaboon River), Bananah Creek (Congo River), and St. Paul de Loanda were always at or near the surface. Of special interest is the series procured during soundings in the vicinity of the Congo cañon, where gyrations of the water, accompanied by the production of coarse bubbles of foam, were very evident on the surface of the sea.

For Ascidia, Prof. Herdman had recommended three plans, all of which were employed, viz.: (1) picric acid and alcohol; (2) osmic acid and alcohol; and (3) picric acid alone, without alcohol, for *Salpæ* and *Doliolum*. Some were also preserved in glycerine, without either picric acid or spirit to prevent opacity. For living specimens of sclerodermic corals, of which only a few were obtained, the corrosive sublimate treatment was employed. No Hydrozoa were preserved, according to Pagenstecher's * method, by the use of sodium chloride and alum succeeded by stronger and stronger alcohols. For the Peridinidæ, of which several were obtained, Géza Entz's † recommendation of glycerine was not followed, though tried, chiefly on account of refractive considerations. Porifera have been treated by Keller ‡ with osmic and chromic acids, the former of the strength of $\frac{1}{20}$ to $\frac{1}{10}$ per cent., the latter very dilute; but of these, the only representatives obtained were found on the shore at Ascension Island, and were immediately placed in spirit.

Subjoined is a list of the positions of the 48 stations of the expedition, where the best available means were adopted for obtaining collections, with the surface temperature observed at each:—

Station	I.	Dec. 29,	1885,	lat. 13° 48′ N., long. 19° 18′ W. (75° F.).	
„	II.	Jan. 1,	1886,	lat. 7° 54′ N., long. 17° 25′ W. (82°·2 F.).	
„	III.	„ 2,	„	lat. 7° 1′ N., long. 15° 54′ W. (82°·9 F.).	
„	IV.	„ 3,	„	lat. 7° 33′ N., long. 15° 18′ W. (83° F.).	
„	V.	„ 4,	„	lat. 7° 20′ N., long. 13° 26′ W. (83°·2 F.).	
„	VI.	„ „	„	lat. 7° 8′ N., long. 13° 27′ W. (83°·4 F.).	
„	VII.	„ 5,	„	lat. 5° 48′ N., long. 14° 20′ W. (85°·5 F.).	
„	VIII.	„ 9,	„	lat. 3° 57′ 2″ N., long. 7° 42′ 8″ W. (82°·8 F.).	Here a S.E. current down to 150 fms.

* Zeitschr. wiss. Zool. xvii. (1867) p. 379.

† Zool. Anzeig. 1881, p. 575.

‡ Zeitschr. wiss. Zool. xxx. p. 568.

Station IX. Jan. 10, 1886, lat. 3° 0′ 8″ N., long. 7° 43′ W. (83° F.). Station in and near outer edge of Guinea current. Water ultramarine.

„ X. „ 13, „ lat. 3° 58′ N., long. 3° 42′ W. (83°·7 F.).

„ XI. „ 19, „ lat. 5° 15′ 4″ N., long. 3° 10′ E. (83°·2 F.).

„ XII. „ 20, „ lat. 4° 12′ 7″ N., long. 3° 57′ 5″ E. (82°·7 F.). A strong N.N.W. current 2 to 3 fms. deep, and under it a strong current in opposite direction.

„ XIII. „ „ „ lat. 3° 55′ 3″ N., long. 4° 7′ 3″ E. (83°·2 F.).

„ XIV. „ 21, „ lat. 2° 20′ 2″ N., long. 5° 7′ 8″ E. (82°·2 F.).

„ XV. „ 22, „ lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E. (82°·9 F.). Current N. 37° W.= 0·72 knots.

„ XVI. „ 23, „ lat. 0° 38′ 6″ N., long. 6° 25′ 8″ E. (82°·9 F.).

„ XVII. „ 29, „ lat. 0° 21′ 1″ N., long. 7° 33′ E. (83° F.).

„ XVIII. Feb. 3, „ lat. 1° 22′ 2″ S., long. 7° 45′ E. (81°·4 F.).

„ XIX. „ „ „ lat. 1° 6′ 2″ S., long. 8° 10′ 4″ E. (83° F.).

„ XX. „ „ „ lat. 1° 1′ 2″ S., long. 8° 19′ 7″ E. (82°·8 F.).

„ XXI. „ 4, „ lat. 2° 39′ S., long. 8° 58′ E. (81°·7 F.). A floating island near this.

„ XXII. „ „ „ lat. 2° 47′ S., long. 8° 46′ E. (82°·7 F.).

„ XXIII. „ 5, „ lat. 1° 26′ 7″ S., long. 10° 1′ 8″ E. (82°·1 F.). Current S. ½ W.=0·54 knots.

„ XXIV. „ 6, „ lat. 5° 54′ S., long. 11° 33′ E. (82° F.).

„ XXV. „ „ „ lat. 5° 55′ 8″ S., long. 11° 50′ 3″ E. (84°·2 F.). Current W. by S. true.

„ XXVI. „ 9, „ lat. 8° 8′ 2″ S., long. 12° 29′ 4″ E. (79°·8 F.). (At Loanda.)

„ XXVII. „ 19, „ lat. 5° 9′ S., long. 10° 43′ E. (82°·3 F.).

„ XXVIII. „ 20, „ lat. 5° 51′ 7″ S., long. 8° 36′ 5″ E. (83°·3 F.).

„ XXIX. „ 21, „ lat. 5° 47′ 7″ S., long. 6° 49′ 5″ E. (82°·2 F.).

„ XXX. „ „ „ lat. 5° 50′ 9″ S., long. 5° 1′ 4″ E. (81°·7 F.).

„ XXXI. „ 22, „ lat. 5° 59′ 4″ S., long. 3° 49′ 4″ E. (83° F.).

„ XXXII. „ 23, „ lat. 6° 2′ 2″ S., long. 1° 50′ 7″ E. (81°·8 F.).

„ XXXIII. „ „ „ lat. 5° 58′ 1″ S., long. 0° 1′ 5″ E. (81° F.).

„ XXXIV. „ 24, „ lat. 5° 58′ 5″ S., long. 1° 24′ 1″ W. (81° F.).

„ XXXV. „ 25, „ lat. 5° 59′ 5″ S., long. 3° 24′ 5″ W. (80° F.).

„ XXXVI. „ „ „ lat. 6° 0′ 7″ S., long. 5° 5′ 4″ W. (81° F.).

„ XXXVII. „ 26, „ lat. 6° 3′ 4″ S., long. 6° 27′ 2″ W. (85°·5 F.).

XXXVIII. „ „ „ lat. 3° 58′ 6″ S., long. 8° 11′ W. (79°·8 F.).

„ XXXIX. „ 27, „ lat. 5° 56′ 3″ S., long. 9° 32′ 6″ W. (80°·6 F.).

„ XL. „ 28, „ lat. 5° 54′ S., long. 11° 48′ W (81° F.).

„ XLI. Mar. 5, „ lat. 6° 0′ 3″ S., long. 13° 24′ 9″ W. (81° F.).

„ XLII. „ 6, „ lat. 3° 59′ S., long. 13° 28′ W.

„ XLIII. „ 7, „ lat. 2° 42′ 2″ S., long. 14° 43′ 4″ W. (81°·5 F.).

„ XLIV. „ 9, „ lat. 0° 1′ 6″ S., long. 15° 56′ 5″ W. (81° F.).

„ XLV. „ 10, „ lat. 0° 7′ 8″ S., long. 14° 28′ 6″ W. (81°·6 F.).

„ XLVI. „ 11, „ lat. 0° 0′ 7″ N., long. 18° 4′ W. (80°·8 F.).

„ XLVII. „ 12, „ lat. 1° 17′ 6″ N., long. 13° 54′ 4″ W. (82°·3 F.).

„ XLVIII. „ 13, „ lat. 3° 3′ 4″ N., long. 15° 0′ 9″ W. (83°·1 F.).

Part I.

COPEPODA.

The material from which the Copepoda noticed in this Report were obtained was collected chiefly by means of tow-nets worked at the surface and at various depths (under surface) from 2 to 460 fathoms, and a few were shore gatherings.

The material was contained in 149 bottles, which represented about as many separate gatherings.

Lists of species obtained in some of the more important gatherings are appended to these introductory remarks (*vide* p. 13).

Comparatively few of the species were generally distributed throughout the area examined, or were of frequent or common occurrence in the tow-nettings.

The following were among the most common and most widely distributed species in the collection:—*Eucalanus attenuatus*, *Rhincalanus cornutus*, *Undina vulgaris*, *Euchæta marina*, *Temora stylifera*, *Corycæus varius*, *Corycæus speciosus*, and *Oncæa obtusa*. On the other hand, a considerable number of species, though obtained in gatherings from localities all over the area examined, were uncommon or rare in the collections in which they occurred—*Eucalanus setiger* and *Pleuromma abdominale* may be given as examples. Other species, though observed in comparatively few gatherings, were yet moderately common in those in which they did occur—*Hemicalanus longicornis* is a striking example of this. This species was observed in comparatively few gatherings, but in one of these no fewer than 80 fairly perfect specimens were obtained; in contrast to this, it may be stated that scarcely half a dozen specimens of *Hemicalani* were observed in the whole of the 'Challenger' collections. Several species, as *Acartia spinicaudata*, *Oithona minuta*, *Amymone Andrewi*, *Ilyopsyllus affinis*, and some other Harpactids, were obtained in gatherings from inshore and brackish-water localities, as, for example, from a shore collection at Accra and at São Thomé Island, and in surface-gatherings from Bananah Creek at the mouth of the River Congo, and from Loanda Harbour. A few fish-parasites, including the pretty *Hessella*, were also observed, and are described in this Report.

Many of the species occurred more frequently in the surface tow-nettings collected during the night than in those collected during the day, while in the under-surface tow-nettings they were of more frequent occurrence in those collected during the day than in those collected during the night. This will be observed by referring to the classified list of species.

The following Table exhibits some points of interest respecting the general distribution of species in surface and under-surface, and in day and night, collections:—

TABLE I.—Description of the Tow-net Gatherings.

	Number of tow-net gatherings.	Average number of species in each of the gatherings.	Maximum number of species in any one of the gatherings.	Minimum number of species in any one of the gatherings.	Number of gatherings collected during the day.	Maximum depth at which material was collected.	Minimum depth at which material was collected.	Number of gatherings collected during the night.	Maximum depth at which material was collected.	Minimum depth at which material was collected.	Average number of species in each of the day tow-net gatherings.	Maximum number of species in any one of the day tow-net gatherings.	Minimum number of species in any one of the day tow-net gatherings.	Average number of species in each of the night tow-net gatherings.	Maximum number of species in any one of the night tow-net gatherings.	Minimum number of species in any one of the night tow-net gatherings.
Surface	84	14·57	32	1	46	—	—	38	—	—	11	32	1	18·7	28	3
						fms.	fms.		fms.	fms.						
Under-surface..	65	23·3	42	6	48	460	$2\frac{1}{2}$	17	50	2	23·4 +	42	6	21·8 −	38	9
Total number ..	149	18·3			94	—	—	55	—	—	17·54+			19·67+		

It will be observed from this Table that the difference between the average number of species in each of the day and night surface tow-net gatherings is rather considerable; while as regards the average number of species in each of the day and night under-surface tow-net gatherings there is comparatively little difference, and the difference shown is the reverse of that observed in the surface tow-net gatherings. Further, the average number of species in the surface-gatherings is much greater in those collected during the night, but in the under-surface gatherings the average is rather greater in those collected during the day; while in the combined surface and under-surface tow-nettings the average is, again, in favour of the night collections.

The area in which the tow-net gatherings were made may be described approximately as extending from lat. 7° 54′ N., long. 17° 25 W., eastward to ACCRA on the GOLD COAST, thence southwards across the BIGHTS OF BENIN and BIAFRA to SÃO THOMÉ ISLAND; from SÃO THOMÉ ISLAND eastwards towards the mouth of the GABOON RIVER; then southwards to the mouth of the CONGO and to BANANAH CREEK, and thence to LOANDA HARBOUR. No gatherings from mid-ocean are included in the collection: the greatest distance from land where tow-nettings were collected was not much, if at all, over 400 miles; but the greater number of them were collected much nearer land than that, and this probably explains why the 'Buccaneer' Copepoda—which exceed in number of species those obtained from the 'Challenger' collections, extending over an immensely wider area—differ so much in the entire absence of some species, and in the comparatively greater abundance of others, when compared with the 'Challenger' Copepoda, and also accounts for the presence of many curious and interesting species not represented in that collection.

Summary of the 'Buccaneer' Tow-net Collections, with the number of Species observed in each separate gathering.

The surface tow-nettings are kept together, the under-surface are arranged according to the depth at which the tow-nets were let down, and the whole of the tow-net gatherings are arranged as near as possible in the order in which they were collected. In the Table the figures 1, 2, 3, &c. *above* the line represent the number of the gathering as near as possible in the order in which it was collected. "D" indicates that the collection was made between 6 A.M. (inclusive) and 6 P.M., "N" that the collection was made between 6 P.M. (inclusive) and 6 A.M., "SD" or "SN" that the collection was made inshore during the day or night. The figures *under* the line show the number of species observed in each separate gathering. Thus:—"Surface, $\frac{3\ N}{16}$," indicates that No. 3 tow-netting was a surface gathering collected between 6 P.M. and 6 A.M., and that sixteen species of Copepoda were observed in it. "Surface, $\frac{73\ SD}{5}$," indicates that No. 73 was an inshore gathering collected between 6 A.M. and 6 P.M., in which five species of Copepoda were observed. "100 fms., $\frac{8\ D}{26}$," indicates that No. 8 was a gathering from 100 fathoms collected during the day, and yielded twenty-six species of Copepoda; and so on as in the Table.

TABLE II.—Summary of Tow-net Collections.

Surface Tow-net Gatherings.

3 N / 16	9 N / 16	12 D / 7	13 D / 16	14 N / 23	16 D / 16	22 D / 17	27 SD / 16	28 SD / 7
31 D / 14	32 D / 15	34 D / 5	36 N / 7	37 N / 7	39 SD / 4	40 D / 15	48 N / 24	49 D / 13
73 SD / 5	74 D / 11	75 N / 4	76 N / 23	77 SD / 0	78 D / 5	79 D / 4	80 N / 4	81 N / 19
82 N / 25	83 N / 20	84 N / 24	85 N / 26	86 D / 28	87 D / 9	91 SD / 3	92 D / 12	93 D / 14
94 N / 19	95 N / 28	96 N / 25	97 N / 26	98 N / 22	99 D / 8	102 D / 7	103 N / 17	104 N / 16
105 N / 23	106 N / 22	107 D / 17	108 D / 10	110 N / 5	111 N / 19	112 N / 21	120 N / 21	121 N / 15
122 N / 15	123 D / 14	124 D / 7	125 D / 17	126 D / 11	127 D / 1	128 D / 11	129 D / 16	130 D / 25
131 D / 18	132 D / 19	133 N / 21	134 N / 23	135 N / 22	136 N / 3	137 D / 27	138 D / 15	139 D / 4
140 D / 12	141 D / 8	142 D / 7	143 D / 3	144 D / 6	145 D / 6	146 N / 14	147 N / 12	148 D / 14
149 D / 20								

Two fathoms Tow-net Gathering.

$\frac{19\ N}{12}$

Two and half fathoms Tow-net Gathering.

$\frac{88\ D}{23}$.

Three fathoms Tow-net Gatherings.

$\frac{24\ D}{21}$, $\frac{33\ N}{11}$, $\frac{35\ D}{6}$, $\frac{38\ N}{9}$.

Five fathoms Tow-net Gathering.

$\frac{89\ D}{17}$.

Ten fathoms Tow-net Gatherings.

$\frac{41\ D}{21}$, $\frac{42\ D}{15}$, $\frac{45\ N}{21}$, $\frac{50\ D}{22}$, $\frac{51\ N}{25}$, $\frac{54\ N}{20}$, $\frac{55\ N}{21}$, $\frac{64\ D}{27}$, $\frac{65\ D}{21}$, $\frac{67\ D}{23}$,

$\frac{69\ D}{19}$, $\frac{72\ D}{36}$, $\frac{100\ D}{19}$, $\frac{114\ D}{32}$.

Fifteen fathoms Tow-net Gatherings.

$\frac{15\ N}{15}$, $\frac{18\ D}{11}$, $\frac{71\ N}{39}$.

Twenty fathoms Tow-net Gatherings.

$\frac{47\ N}{24}$, $\frac{52\ N}{30}$, $\frac{53\ N}{29}$, $\frac{56\ D}{26}$, $\frac{66\ D}{27}$, $\frac{68\ D}{39}$, $\frac{70\ D}{23}$, $\frac{90\ D}{24}$, $\frac{101\ D}{18}$, $\frac{109\ D}{22}$,

$\frac{115\ D}{28}$.

Twenty-five fathoms Tow-net Gatherings.

$\frac{1\ N}{25}$, $\frac{5\ N}{10}$, $\frac{6\ D}{21}$, $\frac{10\ N}{16}$, $\frac{17\ D}{15}$, $\frac{20\ N}{16}$, $\frac{23\ D}{29}$, $\frac{25\ D}{30}$, $\frac{29\ D}{37}$.

Thirty fathoms Tow-net Gatherings.

$\frac{43\ D}{27}$, $\frac{46\ N}{36}$, $\frac{57\ D}{45}$, $\frac{113\ D}{35}$.

Thirty-five fathoms Tow-net Gathering.

$\frac{58\ D}{33}$.

Fifty fathoms Tow-net Gatherings.

$\frac{2\ N}{26}$, $\frac{4\ N}{34}$, $\frac{7\ D}{11}$, $\frac{11\ N}{13}$, $\frac{21\ D}{35}$, $\frac{26\ D}{30}$, $\frac{30\ D}{31}$, $\frac{44\ D}{28}$.

Sixty fathoms Tow-net Gathering.

$\frac{59\ D}{15}$.

Eighty-five fathoms Tow-net Gathering.

$$\frac{116\ D}{14}.$$

One hundred fathoms Tow-net Gathering.

$$\frac{8\ D}{27}.$$

One hundred and thirty-five fathoms Tow-net Gathering.

$$\frac{117\ D}{24}.$$

One hundred and sixty fathoms Tow-net Gathering.

$$\frac{60\ D}{20}.$$

One hundred and eighty-five fathoms Tow-net Gathering.

$$\frac{118\ D}{31}.$$

Two hundred and thirty-five fathoms Tow-net Gathering.

$$\frac{119\ D}{33}.$$

Two hundred and sixty fathoms Tow-net Gathering.

$$\frac{61\ D}{26}.$$

Three hundred and sixty fathoms Tow-net Gathering.

$$\frac{62\ D}{47}.$$

Four hundred and sixty fathoms Tow-net Gathering.

$$\frac{63\ D}{28}.$$

The following separate Lists, representing about 16·6 per cent. of the entire number of the 'Buccaneer' tow-nettings, are given for the purpose of showing, among other details, the comparative differences in the general grouping of species in gatherings collected at the surface from others collected at various depths.

The richest hauls—that is, those containing the greatest number of species—were under-surface gatherings, and were, with few exceptions, from no very extreme depths. Several good catches were also obtained by working the tow-net at the surface during the night (see Table II.). The gathering that yielded the greatest number of species was No. 62 from 360 fathoms, collected during the middle of the day, on January 22nd, in lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E.; forty-seven species were obtained in this gathering. The collection that appeared to contain the greatest number of individuals was No. 113, from 30 fathoms, collected during the middle of the day, on February 5th, at Station 23.

List I.—Tow-net Gathering No. 3, surface, collected at Station 2, January 1st, 1886, between 6 and 8.15 P.M. The specific gravity of the water calculated at 60° F. was 1·0224, surface temperature of water 82°·2 F.

Euchæta marina (*Prestandrea*).
Temora stylifera (*Dana*).
Candace pachydactyla, *Dana*.
Labidocera detruncata, var. intermedia.
Pontellina plumata, *Dana*.
Oithona Challengeri, *Brady*.
Microsetella atlantica, *Brady & Robertson*.
Miracia efferata, *Dana*.
Clytemnestra rostrata (*Brady*).
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— pellucidus, *Dana*.
—— venustus, *Dana*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Saphirina ovalis, *Dana*.

List II.—This List gives the number of species obtained in Tow-net Gathering No. 4, from 50 fathoms, collected at Station 2 (lat. 7° 54′ N., long. 17° 25′ W.), January 1st, between 7.20 and 8.20 P.M.

Calanus valgus, *Brady*.
—— gracilis, *Dana*.
—— comptus, *Dana*.
Eucalanus attenuatus, *Dana*.
Hemicalanus longicornis, *Claus*.
—— plumosus, *Claus*.
Heterocalanus serricaudatus, n. sp.
Pleuromma abdominale (*Lubbock*).
Undina vulgaris, *Dana*.
Scolecithrix Danæ, *Lubbock*.
—— Bradyi, *Giesbrecht*.
—— securifrons, n. sp.
—— ctenopus, *Giesbrecht*.
—— tenuipes, n. sp.
Euchæta marina (*Prestandrea*).
—— hebes, *Giesbrecht*.
—— australis, *Brady*.
Euchæta barbata, *Brady*.
Ætidius armatus, *Brady*.
Clausocalanus arcuicornis (*Dana*).
Phyllopus bidentatus, *Brady*.
Candace pectinata, *Brady*.
—— pachydactyla, *Dana*.
—— intermedia, n. sp.
Acartia laxa, *Dana*.
Oithona Challengeri, *Brady*.
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
Oncæa obtusa (*Dana*).
—— gracilis (*Dana*).
Saphirina metallina, *Dana*.
*Saphirinella stylifera (*Lubbock*).

List III.—Tow-net Gathering No. 8, 100 fathoms, collected at Station 3, January 2nd, between 9 A.M. and 5.30 P.M. Specific gravity of the water at 100 fathoms 1·02608, temperature 56°·4 F.

Calanus propinquus, *Brady*.
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
Augaptilis longicaudatus (*Claus*).
Calocalanus pavo (*Dana*).
Heteroehæta spinifrons, *Claus*.
Leuckartia flavicornis, *Claus*.
Scolecithrix Danæ (*Lubbock*).
—— minor, *Brady*.
Euchæta marina (*Prestandrea*).
Ætidius armatus, *Brady*.
Temora stylifera (*Dana*).
Acartia laxa, *Dana*.
Phaënna spinifera, *Claus*.
Oithona Challengeri, *Brady*.

* *Saphirinella* is now known to be the male form of *Copilia*, of which there are several species.

Miracia efferata, *Dana*.
Machairopus (?) idyoides, *Brady*.
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
Oncæa obtusa (*Dana*).
Oncæa gracilis (*Dana*).
Copilia mirabilis, *Dana*.
Lubbockia squillimana, *Claus*.
Saphirina metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).

List IV.—Tow-net Gathering No. 14, surface, lat. 5° 58′ N., long. 14° 20′ W., January 5th. Collected in the evening after darkness set in.

Calanus valgus, *Brady*.
—— propinquus, *Brady*.
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Euchirella messinensis (*Claus*).
Scolecithrix Danæ (*Lubbock*).
Euchæta marina (*Prestandrea*).
Candace pachydactyla, *Dana*.
Pontellopsis villosa, *Brady*.
Pontellina plumata, *Dana*.
Labidocera detruncata, var. intermedia, n. var.
Oithona setigera, *Dana*.
Miracia efferata, *Dana*.
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
Oncæa obtusa, *Dana*.
Copilia mirabilis, *Dana*.
Saphirina ovalis, *Dana*.
Saphirinella stylifera (*Lubbock*).

List V.—Tow-net Gathering No. 21, 50 fathoms, Station 9 (lat. 3° 0′ 8″ N., long. 7° 43′ W.), January 10th. Collected at noon. Temperature (corrected) of water at 50 fathoms 59°·59 F., sp. gr. 1·02632.

Eucalanus setiger, *Brady*.
—— attenuatus, *Dana*.
—— spinifer, n. sp.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
Augaptilis longicaudatus (*Claus*).
Leuckartia flavicornis, *Claus*.
Scolecithrix Danæ (*Lubbock*).
—— Bradyi, *Giesbrecht*.
—— ctenopus, *Giesbrecht*.
—— tenuipes, n. sp.
Euchæta marina (*Prestandrea*).
—— Hessei, *Brady*, var. similis, n. var.
Candace pachydactyla, *Dana*.
—— intermedia, n. sp.
Acartia laxa, *Dana*.
Clausocalanus arcuicornis (*Dana*).
Temora stylifera (*Dana*).
Phaënna spinifera, *Claus*.
Pontellina plumata (*Dana*).
Oithona Challengeri, *Brady*.
Euterpe gracilis, var. armata, n. var.
Miracia efferata, *Dana*.
Clytemnestra rostrata (*Brady*).
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— limbatus, *Brady*.
Oncæa obtusa, *Dana*.
—— gracilis, n. sp.
—— mediterranea (*Claus*).
Copilia mirabilis, *Dana*.
Saphirina metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).

List VI.—Tow-net Gathering No. 29, 25 fathoms, lat. 3° 58′ N., long. 3° 42′ W., January 13th. Collected between 8 A.M. and 1 P.M. Temperature at 25 fathoms 67°·7 F., sp. gr. 1·02606.

Calanus valgus, *Brady*.
—— gracilis, *Dana*.
Paracalanus parvus (*Claus*).
Eucalanus setiger, *Brady*.
—— attenuatus, *Dana*.
—— spinifer, n. sp.
Rhincalanus cornutus, *Dana*.
Hemicalanus mucronatus, *Claus*.
Calocalanus pavo (*Dana*).
Heterochæta spinifrons, *Claus*.
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Scolecithrix Danæ (*Lubbock*).
—— ctenopus, *Giesbrecht*.
Euchæta marina (*Prestandrea*).
—— hebes, *Giesbrecht*.
Ætidius armatus, *Brady*.
Clausocalanus furcatus (*Brady*).
Centropages violaceus, *Claus*.
Mecynocera Clausi, *I. C. Thompson*.
Candace pachydactyla, *Dana*.
Acartia laxa, *Dana*.
Pontellina plumata (*Dana*).
Miracia efferata, *Dana*.
Clytemnestra rostrata (*Brady*).
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— venustus, *Dana*.
Oncæa obtusa, *Dana*.
Copilia mirabilis, *Dana*.
Saphirina opaca, *Lubbock*.
—— splendens, *Dana*.
—— metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).
Clausocalanus arcuicornis (*Dana*).

List VII.—Tow-net Gathering No. 46, 30 fathoms, lat. 3° 22′ 5″ N., long. 4° 11′ 8″ E., January 20th. Collected about 7 P.M.

Calanus valgus, *Brady*.
—— propinquus, *Brady*.
—— gracilis, *Dana*.
Eucalanus setiger, *Brady*.
—— attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
—— mucronatus, *Claus*.
Pleuromma abdominale (*Lubbock*).
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Euchirella messinensis (*Claus*).
Scolecithrix Danæ (*Lubbock*).
Euchæta marina (*Prestandrea*).
Ætidius armatus, *Brady*.
Temora stylifera (*Dana*).
Centropages furcatus (*Dana*).
Mecynocera Clausi, *I. C. Thompson*.
Candace pectinata, *Brady*.
Acartia laxa, *Dana*.
Oithona Challengeri, *Brady*.
—— setigera, *Dana*.
Microsetella atlantica, *Brady & Robertson*.
Clytemnestra rostrata (*Brady*).
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— limbatus, *Brady*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Lubbockia squillimana, *Claus*.
Saphirina ovalis, *Dana*.
—— opalina, *Dana*.
—— opaca, *Lubbock*.
—— metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).

List VIII.—Tow-net Gathering No. 55, 10 fathoms, lat. 1° 55′ 5″ N., long 5° 55′ 5″ E., January 22nd. Collected during the middle of the day. Temperature (corrected) of the water 81°·98 F., surface sp. gr. 1·02358.

Paracalanus parvus (*Claus*).
Eucalanus attenuatus, *Dana*.
Euchæta marina (*Prestandrea*).
Clausocalanus furcatus (*Brady*).
Temora stylifera (*Dana*).
Centropages furcatus (*Dana*).
—— violaceus, *Claus*.
Candace pectinata, *Brady*.
Pontellina plumata (*Dana*).
Oithona Challengeri, *Brady*.
Miracia efferata, *Dana*.
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Saphirina ovalis, *Dana*.
—— inæqualis, *Dana*.
—— opaca, *Lubbock*.
Saphirinella stylifera (*Lubbock*).

List IX.—Tow-net Gathering No. 57, 30 fathoms. Locality, date, and time of collection the same as List VIII. Temperature of the water 63°·98 F.

Calanus valgus, *Brady*.
—— propinquus, *Brady*.
—— gracilis, *Dana*.
Paracalanus parvus (*Claus*).
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
Calocalanus pavo (*Dana*).
—— plumulosus (*Claus*).
Heterochæta spinifrons, *Claus*.
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Scolecithrix Danæ (*Lubbock*).
—— minor, *Brady*.
—— Bradyi, *Giesbrecht*.
—— ctenopus, *Giesbrecht*.
Euchæta marina (*Prestandrea*).
Ætidius armatus, *Brady*.
Clausocalanus furcatus (*Brady*).
—— arcuicornis (*Dana*).
Temora stylifera (*Dana*).
—— longicornis (*Müller*).
Mecynocera Clausi, *I. C. Thompson*.
Centropages furcatus (*Dana*).
Candace pachydactyla, *Dana*.
—— intermedea, n. sp.
—— truncata, *Dana*.
Acartia laxa, *Dana*.
Pontellina plumata, *Dana*.
Oithona Challengeri, *Brady*.
Microsetella atlantica, *Brady & Robertson*.
Miracia efferata, *Dana*.
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— limbatus, *Brady*.
—— venustus, *Dana*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Lubbockia squillimana, *Claus*.
Saphirina ovalis, *Dana*.
—— metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).

List X.—Tow-net Gathering No. 59, 60 fathoms. Locality, date, and time of collection the same as List VIII. Temperature of water 60°·25 F., sp. gr. 1·02629.

Eucalanus setiger, *Brady*.
Rhincalanus cornutus, *Dana*.
Pleuromma abdominale (*Lubbock*).
Heterochæta spinifrons, *Claus*.
Leuckartia flavicornis, *Claus*.
Euchæta hebes, *Giesbrecht*.

Candace pachydactyla, *Dana*.
Ætidius armatus, *Brady*.
Phaënna spinifer, *Claus*.
Oithona Challengeri, *Brady*.
Corycæus varius, *Dana*.
Corycæus speciosus, *Dana*.
Copilia mirabilis, *Dana*.
Saphirina metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).

List XI.—Tow-net Gathering No. 60, 160 fathoms. Locality, date, and time of collection the same as List VIII. Temperature about 50° F.

Paracalanus parvus (*Claus*).
Undina vulgaris, *Dana*.
Euchæta marina (*Prestandrea*).
Temora stylifera (*Dana*).
Centropages violaceus, *Claus*.
Pontellina plumata, *Dana*.
Labidocera detruncata, var. intermedia.
Miracia efferata, *Dana*.
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
Corycæus speciosus, *Dana*.
—— pellucidus, *Dana*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Saphirina ovalis, *Dana*.
—— inæqualis, *Dana*.
—— opaca, *Lubbock*.
—— splendens, *Dana*.
Saphirinella stylifera (*Lubbock*).

List XII.—Tow-net Gathering No. 61, 260 fathoms. Locality, date, and time of collection the same as List VIII. Temperature of water about 46° F.

Calanus valgus, *Brady*.
—— gracilis, *Dana*.
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
Pleuromma abdominalis (*Lubbock*).
Heterochæta spinifrons, *Claus*.
Leuckartia flavicornis, *Claus*.
Scolecithrix Danæ (*Lubbock*).
—— Bradyi, *Giesbrecht*.
Ætidius armatus, *Brady*.
Euchæta marina (*Prestandrea*).
Candace pectinata, *Brady*.
Candace pachydactyla, *Dana*.
Pontellina plumata, *Dana*.
Oithona Challengeri, *Brady*.
Miracia efferata, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— limbatus, *Brady*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Saphirina serrata, *Brady*.
Saphirinella stylifera (*Lubbock*).
Saphirella abyssicola, nov. gen. et sp.

List XIII.—Tow-net Gathering No. 62, 360 fathoms. Locality, date, and time of collection the same as List VIII. Temperature of water about 43° F.

Calanus propinquus, *Brady*.
Paracalanus parvus (*Claus*).
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
—— longicaudatus, *Claus*.
—— plumosus, *Claus*.
Augaptilis hecticus, *Giesbrecht*.
Calocalanus pavo (*Dana*).
Pleuromma abdominale (*Lubbock*).
—— princeps, n. sp.
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Scolecithrix Danæ (*Lubbock*).
—— longicornis, n. sp.
—— Bradyi, *Giesbrecht*.

Scolecithrix tenuipes, n. sp.
Amallophora dubia, nov. gen. et sp.
Euchæta marina (*Prestandrea*).
—— barbata, *Brady*.
Ætidius armatus, *Brady*.
—— armiger, *Giesbrecht*.
Clausocalanus arcuicornis (*Dana*).
Phyllopus bidentatus, *Brady*.
Temora stylifera (*Dana*).
Candace truncata, *Dana*.
Acartia laxa, *Dana*.
Mormonilla phasma, *Giesbrecht*.
Phaënna spinifera, *Claus*.
Pontellina plumata, *Dana*.
Oithona Challengeri, *Brady*.
—— setiger, *Dana*.
Miracia efferata, *Dana*.
Setella gracilis, *Dana*.
Ægisthus longirostris, n. sp.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— limbatus, *Brady*.
—— obtusus, *Dana*.
Oncæa obtusa (*Dana*).
—— gracilis (*Dana*).
Copilia mirabilis, *Dana*.
Lubbockia squillimana, *Claus*.
Saphirina inæqualis, *Dana*.
—— metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).

List XIV.—Tow-net Gathering No. 63, 460 fathoms. Locality, date, and time of collection the same as List VIII.

Calanus propinquus, *Brady*.
—— gracilis, *Dana*.
Paracalanus parvus (*Claus*).
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
Pleuromma abdominale (*Lubbock*).
Heterochæta spinifrons, *Claus*.
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Euchirella messinensis (*Claus*).
Amallophora dubia, nov. gen. et sp.
—— magna, n. sp.
Euchæta marina (*Prestandrea*).
Euchæta Hessei, var. similis, n. var.
Ætidius armiger, *Giesbrecht*.
Temora longicornis (*Müller*).
Candace varicans, *Giesbrecht*.
Oithona Challengeri, *Brady*.
Microsetella atlantica, *Brady & Robertson*.
Longipedia minor, *T. & A. Scott*.
Clytemnestra rostrata, *Brady*.
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— venustus, *Dana*.
Oncæa obtusa (*Dana*).
(?) Saphirina nigromaculata, *Claus*.

List XV.—Tow-net Gathering No. 68, 20 fathoms. Off São Thomé Island (lat. 3° 34′ N., long. 6° 30′ 4″ E.). Collected after midday, January 23rd.

Calanus valgus, *Brady*.
—— propinquus, *Brady*.
—— gracilis, *Dana*.
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
—— mucronatus, *Claus*.
Augaptilis hecticus, *Giesbrecht*.
—— Rattrayi, n. sp.
Pleuromma abdominalo (*Lubbock*).
Heterochæta spinifrons, *Claus*.
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Scolecithrix Danæ (*Lubbock*).
—— Bradyi, *Giesbrecht*.
—— ctenopus, *Giesbrecht*.
Euchæta marina (*Prestandrea*).
—— ?, sp.
Ætidius armatus.
Clausocalanus arcuicornis (*Dana*).
Temora stylifera (*Dana*).
Mecynocera Clausi, *I. C. Thompson*.

Candace pectinata, *Brady*.
—— pachydactyla, *Dana*.
—— truncata, *Dana*.
Pontellina plumata, *Dana*.
Stenhelia accraensis.
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
Corycæus limbatus, *Brady*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Lubbockia squillimana, *Claus*.
Saphirina ovalis, *Dana*.
—— opaca, *Lubbock*.
—— metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).

List XVI.—Tow-net Gathering No. 71, 15 fathoms, lat. 0° 28′ 7″ N., long. 6° 35′ 2″ E. Collected about 6 P.M., January 23rd.

Calanus valgus, *Brady*.
—— propinquus, *Dana*.
—— gracilis, *Dana*.
Paracalanus parvus (*Claus*).
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis, *Claus*.
Heterochæta spinifrons, *Claus*.
Undina vulgaris, *Dana*.
Scolecithrix Danæ (*Lubbock*).
—— Bradyi, *Giesbrecht*.
Euchæta marina (*Prestandrea*).
—— hebes, *Giesbrecht*.
Clausocalanus furcatus (*Brady*).
Temora stylifera (*Dana*).
—— longicornis, *Müller*.
Centropages violaceus (*Claus*).
Candace pachydactyla, *Dana*.
—— intermedia, n. sp.
Acartia laxa, *Dana*.
Pontellina plumata, *Dana*.
Oithona Challengeri, *Brady*.
Microsetella atlantica, *Brady & Robertson*.
Miracia efferata, *Dana*.
Clytemnestra rostrata (*Brady*).
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— limbatus, *Brady*.
—— venustus, *Dana*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Lubbockia squillimana, *Claus*.
Saphirina inæqualis, *Dana*.
—— opalina, *Dana*.
—— opaca, *Lubbock*.
—— splendens, *Dana*.
Saphirinella stylifera (*Lubbock*).

List XVII.—Tow-net Gathering No. 82, surface, lat. 0° 22′ 8″ N., long. 8° 33′ 2″ E. Collected about midnight, January 28th. Sp. gr. of the water 1·02237.

Calanus valgus, *Brady*.
Paracalanus parvus (*Claus*).
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Euchæta marina (*Prestandrea*).
Temora stylifera (*Dana*).
—— longicornis, *Müller*.
Centropages furcatus (*Dana*).
Candace pectinata, *Brady*.
—— intermedia, n. sp.
Pontellina plumata, *Dana*.
Oithona Challengeri, *Brady*.
Microsetella atlantica, *Brady & Robertson*.
Euterpe gracilis, var. armata, n. var.
Clytemnestra rostrata (*Brady*).
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— obtusus, *Dana*.
Oncæa obtusa (*Dana*).
Saphirina ovalis, *Dana*.
—— inæqualis, *Dana*.

List XVIII.—Tow-net Gathering No. 91, shore (low tide), São Thomé Island. Collected during the day, January 31st

Laophonte pygmæa, n. sp.
—— longipes, n. sp.
Machairopus idyoides, *Brady*.

List XIX.—Tow-net Gathering No. 92, surface, lat. 0° 7′ 6″ N., long. 6° 59′ 2″ E. Collected February 2nd, shortly after midday.

Calanus valgus, *Brady*.
Temora stylifera (*Dana*).
Pontellina plumata, *Dana*.
Oithona Challengeri, *Brady*.
Microsetella atlantica, *B. & R.*
Miracia efferata, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— venustus, *Dana*.
—— obtusus, *Dana*.
Oncæa obtusa (*Dana*).

List XX.—Tow-net Gathering No. 97, surface, lat. 0° 45′ 8″ S., long. 7° 37′ 4″ E. Collected February 3rd, shortly after midnight.

Calanus valgus, *Brady*.
Rhincalanus cornutus, *Dana*.
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Scolecithrix Bradyi, *Giesbrecht*.
Euchæta hebes, *Giesbrecht*.
Temora stylifera (*Dana*).
—— longicoruis (*Müller*).
Candace intermedia, n. sp.
Labidocera acutifrons (*Dana*).
Pontellina plumata, *Dana*.
Oithona Challengeri, *Brady*.
Euterpe gracilis, var. armata, n. var.
Microsetella atlantica, *Brady & Robertson*.
Miracia efferata, *Dana*.
Clytæmnestra rostrata (*Brady*).
Setella gracilis, *Dana*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— pellucidus, *Dana*.
—— limbatus, *Brady*.
—— venustus, *Dana*.
Oncæa obtusa (*Dana*).
Lubbockia squillimana, *Claus*.
Saphirina inæqualis, *Dana*.
—— serrata, *Brady*.

List XXI.—Tow-net Gathering No. 113, 30 fathoms, Station 23 (lat. 4° 26′ 7″ S., long. 10° 1′ 8″ E.). Collected between 11 A.M. and 3 P.M., February 5th. Temperature 82°·1 F., sp. gr. at noon 1·02347. This gathering contained a greater number of individual specimens, though not of species, than any other in the collection.

Calanus propinquus, *Brady*.
—— gracilis, *Dana*.
—— tonsus, *Brady*.
Eucalanus setiger, *Brady*.
—— attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicoruis, *Claus*.
—— mucronatus, *Claus*.
Heterochæta spinifrons, *Claus*.
Undina vulgaris, *Dana*.
Euchirella messinensis (*Claus*).
Scolecithrix Danæ (*Lubbock*).
Euchæta marina (*Prestandrea*).
—— barbata, *Brady*.
Candace pectinata, *Brady*.
—— pachydactyla, *Dana*.
—— intermedia, n. sp.
—— truncata, *Dana*.
Acartia laxa, *Dana*.
Phaënna spinifera, *Claus*.

Labidocera acutifrons (*Dana*).
Pontella securifera, *Brady*.
Oithona Challengeri, *Brady*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
Oncæa obtusa (*Dana*).
—— gracilis (*Dana*).
Copilia mirabilis, *Dana*.
Copilia quadrata, *Dana*.
—— Rattrayi, n. sp.
Lubbockia squillimana, *Claus*.
Saphirina inæqualis, *Dana*.
—— serrata, *Brady*.
—— splendens, *Dana*.
—— metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).

List XXII.—Tow-net Gathering No. 119, 235 fathoms, Station 23. Date and hour of collection the same as last. At 200 fathoms the temperature was 55° F., sp. gr. 1·02648.

Calanus valgus, *Brady*.
—— propinquus, *Brady*.
—— gracilis, *Dana*.
Eucalanus attenuatus, *Dana*.
—— spinifer, n. sp.
Rhincalanus cornutus, *Dana*.
Hemicalanus longicornis (*Claus*).
—— plumosus, *Claus*.
Pleuromma abdominale (*Lubbock*).
Heterochæta spinifrons, *Claus*.
Leuckartia flavicornis, *Claus*.
Scolecithrix minor, *Brady*.
Euchæta marina (*Prestandrea*).
Ætidius armatus, *Brady*.
Mecynocera Clausi, *I. C. Thompson*.
Acartia laxa, *Dana*.
Mormonilla phasma, *Giesbrecht*.
Euterpe gracilis, var. armata, n. var.
Microsetella atlantica, *Brady & Robertson*.
Miracia efferata, *Dana*.
Clytemnestra rostrata (*Brady*).
Setella gracilis, *Dana*.
Ægisthus longirostris, n. sp.
Oncæa obtusa (*Dana*).
—— gracilis (*Dana*).
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
Copilia mirabilis, *Dana*.
Lubbockia squillimana, *Claus*.
Saphirina splendens, *Dana*.
—— metallina, *Dana*.
Saphirinella stylifera (*Lubbock*).
Artotrogus abyssicolus, n. sp.

List XXIII.—Tow-net Gathering No. 133, surface, lat. 6° 29′ 4″ S., long. 11° 24′ 8″ E. Collected at 7.30 P.M., February 8th. Sp. gr. at 8 P.M. 1·02398.

Paracalanus parvus (*Claus*).
Pleuromma abdominale (*Lubbock*).
Leuckartia flavicornis, *Claus*.
Undina vulgaris, *Dana*.
Scolecithrix Danæ (*Lubbock*).
Temora dubia (*Lubbock*).
—— longicornis (*Müller*).
Centropages brachiatus, *Dana*.
—— furcatus, *Dana*.
Candace pachydactyla, *Dana*.
—— intermedia, n. sp.
Pontellopsis villosa, *Brady*.
Pontella securifer, *Brady*.
—— inermis, *Brady*.
Oithona setigera, *Dana*.
Microsetella atlantica, *Brady & Robertson*.
Corycæus varius, *Dana*.
—— speciosus, *Dana*.
—— obtusus, *Dana*.
Oncæa obtusa (*Dana*).
Lubbockia squillimana, *Claus*.

List XXIV.—Tow-net Gathering No. 137, surface, lat. 7° 38′ S., long. 12° 3′ 3″ E. Collected at 5 A.M., February 9th. Sp. gr. at 4 A.M. 1·02623.

Calanus valgus, *Brady*.
—— propinquus, *Brady*.
Paracalanus parvus (*Claus*).
Eucalanus attenuatus, *Dana*.
Rhincalanus cornutus, *Dana*.
Undina vulgaris, *Dana*.
Scolecithrix Danæ (*Lubbock*).
Euchæta marina (*Prestandrea*).
Temora dubia (*Lubbock*).
—— longicornis (*Müller*).
Candace pectinata, *Brady*.
Acartia laxa, *Dana*.
Pontellopsis villosa, *Brady*.
Labidocera acutifrons (*Dana*).
Pontella securifer, *Brady*.
—— inermis, *Brady*.
Oithona plumifera, *Dana*.
Corycæus speciosus, *Dana*.
—— pellucidus, *Dana*.
—— limbatus, *Brady*.
Oncæa obtusa (*Dana*).
Copilia mirabilis, *Dana*.
Lubbockia squillimana, *Claus*.
Saphirina inæqualis, *Dana*.
—— opalina, *Dana*.
—— splendens, *Dana*.
Saphirinella stylifera (*Lubbock*).

List XXV.—Tow-net Gatherings Nos. 141, 142, 143, 144, and 145, surface, Loanda Harbour. Collected during the afternoon, February 13th and 15th. Surface-temperature at noon on the 13th was 78°·2 F.; at noon on the 15th the surface-temperature of the seaward part of the Harbour, where all the tow-net gatherings, except No. 141, were collected, was 79°·2 F. Few species were observed in any of the Loanda Harbour gatherings.

Eucalanus attenuatus, *Dana*.
Temora longicornis (*Müller*).
Centropages brachiatus, *Dana*.
—— furcatus, *Dana*.
Acartia plumosa, n. sp.
Paracartia dubia, n. g. et sp.
—— spinicaudata, n. g. et sp.
Oithona setigera, *Dana*.
—— minuta, n. sp.
Longipedia minor, *T. & A. Scott*.
Euterpe gracilis, var. armata, n. var.
Corycæus obtusus (*Dana*).
Hersiliodes Livingstoni, n. sp.
Lichomolgus propinquus, n. sp.

COPEPODA.

INDEX TO GENERA AND SPECIES.

Section I. *GNATHOSTOMA*, Thorell.

Family CALANIDÆ.

Genus Calanus, Leach.

1819. *Calanus*, Leach, Dict. Nat. Sci. vol. xiv. Art. Entomostraca.

Calanus valgus, Brady.

1883. *Calanus valgus*, Brady, 'Challenger' Copepoda, p. 33, pl. iii. figs. 1–7.

Habitat. Station 2 (lat. 7° 54′ N., long. 17° 25′ W.), in 5 and 25 fathoms, tow-nettings, January 1st (night collection). Lat. 3° 58′ N., long. 3° 42′ W., in 25 and 50 fathoms, tow-nettings, January 13th (day collections). Bananah Creek, Mouth of the Congo, surface tow-netting (day collection). Lat. 7° 51′ 6″·8, long. 11° 14′ 7″ E., surface tow-netting (night collection), &c.

This species was obtained in 55 tow-nettings, 24 of which were surface nettings and 31 under-surface nettings: 5 of the surface and 22 of the under-surface nettings were day collections, while 19 surface and 11 under-surface nettings were night collections, as shown in the annexed formula:—

Tow-nettings 55 { 24 surface { 5 day collections. / 19 night ditto. } / 31 under-surface { 22 day ditto. / 11 night ditto. }

The under-surface tow-nettings ranged from 5 to 260 fathoms. *Calanus valgus* was taken in the open sea, where the specific gravity of the water was 1·02620, and the

temperature 82·2 F., and at Bananah Creek, where the sp. gr. of the water was 1·00870 and the temperature 82° F. It was also captured at a depth of 260 fathoms (as recorded above), where the temperature of the water was about 46° F. This species is thus apparently able to exist under very varied conditions, as regards the density and temperature of the water. It also appeared to be generally distributed throughout the area examined, but was more plentiful near, and south of, the Equator. The flexed position of the right fifth foot of the male, referred to by Dr. Brady in his Report on the 'Challenger' Copepoda, was also observed in many of 'Buccaneer' specimens.

Calanus propinquus, Brady.

1883. *Calanus propinquus*, Brady, op. cit. p. 34, pl. ii. figs. 1–7, pl. xiv. figs. 10, 11.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms, day collection, January 22nd. Station 23, surface and 235 fathoms, day collections, February 5th.

This species, though only satisfactorily identified in tow-nettings from the localities described, may have occurred in others. Usually I was unable to identify this *Calanus* with certainty, except by carefully dissecting the specimens; hence the probability of its being of more frequent occurrence in the collection than the few localities given for it would seem to indicate.

Calanus tonsus, Brady.

1883. *Calanus tonsus*, Brady, op. cit. p. 34, pl. iv. figs. 8, 9.

Habitat. In a tow-netting from Station 23, a surface gathering.

The large and tumid first abdominal segment seems to be a fairly good character of this species.

Calanus gracilis, Dana.

1852. *Calanus gracilis*, Dana, Crust. U.S. Expl. Exped. p. 1078, pl. lxxiv. fig. 10.
1883. *Calanus gracilis*, Brady, op. cit. p. 35, pl. v. figs. 1–6, and pl. xlvi. fig. 1.

Habitat. Station 2, 5 fathoms, night tow-netting, January 1st. Station 3, 25 fathoms, January 2nd (day collection). Lat. 3° 22′ 5″ N., long. 4° 11′ 8″ E., 30 fathoms, January 20th (night collection). Station 21, surface, February 3rd (day collection). Station 23, surface and 235 fathoms (the first a day, the other a night collection).

Calanus gracilis was obtained in 19 tow-nettings—4 of these were surface gatherings and 15 were under-surface gatherings. 2 of the surface and 12 of the under-surface tow-nettings were day collections, while 2 of the surface and 4 of the under-surface were night collections, as in the formula :—

Tow-nettings 19 { 4 surface { 2 day collections. / 2 night ditto. / 15 under-surface { 12 day ditto. / 4 night ditto.

The under-surface tow-nettings ranged from 5 to 460 fathoms. Though frequent in a few of the gatherings in which it occurred, *Calanus gracilis* was not a common species,

but was, nevertheless, widely though sparingly distributed throughout the greater part of the area examined. The specimens obtained were mostly females, and were readily distinguished from the other species of *Calanus* by the long anterior antennæ and the peculiar terminal spine of the first swimming-feet.

? Calanus comptus, Dana. (Pl. V. figs. 46–50; Pl. VI. figs. 1–5.)

1853. *Calanus comptus*, Dana, Crust. U.S. Expl. Exped. p. 1050, pl. lxxii. fig. 2 *a*.

Male. Length, exclusive of tail-setæ, 3·3 mm. Body composed of six segments, the first as long as the entire length of the other five. Anterior antennæ scarcely longer than the cephalothorax, 23-jointed, and very sparingly setiferous; the proportional lengths of the joints are nearly as in the formula:—

36	6	6	7	8	8	7	8	11	12	13	17	18	20	20	21	22	22	18	19	18	19	16
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

Posterior antennæ and mouth-organs nearly as in *Calanus finmarchicus*. The first four pairs of swimming-feet closely resemble those of *Cal. gracilis*, Dana, the peculiar terminal spine of the outer branches of the first pair in both species being almost identical. The fifth pair also resemble those of that species, as figured in the 'Challenger' Copepoda, except that the small secondary branch is 3-jointed. Abdomen short, 5-jointed, the second segment rather longer than any of the others. Caudal stylets short.

Habitat. Lat. 6° 34′ N., long. 12° 39′ W., surface collection. One or two specimens only were obtained.

This *Calanus* so closely resembles *Calanus gracilis* in many respects that I am inclined to consider it as simply a variety of that species.

Genus Paracalanus, Boeck (1864).

Paracalanus parvus (Claus). (Pl. I. figs. 9–14.)

1863. *Calanus parvus*, Claus, Die freilebenden Copepoden, p. 173, t. xxvi. figs. 10–14, t. xxvii. figs. 1–4.
1864. *Paracalanus parvus*, Boeck, Oversigt Norges Copepoder, p. 232.

Length 1·12 mm. Cephalothorax elongate-ovate, rounded in front and behind. Anterior antennæ reaching to the end of the caudal stylets, 24-jointed; the proportional lengths of the joints are as follow (antennæ the same in both sexes):—

35	25	12	12	10	10	12	13	10	10	10	13	12	13	15	15	15	15	15	15	13	14	15	27
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Posterior antennæ and mouth-organs as in *Calanus*. The inner branch of the first pair of swimming-feet 2-jointed, about as long as the first two joints of the outer branch; the basal joint of the peduncle bears a stout plumose seta near the inner distal angle. The basal joints of both branches of the fourth pair are small, the second and third joints of the inner branch and the second joint of the outer branch are furnished on the side with an armature of spines as in the figure (fig. 11), and the outer margin of the last joint of the outer branch is distinctly dentate from the base to the first marginal

spine. All the first four pairs of swimming-feet have the inner margins of both branches furnished with long plumose hairs. The fifth feet in the male are 1-branched—the right short, 3-jointed, and terminating in two short spines of unequal length; the left 5-jointed, apparently hinged between the first and second joints; length of the joints subequal, the last terminating in two small spines. Fifth pair of feet in the female 1-branched, 2-jointed, the last joint much narrower than the first and terminating in one long and one short spiniform setæ.

Habitat. Lat. 6° 34′ N., long. 12° 39′ W., surface, January 6th (day collection). Off Accra, 3 fathoms, January 15th (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10, 20, 30, 360, and 460 fathoms, January 22nd (day collection). Station 18, surface tow-netting, February 3rd (day collection). Station 24 (off the mouth of the Congo River), surface tow-netting, February 6th (day collection). Lat. 5° 9′ 8″ S., long. 11° 10′ 4″ E., surface tow-netting, February 19th (day collection), &c.

Paracalanus parvus occurred in 49 tow-nettings, 29 of which were surface and 20 under-surface gatherings. The under-surface tow-nettings ranged from 2½ to 460 fathoms. 11 of the surface and 16 of the under-surface tow-nettings were day collections, while 18 surface and 4 under-surface were night collections, as in the formula:—

Tow-nettings 49 { 29 surface { 11 day collections. / 18 night ditto. } / 20 under-surface { 16 day ditto. / 4 night ditto. }

This species was comparatively frequent in all the gatherings in which it was observed.

PARACALANUS PYGMÆUS (Claus). (Pl. I. figs. 1–8.)

1863. *Calanus pygmæus*, Claus, Die freilebenden Copepoden, p. 74.

Female. Length ·7 mm. (1–36th of an inch). Body robust, composed of four segments, the first being fully twice the entire length of the outer three; rostrum short, stout, prominent. Anterior antennæ reaching beyond the cephalothorax, 24-jointed, sparingly setiferous; setæ mostly small, except towards the extremity, where there are several moderately long hairs; the proportional lengths of the joints are as shown in the formula:—

30	6	5	5	5	5	5	5	6	7	8	8	8	8	8	7	8	11	8	12	11	12	10	15
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Posterior antennæ small, provided with moderately long setæ; the primary branch composed of two nearly equal joints; secondary branch fully half the length of the other; 7-jointed, the third, fourth, and fifth joints very short, the others longer and subequal. Mouth-organs as in *Paracalanus parvus*. The swimming-feet are also similar to those of that species, but differ in their armature, especially in having the second as well as the last joints of the outer branches of the second, third, and fourth pairs serrate on the outer margin, in the terminal spines being proportionally smaller, and in both branches

of the fourth pair being more slender. The fifth pair resemble those of *Paracalanus parvus*, but are proportionally stouter and have much shorter terminal spines. Abdomen small, composed of four segments, the second and third segments very short. Caudal stylets nearly as long as the last abdominal segment, breadth about half the length; apical setæ four. No males were observed.

Habitat. Lat. 3° 57′ 2″ N., long. 7° 42′ 8″ W., 2 fathoms, January 9th (night collection). Libreville, Gaboon River, surface, January 28th (day collection). Bananah Creek, Congo River, surface, February 7th (day collection).

Comparatively few specimens of *Paracalanus pygmæus* were obtained.

Genus Eucalanus, Dana.

Eucalanus and *Calanus* (in part), Dana, Crust. U.S. Expl. Exped. (1852).

Eucalanus attenuatus, Dana.

1852. *Calanus attenuatus*, Dana, loc. cit. p. 1080, pl. lxxv. fig. 2.
1856. *Calanus mirabilis*, Lubbock, Trans. Entom. Soc. vol. iv. pl. v. figs. 1–6.
1883. *Eucalanus attenuatus*, Brady, op. cit. p. 38, pl. ii. figs. 8–10, pl. vi. figs. 1–8.

Habitat. Station 2, 5, 25, and 50 fathoms tow-nettings, January 1st (night collections). Station 9, 25 and 50 fathoms tow-nettings, January 10th (day collections). Station 14, 10 fathoms tow-netting, January 21st (night collection). Lagoon Island, São Thomé, surface tow-netting, January 28th (night collection). Station 23, surface, 10, 20, 85, 135, 185, and 235 fathoms tow-nettings, February 5th (day collections). Bananah Creek, Congo River, surface tow-netting, February 7th (day collection). Loanda Harbour (seaward), surface, February 15th (day collection).

This was one of the more common and generally distributed species in the 'Buccaneer' collections. It occurred in 89 tow-nettings, 41 of these being surface and 48 under-surface gatherings. The under-surface tow-nettings ranged in depth from 2 to 460 fathoms. 18 of the surface and 35 of the under-surface gatherings were collected during the day, while 23 of the surface and 13 of the under-surface were collected during the night, as in the formula:—

Tow-nettings 89 { 41 surface { 18 day collections. / 23 night ditto. } / 48 under-surface { 35 day ditto. / 13 night ditto. }

Eucalanus attenuatus was taken at the surface in the open sea, the specific gravity of the water being 1·02543 and temperature 85°·5 F., and at 360 fathoms with the temperature of the water at about 43° F. It was taken off the mouth of the Congo River, where the specific gravity of the water was 1·01984 and the temperature 82° F. (the colour of the water here,—lat. 5° 54′ 3″ S., long. 11° 33′ E.,—was "brownish olive-green to amber-brown"), and at Bananah Creek, where the specific gravity was only 1·00870. It will be observed from these records that this *Eucalanus* is able to live in water of very varied character, as regards density and temperature. A species capable of existing

under such a diversity of conditions might be expected to have a wide distribution, and such is the case with this *Eucalanus*. Dana has recorded it from the Pacific and China Seas. In the 'Challenger' Report it is recorded from the Malayan and Australasian Seas. Sir John Lubbock has recorded it from the Bay of Biscay * and Mr. I. C. Thompson from Madeira and the Canary Islands †. Prof. Claus records a *Calanella* from the Mediteranean, which Dr. Brady thinks is "in all probability identical with the present species."

EUCALANUS SPINIFER, n. sp. (Pl. I. figs. 15–23.)

Length 5·5 mm. Forehead triangular; rostrum as in *Eucalanus attenuatus*; postero-lateral angles produced and spiniform; anterior antennæ 22-jointed, reaching to the extremity of the caudal stylets, the proportional lengths of the joints are nearly as follows :—

40	11	11	12	12	13	20	18	20	25	29	27	29	29	29	26	29	27	24	23	13	10
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

The secondary branch of the posterior antennæ small, 7-jointed, the two basal and the terminal joints longer than the others, both branches furnished with numerous plumose hairs. The secondary branch of the mandible-palp 3-jointed, stouter and nearer the distal end of the large basal part than that of *E. attenuatus*; both branches furnished with a number of long hairs, those of the secondary branch being setiferous from the middle to near the extremity (fig. 17). Anterior and posterior foot-jaws as in *E. attenuatus*. The inner branches of first pair of swimming-feet 2-jointed, joints subequal; the following three pairs as in *Eucalanus attenuatus*. Fifth pair of feet in the male 1-branched, each branch 4-jointed, the last joint terminating in a long somewhat curved spine; on the inner margin and near the base of the spine springs a stout plumose hair, the length of which exceeds that of the terminal spine. Abdomen very short and 3-jointed, the basal joint as long as the other two together. Caudal stylets nearly as long as the last two abdominal segments, each stylet furnished with five plumose hairs, the inner one being about half the length of the other four, which are about equal.

Habitat. Station 9, 50 fathoms tow-netting, January 10th (day collection). Lat. 5° 10′ N., long. 3° 56′ 2″ W., inshore surface tow-netting, January 12th (night collection). Lat. 3° 58′ N., long. 3° 42′ W., 25 fathoms tow-netting, January 13th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35 fathoms tow-netting, January 22nd (day collection). Lat. 4° 26′ 7″ S., long. 10° 1′ 8″ E., 238 fathoms tow-netting, February 5th (day collection).

The tow-nettings from the localities described were the only gatherings in which this *Eucalanus* was observed, but, though its distribution was limited, a considerable number of specimens were obtained. Its chief and most apparent distinctive characters are the spiniform lateral angles of the last thoracic segment and the form of the male fifth feet. *Eucalanus spinifer* is also a larger and more robust species than *Eucalanus attenuatus*, which it closely resembles.

* Trans. Entom. Soc. vol. iv. pt. 2, p. 10.

† Trans. Linn. Soc.

Eucalanus setiger, Brady.

1883. *Eucalanus setiger,* Brady, op. cit. p. 39, pl. iii. figs. 8–15.

Habitat. Station 2, 50 fathoms, January 1st (night collection). Station 9, 50 fathoms, January 10th (day collection). Off Accra, surface and 3 fathoms tow-nettings, January 16th (day collection). Lat. 0° 45′ 8″ S., long. 7° 37′ 4″ E., surface tow-netting, February 2nd (night collection). Bananah Creek, Congo River, surface tow-netting, February 7th (day collection), &c.

Eucalanus setiger was observed in 32 tow-nettings, 15 of which were surface and 17 under-surface gatherings. The under-surface tow-nettings were from various depths, ranging from 3 to 60 fathoms. Of the surface gatherings 10 of them were day, and 5 (including 1 close inshore) were night collections. Of the under-surface gatherings, 11 were day and 6 were night collections, as in the formula :—

Tow-nettings 32 { 15 surface { 10 day collections. / 5 night ditto. ; 17 under-surface { 11 day ditto. / 6 night ditto.

By comparing this with other formulæ it will be observed that *Eucalanus setiger* occurred in a proportionally greater number of day surface tow-nettings than do the majority of the species recorded in this Report, the occurrence of which is frequent enough to admit of comparison. This difference may only be due to accidental causes; nevertheless it seems of sufficient interest to be worth noting, as possibly indicating less susceptibility to the influence of daylight or sunlight than those species which occur more frequently in night than in day surface collections.

Eucalanus setiger, like *Eucalanus attenuatus*, seems able to exist under very varied conditions as regards the density and temperature of the water : it was obtained in the open sea at Station 2 (50 fathoms), the density of the water being about 1·02620 and temperature (corrected) 56°·85 F.; at Station 23 (surface), density 1·02347 and temperature 82°·1 F.; and at Bananah Creek, where the density of the water was only 1·00870. This may readily be distinguished from the other *Eucalani* of this Report by its smaller size and by lateral setæ on the last two thoracic segments.

Genus Rhincalanus, Dana (1852).

Rhincalanus cornutus, Dana.

1852. *Rhincalanus cornutus,* Dana, loc. cit. p. 1083, pl. lxxvii. figs. 2 *a–d.*

1883. *Rhincalanus cornutus,* Brady, op. cit. p. 41, pl. vii. figs. 1–10.

Habitat. Station 3, 100 fathoms tow-netting, January 2nd (day collection). Station 9, 25 and 50 fathoms tow-nettings, January 10th (day collection). Station 14, 10 and 20 fathoms, January 21st (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 55″ E., 30, 60, 260, 360, and 460 fathoms tow-nettings, January 22nd (day collections). Station 23, surface, and 10, 20, 85, 135, 185, and 235 fathoms tow-nettings, February 5th (day collections), &c.

This species was observed in 70 tow-nettings, 29 of these were surface and 41 under-surface gatherings. The under-surface comprised tow-nettings from various depths from 3 to 460 fathoms. 9 of the surface and 30 of the under-surface tow-nettings were collected during the day, while 20 surface and 11 under-surface were collected during the night, as shown by the formula :—

Tow-nettings 70 { 29 surface { 9 day collections. / 20 night ditto. / 41 under-surface { 30 day ditto. / 11 night ditto.

The superficial and bathymetrical distribution of *Rhincalanus cornutus* was co-extensive with the area examined, except that, unlike either *Eucalanus attenuatus* or *setiger*, it was not obtained in any gathering from Bananah Creek or Loanda Harbour, where the specific gravity approximates so closely to that of fresh water. I have not observed a single specimen among the large number that have passed through my hands that could be ascribed to *Rhincalanus gigas*, Brady.

Rhincalanus aculeatus, n. sp. (Pl. II. figs. 11–24.)

Length about 3·25 mm. (exclusive of tail-setæ, which were fully 1 mm. in length). Body ovate, attenuate towards the head. Forehead produced forward into a strongly spiniform rostrum. The postero-lateral angles of the last thoracic segment are produced backward into spine-like processes. The anterior antennæ long and slender, reaching to beyond the caudal stylets, 21-jointed ; the proportional lengths of the joints are nearly as follows :—

170	42	17	18	14	14	10	9	9	12	13	45	54	59	72	85	82	82	80	80	30
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21.

The anterior antennæ are sparingly setiferous. The secondary branch of the posterior antennæ about two-thirds the length of the primary branch, 6-jointed, the first joint fully half as long as the second, the third, fourth, and fifth small, the last as long as all the preceding three together ; the end of the primary branch is furnished with four long plumose setæ and a small plain one ; two plumose setæ spring from the end of the last joint of the secondary branch and one from each of the preceding four joints. Mandible stout, the distal end with four teeth, three of which are close together and one separated from the others by a deep and moderately wide sinus. I failed to observe a mandible-palp. The maxilla-palp furnished with three very long setæ, which are plumose from the middle. The anterior foot-jaws resemble those of *Hemicalanus* more closely than those of *Rhincalanus*. The posterior foot-jaw as in *Rhincalanus cornutus*, but differing in being furnished with three ciliated heart-like processes, two of which are on the under margin and near the end of the first segment and one on the upper margin of the second segment. Both branches of the first four pairs of swimming-feet 3-jointed, the second of the two basal joints of the first feet is produced on the inside so as to form a stout process to which the inner branch is attached. A stout curved spine springs from the end of the posterior margin of the second joint of the outer branch of the second pair of swimming-

feet, which is fully half as long as the next joint. The end of the last joint of the outer branch of the first pair is furnished with a stout plumose spinous seta, while the outer branches of the next three pairs have each a terminal falciform spine ciliated on the inner margin and finely serrate on the outer margin. Fifth pair of feet 2-branched, inner branch 1-jointed, rudimentary, and bearing at its apex a long plumose seta; the outer branch 2-jointed; an extremely long slender seta springs from the outer edge near the proximal end of the second basal joint on both sides. The terminal joints of both of the outer branches bear several small spines on the outer margin and one on the inner margin. Abdomen short, 4-jointed; second and third joints smaller than the first, subequal. Caudal stylets fully as long as the last abdominal segment, and furnished with densely plumose dark-coloured setæ.

Habitat. Lat. 6° 38′ N., long. 12° 37′ W., 25 fathoms tow-netting, January 6th (day collection). One specimen only of this curious form was obtained.

Rhincalanus aculeatus differs somewhat from the generic characters of *Rhincalanus* as described by Prof. Brady in the number of joints of the anterior antennæ, the comparatively long terminal joint of the secondary branch of the posterior antennæ, and in the form of the mandible and maxilla, but agrees with the other characters; I have therefore included it in that genus.

Genus Hemicalanus, Claus, 1863.

Hemicalanus, Claus, Die freilebenden Copepoden, 1863 (not *Hemicalanus* of Dana); Brady, 'Challenger' Copepoda, 1883.

Hemicalanus longicornis, Claus.

1863. *Hemicalanus longicornis*, Claus, loc. cit. p. 179, pl. xxix. fig. 1.
1883. *Hemicalanus longicornis*, Brady, op. cit. p. 44, pl. ix. figs. 1–5.

Habitat. Station 2, 25 and 50 fathoms, January 1st (night collection). Station 3, 100 fathoms (day collection). Station 9, 50 fathoms (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 30, 260, 360, and 460 fathoms (day collections). Station 23, surface, and 10, 20, 85, 135, 185, and 235 fathoms, January 5th (day collections).

Hemicalanus longicornis was obtained in 26 tow-nettings, but only one of these was from the surface, all the others were under-surface gatherings and ranged in depth from 5 to 460 fathoms. 21 of these tow-nettings (including the surface gathering) were day collections, while 5 were night collections, as shown in the formula:—

Tow-nettings 26 { 1 surface — 1 day collection.
25 under-surface { 20 day collections.
5 night ditto.

This *Hemicalanus* was of frequent occurrence in some of the tow-nettings. It was very common in a gathering from 35 fathoms, collected on the 22nd January in lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E.; in this gathering eighty-five perfect specimens, besides a number of others more or less damaged, were obtained.

HEMICALANUS PLUMOSUS, Claus. (Pl. II. fig. 6; Pl. VI. fig. 6.)

1863. *Hemicalanus plumosus*, Claus, Die freilebenden Copepoden, p. 178, pl. xxviii. fig. 12, pl. xxix. figs. 4–7.

Habitat. Station 2, 50 fathoms (night collection). Lat. 6° 38′ N., long. 12° 37′ W., 25 fathoms (day collection). Lat. 3° 55′ 3″ N., long. 4° 7′ 3″ E., 30 fathoms (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms (day collection). Station 23, 85 fathoms and 235 fathoms (day collections).

This appears to be a scarce species in the 'Buccaneer' collections; only a few specimens have been obtained. Claus (*loc. cit.*) gives a very full description and some very good figures of this *Hemicalanus*. *Hemicalanus plumosus* comes very near *Hemicalanus orientalis*, Brady, described in the 'Report on the 'Challenger' Copepoda.'

HEMICALANUS MUCRONATUS, Claus.

1863. *Hemicalanus mucronatus*, Claus, loc. cit. p. 179, pl. xxix. fig. 2.

Length (exclusive of the tail-setæ) of the specimen figured 3·8 mm. (the length varies in different specimens). Body somewhat cylindrical. Head pyramidal, the apex mucronate—in some specimens spiniform, the postero-lateral angles of last thoracic segment rounded. Anterior antennæ, reaching to beyond the caudal stylets, 25-jointed. The proportional lengths of the joints are represented very nearly by the annexed formula:—

40	10	15	17	18	18	18	18	21	20	22	23	30	34	34	35	37	37	33	28	30	29	28	27	18
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Posterior antennæ similar to those of *H. plumosus*. The mouth-organs are also similar to those of that species, except that the anterior foot-jaws are weaker, the spines on the second and third joints of the same foot-jaws are shorter and more slender, and the terminal setæ of both anterior and posterior foot-jaws are not spiniferous or ciliated as in *Hemicalanus plumosus*. The swimming-feet are similar to those of *Hemicalanus plumosus*. Abdomen 4-jointed, first segment much larger than the others. Caudal stylets short, divergent, the terminal setæ densely plumose.

Habitat. (1) Station 2, 50 fathoms tow-netting, January 1st (night collection). (2) Lat. 3° 58′ N., long. 3° 42′ W., 25 fathoms tow-netting, January 13th (day collection). (3) Lat. 3° 22′ 5″ N., long. 4° 11′ 8″ E., 30 fathoms tow-netting, January 20th (night collection). (4) Station 14, 10 fathoms tow-netting, January 21st (night collection). (5) Lat. 6° 38′ N., long. 12° 37′ W., 25 fathoms tow-netting (day collection). (6) Lat. 1° 55′ 5″ E., 35 fathoms tow-netting, January 22nd (day collection). (7) Off São Thomé Island (lat. 0° 34′ N., long. 6° 30′ 4″ E.), 20 fathoms tow-netting, January 23rd (day collection). (8) Station 23, surface tow-netting, February 5th (day collection).

Several specimens of *H. mucronatus* were obtained; the size of the specimens varied to some extent, and the forehead was more spiniform in some specimens than in others. This species comes very near *Hemicalanus aculeatus*, Brady, in general form and in the structure of the appendages, but is much smaller than Brady's specimen. The length of the specimen described and figured in this Report, which was one of the largest of

the 'Buccaneer' specimens, was, as already stated, 3·8 mm.; but *Hemicalanus aculeatus*, Brady, measured 5·75 mm. in length—that is, fully half as long again as the 'Buccaneer' specimen.

It is interesting to note that while six species of *Hemicalanus* (including four of Claus's Mediterranean species) have been obtained in the 'Buccaneer' collection, only three (including one of Claus's Mediterranean species) were observed in the collections of the 'Challenger' expedition, and further, that while *Hemicalani* were of frequent occurrence in the 'Buccaneer' tow-nettings, 85 perfect specimens, besides a number of others more or less damaged, were captured in a single tow-net gathering. The three species recorded in the 'Challenger' Report were represented in the collection "only by about half a dozen specimens in all." Such a remarkable difference in the distribution of the *Hemicalani* seems to indicate that their distribution is local, and that, with perhaps one or two exceptions, they prefer to frequent what is comparatively inshore water to mid-ocean. *Hemicalanus longicornis* appears to be more cosmopolitan than the other species and to have a more or less general distribution throughout tropical and subtropical seas. Yet, though this *Hemicalanus* has undoubtedly an extensive distribution, it is noteworthy that none of Dana's species can be satisfactorily ascribed to it. This might have been accounted for had it been a critical species, but the extremely long anterior antennæ of *Hemicalanus longicornis* at once distinguish it from all other *Calanidæ*.

Genus Augaptilis, Giesbrecht (1889).

Hemicalanus, Claus (in part).

Augaptilis longicaudatus (Claus). (Pl. I. figs. 24–26; Pl. II. fig. 5.)

1863. *Hemicalanus longicaudatus*, Claus, loc. cit. p. 179, pl. xxix. fig. 3.

1892. *Augaptilis longicornis*, Giesbrecht, Fauna und Flora des Golfes von Neapel (Copepoden), p. 414, pl. 27. fig. 31; pl. 28. figs. 2, 8, 19, 23, 31, 35, 38; pl. 39. figs. 37, 48.

Habitat. Station 3, 100 fathoms tow-netting, January 2nd (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms tow-netting (day collection).

This *Augaptilis* occurred only in the tow-nettings from the two localities described; it differs from other species of *Hemicalanus* in the great length of the secondary branch of the posterior antennæ, in the comparatively long caudal stylets, and particularly by the anterior and posterior foot-jaws being furnished with moderately long setæ, which possess each a double row of short filaments with round, flat, button-like tops. These filaments (or sense-organs?) somewhat resemble "drawing-tacks," *i. e.* small nails with round flat heads, used for fixing drawing-paper upon a drawing-board. There is a double row of these filaments on each seta, the filaments of each double row being usually opposite each other; there are about 147 of these filaments in the length of a millimetre. They impart to the setæ that are furnished with them a very marked and striking appearance. Prof. Claus considers them as forming an important and distinctive specific character, and refers to them in his description of the species in the following terms:—"Die Hakenborsten der oberen und untern Maxillarfüsse tragen zwei Reihen sehr zierlich

geknöpfter Seitenspitzen." This form of filament appears to be peculiar to *Augaptilis longicaudatus*. Another species (*Augaptilis Rattrayi*) described in this Report possesses similar filaments, but the button-tops, instead of being round, are broadly crescent-shaped. Not more than about half a dozen specimens of *Augaptilis longicaudatus* were obtained in the 'Buccaneer' collections.

Augaptilis hecticus, Giesbrecht. (Pl. I. figs. 37–39, Pl. II. figs. 1–4, 38–42.)

1892. *Augaptilis hecticus*, Giesbrecht, op. cit. p. 114, pl. 27. fig. 30; pl. 28. figs. 5, 9, 16, 30, 33, 37; pl. 29. fig. 18; pl. 39. fig. 45.

1892. *Hemicalanus longisetosus*, Scott (MS. name).

Length, exclusive of tail-setæ, 2·16 mm.; cephalothorax elongate, slender, cylindrical, subtriangular in front, rounded behind; anterior antennæ, reaching beyond the extremity of the abdomen, 25-jointed; the right antenna of the male 18-jointed. The proportional lengths of the joints are nearly as follows:—

Male.	20	12	10	13	13	13	12	56	20	22	18	17	19	22	35	29	18	18.						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25.
Female.	20	8	8	8	8	8	8	8	10	10	11	13	15	15	14	13	14	15	12	10	10	10	11	15	18.

In the male antennæ the eighth joint is rather longer than the united lengths of the preceding four joints, and there is a distinct hinge between the fourteenth and fifteenth joints; the fifteenth bears at the proximal end a slender hair-like appendage which extends forward beyond the extremity of the joint. A densely plumose seta springs from the lower terminal angle of the sixteenth joint, and from the upper angle a rather long non-plumose spinous seta; a second densely plumose seta, similar to that on the sixteenth, springs from the upper terminal angle of the seventeenth joint. The second and third last joints of the female anterior antennæ and the left male antenna are likewise furnished with one or two (?) plumose setæ similar to those of the male eighth antenna; the antennæ of both sexes are otherwise sparingly setiferous. The secondary branch of the posterior antennæ is fully half the length of the primary branch, 6(?)-jointed, both branches with long plumose hairs; mandible styliform, the extremity somewhat furcate, but one of the teeth nearly obsolete; other mouth-organs as in *Hemicalanus longicornis*. Five pairs of swimming-feet in both sexes, all of them 2-branched, with both branches 3-jointed; the terminal spine of the outer branch of the fourth pair has a row of minute tubercules along its exterior margin; the inner margin is ciliated. The middle joint of the outer branch of the right (?) fifth foot of the male bears a stout, slightly curved process on the upper part of the inner margin; the last joint bears a short terminal spine, immediately behind which, on the inner margin, is a moderately long plumose hair; the last joint of the outer branch of the left foot bears a long curved terminal spine, finely serrate on its inner edge; both the inner margins are furnished with several long plumose hairs which extend beyond the terminal spine of the outer branch of the left foot. Abdomen in the male 5-jointed, in the female 4-jointed; the length of the segments in both are subequal. Caudal stylets in the male about as long as the last two abdominal segments, and in the female about the length of the

last segment of the abdomen. Each stylet is furnished with one extremely long seta, which is longer than the cephalothorax and abdomen together; each seta bears a dense mass of fine hairs, near, but not quite at, its extremity; the extreme end appears to be free from hairs; there are also three short and densely plumose setæ on the exterior margin of the stylets, one near the middle and two near the extremity of each stylet.

Habitat. (1) Lat. 3° 58′ N., long. 3° 42′ W., 25 fathoms tow-netting January, 13th (day collection). (2) Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms tow-netting, January 22nd (day collection, temperature of the water about 43° F.). (3) Off São Thomé Island (lat. 0° 34′ N., long. 6° 30′ 4″ E.), 24 fathoms tow-netting, January 23rd (day collection).

Only two or three specimens of this interesting form were obtained. The extremely long tail-setæ, with the remarkable accumulation of fine hairs near their extremity, distinguish this *Augaptilis* at once from the other species described in this Report.

Augaptilis Rattrayi, n. sp. (Pl. II. figs. 25–37.)

Length, exclusive of tail-setæ, 1·9 mm. Cephalothorax robust, seen from above broadly ovate, measuring in breadth 2·6 mm., rounded in front, the postero-lateral angles of the last thoracic segment also rounded. Thoracic segments five, the first as long as all the other four together. Every part of the integument—cephalothorax, abdomen, and appendages—is covered more or less with minute spinous hairs. Anterior antennæ short, not much longer than the first thoracic segment, 24-jointed. The proportional lengths of the joints are nearly as follows:—

60	25	20	20	20	20	22	35	35	32	43	50	53	49	52	54	60	56	47	49	40	42	45	36
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

The antennæ are sparingly setiferous, the setæ on the second, eighteenth, and twentieth joints being the longest. The posterior antennæ have the basal part stout, the primary and secondary branches short, the secondary branch being shorter and more slender than the other and 7-jointed; the last joint is rather longer than all the preceding four together, and furnished at the extremity with three long setæ, which are plumose from the middle. The end of the primary branch is also furnished with a number of hairs similar to those of the secondary branch. The mandibles are slender and terminate in two moderately long teeth, between which is another minute and rudimentary one; the mandible-palp is stout, 2-branched, one of the branches 2-, the other 4-jointed; both branches bear several plumose hairs. The "rod-like process" of the maxillæ terminates in three very long plumose hairs. Two hairs, bearing each a double row of peculiar short filaments having flat broadly crescent-shaped tops, which extend from near the distal end to about the middle of the hairs, spring from the extremity of a stout lateral appendage of the maxillæ. Anterior foot-jaws stout, 5-jointed, the first two with several stout spinous hairs on the anterior margin, the last three with a number of long setæ having a double row of short filaments, with flat, broadly crescent-shaped tops, each double row not extending below the middle of the seta. The posterior foot-jaw 6-jointed, the first two joints moderately stout and long, sparingly setiferous on the upper margin; the second joint has also a long non-plumose hair attached to

its upper distal angle; the next three joints are short and stout, and bear four long filamentiferous setæ similar to those of the anterior foot-jaws. The end joint is small and rudimentary, and terminates in one short and two long non-plumose hairs. The swimming-feet are as in *Hemicalanus longicornis*; the five pairs are 2-branched and each branch 3-jointed, all of them being more or less thickly beset with short spinous hairs. The basal joint of the outer branches of the first pair bears on its posterior distal angle an elongate spine, which extends to the extremity of the last joint. The exterior distal angles of the first and second joints of the outer branches of the third and fourth pairs bear one very stout spine, having a short spinous process on each side of it at its base. Abdomen short, 3-jointed, the first joint much longer than the other two together. Caudal stylets short, somewhat divergent, each with six plumose hairs, four terminal, which are moderately long and subequal; a smaller one on the lower outer margin, and one very slender hair near the base of the second terminal seta, counting from the inside.

Habitat. (1) Station 3, 100 fathoms tow-netting, January 2nd (day collection), specific gravity of the water 1·02608, temperature 56°·4 F. (2) Lat. 6° 38′ N., long. 12° 37′ W., 25 fathoms tow-netting, January 6th (day collection), sp. g. of the water (surface) 1·02400, temperature (surface) 83°·5 F. (3) Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35 fathoms tow-netting, January 22nd (day collection), temperature at 30 fathoms 63°·98 F. (4) Off São Thomé Island, lat. 0° 34′ N., long. 6° 20′ 1″ E., 20 fathoms tow-netting, January 23rd (day collection).

Only one adult specimen and a few others more or less immature were obtained; the adult specimen is from locality (3), and is the one from which the drawings were made.

The peculiar short flat-topped filaments (sense-organs ?) with which several of the hairs of the maxillæ and foot-jaws are furnished resemble those observed and described in *Augaptilis longicaudatus*, which Prof. Claus speaks of as "sehr zierlich geknöpfte Seitenspitzen," but instead of the tops being circular like a button, as in that species, they are broadly crescent-shaped; the "button-tops" are also larger than those of *Augaptilis longicaudatus*. In *Augaptilis Rattrayi* there are about forty button-topped filaments in the length of a millimetre, but in *Augaptilis longicaudatus* the number of filaments in a millimetre is about one hundred and forty-seven. The filaments in each double row are usually opposite each other, as shown in the enlarged drawings. They give a peculiar and striking appearance to the setæ that are provided with them.

Genus Calocalanus, Giesbrecht (1891).

Elenco dei Copepodi pelagici,—R. Corvetta 'Vettor Pisani.' (Atti della Reale Accademia dei Lincei, serie iv. Rendiconti, vol. v. pt. 1.)

Calocalanus pavo (Dana). (Pl. VI. figs. 9, 10.)

1852. *Calanus pavo*, Dana, loc. cit. p. 1061, pl. 72.

1892. *Calocalanus pavo*, Giesbrecht, op. cit. p. 185, pls. 1, 4, 9, 36.

Length about 7 mm. Cephalothorax rounded in front and behind. Anterior antennæ fully a half longer than the cephalothorax and abdomen together, 24-jointed, the first joint large and bearing two plumose and a few plain setæ, the last joint long and slender, furnished at its extremity with four plain setæ of moderate length. The second and third last joints possess longer setæ than any of the other joints; all the joints from the eleventh to the twentieth inclusive bear each a number of small hairs on the upper margin besides the longer setæ with which all the joints are more or less furnished. The proportional lengths of the joints are very nearly as in the annexed formula:—

45	10	10	10	10	10	10	10	11	11	15	15	17	18	22	24	27	28	29	30	25	24	20	87
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Secondary branch of the posterior antennæ as long as the primary branch, 8-jointed; the third and last much larger than the other joints; both branches setiferous. Mandibles stout, the apex furnished with several more or less rudimentary teeth; the mandible-palp well developed; secondary branch 5(?)-jointed, shorter than the primary, the basal part furnished with three setæ on its inner margin. Maxillæ large, somewhat similar to those of *Eucalanus*, but the basal part dilated. Foot-jaws as in *Eucalanus*, but the terminal setæ of first foot-jaws plain. The first four pairs of swimming-feet 2-branched, outer branches 3-jointed, the inner branch of first pair 2-, of the others 3-jointed. The outer branches of second, third, and fourth pairs only with sabre-like terminal spines; the second joint of the outer and the second and third joints of the inner branches armed with transverse rows of spines. Fifth pair of feet in the male (?) 1-branched, branches 3-jointed, the terminal joint longer than the other two together, compressed, the extremities rounded and furnished with several long setæ and two or three transverse rows of small hairs as in the figure. Abdomen very short, 3(?)-jointed. Caudal stylets extremely divergent, bearing four long spreading setæ, two of which are divided to near the base.

Habitat. Station 2, surface and 25 fathoms tow-nettings, January 1st (night collections). Station 3, 25 fathoms, January 2nd (day collection). Station 9, 50 fathoms, January 10th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 and 460 fathoms tow-netting, January 22nd (day collection). Station 23, 20 fathoms, February 5th (day collection).

This species was comparatively frequent all over the area examined. It is readily distinguished from other *Calanidæ* described in this Report by the remarkably divergent caudal stylets, which are at almost right angles to the abdomen. The anterior antennæ and tail-setæ appear to be, in this species, more than usually fragile; not a single perfect specimen was obtained in the whole collection. The tail-setæ were commonly altogether wanting or the stumps of them only remained, and the anterior antennæ were, with very few exceptions, all more or less damaged. It was only after very carefully searching the tow-nettings that a few specimens were discovered that had the joints of the antennæ complete; the figure, therefore, represents the anterior antennæ perfect as regards the number of joints. No specimens with perfect caudal setæ were obtained.

Calocalanus plumulosus (Claus). (Pl. I. figs. 35, 36; Pl. VI. figs. 7, 8.)

1863. *Calanus plumulosus*, Claus, Die freilebenden Copepoden, p. 174, taf. xxvi. figs. 15, 16.
1892. *Calocalanus plumulosus*, Giesbrecht, op. cit. p. 185, pls. 3, 9, 36.

Length (female) 1·3 mm. Body elongate, first segment nearly equal to twice the entire length of the other three; postero-lateral angles of thorax rounded. Anterior antennæ, reaching somewhat beyond the extremity of the abdomen, 24-jointed; the large basal joint bears one long plumose seta near the proximal end, the last joint is slender and equal to the combined length of the preceding two. The proportional lengths of the joints are nearly as shown in the formula:—

50	10	10	10	10	10	10	10	11	13	16	16	18	18	18	19	18	21	21	21	21	20	15	36
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24.

Posterior antennæ, mouth-appendages, and swimming-feet as in *Calocalanus pavo*. The last joint of each foot of the fifth pair is equal to half the length of the foot, and the third joint is nearly one and a half times the length of the preceding one; the broadly rounded extremity of the last joint bears a small spine near the outer angle, a much larger spine near the middle, and a moderately long seta near the inner angle; there are also two small setæ near the distal end of the inner margin; both margins of the joints are also more or less fringed with cilia (Pl. I. fig. 35). Abdomen short, first segment rather tumid, the second much shorter than either the first or third, breadth of the second and third increasing towards the distal end; the first and second have each a fringe of small serræ concentric with, and a little anterior to, the distal margin. Stylets about equal to the length of the second abdominal segment, slightly divergent, and furnished with four terminal plumose setæ, and one very small seta near the extremity of the inner margin.

Calocalanus plumulosus was obtained in a tow-net gathering from 30 fathoms, lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., collected January 22nd. Only a few specimens were observed.

This species differs very markedly, not only in its greater size but also in general appearance, from *Calocalanus pavo*; moreover, the anterior antennæ are proportionally much shorter than in that species. The proportional lengths of the joints of the anterior antennæ and fifth feet also differ considerably in the two species. Another character of the spirit specimens is the abruptly flexed abdomen, which is bent at a right angle in all those obtained. The position of the caudal stylets in *Calocalanus plumulosus* is almost normal, while those of *Calocalanus pavo* are extremely divergent. The long plumose seta on the basal joint of the anterior antennæ appears also to be a character of *Calocalanus plumulosus* *.

Genus Heterocalanus, nov. gen. (Provisional name.)

Anterior antennæ 22-jointed; right antennæ of the male resembling that of the

* "Dieser" (the long basal joint of the anterior antennæ) "trägt eine kräftige, zweiseitig befiederte, gelb pigmentirte Borste." Claus, *loc. cit.*

Pontellidæ. Second branch of the posterior antennæ longer than the primary branch, 4-jointed. Mandibles stout, broad, furnished with papilliform teeth and elongate tooth-like processes on the exterior angle; mandible palp 2-branched, secondary branch 3-jointed. Anterior foot-jaws like those of *Rhincalanus cornutus*. Posterior foot-jaws strong, 6-jointed, the two basal joints large. The first four pairs of swimming-feet have both branches 3-jointed. Fifth pair in both sexes 1-branched, those of the male dissimilar and adapted for grasping; those of the female the same on both sides, 3-jointed, the last joint produced into a large curved spiniform process. Ovisac large.

Heterocalanus serricaudatus, n. sp. (Pl. II. figs. 43–48; Pl. III. figs. 1–7.)

Length 1·15 mm. Body elongate, narrowly rounded in front, the postero-lateral angles of last thoracic segment rounded and bearing several small spines. Anterior antennæ longer than the body; those of the female slender, 22-jointed, sparingly setiferous. The proportional lengths of the joints are nearly as follows:—

11	11	5	7	6	10	5	6	10	12	14	16	18	18	18	16	14	14	13	14	12	3
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

The right anterior antenna of the male also 22-jointed, distinctly hinged between the 18th and 19th joints, the upper margin of the 18th joint serrate; the 11th and 12th joints are small, the 14th, 15th, and 16th dilated. The general form of the male right antenna somewhat resembles that of the *Pontellidæ*. Posterior antennæ have the secondary branches longer than the primary, 4-jointed, the third joint very small, imparting to the branch the appearance of being much constricted in the middle; both branches furnished with numerous non-plumose hairs. Mandible stout, broad, bearing several small papillose teeth, and on the exterior angle three elongate tooth-like processes and a short plumose seta. The basal part of the mandible palp is comparatively large, and produced laterally to form the base of the secondary branch, which is 3-jointed. Both branches are furnished with a number of non-plumose hairs (Pl. III. fig. 4). Anterior foot-jaws like those of *Rhincalanus cornutus*, short, obscurely 3(or 4 ?)-jointed. Posterior foot-jaws strong, 6-jointed, the two basal joints large, the other four small, subequal; each of the fourth, fifth, and sixth joints bear interiorly a stout, elongate, blunt-pointed spine, that of the fifth being much larger than those of the other two joints; the terminal joint is also furnished with six long plumose hairs. The first four pairs of swimming-feet are 2-branched, both branches 3-jointed. The joints of the inner branch of the first pair subequal; the outer branch is without dagger-like spines at the distal angles of the joints. The first joint of the inner branch and the middle joint of the outer branch of the second, third, and fourth pairs are smaller than the other joints, and the exterior distal angles of all the joints of the outer branches bear stout dagger-like spines, which are finely serrate on both edges; the last joint has an additional and similar spine arising from an excavation on the lower half of the outer margin. The terminal spines of the outer branches are finely serrate on the outer edge, except near the base, which is plain; the extremity of the terminal spines is slightly curved

outwards. The terminal spines of the outer branches of the first pair are more slender than those of the others; all the four pairs are furnished with numerous stout plumose setæ on the inner margins of both branches as well as round the extremity of the inner branches. The fifth pair in the male is 1-branched. The second joint of the right foot bears interiorly a small dilated process having a number of small spines; the extremity of the last joint truncate; an elongate curved appendage with a tumid base springs from the inner angle, and a stout setiferous spine from the outer angle of the extremity of the last joint. The second joint of the left foot has a long slender appendage, very faintly serrate on the inner edge. The outer angle of the third joint and the extremity of the fourth terminate in a long spinous process, and the inner edge of the base of the last joint is ciliated. The fifth pair in the female is 1-branched, the right and left are similar, and 3(or 4?)-jointed; the first and second joints stout, the third short, but produced inwards into a large curved spiniform process, finely but distinctly serrate on both margins; the last (?) joint nearly obsolete, terminating in one long plain spine and a second short one, serrate on the inner edge. Abdomen (exclusive of caudal stylets) nearly half as long as the cephalothorax, 5-jointed in the male, 4-jointed in the female; the second, third, and fourth segments in the male, and the first, second, and third in the female, fringed posteriorly with a prominent row of saw-like teeth. Caudal stylets as long as the last abdominal segment, narrow, somewhat divergent, bearing each four moderately long, terminal, plumose setæ, and a fifth which springs from a notch on the outer margin; all the setæ are articulated below the proximal half; there is also a small hair between the two inner setæ. Ova forming one large circular complanate cluster, containing about sixteen large ova arranged in a single layer, eleven or twelve round the circumference, the others central.

Habitat. Lat. 5° 10′ N., long. 3° 56′ 2″ W., surface, close inshore, January 12th (night collection). Off Accra, three fathoms, January 16th (night collection). Off Appi, surface tow-netting, January 18th (day collection). Libreville, Gaboon River, in two surface tow-nettings, January 28th (day collection). Bananah Creek, Congo River, surface tow-netting, February 8th (night collection).

Heterocalanus serricaudatus appears to be more confined to inshore waters than many of the species recorded in this Report, though it seems nevertheless capable of existing under varied conditions as regards the density of the water, having been obtained in water varying in specific gravity from 1·02511 to 1·00870.

Genus Pleuromma, Claus.

Pleuromma, Claus, Die freilebenden Copepoden (1863).
? *Metridia*, Boeck, Oversigt af Norges Marine Copepoda, 1864.
? *Metridia*, Brady, Monograph, British Copepoda, vol. i. 1878.

Pleuromma abdominale, Claus.

1863. *Pleuromma abdominale*, Claus, loc. cit. p. 195, pl. v. figs. 1–6, 13, 14; pl. vi. figs. 1–10.
1883. *Pleuromma abdominale*, Brady, 'Challenger,' Copepoda, p. 46, pl. xi. figs. 1–13.

Habitat. Station 2, 25 fathoms tow-netting, January 1st (night collection). Lat. 3° 55′ 3″ N., long. 4° 7′ 13″ E., 50 fathoms tow-netting, January 20th (day collection). Off São Thomé Island (lat. 0° 34′ N., long. 6° 31′ 6″ E.), 20 fathoms tow-netting, January 23rd (day collection). Station 23, 235 fathoms tow-netting, February 5th (day collection).

Pleuromma abdominale was obtained in 25 tow-nettings, eight of which were surface gatherings, and seventeen under-surface, ranging in depth from 3 to 460 fathoms; one of the surface and seven of the under-surface gatherings were day collections, the others were collected during the night, as shown in the formula :—

Tow-nettings 25 { 8 surface { 1 day collection. / 7 night collections. / 17 under-surface { 7 day ditto. / 10 night ditto.

In the adult males the abdomen was usually more or less distorted, as figured by Prof. Brady in his Report on the 'Challenger' Copepoda.

The form agreeing with *Pleuromma gracile*, Claus, was obtained in a few of the tow-nettings, and the difference between it and *Pleuromma abdominale* is so marked and constant in the 'Buccaneer' specimens that I have considered it preferable to record them separately.

Pleuromma gracile, Claus. (Pl. VI. figs. 11–14.)

1863. *Pleuromma gracile*, Claus, loc. cit. p. 197, pl. v. figs. 7–11.

1883. ? *Pleuromma abdominale*, Brady (in part), op. cit. p. 46, pl. xii. figs. 1–16; pl. xxxi. figs. 13, 14.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 250 and 360 fathoms tow-nettings, January 22nd (day collections). Lagoon, São Thomé Island, surface.

A form agreeing with the description and figures of *Pleuromma gracile* in 'Die freilebenden Copepoden' occurred in the gatherings described; it seems to be distinct from *Pleuromma abdominale*.

Pleuromma princeps, n. sp. (Pl. III. figs. 8–20.)

Length (exclusive of tail-setæ) 12 mm. Cephalothorax elongate, robust. Forehead acute; postero-lateral angles of the last thoracic segment produced, shortly spiniform. Left anterior antenna of male 25-jointed; the right antenna is 22-jointed, hinged at the eighteenth joint, the proportional lengths of the joints as in the annexed formula:—

Left.	50	20	20	15	20	20	20	15	20	25	30	30	40	45	50	50	50	50	55	38	35	37	40	30	10.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25.
Right.	70	20	20	20	20	25	16	15	12	12	25	24	30	45	40	50	60	13	70	80	30	7			

The nineteenth joint is furnished at the distal end with a tooth-like process which extends over the base of the next joint. There are also, near the middle of the same joint, one long and one very short spine, which extend in a forward direction along the margin of the segment; both antennæ are sparingly setiferous. Posterior antennæ as

in *Pleuromma abdominale*; setæ on both branches plumose. The mouth-organs also as in *P. abdominale*, but the anterior foot-jaw bears two elongate spines which spring from a prominent basal part near its extremity. The distal processes of the maxillæ appear to be less produced than in *Pleuromma abdominale*. The first pair of swimming-feet are smaller than the following three pairs; the posterior outer aspect of the basal joint of the inner branch is beset with numerous fine cilia, and the outer margin of the middle joint is fringed with fine hairs. The exterior margin of the second, and the upper half of the third, segment of the outer branch are also fringed with fine hairs, while the lower half of the third segment is finely serrate. The outer branch of the second pair of swimming-feet on both sides has the first segment "deeply excavated at the base;" the excavation is bounded interiorly by two strong, upward-directed, curved spines. There is no "thumb-like prominence" on the basal segment of the third pair of feet, as in *Pleuromma abdominale*. The fourth pair of feet closely resemble the preceding pair. The last segment of the outer branch of the first pair terminates in a long stout seta, plumose on the inner margin. The outer branch of the second, third, and fourth pairs terminates in a moderately short, stout, sabre-like spine, the inner margin fringed with cilia, the outer margin very faintly toothed. The fifth pair of feet strongly prehensile; one branch (the right?) terminates in a clumsy claw-like segment. A small spine springs from near the proximal end of the penultimate segment. The last segment of the other branch is furnished, on the inner side and near the base, with a moderately long, stout process, and two peculiar, stalked appendages. There is also at the base of the last segment a thin plate having a saw-like edge, and partly surrounded with delicate cilia; both branches of the fifth feet are about the same length. Abdomen 4-jointed; joints subequal. Caudal stylets twice the length of the last abdominal segment, and each furnished with six setæ, four of them on the rounded extremity of the stylet, one on the outer margin, and a very small slender seta on the inner margin. All the setæ are densely plumose.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms tow-netting, January 22nd (day collection).

Only one specimen—a male—of this fine species was obtained.

Genus Heterochæta, Claus.

Heterochæta, Claus, Die freilebenden Copepoden (1863).

Heterochæta spinifrons, Claus.

1863. *Heterochæta spinifrons*, Claus, loc. cit. p. 182, pl. xxxii. figs. 8, 9, 14, 16.

1883. *Heterochæta spinifrons*, Brady, Report 'Chall.' Copep. p. 49, pl. xiii. figs. 1–13.

Habitat. Station 2, 25 fathoms tow-netting, January 1st (night collection). Lat. 3° 58′ N., long. 3° 42′ W., 50 fathoms tow-netting, January 13th (night collection). Station 14, 10 fathoms, January 21st (night collection). Off São Thomé Island (lat. 0° 34′ N., long. 6° 30′ 4″ E.), 20 fathoms, January 23rd (day collection). Station 23, 235 fathoms, February 5th (day collection).

Heterochæta spinifrons occurred in 20 tow-nettings; only one of these was a surface gathering collected during the day, the other nineteen were under-surface and ranged in depth from 5 to 460 fathoms; fifteen of these were day collections, and four night collections, as shown in the formula :—

Tow-nettings 20 { 1 surface — 1 day collection. ; 19 under-surface { 15 day collections. ; 4 night ditto. }

This, though generally distributed, was a somewhat rare species in the 'Buccaneer' collection. The dilated outer branches of the fourth pair of swimming-feet, with their short terminal spines, and the extremely long and slender seta of the right caudal stylet, allow of its being readily distinguished from most other species.

Genus Leuckartia, Claus.

Leuckartia, Claus, Die freilebenden Copepoden (1863).

Leuckartia flavicornis, Claus.

1863. *Leuckartia flavicornis*, Claus, loc. cit. p. 183, pl. xxxii. figs. 1–7.
1883. *Leuckartia flavicornis*, Brady, op. cit. p. 50, pl. xv. figs. 1–9, 16.

Habitat. Station 2, 25 fathoms, January 1st (night collection). Off Accra, surface tow-netting, January 16th (night collection). Lagoon, São Thomé Island, surface tow-netting, January 27th (night collection). Station 23, 10, 20, 85, 135, 185, and 235 fathoms tow-nettings, February 5th (day collection). Bananah Creek, Congo River, surface tow-netting, February 7th (day collection).

This *Leuckartia* was observed in 67 tow-nettings ; 30 of these were surface gatherings, and 37 under-surface. The under-surface tow-nettings were from various depths, from 10 to 460 fathoms. Seven of the surface and 27 of the under-surface tow-nettings were day collections, the others were night collections, as exhibited by the annexed formula :—

Tow-nettings 67 { 30 surface { 7 day collections. ; 23 night ditto. } ; 37 under surface { 27 day ditto. ; 10 night ditto. }

This species appears to have been widely distributed throughout the area examined during the 'Buccaneer's' expedition, but comparatively few specimens were observed in the tow-nettings in which it occurred, except in those from deep water.

Genus Undina, Dana.

Undina, Dana, Proc. Amer. Acad. Sci. (1849).

Undina vulgaris, Dana.

1852. *Undina vulgaris*, Dana, Crust. of U.S. Expl. Exped. p. 1092, pl. lxxvii. fig. 8, *a–d*.

1856. *Undina longipes*, Lubbock, Trans. Entom. Soc. p. 17, pl. vi. figs. 1–5.

1883. *Undina vulgaris*, Brady, Report 'Chall.' Copep. p. 53, pl. xv. figs. 11–15; pl. xviii. fig. 6.

Habitat. Station 2, surface tow-nettings, January 1st (night collection). Lat. 3° 58′ N., long. 3° 10′ W., surface tow-netting, January 13th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 20, 35, and 460 fathoms tow-nettings, January 22nd (day collections). Lagoon, São Thomé Island, surface tow-netting, January 27th (night collection). Station 21, surface tow-netting, February 4th (day collection). Bananah Creek, Congo River, surface tow-netting, February 7th (day collection).

Undina vulgaris was observed in 89 tow-nettings; 51 of these were surface gatherings and 38 under-surface, the depth of which ranged from 2 to 460 fathoms; 20 of the surface and 26 of the under-surface gatherings were collected during the day, while 31 of the surface and 12 of the under-surface gatherings were collected during the night, as shown by the annexed formula:—

Tow-nettings 89 { 51 surface { 20 day collections. / 31 night ditto. / 38 under-surface { 26 day ditto. / 12 night ditto.

This *Undina* was comparatively common in the 'Buccaneer' collections, both sexes being equally frequent. It was also one of the more common of the 'Challenger' Copepoda. Another species (*Undina Darwini*, Lubbock), which appears to have been almost as common as *Undina vulgaris* in the 'Challenger' collections, was entirely absent from the 'Buccaneer' tow-nettings, not a trace of it being observed, though carefully sought for.

Genus Euchirella, Giesbrecht (1891).

Elenco dei Copepodi pelagici,—R. Corvetta 'Vettor Pisani.' (Atti della Reale Accademia dei Lincei, serie iv. Rendiconti, vol. v. pt. 1, p. 336.)

? Euchirella messinensis (Claus). (Pl. VI. figs. 15 & 16.)

? *Undina messinensis*, Claus, Die freilebenden Copepoden, p. 187, pl. 31.

Length, exclusive of tail-setæ, 5 mm. Body elongate, robust. Forehead subtruncate; postero-lateral angles of the last thoracic segment rounded and furnished with a number of hairs. Anterior antennæ reaching to near the extremity of the abdomen; the left 24-, the right 23-jointed, the proportional lengths of the joints nearly as in the annexed formula:—

Right antenna.	10	13	7	6	7	7	7	11	8	8	8	14	19	19	19	20	18	20	18	13	13	12	14.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24.
Left antenna.	10	13	7	6	6	7	6	8	6	7	7	8	14	15	20	19	20	18	20	17	14	13	11	14.

The 3rd, 7th, 8th, 13th, 17th, and 20th joints are each furnished with a long plain seta. The terminal joint bears three (or four ?) long setæ, two of them plumose; there is also a plumose seta on the penultimate joint, and two stout short plumose hairs spring from near the end of the basal joint. The posterior antennæ have the secondary branch

large and stout, 6-jointed, the first and last joints long, the intermediate very short. The small intermediate joints bear each one seta, and the extremity of the last joint three long plumose setæ; the primary branch is extremely short, being almost rudimentary. Mandible stout, with numerous terminal papillose teeth; the exterior angle bears a strong laterally-produced spine, which is serrate on the upper margin. The mandible palp is of moderate size, 2-branched, each branch with several long terminal plumose hairs. The maxillæ are large, and bear at the extremity and on the interior margin a number of stout setiferous spines; the external branch of the maxilla-palp very short and broad; terminal branch stout, somewhat digitiform; both branches with numerous plumose hairs. Foot-jaws as in *Euchæta Hessei*, except that near the extremity of the anterior foot-jaw are two setiferous spines much stouter than the others, and also two plain spinous setæ on the lower extreme angle of the ultimate joint. The first four pairs of swimming-feet are similar to those of *Euchæta*; the first pair resemble those of *Euchæta Hessei*, except that the inner branch has a lobe-like process near the base, and the outer branch a long slender terminal spine, finely serrate on the outer margin; the outer branches of the second, third, and fourth pairs armed with a stout terminal spine, having about twenty strong saw-like teeth on its outer margin. The basal joint of the fourth pair bears a large bifurcate spiniform appendage; the setæ on both branches of all the four pairs are densely plumose. Abdomen short, composed of four segments, the first large, being nearly as long as all the other three together. Caudal stylets short, divaricate, each with one short spine on the outer distal angle, and four moderately long terminal plumose hairs; another slender hair springs from near the inner distal angle of each stylet, and is about half the length of the others.

Habitat. Station 2, 50 fathoms, January 1st (night tow-netting). Lat. 5° 58′ N., long. 14° 20′ W., surface gathering, January 5th (night tow-netting). Lat. 3° 22′ 5″ N., long. 4° 11′ 8″ E., 20 and 30 fathoms tow-nettings, January 20th (night collections). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms tow-netting, January 22nd (day collection). Lat. 1° 29′ N., long. 7° 33′ 8″ E., surface tow-netting, January 27th (night collection). Station 23, 30 fathoms, February 5th (day collection).

Only a few specimens of this species were obtained; they were all females, and were readily distinguished by the large forked spiniform appendage on the basal joints of the fourth pair of swimming-feet. As has been pointed out by Prof. Brady, *Undina messinensis*, Claus, differs from *Undina*, Dana, by the absence of the first pair of foot-jaws in the male (as described by Dr. Claus), and by the inner branches of the first and second swimming-feet being only 1-jointed (Claus, however describes the inner branch of the second pair as 2-jointed, but in the 'Buccaneer' specimens it was certainly only 1-jointed). In *Undina*, Dana, on the other hand, the inner branches of all the swimming-feet are 3-jointed. *Undina messinensis* has the fifth pair of feet in the male similar to those of *Euchæta pulchra*, Lubbock (to which it has been doubtfully referred), but differs from that and all other *Euchætæ* known to me by the very rudimentary form of the primary branch of the posterior antennæ.

Genus Scolecithrix, Brady.

Scolecithrix, Brady, Report 'Challenger' Copepoda (1883).

Scolecithrix securifrons, n. sp. (Pl. IV. figs. 40–56; Pl. V. fig. 1.)

Length, exclusive of tail-setæ, about 4 mm. Cephalothorax robust, the anterior segment fully two-thirds the length of the body. Forehead with a prominent median keel, which is continued downwards to the slightly furcate rostrum. Anterior antennæ longer than the body, 23-jointed in the female, 19-jointed in the male. The annexed formula shows very nearly the proportional lengths of the joints:—

Male.	10	11	5	6	6	7	6	41	22	13	13	14	13	10	9	13	13	12	3			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23.
Female.	13	12	6	6	7	7	7	21	9	11	14	15	15	15	14	14	14	13	13	13	14	12	3.

The long eighth joint has one or two pseudo-divisions, indicating the possible coalescence of two, if not three, smaller joints. The secondary branch of the posterior antennæ is half as long again as the primary one, 5-jointed, the third and fourth joints small, the last joint with three terminal setæ; several setæ spring from the vicinity of the two small joints; the primary branch is furnished with a number of terminal setæ, which, with the others, are all more or less plumose. Mandible-palp with two small branches set wide apart, and each with numerous plumose hairs. Maxillæ and other mouth-organs as in *Scolecithrix Danæ*. First pair of swimming-feet small, inner branch 1-jointed, with a lobe-like appendage, terminal spine of the outer branch small. All the joints of the second and third pairs are armed with transverse curved rows of short stout spinules, and the terminal sabre-like spines of the outer branches have their exterior margin strongly and coarsely toothed. The fourth pair wants the transverse rows of spinules, but is otherwise similar to the second and third pairs. The fifth pair in the female is very small, 1-branched, 2-jointed, and with a moderately long slender, curved, terminal spine, the distal half serrate on the outer margin; a small blunt process springs from the inner distal angle of the terminal joint, close to the base of the elongate spine; this spine was apparently hinged to the extremity of the last joint, for in one or two specimens it was turned upward at a right angle to the joint, and in such a manner as to allow of its being applied to the base of the first abdominal segment. The fifth feet in the male are strongly developed; the left foot is 1-branched, 3-jointed, with a curved finger-like process at the extremity; the right has a slender 1-jointed inner branch, curved outwards so as to be opposed to the 2-jointed clawed terminal part of the outer branch; the basal part to which the two branches are attached is much dilated. Abdomen in the female short, first segment larger and much wider posteriorly than the next; the posterior margin of the abdominal segments in both sexes fringed with hairs. Caudal stylets short, divergent, each with four long terminal plumose setæ nearly equal in length, and a small hair near the base of the inner seta.

Habitat. Station 2, 50 fathoms tow-netting, January 1st (night collection). Lat. 7°33′N., long. 15° 18′ W., 25 fathoms tow-netting, January 2nd (night collection). Lat. 1° 55′ 5″ N., long. 55° 55′ 5″ E., 360 fathoms tow-netting, January 22nd (day collection). Lat. 0° 25′ 1″ N.,

long. 6° 35′ 2″ E., 10 fathoms tow-netting, January 23rd (night collection). Station 23, 185 fathoms tow-netting, February 5th (day collection).

Not more than one, or at most two, specimens of this *Scolecithrix* were obtained in each of the tow-nettings from the localities here recorded. The prominent keeled forehead, which gives this species such a marked character, enables it to be readily distinguished.

Scolecithrix ctenopus, Giesbrecht. (Pl. V. figs. 2–9.)

1892. *Scolecithrix ctenopus*, Giesbrecht, Fauna und Flora des Golfes von Neapel (Copepoden), p. 285, pls. 13, 37.

Male. Length, exclusive of tail-setæ, 1·83 mm. The cephalothorax elongate, rounded in front and behind. Anterior antennæ slender, reaching to the extremity of the abdomen, the left 21-, the right 20-jointed. The proportional lengths of the joints of the left antenna are nearly as follows :—

16	16	3	3	3	4	4	16	5	5	6	6	6	5	6	5	6	6	6	3
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

The sixteenth joint of the right antenna consists of two coalescent joints, but otherwise the right and left antennæ are similar ; posterior antennæ and mouth-organs as in *Scolecithrix Danæ*. The inner branch of the third pair of swimming-feet small, the terminal spine of the outer branch somewhat distorted, its outer margin being furnished with irregular but stout and prominent teeth. The fifth pair of feet has one very short 3-jointed, and one very long, slender, 4-jointed branch, which extends beyond the extremity of the abdomen ; the last segment of the elongate branch is curved, furnished on one side with a dense fringe of hairs, and terminates in two unequal spines ; the small 3-jointed branch is about as long as the first segment of the long branch, the basal joint being longer than the other two together. Abdomen 4-jointed ; joints subequal, fully one-fifth the length of the cephalothorax. Caudal stylets short, not divergent, bearing at the extremity four moderately long plumose hairs, the inner being shorter, and the next one considerably longer than the others ; the arrangement of the tail-setæ in this species resembles *Undina* more than *Scolecithrix*.

Habitat. Station 2, 50 fathoms tow-netting, January 1st (night collection). Station 9, 50 fathoms tow-netting, January 10th (day collection). Lat. 3° 58′ N., long. 3° 42′ W., 25 fathoms tow-netting, January 13th (day collection). Lat. 3° 55′ 3″ N., long. 4° 7′ 3″ E., 20 fathoms tow-netting, January 20th (day collection). Lat. 0° 21′ 1″ N., long. 7° 33′ E., 20 fathoms tow-netting, January 29th (day collection).

Scotecithrix ctenopus was comparatively a rare species in the ‘ Buccaneer ’ collection, having been observed in only a few of the tow-nettings. The most marked characteristic of this *Scolecithrix* is the extremely long branch of the fifth foot, having the last segment curved, and with the margin densely setiferous.

Scolecithrix tenuipes*, n. sp. (Pl. V. figs. 10–19.)

Male. Length, exclusive of tail-setæ, 1·4 mm. Anterior antennæ reaching to beyond

* From the long slender fifth foot.

the extremity of the abdomen, the left 21-, the right 20-jointed. The following are the proportional lengths of the joints, nearly, of the left antenna :—

5	4	3	3	3	3	3	13	4	4	5	5	5	6	5	5	5	6	5	5	3
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

The sixteenth joint of the right antenna consists of two coalescent joints, but otherwise both right and left antennæ are similar. The posterior antennæ, mouth-organs, and first pair of swimming-feet are somewhat similar to those of *Scolecithrix Danæ*. The outer branch of the third pair has a distorted terminal spine, as in *Scolecithrix ctenopus*. The segments of all the first four pairs of swimming-feet are armed with curved, transverse rows of short, stout spinules. The fifth pair of feet consists of one very long, slender branch, and an extremely short, almost obsolete, 3-jointed one. The elongate branch has the basal joint somewhat stout and short, the second long, fully twice the length of the third; the fourth long and slender, longer than the second; the last joint is extremely small, with a spiniform extremity. Abdomen, caudal stylets, and tail-setæ as in *Scolecithrix ctenopus*, which appears to be closely allied to the species now described. The fifth pair of feet are, however, decidedly different from those of *Scolecithrix ctenopus*, being much more slender and without the fringe of hairs. The terminal worm-like sense-organs of the anterior foot-jaws are stouter than those of *Scolecithrix ctenopus*, though that species is the larger of the two.

Habitat. Station 2, 50 fathoms tow-netting, January 1st (night collection). Station 9, 50 fathoms tow-netting, January 10th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 30 and 360 fathoms tow-nettings, January 22nd (day collection).

Scolecithrix tenuipes was not obtained from any surface gathering, and was of rare occurrence in the few tow-nettings in which it was observed.

Scolecithrix Danæ (Lubbock).

1856. *Undina Danæ*, Lubbock, Trans. Entom. Soc. vol. iv. p. 15, pl. ix. figs. 6–9.
1883. *Scolecithrix Danæ*, Brady, Report 'Chall.' Copep. p. 57, pl. xvii. figs. 1–12.

Habitat. Station 2, surface tow-netting, January 1st (night collection). Station 9, 25 fathoms tow-netting, January 10th (day collection). Station 11, 10 fathoms tow-netting, January 19th (day collection). Stations 21 and 22, surface tow-nettings, February 4th (day collection). Lat. 5° 55′ 1″ S., long. 11° 30′ 7″ E., surface tow-netting, February 18th (night collection).

Scolecithrix Danæ was observed in 57 tow-nettings, 20 of which were surface gatherings, and the others under-surface; 10 of the surface and 24 of the under-surface were day collections, while 10 of the surface and 13 of the under-surface gatherings were collected during the night, as shown by the formula :—

Tow-nettings 57 { 20 surface { 10 day collections. / 10 night ditto. } / 37 under-surface { 24 day ditto. / 13 night ditto. }

The under-surface tow-nettings ranged from 5 to 260 fathoms. This species was more or less common in nearly all the tow-nettings in which it was observed.

Scolecithrix minor, Brady.

1883. *Scolecithrix minor*, Brady, op. cit. p. 58, pl. xvi. figs. 15–16; pl. xviii. figs. 1–5.

Habitat. Station 3, surface tow-netting, January 2nd (day collection). Lat. 3° 55′ 3″ N., long. 4° 11′ 8″ E., 50 fathoms tow-netting, January 20th (day collection). Station 14, 10 fathoms, January 21st (night collection). Lat. 0° 21′ 1″ N., long 7° 33′ E., 20 fathoms, January 29th (day collection). Station 23, 235 fathoms, February 5th (day tow-netting). Station 24 (off the mouth of the Congo, colour of the water brownish-olive green to amber-brown), surface, February 6th (day collection).

This *Scolecithrix* was a somewhat rare species in the 'Buccaneer' tow-nettings; males especially were very scarce, and were observed only in a 30-fathoms tow-netting from lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E. The ultimate joint of the longer branch of the male fifth foot and the appendage of the same branch were not so long as shown in the figure in the 'Challenger' Report, but otherwise the 'Buccaneer' specimens agreed with the description and drawings of *Scolecithrix minor* (loc. cit.). I have examined many specimens, mature and immature, of *Scolecithrix Danæ*, and have certainly not found the fifth pair of feet in any of them to agree in structure with those of *Scolecithrix minor*; hence I feel satisfied that the two are quite distinct from each other.

Scolecithrix longicornis, n. sp. (Pl. V. figs. 20–28.)

Female. Length, not including tail-setæ, 1·54 mm. The first body-segment is more than twice the entire length of the other three; the forehead is rounded. Anterior antennæ slender, reaching to the extremity of the abdomen, 23-jointed, and furnished with a number of very small setæ (with the exception of the last joints, which bear longer setæ) (fig. 21); the proportional lengths of the joints nearly as in the formula:—

6	4	3	3	3	3	3	7	2	3	4	4	5	6	5	6	6	6	6	6	5	4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

The anterior foot-jaws terminate in four lobes with several plumose setæ at their extremity, while one lobe forms the base of a fascicle of slender sensory filaments; a single filament also springs from the end of the lowest of the four setiferous lobes. Posterior foot-jaws small, the first two joints long, the third very short, the fourth equal to the entire length of the last three. Other mouth-organs similar to *Scolecithrix Danæ*. The first four pairs of swimming-feet similar to those of *Scolecithrix securifrons*. Fifth pair small, 3-jointed, the middle joint rather longer than either of the other two, and bearing several small spiniform setæ at its exterior distal angle; the extremity of the last joint is produced forward into a triangular sharp-pointed process, while an elongate spine, serrate on the outer margin, springs from the inner distal angle (fig. 27). Abdomen short, stout, composed of four segments, the first segment large, the other three very

short. Caudal stylets short, the length and breadth equal; each stylet bears four long plumose terminal setæ, and one small seta on the inner distal angle.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms (day collection). Station 23, 135 fathoms, February 5th (day collection).

This *Scolecithrix* was obtained in only two tow-nettings from comparatively deep water.

Scolecithrix Bradyi, Giesbrecht. (Pl. V. figs. 29–39.)

1892. *Scolecithrix Bradyi*, Giesbrecht, op. cit. p. 283, pls. 4, 13, 37.

Length about 1·8 mm. In form like that of *Scolecithrix Danæ*. Anterior antennæ in the male as long as the cephalothorax, 19-jointed; in the female 23-jointed and about one-fourth longer than those of the male. The proportional lengths of the joints are nearly as in the annexed formula:—

Male.	4	4	2	2	2	2	2	12	3	4	5	5	5	5	4	4	5	6	7.			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23.
Female.	5	5	3	3	3	3	3	7½	3	4	5	5	5	6	6	6	6	5	5	5	6	5	3.

The basal joints bear a number of setæ, but the others are very sparingly setiferous; posterior antennæ and mouth-organs as in *Scolecithrix Danæ*, but the larger branch of the mandible-palp bears a number of very long slender setæ. The first four pairs of swimming-feet are similar to those of *Scolecithrix securifrons*; the terminal spines of the outer branches are finely but somewhat unequally serrate on the outer margin and ciliated on the inner. Fifth pair wanting in the female, 1-branched in the male; basal joints dilated; the third joint of the (?) right foot elongate, with a short digit-like process on the inner margin near the distal end, the last joint divided to near the base into two subequal segments, the inner of which is curved upward so as to form a hook-like appendage. The (?) left foot 5-jointed and longer than the other; the second joint is the longest, being nearly as long as all the following three together, and bearing at its inner distal angle an appendage which is fully as long as the third joint. Abdomen and caudal stylets in both sexes as in *Scolecithrix Danæ*.

Scolecithrix Bradyi resembles *Scolecithrix Danæ* very nearly in its general form, but is much smaller; it differs in possessing extremely long hairs on the larger branch of the mandible-palp, and especially in the form of the fifth pair of feet.

Habitat. Station 2, 25 fathoms tow-netting, January 1st (night collection). Station 9, 50 fathoms tow-netting, January 10th (day collection). Off São Thomé Island (lat. 0° 34′ N., long. 6° 30′ 4″ E.), 20 fathoms tow-netting, January 23rd (day collection). Station 23, 135 fathoms tow-netting, February 5th (day collection).

Scolecithrix affinis was obtained in thirteen of the tow-nettings, one only of which was a surface (night) gathering, the other twelve being under-surface, the depth of which ranged from 5 to 360 fathoms, and of which three were collected during the day and nine during the night, as in the formula:—

Tow-nettings 13 { 1 surface { 0 day collection. / 1 night ditto. / 12 under-surface { 3 day collections. / 9 night ditto.

Scolecithrix latipes, n. sp. (Pl. III. figs. 21–23; Pl. V. figs. 40–43.)

Female. Length 3·2 mm. (1-8th of an inch). Body stout. Abdomen short, 4-jointed Forehead with a median keel extending round the front to the bifid rostrum. Anterior antennæ rather longer than the thorax, 23-jointed, sparingly setiferous (fig. 58). The proportional lengths of the joints are as shown in the formula:—

35	5	5	5	5	5	11	5	5	6	8	8	8	8	9	9	6	8	8	6	9	10	7
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

The posterior antennæ, mouth-organs, and swimming-feet are somewhat as in *Scolecithrix Danæ*, but the anterior foot-jaws are strongly gibbous on the underside (Pl. V. fig. 42). The fifth pair of feet are simple, considerably dilated, especially towards the end, and are each furnished with three spines on the broadly-rounded apex; the inner spine, which is longer than the others, is finely serrate on the outer margin, the others are plain (Pl. III. fig. 22). Caudal stylets short, slightly divergent, and furnished with four long, plumose, terminal setæ.

This form, of which only one or two specimens (females) were obtained, occurred in a gathering from 85 fathoms, collected February 5th at Station 23 (lat. 4° 26′ 7″ S., long. 10° 1′ 8″ E.).

Scolecithrix latipes was readily distinguished from the other species of *Scolecithrix* by the peculiar form of the fifth pair of feet, which are broad and leaf-like.

Scolecithrix major, n. sp. (Pl. III. figs. 24–26; Pl. V. figs. 44, 45.)

Female. Length 3 mm. (1-8th of an inch). Body elongate. The anterior foot-jaws are stout and the marginal lobes are furnished with long, spiniform, plumose, terminal setæ; all the sensory filaments are large with the exception of two, which are smaller and provided with elongate acutely-pointed heads. The terminal spines of the swimming-feet, especially those of the third and fourth pairs, are coarsely toothed on the outer margin; there are sixteen or seventeen large teeth along the margin. Fifth pair small, simple, 2-jointed; the last joint is about three times the length of the other, and armed with one moderately long terminal and one small subterminal spine, while a long spiniform seta springs from near the middle of the inner margin. Abdomen long, composed of four segments, the first three nearly equal, the last much shorter. Caudal stylets short, about as long as the last abdominal segment; apical setæ four, plumose.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms (day collection, January 22nd).

The form of the animal, the armature of the anterior foot-jaws, and the coarsely-toothed terminal spines of the swimming-feet are characters which distinguish this from other species of *Scolecithrix*. A considerable portion of the anterior antennæ was wanting in the only specimen obtained.

Scolecithrix tumida, n. sp.* (Pl. III. figs. 33–38.)

? *Scolecithrix abyssalis*, Giesbrecht, op. cit. p. 284, pl. 13. figs. 15, 40, pl. 37. fig. 7.

Female. Length 2·1 mm. Body somewhat robust; forehead obtuse, with a small

* This is probably the *Scolecithrix abyssalis* of Giesbrecht; but, as there appear to be some differences between his

rostrum; postero-lateral angles of last thoracic segment rounded. Anterior antennæ long, reaching to near the extremity of the abdomen, 21-jointed and sparingly setiferous. The annexed formula shows the proportional lengths of the joints :—

12	3	3	3	3	3	8	3	3	4	6	6	7	7	8	7	7	7	6	8	11
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Anterior foot-jaws stout; four of the marginal lobes are each armed with a long setiferous spine and two setæ; a number of slender sensory filaments spring from the end of the anterior foot-jaws as in other species of *Scolecithrix*. The terminal spines of the swimming-feet are finely toothed on the outer margin; the arrangement of the marginal teeth of the terminal spines of the third and fourth pairs differs from those of the second, as shown in figure 36. The fifth pair are small, somewhat dilated, and 1-jointed, armed with one terminal spine, a stout and prominent spine on the inner margin, and a small tooth on the outer margin (fig. 37). Abdomen short, stout, the last segment small. Caudal stylets short, the breadth about equal to the length, and furnished with one subterminal and three apical setæ.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms (January 22nd, day collection). Station 23, 85, and 235 fathoms (February 5th, day collection).

Scolecithrix tumida is a rare species in the 'Buccaneer' collections; its robust form, the spinous armature of the anterior foot-jaws, and the dilated fifth pair of feet are characters that readily distinguish it from other species of *Scolecithrix*.

Scolecithrix dubia, Giesbrecht. (Pl. III. figs. 27–32)

1892. *Scolecithrix dubia,* Giesbrecht, op. cit. p. 284, pl. 13. fig. 29 *a*.

1892. *Scolecithrix simulans,* Scott (MS. name).

?*Male.* Length 1·6 mm. Body robust; abdomen of moderate length, 3-jointed, the middle segment rather shorter than the first or last. Anterior antennæ reaching to about the end of the second abdominal segment, sparingly setiferous, composed of twenty joints, the eighth equal to the entire length of the preceding four, the last two elongate, slender. The formula shows the proportional lengths of the different joints :—

5	5	3	3	3	3	3	12	3	5	6	7	7	7	7	5	5	4	8	9
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The articulation between the sixteenth and seventeenth joints of the right antenna is imperfect and somewhat indistinct. The posterior antennæ, mouth-appendages, and first four pairs of swimming-feet nearly as in *Scolecithrix Danæ*, except that the marginal lobes, especially the one nearest the apex, of the anterior foot-jaws bear elongate curved spines with ciliate inner margins; the apex, as in *Scolecithrix Danæ,* bears a number of hair-like filaments (fig. 29). The terminal spines of the swimming-feet are finely serrate on the outer and ciliate on the inner margins. The fifth pair are unequal; the (?) left consists of three joints; the basal part of the elongate middle joint is considerably swollen and bears a (?) spiniform appendage on its inner aspect; the inner angle at the distal end

description and figures and the description and figures given in this Report, I leave the 'Buccaneer' species as originally described.

forms a produced lobe-like process; the last joint small, curved inward, and bearing a minute bent terminal spine. The (?) right foot is longer than the other and 5-jointed; the first joint is about twice the length of the first joint of the (?) left foot, but the first and second joints of the (?) right are together scarcely equal to the length of the same joints of the other foot; an elongate appendage—? as long as the third joint—springs from the end of the second joint; the third and fourth joints, which are subequal in length, are more slender than the preceding joint, and are together nearly equal in length to the first; the fifth, which is scarcely so long as the fourth and appears to be connected with it by a hinged articulation, is ciliate on the inner edge.

Habitat. Lat. 4° 26′ 7″ S., long. 10° 1′ 8″ E., in a tow-net gathering from 235 fathoms collected between 11 A.M. and 3.30 P.M. February 5th.

This *Scolecithrix* somewhat resembles *Amallophora* in the form of the feet of the fifth pair, but differs in the number and proportional length of the joints. It also differs from any other *Scolecithrix* described in this Report in the proportional length of the joints of the anterior antennæ, the form of the anterior foot-jaws, and the fifth pair of feet.

Subgenus Amallophora *.

(Subgenus of *Scolecithrix*, Brady.)

Anterior antennæ 20- to 23-jointed. Mouth-organs and swimming-feet nearly as in *Scolecithrix*, except that the anterior foot-jaws are furnished with one or more appendages, each consisting of a bundle of filaments resembling a sheaf of corn in miniature. Fifth pair of feet in the male dissimilar, 1- or 2-branched, prehensile; in the female simple, 1-branched.

Amallophora typica, n. sp. (Pl. III. figs. 39–46; Pl. VI. figs. 1–4.)

Length 2·7 mm. (about 1-9th of an inch). Body elongate, moderately stout; forehead rounded. Anterior antennæ rather longer than the body, 20-jointed, and sparingly setiferous. The formula shows approximately the proportional lengths of the joints :—

15	18	10	10	10	10	10	17	64	21	25	26	26	22	14	15	14	16	14	10
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The first seven joints bear short club-shaped appendages. Primary branch of the posterior antennæ short, secondary branch moderately long, the intermediate three very short (fig. 41). Mandible small, with a large 2-branched palp, one of the branches 2-, the other 4-jointed (fig. 42). Anterior foot-jaws stout, short, 4-jointed, first joint long, the second provided with an appendage bearing a large rounded cluster of curled filaments, and somewhat resembling a sheaf of corn in miniature; third and fourth joints small and armed with a large spiniform and several small plumose setæ (fig. 44). Posterior foot-jaws slender and elongate, 6-jointed, the first, second, and fourth joints long, the others very short and bearing a few setæ. The first four pairs of swimming-feet as in *Scolecithrix*; the terminal spines are strongly serrate on the outer edge, those of the third

* Ἁμαλλα, a bundle or sheaf, and φέρειν, to carry.

pair considerably narrowed at the base. The fifth pair is simple, consisting of one short 3-jointed branch, which terminates in a small spine, and one very long and slender branch, composed of four nearly equal parts, and bearing a ciliate digitiform process and a number of short setæ at the apex. Abdomen short, the first segment rather narrower than the next; the last is very small. The caudal stylets are also very short and somewhat divergent (Pl. IV. fig. 4).

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., in a tow-net gathering from 35 fathoms, collected January 22nd. Only one specimen of this curious form was obtained.

Amallophora magna, n. sp. (Pl. IV. figs. 5–9.)

Female. Length about 4·5 mm. (2-11ths of an inch). Body robust, attenuated towards the front, the first segment equal to the entire length of the other body-segments and abdomen; head produced into a distinct though small median keel, which passes round over the forehead (fig. 31). The postero-lateral angles of the last thoracic segment are produced ventrally into a small tooth. Anterior foot-jaws small; four of the marginal lobes are furnished with long terminal plumose setæ, while the other forms the base of a long setose spine; several small sensory filaments, some of which have rounded heads, spring from the extremity of the foot-jaw, as shown in fig. 6. The other mouth-organs and swimming-feet are similar to those in *Scolecithrix Danæ*, except that the large terminal spines of the swimming-feet are strongly toothed on the outer margin. The fifth pair are very small, simple, 2-jointed; the second joint is nearly twice the length of the other and provided with one terminal and two submarginal setæ; the terminal and one of the submarginal setæ are long and slender, the other is very short (fig. 9). Abdomen short.

Habitat. Off São Thomé Island, 20 fathoms, January 23rd (day collection).

One specimen only of this curious form was obtained; it wanted a considerable portion of the anterior antennæ and part of the abdomen, but, though thus mutilated, the peculiar structure of the anterior foot-jaws and the large, strongly-toothed, terminal spines of the swimming-feet, together with the large size of the animal, readily distinguish this from allied species. No males were observed.

Amallophora dubia, n. sp. (Pl. IV. figs. 10–18.)

Male. Length 2·5 mm. (1-10th of an inch). In this species the first cephalothoracic segment is nearly equal to the entire length of the other three body-segments and the abdomen. Anterior antennæ about as long as the cephalothorax; the right antenna is 18-, the left 23-jointed; in the right antenna, which is indistinctly geniculate at the proximal half (fig. 11), the seventh joint is composed of five and the fifteenth of two coalesced joints; the first thirteen joints of the left antenna and the corresponding joints of the right have a row of elongate setæ along the upper margin, each of which is furnished with a membrane-like unilateral expansion or fringe as shown in the figure, but the remaining portion of the antennæ is only sparingly setiferous. The annexed formula shows the proportional lengths of the right and left antennæ:—

Right antenna.	12	4	4	4	4	4	18	5	5	7	12	12	11	10	12	5	8	9.					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18.					
Left antenna.	12	4	4	4	4	4	4	4	4	4	4	5	5	7	13	13	13	12	6	6	5	10	10.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23.

The mouth-organs are as in *Scolecithrix*, except that the anterior foot-jaws are each provided with two peculiar appendages, consisting of a moderately stout filament bearing an oblong conical head, which appears to be composed of dense fibre-like tissue (fig. 13). The posterior foot-jaws are furnished at the extremity with a few hair-like papilliferous filaments (fig. 14). The swimming-feet are as in *Scolecithrix*, but the first four pairs differ in the form and amount of their armature (figs. 15, 16). The fifth pair has the second joint of the left foot elongate; the basal part of the joint is greatly dilated, and is furnished interiorly with a spiniform appendage which terminates in a small apical seta; the third and fourth joints are small and slender; both branches of the right foot are 2-jointed and furnished with small digitiform terminal processes (fig. 17). The abdomen is composed of four segments, the first being rather shorter than the others. Caudal stylets short, each bearing four moderately long, plumose, terminal hairs (fig. 18).

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5′ E. In two gatherings, one from 360 fathoms and one from 460 fathoms. Collected during the middle of the day, January 22nd.

Variety *similis*. (Pl. IV. figs. 19–23.)

This is a form which occurred along with the other in the gathering from 460 fathoms, and which, though closely resembling it, yet differs in a few points. It resembles *Amallophora dubia*, especially in the form of the fifth pair of feet, but differs considerably in the proportional length of the joints of the anterior antennæ and of the segments of the abdomen, as will be observed by comparing the figures of the variety with those of the species.

Amallophora robusta, n. sp. (Pl. IV. figs. 24–29.)

Female. Length 3 mm. (1-8th of an inch). The body is robust, with a rounded forehead and a small rostrum. The anterior foot-jaws are provided with a number of terminal filaments, the majority of which are comparatively short and possess ovate conical heads, while three of them are stout and moderately long and resemble those in *Scolecithrix* (fig. 25). Posterior foot-jaws as in *Scolecithrix*, except that the first joint in each is furnished with a short and stout filament having an ovate pointed head like the smaller filaments of the anterior foot-jaws. The swimming-feet are similar to those of *Amallophora magna*, but the terminal spines are long, and finely serrate on the outer edge, and plain on the inner edge. The fifth feet are small, simple, and 2-jointed; a large setose spine springs from the inner margin, and a small spiniform seta from the outer margin, of the last joint; while a plain spine, smaller than that on the inner margin, springs from the inner part of the rounded apex, as shown in the figure (fig. 28). Abdomen comparatively small, 4-jointed, the segments subequal. Caudal stylets about half the length of the last abdominal segment, and furnished with four apical plumose setæ.

Habitat. Station 23 (Lat. 4° 26′ 7″ S., long. 10° 1′ 8″ E.), in a gathering from 85 fathoms. Collected about midday, February 5th.

One or two specimens only of this species were obtained. The armature of the anterior and posterior foot-jaws, the long and finely serrate terminal spines of the swimming-feet, and the form and armature of the fifth pair are characters by which this may be distinguished from other allied species.

Genus Euchæta, Philippi.

Euchæta, Philippi, Archiv f. Naturgesch. 1843; Dana, Proc. Amer. Acad. Sci. 1849; Claus, Die freilebenden Copepoden, 1863; Brady, Report Chall. Copep. 1883.

Euchæta marina (Prestandrea, 1833).

1843. *Euchæta Prestandreæ*, Philippi, Archiv. f. Naturgesch. Taf. iv. fig. 5.
1863. *Euchæta Prestandreæ*, Claus, Die freilebenden Copepoden, p. 183, pl. v. fig. 12 *a*, pl. ix. figs. 6, 7, 9, 12, pl. xxx. figs. 8–17.
1883. *Euchæta Prestandreæ*, Brady, Report Chall. Copep. p. 60, pl. xviii. figs. 7–15, and pl. xix.
1892. *Euchæta marina*, Giesbrecht, Fauna und Flora des Golfes von Neapel (Copepoden), p. 262, pls. 1, 15, 16, 37.

Habitat. Stations 2, 3, 9, 11, 14, 21, 24, and others; also Lagoon, São Thomé Island, surface tow-nettings.

Euchæta marina was one of the commoner species observed in the collection. It occurred in 106 tow-nettings, 47 of which were surface-gatherings and 59 under-surface, ranging from 2 to 460 fathoms. 16 of the surface and 41 of the under-surface tow-nettings were collected during the day, and 31 of the surface and 18 of the under-surface during the night, as represented in the formula:—

Tow-nettings 106 { 47 surface { 16 day collections. / 31 night ditto. } / 59 under-surface { 41 day ditto. / 18 night ditto. }

A greater number of *Euchæta marina* carried ova than any other species of Calanidæ in the 'Buccaneer' collection. The clusters of ova somewhat resembled miniature bunches of grapes.

Euchæta pulchra (Lubbock).

1856. *Undina pulchra*, Lubbock, Trans. Entom. Soc. iv. p. 14, pl. iv. figs. 5–8, pl. vii. fig. 6.
1883. *Euchæta pulchra*, Brady, Report Chall. Copep. p. 63, pl. xiv. figs. 6–9, pl. xx. figs. 14–19.

Habitat. Lat. 7° 33′ N., long. 15° 18′ W., 25 fathoms tow-netting, January 2nd (night collection). Lat. 2° 34′ 9″ N., long. 5° 22′ 2″ E., 20 fathoms, January 21st (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35 fathoms, January 22nd (day collection). Lat. 0° 25′ 1″ N., long. 6° 36′ 6″ E., 10 fathoms, January 24th (night collection). These are the only tow-nettings in which this *Euchæta* was observed, and a few specimens only were obtained.

Euchæta australis, Brady. (Pl. VI. fig. 23.)

1883. *Euchæta australis*, Brady, Report Chall. Copep. p. 65, pl. xxi. figs. 5–11.

A single specimen of this species (a male) was obtained in a tow-net gathering from 50 fathoms at Station 2 (lat. 7° 54′ N., long. 17° 25′ W.). Collected between 7.20 and 8.20 p.m., January 1st. I have nothing to add to the description of this apparently rare species contained in the Report on the Copepoda of the 'Challenger' Expedition. The species, after being dissected, was easily recognized by the description and figures of it in that Report.

Euchæta gigas, Brady.

1883. *Euchæta gigas*, Brady, loc. cit. p. 65, pl. xxii. figs. 1–5.

This *Euchæta* was obtained in a tow-net gathering from a depth of 35 fathoms in lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E. Collected during the day, January 22nd. Two or at most three specimens (females) were obtained.

Euchæta barbata, Brady. (Pl. VI. fig. 17.)

1883. *Euchæta barbata*, Brady, loc. cit. p. 66, pl. xxii. figs. 6–12.

This *Euchæta* was obtained in three different tow-net gatherings, in one from 50 fathoms at Station 2, January 1st, in one from 360 fathoms in lat. 1° 55″ 5′ N., long. 5° 55′ 5″ E., January 22nd, and in one from 30 fathoms, at Station 23, February 4th.

This remarkable species is readily distinguished from other *Euchætæ* by the tufts of setæ on the last abdominal segment, by the first abdominal segment being greatly dilated ventrally, and by the tufts of setæ on the posterior angles of the last thoracic segment. Very few specimens (females) were obtained.

Euchæta (?) Hessei, Brady, var. similis, nov. var. (Pl. VI. figs. 24 & 25.)

1883. *Euchæta Hessei*, Brady, loc. cit. p. 63, pl. xx. figs. 1–13, pl. xxiii. figs. 11–14.

Male. Length 2·2 mm. (1-12th of an inch). Body elongate, rounded in front; the postero-lateral angles of the last thoracic segment are produced in aculeate spines, as shown in fig. 1. Anterior antennæ as long as the thorax, 21-jointed, geniculate at the twelfth joint; the eighth and twelfth joints are composed of two or three coalesced joints and are indistinctly articulated; the basal joints are furnished with leaf-like appendages, and a club-shaped filament springs from the end of the last joint. The annexed formula shows the proportional lengths of the joints:—

10	3	3	3	3	3	3	8	3	3	4	4	5	6	6	6	9	14	8	8	8
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Posterior antennæ and mouth-organs similar to those of *Euchæta marina*, but the anterior foot-jaws, though small, are somewhat stout, as shown in fig. 4. Swimming-feet also as in that species, except that the terminal spines of the swimming-feet are more coarsely serrate—especially those of the third and fourth pairs, the serrations of which number about eighteen; the secondary spines of the second pair are longer than

in the other swimming-feet. The fifth pair (fig. 25) closely resemble those of *Euchæta Hessei* as figured in the 'Challenger' Copepoda. Abdomen composed of four nearly equal segments. Caudal stylets very short, furnished with four long plumose hairs.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms (day collection, January 22nd).

This comes very near *Euchæta Hessei*,* and is possibly a form of that species. It differs in the following points :—It wants the prominent rostrum of *Euchæta Hessei*; the posterior margin of the last thoracic segment bears on each side a small but distinct aculeate spine; it possesses small but stout anterior foot-jaws; the inner edge of the terminal spines of the swimming-feet is densely ciliate. The right foot of the fifth pair has no secondary appendage and terminates in a spiniform process; the left foot has a very short inner appendage, and the last joint, which is elongate, is geniculate near the middle.

No females were observed.

EUCHÆTA HEBES, Giesbrecht. (Pl. VI. figs. 18 & 19.)

1892. *Euchæta hebes*, Giesbrecht, op. cit. p. 263, pls. 15, 16, 37.

Male. Length 2·7 mm. (1-9th of an inch). Body elongate, rostrum small. Anterior antennæ not longer than the thorax, 22-jointed; the second joint bears a number of small club-shaped appendages; the upper margin of the eighth joint is produced near the distal end into a small digitiform setiferous lobe; the proportional lengths of the joints is shown in the annexed formula :—

6	5	3	3	3	4	4	9	4	4	6	6	6	7	7	8	9	8	8	9	8	11
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Posterior antennæ robust, the primary branch considerably shorter than the secondary. Mouth-organs as in *Euchæta marina*, except that the posterior foot-jaws are comparatively short and stout. Swimming-feet nearly as in *Euchæta marina*; the fifth pair are unequal in length; the left is 2-branched, the outer branch 3-jointed, the last joint being long and slender, with a bluntly rounded extremity, the inner branch is 1-jointed and as long as the first two joints of the outer branch; the right foot, which has a small rudimentary inner branch, is shorter than the other and terminates in three processes; one of these processes is stout, curved, and spiniform; the second is oblong-ovate, somewhat truncate at the apex, and bears a dense fringe of cilia on the distal end of the inner margin; the third is a strong, somewhat hook-like appendage, serrate on the inner edge. The whole forms a complicate apparatus with which the left foot probably interlocks. Abdomen elongate, of four nearly equal segments, the posterior margins of which are serrate. Caudal stylets very short, nearly obsolete, and furnished with four plumose setæ—the third from the outside being considerably longer than the others.

Habitat. Station 2, 50 fathoms (night collection, January 1st). Station 9, 50 fathoms (day collection, January 10th).

* This reference is to the description and drawings of *Euchæta Hessei* in the 'Challenger' Copepoda, as no *Euchæta* agreeing with these was obtained in the 'Buccaneer' collections.

This species is closely allied to *Euchæta marina*, but differs in several important points and especially in the character of the fifth feet; it also wants the prominent bifid rostrum of that species. No females were observed.

Euchæta hebes, var. valida. (Pl. VI. figs. 20–22.)

A form, which may be only a variety of *Euchæta hebes*, occurred along with that species in a tow-net gathering from 50 fathoms at Station 2 (lat. 7° 54′ N., long. 17° 25′ W.). But while resembling *Euchæta hebes* in general form and in the form of the fifth feet, it differs in some of its structural details as well as by its much greater size. The following is a description of some of its more obvious differences:—

Length (male) 5·7 mm., of which the body forms two-thirds and the abdomen one-third. Anterior antennæ reaching somewhat beyond the last thoracic segment, 22-jointed, sparingly setiferous; the eighth joint, which is longer than the preceding two together, and the seventeenth, eighteenth, and last are subequal, and are the longest joints of the antennæ. The proportional lengths of the joints are nearly as shown in the formula:—

12	12	5	6	7	8	9	19	6	8	11	10	13	14	15	16	19	19	16	16	15	19
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Between each of the large marginal teeth of the proximal half of the terminal spines of the second, third, and fourth swimming-feet there is a very small tooth; it can only be satisfactorily distinguished by using a moderately high magnification (fig. 21). The second joint of the (?) right foot of the fifth pair is moderately short and considerably swollen, and bears interiorly at its distal end an appendage, the length of which is rather greater than the elongate third joint; the fourth joint is very slender and as long as the third, and terminates in a blunt-pointed extremity. The (?) left foot is 4-jointed, the first joint is short, the second and third elongate; the last, which is comparatively short, ends in a complex trifid apparatus, somewhat similar to that of *Euchæta hebes* (fig. 22). Abdomen slender, the last segment about two-thirds the length of the preceding. Stylets short, their breadth scarcely equal to the length; the long seta—the third seta from the outside—of each is at least equal in length to the abdomen.

Genus Candace, Dana.

Candacia, Dana, Amer. Journ. Sci. 1846.
Ifionyx, Kröyer, Nat. Tidsskr. 1849.
Candace, Dana, U. S. Expl. Exped. 1852.

Candace pachydactyla, Dana.

1852. *Candace pachydactyla*, Dana, U. S. Expl. Exped. p. 1113, pl. lxxviii. figs. 2 *a–b*.
1883. *Candace pachydactyla*, Brady, Report Chall. Exped. p. 68, pl. xxxi. figs. 2–9.

Habitat. Station 2, 5 fathoms tow-netting, January 1st (night collection). Lat. 4° 21′ 8″ N., long. 1° 57′ W., surface tow-netting, January 14th (day collection). Station 24, 10 fathoms, January 21st (night collection). Lagoon, São Thomé Island, surface,

January 27th (day collection). Station 23, surface, 10, 20, 85, and 185 fathoms tow-nettings, February 5th (day collection). Lat. 8° 36′ 8″ S., long. 12° 57′ E., surface, February 9th (day collection).

This *Candace* was obtained from 57 tow-nettings, 24 of which were surface and 33 under-surface gatherings; 37 of the tow-nettings (16 surface and 21 under-surface) were collected during the day, and 20 (8 surface and 12 under-surface) were collected during the night, as shown in the formula:—

Tow-nettings 57 { 24 surface { 16 day collection. / 8 night ditto. ; 33 under-surface { 21 day ditto. / 12 night ditto.

The under-surface tow-nettings ranged in depth from 2 to 260 fathoms. *Candace pachydactyla*, as noted above, occurred in twice as many day surface as in night surface-gatherings; its distribution in this respect is thus more or less the reverse of that of most of the species described in this Report.

Candace pectinata, Brady.

1878. *Candace pectinata*, Brady, Monog. Brit. Copep. i. p. 49, pl. viii. figs. 14, 15; pl. x. figs. 1–12.
1883. *Candace pectinata*, Brady, Report Chall. Copep. p. 67, pl. xxx. figs. 1–13.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35 fathoms, January 22nd (day collection). Station 23, surface tow-netting, February 5th (day collection).

This *Candace* was of rare occurrence in the 'Buccaneer' collections.

Candace intermedia, n. sp. (Pl. IV. figs. 30–37.)

? *Candace curta*, Dana (1852), Crust. U. S. Expl. Expedition.

Length, exclusive of tail-setæ, 2·46 mm. In form somewhat like *Candace pectinata*, Brady, but the posterior margin of the first thoracic segment is produced in the median dorsal line so as to form a distinct hump, which is usually of a chocolate-brown colour, while the surrounding integument is white or nearly so (fig. 56). The last thoracic segment (figs. 62, 63) is furnished on each side with four small hairs, the posterior one being the longest. The 16th, 17th, and 18th joints of the right male antennæ are toothed in a manner somewhat similar to that of *Candace pectinata*, but the teeth on the 18th joint (the joint on the distal side of the hinge) do not form a distinct beard-like fringe as in that species. The proportional lengths of the joints, especially of the right male antenna, differ from those of *C. pectinata* and are very nearly as in the annexed formula:—

Male antennæ.	10	10	3	5	6	3	3	3	3	3	4	6	6	7	8	6	10	10	10	6	5	6	8.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23.
Female antennæ.	10	10	3	4	5	3	3	3	3	3	5	5	5	7	7	9	8	9	7	5	4	5	6.

The 17th joint in the male is usually dark-coloured. The mouth-organs and swimming-feet, except the fifth pair, resemble those of *Candace pectinata*. The fifth feet in the female are somewhat like those of *Candace pachydactyla*, but the terminal spines only

are dark-coloured; the fifth feet in the male are intermediate in form (fig. 35) between *Candace pectinata* and *Candace pachydactyla*. The abdomen in the female has the first segment stout and rounded—not "produced at each side into a triangular prominence," as in *Candace pectinata*. The first segment in the male, however, is produced on the right side similar to that species. The posterior margin of all the abdominal segments is finely and distinctly serrate. Between the second and third setæ of the caudal stylets (counting from the outside) there is a short stout spine, which was quite conspicuous in some of the specimens.

This species is intermediate between *Candace pectinata* and *Candace pachydactyla*, but is readily distinguished from both by the characteristic dark-coloured dorsal hump described above.

Habitat. Station 2, 5 fathoms, January 1st (night collection). Station 9, 50 fathoms (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35 fathoms, January 22nd (day collection). Station 23, surface and 10 fathoms, February 5th (day collection). Lat. 7° 54′ 6″ S., long. 12° 14′ 7″ E., surface, February 9th (day collection). This species occurred in 16 tow-nettings, 9 of which were surface and 7 under-surface gatherings; the under-surface tow-nettings were from 5 to 50 fathoms. The proportion of day to night gatherings in which it was observed is shown in the annexed formula:—

Tow-nettings 16 { 9 surface { 2 day collections. / 7 night ditto. ; 7 under-surface { 4 day ditto. / 3 night ditto.

Candace intermedia, though restricted in its distribution, was nevertheless of frequent occurrence in some of the gatherings in which it was observed.

CANDACE VARICANS, Giesbrecht. (Pl. IV. figs. 38, 39; Pl. VII. figs. 7–10.)

1892. *Candace varicans*, Giesbrecht, Fauna und Flora des Golfes von Neapel (Copepoden), p. 439, pl. 22. figs. 22, 23.

Candace tenuiremus, Scott (MS. name).

Length, exclusive of tail-setæ, 2·3 mm. Anterior antennæ long and slender, reaching to the extremity of the abdomen, 24-jointed in the female, the right antenna in the male 23-jointed; the proportional lengths of the joints as in the annexed formula:—

Male right antenna.	10	10	5	4	6	7	3	4	3	3	4	4	8	7	8	8	6	13	11	13	7	6	8.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24.
Female antenna ...	12	10	4	4	6	8	4	3	4	4	4	7	7	8	9	10	11	12	13	12	7	6	7	10.

The 18th joint of the right male antenna (the joint on the proximal side of the hinge) is distinctly pectinate; the 17th joint, which is about half the length of the 18th, is finely toothed, and the 19th has a fringe of small fine setæ on the upper margin; several of the basal joints bear strong marginal spines, and the 20th joint is as long as the following two joints together. The female antennæ resemble those of *Candace truncata*. The mouth-organs and first four pairs of swimming-feet resemble those of other species of *Candace*. The 5th pair in the female 3-jointed, the last joint long, with three long, stout,

terminal setose spines, and a small spine on the exterior margin below the middle of the segment; the 2nd joint has a stout seta on the exterior distal angle. The 5th pair in the male are somewhat similar to those of *Candace pectinata* and *Candace pachydactyla*; the left foot is 4-jointed, the penultimate being longer than the others, and furnished with a fringe of hairs on the lower exterior margin and a small spine near the interior distal angle; the outer margin of the last joint has a fringe of hairs on the upper half and four spines (2 short, 1 long, and 1 intermediate) near the margin of the lower half. There is a small tuft of hairs and a spine on the inner aspect of the same foot; the right foot terminates in a stout prehensile hand like *Candace pectinata*. The posterior thoracic segment has the lateral angles produced into stout prominent spines, which in the male reach to near the end of the first abdominal segment. The abdomen in the male 5-, in the female 3-jointed; the first segment of the female abdomen is about as long as the other two together, stout and rounded, but not produced into angular processes as in *Candace pectinata*. It resembles *Candace truncata* in this respect, but the middle segment is much shorter than in that species. The abdomen of the female in the 'Buccaneer' specimens is dark-coloured—almost black, but only the stylets of the male abdomen are dark-coloured. The tail-setæ are also dark-coloured and densely plumose. This species is intermediate between *Candace pachydactyla* and *Candace truncata*; its chief distinctive characters seem to be the form of the anterior male antenna and of the male and female fifth feet.

Habitat. Lat. 1° 55′ 5″ S., long. 5° 55′ 5″ E. It was obtained in two tow-nettings from this locality, one from 35 fathoms and one from 460 fathoms. The peculiar arrangement of the colour, together with its decided character, make the species, especially the females, quite conspicuous among their *confrères*.

Candace truncata, Dana.

1852. *Candace truncata*, Dana, Crust. U. S. Explor. Exped. p. 1118, pl. lxxviii. figs. 8 *a–d*.

1863. ? *Candace bispinosa*, Claus, Die freilebenden Copep. p. 191, pl. xxvii. figs. 9–16; pl. xxxiii. fig. 5.

1883. *Candace truncata*, Brady, Report 'Challenger' Copep. p. 69, pl. xxviii. figs. 12–15; pl. xxix. figs. 1–14.

Habitat. Station 2, 25 fathoms tow-netting, January 1st (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 20 and 30 fathoms tow-netting, January 22nd (day collections). Off São Thomé Island, lat. 0° 38′ 6″ N., long. 6° 25′ 8″ E., 20 fathoms tow-netting, January 23rd (day collection). Station 23, surface tow-netting, February 5th (day collection).

Candace truncata was a somewhat rare species in the 'Buccaneer' collection, the tow-nettings described above being the only ones in which it was observed. It nevertheless appears to have a wide distribution.

Genus Mormonilla, Giesbrecht (1891).

Corynuropis, Scott (MS. 1892).

Resembles *Corynura*, Brady, in general appearance but differs in the following details:—

1st. The body becomes gradually narrower posteriorly, so that the thorax and abdomen are not clearly defined the one from the other.

2nd. The secondary branch of the posterior antennæ is multiarticulate.

3rd. The maxillæ are provided with a well-developed bilobed palp.

4th. The anterior foot-jaws are large and resemble those of *Hemicalanus longicornis*, Claus.

5th. The posterior foot-jaws, which are furnished with a number of marginal setæ, are 2-jointed, the apical joint being comparatively short (fig. 17). They resemble neither *Acartia* nor *Corynura*.

6th. The outer branches of the first four pairs of swimming-feet are 2-, and the inner branches 1-jointed, except the first and second pairs, which appear to have the inner branches very indistinctly 2-jointed.

7th. In the female the fifth pair of feet is absent or obsolete. Male unknown.

These differences, especially the 3rd, 5th, and 7th, are too important to allow of the 'Buccaneer' specimens being ascribed to *Corynura*, even though the general resemblance is very striking.

Mormonilla phasma, Giesbrecht. (Pl. VII. figs. 11–21.)

1892. *Mormonilla phasma*, Giesbrecht, Fauna und Flora des Golfes von Neapel (Copepoden), p. 536, pl. 43. figs. 28–32, 34–41.

1892. *Corynuropis tenuicaudatus*, Scott (MS. name).

Female. Length 1·7 mm. Body elongate-pyriform, composed of five segments, the first equal to the combined length of the other body-segments and abdomen; forehead narrowly rounded. Anterior antennæ slender, 5-jointed, and bearing a number of long plain setæ, especially at the extremity, where there are six or seven of considerable length; the second and fourth joints are subequal and fully twice the length of the third joint, as shown by the annexed formula:—

$$\text{Anterior antennæ.}\quad \frac{14\ .\ 20\ .\ 9\ .\ 23\ .\ 14}{1\quad 2\quad 3\quad 4\quad 5}.$$

The basal joint of the posterior antennæ short; the primary branch moderately stout, 2-jointed; the end joint about three-fourths the length of the first; the integument of both partly covered with fine cilia. Secondary branch rather longer than the first joint of the primary branch, 8-jointed; all the joints small except the first, which is nearly equal to the entire length of the next three; the last joint of the principal branch and all the joints of the secondary one are furnished with very long plumose setæ (fig. 13). Mandibles with a broad dentate biting part; the principal branch of the palp is furnished with long aculeate setæ, and the small secondary branch with plumose setæ (fig. 14).

The maxillæ are well developed and provided with a stout bilobed palp—one lobe bearing long plumose, the other aculeate setæ (fig. 15). Anterior foot-jaws large, 5-jointed, the first joint about twice the length of the remaining portion, the three apical joints very short; the third and fourth joints bear each one, and the last three, moderately long aculeate setæ; the anterior foot-jaws are also provided with four marginal setiferous lobes—three on the first joint and one on the proximal end of the second. Posterior foot-jaws smaller, 2-jointed, and bearing several stout marginal and terminal setæ; the last joint is comparatively short (fig. 17). The last joint of the outer branches of the first four pairs of swimming-feet are each provided with a long slender terminal spine, very finely serrate on the outer and ciliate on the inner edge, and also with several long plumose setæ; the inner branches, which are shorter than the outer, bear two long terminal setæ, and a subterminal one. In the first pair, which differ from the others, the exterior margin of the outer branch is armed with three stout spines and a subterminal spiniform seta, while the interior margin of the inner branch bears three processes resembling somewhat the dilated bases of rudimentary hairs. The inner margin of the second basal joint is also armed with several short spines (fig. 18). Abdomen slender, 3-jointed, the middle segment scarcely half the length of either the first or third. Caudal stylets very slender, once and a half the length of the abdomen, bearing each four long terminal setæ, and a small subterminal seta exteriorly, while a moderately long seta springs from the outer margin and near the base of each stylet, as shown in figure 21.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms, tow-net gathering. Collected during the day, January 22nd. Temperature of the water about 43° F. Lat. 4° 24′ 7″ S., long. 10° 1′ 8″ E., in tow-net gatherings from 235 fathoms and 185 fathoms. Collected between 11 A.M. and 3.30 P.M., February 5th. Temperature of the water at 200 fathoms 55° F. A considerable number of specimens were obtained in the first of the three gatherings. No males were observed.

This species has a close general resemblance to *Corynura gracilis*, Brady, and I was at first inclined to ascribe it to that genus, but a further study of the structure of the animal showed that there were differences between it and *Corynura* so important as to make its position in that genus untenable (see remarks to description of genus, p. 64).

Genus Acartia, Dana.

Acartia, Dana, Amer. Journ. Sci. 1846; Brady, Report 'Chall.' Copep. 1883.

Dias, Lilljeborg, Crust. ex. ord. trib. 1853; Claus, Die freilebend. Copep. 1863; Boeck, Oversigt Norg. Copep. 1864; Brady, Monogr. Brit. Copep. 1878.

Acartia laxa, Dana.

1852. *Acartia laxa,* Dana, Crust. U.S. Expl. Exped. p. 1123, pl. lxxix. figs. 5 *a–c*.

1883. *Acartia laxa,* Brady, Report 'Chall.' Copep. p. 73, pl. xxxii. figs. 1–11.

Habitat. Station 2, 25 fathoms, tow-netting, January 1st (night collection). Station 9, 50 fathoms, January 10th (day collection). Off São Thomé Island (lat. 0° 38′ 6″ N.,

long. 6° 25′ 8″ E.), 20 fathoms, January 23rd (day collection). Station 22, 20 fathoms, February 4th (day collection). Lat. 5° 55′ 1″ S., long. 11° 30′ 7″ E., surface, February 18th (night collection), &c.

Acartia laxa was observed in 38 tow-nettings, 11 of which were surface and 27 under-surface gatherings. The under-surface tow-nettings ranged in depth from 5 to 235 fathoms. Four of the surface and 19 of the under-surface gatherings were collected during the day, while 7 surface and 8 under-surface gatherings were collected during the night, as shown in the formula:—

Tow-nettings 38 { 11 surface { 4 day collections. / 7 night ditto. } / 27 under-surface { 19 day ditto. / 8 night ditto. }

Acartia laxa was of frequent occurrence in nearly all of the tow-nettings in which it was observed.

Acartia denticornis, Brady.

1883. *Acartia denticornis*, Brady, op. cit. p. 73, pl. xxxi. fig. 1, pl. xxxii. figs. 12–17.

Habitat. Lagoon, São Thomé Island, surface tow-netting, January 27th (night collection). Libreville, Gaboon River, surface, January 28th (day collection). Lat. 4° 40′ S., long. 10° 25′ 2″ E., surface, February 5th (night collection). Bananah Creek, Congo River, surface, February 7th (day collection). Loanda Harbour, surface, February 13th (day collection).

The distribution of *Acartia denticornis* within the area dealt with in this Report appears to have been more restricted than *Acartia laxa*; it was also more confined to inshore and surface gatherings than was that species. It is interesting to note that this apparent preference of *A. denticornis* for localities more or less inshore is borne out to some extent by the 'Challenger' records, where the following statement occurs (*loc. cit.* p. 74):—"Abundant in Hilo Harbour, Sandwich Islands (August 1875); one or two specimens noted in a gathering from the Philippine Islands and (?) in the Atlantic, north of Tristan d'Acunha."

Acartia denticornis was obtained in 14 of the 'Buccaneer' tow-nettings—all of them surface gatherings. Eight of the tow-nettings were day and 6 were night collections. The specific gravity of the water in which it occurred varied from 1·0255 to 1·0087.

Acartia plumosa, n. sp. (Pl. VII. figs. 22–32.)

Length 1·2 mm. Body elongate-ovate, somewhat rounded in front; the rounded postero-lateral angles of the last thoracic segment bear a number of small spines. Anterior antennæ about as long as the cephalothorax, those of the female 20-jointed and furnished with numerous plumose setæ; the annexed formula shows the proportional lengths of the joints:—

18	11	10	9	12	8	8	5	13	11	15	15	15	12	14	15	10	18	10	8
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The male right antenna is 17-jointed; the 11th, 12th, and 13th appear to be each composed of two coalesced joints, indistinctly hinged between the 12th and 13th joints, both of which are ciliate on the upper margin. On the proximal side of the hinge there is one and on the distal side three short stout spines, as shown in fig. 8. Posterior antennæ and mouth-organs as in *Paracartia spinicaudata*. The length of the joints of the inner branches of the first pair of swimming-feet is about equal, while the first joint of the outer branch is much stouter and once and a half the length of the next. The inner branch of the fourth pair is slender, the first joint of which reaches nearly to the middle of the second joint of the outer branch; the last joint of the outer branch is much smaller than either of the other two joints; the terminal spines are long and slender (fig. 27). The fifth pair in the female are each furnished with two long setæ, one of which is submarginal and plumose and one apical; the basal part of the plain apical seta is considerably dilated and gibbous (figs. 29, 30). The right fifth foot in the male is much longer than the other, and the penultimate joint, which is shorter than either the preceding or following joints, is produced interiorly into an elongate protuberance; the last joint of the left foot is armed with a large spine on its inner aspect; each foot terminates in a short stout spine, and the first joint of both is furnished with a long plumose seta on the outer margin (fig. 30). In the abdomen of the female the first segment is about once and a half the length of the next and fully twice the length of the last segment; the first and second segments are sparingly dentate on the posterior margin (fig. 31). Caudal stylets longer than the last, and nearly as long as the penultimate, abdominal segment; caudal setæ as in *Acartia Clausi*. The first segment in the male abdomen is considerably narrower than those that follow. The caudal stylets are about three-fourths the length of those of the female and not longer than the last abdominal segment, and furnished with setæ as in the female (fig. 32).

Habitat. Bananah Creek, Congo River, in a surface gathering collected at noon, February 7th; the specific gravity of the water when the gathering was made was 1·00870; and in Loanda Harbour, in two surface gatherings collected in the seaward part of the Harbour during the afternoon of the 15th February. The surface temperature of the water was about 79° F.

Acartia plumosa somewhat resembles *Acartia discaudata* (Giesb.), especially in the male right anterior antennæ and fifth pair of feet, which are quite prominent in adult specimens.

Acartia Clausi, Giesbrecht. (Pl. VII. figs. 33–40.)

1889. *Acartia Clausi*, Giesbrecht, Rendiconti R. Accad. d. Lincei, vol. v. fasc. 11.

1892. *Acartia gaboonensis*, Scott (MS. name).

Length fully 1 mm. Viewed dorsally the body is oblong-ovate, the forehead is broadly triangular, almost truncate, with the lateral angles somewhat produced; the last thoracic segment has the postero-lateral angles rounded. Anterior antennæ nearly as long as the thorax, those of the female, which are 21-jointed, are sparingly setiferous, except towards the extremity, where the last five joints bear moderately long plumose setæ; a plumose seta

also springs from the 8th and 12th joints, counting from the end. The proportional lengths of the joints are nearly as shown in the formula:—

34	8	10	6	11	16	14	15	15	13	11	16	18	18	15	15	17	9	16	10	6
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

The jointing of the proximal half of the antennæ was somewhat indistinct and required a high power of the microscope and careful focussing to make out the articulations. The right anterior antenna of the male is 15-jointed, and hinged between the 11th and 12th joints; both of these joints are fringed with small teeth on the upper margin, while a moderately stout spine springs from the proximal end of the 12th joint (fig. 35); the male antennæ are shorter than those of the female, and are provided with a greater number of plumose setæ. The posterior antennæ and mouth-organs resemble those of *Paracartia spinicaudata*. The first four pairs of swimming-feet also resemble those of that species. The fifth pair in the female have the apex subtriangular and are each furnished interiorly with an elongate stout spine, serrate on the inner margin of the distal half and exteriorly with a long plumose seta (fig. 31). In the male the fifth pair are comparatively short and stout, as in *Acartia denticornis*, Brady; the proximal joint of each is furnished on the exterior margin with a long plumose seta (fig. 38). Abdomen in the female short, stout, and composed of three segments; the first is longer than both the other two together, the second is about equal in length to the third; the posterior margin of the first and second joints is fringed with small teeth. The caudal stylets are somewhat longer than the last abdominal segment, and are each provided with six plumose setæ arranged as follows:—one, strongly curved, near the middle of the exterior margin; one subterminal; three terminal, the middle one being much longer than any of the others; and one (small) on the lower half and near the inner margin of the stylet. The abdomen in the male is composed of five segments; the first is rather narrower than the next, and the penultimate one is very short. The stylets are shorter than those of the female, but the number and arrangement of the plumose setæ are similar (fig. 34).

Habitat. Libreville, Gaboon River, in a surface gathering collected at midday, January 28th. The surface temperature of the water was 83°·4 F., and the specific gravity 1·02301.

This *Acartia* resembles *Acartia denticornis*, Brady, in several of its characters, but differs in some important points, especially in the armature and proportional length of the joints of the male right anterior antenna and in the form of the male and female fifth feet and abdomen.

Subgenus Paracartia, n. subgen.

Near *Acartia*, Dana, but differing very markedly in the form of the fifth pair of feet, which in the female are each armed with a stout curved spine; in the male the fifth pair are large and unsymmetrical, that of the left side being about half the length of the right; the male right antenna has also the joints of the proximal half somewhat tumid, as in *Pontella*.

PARACARTIA SPINICAUDATA, n. sp. (Pl. VIII. figs. 1–11.)

Female. Length 1·25 mm. Cephalothorax elongate, rather tumid, rounded in front, the postero-lateral angles of the last thoracic segment acute. Anterior antenna as long as the cephalothorax, 20-jointed, and bearing a number of long plumose setæ distributed as follows—one on each of the 2nd, 3rd, 4th, 8th, 9th, 10th, 13th, 15th, 16th, and 18th joints, two (one smaller than the other) on the 19th, and five on the last joint. The 7th joint is about as long as all the preceding three together; the 12th and last joints are shorter than the others. The proportional lengths of the joints are nearly as in the annexed formula :—

30	16	9	13	11	9	30	15	10	15	15	12	6	14	12	16	13	15	14	7
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Posterior antennæ, mouth-organs, and first four pairs of swimming-feet as in *Acartia laxa*, except that the last joint of the outer branch of the first swimming-feet has the lower exterior surface setose. Fifth pair of feet small, 1-branched, the basal part short and tumid and furnished with a stout curved spine, the distal half of which is strongly toothed on both margins; exteriorly and close to the spine and about a third of its length is a small plain seta; the right and left branches are alike. Abdomen short, 3-jointed; the first segment is somewhat triangular in form and has the distal end fully twice the breadth of the next segment; it is also longer than both the second and last segments together. Caudal stylets short and broad, rather longer than the last abdominal segment, each stylet armed with a prominent and strong terminal spine and two setæ, one on each side of the spine; there are also two setæ on the exterior margin of the stylets, and a third, with a distinct basal part, a little above the inner of the two terminal setæ. The terminal spines, which are about double the length of the stylets, and all the setæ, except the one last described, are plumose.

Habitat. Bananah Creek, Congo River, in one surface tow-netting collected at noon and in another collected at 4.30 P.M. February 7th, 1886. Several specimens, all females, were obtained in these two tow-nettings.

The more obvious characters which serve to distinguish this species are the fifth feet and the peculiar form of the abdomen.

PARACARTIA DUBIA, n. sp. (Pl. VII. figs. 41, 42; Pl. VIII. figs. 12–15.)

Male. Length about 1·2 mm. Body elongate, broadly subtriangular in front, and rounded posteriorly, composed of five segments; head indistinctly separated from the thorax. Anterior antennæ about as long as the body, that of the left side provided with a number of moderately long setæ, 20-jointed, the proportional lengths of the joints being nearly as shown in the formula :—

16	14	6	5	5	8	10	10	12	11	9	20	20	15	12	16	11	18	10	8
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

The proximal half of the right antenna, which bears several long plumose hairs, has the lower portion somewhat dilated; there is a hinged articulation between the fifth

and sixth joints, counting from the end. The sixth joint, which is nearly as long as the remaining portion of the antenna, has a rounded excavation on the upper edge and near the proximal end; the lower side of the excavation is produced into a stout tooth-like lobe; the fifth joint, still counting from the end of the antenna, is about half the length of the preceding, and bears a styloid process on its upper margin and a long plumose seta at the upper distal angle; the ultimate and penultimate joints are also furnished with a number of long plumose setæ (Pl. VII. fig. 42). The posterior antennæ and mouth-organs as in *Paracartia spinicaudata*. The first four pairs of swimming-feet similar to those of *Acartia*. The fifth pair is largely developed, that of the right side large, 4-jointed, the first and second joints stout, the other two slender, elongate; the fourth joint appears as if it were articulated to the *side* of the third. There is a stout digitiform process on the inner side of the upper half of the second joint, and near the middle of the third joint the outer margin is produced into a bluntly triangular lobe; the last joint bears an apical appendage, the basal part of which is tumid, the extremity slender and setiform. The right foot has an inner rudimentary second branch composed of one joint about equal in length to the first joint of the outer branch. The left foot, which is stout, scarcely reaches to the middle of the second joint of the principal branch of the right foot, and appears to be 3-jointed; the second joint is furnished with a membraneous, curved (?) sexual process, as shown in figure 9. Abdomen composed of five segments, the first short, of greater width than the next, the outline of the sides rounded (Pl. VIII. fig. 15); the second and third joints are long, while the combined length of the fourth and fifth is scarcely equal to the third. The stylets are somewhat longer than the last abdominal segment, and have the third apical seta, counting from the outside, considerably longer than any of the others.

Habitat. Loanda Harbour, in material collected with surface tow-net, on the afternoon of February 15th. Several specimens, males only, were obtained.

As females only of *Paracartia spinicaudata*, and males only of *P. dubia*, were obtained in the tow-net gathering from Loanda Harbour, it is just possible that they may both belong to the same species, but the difference between the two is so considerable and so marked that it seems better, for the present at least, to describe them under separate names.

A species described and figured by I. C. Thompson in the 'Proceedings of the Liverpool Biological Society,' vol. ii. p. 141 (1888), as *Acartia verrucosa*, resembles somewhat the *Paracartia spinicaudata* of this Report; but the difference in the form of the fifth feet and in other important details is great enough to render them at least specifically distinct.

Genus Ætidius, Brady.

Ætidius, Brady, Report on the Copepoda of the 'Challenger' Expedition, 1883.

Ætidius armatus, Brady.

1883. *Ætidius armatus*, Brady, Report 'Chall.' Copep. p. 76, pl. x. figs. 5–16.

Habitat. Station 2, 5 fathoms tow-netting, January 1st (night collection). Lat. 3° 58′

N., long. 3° 42′ W., 50 fathoms, January 13th (day collection). Lat. 3° 55′ 3″ N., long. 4° 7′ 3″ E., 30 fathoms, January 20th (day collection). Off São Thomé Island (lat. 0° 34″ N., long. 6° 31′ 6″ E.), 20 fathoms, January 23rd (day collection). Station 3, 135 fathoms, February 5th (day collection).

Ælidius armatus occurred in 19 tow-nettings, all of which were under-surface collections and ranged in depth from 5 to 160 fathoms; 2 of the tow-nettings were collected during the night, the other 17 were day collections. With one exception, all the tow-nettings were from 20 fathoms or more, and eleven of them from 50 fathoms and over. The difference between the bathymetrical distribution of this species and of *Acartia denticornis* is very marked, the *Acartia* having been observed only in surface gatherings. The distribution of *Ælidius* was nearly coextensive with the area examined, and in some of the tow-nettings it was of comparatively frequent occurrence. The strong curved rostrum, and the spinous and strongly produced lateral angles of the last thoracic segment, are so conspicuous as to make the species readily distinguished from other Copepoda. It was obtained at five of the 'Challenger' stations, one of which (Station 348, lat. 3 10′ N., long. 14 51′ W.) was in the vicinity of the area traversed by the 'Buccaneer.'

ÆTIDIUS ARMIGER (Giesbrecht). (Pl. VIII. figs. 16–27.)

1892. *Gaëtanus armiger*, Giesbrecht, Fauna und Flora des Golfes von Neapel (Copepoden), p. 224, pl. xiv. figs. 19, 20, 22, 26, 28, pl. xxxvi. figs. 2, 6.

Female. Length, exclusive of tail-setæ, 2·6 mm. (about 1-10th of an inch). The male is rather smaller than the female. Body robust, composed of four segments, the first segment more than twice the entire length of the other three, rounded anteriorly and furnished with a prominent sharp-pointed rostrum. The postero-lateral angles of the last thoracic segment are produced backward into spiniform processes as long as the first abdominal segment. Anterior antennæ reaching to the extremity of the abdomen, alike in both sexes, and composed of 24 joints, which are sparingly setiferous; the proportional lengths of the joints nearly as in the formula :—

9	6	3	3	3	3	4	6	3	3	4	6	5	6	7	7	7	9	8	7	8	8	7	3
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

The basal joint of the posterior antennæ wants the three setæ shown in Brady's figure of *Ælidius armatus*; the first joint of the secondary branch is small, the second larger, the third, fourth, and fifth small and bearing each a long plumose seta; the sixth joint is fully one third the length of the whole branch, and furnished with one plain and three long plumose terminal setæ. Mandibles and maxillæ as in *E. armatus*; one of the two small intermediate digits of the maxilla-palp terminates in a spiniform plumose seta. Foot-jaws also similar to those of *Ælidius armatus*, except that the two outer marginal lobes of the anterior foot-jaw terminate each in a stout elongate spine, ciliate on the inner edge; and the inner distal angle of the basal joint of the second foot-jaw forms a blunt, rounded process, the end of which is ciliate and bears a few setæ (fig. 22). The

first four pairs of swimming-feet resemble those of *Ætidius armatus*, except that the second joint of the inner branch of the second pair is shorter than the other. Fifth pair in the male small, each composed of a basal joint and two 1-jointed branches; the outer branch is comparatively large and bears two small unequal teeth at the extremity; the inner branch is small and rudimentary, with a rounded end. Abdomen in both sexes composed of five (?) segments, the last segment very small, the other segments in the male abdomen subequal; in that of the female the first segment is large and tumid, the second smaller, while the third and fourth are about equal and smaller than the second. Caudal stylets short and broad, and furnished with four long and two very small terminal plumose setæ.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 and 460 fathoms, January 22nd (day collection). Station 23, 135 fathoms, February 5th (day collection). *Ætidius armiger*, of which only two or three specimens have been obtained, is quite distinct from *Æ. armatus*, being readily distinguished by the difference in the form of the male fifth feet, and by the peculiar spiny armature of the forehead and last thoracic segment.

Genus Clausocalanus, Giesbrecht, 1888.

Drepanopus, Brady (in part).

Clausocalanus furcatus (Brady).

1883. *Drepanopus furcatus*, Brady, Report of the 'Challenger' Copepoda, p. 77, pl. iv. figs. 1 & 2; pl. xxiv. figs. 12–15.

1892. *Clausocalanus furcatus*, Giesbrecht, Fauna und Flora des Golfes von Neapel (Copepoden), p. 194, pl. xxxvi. figs. 32, 33, 35.

Habitat. Station 2, 25 fathoms (night collection), January 1st. Lat. 3° 58′ N., long. 3° 42′ W., 25 fathoms (day collection), January 13th. Off São Thomé Island (lat. 0° 34′ N., long. 6° 30′ 4″ E.), 10 fathoms, January 23rd (day collection). Station 23, 10 fathoms, February 5th (day collection). Lat. 6° 39′ 5″ S., long. 11° 24′ 7″ E., surface, February 8th (night collection), &c.

This species occurred in 20 tow-nettings, 3 of which were surface and 17 under-surface gatherings. The under-surface gatherings were from various depths ranging from $2\frac{1}{2}$ to 50 fathoms. The 3 surface tow-nettings were night collections; 11 of the under-surface were day and 6 were night collections, as shown by the formula:—

Tow-nettings 20 { 3 surface { no day collections. / 3 night ditto. } / 17 under-surface { 11 day ditto. / 6 night ditto. }

Clausocalanus latipes, n. sp. (Provisional name.) (Pl. VIII. figs. 28–37.)

Female. Anterior antennæ long and slender, provided with a very few short setæ and

composed of 23 joints, the proportional lengths of the joints being nearly as shown in the formula :—

3	5	2	2	2	2	2	4	2	2	3	3	4	4	4	4	4	4	4	4	5	6
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

The posterior antennæ nearly as in *Drepanopus pectinatus*. Mandibles well developed, strongly dentiferous on the biting-edge, and furnished with a large two-branched palp one branch being 2-, the other 4-jointed (fig. 29). Anterior foot-jaws 4-jointed, the last two very small; marginal lobes six, five of them large, each with two (or three) plumose terminal setæ; the other small, forming the base of a single plain seta; three plain setæ spring from the last joint of this foot-jaw. The posterior foot-jaws are 7-jointed; the first and second joints are large, subequal, and longer than the entire length of the next three; the third to the last joints are small and furnished with a few plumose hairs (fig. 31). First pair of swimming-feet similar to those of *Drepanopus pectinatus*, but there are longer spines on the outer distal angles of the first two joints of the outer branch, and the inner distal angle of the second basal joint terminates in a short spine instead of a plumose hair. The three following pairs are also similar to *Drepanopus pectinatus*, except that the distal margin of the second basal joint is strongly denticulated in the second pair, and in the third pair is furnished with a few large spiniform teeth; the terminal spines of the outer branches are long and broad, and finely serrate on the outer margin. The fifth pair are robust, simple, and composed of two 2-jointed branches of unequal length; in the short branch the last joint is much smaller than the other and terminates in three conical tooth-like prolongations; in the other branch, which is at least twice the length of the short one, the last joint is rather longer than the first, and bears a small spine near the middle of the outer margin and three spiniform teeth at the extremity (fig. 35). The abdomen is composed of four segments, the first longer than the others, the next two subequal, the last small. Caudal stylets about as long as the last abdominal segment and bearing four plumose terminal hairs.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35 fathoms.

One specimen only of this species has been obtained; it appears to be a female. While agreeing with *Drepanopus* in its more important details of structure, *Clausocalanus latipes* differs from both the species described in the Report on the 'Challenger' Copepoda, especially in the number and proportional length of the joints of the anterior antennæ and in the form of the fifth feet. It agrees in some respects with *Clausocalanus furcatus*, Brady, but in that species, the inner branches of the second pair of swimming-feet are 1-jointed, the fifth pair and the anterior antennæ also differ considerably, so that for the present it seems better to consider the species as distinct.

Clausocalanus arcuicornis (Dana). (Pl. VIII. figs. 38–47.)

1849. *Calanus arcuicornis*, Dana, Amer. Journ. Sc. vol. viii.

1892. *Clausocalanus arcuicornis*, Giesbrecht, op. cit. p. 193, pls. 1, 2, 10, 36.

Length, not including tail-setæ, 1·3 mm. Body elongate, composed of five segments,

the first nearly twice the entire length of the other four. Forehead rounded, produced into a small, sharp-pointed rostrum. Anterior antennæ slender, as long as the cephalothorax, 20-jointed, and sparingly setiferous, the proportional lengths of the joints as in the formula:—

$$\frac{34}{1}\,.\,\frac{4}{2}\,.\,\frac{4}{3}\,.\,\frac{4}{4}\,.\,\frac{4}{5}\,.\,\frac{3}{6}\,.\,\frac{3}{7}\,.\,\frac{4}{8}\,.\,\frac{4}{9}\,.\,\frac{4}{10}\,.\,\frac{4}{11}\,.\,\frac{10}{12}\,.\,\frac{16}{13}\,.\,\frac{10}{14}\,.\,\frac{12}{15}\,.\,\frac{12}{16}\,.\,\frac{18}{17}\,.\,\frac{15}{18}\,.\,\frac{18}{19}\,.\,\frac{22}{20}$$

The first joint is stout and long, and the second considerably broader than those immediately following. The primary branch of the posterior antennæ is short and 2-jointed; the secondary branch is fully twice the length of the other, and composed of six joints; the second joint is long and about equal to the entire length of the next four; the third, fourth, and fifth joints are very small (fig. 39). Mandible-palp small, one branch is 4-, the other 2-jointed (fig. 40). Maxillæ nearly as in *Drepanopus pectinatus*. Anterior foot-jaw very small, with four (or five) marginal setiferous lobes. Posterior foot-jaw small, 7-jointed, and bearing a few spinous setæ; the first and second joints are elongate, the third short, the fourth about twice the length of the third, the fifth about equal to the third and as long as the next two together (fig. 44). The first four pairs of swimming-feet resemble those of *Drepanopus pectinatus*, except that the first two joints of the outer branch of the first pair have no spines on the exterior distal angles. The fifth pair are simple and consist of one very short 2-jointed branch, and one which is long and 4-jointed; the last joint of the short branch is very small and terminates in three small spines; the extremity of the long branch terminates on one side in a digitiform lobe, which is opposed by a finger-like process, articulated to the basal part of the lobe; both are fringed with fine cilia (fig. 45). Abdomen 5-jointed, the last segment very small. Caudal stylets short, length about equal to the breadth, each furnished with four plumose terminal setæ.

Habitat. Station 2, 50 fathoms, January 1st (night collection). Station 9, 50 fathoms, January 10th (day collection). Lat. 3° 58′ N., long. 3° 42′ W., 25 and 50 fathoms, January 13th (day collection). Off Accra, 3 fathoms, January 16th (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms, January 22nd (day collection). Off São Thomé Island, 20 fathoms, January 23rd (day collection).

Males only of this species were obtained.

Genus Phyllopus, Brady.

Phyllopus, Brady, Report on the Copep. of the Chall. Exp. 1883.

Phyllopus bidentatus, Brady. (Pl. VI. figs. 26–28.)

1883. *Phyllopus bidentatus*, Brady, Report Chall. Copep. p. 78, pl. v. figs. 7–14.

Habitat. Station 2, 5 fathoms, January 1st (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms, January 22nd (day collection). Temperature of water at 360 fathoms about 43° F.

Three specimens only of this curious form were obtained, and they were all more or

less damaged; two of them were carefully dissected, from these dissections figures have been prepared of a few of the more important details, not represented in the 'Challenger' Report. I have also been enabled to add the following description:—Secondary branch of the anterior antennæ nearly twice the length of the primary branch, 8-jointed, the last nearly as long as the preceding six joints, and furnished with four terminal hairs. Both branches of the first four pairs of swimming-feet 3-jointed, the middle joint of the outer branch of the first pair shortest, bearing a comparatively long, slightly curved, setiferous spine on the exterior distal angle; the last joint has two shorter and more slender spines on its outer margin, and a long slender terminal spine, both branches furnished with numerous, long, plumose setæ. In the second, third, and fourth pairs the inner are much shorter than the outer branches; the three joints of the outer branches are each armed with a stout dagger-like spine at the outer distal angles; the last joint has two similar additional spines inserted in excavations of the outer margin, and a broad falciform terminal spine, finely serrate on the outer margin; both branches are well furnished with plumose setæ. The fifth pair in the female resemble the figured example in the 'Challenger' Report, but their form seems to vary somewhat in different specimens, both as regards the serration of the last joint, and also the comparative length and breadth of the joints. Abdomen in the female 4-jointed, first joint much larger than the others and dilated. Caudal stylets short, not divergent, each with five long, plumose terminal setæ, the second from the inside longer than the others.

The mouth is a short tube; the front part projects outward and backward so as to form an oblique opening. The edge of the upper part of the tube has a dense fringe of hairs, which can be readily observed if the specimen be in a favourable position. Judging from a careful examination of the 'Buccaneer' specimens, I am inclined to think that the figures in the 'Challenger' Report represent a female instead of a male.

Genus Temora, Baird.

Temora, Baird, Brit. Entomostraca, 1850.
Diaptomus, Lubbock, Trans. Entom. Soc. 1856.

Temora stylifera (Dana).

1849. *Calanus stylifer*, Dana, Amer. Journ. Sci. vol. viii.
1856. *Diaptomus dubius*, Lubbock, Trans. Entom. Soc. vol. iv. n. s. p. 21, pl. ii. figs. 1–7.
1883. *Temora dubia*, Brady, Report Chall. Copep. p. 79, pl. xxv. figs. 1–17.

Habitat. Station 2, surface and 25 fathoms, January 1st (night collections). Station 9, 25 fathoms, January 10th (day collection). Station 11, 10 fathoms, January 19th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms, January 22nd (day collection). Lagoon, São Thomé Island, surface, January 27th (one day and one night collection). Libreville, Gaboon River, surface, January 28th (day collection). Station 23, 10, 20, 135, and 185 fathoms, February 5th (day collections). Bananah

Creek, Congo River, surface, February 7th (two day collections). Lat. 5° 55′ 1″ S., long. 11° 30′ 7″ E., February 18th (night collection).

Temora stylifera was observed in 105 tow-nettings, 61 of them surface and 44 under-surface gatherings: of the surface gatherings 25 were collected during the day and 36 during the night; of the under-surface gatherings, which ranged in depth from 2 to 360 fathoms, 37 were collected during the day and 7 during the night, as shown by the annexed formula :—

Tow-nettings 105 { 61 surface { 25 day collections. / 36 night ditto. ; 44 under-surface { 37 day ditto. / 7 night ditto. }

This was one of the more common and generally distributed species in the 'Buccaneer' collection; it also appears to be one of the most common of the extra-European Copepoda.

Temora longicornis (Müller). (Pl. VII. fig. 47.)

1785 ?. *Cyclops longicornis*, Müller, Entom. p. 115, t. xix. figs. 7–9.

1850. *Temora finmarchica*, Baird, Brit. Entom. p. 228, pl. xxviii. figs. 1 *a–g*.

1849 ?. *Calanus turbinatus*, Dana, Amer. Journ. Sc. vol. viii.

1857. *Diaptomus longicaudatus*, Lubbock, Ann. & Mag. Nat. Hist. ser. 2, vol. xx. pl. x. figs. 11, 12; pl. xi. figs. 12, 13.

1878. *Temora longicornis*, Brady, Monogr. Brit. Copep. vol. i. p. 54, pl. iii. figs. 10–19.

Habitat. Lat. 7° 33′ N., long. 15° 18′ W., surface, midnight, January 2nd. Station 9, 50 fathoms, January 10th (day collection). Off Accra, 3 fathoms, January 15th (night collection). Same locality, January 16th, surface, night collection, and 3 fathoms, day collection. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35 and 460 fathoms, January 22nd (day collections). Libreville, Gaboon River, surface, January 28th (day collection). Bananah Creek, Congo River, surface, February 6th (day collection). Loanda Harbour, surface, February 13th (day collection), and again on the 15th in the seaward part of the Harbour, also surface (day collection). Lat. 5° 40′ 8″ S., long. 11° 33′ 4″ E., surface, February 19th, &c. (day collection).

This *Temora* was observed in 57 tow-nettings, 40 of which were surface and 17 under-surface gatherings; 16 of the surface gatherings and 12 of the under-surface were day collections, while 24 surface and 5 under-surface were night collections, as shown by the formula :—

Tow-nettings 57 { 40 surface { 16 day collections. / 24 night ditto. ; 17 under-surface { 12 day ditto. / 5 night ditto. }

The under-surface tow-nettings were from depths ranging from 3 to 50 fathoms, and one from 135 and another from 460 fathoms.

Temora longicornis was not only generally distributed throughout the area examined,

but was a moderately common species in some of the tow-nettings in which it occurred. This species is readily distinguished from either *Temora stylifera* (Dana) or *Temora armata*, Claus, by having the last thoracic segment in both sexes rounded at the postero-lateral angles. The first pair of swimming-feet have the inner branches more or less distinctly 2-jointed. The male fifth pair (fig. 17) differ somewhat from the same pair of feet in British specimens, but otherwise the 'Buccaneer' specimens agree with those of the British seas.

Genus Centropages, Kröyer.

Centropages, Kröyer, Nat. Tidskr. 1849; Boeck, Oversigt Norges Copep. 1864; Brady, Monogr. Brit. Copep. 1878.

Catopia, Dana, Proc. Amer. Acad. Sci. 1849.

Calanopia, id. (in part) Crust. U.S. Expl. Exped. 1852.

Ichthyophorba, Lilljeborg, De Crust. ex. ord. trib. 1853; Claus, Die freilebenden Copepoden, 1863.

Centropages brachiatus (Dana).

1852. *Calanopia brachiata*, Dana, Crust. U.S. Expl. Exped. p. 1133, pl. lxxix. figs. 7 *a, b*.

1883. *Centropages brachiatus*, Brady, Report Chall. Copep. p. 82, pl. xxvi. figs. 1–7.

Habitat. Lat. 7° 33′ N., long. 15° 18′ W., surface, January 2nd (midnight collection). Lat. 5° 10′ N., long. 3° 56′ 2″ W., surface (close inshore), January 12th (night collection). Station 21, surface, February 4th (day collection). Station 23, 20 fathoms, February 5th (day collection). Bananah Creek, Congo River, surface, February 7th (two day collections). Loanda Harbour, surface, February 13th (day collection).

Centropages brachiatus was observed in 37 tow-nettings, comprising 28 surface and 9 under-surface gatherings. The under-surface tow-nettings included two at 3 fathoms, two at 10 fathoms, one at 20 fathoms, two at 25 fathoms, and two at 50 fathoms. 14 of the surface and 6 of the under-surface gatherings were day collections, while 14 surface and 3 under-surface were night collections, as shown by the formula:—

Tow-nettings 37 { 28 surface { 14 day collections. / 14 night ditto. / 9 under-surface { 6 day ditto. / 3 night ditto.

This, though occurring in a considerable number of tow-nettings, was by no means a common species. The size of the 'Buccaneer' specimens agreed with those of the 'Challenger' collections, viz. 8–100ths of an inch=about 2 mm. (not 4·4 mm. as stated in the 'Challenger' Report).

Centropages furcatus (Dana).

1852. *Catopia furcata*, Dana, Crust. U.S. Expl. Exped. p. 1173, pl. lxxix. figs. 1 *a–d*.

1883. *Centropages furcatus*, Brady, Report Chall. Copep. p. 83, pl. xxviii. figs. 1–11.

Habitat. Lat. 7° 33′ N., long. 15° 18′ W., surface, January 2nd (midnight collection). Lat. 5° 10′ N., long. 3° 56′ 2″ W., surface (close inshore), January 12th (night collection).

Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10 and 30 fathoms, January 22nd (day collections). Libreville, Gaboon River, surface, January 28th (two day collections). Lat. 5° 56′ 5″ S., long. 11° 17′ 2″ E., surface, February 8th (night collection). Loanda Harbour (seaward), surface, February 15th, &c. (day collection).

This *Centropages* was observed in 49 tow-nettings, 33 of which were surface and 16 under-surface gatherings; 11 of the surface and 11 of the under-surface tow-nettings were day collections, and 22 surface and 5 under-surface were night collections, as shown by the annexed formula :—

Tow-nettings 49 { 33 surface { 11 day collections. / 22 night ditto. ; 16 under-surface { 11 day ditto. / 5 night ditto.

The under-surface tow-nettings were from depths ranging from 3 to 50 fathoms. This species can be readily distinguished, even in the immature stages, by the characteristic armature of the last thoracic segment.

Centropages violaceus (Claus).

1863. *Ichthyophorba violacea*, Claus, Die freilebenden Copep. p. 199, pl. xxxi. figs. 13, 14.
1883. *Centropages violaceus*, Brady, Report Chall. Copep. p. 83, pl. xxvii. figs. 1–14.

Habitat. Station 2, 50 fathoms, January 1st (night collection). Station 9, 25 fathoms, January 10th (day collection). Off São Thomé Island (lat. 0° 32′ 7″ N., long. 6° 31′ 6″ E.), 10 fathoms, January 23rd (day collection). Lat. 1° 47′ 7″ S., long. 8° 21′ 3″ E., surface, February 4th, &c. (night collection).

Centropages violaceus was obtained in 11 tow-nettings, one of which was a surface (night) gathering, and the other 10 under-surface gatherings; 6 of the under-surface gatherings were day, and 4 were night collections, as shown by the formula :—

Tow-nettings 11 { 1 surface { 0 day collection. / 1 night ditto. ; 10 under-surface { 6 day collections. / 4 night ditto.

Four of the under-surface gatherings were from 10 fathoms, two from 15 fathoms, one from 20 fathoms, two from 25 fathoms, and one from 50 fathoms.

This *Centropages* was much rarer in the 'Buccaneer' collections than the other two species recorded in the 'Challenger' collection. On the other hand, it was the more common of the three species of *Centropages* observed by Dr. Brady. *Centropages violaceus* differs from the other two species in having the postero-lateral angles of the last thoracic segment rounded off instead of being produced into spinous processes. No indication of colour could be detected in the 'Buccaneer' specimens. This was probably due to their long immersion in spirit, which had extracted the colour characteristic of the species.

Genus Temoropia, n. gen. (Provisional name.)

Anterior antennæ ? 22- or ? 23-jointed; the right antenna of the male 19-jointed, hinged between the 15th and 16th joints. Posterior antennæ and mouth-organs as in *Calanus*. Inner branch of the first pair of swimming-feet 2-jointed, of the second, third, and fourth pairs 3-jointed. Fifth pair in the female simple, alike on both sides, and each composed of a single 3-jointed branch; in the male the fifth pair, which are prehensile, and each composed of a single branch, are large and conspicuous. The female abdomen consists of four and the male of five segments; the first segment in the female is considerably dilated.

Temoropia mayumbaensis, n. sp. (Pl. VIII. figs. 18, 19; Pl. IX. figs. 1–12.)

Length ·93 mm. Body elongate-ovate, composed of five segments; the first segment, which is about as long as the combined length of the next three, is indistinctly articulated at the upper half. Forehead broadly triangular. Anterior antennæ of the female ? 22- or ? 23-jointed.* The right anterior antenna of the male scarcely reaches to the end of the thorax, is sparingly setiferous, and 19-jointed, constricted between the 11th and 12th, and hinged between the 15th and 16th joints; the proportional lengths of the joints as in the formula :—

Male:	30	10	8	8	9	6	7	8	9	9	14	27	11	12	27	28	17	15	22
Right anterior antenna.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Posterior antennæ and mouth-organs as in *Calanus*. The inner branches of the first pair of swimming-feet are 2-jointed; the inner branches of the second, third, and fourth pairs 3-jointed; the first joint is short, while the last is equal to the combined length of the preceding two joints. Fifth pair of feet in the female simple, each composed of a single 3-jointed branch, one branch being rather longer than the other; the first joint in both is somewhat dilated; the inner distal angle of the second joint is furnished with a spiniform seta nearly as long as the last joint; the last joint has a conical and pointed extremity with a small tooth-like process on the inner margin. The fifth pair in the male is large and conspicuous; the right foot is composed of two moderately large joints, which decrease in breadth towards the extremity, and terminates in a long slender curved spine. The left foot, which consists of three broad joints, has an excavation at the apex in which the terminal spine of the foot probably interlocks, while a long curved spine springs from the end of the first joint (Pl. IX. fig. 9). The abdomen in the female consists of four, in the male of five, segments; the first segment in the female is considerably swollen, and is produced ventrally and posteriorly into a large rounded process (Pl. IX. fig. 10). Caudal stylets short, each furnished with three stout plumose terminal setæ, and a small seta on the inner margin.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35 and 360 fathoms (day collections). Station 23 (lat. 1° 26′ 7″ S., long. 10° 1′ 8″ E.), 235 fathoms (day collection).

* The basal portions only of the anterior antennæ of all the females, and of the left antenna of all the males, remain intact; they were broken off, mostly, at the end of the eighth joint; but, judging from the number of joints in the male right antenna, the female antennæ probably consist of twenty-two or twenty-three joints.

About twenty specimens of this species were obtained in tow-nettings from the localities described; the specimens were all more or less imperfect, especially the anterior antennæ and swimming-feet.

The specific name has reference to Mayumba, a place on the coast near Station 23, one of the two localities where the species was obtained.

Genus Mecynocera, I. C. Thompson (1888).

1888. *Mecynocera*, I. C. Thompson, Journ. Linn. Soc. (Zoology) vol. xx. p. 146.

Mecynocera clausii, I. C. Thompson. (Pl. I. figs. 27–34; Pl. II. 7–10.)

1888. *Mecynocera clausii*, I. C. Thompson, Journ. Linn. Soc. (Zoology) vol. xx. p. 146, pl. xi. figs. 1–4.

Length fully 1 mm. Female somewhat longer than the male. Body elongate, slender. Cephalothorax composed of six segments; viewed dorsally the first is almost cylindrical; forehead somewhat angularly rounded; the postero-lateral angles of the last segment are rounded. Anterior antennæ fully twice the length of the animal, slender, 24-jointed; the 16th to the 20th joints are considerably longer than any of the others; several of the middle joints of both antennæ in male and female are provided with longitudinal rows of small spiniform teeth; two, or even three, rows were observed on some of the joints, on others only one row; the antennæ are sparingly setiferous (Pl. I. fig. 31). The annexed formula shows the proportional lengths of the joints:—

7	14	7	7	7	7	7	12	12	10	12	13	14	17	18	22	24	29	26	24	18	12	8	14
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24.

The basal joint of the posterior antennæ stout, primary branch 2-jointed (exclusive of the basal joint), the first being nearly a third longer than the other; secondary branch 7-jointed; the second joint is longer than the first, and nearly equal to the entire length of the next four; the third to the last joints very short (Pl. I. fig. 30). Mandible-palp well developed, 2-branched, basal part stout, distally narrowed and produced to form the base of the 1-jointed branch; the second branch, which occupies a submarginal position, is 4-jointed (Pl. II. fig. 7). Foot-jaws and swimming-feet nearly as in *Rhincalanus*, except that the inner branches of the first swimming-feet are 1-jointed, the inner branches of the second, third, and fourth pairs are 3-jointed; the exterior distal angles of the joints of the outer branches are armed with short stout spines which are curved inwardly; the last joint of the outer branches of the fourth pair has a similar spine on the exterior margin (Pl. I. fig. 33); the outer branches of all the first four pairs possess long delicate terminal spines. The fifth pair are 1-branched, alike on both sides and in both sexes; basal portion 2-jointed, not much stouter than the terminal portion, which is 3-jointed. There is, so far as could be observed, no terminal spine. Caudal stylets somewhat divergent, and about two thirds the length of the last abdominal segment; caudal setæ four, long, plumose.

Habitat. Station 2, 25 fathoms, collected January 1st. Lat. 6° 34′ N., long. 12° 39′ W., surface, collected January 6th. Lat. 4° 31′ 6″ N., long. 6° 4′ 4″ W., 50 fathoms, collected

January 11th. Off São Thomé Island (lat. 0° 34′ N., long. 6° 30′ 4″ E.), 20 fathoms, collected January 23rd. Lat. 4° 26′ 7″ S., long. 10° 1′ 8″ E., 235 fathoms, collected February 5th, &c.

Mecynocera Clausii was observed in 16 of the tow-net collections, 1 only being a surface gathering; the deepest under-surface gathering in which it was observed was 235 fathoms.

Tow-nettings 16 { 1 surface { 1 day collection. / 0 night ditto. / 15 under-surface { 12 day collections. / 3 night ditto.

The 'Buccaneer' specimens of this species differed from *Mecynocera Clausii*, I. C. Thompson, as described and figured in the 'Transactions' of the Linnean Society, vol. xx. p. 150, pl. xi. figs. 1–4. *Mecynocera Clausii* is there described as wanting a fifth pair of feet, whereas the 'Buccaneer' specimens possess a fifth pair large enough to be easily observed without requiring to dissect the animal to see them.

Genus Phaënna, Claus.

Phaënna, Claus, Die freilebenden Copepoden, 1863.

Phaënna spinifera, Claus. (Pl. VI. fig. 35; Pl. VII. figs. 1, 2.)

1863. *Phaënna spinifera*, Claus, Die freilebenden Copepoden, p. 189, pl. xxxi. figs. 1–7.

Length 2·25 mm. Body globose (breadth about 1·1 mm.), composed of five segments, the first rather longer than the next two together. Anterior antennæ as long as the cephalothorax, 24-jointed. The proportional lengths of the joints are very nearly as shown in the formula:—

10	4	3	4	4	4	4	5	4	4	4	6	7	9	9	9	10	10	8	9	7	8	9	4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Sparingly setiferous; the basal joint in the female bears on its upper margin a single plumose seta*. The ends of the third, last, and of the basal joints bear each a plumose hair on the underside. In the male the basal joint wants the plumose seta. The posterior antennæ have the primary branch much shorter than the secondary; the secondary branch 5-jointed; the first and last joints are large, the three intermediate ones very small, both branches furnished with long plumose hairs. Mandibles elongate, bearing numerous small teeth at the distal ends; mandible-palp stout, 2-branched, both branches furnished with plumose hairs, the basal part with three short hairs on its inner aspect. Maxillæ large, foliaceous. Anterior foot-jaws short, truncate; joints crowded, not clearly defined, setiferous, the apical part bearing one long, faintly serrate, spiniform, curved appendage; and a number of peculiar, cylindrical processes (sense-

* "Das basale Glied trägt im weiblichen Geschlechte eine befiederte Borste," Claus, *loc. cit.* p. 189.

organs ?), densely ciliated at the extremity; posterior foot-jaw in the female slender, 6-jointed, the last two joints very small. Three long setæ, plumose along the upper edge, spring from the terminal joints; the basal joints are sparingly setiferous; the posterior foot-jaw is stouter in the male, and the terminal joints bear a much larger number of setæ. First pair of swimming-feet 2-branched, the outer 3-jointed, the inner 2-jointed; both branches with numerous stout plumose setæ, the terminal spine of the outer branch slender, and faintly serrate on the outer margin. The inner branch of the second pair 2-jointed, of the third and fourth pairs 3-jointed and armed on the side with fascicles of short, stout, and sharp-pointed spines; the outer branches foliaceous and bearing several strong spines on the exterior margin, one at the base of the first and second joints, and three on the last joint; the terminal spines of the outer branches of the second, third, and fourth pairs broad, falciform, the outer margin faintly serrate. The fifth pair wanting in the female, in the male simple, 1-branched, 5(?)-jointed, the left branch longer and stouter than the right, with the last joint small and fringed with hairs; the right branch terminates in a slender spine. Abdomen in the male 5-, in the female 4-jointed, the last joint the smallest. Caudal stylets short, divergent, and furnished with several plumose setæ, the second seta from the inside being much longer than the others.

Habitat. Station 9, 25 and 50 fathoms, January 10th (day collections). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 35, 60, and 360 fathoms, January 22nd (day collections). Station 23, surface, 20 and 85 fathoms, February 5th (day collections). These were the only gatherings in which *Phaënna spinifera* was obtained.

The ciliated processes of the anterior foot-jaws resemble somewhat the worm-like sense-organs of the same appendages in *Scolecithrix*, but instead of being produced so as to form lengthened hair- or "worm-"like processes, as in that genus, they are cylindrical and truncate, and furnished with a terminal fascicle of delicate cilia.

Subfamily Pontellinæ, Dana.

Genus Labidocera, Lubbock, 1853.

Pontella, Dana (in part), Amer. Journ. Sci. 1846; Claus, Die freilebenden Copep. 1863; Brady, Monogr. Brit. Copep. 1878; id. Report Chall. Copep. 1883.

Labidocera, Lubbock, Ann. & Mag. Nat. Hist. ser. 2, vol. xi. (1853).

Labidocera detruncata (Dana), var. intermedia. (Pl. VI. figs. 36–38; Pl. VII. figs. 3, 4.)

Length 3 mm. Cephalothorax elongate-ovate, the postero-lateral angles of the last thoracic segment produced, acute. Anterior antennæ in the female 23-jointed, the upper margin of the first eight or nine joints furnished with moderately short, plumose setæ, and the lower margin with a fringe of delicate hairs extending to the 12th joint. Right anterior antennæ of the male 17-jointed, hinged between the 13th and 14th

joints, the upper margins of these joints minutely denticulate (a $\frac{1}{4}$-inch objective is required to see the denticulation distinctly). The 12th joint is not denticulate. Mandible strongly toothed; the distal end is covered exteriorly with numerous short spinous setæ arranged in oblique rows; the two inner teeth of the mandible are large and wide apart. The posterior foot-jaws are somewhat similar to those of *Labidocera acuta*, Dana. The third segment of the right fifth foot of the male has the base produced into a long stout spine, and at the distal end is furnished with a long curved and slender appendage, bearing two short claw-like processes at its extremity. The left foot is 3-jointed; the second joint is shorter than the first, the third is about equal in length to the second and somewhat triangular in shape; the apex terminates in three teeth, the middle one being the longest. The fifth pair in the female are intermediate between *Labidocera detruncata* and *Labidocera acutifrons*, Dana. Abdomen in the male 4-jointed, in the female 3-jointed; the middle segment in the female large and tumid, the last segment of the male abdomen smaller than the other three, which are subequal in length.

The form here described differs from *Labidocera detruncata*, as described and figured in the 'Challenger' Report, in the following particulars:—the right anterior male antenna differs in the proportional length of the joints and in the absence of the prominent denticulations on the 12th, 13th, and 14th joints, but especially on the 12th, and also in the postero-lateral angles of the last thoracic segment being acutely and strongly produced so as to resemble, in this respect, *Labidocera acutifrons*. The fifth pair of feet in the male of the variety here described resemble Dana's figure very closely, much more so than that of the specimen figured in the Report on the 'Challenger' Copepoda.

Habitat. Lat. 5° 58′ N., long. 14° 20′ W., surface, January 6th (one day and one night collection). Off São Thomé Island (lat. 0° 32′ 7″ N., long. 6° 31′ 6″ E.), 10 fathoms, January 23rd (day collection). Lagoon, São Thomé Island, surface, January 27th and 28th (one day and one night collection). Lat. 1° 30′ 3″ S., long. 8° 8′ 6″ E., surface, February 3rd (night collection). Lat. 4° 55′ 9″ S., long. 10° 47′ 3″ E., surface, February 5th (night collection). Lat. 5° 56′ 5″ S., long. 11° 17′ 2″ E., surface, February 8th (night collection). Lat. 6° 39′ 5″ S., long. 11° 24′ 7″ E., surface, February 8th (night collection).

This was comparatively a rare species in the 'Buccaneer' collection. The above is a full list of the localities where it was obtained.

Labidocera Darwinii (Lubbock). (Pl. VI. figs. 39–42; Pl. VII. figs. 5, 6.)

1853. *Labidocera Darwinii*, Lubbock, Ann. & Mag. Nat. Hist. ser. 2, vol. ii. p. 29, pl. i. figs. 1–11.
1892 ?. *Labidocera Lubbockii*, Giesbrecht, Pelag. Copep. Golfes von Neapel, p. 459, pls. 23, 25, 41.

Length, male 2·2 mm., female 2·4 mm. The forehead is broadly rounded, and does not possess any angular median projection. The last thoracic segment has the lateral angles considerably produced, and in the male more so on the right side than the left, but the

same on both sides in the female. Anterior antennæ 24-jointed; the two basal joints are moderately stout and large, several of the succeeding joints are very short, while from the 16th to the end all the joints, but especially the 18th and 19th, are elongate and slender. The approximate proportional lengths of the joints are shown in the formula :—

7	10	1	1	1	1	2	2	3	3	3	4	5	5	6	9	9	10	11	8	7	7	6	6
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

The middle joints of the right male antenna are slightly swollen; the 3rd joint has a number of indistinct articulations; the 9th and 10th joints, between which is a distinctly hinged articulation, are furnished with marginal appendages that are toothed along the upper edge; the free portion of the appendage of the 9th joint extends backward the whole length of the preceding joint, while that of the 10th joint projects only a little forward beyond the joint to which it belongs; the 7th joint is about twice the length of the preceding one, and equal to the next; the 9th is a little shorter than the 8th, and about half the length of the 10th; the 11th is about two thirds the length of the 10th, and equal to the next two together. The marginal teeth on the appendage of the 9th joint spring from the distal end of a quadrangular base; the basal parts of the teeth are closely applied to each other, end to end, as shown in the enlarged drawing; the marginal teeth on the appendage of the 10th joint are somewhat conical in shape, and are slightly curved forward. The apical portion of the posterior foot-jaw is 4-jointed (Pl. VI. fig. 39). The first joint of the right fifth foot of the male (fig. 41) has a broad triangular outline, and part of the outer angle is, as it were, cut off to form an attachment for the next joint; the last joint is considerably swollen, so that the inner margin forms an elevated arch; a stout curved and spoon-like claw is articulated to the exterior portion of the joint, and the claw is opposed by a produced basal process so as to form a prehensile organ closely resembling the beak of a bird, and giving to the whole joint somewhat the appearance of an enlarged "bird's-head process" observed in species of Polyzoa. The last joint of the left foot has a bifid apex and a small blunt-pointed tooth on its outer margin; part of its inner surface is covered with fine cilia, while the inner angle of the second joint is produced in the form of a ringed (? sexual) process. Fifth pair in the female simple, the basal joints stout, with a small seta on the proximal half; outer branches elongate, attenuated towards the pointed apex, and furnished exteriorly with a comparatively large subapical spine, and with a minute spine on the interior edge. The inner branches are small, curved, stoutly spiniform, and not half the length of the outer branch. The abdomen in the male is composed of four, in the female of two segments, as shown in Pl. VI. fig. 42 and Pl. VII. fig. 5. In the female the caudal stylets are unequal in length; the fourth caudal seta, counting from the outside, in both male and female, but especially the former, is considerably longer than the others (fig. 42). In all the female specimens obtained an apparently structureless membrane of an irregular outline covered the greater portion of the abdomen, and extended beyond the stylets to about halfway over the caudal setæ, as shown in fig. 42.

Habitat. Libreville, Gaboon River, in surface tow-net material collected after midday, January 28th.

Though the *Labidocera* now described differs in one or two points from Sir John Lubbock's *Labidocera Darwinii*, especially in the number of joints of the apical portion of the posterior foot-jaws, yet its agreement with that species is closer than with *Labidocera acutifrons*, Dana; the 'Buccaneer' specimens have therefore been ascribed provisionally to Lubbock's species.

Labidocera acutifrons (Dana).

1852. *Pontella acutifrons*, Dana, Crust. U.S. Expl. Exped. p. 1149, pl. lxxx. figs. 11 *a–h*.
1883. *Pontella acutifrons*, Brady, Report Chall. Copep. p. 91, pl. xxxv. figs. 1–13.

Habitat. Lat. 5° 10′ N., long. 3° 56′ 2″ W., surface (close inshore), January 12th (night collection). Near Appi (Porto Novo), surface, January 18th (day collection). Libreville, Gaboon River, surface, January 28th (two day collections). Bananah Creek, Congo River, surface, February 7th (day collection). Lat. 7° 54′ 6″ S., long. 12° 14′ 7″ E., surface, February 9th (night collection).

This *Labidocera* was obtained in 24 tow-nettings, 20 of which were surface and 4 under-surface gatherings; one of the under-surface gatherings was from $2\frac{1}{2}$ fathoms (day collection), one from 3 fathoms (night collection), one from 10 fathoms (day collection), and one from 50 fathoms (day collection). 10 of the surface-gatherings were day, and 10 were night collections, as in the formula :—

Tow-nettings 24 { 20 surface { 10 day collections. / 10 night ditto. } / 4 under-surface { 3 day ditto. / 1 night collection. }

Labidocera acutifrons was comparatively a rare species, though generally distributed throughout the area examined.

Labidocera acuta (Dana).

1859. *Pontella acuta*, Dana, Crust. U.S. Expl. Exped. p. 1150, pl. lxxx. figs. 12 *a–c*.
1883. *Pontella acuta*, Brady, Report Chall. Copep. p. 89, pl. xxxvi. figs. 1–12.

Habitat. Libreville, at the mouth of the Gaboon River. Only one or two specimens of what appeared to be this species were obtained.

Genus Pontella, Dana, 1846.

Pontia, Milne-Edwards, Hist. Nat. des Crust. (1828).
Pontella, Dana (in part), Amer. Journ. Sc. (2) vol. i. (1846); Brady (in part), Report 'Challenger' Copepoda, 1883; Giesbrecht, Fauna und Flora des Golfes von Neapel (Pelagische Copepoden), 1892.

Pontella inermis, Brady.

1883. *Pontella inermis*, Brady, Report Chall. Copep. p. 95, pl. xlv. figs. 10–15.

Habitat. Lat. 5° 10′ N., long. 3° 56′ 2″ W., surface (close inshore), January 12th

(night collection). Station 24 (off the mouth of the Congo), surface, February 6th (two day collections). Also in surface gatherings collected on the 8th February at the following localities :—Lat. 5° 56′ 5″ S., long. 11° 17′ 2″ E.; lat. 5° 54′ 4″ S., long. 10° 50′ 7″ E.; lat. 6° 3′ 3″ S., long. 11° 7′ 5″ E.; lat. 6° 29′ 4″ S., long. 11° 24′ 8″ E.; lat. 6° 39′ 5″ S., long. 11° 24′ 7″ E.; and on the 9th February at lat. 7° 38′ S., long. 12° 3′ 3″ E.

Pontella inermis was observed only in tow-nettings from the localities described above. They were all surface gatherings, and comprised four day and five night collections.

Pontella securifer, Brady.

1883. *Pontella securifer*, Brady, Report Chall. Copep. p. 96, pl. xlv. figs. 1–9.

Habitat. Lat. 3° 57′ 2″ N., long. 7° 42′ 8″ W., 2 fathoms, January 9th (night collections). Lat. 0° 22′ 4″ N., long. 7° 59′ 8″ E., surface, January 29th (day collection). Station 23, surface, day collection, February 5th. Lat. 5° 56′ 5″ S., long. 11° 17′ 2″ E., surface, February 8th (night collection), also on the same date at lat. 6° 3′ 3″ S., long. 11° 7′ 5″ E., surface (day collection); lat. 6° 23′ 3″ S., long. 11° 3′ 8″ E., surface (day collection); lat. 6° 29′ 4″ S., long. 11° 24′ 8″ E., surface (night collection). On the 9th February at lat. 7° 38′ S., long. 12° 3′ 3″ E., surface (night collection); lat. 8° 36′ 8″ S., long. 12° 57′ E., surface (day collection); and on February 18th at lat. 5° 53′ S., long. 11° 31′ 1″ E.

All the tow-nettings in which *Pontella securifer* was obtained were surface gatherings, and comprised five day and four night collections. This species is readily distinguished from the other *Pontellæ* by the remarkable "hatchet-shaped" appendage of the right male antennæ. A few specimens only of this interesting species were obtained.

Pontella (?) mediterranea (Claus), var. gaboonensis, nov. var. (Pl. V. figs. 43–48.)

1863. *Pontellina mediterranea*, Claus, Die freilebenden Copepoden, p. 211, t. ii. figs. 8–10, t. iii. fig. 8, t. xxxvi. figs. 11, 12.

Male. Length 2·5 mm. Rostrum with prominent frontal eye as in *Pontella securifer*, Brady. The posterior thoracic angles scarcely produced. Anterior antennæ not reaching to the end of the thorax; that of the left side 24-jointed; the first and second joints are moderately stout, the third to the eleventh are short, while the 17th, 18th, 19th, and 22nd are longer than any of the others with the exception of the basal joints, as shown by the annexed formula :—

Left anterior antenna.	22.	14.	4.	4.	4.	4.	4.	4.	5.	5.	4.	8.	8.	8.	10.	14.	15.	18.	19.	14.	13.	15.	10.	13
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Several of the small proximal joints are furnished with moderately long plumose setæ on the upper edge, and a fringe of fine hairs or cilia on the lower margin (fig. 44). The sixth, seventh, and eighth joints of the right antenna are abruptly and considerably dilated; the first of the three, which is also the shortest, bears a stout elongate spine on its upper edge (fig. 45). The tenth and eleventh joints, which are long, and connected together by a hinged articulation, are finely toothed along the upper margin; the denticulations of the tenth joint appear to be bifid, as shown by the figure; the penultimate

joint is as long as the preceding and fully twice the length of the terminal joint. The joints of the apical portion of the posterior foot-jaws gradually decrease in length towards the extremity; the first joint is about twice the length of the third, the second is as long as the third and fourth together, the terminal joint is very small (fig. 46). Inner branches of the first pair of swimming-feet 3-jointed, and not longer than the first two joints of the outer branch. Inner branches of the second, third, and fourth pairs 2-jointed. The basal angle of the short, tumid, terminal joint of the right fifth foot is produced into a moderately long digitiform process, which appears to interlock with the spoon-like apical part of the stout angularly curved terminal claw. The last joint of the left foot is furnished with three stout apical spines, one of which is short, while the longer one of the other two is about equal in length to the terminal joint (fig. 48). Abdomen composed of four (? five) segments, the first and third segments are considerably longer than the others. Caudal stylets longer than the third abdominal segment; the fourth seta of each stylet (counting from the outside) is about twice the length of the others.

Habitat. Libreville, at the mouth of the Gaboon River, in two surface gatherings—one being collected near the highest point reached.

Figure 47 shows the fifth feet of an immature female from the same locality. Only three female specimens were obtained, which were all immature.

The *Pontella* here described seems to be nearly identical with *Pontellina mediterranea*, Claus, except that Claus's specimens were larger—4 mm. There is also a difference in the number of joints that precede the three swollen ones of the right male antenna: Claus describes the three swollen joints as "vom dreizehnten bis funfzehnten Gliede," but in the 'Buccaneer' specimens it is the sixth to the eighth joints that are swollen. Moreover, there is some difference in the armature of the prehensile part of the right fifth foot; in the 'Buccaneer' specimens the "eight large and numerous small boat-like knobs" described by Claus are wanting. But as these differences are comparatively unimportant, and may be due to local causes, there appears to be no sufficient reason to consider the 'Buccaneer' specimens distinct from *Pontella mediterranea*, Claus, except as a local variety.

Genus Pontellopsis, Brady.

(*Pontellopsis*, Brady, 'Challenger' Copepoda, p. 85, 1883.)
? *Monops*, Lubbock, 1853.

Pontellopsis villosa, Brady. (Pl. VI. figs. 29–34.)

Pontellopsis villosa, Brady, op. cit. p. 86, pl. xxxiv. figs. 10–13, pl. xxxv. figs. 14–20.

Male. Length 1·85 mm. Right anterior antenna somewhat like that of *Pontella plumosa*, Dana, but differing in the armature and in the number and proportional length of the joints (fig. 34). The left anterior antenna, the posterior antennæ, mouth-organs, and swimming-feet are similar to those of the female (see also pl. xxxv. figs. 14–20,

of the 'Challenger' Copepoda). The annexed formula shows the proportional lengths of the joints of the left anterior antenna, which is 18-jointed :—

5	7	6	7	4	4	4	4	3	6	7	8	9	6	6	7	7	7
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

The fifth pair of feet are nearly like those of *Pontella plumosa*; the most obvious difference between them is in the size and proportional length of the joints. Abdomen stout, short, and composed of five segments; the first is rather longer than the combined length of the next two; the second, third, fourth, and fifth segments are nearly equal in length. Caudal stylets about equal in length to the three preceding abdominal segments.

Pontellopsis villosa was obtained in 21 tow-nettings from various parts of the area traversed by the 'Buccaneer,' between lat. 5° 58′ N., long. 1° 4′ 10″ W., and lat. 5° 9′ 8″ S., long. 11° 10′ 4″ E., all of which, except one from 10 fathoms, were surface-gatherings. The number of day and night collections are as follows :—

Tow-nettings 21 { 20 surface { 9 day collections. / 11 night ditto. / 1 under-surface (10 fathoms) { 1 day collection. / 0 „ ditto.

The genus and species were described by Dr. Brady from female specimens, of which only three were obtained. In the 'Buccaneer' collections a considerable number of specimens were observed, but comparatively few of them were females, and none of them reached the dimensions of those described in the 'Challenger' Copepoda; the females also wanted the peculiar lateral abdominal appendage possessed by the 'Challenger' specimens; otherwise, however, the 'Buccaneer' specimens (females) agree in every respect with those described and figured in the 'Challenger' Report. The last three thoracic segments of all the 'Buccaneer' specimens possess a brownish coloured mark of an irregular outline on each side of the median dorsal line, as shown in figure 29. The abdomen in the females is also commonly distorted, and the first segment is furnished with two small protuberances; the form and size of the caudal stylets are also more or less unequal.

Dr. Giesbrecht* considers *Monops*, Lubbock, to be synonymous with *Pontellopsis*, Brady, and as *Monops* is prior to the other he substitutes it for *Pontellopsis*.

Genus Pontellina, Dana, 1852.

Pontella, Brady (in part.), Report on the 'Challenger' Copepoda, 1883.
Pontellina, Giesbrecht, Fauna und Flora des Golfes von Neapel (Pelagische Copepoden), 1892.

Pontellina plumata, Dana.

1852. *Pontellina plumata*, Dana, Crust. U.S. Expl. Exped. p. 1135, pl. lxxix. figs. 10 *a–d*.

* 'Fauna und Flora des Golfes von Neapel (Pelagische Copepoden),' p. 486.

1852. *Pontella turgida*, ♂, Dana, loc. cit. p. 1136, pl. lxxix. figs. 11 *a*, *b*, figs. 12 *a*, *b*.
1883. *Pontella plumata*, Brady, Report Chall. Copep. p. 92, pl. xxxvii. figs. 1–11.

Habitat. Station 3, 25 fathoms, January 2nd (day collection). Station 9, 25 fathoms, January 10th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10, 20, 30, 260, and 360 fathoms, January 22nd (day collections). Station 23, 10 and 185 fathoms, February 5th (day collection). Lat. 8° 36′ 8″ S., long. 12° 57′ E., surface, February 13th (day collection), &c.

Pontellina plumata occurred in 67 tow-nettings, 39 of which were surface and 28 under-surface gatherings. The under-surface gatherings ranged from 2½ to 360 fathoms; 16 of the surface and 21 of the under-surface were day collections, while 23 surface and 7 under-surface were night collections, as shown by the annexed formula :—

Tow-nettings 67 { 39 surface { 16 day collections. / 23 night ditto. / 28 under-surface { 21 day ditto. / 7 night ditto.

This species was abundant in the 'Buccaneer' collection, both sexes being frequent. Its distribution was co-extensive with the area examined.

Family CYCLOPIDÆ.

Genus Oithona, Baird.

Oithona, Baird, Zoologist, 1843.

Oithona Challengerii, Brady.

1883. *Oithona Challengerii*, Brady, Report Chall. Copep. p. 97, pl. xl. figs. 1–10.

Habitat. Station 2, 5 fathoms, January 1st (night collection). Station 9, 50 fathoms, January 10th (day collection). Station 18, surface, February 3rd (day collection). Station 23, surface, February 5th (day collection). Lat. 5° 53′ S., long. 11° 31′ 1″ E., surface, February 18th (night collection), &c.

O. Challengerii seemed to be distributed all over the area examined; in some tow-nettings it was rather rare, but in others frequent. Considerable care was necessary in diagnosing the species, owing to the close resemblance between it and others of the same genus, and to their being so long immersed in spirit, which rendered it very difficult to make out the number of joints in the antennæ.

Oithona plumifera, Dana.

1852. *Oithona plumifera*, Dana, Crust. U.S. Expl. Exped. p. 1100, pl. 76.

Habitat. Lat. 4° 31′ 6″ N., long. 6° 4′ 4″ W., 25 fathoms, January 11th (day collection). Lat. 3° 58′ N., long. 3° 42′ W., 50 fathoms, January 13th (day collection). Lat. 2° 22′ 2″ S., long. 7° 45′ E., 20 fathoms, February 3rd (day collection). Station 21, surface, February

4th (day collection). Station 22, 20 fathoms, February 4th (day collection). Station 24, surface, February 6th (day collection). Lat. 7° 38′ S., long. 12° 3′ 3″ E., surface, February 9th (night collection).

This *Oithona* has long densely plumose setæ of a persistent purplish colour, which are sufficiently conspicuous to enable the species to be readily distinguished. *Oithona plumifera*, though frequent in the tow-nettings in which it was observed, appeared to be somewhat rare generally, as the seven collections noticed above were the only ones in which it was obtained.

Oithona minuta, n. sp. (Pl. IX. figs. 14–25.)

Length, female ·64 mm., male ·5 mm. Body moderately stout, ovate. Anterior antennæ not reaching to the end of the thorax: in the female composed of nine distinct joints; the basal joint, which forms about a third part of the whole length of the antenna, is indistinctly divided into seven unequal portions by very faint lines that do not appear to be true joints. If these indistinct articulations be included the female antennæ will consist of fifteen joints, the proportional lengths of which are nearly as shown in the formula:—

$$\frac{(32.4.4.13.4.4.4).14.24.34.10.16.6.12.11}{(1.2.3.4.5.6.7).8.9.10.11.12.13.14.15}.$$

The figures in parentheses refer to the indistinct pseudo-articulations observed in the elongate basal joint. Male antennæ 11-jointed, hinged between the ninth and tenth joints (fig. 16). Posterior antennæ nearly as in *Oithona spinirostris*, Claus (fig. 17) The principal branch of the mandible-palp is armed with two stout, curved, claw-like apical appendages bearing minute marginal spines; the accessory branch is 4-jointed and furnished with several long plumose setæ (fig. 19). The biting part has on one side a short, stout, submarginal tooth, and on the other side a spiniform seta at the apical angle fully twice the length of the apical teeth (fig. 18). Anterior and posterior foot-jaws nearly as in *Oithona Challengerii* or *Oithona spinirostris*, as are also the swimming-feet. The feet of the fifth pair in the female are bisetose, with moderately long plumose setæ; those of the male very minute, with two very small setæ. Abdomen of the female 4-, of the male 5-jointed; stylets as long as the last abdominal segment; the last abdominal segment and stylets in the male are a third shorter than in the female, the tail-setæ in the male are also much shorter than in the female (figs. 24, 25).

This minute but distinct *Oithona* was obtained in a tow-net gathering collected at Bananah Creek, Congo River, February 7th; the sp. gr. of the water was only 1·00870. In two tow-net gatherings from the seaward portion of Loanda Harbour, February 15th, surface-temperature of the water at noon 79·2 F.: the Loanda Harbour tow-net gatherings were collected during the afternoon. *Oithona minuta* was moderately common in these last two gatherings, and many of the females carried ovisacs.

Oithona setigera, Dana.

1852. *Oithona setigera*, Dana, Crust. U.S. Expl. Exped. p. 1101, pl. 76.

Habitat. In tow-net gatherings from 50 fathoms, lat. 3° 58′ N., long. 3° 42′ W. (temperature 61°·45 F., sp. gr. 1·02531), collected between 8 A.M. and 1 P.M., January 13th; and from 360 fathoms, lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E. (temperature about 43° F.), collected January 22nd. *Oithona setigera* was also obtained in a few other gatherings, but was much less frequent than *Oithona Challengerii*.

Subfamily Longipediinæ, Boeck.

Genus Longipedia, Claus (1863).

Longipedia minor, T. & A. Scott. (Pl. XII. figs. 10–13.)

1882. *Longipedia coronata*, Giesbrecht, Die freileb. Copepoden der Kieler Föhrde, p. 99, pls. i., iv., xii.
1893. *Longipedia coronata*, var. *minor*, T. & A. Scot, Ann. Scott. Nat. Hist. vol. ii. pt. 2, p. 93.
1893. *Longipedia coronata*, var. *minor*, T. Scott, xi. Ann. Rept. Fishery Board for Scotland, pt. iii. p. 200, pl. ii. figs. 14–20.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms, tow-net gathering, collected January 22nd. Loanda Harbour, in three surface tow-net collections, February 15th. Four or five specimens in all were obtained; they differed considerably from *Longipedia coronata* as described by Drs. Claus and Brady.

Genus Microsetella, Brady & Robertson (1873).

Microsetella, Brady & Robertson, Ann. & Mag. Nat. Hist. ser. 4, vol. xii. p. 130 (1873).
Ectinosoma, Brady (in part), Mon. Brit. Copepoda, vol. ii. p. 13; id. Report on the 'Challenger' Copepoda, p. 100 (1883).

Microsetella atlantica, Brady & Robertson.

1873. *Microsetella atlantica*, Brady & Robertson, Ann. & Mag. Nat. Hist. ser. 4, vol. xii. p. 130, pl. ix. figs. 11–16.
1880. *Ectinosoma atlanticum*, Brady, Mon. Brit. Copep. viii. p. 13, pl. xxxviii. figs. 11–19.
1883. *Ectinosoma atlanticum*, id. Report Chall. Copep. p. 100, pl. iv. figs. 10–14.

Habitat. Lat. 7° 33′ N., long. 15° 18′ W., surface, January 2nd (night collection). Lat. 3° 58′ N., long. 3° 42′ W., 50 fathoms, January 13th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms, January 22nd (day collection). Lat. 6° 47′ 5″ S., long. 11° 30′ 6″ E., surface, February 8th (night collection), &c.

Microsetella atlantica was observed in 40 tow-nettings, 19 of which were surface and 21 under-surface gatherings; 4 of the surface and 15 of the under-surface gatherings were day collections, while 15 of the surface and 6 under-surface were night collections, as shown by the annexed formula:—

Tow-nettings 40 { 19 surface { 4 day collections. / 15 night ditto. } / 21 under-surface { 15 day ditto / 6 night ditto. }

The under-surface tow-nettings included eighteen gatherings from $2\frac{1}{2}$ to 50 fathoms, and one at 185, 235, and 460 fathoms. This species appeared to be distributed all over the area examined, and was comparatively frequent in some of the gatherings; females with ovisacs were not uncommon.

Canthocamptus roseus, Dana, probably belongs to this species. Dana's description (so far as it goes) and figure agree with *Microsetella atlantica*, but the description is too meagre to admit of a satisfactory comparison. There is a difference between the two as regards size and colour, but such differences are not of much value unless allied with structural differences.

Genus Ectinosoma, Boeck.

Ectinosoma, Boeck, Oversigt Norges Copepoder, 1864.
Ectinosoma, Brady (in part), Mon. Brit. Copep. vol. ii. p. 10.

Ectinosoma Chrystalii, n. sp. (Pl. IX. figs. 26–35.)

Length 1 mm. Body robust; anterior antennæ short, stout, furnished with numerous long setæ; 6-jointed, the third joint is somewhat longer than either the preceding or following; the last is smaller than the others and about two-thirds the length of the penultimate joint, truncate at the apex, and furnished with three long apical setæ. The long middle joint of the posterior foot-jaw is setose on the upper edge, and a long plumose seta that extends beyond the apex of the foot-jaw springs from the upper distal angle of the first joint; last joint short, provided with three setæ (fig. 34). The second basal joints of the first pair of swimming-feet are furnished interiorly with a setose spine that extends nearly to the middle of the second joint of the inner branches; the outer branches, which are comparatively short, reach only to the end of the second joint of the inner branches, and the spines on the exterior edge are elongate and sharp-pointed, otherwise the first pair closely resemble those of *Ectinosoma spinipes*. The second basal joint of the fourth pair is somewhat produced and armed exteriorly with an elongate setose spine; the branches of the fourth pair are nearly of equal length, and armed similar to the first pair, except that the exterior marginal spines of the outer branches are not elongate nor setose. Fifth pair nearly as in *Ectinosoma melaniceps*, Boeck. Caudal stylets about equal in length to the last abdominal segment; the inner of the two principal caudal setæ considerably longer than the other.

Habitat. Station 3 (lat. 7° 1′ 1″ N., long. 15° 54′ W.), 25 fathoms, collected between 9 A.M. and 5.30 P.M., January 2nd.

Several specimens, all females, were obtained in this gathering. The species is named after Professor Chrystal, who designed a tow-net used in collecting some of the material from which the Copepoda described in this Report were obtained.

Genus Bradya, Boeck, 1872.

Bradya, Boeck, Nye Slægter og Arter af Saltvands-Copepoder, 1872.

Bradya brevicornis, sp. n. (Pl. IX. figs. 36–43.)

Length 88 mm. Somewhat similar in form to *Bradya typica*, Boeck. Anterior

antennæ short, stout, upper edge fringed with long setæ, 7-jointed, the second joint shorter than, and having the upper distal angle produced so as to extend considerably over, the next joint; the fourth joint is much shorter than either the preceding or following joints; the last joint is very small and bears two long terminal setæ. In the 2-jointed secondary branches of the posterior antennæ the distal joint is about twice the length of the proximal one (fig. 38). The anterior foot-jaws are short and stout. The small terminal joint of the posterior foot-jaws bears two long, stout, blunt-pointed spines, ciliate on both edges, and a long, slender seta; a long, plain seta springs from the end of the first joint (fig. 10). The first four pairs of swimming-feet are nearly as in *Bradya typica*; the fifth pair are longer than broad, the apex of the second joint is obliquely truncate and furnished with two setæ, while the inner distal angle terminates in a stout conical spine. Caudal stylets about once and a half the length of the last abdominal segment. The inner of the two principal tail-setæ is about twice the length of the other; a small spiniform seta springs from the outer margin and near the distal end of each stylet.

Habitat. In a surface tow-net gathering from a lagoon, São Thomé Island, collected January 21st.

Subfamily Tachidiinæ, Boeck.

Genus Euterpe, Claus.

Euterpe, Claus, Die freilebenden Copepoden, 1863; Brady, Monog. Brit. Copep. 1880.

Euterpe gracilis, Claus, var. armata, n. var. (Pl. XII. figs. 14–23.)

Length ·9 mm. Body as in *Euterpe gracilis*, but with the rostrum more pyramidal, slightly curved. Anterior antennæ 7-jointed, shorter than the first body-segment. The proportional lengths of the joints as in the formula:—

$$\frac{5 \cdot 10 \cdot 8 \cdot 9 \cdot 6 \cdot 5 \cdot 9}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7}.$$

The fourth joint bears one and the last joint two slender sensory hairs at their distal end. The last three joints also bear a number of long plain setæ. Posterior antennæ 1-jointed, the first two short, the third and fourth longer, subequal; a small 1-jointed secondary branch springs from near the end of the second joint. The mouth-organs and swimming-feet are similar to those of *Euterpe gracilis*, but with the following differences:— The second joint of the inner branches of the first pair of swimming-feet bears a moderately long and stout setiferous terminal spine, which is curved outwards; near the middle of the same joint is a curved transverse row of setæ extending from the outer margin to fully halfway across the joint. The extremity of the outer branches of the second pair is furnished with a long spine, finely serrate on the outer edge, a shorter setiferous spine, a long slender plumose seta, and several small setose spines; the inner branches also bear a row of small spines at their extremities in addition to the plumose hairs. The inner branches of the third and fourth pairs are each armed with a long, stout, strongly seti-

ferous, and straight terminal spine, in addition to several smaller spines and a slender plumose seta. The extremity of the outer branches bears a long curved spine, serrate on the outer edge, two smaller dagger-like spines, and a plumose hair; these smaller spines and the spines at the outer distal angles of the first and second joints are strongly serrate on both margins. A row of spinous setæ extends obliquely across the lower middle portion of the last joint of the inner branches of the fourth pair as well as round the extremity of the joint. The fifth pair as in *Euterpe gracilis*, but with only one short and three long dagger-like terminal spines. A moderately long seta springs from the external margin and near the base of each branch, and a row of small spines extends obliquely from the marginal seta to fully halfway across the segment; moreover, the extremity and inner margin of each branch are fringed with short spinous setæ. Ovisac single, large, containing numerous ova.

Habitat. Station 9, 50 fathoms, January 10th (day collection). Off Accra, surface, 1 day and 1 night collection; 3 fathoms, 1 day and 1 night collection, January 16th. Lagoon, São Thomé Island, surface, January 27th (night collection). Station 23, 235 fathoms, February 5th (day collection). Loanda Harbour, surface, February 15th (day collection).

This species was obtained in 29 tow-nettings, 16 of which were surface and 13 under-surface gatherings; 4 of the surface gatherings were collected during the day and 12 during the night, while 10 of the under-surface were collected during the day and 3 during the night, as shown by the annexed formula :—

Tow-nettings 29 { 16 surface { 4 day collections. / 12 night ditto. } / 13 under-surface { 10 day ditto. / 3 night ditto. }

The under-surface gatherings were from depths ranging from $2\frac{1}{2}$ to 235 fathoms.

The form here described, though agreeing generally with *Euterpe gracilis*, differs in several important points, as, for instance, in the proportional length of the joints of the anterior antennæ, in the inner branches of the third and fourth pairs of swimming-feet being furnished with prominent, strongly setiferous, terminal spines, and in the fifth pair possessing four instead of five terminal spines. These differences, which are sufficiently characteristic to allow of the variety being readily distinguished, may ultimately be considered of specific value; meanwhile, however, I prefer to consider the 'Buccaneer' specimens as constituting a variety of *Euterpe gracilis*.

Subfamily Amymonin.e, Boeck.

Genus Amymone, Claus.

Amymone, Die freilebenden Copepoden, 1863; Brady, Monog. Brit. Copep. 1880.

Amymone Andrewi, n. sp. (Pl. XI. figs. 44–47; Pl. X. fig. 1.)

Length ·55 mm. Cephalothorax somewhat similar in form to *Amymone sphærica*, Claus, except that the last thoracic segment is more produced and does not bear any spine-like

processes. Anterior antennæ not longer than the first thoracic segment, 8-jointed, the proportional lengths as follows :—

$$\frac{24 \cdot 24 \cdot 18 \cdot 13 \cdot 6 \cdot 5 \cdot 3 \cdot 8}{1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6\ \ 7\ \ 8}.$$

The fourth joint bears a long sensory hair at its distal end, and two similar but rather small hairs spring from the extremity of the last joint. Posterior antennæ slender, 3-jointed, the second and third joints subequal, the last terminating in one long and one short, stout, claw-like seta ; the first joint bears at its distal end a small 1-jointed secondary branch possessing four apical setæ. The terminal joint of the first foot-jaws is slender, and furnished with several long plumose hairs and at the extremity with three stout spiniform setæ. A stout setiferous process springs from the end of the second last joint and reaches to the end of the spiniform setæ just described. Second foot-jaws 2-jointed, long, and powerful. The hands possess strong curved terminal claws, bearing below the middle portion one long and one short spinous seta. The basal part of the hands is produced outward into a stout, curved, spiniform process ; the hollow formed by this spiniform process bears a peculiar dilated appendage, furnished with several small spine-like tubercles on its outer surface. The inner margin of the hand is doubly and finely serrate. The integument is closely beset with minute tubercles, much more prominent and distinct than those of *A. sphærica*.

Habitat. Lagoon, São Thomé Island, surface, January 27th (night collection). Specific gravity of the water 1·0237 to 1·0255. One specimen only of this curious species was obtained : I was able to prepare the foregoing description without dissecting it.

The posterior foot-jaws in this species form powerful grasping-organs. The produced base of the hand acting as a sort of thumb and the terminal claw as a finger, with the dilated appendage in the hollow at the base of the hand acting as an interlocking arrangement, form together an elaborate and efficient instrument for grasping purposes, such as I have not observed in any other described species. This curious and interesting genus is represented in various and widely distant localities. It has been observed in various parts of the North Sea, as at Heligoland, Christiania, and several places on the English and Scotch coasts ; at Messina, Naples, and other localities on the Mediterranean coast (*Claus*) ; in the Gulf of Mexico (*Herrick*) ; and on the West Coast of Africa, as now recorded.

The species is named after my son Andrew Scott, who has assisted me so well with the preparation of this Report, and who discovered the only specimen of this genus obtained in the ' Buccaneer ' tow-nettings.

Subfamily Stenheliinæ, Brady (1880).

Genus Stenhelia, Boeck (1864).

Stenhelia, Boeck, Oversigt Norges Copepoder, 1864.

Stenhelia accraensis, n. sp. (Pl. X. figs. 2–12.)

Length ·85 mm. Body moderately robust ; first cephalothoracic segment considerably

longer than the entire length of the other four; rostrum prominent. Anterior antennæ short and stout, 9-jointed; the upper distal angle of the fourth joint is produced forward over the next, while the terminal joint is about as long as the total length of the preceding four; the relative lengths of the joints are nearly as shown in the formula:—

$$\frac{10 . 8 . 5 . 3 . 2 . 3 . 2 . 2 . 9}{1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6\ \ 7\ \ 8\ \ 9}.$$

Mandibles and maxillæ nearly as in *Stenhelia hispida*. Foot-jaws nearly as in *Stenhelia ima*. The swimming-feet are also nearly as in the last-named species, except that the proportional lengths of the joints are somewhat different; the first joint of the inner branches of the first pair is not longer than the outer branches and not much longer than the combined length of the second and third joints. The inner branches of the fourth pair are somewhat longer than the outer branches. The fifth pair closely resemble those of *Stenhelia ima* (fig. 11). Caudal stylets somewhat widely apart, about equal in length to the last abdominal segment, and furnished with four apical setæ (fig. 12).

Habitat. Accra, in a shore gathering, collected January 16th.

Subfamily Canthocamptinæ, Brady (1880).

Monograph of the British Copepoda, vol. ii. p. 47.

Genus Laophonte, Philippi (1840).

Laophonte, Philippi, Archiv für Naturgeschichte, 1840.
Cleta, Claus, Die freilebenden Copepoden, 1863.
Asellopsis, B. & R., Ann. & Mag. Nat. Hist. vol. xii. 1873.

Laophonte serrata (Claus). (Pl. XII. figs. 24–28.)

1863. *Cleta serrata*, Claus, loc. cit. p. 123, t. xv. figs. 13–20.
1880. *Laophonte serrata*, Brady, op. cit. vol. ii. p. 71, pl. lxxii. figs. 1–14.

Habitat. Accra, in a shore gathering, collected January 16th. This, though apparently widely distributed, is nevertheless a rare species. It has been obtained in a few British localities, but always sparingly.

The strong conical tooth-like process on the second joint of the anterior antennæ and the serrated margin of the third joint (fig. 25) are well-marked characters of the species.

Laophonte longipes, n. sp. (Pl. X. figs. 13–23.)

Length ·6 mm. Body elongate; anterior antennæ 7-jointed; the first three joints are together about equal to twice the entire length of the other four, and the last is about equal to the combined length of the two preceding joints. The relative lengths of the joints are nearly as follows:—

$$\frac{6 . 7 . 7 . 2 . 2 . 2 . 4}{1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6\ \ 7}.$$

The upper distal portion of the fourth joint is produced and forms the base of a sensory filament and one or two setæ. The secondary branch of the posterior antennæ is very short and provided with four setæ—three terminal and one subterminal. Mouth-organs nearly as in *Laophonte similis*, Claus. The outer branches of the first pair of swimming-feet 2-jointed, not reaching to the middle of the inner branches; the first joint is about two-thirds the length of the second. The inner branches of the fourth pair, which reach nearly to the end of the second joint of the outer branches, have the first joint fully half as long as the second, but the first and second joints of the outer branches are about equal in length. Fifth pair nearly as in *Laophonte curticauda*. Caudal stylets somewhat divergent; length about three times the breadth; principal tail-setæ elongate, two-thirds the length of the animal.

Habitat. In a shore gathering from São Thomé Island, collected January 25th at low water; and in a tow-net gathering from 20 fathoms off São Thomé, collected January 23rd.

Laophonte pygmæa, n. sp. (Pl. X. figs. 24–30.)

Length ·46 mm. (1-54th of an inch). Body elongate, slender. Anterior antennæ 7-jointed, nearly as in *Laophonte brevicornis*; the annexed formula shows the proportional lengths of the joints:—

$$\frac{6\,.\,7\,.\,7\,.\,2\,.\,2\,.\,3\,.\,4}{1\quad 2\quad 3\quad 4\quad 5\quad 6\quad 7}.$$

The posterior antennæ and mouth-organs are also nearly as in *Laophonte brevicornis*, except that the posterior foot-jaws have the second joint finely ciliate on the inner edge and furnished with a small seta near the middle of the exterior edge. Inner branches of first swimming-feet small, 2-jointed; inner branches of fourth pair very short, scarcely longer than the first joint of the outer branches, 2-jointed; the first joint is very small, and the apex of the second is provided with one stout terminal and two subterminal setæ. The outer branches are armed with a stout apical spine (fig. 28). Feet of the fifth pair nearly as in *Laophonte curticauda*, Boeck; outer margin and surface of basal joints ciliate. Caudal stylets somewhat divergent; their breadth is nearly equal to half the length, and each is provided with two stout apical setæ, the inner one being nearly double the length of the other.

Habitat. Shore, São Thomé Island, in the same gathering as the last.

Laophonte brevicornis, n. sp. (Pl. X figs. 31–37.)

Length ·58 mm. Body slender. Anterior antennæ 6-jointed, the fourth and fifth joints very short; the upper portion of the fourth is produced so as to extend to near the extremity of the following joint and form the base of a moderately stout sensory filament. The relative lengths of the joints are nearly as shown in the annexed formula:—

$$\frac{10\,.\,7\,.\,7\,.\,2\,.\,2\,.\,8}{1\quad 2\quad 3\quad 4\quad 5\quad 6}.$$

Second joint of posterior foot-jaws with a row of very fine cilia on the upper margin;

both the two joints and the terminal claws appear to be otherwise destitute of spines or setæ. Outer branches of first pair of swimming-feet 2-jointed, fully half the length of the first joint of the inner branches, the joints subequal; the length of the first joint of the inner branch is equal to nearly four times its breadth; the terminal claw is stout, and fully two-thirds the length of the first joint and nearly twice and a half the length of the second (fig. 34). The inner branches of the fourth pair, which are scarcely equal in length to the first joint of the outer branches, are composed of two nearly equal joints —the first being the smaller of the two and possessing a moderately long seta on its inner edge; the last joint is furnished with two coarsely plumose terminal setæ and a similar seta on the inner and outer margin; the joints of the 3-jointed outer branches are subequal in length, but the middle one is the shortest of the three (fig. 35). The second joint of the fifth pair, which is considerably smaller than the basal joint, is broader at the distal than the proximal end, and furnished with six setæ round the exteriorly oblique apex; the basal joint is somewhat truncate at the apex and provided with three plain apical setæ and two coarsely plumose setæ on the lower portion of the inner margin (fig. 36). Caudal stylets about equal in length to the last abdominal segment and comparatively wide apart. Each stylet is furnished with one long and stout and a few small setæ; the length of the principal seta is equal to about once and a half the combined length of the stylet and last abdominal segment, and has the extremity curved outwards (fig. 34).

Habitat. In a shore gathering at Accra, collected January 16th.

Genus Cletodes, Brady (1872).

Cletodes, Brady, Nat. Hist. Trans. Northumb. & Durham, 1872.
Lilljeborgia, Claus, Die Copepoden-Fauna von Nizza, 1866.
Orthopsyllus, Brady & Robertson, Ann. & Mag. Nat. Hist. vol. xii. 1873.

Cletodes linearis (Claus). (Pl. XII. figs. 29–32.)

1866. *Lilljeborgia linearis*, Claus, Die Copepoden-Fauna von Nizza, p. 22, t. ii. figs. 1–8.
1873. *Orthopsyllus linearis*, B. & R., Ann. & Mag. Nat. Hist. vol. xii. p. 138.
1880. *Cletodes linearis*, Brady, Brit. Copep. vol. ii. p. 95, pl. lxxx. figs. 1–14.

Habitat. Accra, in a shore gathering, collected January 16th. Loanda Harbour, in a surface tow-net gathering, collected February 13th.

This species, though numerically scarce, appears to have an extensive distribution. In 'British Copepoda' Professor Brady records it from Scilly Islands, also from Newry and Roundstone, Ireland, and Claus has recorded it from Nice.

Subfamily Harpacticinæ, Boeck (in part).

Oversigt Norges Copepoder, 1864.

Genus Dactylopus, Claus (1863).

Dactylopus, Claus, Die freilebenden Copepoden, 1863.
Dactylopus, Brady, British Copepoda, 1880.

Dactylopus latipes, n. sp. (Pl. X. figs. 38–43.)

Length 1·25 mm. (1-20th of an inch). Body moderately robust. First segment of the cephalothorax once and a half the entire length of the other four segments; rostrum slightly curved, stout, of moderate length. Anterior antennæ short, stout, 9-jointed; first joint large, the fourth provided with a long sensory filament; the proportional lengths of the joints nearly as in the formula :—

$$\frac{15 . 8 . 7 . 6 . 3 . 4 . 2 . 1 . 8}{1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6\ \ 7\ \ 8\ \ 9}.$$

Second foot-jaws short and stout; a plumose seta springs from near the inner distal angle of the first joint; the inner margin of the second joint is ciliate, and a small seta springs from the side and near the middle of the same joint (fig. 40); the terminal claw is provided with a slender seta near the base. First pair of swimming-feet nearly as in *Dactylopus tisboides*, Claus. The fifth pair consists of large foliaceous plates partly overlapping each other and forming, apparently, a kind of ovigerous pouch for the protection of the ova (fig. 42; see also fig. 38). Abdominal segments fringed with small teeth; their general surface is also more or less hispid. Caudal stylets about equal in length to the last abdominal segment and rather longer than broad. The inner of the two principal tail-setæ is equal to the entire length of the abdomen and stylets.

Habitat. Accra, in a shore gathering with *Dactylopus propinquus*, *Laophonte serrata*, *Stenhelia*, &c., collected January 16th.

Dactylopus propinquus, n. sp. (Pl. X. figs. 44–52; Pl. XI. figs. 1–3.)

Female. Length ·5 mm. (1-50th of an inch). Body moderately stout. Anterior antennæ short and stout, 6-jointed; the upper portion is produced and forms the base of a long sensory filament. The annexed formula shows the proportional lengths of the joints :—

$$\frac{8 . 5 . 8 . 2 . 4 . 6}{1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6}.$$

Posterior antennæ nearly as in *Dactylopus tisboides*, Claus (Pl. X. fig. 47). The first joint of the posterior foot-jaws bears two small spinous setæ on the inner margin and another at the inner distal angle; a row of small spinous setæ extends diagonally from near the outer edge at the proximal end to the upper edge near the distal end of the second joint; the terminal claw is stout and provided with a small seta on its inner aspect. The outer branches of the first swimming-feet consist of three nearly equal joints—the middle one being somewhat shorter than the first or third, the last two joints of the inner branches very short and armed with one stout terminal claw and a long seta; the exterior margin of both the last two joints bears several small spiniform teeth (fig. 49). The inner branches of the second, third, and fourth pairs are somewhat shorter than those of *Dactylopus Stromii* (Baird), but otherwise they resemble very closely the same swimming-feet of that species. The second joint in the fifth pair, which does not extend much beyond the apex of the basal joint, is subquadrangular in outline and furnished with five

long setæ on its outer nearly straight margin, and another on the inner lateral margin; the broadly triangular portion of the basal joint bears one apical and two subapical stout plain setæ, and two slender setæ spring from the anterior margin (fig. 50). Caudal stylets very short, fringed with long slender serræ; the longer of the two principal terminal setæ is fully twice the length of the abdomen. Ovisacs two.

Habitat. Accra, in a shore gathering collected January 16th. Off São Thomé Island, in a tow-net gathering from 20 fathoms, collected January 23rd, and in a tow-net gathering from a lagoon by the shore of São Thomé Island, collected January 23rd.

A form, which is probably the male of the *Dactylopus* now described, occurs in the same gatherings with it. The only important difference is in the anterior antennæ, which are somewhat longer and 8-jointed; they are hinged between the fifth and sixth joints. But though the anterior antennæ of the male usually consist of the same number of joints as in the female, and frequently of a fewer number, it occasionally happens that they are composed of more joints—as, for instance, in *Ilyopsyllus coriaceus* (Brady and Robertson *) and *Ilyopsyllus affinis*, described in this Report, in both of which the male antennæ consist of a greater number of joints than those of the female.

The first swimming-feet of the male of *Dactylopus propinquus* are similar to those of the female already described; the second pair resemble those of the male of *Dactylopus Stromii* (Baird). The first abdominal segment is provided with a pair of trispinose appendages as shown in Pl. XI. fig. 3 (see also Pl. X. fig. 44).

Genus Thalestris, Claus.

Thalestris, Claus, Die freilebenden Copepoden, p. 128 (1863).

Thalestris forficula, Claus. (Pl. XII. figs. 33–41.)

1863. *Thalestris forficula*, Claus, Die freilebenden Copepoden, p. 131, pl. xvii. figs. 7–11.

Habitat. In a shore gathering from Accra, collected January 16th.

The length (·5 mm.) of the 'Buccaneer' specimen is less than that stated by Claus, which is ·8 mm. The anterior antennæ are 8-jointed; the relative lengths of the joints being nearly as shown by the annexed formula:—

$$\begin{matrix} 9 & 8 & 6 & 5 & 4 & 4 & 3 & 4 \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{matrix}$$

The secondary branch of posterior antennæ 2-jointed. First pair of swimming-feet elongate, the inner branches considerably longer than the outer; terminal claws short and stout. Inner branches of the second, third, and fourth pairs shorter than the outer branches: in the fourth pair the inner branches reach only to about the end of the second joint of the outer branches, while the outer branches are long and slender, with a long slender terminal spine, ciliate on the outer edge (fig. 39). Second joint of the fifth pair

* Brit. Copep. vol. ii. pl. lxxxii. fig. 4.

elongate, larger than the basal joint and furnished with six plain setæ—two apical, two subapical, and two on the lower half of the outer margin (fig. 10). Caudal stylets very short; the basal part of the principal caudal setæ is distinctly gibbous, as shown in fig. 41. Claus also, *op. cit.*, describes and figures this character of the tail-setæ. He obtained *Thalestris forficula* at Messina.

Genus Ilyopsyllus, Brady & Robertson.

Ilyopsyllus, Brady & Robertson, Ann. & Mag. Nat. Hist. s. 4, vol. xii. p. 132 (1873).

Ilyopsyllus affinis, n. sp. (Pl. XI. figs. 4–17.)

Length ·5 mm. Body tumid, similar in form to *Ilyopsyllus coriaceus*, B. & R.; rostrum broadly triangular, furcate at the apex.

Anterior antennæ 5-jointed in the female, 8-jointed in the male; the produced upper distal portion of the dilated basal joint is more or less hispid and furnished with several spiniform setæ; a curved fold fringed with long stout serræ occurs near the distal end of the base, and extends from the upper margin downwards about two-thirds the breadth of the joint. In the female the three apical joints are of nearly equal length. The proportional lengths of the joints are nearly as shown in the formula:—

Female:	20	10	8	7	8			
	1	2	3	4	5	6	7	8
Male:	8	20	5	9	7	10	6	5

The third and fourth joints in the male are each provided with a long "olfactory" appendage, as are also the female antennæ, and these olfactory filaments appear to have a small joint near the proximal end, as shown by the figs. 4 and 5; posterior antennæ and mandibles nearly as in *Ilyopsyllus coriaceus*. Fig. 10 represents what appear to be the maxillæ and oral aperture. Figs. 11 and 12 represent what appear to be the anterior and posterior foot-jaws as observed in the dissections of the animal. The first four pairs of swimming-feet resemble those of *Ilyopsyllus coriaceus*, except that the middle joint of the outer branches of the first pair is somewhat longer than either the first or third joints. Fifth pair small, simple, obliquely truncate at the apex, with the lateral angles somewhat produced and bearing each a small spiniform seta, and a similar seta springs from the distal half of the outer margin; a transverse curved row of small spines extends nearly across the basal part of each foot (fig. 15). Abdominal segments fringed with stout cilia. Caudal stylets short, breadth about equal to the length, each furnished with two very short setæ and a long one, which is slightly spathulate at the base.

Habitat. In a shore lagoon at São Thomé Island, among species of Conferva.

Genus Harpacticus, Milne-Edwards (1838).

Harpacticus chelifer, ? var. (Pl. XII. figs. 42–46.)

1776. *Cyclops chelifer*, Müller, Zool. Dan. Prodr. 2413; Entomostraca, p. 114, t. xix. figs. 1–3.
1850. *Arpacticus*, Baird, Brit. Entom. p. 212, t. xxix. figs. 2, 3, 3 *a–g*.
1863. *Harpacticus*, Claus, Die freilebenden Copepoden, p. 135, t. xix. figs. 12–19.
1880. *Harpacticus*, Brady, Brit. Copep. vol. ii. p. 146, pl. lxv. figs. 1–15, pl. lxiv. figs. 10, 11.

A form of *Harpacticus* closely resembling *Harpacticus chelifer* was obtained in a shore gathering collected at Accra, January 16th, and in a tow-net gathering from 185 fathoms at Station 23, collected February 5th.

The chief point of difference seems to be the absence of the curved spines or "claws" on the inner distal margin of the last joint of the posterior foot-jaws; the inner margin of these foot-jaws is also not concave as in *H. chelifer*, but in all other respects the 'Buccaneer' specimens closely resemble that species.

Genus Miracia, Dana.

Miracia, Dana, Proceed. Amer. Acad. Sci. 1849.

Miracia efferata, Dana.

Habitat. Station 2, 50 fathoms, January 1st (night collection). Station 9, surface, 25 and 50 fathoms, January 10th (day collections). Station 14, 10 fathoms, January 21st (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10 to 360 fathoms, January 22nd (day collections). Lat. 6° 3′ 3″ S., long. 11° 7′ 5″ E., surface, February 8th (day collection).

This *Miracia* was observed in 49 tow-nettings, 18 of which were surface and 31 under-surface gatherings. The under-surface gatherings were from 3 to 360 fathoms, 8 of the surface and 21 of the under-surface tow-nettings were day collections, while 10 surface and 10 under-surface were night collections, as shown by the formula:—

Tow-nettings 49 { 18 surface { 8 day collections. / 10 night ditto. ; 31 under-surface { 21 day ditto. / 10 night ditto.

It was of frequent occurrence in several of the gatherings, and many of the specimens carried ovisacs.

Miracia minor, n. sp. (Pl. XI. figs. 18–30.)

Length ·93 mm. General form as of *Miracia efferata*, but not half the size. Anterior antennæ 8-jointed, slender in the female; the proportional lengths of the joints are as follows:—

$$\frac{18}{1}\,.\,\frac{15}{2}\,.\,\frac{13}{3}\,.\,\frac{19}{4}\,.\,\frac{14}{5}\,.\,\frac{20}{6}\,.\,\frac{11}{7}\,.\,\frac{15}{8}.$$

The joints bear from one to four setæ each, except the last, which has one on the upper and four on the lower side; it has also three terminal setæ. The seta which springs from the upper distal angle of the third joint is longer than those on the other joints except the last, and a long sensory filament springs from the upper distal angle of the fourth joint. In the male antennæ the first three joints are short, the third being shorter than either of the other two; the fourth is dilated and longer than the preceding three together; the fifth is short; the sixth long and slender; the seventh is very small; the eighth a little longer than the seventh and furnished with four terminal setæ; the male antennæ hinged between the fifth and sixth joints. The following are the proportional lengths of the joints :—

10	9	4	24	9	11	2	5
1	2	3	4	5	6	7	8.

Posterior antennæ 4-jointed—the last joint as long as the preceding two together, and ciliated along one of its margins. A small 1-jointed secondary appendage, furnished with two stout terminal setæ and a few marginal cilia, springs from the end of the second joint. Mouth-organs as in *Miracia efferata*, except that the posterior foot-jaws are 3-jointed and nearly alike in both sexes, but that of the male has a longer terminal claw; in neither, however, is the terminal claw so short as in *Miracia efferata*. The first pair of swimming-feet has the inner branches scarcely so long as the outer ones; the second joint of the outer branches is furnished with a moderately long plumose hair on the inner distal angle; the inner margin is fringed with short stout setæ, as are also the ends of the first and second joints. The second pair in the female resembles the third and fourth pairs, but are rather smaller. The inner branches of the second pair in the male are 2-jointed; the last joint bears one short terminal spine, and one on the lower half of the outer margin; on the inner margin are two long plumose hairs. The third and fourth pairs are similar in both sexes; the inner branches being shorter than the outer; all the joints of both branches are fringed with hairs on the external margin; the inner distal angle of the last joint bears a long, slender, non-plumose hair (or spine). The fifth feet small, foliaceous, 2-jointed; the proximal joint in the male is armed with two spinous setæ; the distal bears one long setiferous spine and two short spines, also a small hair on the inner aspect, as shown in the figure. In the female the proximal joint is armed with one long setiferous spine and four small spinous setæ (one of which is very minute); the distal joint is somewhat cylindrical in form, and is furnished with several setiferous spines at the extremity. Abdomen in the male 5-, in the female 4-jointed—the first two joints being coalescent in the female. The posterior margin of the last three segments, in both sexes, fringed with small spinous setæ. Caudal stylets rather longer than the last abdominal segment, each furnished with one moderately long setiferous and two shorter spines, besides several spinous setæ on the outer aspect near the middle of the stylet. At the extremity are one long and stout and one short setiferous spine and a number of spinous setæ; the long terminal setiferous spine is fully half as long again as the stylet.

Habitat. Station 23, 235 fathoms, February 5th (day collection).

Several specimens, a few carrying ovisacs, were obtained in this gathering, which was the only one in which *Miracia minor* was observed. It differs from both Dana's species, especially in the number and proportional lengths of the joints of the anterior antennæ.

Genus Machairopus, Brady.

Machairopus, Brady, Report on the 'Challenger' Copepoda, 1883.

Machairopus idyoides, Brady.

1883. *Machairopus idyoides*, Brady, Report 'Challenger' Copep. p. 104, pl. xli. figs. 1–12.

Habitat. The shore of São Thomé Island, January 31st (day collection).

This collection, which contained a very small quantity of weed and sand, yielded a number of *Harpacticidæ*, including two specimens of the *Machairopus*. The 'Challenger' specimens ("two or three only were found") were from Betsy Cove, Kerguelen Island.

The full and carefully figured details which accompany the description of this species make its identification comparatively easy and certain.

Genus Ægisthus, Giesbrecht, 1891.

Ægisthus, Giesbrecht, Fauna und Flora des Golfes von Neapel (Pelagische Copepoden), p. 573 (1892).
Thaumatopsyllus *, Scott, MS. name, 1892.

Body slender, elongate, and with a more or less sharp-pointed rostrum. Anterior antennæ slender, in the female about equal in length to the first body-segment, 6-jointed; in the male the anterior antennæ are longer, and consist of a greater number of joints. Posterior antennæ somewhat similar to those of *Miracia*, 3-jointed, and with a small 1-jointed secondary branch. Mandibles well developed, the broad biting apex irregularly toothed; mandible-palp (?) absent or very rudimentary. Posterior foot-jaws 5-jointed, the three apical joints very small; a long, stout, curved spine springs from the inner distal angle of the second joint; in the male the posterior foot-jaws are smaller than those of the female. Both branches of the first four pairs of swimming-feet 3-jointed and of nearly equal length; in the first pair in the female the articulation between the second and third joints is imperfect and indistinct. Fifth pair simple, 1-branched, 1- (or indistinctly 2-) jointed in the female; distinctly 2-jointed in the male. The tail-setæ of the species for which the genus is instituted are extremely long, and may or may not form a generic character. (*Note.*—This description was written before I saw Giesbrecht's work.)

Ægisthus longirostris, n. sp. (Pl. XI. figs. 31–44.)

Body elongate, slender, gradually tapering towards the posterior end; forehead produced into a long pointed rostrum. Caudal stylets short, each terminating in an

* *θαυμαστὸς*, wonderful; *ψύλλος*, a flea.

extremely long, slender, jointed, setiferous spine, bearing a plumose seta at its extremity (fig. 31). Length, exclusive of caudal spines, 2·4 mm.; length to the extremity of the caudal spines 12·5 mm. ($\frac{1}{2}$ an inch). Anterior antennæ (female) slender, about equal in length to the first cephalothoracic segment, 6-jointed, sparingly setiferous, penultimate joint very short. The upper distal end of the first joint is produced to form a broadly conical tooth provided with an apical seta. A long "olfactory" appendage springs from the end of the third joint. The relative lengths of the joints are nearly as follows :—

$$\frac{10 \cdot 12 \cdot 13 \cdot 8 \cdot 1 \cdot 3}{1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6}.$$

Anterior antennæ of the male very long and slender, fully twice the length of those of the female, 7-jointed, penultimate joint extremely long; the olfactory appendage that springs from the distal half of the fourth joint and the principal apical seta are also very long. The annexed formula shows the relative lengths of the joints :—

$$\frac{12 \cdot 13 \cdot 5 \cdot 15 \cdot 6 \cdot 38 \cdot 12}{1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6\ \ 7}.$$

Both the male and female antennæ are geniculate between the first and second joints (fig. 34). Second and third joints of the posterior antennæ elongate: secondary branch very short, with two apical setæ. Mandibles broad, with the truncate distal end irregularly toothed and bearing a pectinate stout seta at the outer angle (fig. 36); no trace of a palp was observed. The maxillæ have a well-developed biting part and a small secondary appendage bearing three apical setæ. Anterior foot-jaws small; first joint armed with two stout spines, setose on both edges, and a small spine and a seta; the very small terminal point bears three apical setæ. The last three joints of the second foot-jaws are very small and furnished with several long setæ; the inner distal portion of the elongate second joint is produced and forms the base of a long, stout, curved spine; there is a small setiferous process on the inner margin of the proximal end (fig. 39). The posterior foot-jaws in the male are somewhat similar to those of the female, but smaller and less setiferous (fig. 40). The middle joint of the second, third, and fourth pairs of swimming-feet shorter than the first or third; the marginal spines of the outer branches stout, dagger-shaped, and serrate on both margins; terminal spines elongate, falcate, serrate on the outer edge, the inner edge ciliate. Fifth pair of feet simple, each foot armed with three long dagger-shaped spines on the outer margin and two at the apex: both edges of these spines are serrate except near the base: there are two plumose setæ near the middle of the inner margin, and a plain seta near the base of the outer margin of each foot, as shown in fig. 13.

Habitat. In a tow-net gathering from 360 fathoms. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., collected January 22nd; and in tow-net gatherings from 185 fathoms and 235 fathoms, Station 23, collected February 5th.

Several specimens of this remarkable species were obtained. They do not agree with *Ægisthus aculeatus*, Giesbrecht,—*e. g.* the fifth pair of thoracic feet, &c.

Genus Clytemnestra, Dana.

Clytemnestra, Dana, Proc. Amer. Acad. Sci. 1849.
Goniopsyllus, Brady, Report 'Challenger,' Copepoda, 1883.
Goniopelte, Claus, Arb. Zool. Inst. Wien, 1889.
Saphir, L. Car. 1890.

Head and first thoracic segment coalescent. Forehead usually subrostrate. The joints of the cephalothorax much constricted in front, dilated behind so as to form prominent lateral triangular processes. Anterior antennæ 6- to 8-jointed, geniculate in the male. Posterior antennæ 3(or 4?)-jointed; secondary branch wanting, or very small and rudimentary. Mandible slender, apex obscurely digitiform; the palp absent or very rudimentary. Maxillæ also rudimentary. Anterior foot-jaw small, clawed at the apex. Posterior foot-jaw elongate, 2- or 3-jointed; terminal claw, in the male, long and powerful, in the female small. First pair of swimming-feet 2-branched, inner branch 3-jointed, the outer with one to three joints. The second, third, and fourth pairs nearly alike, 2-branched, both branches 3-jointed. Feet of fifth pair 1-branched, the branches similar and 1-jointed, and the same in both sexes.

Clytemnestra rostrata (Brady). (Pl. XII. figs. 47–57; Pl. XIII. figs. 1–3.)

1883. *Goniopsyllus rostratus*, Brady, Report on the 'Challenger' Copepoda, p. 107, pl. xlii. figs. 9–16.
1849. *Clytemnestra* (?) *scutellata*, Dana, Proc. Amer. Acad. Science.
1860. *Clytemnestra* (?) *tenuis*, Lubbock, Trans. Linn. Soc. vol. xxiii. p. 180, pl. xxix. figs. 6, 7.
1889. (?) *Goniopelte gracilis*, Claus, Arb. Zool. Inst. Wien, t. ix.

Length about 1·25 mm. The body is usually more or less curved inwards. The forehead is subtruncate, with middle part produced forward so as to form a prominent rostrum. Postero-lateral angles of the first four thoracic segments extended backward into angular processes; the last thoracic segment smaller than either the preceding one or the first abdominal segment, its postero-lateral angles not produced. Abdomen 5-jointed in the male, 4-jointed in the female; the first abdominal segment in the female composed of two coalescent segments, with usually a pellucid spot in the median dorsal line (Pl. XII. fig. 48). Body, seen dorsally, elongate, narrow, and tapering gradually from the head backwards. Caudal stylets short, about as long as the last abdominal segment, each furnished with a few short marginal hairs, and in the male with two long plumose terminal setæ. The plumose setæ are wanting in the female and are replaced by two or three plain and very small hairs. Anterior antennæ in both male and female 7-jointed, the proportional lengths of the segments being nearly as follows:—

Male.	12	19	6	22	3	18	25
	1	2	3	4	5	6	7
Female.	12	20	16	15	15	17	22

The anterior antennæ of both male and female are sparingly setiferous. There is a hair-like filament on the upper margin and near the middle of the third joint in both sexes, while the upper distal angle of the fourth segment and the extremity of the last

bear each two similar filaments or "sensory hairs," one of which on both segments is longer and stouter than the other. In the male the third (?) and last joints are hinged, and the fifth bears a spiniform appendage. The posterior antennæ are of moderate length and 3-jointed (Claus says 4-jointed, and the basal joint of some of the 'Buccaneer' specimens has a faint line, requiring the $\frac{1}{4}$-inch objective to see it, crossing the basal segment near the middle, which may be a pseudo-joint; but there are certainly only *three distinct joints* in all of the 'Buccaneer' specimens examined), having at the distal end of the first segment a 1-jointed rudimentary branch bearing two long terminal plumose setæ. The lower margin and the distal half of the surface of the last segment of the primary branch is setose; the upper edge of the same segment bears one, and at the extremity five setæ. Mandibles small, basal part somewhat dilated, the upper part slender, with the extremity furcate or obscurely digitiform; the mandible-palp absent or very rudimentary (no palp was observed in any of the 'Buccaneer' specimens, though they were dissected with the greatest possible care). Maxillæ rudimentary, bearing two terminal spiniform setæ, and one seta near the middle of the basal part. Anterior foot-jaws small; the end joint with three terminal spiniform setæ, the middle one being the longest. There is at the end of the basal segment a proportionally large marginal process bearing three terminal spiniform hairs, which imparts to the anterior foot-jaws the appearance as if they were 2-branched; a long, slender, marginal hair springs from the proximal half of the basal joint. Posterior foot-jaws in the male large, composed of two long segments and a long, curved, terminal claw, nearly as long as the second joint, and forming a powerful prehensile organ; the upper margin of the second joint is finely serrate. The posterior foot-jaw in the female, which is also 2-jointed (Pl. XII. fig. 56), is shorter and more slender than that of the male, the terminal claw being also short and feeble, the length of the whole appendage being little, if at all, longer than the first joint of the male appendage (Prof. Brady describes, *loc. cit.*, the posterior foot-jaws as possessing a rudimentary third joint, but no such joint was observed in the 'Buccaneer' specimens). First pair of swimming-feet 2-branched, inner branches 3-jointed, the last joint being the shortest; outer branches 1-jointed, rather longer than the first joint of the inner branches. All the joints are furnished with long plumose hairs; a single plumose hair springs from the outer margin of the second basal joint. Second, third, and fourth pairs nearly alike, also 2-branched, both branches 3-jointed, joints subequal; the outer branches rather shorter than the inner ones, all well furnished with long plumose setæ. Fifth pair of feet 1-branched, 2-jointed, slender, the second joint twice the length of the first, bearing a long, slender, setiferous, terminal spine, and a similar one on the inner margin near the extremity of the joint; four short spinous hairs spring at irregular intervals along the outer margin; there is also a slender hair on the outer margin and near the distal end of the first joint. The preceding description of the five pairs of feet applies to both sexes. Ova not apparently enclosed in a sac, but forming a single cluster somewhat similar to that of *Euchæta marina*.

Habitat. Station 2, surface, January 1st (night tow-netting). Station 9, 50 fathoms,

January 10th (day tow-netting). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms, January 22nd (day tow-netting). Station 23, 10, 185, 235 fathoms, February 5th, &c. (day tow-nettings, and a surface night tow-netting).

This interesting species was obtained in 31 tow-nettings, 16 of these being surface and 15 under-surface collections. One of the surface and 9 of the under-surface tow-nettings were day collections, while 15 surface and 6 under-surface were night collections, as shown in the formula:—

Tow-nettings 31 { 16 surface { 1 day collection. / 15 night collections. ; 15 under-surface { 9 day ditto. / 6 night ditto.

The under-surface tow-nettings ranged from 3 to 460 fathoms.

Clytemnestra rostrata was of more or less frequent occurrence in nearly all the tow-nettings in which it was observed. Specimens carrying ova were not uncommon in some of the collections.

The form here described, including its real and supposed varieties, has been the subject of a good deal of misunderstanding and controversy, due in great part to the meagreness and insufficiency of Dana's description and figures. Nevertheless, after having carefully dissected and examined a large number of specimens, I have no doubt whatever that the species under consideration belongs to Dana's *Clytemnestra*, and I hesitate to ascribe it to his *Clytemnestra scutellata* only because of the difference in number of the joints of the inner branches of the first pair of swimming-feet, which in *C. scutellata*, as described by Dana, are 3-jointed, but which in the 'Buccaneer' specimens are 1-jointed; and also because of the very marked difference in the form of the dorsal aspect between the 'Buccaneer' specimens and Dana's figure of *Clytemnestra scutellata*. Dana's figure represents the thoracic as decidedly broader than the abdominal part of the body, whereas the form of the 'Buccaneer' specimens is elongate-narrow, with the breadth *gradually diminishing* from the head to the last abdominal segment, and in this respect they agree with *Goniopsyllus rostratus*, Brady, and *Goniopelte gracilis*, Claus. Further, the 'Buccaneer' specimens differ from *Goniopsyllus rostratus*, as figured and described by Prof. Brady in the 'Challenger' Report, in two important points: first, the posterior antennæ of the 'Buccaneer' specimens possess a rudimentary but yet distinct secondary branch bearing two plumose hairs, while in *Goniopsyllus rostratus* the secondary branch is wanting, being represented by a single plumose hair attached to the end of the basal joint of the primary branch; second, the inner branches of the first pair of swimming-feet in *Goniopsyllus rostratus* are described as 3-jointed, whereas in the 'Buccaneer' specimens they are only 1-jointed, and are so in both the male and female. On the other hand, the species described and figured by Prof. Claus as *Goniopelte gracilis* agrees, so far as I can make out, in every essential particular with the 'Buccaneer' specimens, so that the 'Buccaneer' specimens appear to belong to *Goniopelte gracilis*, Claus, rather than to *Goniopsyllus rostratus*, Brady.

In an interesting paper by Prof. Claus in the 'Zoologischer Anzeiger,' No. 378

(Nov. 30, 1891), he discusses somewhat fully the classification of the species now under consideration, as well as that of its allied forms, and also the various opinions expressed by different writers bearing on the same question. In this paper Prof. Claus shows, more or less conclusively, that *Sapphir rostratus*, L. Car., is synonymous with *Goniopsyllus rostratus*, Brady, and also that *Clytemnestra Hendorffi*, Poppe, is equivalent to *Goniopelte gracilis*, Claus. In a concluding note, referring to the likelihood that *Goniopelte* may be synonymous with *Goniopsyllus*, he says: "But if it is desirable,—which I could not advise, taking into account the different points,—that the two forms *Goniopelte* and *Goniopsyllus* should be made only different species of the same genus, *Clytemnestra*, for reasons given in my work on Copepods, would not be valid as a generic name. It must in that case be *Goniopsyllus*, Brady." With all deference, however, to what Prof. Claus has stated, I prefer meantime to restore Dana's generic name, *Clytemnestra*; for, though his description be imperfect, there need be no uncertainty as to his figures.

(*Note.*—The preceding remarks on *Clytemnestra* were written at the close of 1891, and long before I saw Giesbrecht's Monograph of the Neapolitan Copepoda.)

Genus Setella, Dana.

Setella, Dana, Crust. U.S. Expl. Exped. 1852.

Setella gracilis, Dana.

1852. *Setella gracilis*, Dana, Crust. U.S. Expl. Exped. p. 1198, pl. lxxxv. figs. 3 *a*, *g*.
1883. *Setella gracilis*, Brady, Report Chall. Copep. p. 108, pl. l. figs. 1–10.

Habitat.—Station 2, 5 fathoms, January 1st (night collection). Station 9, 50 fathoms, January 10th (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms, January 22nd (day collection). Station 18, surface, February 3rd (day collection). Lat. 6° 47′ 5″ S., long. 11° 30′ 6″ E., surface, February 8th (day collection), &c.

Setella gracilis was obtained in 85 tow-nettings, 34 of which were surface and 51 under-surface gatherings. The under-surface gatherings were from various depths, from $2\frac{1}{2}$ to 460 fathoms. 11 of the surface and 34 of the under-surface tow-nettings were collected during the day, and 23 of the surface and 17 under-surface were night collections, as shown by the formula:—

Tow-nettings 85 { 34 surface { 11 day collections. / 23 night ditto. / 51 under-surface { 34 day ditto. / 17 night ditto.

A considerable proportion of the specimens carried ovisacs. The size of the specimens varied sufficiently to lead me to think that there were more than one species of *Setella* in the collection; but careful dissection showed little, if any, structural difference among the specimens, and any structural difference observed was easily accounted for by difference in maturity or sex.

Section II. *PŒCILOSTOMA*, Thorell.

Family CORYCÆIDÆ, Dana.

Genus Corycæus, Dana.

Corycæus, Dana, Proc. Acad. Nat. Sci. Philadelphia, 1845.
Corycæus, Brady, Report on the Copepoda of the 'Challenger' Expedition, 1883.

Corycæus varius, Dana.

1852. *Corycæus varius*, Dana, Crust. U.S. Expl. Exped. p. 1211, pl. lxxxv. figs. 4 *a–i*.
1856. *Corycæus styliferus*, Lubbock, Trans. Entom. Soc. iv. N. S. pl. v. figs. 7, 8.
1863. *Corycæus furcifer*, Claus, Die freilebenden Copep. p. 157, pl. xxiv. figs. 7–12.
1883. *Corycæus varius*, Brady, Report Chall. Copepoda, p. 111, pl. lii. figs. 1–14.

Habitat. Station 2, 25 fathoms, January 1st (night collection). Station 9. 50 fathoms, January 10th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 460 fathoms, January 22nd (day collection). Station 18, surface, February 3rd (day collection). Bananah Creek, Congo River, surface, February 7th (day collection), &c.

This *Corycæus* was observed in 110 tow-nettings, comprising 48 surface and 62 under-surface gatherings. The under-surface gatherings ranged in depth from 2 to 460 fathoms. 23 of the surface and 44 of the under-surface tow-nettings were day collections, while 25 surface and 18 under-surface were night collections, as shown by the annexed formula:—

Tow-nettings 110 { 48 surface { 23 day collections. / 25 night ditto. } / 62 under-surface { 44 day ditto. / 18 night ditto. }

This was the most common species of *Corycæus* in the collection, both as regards its general distribution throughout the area examined and its frequency in the tow-nettings in which it occurred.

Corycæus pellucidus, Dana.

1852. *Corycæus pellucidus*, Dana, Crust. U.S. Expl. Exped. p. 1224, pl. lxxxvi. fig. 6.
1863. *Corycæus rostratus*, Claus, Die freilebenden Copepoden, p. 157, pl. xxviii. fig. 5.
1883. *Corycæus pellucidus*, Brady, Report Chall. Copep. p. 112, pl. lii. figs. 15–19.

Habitat. Station 2, 50 fathoms, January 1st (night collection). Station 9, surface, 25 and 50 fathoms, January 10th (day collections). Lagoon, São Thomé Island, surface, January 27th (one day and one night collection). Station 18, surface, February 3rd (day collection). Lat. 7° 38′ S., long. 12° 3′ 3″ E., surface, February 9th (night collection), &c.

This *Corycæus*, which was a moderately common species in the collection, occurred

in 81 of the tow-nettings, which comprised 42 surface and 39 under-surface gatherings. The under-surface tow-nettings ranged in depth from 2 to 360 fathoms. 15 of the surface and 30 under-surface tow-nettings were day collections, while 27 surface and 9 under-surface were night collections, as shown in the formula :—

Tow-nettings 81 { 42 surface { 15 day collections. / 27 night ditto. ; 39 under-surface { 30 day ditto. / 9 night ditto.

The distribution of *Corycæus pellucidus* was co-extensive with the area examined. The long spine-like and strongly setiferous hairs of the posterior foot-jaws form an easily recognized character of this species.

Corycæus limbatus, Brady.

1883. *Corycæus limbatus*, Brady, Report Chall. Copep. p. 114, pl. xlix. figs. 18–22.

Habitat. Station 2, night collection. January 1st. Station 9, 50 fathoms, January 10th (day collection). Station 11, 10 fathoms, January 19th (day collection). Lagoon, São Thomé Island, surface, January 27th (night collection). Lat. 7° 38′ S., long. 12° 3′ 3″ E., surface, February 9th (night collection), &c.

Corycæus limbatus was obtained in 25 tow-nettings, 10 of which were surface and 15 under-surface gatherings. The depth of the under-surface tow-nettings ranged from $2\frac{1}{2}$ to 50 fathoms, exclusive of two, one of which was from 260 fathoms and one from 360 fathoms. 4 of the surface and 10 of the under-surface tow-nettings—including the two specially referred to—were day collections, while 6 of the surface and 5 of the under-surface were night collections, as shown by the formula :—

Tow-nettings 25 { 10 surface { 4 day collections. / 6 night ditto. ; 15 under-surfaee { 10 day ditto. / 5 night ditto.

This *Corycæus*, though generally distributed over the area examined, was nevertheless a comparatively rare species, only a few specimens at most being observed in any one of the tow-nettings in which it occurred.

Corycæus venustus, Dana.

1852. *Corycæus venustus*, Dana, Crust. U. S. Expl. Exped. p. 1222, pl. lxxxvi. figs. 4 *a–d*.

1883. *Corycæus venustus*, Brady, Report Chall. Copep. p. 115, pl. liv. figs. 8–10.

Habitat. Station 2, surface, January 1st (night collection). Station 9, surface and 25 fathoms, January 10th (day collections). Lat. 1 55′ 5″ N., long. 5° 55′ 5″ E., 30 and 460 fathoms, January 22nd (day collections). Lat. 6 23′ 3″ S., long. 11 3′ 8″ E., surface, February 8th (day collection).

This species—one of the rarer of the *Corycæidæ* in the collection—was obtained in 24 tow-nettings, 13 of which were surface and 11 under-surface gatherings. The

surface tow-nettings comprised 7 day and 6 night collections, and the under-surface 7 day and 4 night collections, as shown in the formula :—

Tow-nettings 24 { 13 surface { 7 day collections. / 6 night ditto. ; 11 under-surface { 7 day ditto. / 4 night ditto.

The under-surface tow-nettings included four at 10 fathoms, one at 15 fathoms, one at 20 fathoms, two at 25 fathoms, one at 30 fathoms, one at 50 fathoms, and one at 460 fathoms.

Corycæus speciosus, Dana.

1852. *Corycæus speciosus*, Dana, Crust. U.S. Expl. Exped. p. 1222, pl. lxxxvi. figs. 4 *a–d*.
1883. *Corycæus speciosus*, Brady, Report Chall. Copep. p. 115, pl. liv. figs. 8–10.

Habitat. Station 2, 5, 25, and 50 fathoms, January 1st (night collection). Station 9, surface, 25 and 50 fathoms, January 10th (day collections). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10, 20, 30, 60, 260, 360, and 460 fathoms, January 22nd (day collections: the nets were fixed at intervals on a deep-sea line and exposed simultaneously from 11 A.M. to 2.23 P.M.). Station 23, surface, 10, 20, 135, 185, and 235 fathoms, February 5th (day collections: nets fixed on deep-sea line and exposed simultaneously from 11 A.M. to 3.30 P.M.). Lat. 7° 54′ 6″ S., long. 12° 14′ 7″ E., surface, February 9th (day collection), &c.

This fine and well-marked species was observed in 86 tow-nettings, 32 of which were surface and 54 under-surface collections. The depth of the under-surface tow-nettings ranged from 2 to 460 fathoms. 17 of the surface and 39 of the under-surface tow-nettings were day collections, while 15 surface and 15 under-surface were night collections, as shown in the annexed formula :—

Tow-nettings 86 { 32 surface { 17 day collections. / 15 night ditto. ; 54 under-surface { 39 day ditto. / 15 night ditto.

Corycæus speciosus was one of the more common species of the *Corycæidæ* observed in the collection, but it was not obtained in any gathering from localities where the water was of a decidedly brackish character, as at Bananah Creek. The remarkably divergent caudal stylets made this an easily recognized species ; several specimens were obtained with ovisacs.

Corycæus obtusus, Dana.

1852. *Corycæus obtusus*, Dana, Crust. U.S. Expl. Exped. p. 1211, pl. lxxxv. fig. 6.
1857. ? *Corycæus anglicus*, Lubbock, Ann. & Mag. Nat. Hist. vol. xx. pl. xi. figs. 14–17.
1883. *Corycæus obtusus*, Brady, Report Chall. Copep. p. 116, pl. xlvi. figs. 7–9.

Habitat. Station 2, 50 fathoms, January 1st (night collection). Off Accra, 3 fathoms, January 16th (day collection). Lagoon, São Thomé Island, surface, January 27th (night collection). Loanda Harbour, surface, February 13th (day collection).

Corycæus oblusus was observed in 39 tow-nettings, 23 of which were surface and 16 under-surface gatherings; 7 of the surface and 10 of the under-surface tow-nettings were collected during the day, while 16 of the surface and 6 of the under-surface were night collections, as shown in the annexed formula :—

Tow-nettings 39 { 23 surface { 7 day collections. / 16 night ditto. ; 16 under-surface { 10 day ditto. / 6 night ditto.

The under-surface tow-nettings ranged from $2\frac{1}{2}$ to 50 fathoms, and one at 185 fathoms. The hook-like process at the base and on the under surface of the first abdominal segment seems to be peculiar to this species and forms one of its distinctive characters.

Genus Copilia, Dana.

Copilia, Dana, Proc. Amer. Acad. Sci. 1849; Brady, Report on the Copepoda of the 'Challenger' Expedition, 1883.

Copilia mirabilis, Dana.

1852. *Copilia mirabilis*, Dana, Crust. U.S. Expl. Exped. p. 1232, pl. lxxx. figs. 14 *a–g*.
1856. *Saphirina stylifera*, Lubbock, Trans. Entom. Soc. vol. iv. p. 28, pl. iv. figs. 9, 10 ♂.
1863. ? *Copilia denticulata*, Claus, Die freilebenden Copepoden, p. 161, pl. xxv. figs. 14–20.
1883. *Copilia mirabilis*, Brady, Report Chall. Copepoda, p. 117, pl. liii. figs. 1–11.

Habitat. Station 2, surface and 50 fathoms, January 1st (night collection). Station 9, surface and 25 and 50 fathoms, January 10th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10, 20, 30, 60, and 360 fathoms, January 22nd (day collection). Station 23, surface, February 5th (day collection).

Copilia mirabilis was observed in 70 tow-nettings, 24 of which were surface and 46 under-surface gatherings. The under-surface gatherings ranged in depth from 2 to 360 fathoms. 12 of the surface and 33 of the under-surface tow-nettings were day collections, while 12 surface and 13 under-surface were night collections, as shown by the annexed formula :—

Tow-nettings 70 { 24 surface { 12 day collections. / 12 night ditto. ; 46 under-surface { 33 day ditto. / 13 night ditto.

This species was of frequent occurrence in several of the tow-nettings.

Copilia quadrata, Dana.

1849. *Copilia quadrata*, Dana, Proc. Amer. Acad. Boston, vol. ii.
1866. *Saphirinella pellucida*, Claus, Die Copepoden-Fauna von Nizza.
1892. *Copilia quadrata*, Giesbrecht, Fauna und Flora des Golfes von Neapel (Pelagische Copepoden), p. 658, pl. 2. fig. 3, pl. 50. figs. 1, 10, 13, 16, 22, 28, 33, 36, 41.

Habitat. Station 23 (lat. 4° 26′ 7″ S., long. 10 1′ 8″ E.), 30 fathoms, in a tow-net gathering collected between 11 A.M. and 3 P.M. A few specimens (male and female) were observed; they were readily distinguished by being larger and much broader in proportion to the length than the others.

? COPILIA DENTICULATA, Claus.

1863. *Copilia denticulata*, Claus, Die freilebenden Copepoden, p. 161, pl. xxv. figs. 14–20.

One or two specimens (♀) of a *Copilia* apparently belonging to this species occurred in a few of the tow-net gatherings along with *Copilia mirabilis*.

COPILIA FULTONI, n. sp. (Pl. XI. figs. 45–50; Pl. XII. figs. 1–3.)

Length, including caudal stylets, 5·3 mm. ($\frac{1}{4\frac{9}{7}}$ of an inch), the length of the caudal stylets is about 1·6 mm. The first cephalothoracic segment is equal to about four-tenths of the entire length of the animal, including the stylets. Anterior antennæ as in *Copilia mirabilis*, Dana, 6-jointed, the proportional lengths of the joints as in the formula:—

$$\begin{matrix} 40 & 35 & 17 & 35 & 17 & 16 \\ 1 & 2 & 3 & 4 & 5 & 6 \end{matrix}.$$

Posterior antennæ and mandibles also nearly as in *Copilia mirabilis*, except that the third joint of the posterior antennæ is scarcely two-thirds the length of the preceding joint, and the marginal spine of the second joint is much smaller than that on the intero-distal angle of the first joint (Pl. XI. figs. 47–48). The maxillæ consist each of a single broadly spatulate joint bearing three apical spines (Pl. XI. fig. 49). Anterior foot-jaws stout, 1-jointed, and provided with two terminal spines and two lateral spiniform setæ (Pl. XI. fig. 50). Posterior foot-jaws 2-jointed and armed with a stout, nearly straight claw (Pl. XII. fig. 1). Swimming-feet as in *Copilia mirabilis*. Fifth pair rudimentary, each consisting of one small joint provided with a terminal spine and two small setæ. The abdomen is 4-jointed and is about equal to the combined length of the last three thoracic segments; the postero-distal angles of the first abdominal segment each bear two small spiniform setæ, and the last joint is about equal to the combined length of the two preceding joints. The second last thoracic segment only is produced into a median dorsal spine.

Habitat. Station 23, in a tow-net gathering from 30 fathoms, collected February 5th. Only three specimens were obtained.

The comparatively short posterior abdominal segment distinguishes this species at a glance from *Copilia mirabilis*, Dana. It differs from *Copilia Brucii*, I. C. Thompson, by the evenly rounded outline of the first body-segment, in the proportional length of the joints of the posterior antennæ, in the second last thoracic segment being produced into a median dorsal spine, and in the presence of a fifth pair of feet, besides one or two other points shown by the drawings.

In the Report on the 'Challenger' Copepoda the abdomen of *Copilia* is, in the

definition of the genus, stated to consist of five segments, and in the drawings of *Copilia mirabilis* the fourth pair of swimming-feet are represented as attached to what is described as the last thoracic segment; if this be correct, then, should a fifth pair of feet be present, they would necessarily be attached to the same segment as the fourth pair, which would be very unusual, the fifth pair only being usually attached to the last segment of the thorax. In the species now described, if the abdomen be held to consist of five segments, the appendages of the first segment are not a fifth pair of feet, and the fourth pair are attached to what, in that case, is the last thoracic segment, and a separate segment, for the support of a fifth pair of feet, is entirely absent. In these circumstances I prefer to consider the abdomen as consisting of four segments and that the fourth pair of swimming-feet are appendages of the second last segment of the thorax, and further that the rudimentary appendages of the next, or last, thoracic segment are a fifth pair of feet, because such an arrangement of the parts is more in harmony with those of closely allied genera.

Genus Lubbockia, Claus.

Lubbockia, Claus, Die freilebenden Copepoden, 1863; Brady, Report on the Copepoda of the 'Challenger' Expedition, 1883.

Lubbockia squillimana, Claus.

1863. *Lubbockia squillimana*, Claus, Die freilebenden Copepoden, p. 164, pl. xxv. figs. 1–5.
1883. *Lubbockia squillimana*, Brady, Report Chall. Copep. p. 118, pl. liii. figs. 12–16, pl. liv. figs. 1–7.

Habitat. Station 3, 100 fathoms, January 2nd (day collection). Station 9, 25 fathoms, January 10th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms, January 22nd (day collection). Station 23, surface and at 10 fathoms, February 5th (day collection). Lat. 8° 36′ 8″ S., long. 12° 5′ 7″ E., surface, February 9th (day collection), &c.

Lubbockia squillimana was observed in 39 tow-nettings, 13 of which were surface gatherings and 26 under-surface. The under-surface gatherings were from various depths from 10 to 360 fathoms; 3 of the surface and 18 of the under-surface tow-nettings were day collections, while 10 surface and 8 under-surface were night collections, as in the formula:—

Tow-nettings 39 { 13 surface { 3 day collections. / 10 night ditto. } / 26 under-surface { 18 day ditto. / 8 night ditto. }

Though generally distributed throughout the area represented in this Report, and though observed in a considerable number of gatherings, *Lubbockia* was of less frequent occurrence in the tow-nettings in which it was obtained than some other species with a more restricted distribution. Specimens of both sexes were collected, but females were much more common than males; several females carrying ovisacs were taken.

Genus Oncæa, Philippi.

Oncæa, Philippi, Wiegmann's Archiv, 1843.
Antaria, Dana, Proc. Amer. Acad. Sci. 1849.

Oncæa obtusa (Dana).

1843. *Oncæa venusta*?, Philippi, Wiegmann's Archiv, pl. 111. fig. 3.
1852. *Antaria obtusa*, Dana, Crust. U.S. Expl. Exped. p. 1230, pl. lxxxvi. figs. 13 *a–c*.
1883. *Oncæa obtusa*, Brady, Report Chall. Copep. p. 120, pl. li. figs. 1–11.

Habitat. Station 2, surface, 5, 25, and 50 fathoms, January 1st (night collections). Station 9, surface, 25 and 50 fathoms, January 10th (day collections). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10, 20, 30, 260, 360, and 460 fathoms, January 22nd (day collections). Bananah Creek, Congo River, surface, February 7th (day collection). Loanda Harbour, surface, February 13th (day collection).

Oncæa obtusa was observed in 119 tow-nettings, 60 of which were surface and 59 under-surface gatherings. The under-surface tow-nettings ranged in depth from 2 to 460 fathoms. 26 of the surface and 41 of the under-surface gatherings were day collections; 34 of the surface and 18 of the under-surface gatherings were night collections, as shown by the formula:—

Tow-nettings 119 { 60 surface { 26 day collections. / 34 night ditto. ; 59 under-surface { 41 day ditto. / 18 night ditto.

This was one of the most common and most generally distributed species in the 'Buccaneer' collection; many of the specimens carried ovisacs, and though the collection had been for several years in spirit a considerable proportion of the *Oncææ* retained much of the vivid coloration so characteristic of the species.

Oncæa gracilis (Dana). (Pl. XIII. figs. 4–12.)

1853. *Antaria gracilis*, Dana, Crust. U.S. Expl. Exped. p. 1229, pl. lxxxvi. fig. 11 *a*.

Length 1·1 mm. Cephalothorax narrow, ovate. Abdomen elongate, slender; the breadth of the first abdominal segment is somewhat less than two-thirds its length, and one-third the length of the abdomen, exclusive of the stylets; the second segment is scarcely half the length of the first, and equal to the combined length of the next two; the third segment is nearly twice the length of the last, while the caudal stylets are somewhat longer than the last abdominal segment (fig. 12). The anterior antennæ are similar to those of *Oncæa obtusa*, but are more slender; the relative lengths of the joints are nearly as in the formula:—

$$\frac{4 \cdot 4 \cdot 13 \cdot 2 \cdot 1 \cdot 3}{1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6}.$$

The last joint of the posterior antennæ about as long as the preceding one, but more slender and furnished with four long, stout, apical setæ, and another seta near the base. Mouth-appendages nearly as in *Oncæa obtusa*, except that the last joint of the posterior foot-jaw is elongate and armed with a long, powerful, nearly straight terminal claw,

which is finely serrate on the inner edge (fig. 10). First swimming-feet also similar to that species, but more slender, and provided with much longer terminal spines,—the terminal spine of the outer branch is equal to about three times the length of the joint from which it springs. The terminal spines of the three pairs (both branches) are also long. The inner branch of the fourth pair is much shorter than the outer branch, and its three joints are nearly equal in length; the terminal spine is long and setiform. Fifth pair of feet as in *Oncæa obtusa*.

Habitat. Station 2, 50 fathoms, collected January 1st, between 7.20 and 8.20 P.M. Station 9, 50 fathoms, collected January 10th, during the day. Off Appi* (near Porto Novo), surface, collected January 18th (day). Lat. 3° 55′ 3″ N., long. 4° 7′ 3″ E., 30 fathoms, collected January 20th. Lat. 2° 34′ 9″ N., long. 5° 22′ 2″ E., 20 fathoms, collected January 21st. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms, collected January 22nd. Station 23, in two gatherings at 30 and 85 fathoms, collected February 5th. All the gatherings except the first one were collected during the day.

Though I have included this species under *Oncæa*, it nevertheless differs very markedly from the very common *Oncæa obtusa*, Dana. The last joint of the posterior antennæ is elongate and slender; the inner branch of the fourth pair of swimming-feet is considerably shorter than the outer branch, and consists of three nearly equal joints; the abdomen is long and slender, and the last three segments are much longer, comparatively, than in *Oncæa obtusa*. These differences, taken together, should perhaps be considered of more than merely specific value, but I prefer meantime to refer the species above described to *Oncæa*.

NOTE.—The species described above agrees in several points with *Conæa rapax*, Giesbrecht (Mon. Pelag. Copep. of the Gulf of Naples), and should perhaps be ascribed to that genus.

ONCÆA MEDITERRANEA (Claus). (Pl. XIII. figs. 13–17.)

1863. *Antaria mediterranea*, Claus, Die freilebenden Copepoden, p. 159, pl. xxx. figs. 1–7.

Length ·85 mm. (1-30th of an inch). Somewhat like *Oncæa obtusa* in general form, but with a proportionally shorter abdomen. Abdomen, including caudal stylets, equal to about two-fifths the length of the cephalothorax; length of first abdominal segment equal to about twice the breadth, and to fully twice the entire length, of the remaining segments; and, together with the caudal stylets, the length of the last abdominal segment is rather greater than that of the two preceding segments added together. Caudal stylets about twice as long as broad, and nearly equal in length to the last two abdominal segments. Anterior antennæ slender; the proportional lengths of the joints are nearly as shown in the formula :—

$$\frac{2\,.\,3\,.\,8\,.\,2\,.\,1\,.\,2}{1\quad 2\quad 3\quad 4\quad 5\quad 6}.$$

* *Note by Mr. Rattray.*—"Appi is a flourishing village, with three French factories. It is the nearest port to the inland town of Porto Novo, and communicates with it by a lagoon. The surf at Appi is very heavy, and it is impossible to land except in a native boat built for that purpose. The boats are manned by about sixteen negroes and propelled by paddles. The beach is steep and sandy."

Last joint of the posterior antennæ fully three-fourths the length of the preceding joint. Mouth-organs similar to those of *Oncæa obtusa*, except that the last joint of the posterior foot-jaw is broadly ovate; the fringe of hairs on the inner margin extends backwards from the apex nearly three-fourths the length of the joint, and is bounded at the proximal end by a small spine (fig. 16). The swimming-feet are similar to those of *Oncæa obtusa*, but the joints, especially of the outer branches of the first pair, are proportionally longer, and the length of the terminal spines of both branches of all the swimming-feet is much greater than those of that species: in the first pair the terminal spine of the outer branches is equal to the combined length of the second and last joints; in the fourth pair the terminal spines of both branches are equal to the entire length of the branches they spring from; the terminal spines of the inner branches are also serrate on both branches. The fifth pair, like those of *Oncæa obtusa*, are very small and rudimentary. One or two females only of this species were obtained.

Habitat. Station 9, 50 fathoms, collected January 10th. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 360 fathoms, collected January 22nd.

This species, though closely resembling *Oncæa obtusa*, appears to be quite distinct from it; the following are some points in which it differs from that species:—the last joint of the secondary branch of the posterior antennæ is considerably longer; the joints of the outer branches of the first swimming-feet are proportionally longer; the abdomen is shorter, being only equal to about two-fifths of the length of the cephalothorax; and the terminal spines of the swimming-feet, and especially of the fourth pair, are of much greater length than those of *Oncæa obtusa*. *Oncæa mediterranea* (Claus) seems to agree much closer with this species than with *Oncæa obtusa* (Dana), and I have therefore ascribed it to the species described by Dr. Claus.

Genus Hersiliodes, Canu, 1888.

Hersiliodes Livingstoni, n. sp. (Pl. XIII. figs. 31–38.)

Length, exclusive of tail-setæ, 1·63 mm. Viewed dorsally the body is broadly ovate, and much constricted near the posterior end; it is composed of six segments, the first being nearly equal to the entire length of the other five; the fifth segment is short, and considerably narrower than that which precedes or follows it; the breadth of the last segment is greatest posteriorly. Forehead rounded. Anterior antennæ stout, 7-jointed, and bearing numerous setæ; the proportional lengths of the joints are nearly as shown in the formula:—

$$\frac{15\,.\,25\,.\,12\,.\,18\,.\,14\,.\,11\,.\,11}{1\quad 2\quad 3\quad 4\quad 5\quad 6\quad 7}.$$

Posterior antennæ stout, 4-jointed, the first joint being nearly equal to the combined length of the other three; the third joint bears two stout curved spines at the exterior distal angle, while the truncate extremity of the last joint is armed with four elongate curved spines and a few setæ (fig. 33). The mouth is in the form of a small conical tube, the margin of which is fringed with cilia. The mandible is armed exteriorly with a stout, somewhat curved tooth, having a double row of serratures along

its inner margin, and interiorly with three setiferous spines. Maxillæ simple, terminating in two very short and rounded spiniferous lobes (fig. 34). The anterior foot-jaws are furnished with a short, stout, and slightly curved terminal claw, which is provided with several setiferous spines at the base, while two stout setiferous spines spring from the end of the first joint and close to the basal part of the claw. The posterior foot-jaws are large; they are furnished with several spiniform plumose setæ on the inner margin, and terminate in stout, elongate, and strongly curved claws, from the base of which springs a strong and curved claw-like spine (fig. 35). Both branches of the first four pairs of swimming-feet 3-jointed; joints short and broad. The exterior margin of the outer branches of the first pair is furnished with four spines,—one on each of the first and second, and two on the last joint. Round the end and inner margin of the last joint there are six long plumose setæ, while one long seta, also plumose, springs from the inner distal angle of the second joint. The first and second joints of the inner branches have no spine on the outer margin; the outer distal angle of the second joint forms a tooth-like process; the last joint is furnished with a stout spine on the lower half of the exterior margin,—the margin being hollowed out to receive the base of the spine; there are also five plumose setæ round the end and inner edge of the last joint. The extremities of both branches of the second, third, and fourth pairs are armed with one long and one short spine; the long spine of the outer branches is ciliate along the inner edge (fig. 37). The foot of the fifth pair consists of a broad foliaceous joint, rounded at the extremity, and furnished with one long terminal and three small submarginal setæ (fig. 38). Abdomen composed of four segments; the first is considerably dilated, the first, third, and fourth are about equal in length, but the second is rather longer. Caudal stylets half as long again as the last abdominal segment, somewhat divergent, and furnished with two long and three short terminal setæ; there is also a small submarginal spine about one-third the length of the stylet from the extremity (fig. 31).

Habitat. Loanda Harbour; surface tow-net gathering, collected February 15.

Genus Pachysoma, Claus.

Pachysoma, Claus, Die freilebenden Copepoden, 1863.

Pachysoma punctatum, Claus. (Pl. XIII. figs. 18–24.)

1863. *Pachysoma punctatum*, Claus, op. cit. p. 163, pl. xxv. figs. 6–11.

Length 2·5 mm. Body rotund; forehead produced into a small triangular pointed rostrum. Anterior antennæ very short, stout, 7-jointed, the third and fourth joints shorter than the others; the proportional lengths of the joints are as follows:—

1	2	3	4	5	6	7
30	25	9	12	22	20	15

Posterior antennæ nearly as in *Lichomolgus*, 4-jointed, the third joint short, the others of moderate length and subequal (fig. 20). Mandibles small, stylet-shaped, ciliate along one edge; the maxillæ consist of small 1-jointed appendages bearing two long apical

setæ. Anterior foot-jaws rudimentary, 1-jointed, with a moderately stout terminal claw and a small seta (fig. 23). Basal joint of posterior foot-jaws greatly dilated; second joint stout, bearing two marginal spiniform setæ and armed with a strong curved terminal claw, which is provided with a small seta near the base and on the inner aspect. Swimming-feet nearly as in *Lichomolgus*, both branches 3-jointed; the setæ on their inner margins are stout and densely plumose; the inner branches are considerably longer than the outer (fig. 24). Fifth pair rudimentary and provided with one small marginal and two apical plumose setæ. Abdomen short, composed of four segments; first segment large, the next three much shorter and narrower; in the male the postero-lateral angles of the first abdominal segment carry two plumose setæ. Caudal stylets about equal in length to the first abdominal segment; apical setæ three, and one on the outer edge about one-third the length of the stylet from the proximal end. The structure of the integument is shown in fig. 18.

Habitat. Station 9, in a tow-netting from 25 fathoms. Lat. 2° 34′ 9″ N., long. 5° 22′ 2″ E., 20 fathoms. Station 14, in two tow-net gatherings from 10 and 20 fathoms. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 20 fathoms, and lat. 0° 21′ 1″ N., long. 7° 0′ 33″ E., 20 fathoms.

Though observed in these six separate tow-net gatherings, very few specimens were obtained.

Genus Lichomolgus, Thorell.

Lichomolgus, Thorell, Om Krustaceer i Aseidier, p. 74 (1859).

Lichomolgus congoensis, n. sp. (Pl. XIII. figs. 39–48.)

Length fully 1 mm. Cephalothorax moderately robust. Anterior antennæ fully half the length of the first cephalothoracic segment, 7-jointed, nearly as in *Lichomolgus fucicolus*; the relative lengths of the joints are shown in the formula:—

$$\frac{12 \cdot 26 \cdot 8 \cdot 17 \cdot 18 \cdot 15 \cdot 10}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7}.$$

Posterior antennæ 4-jointed; first, second, and fourth joints elongate, subequal; third joint very short and bearing two stout setæ on the upper distal angle; the last joint is armed with two slender curved terminal spines and two setæ; there is also a small seta on the inner margin near the apex (fig. 41). The mandible consists of a comparatively broad and apparently abruptly bent process, the truncate apex of which is furnished with a comb-like fringe of short setæ; a stout stylet-like appendage, finely crenate on the upper edge, springs from the outer distal angle, and is closely applied to the anterior edge of the appendage, and extends some distance beyond its fringed apex (fig. 42). The maxillæ are simple 1-jointed appendages, bearing a few apical setæ (fig. 43). Foot-jaws nearly as in *Lichomolgus fucicolus*, except that the posterior foot-jaw is armed with a long curved spine on the inner margin of the proximal half of the second joint (fig. 45). The four pairs of swimming-feet are also nearly as in *Lichomolgus fucicolus*, except that there are stout dagger-shaped spines on the exterior margin and

apex of the outer branches; the apex of the inner branches is also provided with similar spines; the inner branch of the fourth pair is 2-jointed (fig. 46). Fifth pair subquadrangular, rather longer than broad, and furnished with two stout terminal spines. Abdomen scarcely equal to half the length of the cephalothorax. Caudal stylets about as long as broad, and three-fourths the length of the last abdominal segment. The fourth tail-seta, counting from the outside, is stouter and rather longer than the others.

Habitat. Banamah Creek, Congo River, in a surface tow-net gathering, collected February 6th. Only two specimens (females) were obtained.

Genus Pseudanthessius, Claus.

Pseudanthessius, Claus, Arb. Zool. Inst. Wien, 1889.

Pseudanthessius propinquus, n. sp. (Pl. XIII. figs. 49–56; Pl. XIV. figs. 1, 4.)

Length 1·3 mm. (1-18th of an inch). Anterior antennæ 7-jointed; the formula shows the proportional lengths of the joints:—

$$\frac{12 \cdot 21 \cdot 6 \cdot 12 \cdot 12 \cdot 11 \cdot 8}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7}.$$

The short penultimate joint of the posterior antennæ bears a long slender spine on its upper distal angle; the last joint is provided with a stout curved apical spine and five setæ. Mandibles somewhat as in *Lichomolgus congoensis*, but the stylet-like appendage is longer and strongly dentate on the upper edge, the basal tooth being much larger than the others (Pl. XIII. fig. 52). Maxillæ armed with three stout terminal spines, two of which are serrate on both edges, and a small marginal seta (Pl. XIII. fig. 53). Anterior foot-jaws stout, 1-jointed, and provided with four strong terminal spines, the two larger of which are furnished with several tooth-like processes. Posterior foot-jaws in the female short, 3-jointed; the second joint carries two short, stout, marginal spines, and the last joint, which is small, carries one terminal and four lateral setæ (Pl. XIII. fig. 54). In the male the posterior foot-jaws are more slender; the first and second joints are fully twice as long as broad, and the inner margin is fringed with cilia; the last joint is very short and forms the base of a stout, elongate, curved claw, which is furnished with two small setæ near the base. The fourth pair of swimming-feet are nearly as in *Pseudanthessius Thorelli* (Brady), but the margins of the 1-jointed inner branches are not ciliate; a moderately long plumose seta springs from the proximal half of the inner edge (? and probably also from the outer edge opposite to the other) (Pl. XIV. fig. 3). The first three pairs of swimming-feet are nearly as in *Lichomolgus fucicolus*. The fifth pair consist each of a moderately stout joint, furnished with two apical spines. Abdomen, inclusive of stylets, nearly equal to three-fourths the length of the cephalothorax: in the male the first segment is as long as the next two together; in the female the first segment is rather more than half the length of the abdomen, the remaining three segments are as in the male. Caudal stylets once and a half the length of the last abdominal segment, and furnished with one seta near the middle of the outer margin and four apical setæ.

Habitat. Loanda Harbour, in a surface tow-net gathering, collected February 15th. Very few specimens were obtained.

Genus Saphirina, Thompson.

Saphirina, Thompson, Zoological Researches, 1829

Saphirina ovalis, Dana.

1852. *Saphirina ovalis*, Dana.
1883. *Saphirina ovalis*, Brady, Report Chall. Copep. p. 123, pl. xlvii. figs. 1–12.

Habitat. Station 2, January 1st (night collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10 and 30 fathoms, January 22nd (day collections). Station 21, surface, February 4th (day collection). Station 24, surface, February 6th (day collection), &c.

This Saphirine was obtained in 27 tow-nettings, 10 of which were surface and 17 under-surface gatherings. The under-surface tow-nettings ranged from 2 to 50 fathoms, with the exception of one which was from 185 fathoms. 2 of the surface and 13 of the under-surface were day collections, while 8 surface and 4 under-surface were night collections, as shown in the formula:—

Tow-nettings 27 { 10 surface. { 2 day collections. / 8 night ditto. / 17 under-surface { 13 day ditto. / 4 night ditto.

Only one or at most very few specimens were observed in any one of the tow-nettings. The females of *Saphirina ovalis* were usually readily distinguished from other Saphirines by the numerous, circular, opaque white spots scattered somewhat symmetrically over the entire dorsal surface, and which imparted a rather elegant appearance to the specimens. (It will be understood that the ornamentation described is that of specimens which have been several years in spirit.)

Note.—This appears to be the species described by Giesbrecht as *Saphirina stellata* and = *S. ovalis* of Dr. Brady's 'Challenger' Copepoda, but not *S. ovalis*, Dana.

Saphirina inæqualis, Dana. (Not *S. nigromaculata*, Claus.)

1852. *Saphirina inæqualis*, Dana, Crust. U.S. Expl. Exped. p. 1244, pl. lxxxvii. fig. 7.
1860. *Saphirina elegans* (♀), Lubbock, Trans. Linn. Soc. vol. xxiii. p. 12, pl. xxix. figs. 18, 19.
1883. *Saphirina inæqualis*, Brady, Report Chall. Copep. p. 124, pl. xlviii. figs. 1–5.

Habitat. Station 9, 25 fathoms, January 10th (day collection). Station 11, 10 fathoms, January 19th (day collection). Station 14, 20 fathoms, January 21st (night collection). Station 18, surface, February 3rd (day collection). Station 24, surface, February 6th (day collection). Lat. 5° 40′ 8″ S., long. 11° 33′ 4″ E., surface, February 19th (day collection), &c.

Saphirina inæqualis was observed in 41 tow-nettings, 22 of which were surface and 19 under-surface gatherings; 8 of the surface and 14 of the under-surface gatherings were day collections, while 14 of the surface and 5 of the under-surface were night collections. The under-surface tow-nettings ranged from 2½ to 25 fathoms, with the exception of one which was from 360 fathoms.

Tow-nettings 41 { 22 surface { 8 day collections. 14 night ditto. ; 19 under-surface { 14 day ditto. 5 night ditto.

This was the most common of the Saphirines in the 'Buccaneer' collections.

Saphirina serrata, Brady.

1883. *Saphirina serrata*, Brady, Report Chall. Copep. p. 125, pl. xlix. figs. 1, 2.

Habitat. Station 9, 25 fathoms, January 11th (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 260 fathoms, January 22nd (day collection). Station 23, surface and 10 fathoms, February 5th (day collections). Lat. 5° 40′ 8″ S., long. 11° 33′ 4″ E., surface, February 19th (day collection), &c.

This species occurred in 20 tow-nettings, 10 of which were surface and 10 under-surface gatherings. The surface comprised 5 day and 5 night collections; the under-surface 8 day and 2 night collections, as shown in the formula :—

Tow-nettings 20 { 10 surface { 5 day collections. 5 night ditto. ; 10 under-surface { 8 day ditto. 2 night ditto.

The under-surface tow-nettings included one at 3 fathoms, three at 10 fathoms, one at 15 fathoms, two at 20 fathoms, one at 25 fathoms, one at 50 fathoms, and one at 260 fathoms. The distinct, though finely serrate, margins of the abdominal segments (except the first) in the female constitute one of the most prominent characters of the species. *S. serrata* was one of the less common of the Saphirines in the collection.

Saphirina opalina, Dana.

1852. *Saphirina opalina*, Dana, Crust. U.S. Expl. Exp. p. 1254, pl. lxxxviii. fig. 4.
1860. *Saphirina Thomsoni*, Lubbock, Trans. Linn. Soc. vol. xxiii. p. 186, pl. xxix. figs. 22, 23.
1883. *Saphirina opalina*, Brady, Report Chall. Copep. p. 126, pl. xlix. figs. 3–6.

Habitat. Station 9, 25 fathoms, January 10th (day collection). Off São Thomé Island (lat. 0° 34′ N., long. 6° 30′ 4″ E.), 10 fathoms, January 23rd (day collection). Station 23, 20 fathoms, February 5th (day collection). Lat. 7° 38′ S., long. 12° 3′ 3″ E., surface, February 9th (night collection), &c.

This Saphirine was obtained in 5 surface and 8 under-surface tow-nettings. The 8 under-surface gatherings comprised two at 10 fathoms, one at 15 fathoms, two at 20 fathoms, and two at 25 fathoms. The annexed formula shows the number of day and night collections :—

Tow-nettings 13 { 5 surface { 1 day collection. 4 night collections. ; 8 under-surface { 5 day ditto. 3 night ditto.

This species was readily distinguished from other Saphirines by the peculiar form of the very short caudal stylets.

Saphirina opaca, Lubbock.

1856. *Saphirina opaca,* Lubbock, Trans. Ent. Soc. vol. iv. p. 27, pl. v. figs. 9–11.
1883. *Saphirina opaca,* Brady, Report Chall. Copep. p. 127, pl. xlix. figs. 14–17.

Habitat. Lat. 3° 58′ N., long. 3° 42′ W., 25 fathoms, January 13th (day collection). Off São Thomé Island (lat. 0° 46′ 6″ N., long. 6° 22′ E.), 10 fathoms, January 23rd (day collection). Off the Gaboon River (lat. 0° 22′ 8″ N., long. 8° 16′ 7″ E.), surface, January 28th (two night collections). Station 23, 10 fathoms, February 5th (day collection).

This comparatively large species was obtained in 18 tow-nettings, 7 of which were surface and 11 under-surface gatherings. The under-surface tow-nettings included one at $2\frac{1}{2}$ fathoms, six at 10 fathoms, one at 15 fathoms, one at 20 fathoms, one at 25 fathoms, and one at 30 fathoms. 1 surface and 9 under-surface gatherings were collected during the day, while 6 surface and 2 under-surface were night collections, as shown by the annexed formula:—

Tow-nettings 18 { 7 surface { 1 day collection. / 6 night collections. / 11 under-surface { 9 day ditto. / 2 night ditto.

The large size, elongate form, and the produced inner angle of the caudal stylets serve to distinguish this from most of the other Saphirines in the collection. A few specimens carried ovisacs.

Saphirina splendens, Dana.

1852. *Saphirina splendens,* Dana, Crust. U.S. Expl. Exped. p. 1216, pl. lxxxvii. fig. 9.
1883. *Saphirina splendens,* Brady, Report Chall. Copep. p. 127, pl. xlix. figs. 11–13.

Habitat. Station 3, 25 fathoms, January 2nd (day collection). Lat. 4° 31′ 6″ N., long. 6° 4′ 44″ W., 50 fathoms, January 11th (day collection). Off the Gaboon River (lat. 0° 22′ 8″ N., long. 8° 25′ E.), surface, January 29th (night collection). Station 23, surface and 10 fathoms, February 5th (day collection). Lat. 7° 38′ S., long. 12° 3′ 3″ E., surface, February 9th (night collection), &c.

Saphirina splendens occurred in 16 tow-nettings—6 surface and 10 under-surface. The surface tow-nettings comprised 3 day and 3 night collections, the under-surface 9 day collections and 1 night collection. The under-surface tow-nettings included one at $2\frac{1}{2}$ fathoms, four at 10 fathoms, one at 15 fathoms, two at 25 fathoms, and two at 50 fathoms. The annexed formula shows the number of day and night collections:—

Tow-nettings 16 { 6 surface { 3 day collections. / 3 night ditto. / 10 under-surface { 9 day ditto. / 1 night collection.

SAPHIRINA METALLINA, Dana. (Pl. XII. fig. 4.)

1852. *Saphirina metallina*, Dana, Crust. U.S. Expl. Exped. p. 1242, pl. lxxxvii. fig. 5.
1860. *Saphirina cylindrica*, Lubbock, Trans. Linn. Soc. vol. xxiii. p. 184, pl. xxix. figs 13–15.
1883. *Saphirina metallina*, Brady, Report Chall. Copep. p. 128, pl. l. figs. 11–17.

Habitat. Station 2, 5, 25, and 50 fathoms, January 1st (night collections). Station 3, 100 fathoms, January 2nd (day collection). Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 30, 60, and 360 fathoms, January 22nd (day collections). Station 23, surface, one day and one night collection; also in one at 20, 85, 135, and 235 fathoms, February 5th, &c. (day collections).

Saphirina metallina occurred in 29 tow-nettings; only 4 of these were surface, the other 25 being under-surface and ranging in depth from 5 to 360 fathoms. The surface gatherings comprised 1 day and 3 night collections, and the under-surface 19 day and 6 night collections, as shown by the annexed formula:—

Tow-nettings 29 { 4 surface { 1 day collection. / 3 night collections. ; 25 under-surface { 19 day ditto. / 6 night ditto.

The form of the caudal stylets in this species makes it readily distinguished from all other Saphirines. A peculiar appendage of the caudal stylets is, by deep staining, brought prominently into view. The outline of the appendage may be perceived without staining by observing the diffraction of light around its edges, but it is only by allowing the specimen to be well soaked in the stain (Kleinenberg's hæmatoxylin does very well to stain with) that the appendage can be seen to advantage. It is then observed to possess a narrow oval outline with an acute apex; a thickened part extends from base to apex like the midrib of a leaf. The whole appendage has thus the appearance of a seta possessing delicate wing-like expansions. Such a leaf-like appendage (*cercophyllum*) has not been noticed in any other species of *Saphirina* in the 'Buccaneer' collections. These *cercophylla* probably enable the animal to move with greater rapidity through the water, and thus to be more successful in the struggle for existence. By possessing greater celerity in its movements it would be able to escape more readily from its enemies and be more certain of success in attacking its prey. Whether the *cercophylla* are used as an additional motive-power or not is at present conjectural, but the study of the animal in the living state should tend to throw some light on the use of these curious organs.

SAPHIRINA SINUICAUDA, Brady.

1883. *Saphirina sinuicauda*, Brady, Report Chall. Copep. p. 129, pl. xlix. figs. 7–10.

Habitat. Lat. 23° 4′ 9″ N., long. 5° 22′ 2″ E., 20 fathoms, January 21st (night collection). Station 24, surface, February 6th (day collection).

This was one of the rarest of the Saphirines observed in the 'Buccaneer' collections, and is distinguished from the other species by the form of the inner branch of the second swimming-foot and of the caudal lamellæ. Only two or three specimens in all were obtained.

Genus Saphirinella, Claus.

Saphirinella, Claus, Die freilebenden Copepoden, 1863.

Saphirinella stylifera (Lubbock).

1856. *Saphirina stylifera*, Lubbock, Trans. Ent. Soc. vol. iv. p. 28, pl. iv. figs. 9, 10.
1866. *Saphirinella stylifera*, Claus, Die Copepoden-Fauna von Nizza, p. 17, pl. i. figs. 13, 14.

Habitat. Station 2, 5, 25, and 50 fathoms, January 1st (night collections). Station 3, 25, 50, and 100 fathoms day tow-nettings, and 50 fathoms night tow-netting, January 2nd. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., 10, 20, 30, 60, 260, and 360 fathoms, January 22nd (day collections). Station 23, surface, 20, 85, 185, and 235 fathoms, February 5th (day collections).

Saphirinella stylifera was obtained in 58 tow-nettings, 37 of which were day and 21 were night collections. 47 of the collections were under-surface, the others were surface gatherings, as shown by the annexed formula:—

Tow-nettings 58 { 11 surface { 4 day collections. / 7 night ditto. ; 47 under-surface { 33 day ditto. / 14 night ditto.

The under-surface tow-nettings included gatherings from 5 to 360 fathoms, in nearly all of which *Saphirinella* was more or less frequent.

Many specimens of *Saphirinella* were obtained, but they all appeared to belong to the one species *Saphirinella stylifera* (Lubbock). Very few specimens were observed in the 'Challenger' collections, which is the more remarkable considering the number of gatherings and the extensive area represented.

Note.—*Saphirinella*: It has been shown by Dr. Giesbrecht that *Saphirinella* is only the male form of *Copilia*, and that *Saphirinella stylifera*, Lubbock, is the male of *Copilia mirabilis*, Dana.

Saphirella, nov. gen. (Provisional name.)

Anterior antennæ nearly as in *Saphirina*, 5-jointed. Posterior antennæ 3-jointed. Mandibles stout, each bearing a strong terminal conical tooth, serrate on both margins, and a stout plumose terminal spine. Maxillæ broadly subquadrangular and furnished with a few terminal setæ. Posterior foot-jaws stout, 3-jointed, and armed with a moderately strong terminal claw. The swimming-feet are 2-branched, each branch consists of a single broadly foliaceous joint; fifth pair rudimentary or obsolete.

Saphirella abyssicola, n. sp. (Pl. XIII. figs. 57, 58; Pl. XIV. figs. 5–10.)

Length 1·2 mm. Cephalothorax robust; the first segment, which is about as long as broad, is fully two-fifths the length of the whole animal; the triangular postero-distal angles of the second segment are extended backwards to near the end of the fourth

segment. Anterior antennæ nearly as in *Saphirina*, short, stout, 5-jointed, the third and fourth joints shorter than the others; the proportional lengths of the joints are shown by the annexed formula :—

$$\frac{12 . 19 . 10 . 8 . 12}{1\ \ 2\ \ 3\ \ 4\ \ 5}.$$

The posterior antennæ consist of three nearly equal joints, and are furnished with one or two marginal and a number of apical setæ, two of the apical setæ and one subapical being strongly curved, long, and spiniform (Pl. XIII. fig. 58). Mandibles stout, armed with a strong terminal conical tooth; serrate on both edges, and a stout plumose spine; there are also two stout subapical plumose setæ (Pl. XIV. fig. 6). Maxillæ broadly subquadrangular, bearing one submarginal and a few terminal setæ (Pl. XIV. fig. 7). The basal joint of the anterior foot-jaws is considerably dilated, and is provided with two stout plumose spines on the inner distal angle; the last joint is small, about once and a half longer than broad, and bears four spines on its truncate apex (Pl. XIV. fig. 8). Posterior foot-jaw stout, 3-jointed, the last joint very small and furnished with a moderately strong and nearly straight claw and a long, spiniform, plain seta; the first joint bears three setæ on its inner distal angle, and there are two setæ near the middle of the second joint (Pl. XIV. fig. 9). Swimming-feet stout, 2-branched; each branch consists of a single broadly foliaceous joint; the outer branch of the first pair carries four stout dagger-shaped marginal and subterminal spines, serrate on both edges, and three terminal plumose setæ; the inner branch carries three similar spines, two plain apical setæ, and a seta near the base of the inner margin. The second pair of feet are like the first, but the three dagger-shaped spines on the inner branch are replaced by plumose setæ. Only two pairs of feet were observed; the others were wanting. The last segment of the abdomen is about twice and a half longer than broad. Caudal stylets very short, each bearing a long, slender, sabre-like spine and a few very small setæ.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., in a tow-net gathering from 260 fathoms, collected January 22nd.

Section III. *SIPHONOSTOMA*, Thorell.

Family ARTOTROGIDÆ.

Cyclopicera, Brady (1872).

? Cyclopicera lata, Brady. (Pl. XIII. figs. 25–30.)

1868. *Ascomyzon echinicola*, Norman, Brit. Assoc. Report, p. 300.

1872. *Cyclopicera lata*, Brady, Nat. Hist. Trans. Northumb. and Durham, vol. iv. p. 433, pl. xvm. figs. 3–8.

1880. *Cyclopicera lata*, Brady, Mon. Brit. Copep. vol. iii. p. 56, pl. lxxxix. fig. 12; pl. xc. figs. 11–14

Length ·7 mm. Body subrotund; first body-segment shorter than broad and about

equal to half the entire length of the animal, exclusive of caudal stylets; forehead broadly rounded. Anterior antennæ slender, shorter than the first body-segment, 20-jointed; the second to the ninth joints and also the eighteenth and twentieth, which are all of nearly equal length, are shorter than the others, as shown in the annexed formula:—

$$\frac{10.4.3.3.3.2.2.3.4.4.7.7.7.6.7.8.10.4.6.3}{1\ 2\ 3\ 4\ 5\ 6\ 7\ 8\ 9\ 10\ 11\ 12\ 13\ 14\ 15\ 16\ 17\ 18\ 19\ 20}.$$

An olfactory filament springs from the end of the seventeenth joint. Posterior antennæ and mouth-organs nearly as in *Artotrogus Boeckii*, except that the mandibular stylets are considerably longer and their terminal setæ shorter; the terminal claw of the posterior foot-jaws is also longer in the 'Buccaneer' specimens. The five pairs of swimming-feet also resemble those of *Artotrogus Boeckii*. In the fourth pair (fig. 26) a long, stout, plumose seta springs from the extero-distal angle of the first basal joint, and the outer distal angle of the second joint of the inner branch is bidentate. The abdomen consists of three segments, and the caudal stylets, which are about three times as long as broad, are equal in length to the last abdominal segment.

Habitat. Accra, in a shore gathering, collected January 16th. One or two specimens only were obtained.

Artotrogus, Boeck (1859).

Artotrogus (pars) and *Asterocheres*, Boeck, Tvende nye parasitiske Krebsdyr, 1859.
Ascomyzon, Thorell, Om Krustaceer i Ascidier, 1859.

? Artotrogus abyssicolus, n. sp. (Pl. XII. figs. 5–9; Pl. XIV. figs. 11–18.)

Female. Length 1·1 mm. Cephalothorax robust; the first segment, which is considerably dilated and equal to about four-ninths the length of the entire animal, is anteriorly three-lobed; the two side-lobes are rounded, but the middle one is broadly triangular; the last thoracic segment is very small and scarcely so broad as the first segment of the abdomen. The abdomen is elongate and slender, and nearly of equal breadth throughout; first segment about equal to the length of the next two together, the remaining segments become gradually shorter. Caudal stylets about half the length of the last abdominal segment, and furnished with five moderately long setæ. Anterior antennæ short, 8-jointed, the last joint longer than any of the others; a long sensory filament springs from the end of the sixth joint; the relative lengths of the joints are shown in the formula:—

$$\frac{27.12.6.12.8.18.10.34}{1\ 2\ 3\ 4\ 5\ 6\ 7\ 8}.$$

Posterior antennæ 4-jointed, the second and third joints subequal and longer than the first or fourth; the last joint bears three spines—two terminal, one of which is moderately long and one short, and a marginal spine; a small 1-jointed secondary branch springs from near the end of the second joint. The mandible consists of an elongate basal

joint furnished with two long, slender, terminal setæ. The first joint of the anterior foot-jaws is stout and without spines or setæ; the apical portion of the foot-jaw is long and slender, the proximal half being about four times longer than broad and finely ciliate on the inner aspect, while the distal half forms a strongly curved claw; no articulation was observed between the claw and the broadened basal part. Posterior foot-jaw 4-jointed, second joint large, third and fourth much narrower and shorter; the second, third, and fourth are each provided with a small spine on the inner aspect; terminal claw equal to fully twice the length of the last joint, stout and slightly curved. Swimming-feet nearly as in *Artotrogus* (Pl. XIV. figs. 17, 18). No fifth pair were observed. Siphon as in *Artotrogus*.

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., in a tow-net gathering from 360 fathoms, collected January 22nd. Station 23, in a tow-net gathering from 235 fathoms, collected February 5th.

Several specimens of what may be the male (? immature) of this species occurred in the same gatherings; they differed in the following points:—Body elongate ovate; abdomen long and very slender, and apparently 6-jointed, the first segment being distinctly constricted in the middle (Pl. XII. fig. 9). The anterior antennæ consist of four moderately stout, short joints, and an extremely long, slender, apical part without articulations (Pl. XII. fig. 6). The approximate proportional lengths of the basal joints and long apical part are as follows:—

$$\frac{25 . 8 . 8 . 4 . 270.}{1 \quad 2 \quad 3 \quad 4 \quad 5}$$

The posterior foot-jaws are more slender (Pl. XII. fig. 8). All the other appendages closely agree with the foregoing description.

Caligus, Müller.

Caligus (?) Thymni, Dana. (Pl. XIV. fig. 21.)

1853. *Caligus Thymni*, Dana, Crust. U.S. Expl. Exped. p. 1353, pl. xciv. fig. 3 *a*.

Habitat. Station 9, in a tow-net gathering from 25 fathoms, collected about midday, January 10th. One specimen only.

This specimen, which is doubtfully referred to *Caligus Thymni*, Dana, differs from that species chiefly in the form and comparative length of the posterior part of the abdomen. In the 'Buccaneer' specimen this part is somewhat narrower and longer proportionally than Dana's figure represents *Caligus Thymni* to be.

Caligus Murrayanus, n. sp. Provisional name. (Pl. XIV. fig. 19.)

Length 3 mm. Frontal plate produced and much narrower anteriorly. Fourth pair of feet elongate and rather slender. The first abdominal (genital) segment in the female, which becomes wider posteriorly, is about one-and-a-half times longer than it is broad at the middle, and equal to about half the length of the cephalothorax. The

posterior part of the abdomen, exclusive of caudal stylets, is about half as long as the genital segment, and the breadth less than half the length. A small sucker-like appendage springs from each side of the median ventral line and at the posterior end of the genital segment. Caudal stylets very short.

Habitat. Loanda Harbour, in a surface tow-net gathering, during the afternoon of February 15th. One specimen only obtained.

The outline of the frontal plate, in this species, somewhat resembles an equilateral triangle, from the apical part of which a portion equal to about two fifths of the height has been cut off, while the sucker-disks are situated near the middle of what remains of each side. The species is named in compliment to Dr. Murray of the 'Challenger' Expedition, who has done so much to foster and encourage the study of marine zoology.

Caligus bengoensis, n. sp. Provisional name. (Pl. XIV. fig. 20.)

Length about 2·4 mm. Frontal plate about one fifth of the length of the cephalothorax, narrower anteriorly. Sucker-disks forming almost a complete circle. The length of the genital segment of the abdomen is about equal to one-and-one-third times its breadth; the following segment is shorter than broad, and in length equal to about half the breadth of the genital segment; the last abdominal segment is longer than the preceding one, and about as broad as long. Caudal stylets half as long as the last abdominal segment. The fourth pair of feet are moderately stout.

Habitat. Loanda Harbour, in a surface tow-net gathering, but not the same as that in which *Caligus Murrayanus* was obtained.

Caligus dubius, n. sp. Provisional name. (Pl. XIV. fig. 22.)

Female. Length 3·6 mm. Forehead broadly rounded, sucker-disks comparatively shallow. Cephalothorax equal to about four sevenths of the entire length of the animal. The genital segment, which becomes wider towards the distal end, is about as long as the remaining portion of the abdomen, including caudal stylets; its breadth at the distal end is equal to about three fourths the length, and the postero-lateral angles are rounded. The remaining portion of the abdomen, the length of which is about equal to the posterior end of the genital segment, is three times longer than broad; no articulations were observed in this part of the abdomen. The length of the caudal stylets is equal to twice the breadth, and each is furnished with three moderately short plumose setæ.

Habitat. Loanda Harbour, in two surface tow-net gatherings, collected, one on the 13th and one on the 15th of February; also in a surface tow-net gathering collected off Appi, January 18th.

Nogagus, Leach.

Nogagus validus, Dana. (Pl. XIV. fig. 23.)

1853. *Nogagus validus*, Dana, Crust. Expl. Exped. p. 1363, pl. xciv. fig. 9 *a–h*.

Habitat. Lat. 1° 55′ 5″ N., long 5° 55′ 5″ E., in a tow-net gathering from 30 fathoms, collected January 22nd. One specimen only was obtained.

Hessella, Brady.

Hessella cylindrica, Brady.

1883. *Hessella cylindrica*, Brady, 'Challenger' Copepoda, p. 136, pl. lv. figs. 9–13.
1860. ? *Baculus elongatus*, Lubbock, Trans. Linn. Soc. vol. xxiii. p. 190, pl. xxix. fig. 40.

Habitat. Station 3, in a tow-net gathering from 25 fathoms, collected January 2nd. Only one specimen of this interesting species was obtained.

This appears to be the *Baculus elongatus*, Lubbock, described by Sir John Lubbock in his paper "On some Oceanic Entomostraca collected by Captain Toynbee," and published in vol. xxiii. of the Transactions of the Linnean Society. If my conjecture is right, Sir John Lubbock's name must take precedence of that of Dr. Brady.

Incertæ Sedis.

Pontopsyllus elongatus, n. g. et sp. (Pl. XIV. figs. 24–30.)

Length 2·23 mm. (1-11th of an inch). Body cylindrical; first segment four sevenths of the whole length of the animal and equal to twice the combined length of the remaining three segments, which are subequal. Abdomen very short, composed of four segments; the two intermediate segments, which are of about equal length, are shorter than the first or fourth. Caudal stylets rudimentary and furnished with a moderately stout curved plumose terminal seta and three small marginal ones; the integument of the last abdominal segment is covered with minute cilia, and the terminal seta of each of the caudal stylets is curved inwards (fig. 24). Anterior antennæ short, 5-jointed, bearing a few scattered hairs; the anterior distal angle of the basal joint is provided with a long plain seta that reaches beyond the apex of the antenna. The proportional lengths of the joints are as follows:—

27	18	15	15	18
1	2	3	4	5

The posterior antennæ are 2-jointed and very short and stout; a strong curved claw, articulated to the exterior half of the truncate apex and opposed by a stout pointed tooth, forms a powerful grasping-organ (fig. 26). Mandible and maxillæ rudimentary; the first consists of a simple, somewhat stylet-shaped appendage, the other of two strong hooked spines attached to a stout 1-jointed basal part (figs. 27 *a*, *b*). Posterior foot-jaws large; the dilated basal joint carries an elongate, slender, apical appendage, the distal end of which is clothed with fine cilia, and, becoming gradually attenuated, terminates in a small spiral coil of about one-and-a-half turns, as shown in figure. The four pairs of swimming-feet are all similar and consist of two short 2-jointed branches; the exterior distal angles of the joints of the outer branches are furnished with stout dagger-shaped spines, finely serrate on both edges; the broad terminal spines, which are more than twice

the length of the branches from which they spring, are plain on the inner and serrate on the outer margin; the inner branches have no terminal spine; both branches are provided with several long plumose setæ (fig. 29).

Habitat. Lat. 1° 55′ 5″ N., long. 5° 55′ 5″ E., in a gathering from 360 fathoms, collected January 22nd. One specimen only was obtained.

A form that may be an immature stage of the foregoing was obtained in a surface tow-net gathering from Loanda Harbour, collected February 15th, and is represented by fig. 58. The anterior antennæ are 2-jointed; the posterior foot-jaws are large and well-developed; the siphon is elongate, with a flattened sucker-like disk at the extremity (fig. 30)

This form is closely analogous to the immature stage of *Caligus*, formerly described as a distinct genus under the name of *Chalimus*.

Part II.

CLADOCERA and OSTRACODA.

INDEX OF GENERA AND SPECIES.

CLADOCERA.

Cladocera were exceedingly rare in regard to the number of species observed, only two species having been obtained in the whole of the 'Buccaneer' collections. They

represented, however, two widely prevailing groups—the *Calyptomera* and *Gynomera*; the first is confined almost exclusively to fresh and brackish water, while species belonging to the other are to be found in fresh water and also in the open sea.

The following are the two species referred to :—

CALYPTOMERA.

Family PENILIDÆ, Dana.

Genus Penilia, Dana (1853).

Penilia orientalis, Dana.

1853. *Penilia orientalis*, Dana, Crust. U.S. Expl. Exped. p. 1270, pl. lxxxix. fig. 3 *a–e*.

Habitat. Loanda Harbour, in three surface tow-net gatherings, collected February 15th. A number of specimens were observed.

GYMNOMERA.

Family POLYPHEMIDÆ, Baird.

Genus Evadne, Lovén.

Evadne Nordmanni, Lovén.

This species was obtained in a number of the tow-net gatherings.

OSTRACODA.

Comparatively few Ostracoda were obtained in the 'Buccaneer' collections. The Ostracoda, with the exception of *Halocypris* and a few others, live among the weed, or on the sand and mud at the bottom of the water, and can be captured only by the dredge or other implement suited for collecting bottom material; dead shells of Ostracods, however, may be frequently obtained by carefully examining the sand or other débris on the shore. As, therefore, the 'Buccaneer' collections consisted chiefly of tow-net gatherings, pelagic species, as *Halocypris*, were the only forms observed in all but a very few of the gatherings.

Several species of *Cythere*, as well as one or two of other genera belonging both to the Cypridæ and Cytheridæ, were obtained in a surface gathering from a lagoon at São Thomé Island, in another from Loanda Harbour, and in a third collected off the mouth of the River Congo.

One of the most interesting captures was an Ostracod closely allied to *Cypria exsculpta* (Fischer), which in this Report is named provisionally *Cypria atlantica*; it was obtained in the gathering collected off the mouth of the River Congo, referred to above, at about 40 miles from land. It is well known to students of the Entomostraca that several species of the Cypridæ, as, for example, *Cypria ophthalmica* (Jurine), *Cypris prasina*, Fischer, *Candona candida* (Müller), &c., though usually or frequently obtained in fresh water, are nevertheless occasionally obtained also in water more or less brackish, but have not been known to occur in the open sea, except as dead shells; it is therefore interesting to find a species closely resembling a freshwater *Cypria* living in the sea so many miles from land.

It is possible that the fresh water poured into the sea by the River Congo may extend to a distance of 40 miles or more from land before it becomes thoroughly mingled with the water of the Atlantic, and may thus form a suitable *habitat* for a species which possibly would not be able to live in pure sea-water. Whether this be the correct explanation of the occurrence of a *Cypria* so far out at sea, or not, it is a subject of some interest as bearing on the distribution of species.

It may be stated in connexion with this that several surface tow-net gatherings were collected off the mouth of the Congo, and within a few miles of each other, but the *Cypria* was observed only in the one mentioned under the description of the species.

Though the Ostracoda described in this Report be comparatively few in number, they nevertheless include representatives of three out of the four principal Groups, viz.:— the Podocopa, the Myodocopa, and the Platycopa. The following are the descriptions of species obtained belonging to these three Groups:—

I. *PODOCOPA.*

Family CYPRIDÆ.

Cypria, Zenker (1854).

(?) Cypria atlantica, n. sp. (Pl. XIV. figs. 31–33; Pl. XV. figs. 16, 20, 21, 25.)

Shell compressed; seen from the side, the dorsal margin is considerably arched, highest and somewhat angular in front of the middle; the dorsal margin slopes gently backwards from the highest part in a nearly straight line till it joins the broadly curved posterior margin; the front slope has a greater declivity and is very slightly curved, and merges in the boldly rounded anterior margin; ventral margin nearly straight. Greatest height equal to two-thirds of the length. Outline seen from above ovate; sides evenly rounded, widest behind the middle; greatest width equal to about seven sixteenths of the length; extremities acutely angular, but more so in front than behind; the sides also converge more gradually towards the anterior extremity than they do posteriorly. Surface of shell ornamented with impressed reticulate lines, having the interspaces

covered with minute dots that appear to have a linear arrangement when viewed in certain positions. Length of shell ·61 mm. (1-41st of an inch). Antennules 7-jointed, basal joint large, the others small; the formula shows the relative lengths of the joints:—

$$\frac{32 . 10 . 11 . 8 . 7 . 6 . 9}{1 . 2 . 3 . 4 . 5 . 6 . 7}.$$

The last two or three joints are provided with several long plain setæ; there are also a few scattered setæ on the other joints. Antennæ 4-jointed; the proportional lengths of the joints are as follows:—

$$\frac{10 . 14 . 10 . 4}{1 . 2 . 3 . 4}.$$

Five long and nearly equal setæ spring from the end of the second joint; the terminal claws reach only to about the middle of the setæ. Post-abdomen moderately stout, armed at the apex with two strong, curved, and nearly equal claws, and a small seta; a small seta also springs from near the middle of the lower margin of the post-abdomen.

Habitat. Lat. 5° 53′ 0″ S., long. 11 31′ 1″ E., in a surface tow-net gathering collected 11.30 P.M., February 18th. (Off the mouth of the River Congo, about 40 miles from land.)

A considerable number of specimens were obtained. The occurrence in the open sea of a species so closely related to a freshwater *Cypria* is of interest as forming another link connecting the truly freshwater with the truly marine Ostracoda.

Figure 33, Pl. XIV., is that of an immature specimen.

Phlyctenophora, Brady (1880).

Phlyctenophora africana, n. sp. (Pl. XIV. figs. 34, 35; Pl. XV. figs. 17–19.)

Shell elongate ovate; seen from the side the dorsal margin forms a depressed arch, rather highest in front of the middle; ventral margin sinuated in front, gently convex behind; anterior extremity somewhat attenuate and evenly rounded; posterior margin slightly produced and angular below the middle; greatest height equal to five twelfths of the length. The outline seen from above is compressed ovate, widest in the middle; greatest width a little more than a third of the length; sides tapering similarly and evenly to both extremities, which are subacute. Length 1 mm. (1-25th of an inch). Antennules 7-jointed; relative lengths of the joints nearly as in the formula:—

$$\frac{22 . 5 . 5 . 5 . 6 . 4 . 4}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7}.$$

The last joint bears a moderately stout and long apical spine; the other joints are more or less setiferous; setæ plain. Antennæ 6-jointed, sparingly setiferous; the first three joints large, the last three small, as shown by the relative lengths of the joints given in the formula:—

$$\frac{17 . 16 . 17 . 4 . 7 . 3}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6}.$$

A fascicle of about six short setæ springs from the side and near the distal end of the third joint, while the penultimate joint carries one spine, and the last joint two moderately long claw-like spines. Post-abdomen short, stout, and armed with two strong terminal claws, setiferous on the lower distal half, and a few small setæ.

Habitat. Loanda Harbour, in a surface tow-net gathering, collected February 13th. Several specimens were obtained.

Pontocypris, G. O. Sars (1865).

Pontocypris trigonella, G. O. Sars. (Pl. XIV. figs. 36, 37.)

1865. *Pontocypris trigonella,* G. O. Sars, Oversigt af Norges Marine Ostrac. p. 16.

1889. *Pontocypris trigonella,* Brady and Norman, Mon. M. & F.-w. Ostrac. of the N. Atlantic and N.W. Europe, p. 109, pl. xxii. figs. 18–25, pl. xxiii. fig. 6.

Habitat. São Thomé Island, in a surface tow-net gathering from a shore-lagoon, collected January 27th. One specimen only was obtained.

(?) Pontocypris subreniformis,n. sp. Provisional name. (Pl. XIV. figs. 38, 39.)

Outline of the shell seen from the side subreniform; dorsal margin considerably arched; extremities similarly and somewhat obliquely rounded; ventral margin slightly concave; greatest height at the middle scarcely equal to four ninths of the length. Seen from above oblong ovate, widest at the middle, tapering at the sides from the middle to each end in nearly straight lines; extremities obtusely pointed. Greatest width equal to rather more than one third the length. Length ·58 mm.

Habitat. In the same gathering with the last.

Family BAIRDIIDÆ.

Bairdia, M'Coy (1844).

Bairdia inornata, n. sp. (Pl. XIV. figs. 40, 41.)

Viewed laterally the dorsal margin of the shell is boldly arcuate; highest a little behind the middle; at the highest the dorsal margin is obtusely angular, and from thence it slopes rapidly downwards on both sides, but more so behind than in front, till it merges in the evenly rounded extremities; ventral margin gently sinuated; greatest height equal to two-thirds of the length. The outline of the shell seen from above is compressed ovate; greatest width slightly behind the middle and equal to about five twelfths of the length; the sides curve regularly towards both ends; extremities subacute; surface of valves smooth. Length ·7 mm.

Habitat. Lat. 5° 53′ 0″ S., long. 11° 31′ 1″ E.; in a surface tow-net gathering collected at 11.30 p.m., February 18th. One specimen only obtained: it was in the same gathering with *Cypria atlantica,* already described, and which was taken off the mouth of the River Congo, at about 40 miles from land.

Family CYTHERIDÆ.

Cythere, Müller (1785).

Cythere multicava, n. sp. (Pl. XIV. figs. 42, 43; Pl. XV. figs. 13, 15.)

Shell elongate, rather tumid; seen from the side, dorsal margin highest and bluntly angular in front of the middle; thence it slopes gently backwards in a nearly straight line to the rounded, obscurely crenate, posterior end; anterior margin oblique, inferiorly rounded and crenulate, flattened above, and sloping posteriorly upward to the hinge-prominence. Height rather less than half the length. As seen from above oblong, sides nearly parallel, slightly gibbous in front; width about two fifths of the length; posterior extremity broadly rounded at the sides, centrally produced and truncate; anteriorly the valves taper gently to the obtusely pointed extremity. Shell ornamented with numerous small circular depressions arranged in irregular lines. Length ·77 mm.

Antennules 6-jointed, first and second joints long, the others small; their relative lengths are as follows:—

$$\frac{25}{1}\cdot\frac{27}{2}\cdot\frac{10}{3}\cdot\frac{6}{4}\cdot\frac{8}{5}\cdot\frac{10}{6}.$$

A stout spine springs from the exterior distal angle of the third, fourth, and fifth, and from the apex of the last joint.

First and third joints of the antennæ elongate, subequal, about three times as long as the second joint; last joint very small, and furnished with two apical spines. A long, hair-like appendage carried by the second joint is connected by a duct with a (?) poison-gland situated at the base of the antennæ.

Habitat. Loanda Harbour, in a gathering collected February 13th. A few specimens only were obtained.

Cythere sculptilis, n. sp. (Pl. XIV. figs. 44, 45.)

Shell: viewed laterally, the outline of the shell is broad and obliquely rounded in front, narrow behind; greatest height in front of the middle equal to fully half the length; dorsal margin forming a sinuous declivity towards the posterior end; posterior extremity subtruncate, somewhat produced below and bluntly dentate; lower part of anterior margin crenate or bluntly toothed, ventral margin shallow concave. Seen from above, subquadrangular; anterior end truncate; sides subparallel, sinuated; greatest width scarcely equal to half or three sevenths of the length, constricted behind the middle, gently rounded and converging posteriorly. Towards the posterior end the edges of the valves become flattened and are produced backwards, and terminate in obliquely truncate ends as in the figures. Length ·54 mm.

Habitat. With the last in a surface tow-net gathering from a lagoon, São Thomé Island. One specimen only obtained.

Cythere radula, Brady.

Cythere radula, Brady, Report on the 'Challenger' Copepoda, p. 102, pl. xix. fig. 4 *a*, *b*.

Habitat. Lagoon, São Thomé Island, in the same gathering with the last. A single valve evidently belonging to *Cythere radula* was obtained, but was broken while being examined.

Cythere rimosa, n. sp. (Pl. XIV. figs. 46, 47.)

Shell tumid; seen from the side the dorsal margin is highest behind the middle, thence it slopes gently in a nearly straight line to the anterior end, but merges behind into the boldly and somewhat obliquely rounded posterior margin; front margin subtruncate, the lower part of the shell slightly produced; greatest height equal to fully half the length. The outline seen from above subovate, sides nearly parallel, but somewhat wider in front of the middle; thence they converge in a gently rounded curve to the posterior end, which is slightly emarginate; greatest width scarcely equal to half the length. Posterior extremity subtriangular, with the apex truncate. Surface of the valve curiously sculptured, with flattened ridges arranged in irregular and more or less oblique lines extending across the shell. Length ·6 mm.

Habitat. Lagoon, São Thomé Island, in a surface tow-net gathering, collected January 27th, also the same gathering with *Cypria atlantica* collected off the mouth of the river Congo, at about 40 miles from land, February 18th.

Cythere thalassica, n. sp. (Pl. XIV. figs. 48, 49.)

Outline of shell, seen from the side, narrow, elliptical, highest at the middle; greatest height scarcely equal to half the length; dorsal margin gently and evenly arched, ventral margin nearly straight; both extremities similarly and boldly rounded. Seen from above, ovate, rather widest at the middle, width and height about equal; anteriorly the sides, which are slightly rounded, converge gently towards the obtusely pointed extremity; posterior end broadly and moderately convex. Surfaces of valves smooth. Length ·85 mm.

Habitat. In a lagoon, São Thomé Island, in a surface tow-net gathering, collected January 27th. One or two specimens only obtained.

Cythere venusta, n. sp. (Pl. XIV. figs. 50, 51.)

Shell, seen from the side, broadly elliptical; greatest height behind the middle, scarcely equal to half the length. The dorsal margin is slightly arcuate, middle portion forming a nearly straight line, but gently curved in front to where it joins the boldly and evenly rounded anterior extremity; posterior margin moderately and regularly convex; ventral margin slightly concave. Seen from above the shell is broadly ovate, widest behind the middle; greatest width equal to five twelfths of the length; sides evenly rounded, converging gently towards the anterior extremity, but more convex posteriorly; extremities bluntly angular; valves somewhat unequal, the right being rather smaller than the left. Surface of the valves ornamented with flattened and gently curved longitudinal ribs placed

side by side, extending from the posterior extremity, but becoming obsolete towards the anterior end, where they run out into shallow circular depressions; the front margin is marked with a number of impressed, short, radiating lines. Length ·8 mm. (1-31st of an inch).

Habitat. Loanda Harbour, in a surface tow-net gathering, collected February 13th. One specimen only obtained.

This species closely resembles *Cythere costellata*, Roemer, an ostracod obtained fossil in the Tertiary deposits of England and also in France.

Xestoleberis, G. O. Sars (1865).

Xestoleberis (?) margaritea (Brady).

1865. *Cytheridea margaritea*, Brady, Trans. Zool. Soc. vol. v. p. 370, pl. lviii. fig. 6, *a*, *b*.

1880. *Xestoleberis margaritea*, Brady, Report on the 'Challenger' Copepoda, p. 127, pl. xxx. fig. 2, *a*, *b*.

Habitat. Lagoon, São Thomé Island, in a surface tow-net gathering, collected January 27th; several species were obtained. The *Xestoleberis* now recorded, when viewed laterally, differs from *X. margaritea* described and figured in the 'Challenger' Report in being rather more pointed at the anterior end, but otherwise it seems to agree with that species; it also agrees with the figures of the same species in the 'Monograph of the Marine and Fresh-water Ostracoda of the North Atlantic and North-western Europe,' by Brady and Norman, p. 246.

Cytherura, G. O. Sars.

Cytherura simulans, n. sp. (Pl. XIV. figs. 52, 53.)

Shell, viewed laterally, subovate; greatest height behind the middle equal to about four ninths of the length; dorsal margin moderately and evenly arched; ventral margin slightly concave; beak subcentral, obtuse, more prominent than in *Cytherura similis*, G. O. Sars, which the species now described somewhat resembles; anterior extremity evenly rounded and slightly oblique; the outline seen from above is subovate, widest behind the middle; width equal to the height; sides flattened centrally, converging and gently curved; anterior subtruncate behind, with the middle part shortly produced to a blunt pointed apex; anterior extremity subacuminate. Length ·46 mm.

Habitat. Loanda Harbour, in a surface tow-net gathering, collected February 13th. One specimen only obtained.

Cytheropteron, G. O. Sars (1865).

Cytheropteron trilobitis, Brady. (Pl. XIV. figs. 54, 55.)

1880. *Cytheropteron trilobitis*, Brady, On Ostracoda collected by H. B. Brady in South Sea Islands, Trans. R. S. E. vol. xxxv. pt. ii. p. 511, pl. iii. figs. 22, 23.

Habitat. In a lagoon, São Thomé Island, in a tow-net gathering, collected January 27. Only a few valves of this species were obtained; it differs very little from the 'Challenger' specimen.

II. *MYODOCOPA.*

Family CYPRIDINIDÆ, Baird.

Genus Asterope, Philippi.

Asterope squamiger, n. sp. (Pl. XIV. figs. 56, 57; Pl. XV. figs. 14, 22, 23, 26.)

Female. Shell, seen from the side, subrotundate, highest at the middle, convex and evenly rounded in front; dorsal margin nearly straight; extremities evenly rounded; the posterior curve slightly oblique, notch well defined, beak subacute, height equal to four fifths of the length. Length 1·15 mm. Seen from above ovate, tumid, widest at the middle; width equal to three fifths of the length; sides moderately and regularly convex; posterior extremity obtusely rounded; valves slightly produced in the middle; anterior extremity emarginate. Surface of shell ornamented with small squamiferous markings. Antennules 6-jointed and of moderate length, the second to the fifth joints subequal, the last very small and furnished with several slender apical setæ and a slightly hooked claw. Secondary branches of antennæ 3-jointed,; first and third joints short, the last bearing a short seta at its apex. First maxillæ nearly as in *Asterope teres*, Jones; post-abdomen armed with about six spines, the first large and serrate on the posterior edge, the next three shorter and plumose and apparently articulated near the base, the others very small.

Habitat. (?) Lagoon, São Thomé Island, in a surface tow-net gathering, collected during night, January 27th. Two specimens only.

Sarsiella, Norman, 1868.

Sarsiella Murrayana, n. sp. (Pl. XIV. fig. 58; Pl. XV. figs. 24, 28, 29, 31.)

Male. Shell laterally compressed in front, tumid behind, seen from the side subrotund; height equal to three fourths of the length; dorsal margin slightly convex; front margin boldly rounded and continuous with the anterior end; posterior extremity produced in front into a blunt-pointed, triangular, beak-like process; dorsal angle at the junction of the posterior and dorsal margin rounded; there is a small, tumid, triangular, tooth-like process a little behind the dorsal angle (fig. 40). Surface of the shell covered with small puncture-like markings.

Antennules 4-jointed; first joint elongate, second and third subequal and shorter than the first; last joint fully three fourths the length of the preceding and furnished with several apical setæ of moderate length; second joint of natatory branch rather longer than the next two joints together; third to the last joints small, subequal. Post-abdomen armed with a long, powerful, terminal claw and four spines of varying length on the posterior distal margin. Oviferous foot nearly as in *Asterope Mariæ* (Baird). Length ·93 mm.

Habitat. Lagoon, São Thomé Island, in a surface tow-net gathering collected during night, January 27th. Two specimens only obtained.

Family CONCHŒCIDÆ.

Subfamily HALOCYPRINÆ, Dana.

Genus HALOCYPRIS, Dana (1853).

HALOCYPRIS BREVIROSTRIS, Dana.

1853. *Halocypris brevirostris*, Dana, Crust. U.S. Expl. Exped. p. 1303, pl. xci. fig. 9, *a-c*.

Habitat. From the following, among other localities :—

January 5th, lat. 5° 58′ 0″ N., long. 14° 10′ 0″ W., surface gatherings.
„ 10th, „ 3° 0′ 8″ N., „ 7° 43′ 0″ W., 50 fathoms (Station 9).
„ 20th, „ 3° 22′ 5″ N., „ 4° 11′ 8″ E., 30 fathoms.
„ 21st, „ 2° 34′ 9″ N., „ 5° 22′ 2″ E., 20 fathoms.
„ 22nd, „ 1° 55′ 5″ N., „ 5° 55′ 5″ E., 20 and 30 fathoms.
February 5th, „ 4° 26′ 7″ S., „ 10° 1′ 8″ E., 20 and 30 fathoms (Station 23).

The first of these gatherings was collected in the evening after dark, the others during the day. The specimens observed in any of the gatherings were comparatively few in number.

HALOCYPRIS ELONGATA, n. sp. (Pl. XV. figs. 1, 2, 27, 30.)

Shell, seen from the side, elongate, anterior extremity rounded below the notch and continuous with the ventral margin; ventral and dorsal margins nearly straight, dorsal produced posteriorly so as to be considerably longer than the ventral; posterior margin oblique, nearly straight, forming an acute angle at its junction with the dorsal edge; the ventral angle obtusely rounded; shell highest posteriorly, greatest height fully one third of the length. Length 3·2 mm. Seen from above, elongate ovate, widest at the middle, width equal to rather less than one third of the length; from the middle the shell tapers and becomes much compressed towards the posterior extremity, which is somewhat obtuse; anteriorly the width decreases more gradually to the base of the rostrum, whence the valves rapidly converge to the sharp pointed extremity of the beak; surface of the valves smooth. The setæ of the anterior antennæ of the female are four short and one long; the second joint is somewhat shorter than that which precedes or follows; the last joint is very short. The distal part of the tentacle seems to be continuous with the basal portion instead of sagittiform as in *Halocypris atlantica*, Lubbock. Natatory branch of the posterior antennæ slender; secondary branch small; first joint somewhat dilated and furnished with two small spines; apical joint small, bearing five setæ—two very small, two elongate and reaching to near the extremity of the apical setæ of the primary branch, and one about half as long.

Habitat. From several localities, among which are the following :—

January 10th, lat. 3° 0′ 8″ N., long. 7° 43′ 0″ W., 50 fathoms (Station 9).
„ 20th, „ 3° 55′ 3″ N., „ 4° 7′ 3″ E., 30 fathoms.
„ 22nd, „ 1° 55′ 5″ N., „ 5° 55′ 5″ E., 20, 30, and 35 fathoms.
February 5th, „ 4° 26′ 7″ S., „ 10° 1′ 8″ E., 20 and 30 fathoms (Station 23).

This species was not observed in any surface tow-net gathering.

Halocypris torosa, n. sp. (Pl. XV. figs. 3, 4, 32, 35, 37.)

Shell tumid; surface of valves finely reticulated. Seen from the side the dorsal margin is nearly straight, slightly sinuate; a sulcus begins near the middle of the dorsal margin and passes obliquely backward across each valve; the tumidity extends downward, anterior to the sulcus, and overhangs the nearly straight ventral margin. A second, though very shallow, groove is observed in some of the more robust specimens, between the subcentral sulcus and the posterior extremity. Posterior margin truncate, dorsal angle slightly produced; at the anterior end the ventral margin rises obliquely in a nearly straight line and merges in the small rounded angle below the notch. The beak is a hood-like process with broad overhanging sides. Shell highest at the posterior end; height equal to nearly half the length; length 3·75 mm. Seen from above oblong-ovate, widest behind the middle; greatest width equal to two fifths the length. Sides sinuous, posterior extremity rounded, anterior end bluntly angular. Anterior antennæ with four apical setæ and a curved hair-like filament; one of the apical setæ is very long and is provided with a fringe of small teeth on a portion of the proximal half, similar to *Halocypris imbricata*; a small plumose seta springs from near the middle of the penultimate joint. The blunt-pointed arrow-like head of the tentacle reaches slightly beyond the extremity of the antennæ. Secondary branch of the posterior antennæ furnished with a stout plumose seta on the enlarged basal joint; the small terminal joint bears an extremely long ringed seta, another about one third as long, and five very small setæ, as well as a strongly-hooked claw. The first foot consists of four moderately long subequal joints, which are sparingly setiferous, and a very small terminal joint furnished with three long plumose setæ.

Habitat. The following are some localities where this species was obtained:—

January	5th,	lat.	5° 58′ 0″ N.,	long. 14° 20′ 0″ W.,	collected near surface.
,,	20th,	,,	3° 55′ 3″ N.,	,, 4° 7′ 3″ E.,	20 and 30 fathoms.
,,	21st,	,,	2° 20′ 2″ N.,	,, 5° 7′ 8″ E.,	20 fathoms (Station 14).
,,	22nd,	,,	1° 55′ 5″ N.,	,, 5° 55′ 5″ E.,	35 and 460 fathoms.
,,	23rd,	,,	0° 25′ 1″ N.,	,, 6° 36′ 6″ E.,	10 fathoms.

This species appears to be intermediate between *H. atlantica*, Lubbock, and *H. imbricata*, Brady.

Halocypris aculeata, n. sp. (Pl. XV. figs. 5, 6, 33, 34, 38.)

Shell seen from the side highest at the middle, height nearly equal to half the length; dorsal margin straight, right valve terminating posteriorly in a short backward-directed spine-like process, similar to that at the anterior extremity of the left valve; ventral margin convex, evenly rounded, and forming a continuous curve from the postero-dorsal spine round to the shallow notch under the beak in front. Seen from above elongate-ovate, widest at the middle, evenly rounded, and tapering to the posterior extremity; tapering and somewhat sinuate anteriorly. Valves smooth. Length 1 mm.

Antennules in the female provided with numerous apical setæ of moderate length (fig. 54). The last joint of the male antennule is abruptly curved and furnished with a dense subapical fascicle of short hairs, besides several terminal setæ, one of which is of considerable length and much longer than the others; tentacle very slender and scarcely reaching to the extremity of the antennule.

Secondary branch of the male antennæ nearly two thirds the length of the natatory branch and furnished with two apical setæ—one extremely long and one about two fifths the length of the other. The antennal hook, which is slightly dentate on the inner margin at the distal end, carries one short seta and two elongate ones on the exterior edge, immediately behind the geniculation (fig. 55).

Habitat. Lat. 0° 19′ 2″ S., long. 7° 19′ 0″ E. This is the nearest observed position to where the material containing specimens of this species was collected. It was a surface gathering, collected at 8.45 P.M.; the position recorded was taken about 40 minutes earlier on February 2nd.

The drawings of the side and dorsal views are from two specimens which differed somewhat in size. The length of the spines at the extremities of the dorsal margin varies in different specimens.

HALOCYPRIS PUNICA, n. sp. (Pl. XV. figs. 7, 8, 39, 40.)

Shell (*male*) robust, subcentrally gibbous. Outline as seen from the side:—Dorsal margin sinuated; ventral margin slightly convex, immediately posterior to the subcentral gibbosity, then bending up posteriorly in a flattened curve to a little below the horizontal middle line of the shell; thence the posterior extremity recedes upward in a gentle slope to the dorsal margin, with which it forms a bluntly-rounded obtuse angle; the anterior margin is boldly convex below the notch, then evenly and gently rounded inferiorly, where it merges into the ventral margin. Greatest height fully equal to half the length. Beak prominent, stout. Seen from above, broadly and rather irregularly ovate; greatest breadth, in front of the middle, equal to about half the length; posterior extremity bluntly rounded; anterior end subacute. Antennules furnished with nine apical setæ, the two inner ones abruptly twice geniculated at the base; two of the outer rather longer than the others, and bearing a double row of small spiniform teeth near the middle; tentacle slender and extending considerably beyond the apex of the antennules. Secondary branch of the antennæ short and stout, basal part dilated. The upper margin with two processes—one narrow and tooth-like, the other larger and bearing two small spines; apical joint furnished with two terminal elongate setæ, three small submarginal filaments, and a small hook; the hook has the inner margin at the distal end slightly crenate or toothed. Several of the plumose setæ of the natatory branch are thickened or spatulate at the extremity. Length ·77 mm.

Habitat. Station 9 (lat. 3° 0′ 8″ N., long. 7° 13′ 0″ W.), 50 fathoms, in a tow-net gathering, collected January 10th. A few specimens only were obtained.

III. *PLATYCOPA.*

Family CYTHERELLIDÆ, G. O. Sars.

Genus Cytherella, Jones (1849).

Cytherella africana, n. sp. (Pl. XV. figs. 9, 10, 36, 41, 42.)

As seen from the side, the valves of the shell are broadly elliptical; dorsal margin flatly and somewhat unevenly rounded; ventral margin slightly concave, extremities boldly convex. Shell rather highest behind the middle; height fully half the length. Seen from above, the greatest breadth is near the posterior end, which is subtruncate; the sides are slightly curved and converge gently towards the anterior extremity, which is somewhat emarginate. Surface of valves smooth. Length ·86 mm. (1-29th of an inch),

Anterior antennæ 7-jointed, setiferous, the last joint with three spines fully twice the length of the joint; the secondary branch of the posterior antennæ scarcely equal in length to the first joint of the larger branch; post-abdominal laminæ armed on the exterior margin and apex with several strong divaricate spines; inner margin with three or four smaller spines, having one of the edges setose (fig. 42).

Habitat. Loanda Harbour, in a surface tow-net gathering, collected February 13th. 1886. The form of the shell of this species closely resembles *Cytherella scotica*, Brady. It differs in being scarcely so truncate behind; seen from above, the sides of the shell are more distinctly curved in outline, and the dorsal margin, seen from the side, is slightly convex instead of concave.

(?) Cytherella pumila. (Pl. XV. figs. 11, 12.)

Shell outline, seen from the side, broadly elliptical; dorsal margin flatly convex and obscurely angulated; greatest height equal to five ninths of the length; ventral margin gently and evenly rounded; extremities also moderately convex, but the anterior end is rather narrower than the other and somewhat oblique. Seen from above, ovate; greatest breadth behind the middle and equal to four ninths of the length; sides evenly rounded; extremities subacute. Length ·57 mm.

Habitat. Loanda Harbour, in a surface tow-net gathering collected February 13th. A single perfect specimen only was obtained and two valves.

DESCRIPTION OF THE PLATES.

Plate I.

Paracalanus pygmæus (Claus).

Fig. 1. Female, lateral view. × 53.
2. Anterior antenna. × 84.
3. Posterior antenna. × 165.
4. Posterior foot-jaw. × 170.
5. Foot of second pair. × 125.
6. Foot of fourth pair. × 125.
7. Foot of fifth pair. × 250.
8. Abdomen and caudal stylets. × 125.

Paracalanus parvus (Claus).

ig. 9. Female, dorsal view. × 40.
10. Foot of first pair. × 95.
11. Foot of fourth pair. × 95.
Fig. 12. Foot of fifth pair, female. × 190.
13. Foot of fifth pair, male. × 125.
14. Abdomen and caudal stylets. × 63.

Eucalanus spinifer, n. sp.

Fig. 15. Female, dorsal view. × 10.
16. Posterior antenna. × 18.
17. Mandible. × 13.
18. Maxilla. × 13.
19. Anterior foot-jaw. × 23.
Fig. 20. Posterior foot-jaw. × 13.
21. Foot of first pair. × 35.
22. Foot of third pair. × 35.
23. Foot of fifth pair. × 86.

Augaptilis longicaudatus (Claus).

Fig. 24. Female, dorsal view. × 12.
25. Posterior antenna. × 28.
Fig. 26. Anterior foot-jaw (*a*, one of the seta more highly magnified). × 35.

Mecynocera Clausi, I. C. Thompson.

Fig. 27. Male, dorsal view. × 32.
28. Female, lateral view. × 32.
29. Anterior antenna. × 35.
30. Posterior antenna. × 125.
Fig. 31. Posterior foot-jaw. × 84.
32. Foot of first pair. × 100.
33. Foot of fourth pair. × 100.
34. Foot of fifth pair. × 125.

Calocalanus plumulosus (Claus).

Fig. 35. Foot of fifth pair. × 125.
Fig. 36. Abdomen and caudal stylets. × 63.

Augaptilis hecticus, Giesbrecht.

Fig. 37. Anterior antenna, male. × 23.
38. Posterior antenna. × 18.
Fig. 39. Foot of fifth pair, female. × 86.

Plate II.

Augaptilis hecticus, Giesbrecht.

Fig. 1. Posterior foot-jaw. × 70.
2. Foot of second pair of swimming-feet. × 43.
Fig. 3. Terminal spine of outer branch of fourth pair. × 345.
4. Fifth pair of thoracic feet, male. × 170.

Augaptilis longicaudatus (Claus).

Fig. 5. Abdomen and caudal stylets. × 23.

Hemicalanus plumosus, Claus.

Fig. 6. Posterior foot-jaw. × 32.

Mecynocera Clausi, I. C. Thompson.

Fig. 7. Mandible. × 125.
8. Anterior foot-jaw. × 165.
9. Abdomen and caudal stylets, female. 63×.
10. Abdomen and caudal stylets, male. × 63.

Rhincalanus aculeatus, n. sp.

Fig. 11. Female, dorsal view. × 12·5.
12. Female, lateral view. × 12·5.
13. Anterior antenna. × 12·5.
14. Posterior antenna. × 20.
15. Mandible. × 76.
16. Maxilla. × 17.
17. Anterior foot-jaw. × 40.
18. Posterior foot-jaw. × 32.
19. Foot of first pair. × 38.
20. Foot of second pair. × 30.
21. Foot of fourth pair. × 30.
22. Foot of fifth pair. × 38.
23. (?) Immature female. × 10.
24. Foot of fifth pair of same. × 17.

Augaptilis Rattrayi, n. sp.

Fig. 25. Female, dorsal view. × 9.
26. Anterior antenna. × 22.
27. Posterior antenna. × 18.
28. Mandible. × 18.
29. Maxilla. × 18.
30. Anterior foot-jaw. × 28.
31. Posterior foot-jaw. × 28.
32. Foot of first pair. × 28.
33. Foot of third pair. × 20.
34. Foot of fifth pair. × 28.
35. Rostrum. × 32.
36. Portion of seta of the posterior foot-jaw (*aa*, "buttons" more highly magnified). × 380.
37. Portion of test highly magnified.

Augaptilis hecticus, Giesbrecht.

Fig. 38. Male, dorsal view. × 20.
39. Anterior antenna, female. × 13.
40. Mandible. × 115.
41. Anterior foot-jaw. × 70.
42. Abdomen and caudal stylets, female. × 20.

Heterocalanus serricaudata, n. sp.

Fig. 43. Female, dorsal view. × 32.
44. Female, lateral view (*a*, ovisac more highly magnified). × 32.
45. Posterior foot-jaw. × 190.
46. Foot of fifth pair, female. × 135.
47. Abdomen and caudal stylets, female. × 76.
48. Abdomen and caudal stylets, male. × 76.

Plate III.

Heterocalanus serricaudatus, n. sp.

Fig. 1. Anterior antenna, female. × 100.
2. Right anterior antenna, male. × 76.
3. Posterior antenna. × 70.
4. Mandible (*a*, mandible palp). × 190.
5. Anterior foot-jaw. × 250.
6. One of the swimming-feet. × 128.
7. Fifth pair of thoracic feet, male. × 150.

Pleuromma princeps, n. sp.

Fig. 8. Male, dorsal view. × 4.
9. Male, lateral view. × 4.
10. Right anterior antenna (*a*, nineteenth joint more highly magnified). × 8.
11. Left anterior antenna. × 4.
12. Posterior antenna. × 9.
13. Mandible and palp. × 10·5.
14. Maxilla. × 10.
15. Anterior foot-jaw. × 13·5.
16. Posterior foot-jaw. × 12.
17. Foot of first pair. × 13·5.
18. Foot of second pair. × 13·5.
19. Foot of fourth pair. × 13·5.
20. Foot of fifth pair. × 16.

Scolecithrix latipes, n. sp. ♀.

Fig. 21. Terminal spine of outer branch of fourth swimming-foot. × 95.
22. Foot of fifth pair. × 76.
23. Abdomen and caudal stylets. × 20.

Scolecithrix major, n. sp. ♀.

Fig. 24. Anterior foot-jaw. × 76.
25. Terminal spine of outer branch of third swimming-foot. × 127.
26. Foot of fifth pair. × 127.

Scolecithrix dubia, Giesbrecht. ♂.

Fig. 27. Male, lateral view. × 27.
28. Left anterior antenna. × 35.
29. Anterior foot-jaw. × 18.
30. Terminal spine of outer branch of fourth swimming foot. × 127.
31. Fifth pair of thoracic feet. × 84.
32. Abdomen and caudal stylets. × 80.

Scolecithrix tumida, n. sp.

Fig. 33. Female, lateral view. × 18.
34. Anterior antenna. × 22.
35. Anterior foot-jaw. × 95.
36. Terminal spine of outer branch of fourth swimming-foot. × 127.
37. Fifth pair of thoracic feet. × 127.
38. Abdomen and caudal stylets. × 27.

Amallophora typica, n. sp.

Fig. 39. Male, lateral view. × 20.
40. Anterior antenna. × 27.
41. Posterior antenna. × 23.
42. Mandible. × 47.
43. Maxilla. × 47.
44. Anterior foot-jaw. × 115.
45. Posterior foot-jaw. × 35.
46. Foot of second pair. × 35.

Plate IV.

Amallophora typica, n. sp.

Fig. 1. Foot of third pair. × 35.
2. Foot of fourth pair. × 35.
3. Foot of fifth pair. × 57.
4. Abdomen and caudal stylets. × 18.

Amallophora magna, n. sp.

Fig. 5. Female, lateral view. × 10.
6. Anterior foot-jaw. × 127.
7. Posterior foot-jaw. × 20.
8. Terminal spine of outer branch of fourth swimming-foot, highly magnified.
9. Foot of fifth pair. × 125.

Amallophora dubia, n. sp.

Fig. 10. Male, lateral view. × 13.
11. Right anterior antenna. × 20.
12. Left anterior antenna. × 20.
13. Anterior foot-jaw. × 95.
14. Posterior foot-jaw. × 63.
15. Foot of first pair. × 63.
16. Foot of fourth pair. × 48.
17. Fifth pair of thoracic feet. × 40.
18. Abdomen and caudal stylets. × 27.

Amallophora dubia, var. *similis*.

Fig. 19. Male, lateral view. × 18.
20. Anterior antenna. × 27.
21. Terminal spine of outer branch of fourth swimming-foot. × 127.
22. Fifth pair of thoracic feet. × 63.
23. Abdomen and caudal stylets. × 27.

Amallophora robusta, n. sp.

Fig. 24. Female, lateral view. × 13.
25. Anterior foot-jaw. × 53.
26. Posterior foot-jaw. × 53.
27. Terminal spine of outer branch of fourth swimming-foot. × 127.
28. Fifth pair of thoracic feet. × 95.
29. Abdomen and caudal stylets. × 27.

Candace intermedia, n. sp.

Fig. 30. Male, lateral view. × 22.
31. Anterior antenna, female. × 37.
32. Anterior antenna, male. × 37.
33. Anterior foot-jaw. × 20.
34. Fifth pair of thoracic feet, female. × 127.
35. Fifth pair of thoracic feet, male. × 67.
36. Abdomen and caudal stylets, female. × 27.
37. Abdomen and caudal stylets, male. × 27.

Candace varicans, Giesbrecht.

Fig. 38. Abdomen and caudal stylets, female. × 20.
39. Abdomen and caudal stylets, male. × 20.

Scolecithrix securifrons, n. sp.

Fig. 40. Male, lateral view. × 9.
41. Anterior antenna, female. × 13.
42. Anterior antenna, male. × 13.
43. Posterior antenna. × 27.
44. Mandible. × 27.
45. Maxilla. × 27.
46. Anterior foot-jaw. × 63.
47. Posterior foot-jaw, female. × 40.
48. Posterior foot-jaw, male. × 40.
49. Foot of first pair. × 35.
50. Foot of second pair. × 27.
51. Foot of fourth pair. × 20.
52. Fifth pair of thoracic feet, female. × 40.
53. Fifth pair of thoracic feet, male. × 20.
54. Abdomen and caudal stylets, female, dorsal view. × 16.
55. Abdomen and caudal stylets, male, dorsal view. × 13.
56. Abdomen, female, lateral view. × 12.

Plate V.

Scolecithrix securifrons, n. sp.

Fig. 1. Rostrum. × 27.

Scolecithrix ctenopus, Giesbrecht. ♂.

Fig. 2. Male, lateral view. × 22.
3. Right anterior antenna. × 23.
4. Left anterior antenna. × 23.
5. Anterior foot-jaw. × 150.
6. Posterior foot-jaw. × 127.
7. Foot of third pair. × 46.
8. Foot of fifth pair. × 12.
9. Abdomen and caudal stylets. × 34.

Scolecithrix tenuipes, n. sp. ♂.

Fig. 10. Male, lateral view. × 20.
11. Right anterior antenna. × 28.
12. Left anterior antenna. × 28.
13. Anterior foot-jaw. × 115.
14. Posterior foot-jaw. × 115.
15. Foot of second pair. × 73.
16. Foot of third pair. × 73.
17. Foot of fourth pair. × 57.
18. Fifth pair. × 57.
19. Abdomen and caudal stylets. × 35.

Scolecithrix longicornis, n. sp. ♀.

Fig. 20. Female, lateral view. × 27.
21. Anterior antenna. × 36.
22. Anterior foot-jaw. × 127.
23. Posterior foot-jaw. × 85.
24. Foot of first pair. × 64.
25. Foot of second pair. × 76.
26. Foot of third pair. × 64.
27. Foot of fifth pair. × 250.
28. Abdomen and caudal stylets. × 53.

Scolecithrix Bradyi, Giesbrecht.

Fig. 29. Male, lateral view. × 18.
30. Anterior antenna, female. × 48.
31. Anterior antenna, male. × 53.
32. Posterior antenna. × 95.
33. Mandible. × 63.
34. Anterior foot-jaw. × 170.
35. Posterior foot-jaw. × 95.
36. Terminal spine of outer branch of one of the swimming-feet. × 170.
37. Fifth pair of thoracic feet, male. × 53
38. Abdomen and caudal stylets, female. × 40.
39. Abdomen and caudal stylets, male. × 32.

Scolecithrix latipes, n. sp. ♀.

Fig. 40. Female, lateral view. × 12.
41. Anterior antenna. × 18
42. Anterior foot-jaw. × 25.
43. Rostrum. × 27.

Scolecithrix major, n. sp.

Fig. 44. Female, lateral view. × 18.
45. Abdomen and caudal stylets. × 20.

Calanus comptus, Dana. ♂.

Fig. 46. Male, lateral view. × 13.
47. Anterior antenna. × 13.
48. Posterior antenna. × 23.
49. Mandible. × 35.
50. Maxilla. × 35.

Plate VI

Calanus comptus, Dana. ♂.

Fig. 1. Posterior foot-jaw. × 56.
2. Foot of first pair. × 35.
3. Terminal spine of outer branch of first swimming-foot, greatly magnified.
4. Foot of fourth pair. × 23.
5. Foot of fifth pair. × 23.

Hemicalanus plumosus, Claus.

Fig. 6. Anterior foot-jaw. × 27.

Calocalanus plumulosus (Claus).

Fig. 7. Female, lateral view. × 35. | Fig. 8. Anterior antenna. × 53.

Calocanus pavo (Dana).

Fig. 9. Female, dorsal view. × 53. | Fig. 10. Fifth pair of thoracic feet. × 115.

Pleuromma gracile, Claus.

Fig. 11. Male, dorsal view. × 17·5.
12. Right anterior antenna of the same. × 23.
13. Left anterior antenna of the same. × 35.
14. 14th joint of left anterior antenna. × 415.

Euchirella messinensis (Claus).

Fig. 15. Male, dorsal view. × 7·6. | Fig. 16. Posterior antenna. × 20.

Euchæta barbata, Brady.

Fig. 17. Male, dorsal view. × 6·5.

Euchæta hebes, Giesbrecht.

Fig. 18. Male, lateral view. × 13. | Fig. 19. Fifth pair of thoracic feet. × 26.

Euchæta hebes, var. *valida*.

Fig. 20. Male, lateral view. × 5·8.
21. Terminal spine of outer branch of fourth swimming-feet. × 63.
22. Fifth pair of thoracic feet. × 13.

Euchæta australis, Brady.

Fig. 23. Female, dorsal view. × 9.

Euchæta (?) *Hessei*, var. *similis*.

Fig. 24. Male, lateral view. × 18. | Fig. 25. Fifth pair of thoracic feet. × 53.

Phyllopus bidentatus, Brady.

Fig. 26. Male, dorsal view. × 10.
27. Mouth as seen from the side (*a*, outline, seen from above), highly magnified.
28. Fifth pair of thoracic feet. × 43.

Pontellopsis villosa, Brady.

Fig. 29. Male, dorsal view. × 13.
30. Anterior antenna, male. × 20.
31. Posterior antenna. × 26.
32. Fifth pair of thoracic feet, female. × 63.
33. Fifth pair of thoracic feet, male. × 53.
34. Abdomen and caudal stylets. × 35.

Phaënna spinifera, Claus.

Fig. 35. Male, lateral view. × 13.

Labidocera detruncata, var. *intermedia*.

Fig. 36. Posterior foot-jaw. × 41.
37. Fifth pair of thoracic feet, female. × 76.
38. Fifth pair of thoracic feet, male, × 34.

Labidocera Darwinii (Lubbock).

Fig. 39. Posterior foot-jaw. × 50.
40. Fifth pair of thoracic feet, female. × 63.
41. Fifth pair of thoracic feet, male. × 50.
42. Abdomen and caudal stylets, female. × 38.

Pontella mediterranea, Claus.

Fig. 43. Female, dorsal view. × 13.
44. Anterior antenna, female (and rostrum). × 27.
45. Hinged joints of right anterior antenna, male. × 63.
46. Posterior foot-jaw. × 48.
47. Fifth pair of thoracic feet, female (? immature). × 100.
48. Fifth pair of thoracic feet, mael. × 63.

Plate VII.

Phaënna spinifera, Claus.

Fig. 1. Anterior foot-jaw. × 95.
2. Fifth pair of thoracic feet. × 50.

Labidocera detruncata, var. *intermedia*.

Fig. 3. Female, lateral view. × 13.
4. Anterior antenna, male. × 20.

Labidocera Darwinii (Lubbock).

Fig. 5. Male, dorsal view. × 18.
6. Hinged joints of right anterior antenna, male. × 50.

Candace varicans, Giesbrecht.

Fig. 7. Anterior antenna, female. × 24.
8. Right anterior antenna, male. × 24.
9. Fifth pair of thoracic feet, female. × 95.
10. Fifth pair of thoracic feet, male. × 95.

Mormonilla phasma, Giesbrecht.

Fig. 11. Female, lateral view. × 27.
12. Anterior antenna. × 32.
13. Posterior antenna. × 63.
14. Mandible. × 50.
15. Maxilla. × 50.
16. Anterior foot-jaw. × 76.
17. Posterior foot-jaw. × 95.
18. Foot of first pair. × 95.
19. Foot of second pair. × 95.
20. Foot of fourth pair. × 76.
21. Abdomen and caudal stylets. × 53.

Acartia plumosa, n. sp.

Fig. 22. Female, dorsal view. × 32.
23. Anterior antenna, female. × 63.
24. Right anterior antenna, male. × 63.
25. Hinged joints of male right anterior antenna. × 253.
26. Foot of first pair. × 95.
27. Foot of fourth pair. × 76.
28. Fifth pair of thoracic feet, female (front view). × 153.
29. Foot of fifth pair, female (side view). × 153.
30. Fifth pair of thoracic feet, male. × 153.
31. Abdomen and caudal stylets, female. × 50.
32. Abdomen and caudal stylets, male. × 50.

Acartia Clausi, Giesbrecht.

Fig. 33. Male, dorsal view. × 32.
34. Anterior antenna, female. × 63.
35. Right anterior antenna, male (*a*, hinged joints more magnified). × 63.
36. Foot of fourth pair. × 95.
37. Fifth pair of thoracic feet, female. × 125.
38. Fifth pair of thoracic feet, male. × 153.
39. Abdomen and caudal stylets, female. × 50.
40. Abdomen and caudal stylets, male. × 50.

Paracartia dubia, n. sp.

Fig. 41. Left anterior antenna of male. × 63.
42. Fifth pair of thoracic feet, male. × 127.

Plate VIII.

Paracartia spinicaudata, n. sp. ♀.

Fig. 1. Female, dorsal view. × 40.
2. Anterior antenna. × 63.
3. Posterior antenna. × 127.
4. Mandible and palp. × 127.
5. Maxilla. × 127.
6. Anterior foot-jaw. × 127.
7. Posterior foot-jaw. × 127.
8. Foot of first pair. × 127.
9. Foot of fourth pair. × 95.
10. Fifth pair of thoracic feet. × 127.
11. Abdomen and caudal stylets. × 95.

Paracartia dubia, n. sp. ♂.

Fig. 12. Male, dorsal view. × 27.
13. Right anterior antenna. × 63.
14. Foot of fourth pair. × 95.
15. Abdomen and caudal stylets. × 63.

Ætidius armiger, Giesbrecht.

Fig. 16. Female, dorsal view. × 20.
17. Male, lateral view. × 21.
18. Anterior antenna. × 21.
19. Posterior antenna. × 23.
20. Mandible and palp. × 38.
21. Anterior foot-jaw. × 47.
22. Posterior foot-jaw. × 39.
23. Foot of first pair. × 57.
24. Foot of second pair. × 57.
25. Foot of fourth pair. × 42.
26. Fifth pair of thoracic feet. × 85.
27. Abdomen and caudal stylets. × 39.

Clausocalanus latipes, n. sp. ♂.

Fig. 28. Right anterior antenna. × 59.
29. Mandible and palp. × 115.
30. Anterior foot-jaw. × 115.
31. Posterior foot-jaw. × 115.
32. Foot of first pair. × 86.
33. Foot of second pair. × 86.
34. Foot of third pair. × 86.
35. Foot of fourth pair. × 86.
36. Fifth pair of thoracic feet. × 230.
37. Abdomen and caudal stylets. × 57.

Clausocalanus arcuicornis, Dana, ♂.

Fig. 38. Male, lateral view. × 23.
39. Anterior antenna. × 35.
40. Posterior antenna. × 23.
41. Mandible palp. × 85.
42. Maxilla. × 113.
43. Anterior foot-jaw. × 276.
44. Posterior foot-jaw. × 172.
45. Foot of first pair. × 115.
46. Fifth pair of thoracic feet. × 115.
47. Abdomen and caudal stylets. × 57.

Temoropia mayumbaensis, n. sp.

Fig. 48. Right anterior antenna of male. × 88.
49. Mandible and palp. × 63.

Plate IX.

Temoropia mayumbaensis, n. sp.

Fig. 1. Male, dorsal view. × 53.
2. Posterior antenna. × 83.
3. Maxilla. × 95.
4. Anterior foot-jaw. × 190.
5. Posterior foot-jaw. × 63.
6. Foot of first pair. × 152.
7. Inner branch of second thoracic feet. × 95.
8. Fifth pair of thoracic feet, female. × 95.
9. Fifth pair of thoracic feet, male. × 95.
10. Abdomen and caudal stylets, female, dorsal view. × 63.
11. Abdomen of female, lateral view. × 63.
12. Abdomen and caudal stylets, male. × 63.

Temora longicornis (Müller).

Fig. 13. Fifth pair of thoracic feet, male. × 95.

Oithona minuta, n. sp.

Fig. 14. Female, dorsal view. × 72.
15. Anterior antenna, female. × 169.
16. Anterior antenna, male. × 230.
17. Posterior antenna. × 230.
18. Mandible. × 270.
19. Mandible palp. × 230.
20. Anterior foot-jaw. × 230.
21. Posterior foot-jaw. × 345.
22. Foot of first pair. × 230.
23. Foot of fourth pair. × 230.
24. Abdomen and caudal stylets, female (*a*, fifth pair of feet). × 127.
25. Abdomen and caudal stylets, male. × 200.

Ectinosoma Chrystali, n. sp.

Fig. 26. Female, lateral view. × 42.
27. Anterior antenna, female. × 230.
28. Posterior antenna. × 127.
29. Mandible and palp. × 35.
30. Anterior foot-jaw. × 253.
31. Posterior foot-jaw. × 253.
32. Foot of first pair of swimming-feet. × 138.
33. Foot of fourth pair of swimming-feet. × 127.
34. Foot of fifth pair. × 190.
35. Last abdominal segments and caudal stylets. × 95.

Bradya brevicornis, n. sp.

Fig. 36. Female, lateral view. × 53.
37. Anterior antenna. × 460.
38. Posterior antenna. × 170.
39. Anterior foot-jaw. × 460.
40. Posterior foot-jaw. × 345.
41. Foot of first pair. × 190.
42. Foot of fifth pair. × 190.
43. Last abdominal segments and caudal stylets. × 95.

Amymone Andrewi, n. sp.

Fig. 44. Female, lateral view. × 63.
45. Anterior antenna. × 190.
46. Posterior antenna. × 190.
47. Anterior foot-jaw. × 380.

Plate X.

Amymone Andrewi, n. sp.

Fig. 1. Posterior foot-jaw. × 253.

Stenhelia accraensis, n. sp.

Fig. 2. Female, lateral view. × 53.
3. Anterior antenna. × 253.
4. Posterior antenna. × 190.
5. Mandible and palp. × 380.
6. Maxilla. × 190.
7. Anterior foot-jaw. × 253.
8. Posterior foot-jaw. × 253.
9. Foot of first pair. × 152.
10. Foot of fourth pair. × 152.
11. Foot of fifth pair. × 126.
12. Last abdominal segments and caudal stylets. × 63.

Laophonte longipes, n. sp.

Fig. 13. Female, lateral view. × 53.
14. Anterior antenna. × 253.
15. Posterior antenna. × 380.
16. Mandible and palp. × 380.
17. Maxilla. × 500.
18 Anterior foot-jaw. × 253.
19. Posterior foot-jaw. × 190.
20. Foot of first pair. × 190.
21. Foot of fourth pair. × 190.
22. Foot of fifth pair. × 190.
23. Last abdominal segments and caudal stylets. × 95.

Laophonte pygmæa, n. sp.

Fig. 24. Female, lateral view. × 53.
25. Anterior antenna. × 253.
26. Posterior foot-jaw. × 253.
27 Foot of first pair. × 253.
28. Foot of fourth pair. × 253.
29. Foot of fifth pair. × 253.
30. Last abdominal segments and caudal stylets. × 127.

Laophonte brevicornis, n. sp.

Fig. 31. Female, lateral view. × 53.
32. Anterior antenna. × 253.
33. Posterior foot-jaw. × 253.
34. Foot of first pair. × 253.
35. Foot of fourth pair. × 253.
36. Foot of fifth pair. × 253.
37. Last abdominal segments and caudal stylets. × 126.

Dactylopus latipes, n. sp.

Fig. 38. Female lateral view. × 33.
39. Anterior antenna. × 190.
40. Posterior foot-jaw. × 253.
41. Foot of first pair. × 190.
42. Foot of fifth pair. × 127.
43. Last abdominal segments and caudal stylets. × 63.

Dactylopus propinquus, n. sp.

Fig. 44. Female, lateral view. × 53.
45. Anterior antenna, female. × 190.
46. Anterior antenna, male. × 253.
47. Posterior antenna. × 253.
48. Posterior foot-jaw. × 253.
49. Foot of first pair. × 190.
50. Foot of fifth pair, female. × 190.
51. Foot of fifth pair, male. × 190.
52. One of the appendages of first abdominal segment, male. × 190.

Plate XI.

Dactylopus propinquus, n. sp.

Fig. 1. Foot of second pair of swimming-feet, male. × 190.
2. Foot of third pair of swimming-feet, male. × 190.
3. Last abdominal segments and caudal stylets. × 95.

Ilyopsyllus affinis, n. sp.

Fig. 4. Female, dorsal view. × 60.
5. Female, lateral view. × 60.
6. Anterior antenna, female. × 250.
7. Anterior antenna, male. × 250.
8. Posterior antenna. × 330.
9. Mandible and palp. × 380.
10. Maxilla and (?) oral aperture. × 500.
11. Anterior foot-jaw. × 500.
12. Posterior foot-jaw. × 330.
13. Foot of first pair. × 190.
14. Foot of third pair. × 152.
15. Foot of fifth pair, female. × 500.
16. Abdomen and caudal stylets. × 95.
17. Rostrum. × 300.

Miracia minor, n. sp.

Fig. 18. Female, lateral view. × 53.
19. Anterior antenna, female. × 152.
20. Anterior antenna, male. × 190.
21. Posterior antenna. × 190.
22. Posterior foot-jaw, female. × 253.
23. Posterior foot jaw, male. × 253.
24. Foot of first pair. × 108.
25. Foot of second pair, female. × 108.
26. Foot of second pair, male. × 108.
27. Foot of third pair. × 108.
28. Fifth pair of thoracic feet, female. × 95.
29. Foot of fifth pair, male. × 190.
30. Abdomen and caudal stylets. × 76.

Ægisthus longirostris, n. sp.

Fig. 31. Female, dorsal view. × 20.
32. Female, side view. × 18.
33. Anterior antenna, female. × 53.
34. Anterior antenna, male. × 32.
35. Posterior antenna. × 63.
36. Mandible. × 190.
37. Maxilla. × 140.
38. Anterior foot-jaw. × 190.
39. Posterior foot-jaw, female. × 95.
40. Posterior foot-jaw, male. × 95.
41. Foot of first pair. × 40.
42. Foot of fourth pair. × 40.
43. Fifth pair of thoracic feet. × 53.
44. Extremity of one of the stylets. × 190.

Copilia Fultoni, n. sp.

Fig. 45. Adult dorsal view. × 10·7.
46. Anterior antenna. × 63.
47. Posterior antenna. × 40.
48. Mandible. × 257.
49. Maxilla. × 190.
50. Anterior foot-jaw. × 253.

Plate XII.

Copilia Fultoni, n. sp.

Fig. 1. Posterior foot-jaw. × 20.
2. Foot of fourth pair of swimming-feet. × 63.
3. Abdomen and caudal stylets (*a*, fifth foot). × 26.

Sophirina metallina, Dana.

Fig. 4. One of the caudal stylets with leaf-like appendages (*cercophylla*). × 125.

(?) *Artotrogus abyssicolus*, n. sp. (?) ♂.

Fig. 5. Adult, dorsal view. × 27.
6. Anterior antenna. × 63.
7. Posterior antenna. × 253.
8. Posterior foot-jaw. × 253.
9. Abdomen and caudal stylets. × 84.

Longipedia minor, T. & A. Scott.

Fig. 10. Male, lateral view. × 53.
11. Foot of second pair. × 84.
12. Fifth pair of thoracic feet and appendages of first abdominal segment. × 190.
13. Last abdominal segments and caudal stylets. × 153.

Euterpe gracilis, Claus, var. *armata*, n. var.

Fig. 14. Female, lateral view. × 53.
15. Anterior antenna. × 190.
16. Anterior antenna. × 190.
17. Mandible. × 190.
18. Maxilla. × 190.
19. Anterior foot-jaw. × 190.
20. Posterior foot-jaw. × 253.
21. Foot of first pair. × 190.
22. Foot of fourth pair. × 190.
23. Fifth pair of thoracic feet. × 190.

Laophonte serrata, Claus.

Fig. 24. Female, lateral view. × 53.
25. Anterior antenna. × 190.
26. Foot of first pair. × 153.
27. Foot of fifth pair. × 127.
28. Last abdominal segments and caudal stylets. × 95.

Cletodes linearis, Claus.

Fig. 29. Female, lateral view. × 53.
30. Anterior antenna, female. × 190.
31. Foot of fifth pair, female. × 153.
32. Fifth pair of thoracic feet (*a*), and appendages (*b*) of first abdominal segment. × 153.

Thalestris forficula, Claus.

Fig. 33. Female, lateral view. × 53.
34. Anterior antenna. × 190.
35. Posterior antenna. × 190.
36. Anterior foot-jaw. × 253.
37. Posterior foot-jaw. × 253.
38. Foot of first pair. × 153.
39. Foot of fourth pair. × 153.
40. Foot of fifth pair. × 153.
41. Last abdominal segments and caudal stylets. × 127.

Harpacticus chelifer, Müller, var.

Fig. 42. Male, lateral view. × 20.
43. Posterior foot-jaw. × 76.
44. Foot of first pair. × 50.
45. Foot of second pair. × 50.
46. Foot of fifth pair. × 127.

Clytemnestra rostrata (Brady).

Fig. 47. Female, lateral view. × 32.
48. Female, dorsal view. × 32.
49. Male, dorsal view. × 32.
50. Anterior antenna, female. × 95.
51. Anterior antenna, male. × 95.
52. Posterior antenna. × 127.
53. Mandible and palpi. × 253.
54. Maxilla. × 380.
55. Anterior foot-jaw. × 253.
56. Posterior foot-jaw, female. × 127.
57. Posterior foot-jaw, male. × 95.

Plate XIII.

Clytemnestra rostrata (Brady).

Fig. 1. Foot of first pair of swimming-feet. × 95.
2. Foot of second pair of swimming-feet. × 95.
3. Foot of fifth pair of swimming-feet. × 127.

Oncæa gracilis (Dana).

Fig. 4. Female, dorsal view. × 53.
5. Anterior antenna. × 53.
6. Posterior antenna. × 84.
7. Mandible. × 153.
8. Maxilla. × 153.
9. Anterior foot-jaw. × 127
10. Posterior foot-jaw. × 95
11. Foot of fourth pair. × 95.
12. Abdomen and caudal stylets (*a*, fifth feet). × 50.

Oncæa mediterranea (Claus).

Fig. 13. Female, dorsal view. × 53.
14. Anterior antenna. × 63.
15. Posterior antenna. × 100.
16. Posterior foot-jaw. × 95.
17. Foot of fourth pair. × 127.

Pachysoma punctata, Claus.

Fig. 18. Adult, dorsal view. × 18.
19. Anterior antenna. × 48.
20. Posterior antenna. × 63.
21. (?) Mandible. × 190.
22. (?) Maxilla. × 153.
23. (?) Anterior foot-jaw. × 253.
24. Foot of fourth pair. × 50.

Cyclopicera lata, Brady.

Fig. 25. Male, dorsal view. × 53.
26. Anterior antenna. × 100.
27. Mandible. × 190.
28. Maxilla. × 153.
29. Foot of fourth pair. × 100.
30. Foot of fifth pair. × 190.

Hersiliodes Livingstoni, n. sp.

Fig. 31. Female, dorsal view. × 27.
32. Anterior antenna. × 127.
33. Posterior antenna. × 95.
34. *m.*, Mandible; *mx.*, Maxilla; Mouth. × 127.
35. Anterior foot-jaw. Posterior foot-jaw. × 127.
36. Foot of first pair. × 76.
37. Foot of fourth pair. × 76.
38. Foot of fifth pair. × 48.

Lichomolgus congoensis, n. sp.

Fig. 39. Female, dorsal view. × 35.
40. Anterior antenna. × 127.
41. Posterior antenna. × 127.
42. Mandible. × 253.
43. Maxilla. × 253.
44. Anterior foot-jaw. × 253.
45. Posterior foot-jaw. × 190.
46. Foot of fourth pair. × 135.
47. Foot of fifth pair. × 190.
48. Abdomen and caudal stylets. × 84.

Pseudanthessius propinquus, n. sp.

Fig. 49. Male, dorsal view. × 35.
50. Anterior antenna. × 170.
51. Posterior antenna. × 135.
52. Mandible. × 190.
53. Maxilla. × 253.
54. Posterior foot-jaw, female. × 84.
55. Foot of first pair. × 135.
56. Abdomen and caudal stylets, female. × 40.

Saphirella abyssicola, n. sp.

Fig. 57. (?) Adult, dorsal view. × 25.
58. Posterior antenna. × 125.

Plate XIV.

Pseudanthessius propinquus, n. sp.

Fig. 1. Anterior foot-jaw. × 190.
2. Posterior foot-jaw, male. × 53.
3. Foot of fourth pair of swimming-feet. × 135.
4. Foot of fifth pair. × 127.

Saphirella abyssicola, n. sp.

Fig. 5. Anterior antenna. × 125.
6. Mandible. × 190.
7. Maxilla. × 152.
8. Anterior foot-jaw. × 190.
9. Posterior foot-jaw. × 170.
10. Foot of first pair of swimming-feet. × 95.

Artrotrogus abyssicolus, n. sp.

Fig. 11. Female, dorsal view. × 35.
12. Anterior antenna. × 127.
13. Posterior antenna. × 135.
14. Mandible. × 253.
15. Anterior foot-jaw. × 152.
16. Posterior foot-jaw. × 152.
17. Foot of first pair of swimming-feet. × 100.
18. Foot of fourth pair of swimming-feet. × 95.

Caligus Murrayanus, n. sp.

Fig. 19. Adult, ventral view. × 17.

Caligus bengoensis, n. sp.

Fig. 20. Adult, ventral view. × 19.

(?) *Caligus Thymni*, Dana.

Fig. 21. Adult, ventral view. × 8.

Caligus dubius, n. sp.

Fig. 22. Adult, ventral view. × 12·5.

Nogagus validus, Dana.

Fig. 23. Adult, ventral view. × 7·5.

Pontopsyllus elongatus, n. g. et sp.

Fig. 24. Adult, dorsal view. × 20.
25. Anterior antenna. × 135.
26. Posterior antenna. × 84.
27. Mandible (*m.*) and maxilla (*mx.*). × 190.
28. One of the foot-jaws. × 125.
29. Foot of fourth pair of swimming-feet. × 95.
30. (?) Immature form; (*s.*) sucking-disk. × 60.

Cypria atlantica, n. sp.

Fig. 31. Shell seen from the side. × 40.
32. Shell seen from above. × 40.
33. Shell seen from the side (young). × 46.

Phlyctenophora africana, n. sp.

Fig. 34. Shell seen from the side. × 27.
35. Shell seen from above. × 27.

Pontocypris trigonella, G. O. Sars.

Fig. 36. Shell seen from the side. × 27.
37. Shell seen from above. × 27.

Pontocypris subreniformis, n. sp.

Fig. 38. Shell seen from the side. × 44.
39. Shell seen from above. × 44.

Bairdia inornata, n. sp.

Fig. 40. Shell seen from the side. ×37. | Fig. 41. Shell seen from above. ×37.

Cythere multicava, n. sp.

Fig. 42. Shell seen from the side. ×32. | Fig. 43. Shell seen from above. ×32.

Cythere sculptilis, n. sp.

Fig. 44. Shell seen from the side. ×48. | Fig. 45. Shell seen from above. ×48.

Cythere rimosa, n. sp.

Fig. 46. Shell seen from the side. ×40. | Fig. 47. Shell seen from above. ×40.

Cythere thalassica, n. sp.

Fig. 48. Shell seen from the side. ×30. | Fig. 49. Shell seen from above. ×30.

Cythere venusta, n. sp.

Fig. 50. Shell seen from the side. ×28·5. | Fig. 51. Shell seen from above. ×28·5.

Cytherura simulans, n. sp.

Fig. 52. Shell seen from the side. ×54. | Fig. 53. Shell seen from above. ×54.

Cytheropteron trilobites, Brady.

Fig. 54. Shell seen from the side. ×40·5. | Fig. 55. Shell seen from above. ×40·5.

Asterope squamiger, n. sp.

Fig. 56. Shell seen from the side. ×22. | Fig. 57. Shell seen from above. ×22.

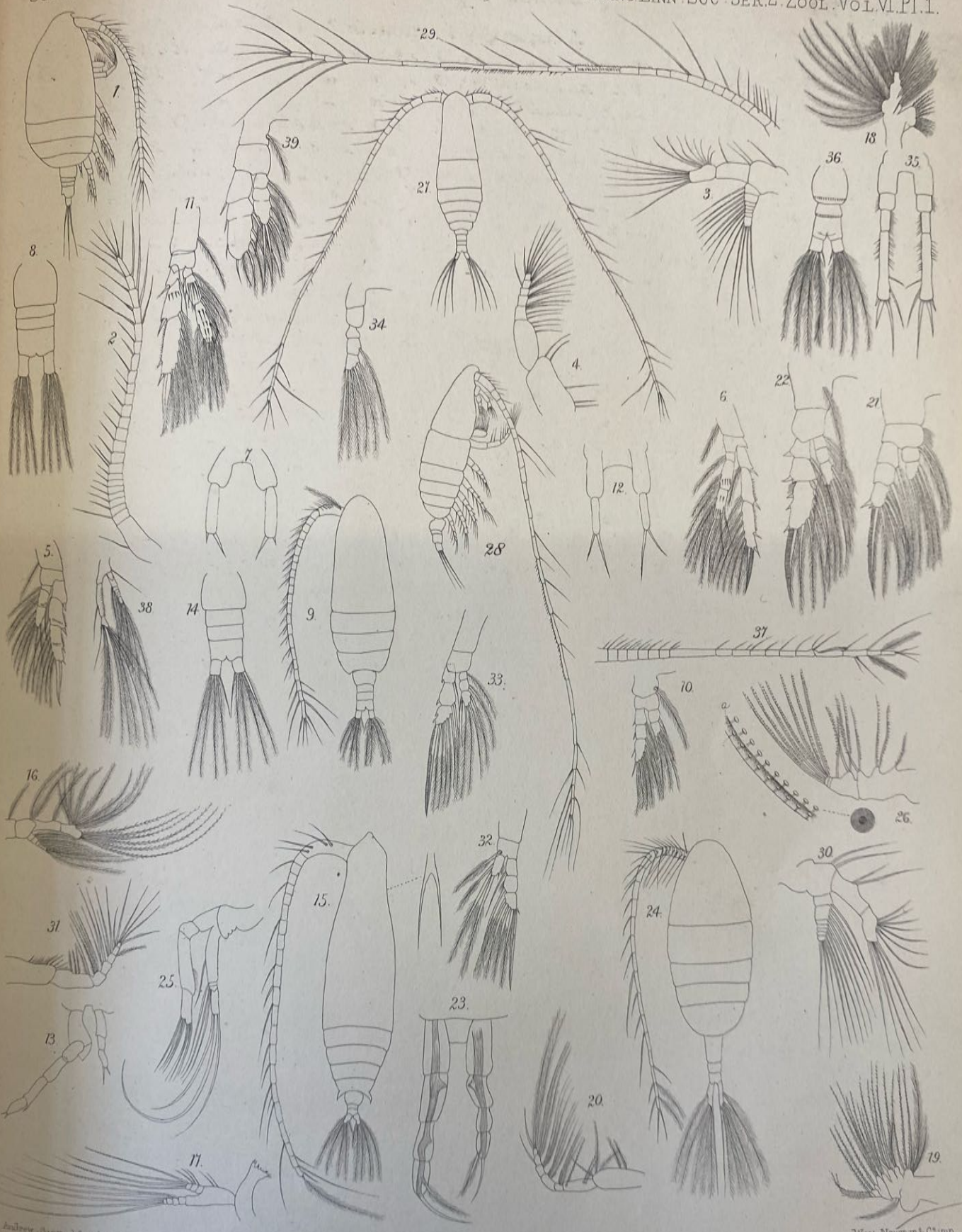
Sarsiella Murrayana, n. sp.

Fig. 58. Shell seen from the side. × 27.

Plate XV.

Fig. 1. *Halocypris elongata*, n. sp. Shell seen from the side. × 8·5.
2. „ „ n. sp. Shell seen from above. × 8·5.
3. „ *torosa*, n. sp. Shell seen from the side. × 7.
4. „ „ n. sp. Shell seen from above. × 7.
5. „ *aculeata*, n. sp. Shell seen from the side. × 30.
6. „ „ n. sp. Shell seen from above. × 30.
7. „ *punica*, n. sp. Shell seen from the side. × 32.
8. „ „ n. sp. Shell seen from above. × 32.
9. *Cytherella africana*, n. sp. Shell seen from the side. × 28·5.
10. „ „ n. sp. Shell seen from above. × 28·5.
11. „ *pumila*, n. sp. Shell seen from the side. × 40.
12. „ „ n. sp. Shell seen from above. × 40.
13. *Cythere multicava*, n. sp. Antennule. × 95.
14. *Asterope squamiger*, n. sp. Antennule. × 54.
15. *Cythere multicava*, n. sp. Antenna. × 95.

Fig. 16. *Cypria atlantica.* Shell structure highly magnified.
17. *Phlyctenophora africana,* n. sp. One of the antennules. × 95.
18. „ „ n. sp. One of the antennæ. × 127.
19. „ „ n. sp. The post-abdomen. × 95.
20. *Cypria atlantica,* n. sp. One of the antennæ. × 127.
21. „ „ n. sp. One of the antennules. × 95.
22. *Asterope squamiger,* n. sp. One of the antennæ. × 54.
23. „ „ n. sp. The post-abdomen. × 27.
24. *Sarsiella Murrayana,* n. sp. One of the antennules. × 54.
25. *Cypria atlantica,* n. sp. The post-abdomen. × 127.
26. *Asterope squamiger,* n. sp. One of the first maxillæ. × 54.
27. *Halocypris elongata,* n. sp. One of the antennæ.
28. *Sarsiella Murrayana,* n. sp. Ovigerous foot. × 190.
29. „ „ n. sp. One of the antennæ. × 80.
30. *Halocypris elongata,* n. sp. One of the antennules.
31. *Sarsiella Murrayana,* n.sp. The post-abdomen. × 127.
32. *Halocypris torosa,* n. sp. One of the antennules. × 13.
33. „ *aculeata,* n. sp. One of the antennules (female). × 54.
34. „ „ n. sp. One of the antennæ. × 27.
35. „ *torosa,* n. sp. First foot. × 13.
36. *Cytherella africana,* n. sp. One of the anterior antennæ. × 95.
37. *Halocypris torosa,* n. sp. One of the antennæ. × 13.
38. „ *aculeata,* n. sp. One of the antennules (male). × 40.
39. „ *punica,* n. sp. One of the antennules. × 54.
40. „ „ n. sp. One of the antennæ. × 54.
41. *Cytherella africana,* n. sp. One of the posterior antennæ. × 95.
42. „ „ n. sp. The post-abdomen. × 95.



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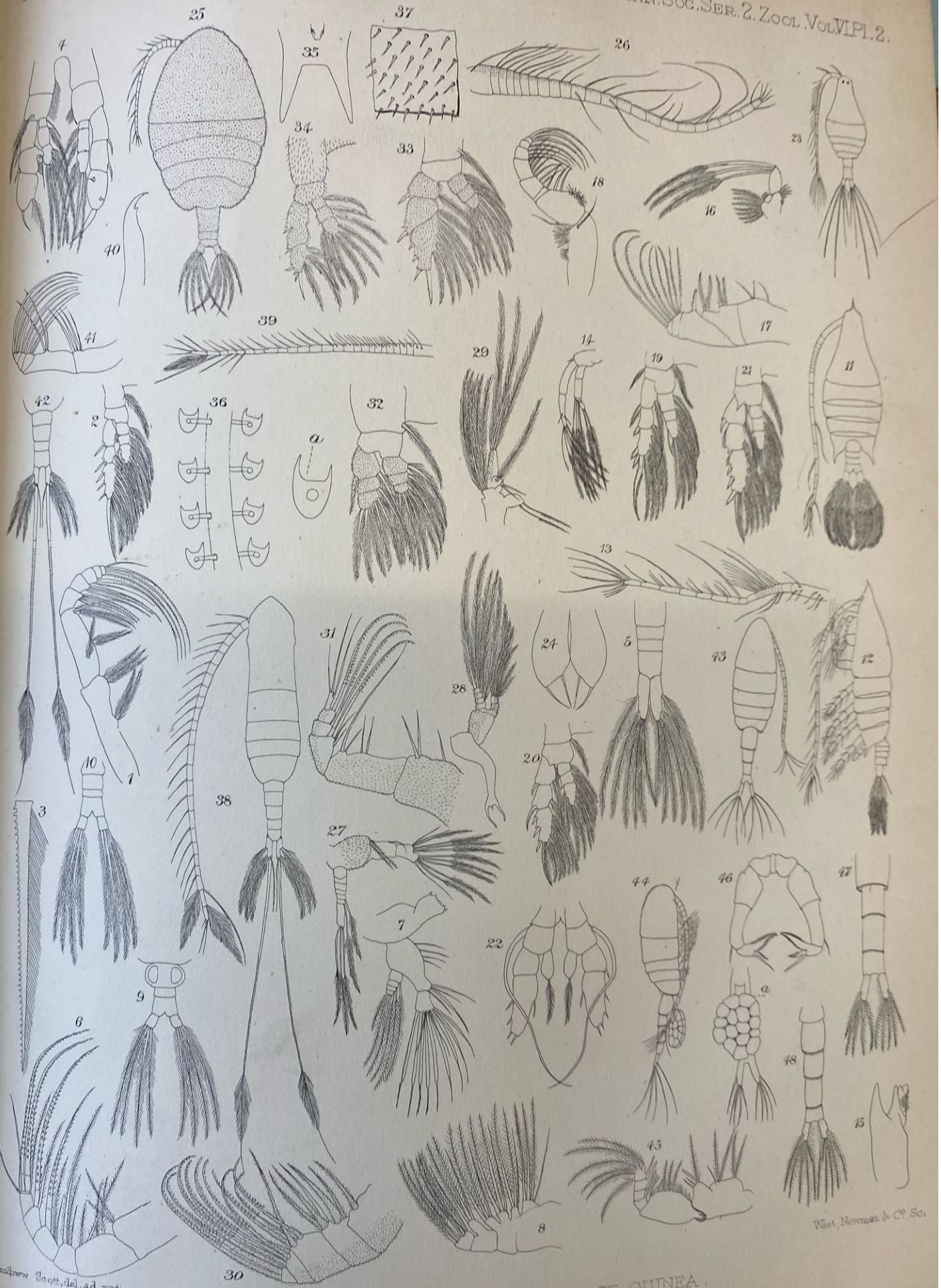

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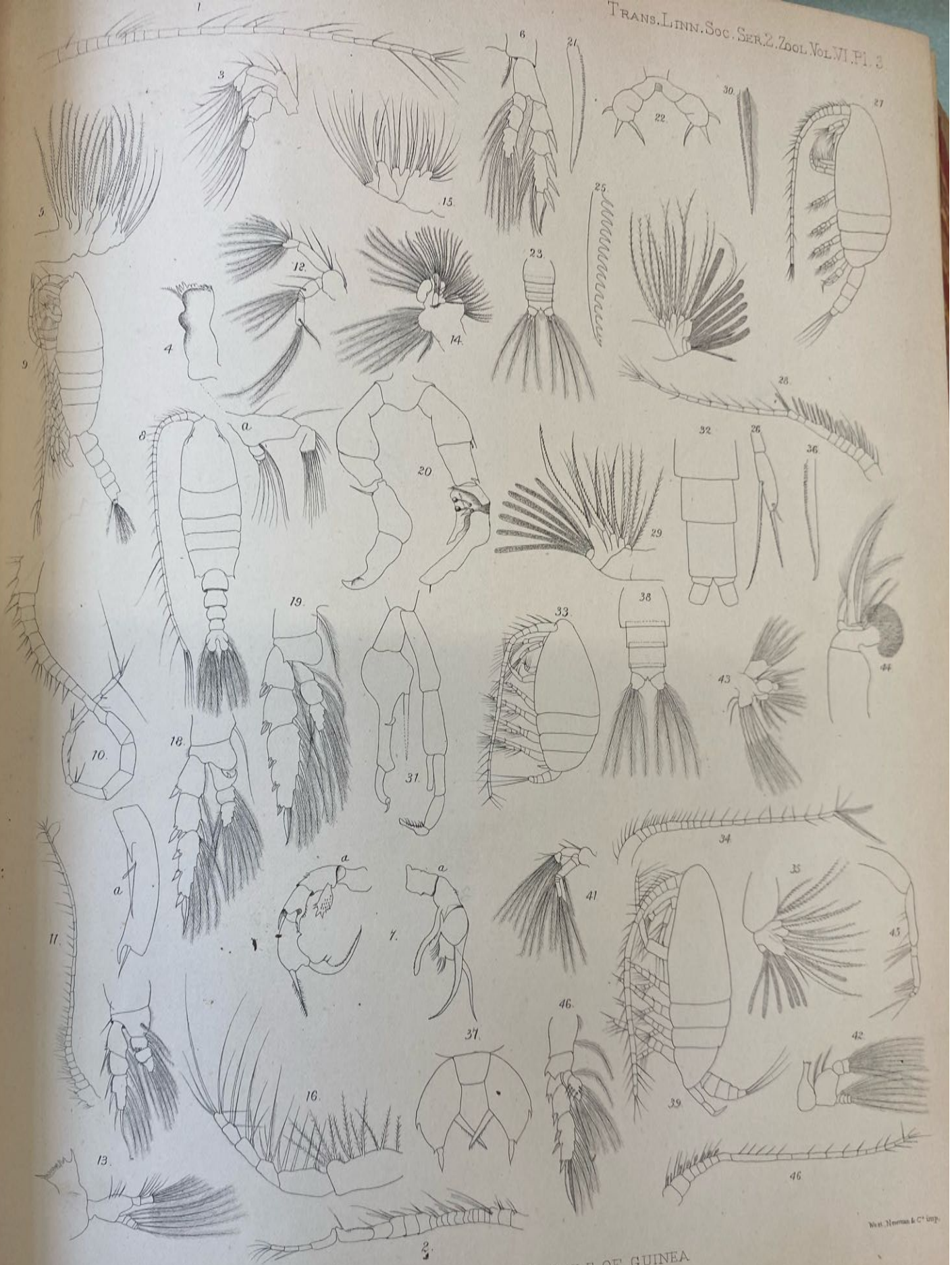

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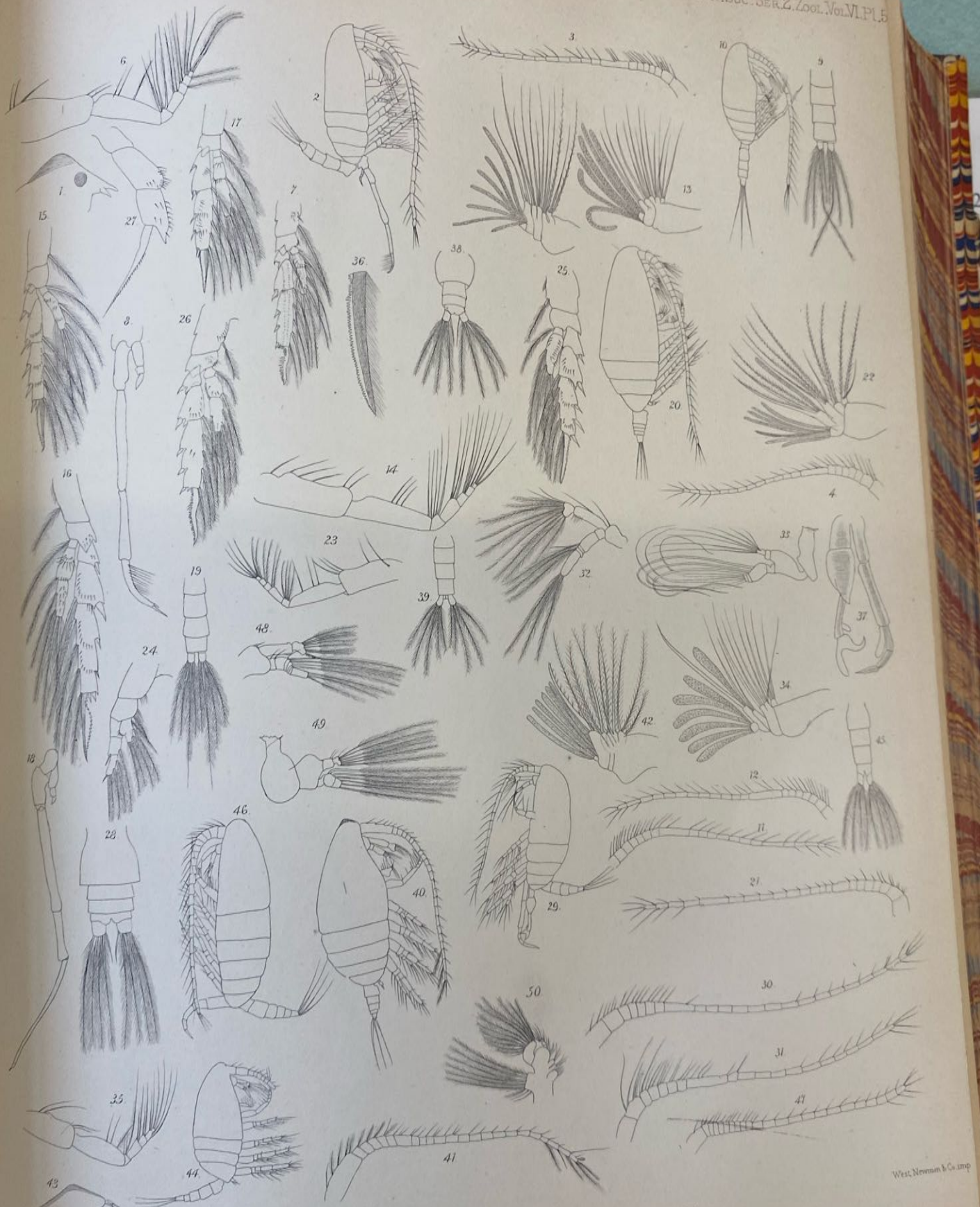

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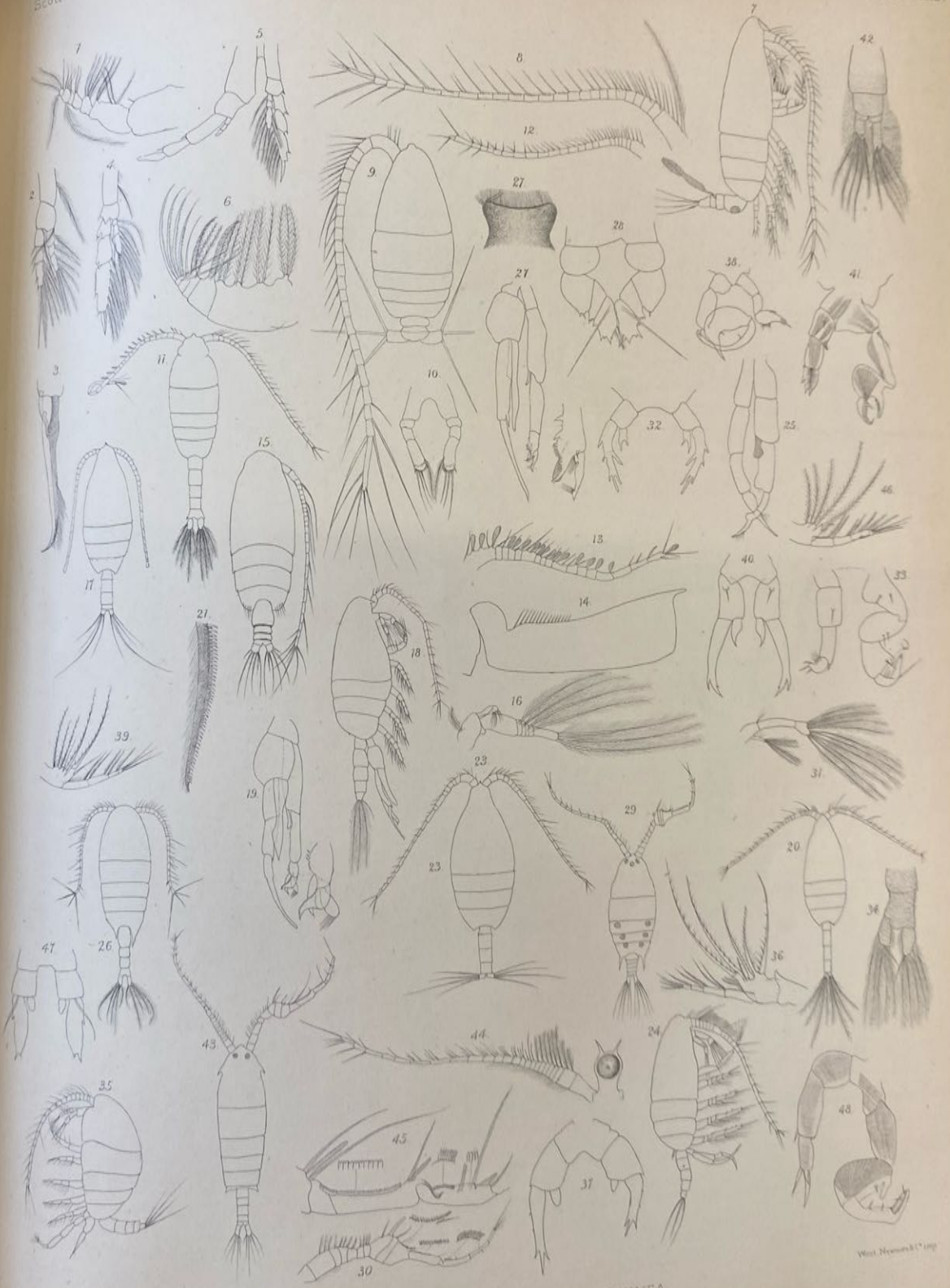

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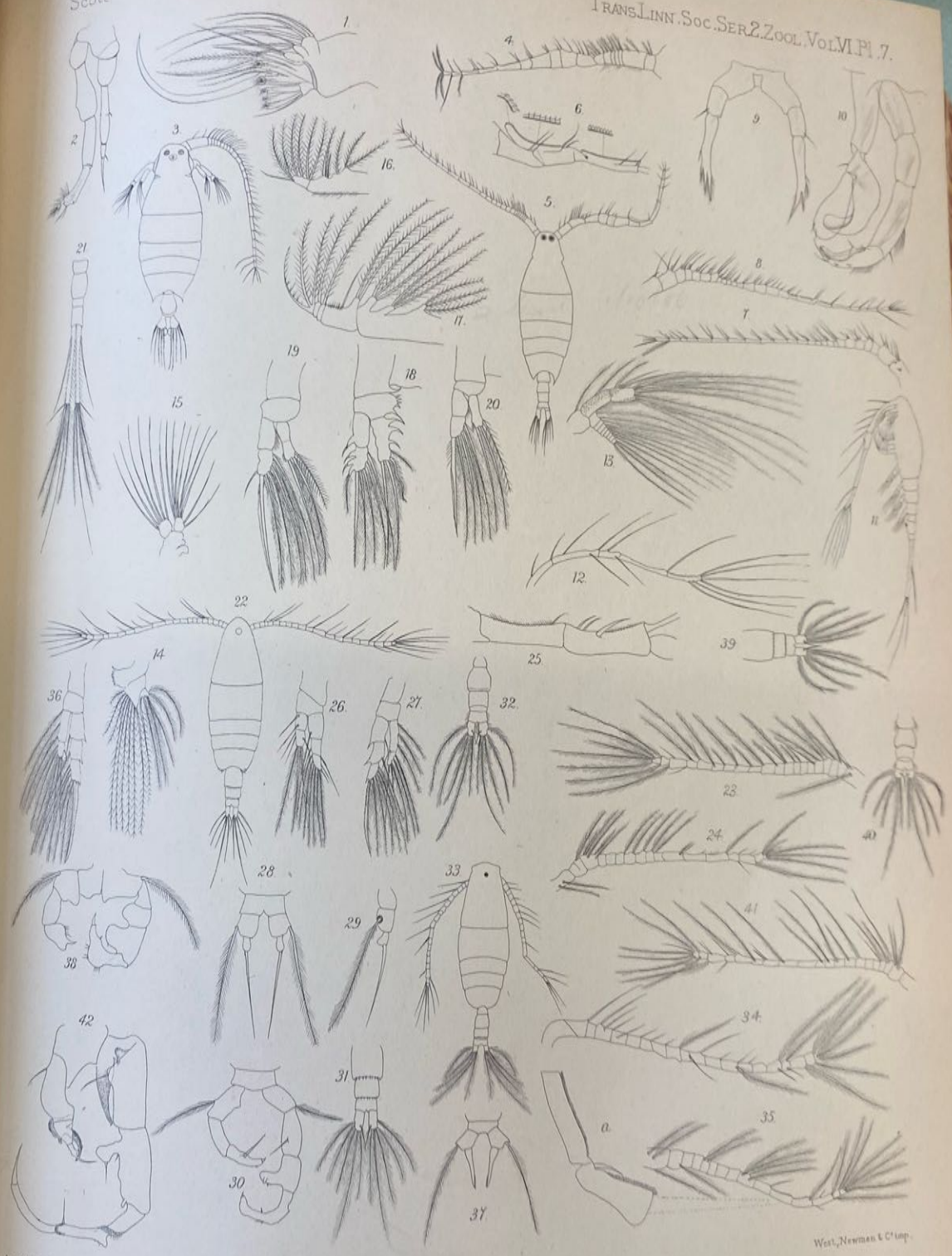

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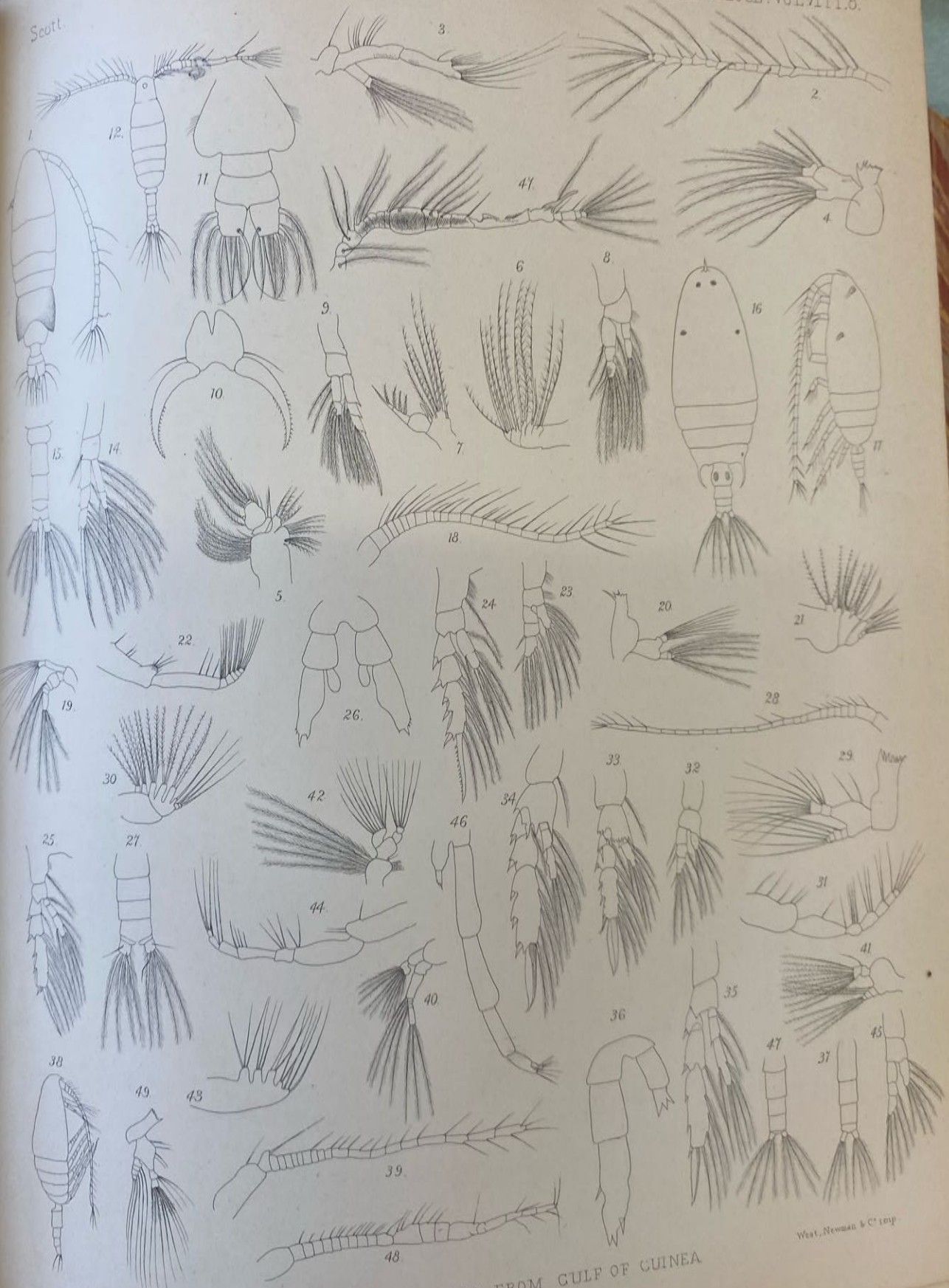

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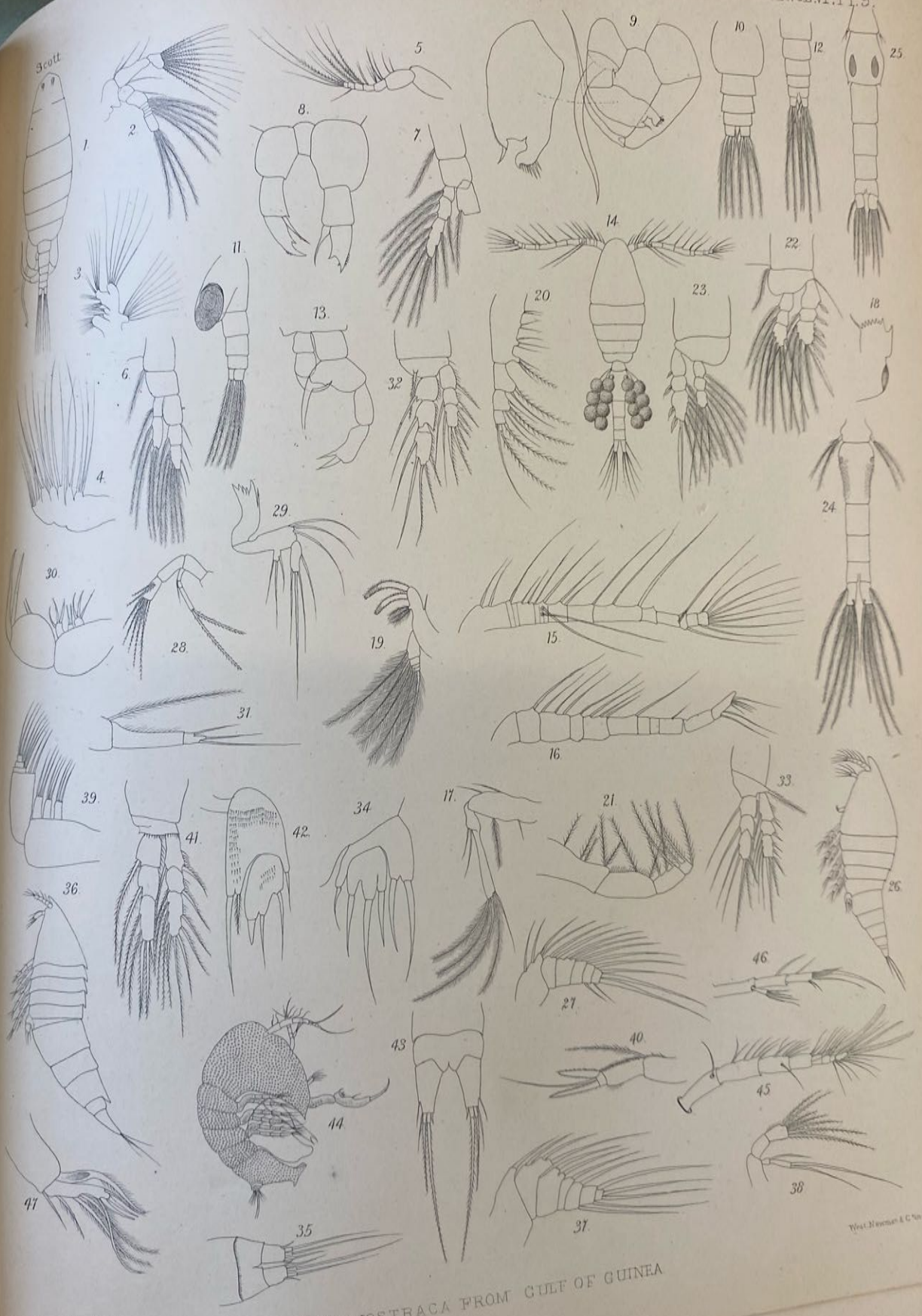

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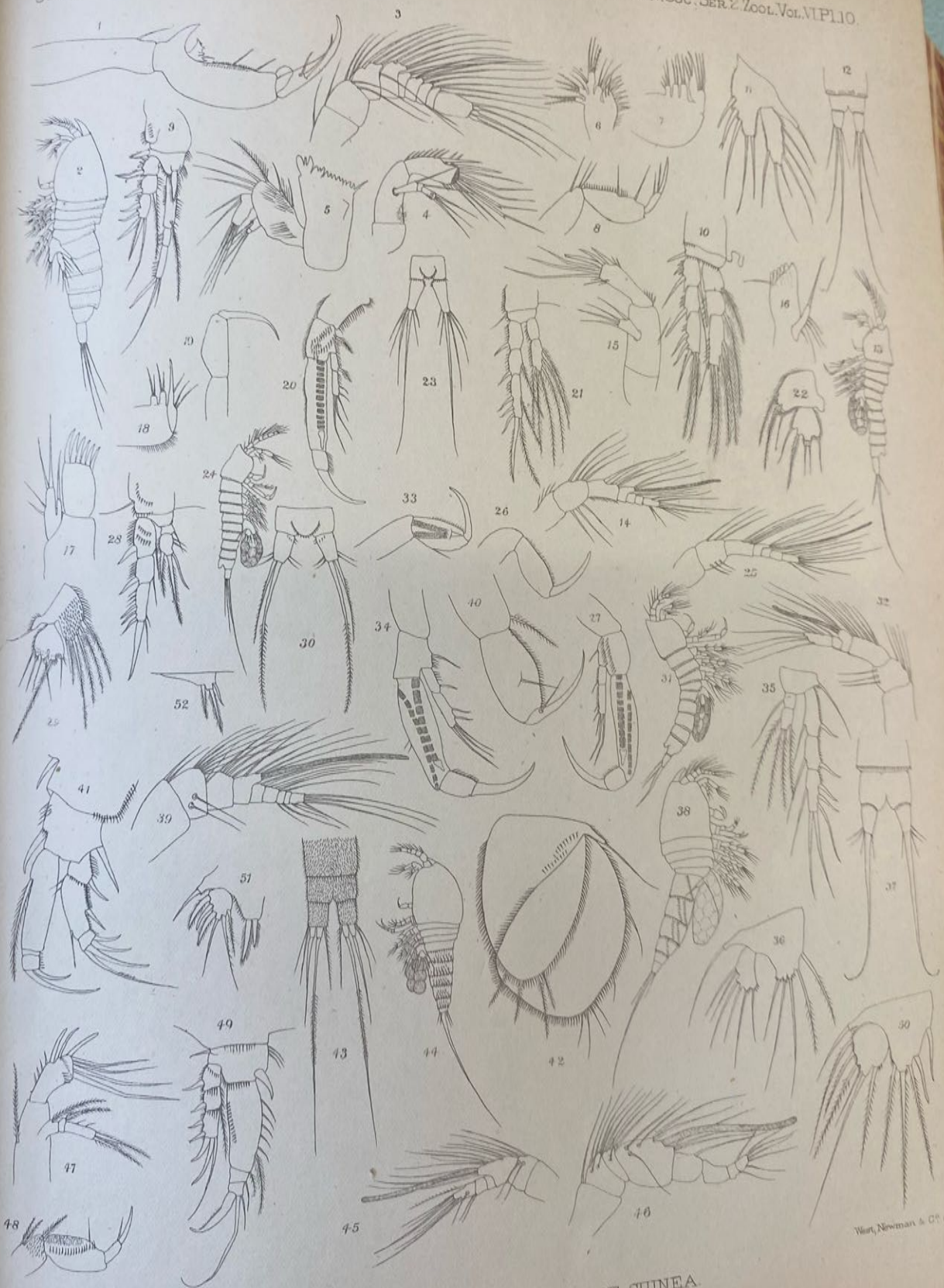

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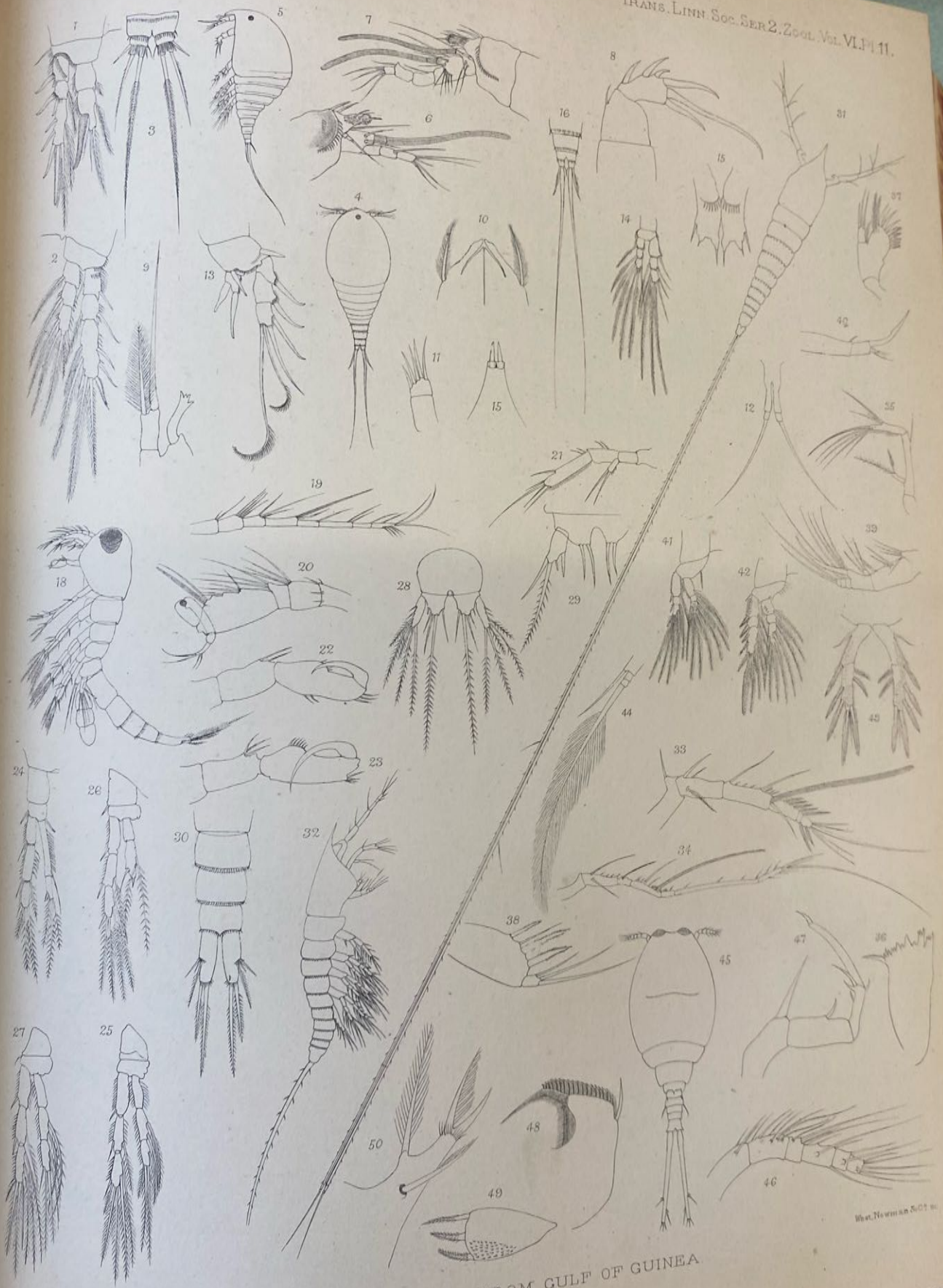

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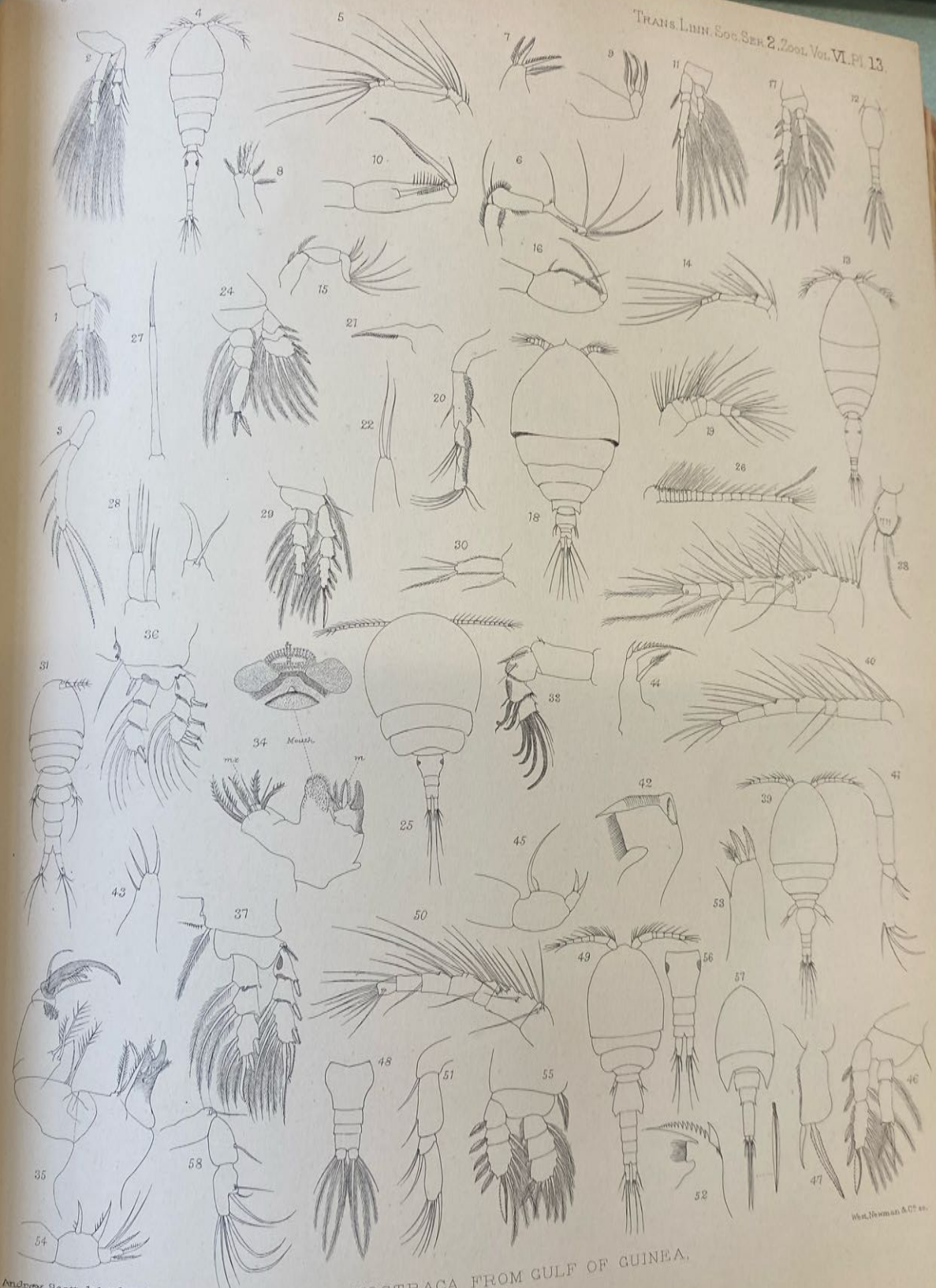

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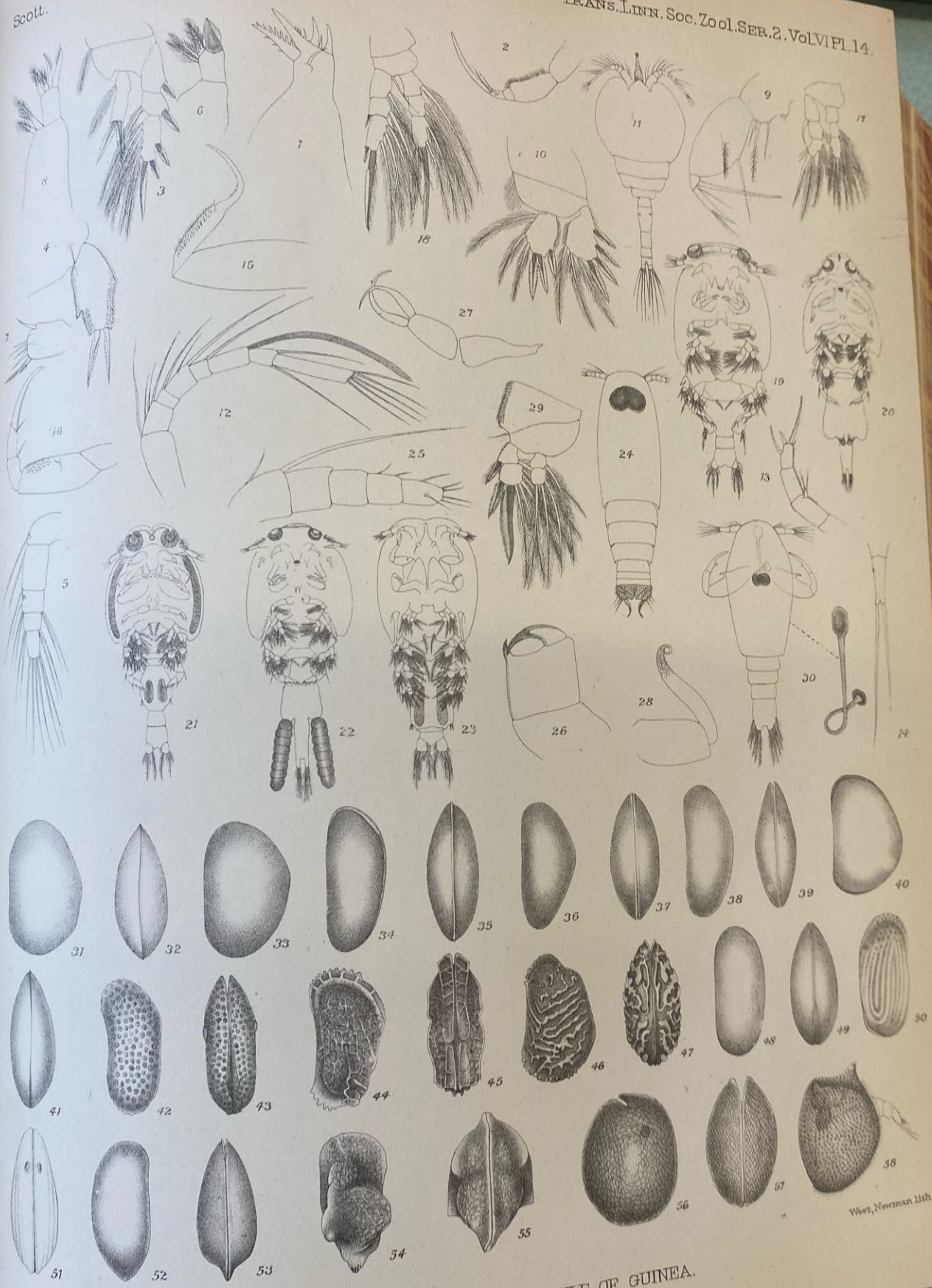

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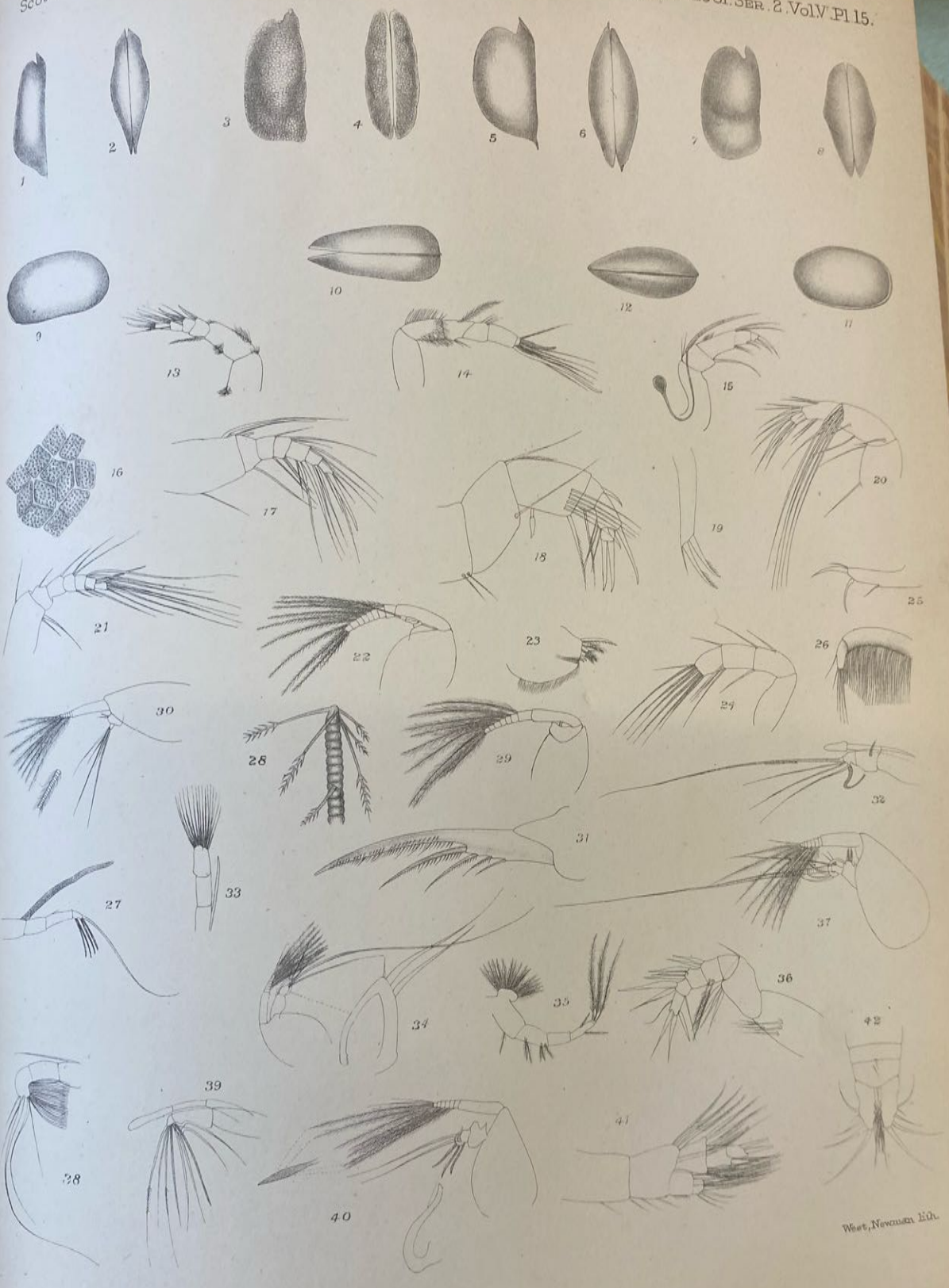

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