

### **Abstract**

The present material consists of two gatherings taken during the 3rd and 4th voyages of R. S. SOYA to and from the Antarctic in 1959. Forty-two species were found in the samples taken at the stations between the Bay of Cape Town and the Antarctic. The species are divided into three groups according to their geographical distribution, viz., Cape Town to 40° S, Subantarctic and Antarctic.

Some of the species which have not been reported in my previous paper of 1960 are described and illustrated.

## I. GENERAL INTRODUCTION

The present paper is based on two small collections of copepods made by R. S. SOYA in the year of 1959 during her 3rd and 4th voyages to the Antarctic. The specimens were kindly placed at my disposal by Dr. S. FUKASE of the Nagasaki Maritime Meteorological Observatory and by Dr. H. FUKUSHIMA of the Yokohama Municipal University respectively. The author wishes to express his sincere gratitude to Drs. FUKASE and FUKUSHIMA.

Though there is no information on the method of collection, the samples contained a fairly large number of species. The material consists of twenty-five gatherings. The stations, dates and localities of collection are given in the following list.

Table 1. List of stations, dates and localities of collection.

Station number	Date	Position	Temperature (°C)	Chlorinity (‰)
1	Dec. 18, 1959	34°43' S 18°30' E	19.1	
2	19	37°34' 20°05'	23.9	19.16
3	20	38°24' 20°33'	21.7	19.71
4	20	41°08' 22°15'	16.8	19.26
5	21	42°52' 25°36'	6.8	18.78
6	22	48°17' 27°36'	3.9	18.76
7	23	51°57' 31°06'	1.0	18.10
8	24	55°22' 34°42'	1.7	18.82
9	Jan. 4, 1959	66°03' 39°22'		
10	6	66°49' 41°49'		
11	7	66°45' 43°22'		
12	7	66°38' 44°27'		
13	7	66°41' 44°33'		
14	8	67°08' 41°16'		
15	8	66°57' 42°21'		
16	10	67°21' 39°59'		
17	11	67°23' 40°03'		
18	14	67°34' 40°26'		
19	15	67°38' 40°22'		
20	16	? ?		
21	18	67°43' 39°58'		
22	Feb. 5	67°10' 40°12'		
23	8	66°01' 50°04'		
24	11	67°38' 31°01'		
25	23	34°18' 18°13' (Bay of Cape Town)		

The samples 1 to 8 were collected by Dr. FUKASE in the 3rd voyage, and 9 to 25 by Dr. FUKUSHIMA in the 4th voyage.

The species recorded falls into three groups; 1) the species collected in the area between Cape Town and about 40° S latitude, 2) those from the area between 41° and 55° S, and 3) those collected in the Antarctic. They are listed below.

Table 2. Group of species.

34° — 40° S	41° — 55° S
<i>Nannocalanus minor</i>	<i>Calanus simillimus</i>
<i>Calanoides carinatus</i>	<i>Calanus tonsus</i>
<i>Paracalanus parvus</i>	<i>Calanoides carinatus</i>
<i>Calocalanus pavo</i>	<i>Clausocalanus arcuicornis</i>
<i>Calocalanus plumulosus</i>	<i>Clausocalanus laticeps</i>
<i>Calocalanus styliremis</i>	<i>Centropages aucklandicus</i>
<i>Clausocalanus arcuicornis</i>	<i>Centropages chierchiae</i>
<i>Clausocalanus laticeps</i>	
<i>Centropages aucklandicus</i>	56° — 67° S
<i>Centropages chierchiae</i>	<i>Calanus propinquus</i>
<i>Pseudodiaptomus nudus</i>	<i>Calanoides carinatus</i>
<i>Candacia aethiopica</i>	<i>Ctenocalanus vanus</i>
<i>Acartia asymmetrica</i>	<i>Drepanopsis pectinatus</i>
<i>Acartia negligens</i>	<i>Stephus longipes</i>
<i>Oithona plumifera</i>	<i>Pareuchaeta</i> sp.
<i>Oithona similis</i>	<i>Scolecithricella glacialis</i>
<i>Oncaea curvata</i>	<i>Centropages brachiatus</i>
<i>Oncaea venusta</i>	<i>Metridia gerlachei</i>
<i>Sapphirina angusta</i>	<i>Paralabidocera antarctica</i>
<i>Sapphirina gemma</i>	<i>Oithona similis</i>
<i>Sapphirina scarlata</i>	<i>Tisbe racovitzai</i>
<i>Corycaeus agilis</i>	
<i>Corycaeus africanus</i>	
<i>Corycaeus asiaticus</i>	
<i>Corycaeus crassiusculus</i>	
<i>Corycaeus giesbrechti</i>	
<i>Corycaeus pacificus</i>	
<i>Corycaeus concinnus</i>	
<i>Corycaeus rostratus</i>	
<i>Macrosetella gracilis</i>	

The total number of species amounts to forty-five, of which twenty-five are Calanoida, fifteen are Cyclopoida and two are Harpacticoida. As seen from the list the geographical distribution of the species is fairly well represented according to the areas in which the fishings were made. While the 1st to 4th stations are rich in species, the stations located in the Subantarctic is represented chiefly by *Calanus simillimus* GIESBRECHT and *Calanus tonsus* BRADY. The characteristic species of the Antarctic region are those known well, such as *Calanus propinquus* BRADY, *Calanoides carinatus* (KRÖYER), *Ctenocalanus vanus* GIESBRECHT, *Drepanopsis pectinatus* BRADY, *Stephus longipes* GIESBRECHT, *Pareuchaeta* sp., *Scolecithricella glacialis* (GIESBRECHT), *Centropages brachiatus* DANA, *Metridia gerlachei* GIESBRECHT, *Paralabidocera antarctica* (I. C. THOMPSON), *Oithona similis* CLAUS and *Tisbe racovitzai* GIESBRECHT.







## II. SYSTEMATIC ACCOUNT

### 1. *Calanus propinquus* BRADY

*Calanus propinquus*, GIESBRECHT, 1892, p. 16.

*Occurrence*: Very frequent in the Antarctic, at the stations 14, 15, 16, 18, 19 and 21. At the remaining stations the specimens were all immature.

*Remarks*: The adult female measured 5.20 mm.

### 2. *Calanus simillimus* GIESBRECHT

*Calanus simillimus*, GIESBRECHT, 1892, p. 91.

*Occurrence*: Chiefly in the Subantarctic, at the stations 5, 6 and 7.

*Remarks*: The adult females measured 3.45-3.70 mm; male, 3.40 mm.

### 3. *Calanus tonsus* BRADY

*Calanus tonsus*, VERVOORT, 1957, p. 27.

*Occurrence*: Exclusively in the Subantarctic, at the station 5.

*Remarks*: Length 4.35-4.60 mm in the female; 3.10 mm in the male.

### 4. *Nannocalanus minor* (CLAUS)

*Calanus minor*, GIESBRECHT, 1892, p. 90.

*Occurrence*: In the subtropical region, at the stations 1, 3 and 8.

*Remarks*: Length, female, 2.06-2.12 mm.

### 5. *Calanoides carinatus* (KRÖYER)

*Calanus brevicornis*, GIESBRECHT, 1892, p. 90, 98, 127, 725, 728; *Calanoides carinatus*, VERVOORT, 1957, p. 29; TANAKA, 1960, p. 16.

*Occurrence*: Widely distributed in the subtropical region of the Atlantic, Indian and Pacific Oceans; also from the Antarctic region, at the stations 2, 3, 4, 15, 16, 17, 18, 19, 20; also in the Bay of Cape Town.

*Remarks*: The forms from the Antarctic were all immature, except three females collected at the stations 16 and 17. As mentioned in my previous paper immature specimens prefer deep waters of the subtropical region, the adult



is often found in the surface layer of the same region and also in the Antarctic. The specimen of adult female collected at the station 3 measured 2.55-2.82 mm, and those from the stations 16 and 17 measured 3.90-3.95 mm. According to FARRAN, Atlantic specimens measured 2.36-2.82 mm and New Zealand specimens 3.06-3.60 mm. My specimen of 1960 from the Subantarctic measured 3.94 mm.

#### 6. *Paracalanus parvus* GIESBRECHT

*Paracalanus parvus*, GIESBRECHT, 1892, p. 164; TANAKA, 1960, p. 27.

*Occurrence*: Four females and two males at the station 1; two females at the station 2; two females at the station 3. The species is widely distributed in the tropical and subtropical regions of the great oceans, also in the Mediterranean Sea, Arabian Sea, Black Sea and North Sea.

*Remarks*: There are two sizes, the major form measuring 0.97-1.12 mm in the female and the minor form 0.89-0.94 mm.

#### 7. *Calocalanus pavo* (DANA)

*Calocalanus pavo*, GIESBRECHT, 1892, p. 175; TANAKA, 1960, p. 29.

*Occurrence*: One female at the station 2; two females at the station 3. The species is widely distributed in the tropical and subtropical regions of the great oceans, also from the Mediterranean Sea, Arabian Sea, Red Sea and Celebes Sea.

*Remarks*: Length, 1.10 mm in the female. The specimen collected from the Indian Ocean in 1960 measured 0.79-0.91 mm in the female.

#### 8. *Calocalanus plumulosus* (CLAUS)

*Calocalanus plumulosus*, GIESBRECHT, 1892, p. 176; TANAKA, 1960, p. 29.

*Occurrence*: One female at the station 3.

*Remarks*: Length, 1.25 mm in the female. A female specimen from the Indian Ocean collected in 1960 measured 0.97 mm.

#### 9. *Calocalanus styliremis* GIESBRECHT

*Calocalanus styliremis*, GIESBRECHT, 1892, p. 176; TANAKA, 1960, p. 30.

*Occurrence*: Two females at the station 3.

*Remarks*: Length, 0.76 mm in the female. The specimen from the Indian Ocean collected in 1960 measured 0.64 mm in the female.

#### 10. *Clausocalanus arcuicornis* (DANA)

*Clausocalanus arcuicornis*, GIESBRECHT, 1892, p. 186; TANAKA, 1960, p. 30.

*Occurrence*: Sixteen females, two males and three juvs at the station 4.

*Remarks*: There are two sizes, the major form measuring 1.56 mm and the minor form 0.96 mm in the female; the major form is more frequent than the minor form.

**11. *Clausocalanus laticeps* FARRAN**

*Clausocalanus laticeps*, FARRAN, 1929, p. 224; TANAKA, 1960, p. 32.

*Occurrence*: Two females at the station 5.

*Remarks*: Length, 1.47 mm in the female. The specimen of 1960 measured 1.62 mm in the female.

**12. *Drepanopsis pectinatus* BRADY**

(Plate I)

*Drepanopsis pectinatus*, BRADY, 1883, p. 76; GIESBRECHT, 1892, p. 201; VERVOORT, 1957, p. 39.

*Occurrence*: Eleven females at the station 16.

*Descriptive Notes*: Female. Length, 2.67-3.00 mm. The anterior and posterior regions of the body have proportional lengths as 61 to 39. The cephalothorax elongate ovate. The head fused with the 1st thoracic segment, so are the 4th with the 5th. The lateral distal margin of the last thoracic segment obtusely triangular, narrowly rounded at the apex. The rostral filaments slender.

The abdomen 4-segmented; the segments and furca in the proportional lengths, 36:20:17:12:15=100. The genital segment swollen laterally on the proximal half.

The 1st pair of legs with 3-jointed exopod and 1-jointed endopod. In the female, the 5th pair of legs 2-jointed; the terminal claw of the distal segment curved, and is furnished with fine spinules on the outer margin.

*Remarks*: The specimen from Kerugelen Whaling Ground sent by Dr. T. NEMOTO of the Whale Research Institute in Tokyo measured 2.95 mm in the female; the present female specimen is similar in size to those from Kerugelen. VERVOORT's specimens collected during the B. A. N. Z. Expedition are somewhat smaller in size than the present specimens.

**13. *Ctenocalanus vanus* GIESBRECHT**

*Ctenocalanus vanus*, GIESBRECHT, 1892, p. 194; TANAKA, 1960, p. 35.

*Occurrence*: Many females at the stations 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 and 21, and also in the Bay of Cape Town.

*Remarks*: Length, 1.16 mm in the female.

**14. *Stephus longipes* GIESBRECHT**

*Stephus longipes*, GIESBRECHT, 1902, p. 20; TAMAKA, 1960, p. 37.

*Occurrence*: One adult male at the station 11, one adult female at the station 12, two adult male at the station 20; immature specimens at the stations 11, 13, 15, 16, 17, 19, 20, 21, 22, 23 and 24.

*Remarks*: Length, 0.85 mm in the female.

**15. *Pareuchaeta* sp.**

*Pareuchaeta* sp., TANAKA, 1960, p. 39.

*Occurrence*: Two juvs at the station 16 and one juv at the station 19.

*Remarks*: The specimen measured 2.81 mm in the copepodid stage III. It is quite identical with that described and figured by me in 1960.

**16. *Scolecithricella glacialis* (GIESBRECHT)**

*Scolecithrix glacialis*, GIESBRECHT, 1902, p. 25; *Scolecithricella glacialis*, TANAKA, 1960, p. 40.

*Occurrence*: One female at the station 16 in the Antarctic circle.

*Remarks*: Length, 1.28 mm in the female.

**17. *Centropages aucklandicus* KRÄMER**

*Centropages aucklandicus*, FARRAN, 1929, p. 256.

*Occurrence*: One male at the station 8.

*Remarks*: Length, 1.59 mm in the male. The present specimen, though slightly larger in size than that described and figured by FARRAN, agrees quite well with his description and figures.

**18. *Centropages brachiatus* DANA**

(Plate II)

*Centropages brachiatus*, GIESBRECHT, 1892, p. 304; WILSON, 1950, p. 185.

*Occurrence*: Four females and one male at the station 16.

*Descriptive Notes*: Female. Length, 1.85-1.88 mm. The anterior and posterior regions of the body have proportional length as 69 to 31. The anterior region 2.5 times as long as broad. The head is separated from the thoracic segment. The last thoracic segment asymmetrical; the left side more protruded posteriorly into a wing-like expansion.

The posterior region consists of three segments and furca, having proportional lengths as follows: 32:31:14:23=100. The genital segment asymmetrical; the lateral distal margin is developed better on the left side and is provided with two spines; the lateral margin of the right side carries two spines on the middle; the ventral surface of the segment produced considerably below. The 2nd segment is slightly asymmetrical on the lateral margins; the left side irregular in outline in dorsal view; this irregularity is marked in some specimens while not so obvious in others; in either case there is transverse rows of minute spinules around this region; there is a small triangular process on the ventro-lateral surface of the left margin. The furcal rami slightly asymmetrical; the left ramous longer and broader than the right.

The 1st antenna, 24-jointed, almost reaches the distal margin of the anal segment when fully extended.

The 5th pair of legs is as described and illustrated by GIESBRECHT.

Male. 1.83 mm. The 5th pair of legs agrees quite well with GIESBRECHT's figure.

*Remarks*: The specimen is closely allied to *Centropages chierchiae* GIESBRECHT and also to *C. typicus* KRÖYER. The female specimen is easily distinguished from either of them by the shape of the wing-like expansion of the 5th thoracic segment and by the complicated structure of the genital segment. The male specimen can be separated from the male of *C. chierchiae* by its large size and by the differences in the minute points of structure in the 5th pair of legs.

The species was first described by DANA on the specimens collected off the Cape of Good Hope. DANA recorded the species off Constitución Chile in large numbers. WILSON recorded the species from a single station 4673, off Peru. The species appears to be a subtropical type. According to GIESBRECHT and SCHMEIL the species has been recorded from the Pacific and Indian Oceans between 10° and 50° S.

#### 19. *Centropages chierchiae* GIESBRECHT

*Centropages chierchiae*, GIESBRECHT, 1892, p. 304; *Centropages typicus*, TANAKA, 1960, p. 46, pl. 20, figs. 1-5.

*Occurrence*: One female and male at the station 1; one female and three males at the station 2; Seven females and four males at the station 3; one male at the station 4.

*Remarks*: Length, male, 1.60 mm.

#### 20. *Pseudodiaptomus nudus* TANAKA

*Pseudodiaptomus nudus*, TANAKA, 1960, p. 47.

*Occurrence*: One female at the station 1, off the Cape of Good Hope.

*Remarks*: Length, female, 1.21 mm.

#### 21. *Metridia gerlachei* GIESBRECHT

*Metridia gerlachei*, GIESBRECHT, 1902, p. 27; TANAKA, 1960, p. 49.

*Occurrence*: One female at the station 15; many females and several immature females at the station 16; one female at the station 19; three immature females at the station 20.

*Remarks*: Length, female, 3.25-3.79 mm.

#### 22. *Candacia aethiopica* (DANA)

*Candacia aethiopica*, GIESBRECHT, 1892, p. 424; *Candacia aethiopica*, TANAKA, 1960, p. 54.

*Occurrence*: One female at the station 3.

*Remarks*: Length, female, 2.81 mm.

**23. *Paralabidocera antarctica*** (I. C. THOMPSON)

(Plates III-IV)

*Paralabidocera antarctica*, FARRAN, 1929, p. 280; VERVOORT, 1957, p. 145.*Occurrence*: Ninety-four females and eleven males at the station 9.

*Descriptive Notes*: Female. Length, 1.88-1.92 mm. The anterior and posterior regions of the body have proportional lengths as 75 to 25. The head is separated from the 1st thoracic segment. The last two thoracic segments are fused. The body moderately robust; the frontal margin of the head evenly rounded in dorsal view; the last thoracic segment slightly asymmetrical; the left side is narrower than the right. In lateral view the frontal margin of the head narrowly rounded, and furnished with an eye as is seen in the genus *Tortanus*; the rostral filaments short and delicate.

The abdomen 3-jointed; the segments and furca are in the proportional length, as 49:13:13:25=100. The genital segment very large and asymmetrical; the left lateral margin is furnished with a blunt process about the middle; the right margin with three processes; the dorsal surface of the segment slightly swollen. The 2nd segment about 2 times as wide as long. The anal segment about 3 times as wide as long. The furcal rami asymmetrical; the right ramus is slightly longer and broader than left.

The 1st antenna 20-jointed, extends posteriorly to the distal margin of the 1st thoracic segment. The segments have the following proportional lengths:

Segments	1	2-3-4	5-6-7	8	9	10	11	12-13	14	15
	103	98	49	15	34	25	29	64	44	34
	16	17	18	19	20	21	22	23	24	25
	34	49	59	49	49	69	49	73	44	30 = 1000

Each of the segments is furnished with long setae.

The 2nd antenna has the endopod about 2 times as long as the exopod; the exopod 6-jointed; the proximal three segments are fused; the 1st segment of the endopod carries eight setae on the inner margin; the 2nd segment has six setae on the distal margin.

The mandible has the endopod about as long as the exopod; the endopod 2-jointed, the proximal segment has two setae, the distal segment has eight setae on the distal margin; the mandibular palp carries a single seta on the inner margin.

In the 1st maxilla the 1st basal segment broad; the 1st outer lobe has seven long and three short setae; the 2nd outer lobe is represented by a single seta; the exopod with two setae; the endopod has five setae; the 3rd inner lobe with a single seta; the 2nd inner lobe with three setae; the 1st inner has seven long spines and two short setae. The 2nd maxilla has five lobes of which the 1st has three spines; the 4th has two long spines and a short seta; each of the remaining

lobes is furnished with a long spine and a short seta.

The maxilliped is small in size; the 1st basal broad, has three lobes; the 2nd basal has a single seta; the endopod 2-jointed, the 1st segment has two setae, the 2nd segment has three setae, of which the distal one stout and long.

The 1st to 4th swimming legs have each 3-jointed exopod and 2-jointed endopod. The outer edge spine of the exopod of the 2nd to 4th legs has no demarcation between the segment and the spine.

The 5th pair of legs 3-jointed; the endopod 1-jointed and small; the exopod 1-jointed, bifid at the apex; the external spine has a small seta near the base on the inner margin.

Male. Length, 1.54-1.62 mm. The specimen dissected measured 1.58 mm. The body rather slender in outline. The lateral distal margin of the last thoracic segment obtusely rounded in lateral view. The anterior and posterior regions of the body are in the proportional length, 65 to 35.

The abdomen 5-jointed; the segments and furca have the proportional lengths: 15:33:16:9:5:22=100. The genital segment dilated near the distal margin. The 2nd segment about 1.7 times as long as wide. The furcal rami symmetrical, 2 times as long as wide.

The right 1st antenna is modified into a clasping organ; it consists of 15 segments, the segments have the following proportional lengths:

Segments	1-2	3-4-5	6-7-8-9	10	11	12	13	14	15
	110	57	38	53	38	19	43	43	43
	16	17	18	19-20-21	22-23-24	25			
	38	80	118	152	143	19	=	1000	

The 3rd segment carries a strong spine on the anterior distal margin; the 12th segment is furnished with a row of denticles on the anterior margin; the 14th segment has a strong seta on the anterior distal margin.

The right 5th leg has four free segments attached to the basal side, and has a rudimentary endopod; the 2nd segment carries a sharp triangular process on the middle of the inner margin; the distal segment is elongated into a long whip-shaped spine. The left leg has three free segments; the 1st segment is rounded and is furnished with denticles on the inner distal margin; the 3rd segment bends inwardly, tapers at the distal end; the inner margin is furnished with a strong seta in about the middle; the outer proximal margin carries two spines, one of which is branched at the distal end.

*Remarks:* The genus *Paralabidocera* is very closely allied to *Acartia*. The present species agrees fairly well with *Paralabidocera hodosni* described and illustrated by WOLFENDEN, differing from it in the shape of the genital segment of the female. The present specimen has the genital segment opposite to the illustration given by WOLFENDEN. In other respects the specimen agrees well with that described and illustrated by WOLFENDEN in 1908.

**24. *Acartia asymmetrica* sp. nov.**

(Plates V-VI)

*Occurrence*: One female and two males in the Bay of Cape Town.

*Descriptive Notes*: Female. Length, 1.40 mm. The anterior and posterior regions of the body have proportional lengths as 79 to 21. The cephalothorax elongate ovate. The head is separated from the thoracic segment. The last two thoracic segments are fused. The last thoracic segment asymmetrical; the right side is pointed at the apex; the left side is elongated into an acute downward-pointing process. The rostrum is composed of two fine slender filaments. The anterior distal margin of the head obtusely triangular in dorsal view. The posterior region of the body is furnished with a sort of lamella.

The abdomen 3-jointed; the segments and furca are in the proportional lengths; 48:14:17:21=100. The genital segment wider than long, dilated in the middle section; the lateral distal margin protruded posteriorly on each side in a dorsal view. The 2nd segment wider at the distal margin. The furcal rami slightly longer than wide (6:5).

The 1st antenna 16-jointed, extends posteriorly when reflexed to the distal margin of the 3rd thoracic segment. The segments have the following proportional lengths:

Segments	1	2-3-4-5	6	7-8	9-10	11	12-13-14-15-16		
	69	64	15	35	73	40	270		
	17	18	19	20	21	22	23	24	25
	59	69	49	49	59	20	69	40	20 = 1000

The 8th segment has a spine on the distal margin; the 13th segment dilated at the distal end.

In the 2nd antenna the 2nd basal is fused with a slender exopod, and looks like that in *Acartia clausi* GIESBRECHT. The mandibular palp rather slender; the exopod and endopod short; the biting blade sharp with short teeth. The 1st maxilla just as in *A. clausi*; the 2nd basal is fused with the endopod; the exopod is represented by two long plumose setae; the 2nd outer lobe is composed of a single seta. The 2nd maxilla well-developed; the setae on the lobes and on the endopod are long, and furnished with spinules. The maxilliped as that of *A. clausi* as shown in the figure.

The 1st 4th legs have each a 3-jointed exopod and 2-jointed endopod. In the 1st leg the 3rd segment of the exopod has a slender outer marginal spine.

In the 5th pair of legs the basal segment of both legs are fused. The terminal claw strong, inwardly curved; the claw is furnished with two rows of fine spinules on the outer margin.

Male. Length, 1.24 mm. The anterior and posterior regions of the body have proportional lengths, 71 to 29. The lateral corner of the last thoracic segment symmetrical, rounded with a row of minute spinules near the dorsal distal margin.

The abdomen 5-jointed; the segments and furca have the proportional lengths of 11:31:22:14:8:14 = 100. The furcal rami about as long as wide.

The left 1st antenna reaches back about the distal margin of the 3rd thoracic segment. The right antenna is modified into a clasping organ; the segments have the following proportional lengths:

Segments	1-2-3	4-5	6-7-8	9-10-11	12-13-14-15-16-17
	81	66	54	76	297
	18	19-20-21	22-23-24-25		
	184	108	140	=	1000

Segments 12 to 17 are broad in the proximal section; segment 18 is slightly sinuate at the anterior margin near the middle of the segment.

The mouth parts and 1st four swimming legs are the same as in the female.

In the 5th pair of legs the 1st basal segment of both legs are fused. The 2nd basal segment of the right leg has a large process on the inner margin; the 1st segment of the exopod is protruded on the inner margin near the middle, and carries a seta; the 2nd segment of the exopod has a clumsy process on the inner proximal margin; the 3rd segment of the exopod slender, terminating into a sharp spine. In the left leg the distal segment has a process on the inner proximal margin which terminates in a slender spine; the distal margin of the segment has, beside a strong sharp spine, a lamellous process furnished with fine short hairs.

*Remarks:* The present species is very closely allied to *Acartia latisetosa* (KRICZAGIN), but is easily distinguished from it in the shape of the 5th pair of legs in both sexes.

### **25. *Acartia negligens* DANA**

*Acartia negligens*, GIESBRECHT, 1892, p. 508; TANAKA, 1960, p. 55.

*Occurrence:* One female at the station 1; 26 females at the station 3.

*Remarks:* Length, 1.19 mm in the female.

### **26. *Oithona plumifera* BAIRD**

*Oithona plumifera*, GIESBRECHT, 1892, p. 537; TANAKA, 1960, p. 61.

*Occurrence:* One female at the station 2.

*Remarks:* Length, 1.48 mm in the female.

### **27. *Oithona similis* CLAUS**

*Oithona similis*, GIESBRECHT, 1892, p. 541; TANAKA, 1960, p. 62.

*Occurrence:* Collected at the following stations: 5(1 ♀); 6(27 ♀, 1 ♂); 7(2 ♀, 2 juvs); 8(4 ♀, 8 juvs); 9(2 ♀, 2 ♂); 10(2 ♀, 1 ♂); 11(24 ♀), 12(1 ♀, 1 juv); 13(7 ♀), 14(21 ♀, 3 ♂); 15(49 ♀, 1 ♂); 16(30 ♀); 17(11 ♀); 18(14 ♀); 19(40 ♀); 20(209 ♀);



21 (102 ♀); 22 (1 ♀).

*Remarks*: Length, female, 0.80-1.02 mm; male, 0.70 mm.

### 28. *Oncaea curvata* GIESBRECHT

*Oncaea curvata*, GIESBRECHT, 1902, p. 42; TANAKA, 1960, p. 68.

*Occurrence*: One female from the Bay of Cape Town.

*Remarks*: Length, 0.52 mm in the female. The species is one of the characteristic copepods in the Antarctic; the occurrence of the species from the Bay of Cape Town seems to be accidental.

### 29. *Oncaea venusta* PHILIPPI

*Oncaea venusta*, GIESBRECHT, 1892, p. 602; TANAKA, 1960, p. 71.

*Occurrence*: 40 females at the station 1; one female at the station 2.

*Remarks*: Two sizes, large and small, were noticed. The large form measured 1.25-1.15 mm, the small form, 0.94-0.96 mm. The small form more abundant than the large.

### 30. *Sapphirina angusta* DANA

*Sapphirina angusta*, GIESBRECHT, 1892, p. 620; TANAKA, 1960, p. 72.

*Occurrence*: Seven females at the station 3.

*Remarks*: Length, 2.63-3.50 mm in the female.

### 31. *Sapphirina gemma* DANA

*Sapphirina gemma*, GIESBRECHT, 1892, p. 620; TANAKA, 1960, p. 73.

*Occurrence*: Two females at the station 1; seven females and one male at the station 3.

*Remarks*: Length, female, 2.65-3.40 mm; male, 4.15 mm.

### 32. *Sapphirina scarlata* GIESBRECHT

*Sapphirina scarlata*, GIESBRECHT, 1892, p. 620.

*Occurrence*: Two females at the station 1; one female at the station 3.

*Remarks*: Length, 1.95-2.35 mm in the female. The specimens from the Japanese waters measured 1.5-3.5 mm in the female.

### 33. ? *Corycaeus africanus* F. DAHL

(Plate VII)

*Corycaeus (Ditrichocorycaeus) africanus*, M. DAHL, 1912, p. 62; SEWELL, 1947, p. 279.

*Occurrence*: Four males at the station 1.

*Descriptive Notes*: Male. Length, 0.87-0.90 mm. The anterior and posterior

regions of the body have the proportional lengths, 59 to 41. The anterior region about 1.5 times as long as wide. The 2nd segment about as wide as the 3rd thoracic segment. The 3rd segment acutely expands on each side reaching the proximal 1/4 of the genital segment. The 4th segment is protruded posteriorly into sharp processes that direct outwardly.

The posterior region of the body has the segments with the following proportional lengths: 49:20:31=100. The genital segment oval in shape 1.6 times as long as wide (35:22); the cylindrical part of the segment short, 1/3 as long as wide (3:9). The 2nd segment about 1.8 times as long as wide (7:4), the width constant throughout its length. The furcal rami 7.7 times as long as wide (23:3). An acute ventral hook is seen on the proximal margin of the genital segment.

In the 2nd antenna the 2nd basal segment has a sharp tooth on the inner distal margin. The spine from the 2nd basal is 4/5 as long as that of the 1st basal (16:20). The 2nd basal is 2.3 times as long as wide.

The first three legs have the terminal spine of the exopod in the following proportional lengths:

	P 1	P 2	P 3		P 1	P 2	P 3
Re.	27	32	28	St.	26	30	35

The terminal spine of the exopod of the 1st leg not straight and is furnished with rather coarse denticles.

*Remarks:* The present specimen is closely allied to *Corycaeus anglicus* LUBBOCK in the general appearance and in the structure of the 2nd antenna, but is distinguished from the latter by the proportional lengths of the 3rd segment of the exopod of the 1st to 4th legs. The terminal spine of the exopod of the 1st leg is curved in the present specimen, whereas it is straight in *anglicus*.

### 34. *Corycaeus agilis* DANA

*Corycaeus (Onychocorycaeus) agilis*, M. DAHL, 1912, p. 84; TANAKA, 1960, p. 83.

*Occurrence:* One male at the station 2; one female at the station 3.

*Remarks:* Length, 1.16 mm in the female, 0.84-0.91 mm in the male. The specimens from the Japanese waters measured 0.88-1.00 mm in the female, 0.71-0.74 mm in the male.

### 35. *Corycaeus asiaticus* F. DAHL

*Corycaeus (Ditrichocorycaeus) asiaticus*, M. DAHL, 1912, p. 74; TANAKA, 1960, p. 79.

*Occurrence:* Two females at the station 2.

*Remarks:* Length, 1.40 mm in the female. The specimens from the Japanese waters measured 1.15-1.19 mm in the female.

### 36. *Corycaeus crassiusculus* DANA

*Corycaeus (Corycaeus) crassiusculus*, M. DAHL, 1912, p. 21; TANAKA, 1960, p. 77.

*Occurrence*: Three females and one male at the station 1; two males at the station 3.

*Remarks*: Length, 1.74-1.82 mm in the female, 1.47-1.74 mm in the male. The specimens from the Japanese waters are smaller in size and measured 1.44-1.57 mm in the female, 1.27-1.36 mm in the male.

### 37. *Corycaeus giesbrechti* F. DAHL

*Corycaeus* (*Onychocorycaeus*) *giesbrechti*, M. DAHL, 1912, p. 88; TANAKA, 1960, p. 84.

*Occurrence*: Many females at the station 1.

*Remarks*: Length, 0.97-1.04 mm.

### 38. *Corycaeus pacificus* F. DAHL

(Plate VIII)

*Corycaeus* (*Onychocorycaeus*) *pacificus*, M. DAHL, 1912, p. 103; TANAKA, 1960, p. 85.

*Occurrence*: Two females and four males at the station 1.

*Descriptive Notes*: Female. Length, 1.16 and 1.22 mm. The anterior and posterior regions of the body have proportional lengths, 67 to 33. The 1st anterior segment about 1.3 times as long as wide (60:47). The wing-like expansion of the 3rd segment over-reaches the middle of the genital segment; and is a little wider than the 2nd thoracic segment. The 4th segment has broad and pointed expansions which extend straight backward.

The posterior region of the body has the segments in the following proportional lengths: 60:20:20=100. The genital segment is large and oval in shape, 1.5 times as long as wide, and carries on each side a fine seta on the genital area; in lateral view the dorsal and ventral surfaces of the segment much vaulted. The 2nd segment wider at the proximal than at the distal end (8:6), 1.25 times as long as it is wide at the distal (7.5:6.0). The furcal rami as long as the 2nd segment, 5 times as long as it is wide at the distal (7.5:1.5).

The 2nd antenna has the 2nd segment about 1.7 times as long as the 1st (25:17) and is about twice as long as broad (25:12) the spine arising from the 1st segment about 2 times as long as that from the 2nd segment (40:18).

In the 2nd leg the terminal spine of the distal segment of the endopod is similar as described and illustrated by M. DAHL. The seta on the 2nd basal segment of the 4th leg is fine.

Male. Length, 1.06-1.11 mm. The anterior and posterior regions of the body have the proportional lengths, 59 to 41. The head is separated from the 1st thoracic segment. The 1st anterior segment about 1.5 times as long as wide (50:33). The 2nd and 3rd thoracic segments have nearly equal lengths. The wing-like expansion of the 3rd thoracic segment extends posteriorly almost to the middle of the genital segment. The apex of the 4th segment directs outwardly.

The posterior region of the body has segments in proportional lengths, as 54:20:26=100 (dorsal). The genital segment oval in shape, 1.6 times as long

as broad (25:16); the cylindrical part of the genital segment 2.4 times as broad as long (5:12); the ventral surface of the segment rounded near the proximal margin, devoid of ventral hook. The 2nd segment a little wider at the proximal than at the distal end, about twice as long as it is wide at the distal end (18:10). The furcal rami parallel, having almost the same width throughout the ramus, and 6 times as long as broad (23:4).

In the 2nd antenna the 2nd segment is about 2 times as long as broad; the spine arising from the 1st segment is a little longer than that from the 2nd segment. The maxilliped is transformed into a clasping organ, and is furnished with a long and curved claw on the distal end.

*Remarks:* The present specimens, both female and male are much larger in size than those reported by M. DAHL. DAHL's specimens measured 1.01 mm in the female and 0.88 mm in the male. The examples from Japanese waters measured 1.12-1.21 mm in the female, 0.99-1.09 mm in the male. SEWELL's specimens from the Arabian Sea measured 1.067-1.108 mm in the female, 0.89-1.03 mm in the male. According to SEWELL his specimens from the Arabian Sea are intermediate between the Pacific form, *pacificus*, and the Mediterranean form, *ovalis*, and the sole distinction between these forms appears to be the presence of a sharp spinous termination to the lateral process of the 4th thoracic segment in *ovalis* and its absence in *pacificus*. SEWELL is inclined to regard *pacificus* and *ovalis* as local forms of the same species.

### 39. *Corycaeus concinnus* DANA

*Corycaeus (Corycella) concinnus*, M. DAHL, 1912, p. 121; TANAKA, 1960, p. 88.

*Occurrence:* Five females at the station 3.

*Remarks:* Length, 0.88-0.93 mm in the female.

### 40. *Corycaeus rostratus* (CLAUS)

*Corycaeus (Corycella) rostratus*, M. DAHL, 1912, p. 111; TANAKA, 1960, p. 90.

*Occurrence:* Twenty-five females and four males at the station 3.

*Remarks:* Length, 0.82 mm in the female, 0.71-0.76 mm in the male.

### 41. *Macrosetella gracilis* (DANA)

*Setella gracilis*, GIESBRECHT, 1892, p. 559; TANAKA, 1960, p. 92.

*Occurrence:* One female at the stations 2 and 3.

### 42. *Tisbe racovitzai* (GIESBRECHT)

*Idya racovitzai*, GIESBRECHT, 1902, p. 38; TANAKA, 1960, p. 93.

*Occurrence:* Five females and eleven females and two juvs at the station 9; one male and five juvs at the station 11; one female at the station 17; two males at the station 20.

*Remarks:* Length, 0.75-0.90 mm in the female, 0.51 mm in the male. The original specimen described by GIESBRECHT measured 0.75-0.80 mm in the female. FARRAN's specimens from the station at 60°-60°30' measured 0.54-0.66 mm in the female, 0.48 mm in the male. The specimen collected by the Japanese Antarctic Expedition in 1960 measured 0.535 mm in the female.

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