THE PELAGIC COPEPODS OF THE IZU REGION, MIDDLE JAPAN SYSTEMATIC ACCOUNT VII[1)]

FAMILY SCOLECITHRICIDAE (PART 1)

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With 21 Text-figures

Family SCOLECITHRICIDAE

The family Scolecithricidae comprises, at present, nine genera, namely, they are *Scottcalanus* SARS, *Scolecocalanus* FARRAN, *Macandrewella* A. SCOTT, *Lophothrix* GIESBREGHT, *Scaphocalanus* SARS, *Scolecithrix* BRADY, *Scolecithricella* SARS, *Amallothrix* SARS and *Racovitzanus* GIESBRECHT.

In these genera the 1st maxilla has in general the following numbers of setae on the various parts, viz. 9 setae (sometimes 11 or 8) on the outer lobe, 9 setae (sometimes 8, 7, or 5) on the exopod, 7 setae (sometimes 10, 8, or 6) on the endopod, 5 (sometimes 4 or 3) setae on the 2nd basal joint, 4 setae (sometimes 3) on the 1st inner lobe, 2 setae on the 2nd inner lobe, and 12 (sometimes 13, 10, 9 or 8) setae on the 1st inner lobe. The 2nd maxilla is furnished with sensory appendages on the endopod, which are either all vermi-form or some of them bud-like. The 1st leg has 3-jointed exopod and unjointed endopod. The 1st joint of the exopod of the 1st leg has an outer edge spine in the following genera: *Scottcalanus*, *Macandrewella* and *Amallothrix*. But it is wanting in the remaining genera, with the exception of a species of *Scolecithricella*, *S. ovata* (FARRAN). The 2nd to 4th legs are spinulose on the posterior surface of the endopod and exopod. The 5th pair of legs of the female is sometimes wanting, but in most cases present, though it is simple in structure.

SARS (1925) created a genus *Amallothrix* which had been comprised in the genus *Scolecithricella*. Some authors have accepted the genus *Amallothrix*, some have rejected it on account of the difficulties met with in the discrimination of both genera using the characters of the 2nd maxilla and 5th legs given by SARS.

All of the genera except *Macandrewella* and *Scolecocalanus* were found in the

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collection. In addition to the genera mentioned above a new genus *Undinothrix* will be proposed, which is very closely allied to *Lophothrix*.

Genus *Scottcalanus* G. O. SARS

Nine species of the genus *Scottcalanus* have been reported from the Malayan and Indian Seas: *Scottcalanus securifrons* (T. SCOTT), *S. helenae* (LUBBOCK), *S. persecans* (GIESBRECHT), *S. farrani* A. SCOTT, *S. setosus* A. SCOTT, *S. longispinus* A. SCOTT, *S. thomasi* A. SCOTT, *S. investigatoris* SEWELL, and *S. dauglishi* SEWELL. FARRAN recorded *S. longispinus* A. SCOTT, *S. sedatus* FARRAN, *S. australis* FARRAN from the Great Barrier Reef region. From the Arabian Sea SEWELL has recorded *S. dauglishi* SEWELL, *S. helenae* (LUBBOCK), *S. persecans* (GIESBRECHT), and *S. securifrons* (T. SCOTT). In the present collection I have found *S. securifrons*, *S. helenae*, *S. australis* and *S. rotundatus*. The last species appears to have been undescribed.

The typical species of the genus, *S. securifrons*, was first obtained by T. SCOTT in the plankton collected from the Gulf of Guinea. He described both female and male. But his male specimen really belongs to another species, *Undina helenae* LUBBOCK. In 1895 GIESBRECHT described a species closely related to *S. securifrons* under the name *S. persecans* by the male specimen taken from the Pacific Ocean. Since then a good deal of confusion have arisen in the identification of these two species, *S. helenae* and *S. persecans*. FARRAN (1908) described both female and male of a species of *Scottcalanus* believing to be identical with *S. persecans*. A. SCOTT described and figured *S. helenae* and *S. persecans* and several other species of *Scottcalanus* and concluded that the male of *persecans* described by FARRAN was not identical with *persecans* (GIESBRECHT) but identical with *helenae*, and the female of *persecans* required further verification as to its correctness of the identity with GIESBRECHT's species. WITH (1915) proposed a new name, *S. thorii*, to the Atlantic species of *S. persecans* which had been recorded by FARRAN from the Atlantic. SARS (1925) described and figured the female and male of *S. persecans* and concluded that *S. thorii* is a synonym of *S. persecans* GIESBRECHT. SEWELL (1929) is of opinion that *S. thorii* is identical with the form recorded by FARRAN under the name *persecans* from the Irish coast, but is different from *S. persecans* (GIESBRECHT), and SARS is erroneous in regarding *S. persecans* and *S. thorii* as synonymous. According to SEWELL (1947, 1929) *S. thorii* is identical with *S. helenae* (LUBBOCK) described and figured by A. SCOTT. I have found in my collection 22 male speciemens of *S. helenae*. My form agrees quite well with the description and figures of *S. helenae* given by A. SCOTT. He illustrated on the same plate (pl. XXVII) the male of *S. persecans* (GIESBRECHT). The main differences between these two males are in the shape of the rostrum and in the length of the endopod of the left 5th leg. The endopod of the left 5th leg is short and clumsy in *S. helenae*, whereas, it is longer and slender in *persecans*.

This long endopod is clearly illustrated also by ESTERLY (1905, p. 166, fig. 28, c). When comparing these figures of the 5th legs given by A. SCOTT and ESTERLY with those of *thorii* (WITH, 1915, pl. VIII, fig. 14, a, b) we find a similarity in the proportional lengths of the endopod of the left 5th leg. I think *S. thorii* is, so far as the male is concerned, a synonym of *S. persecans* (GIESBRECHT), and is not the synonym of *S. helenae* (LUBBOCK).

Scottcalanus securifrons (T. SCOTT)

(Fig. 106, a–e)

Scottcalanus securifrons, T. SCOTT, 1893, p.47 (female); A. SCOTT, 1909, p.104, pl. 25, figs. 1–9, pl. 28, figs. 1–9; WITH, 1915, p. 220, text-figs. 71–73; SARS, 1925, p. 160, pl. 45, figs. 1–8; FARRAN, 1926, p. 267; 1929, p. 251; TANAKA, 1937, p. 259, text-fig. 9, a–c; SEWELL, 1947, p. 143; BRODSKY, 1950, p. 242, text-fig. 152; *Scottcalanus* sp. BRODSKY, 1950, p. 243, text-fig. 153; *Scottcalanus securifrons*, WILSON, 1950, p. 340.

Female. Length, 4.29 mm: cephalothorax, 3.45 mm; abdomen, 0.75 mm. The head fused with the 1st thoracic segment. The 4th thoracic segment fused with the 5th. The head has a high median crest. The last thoracic segment produced posteriorly into triangular expansions with a sharp point at the apex. The distal lateral margin of the last thoracic segment not so outwardly curved as figured by A. SCOTT or by SARS. The rostrum bifurcate, with a very minute spine at the apex.

The abdomen 4-segmented. The proportional lengths of the segments and furca are as follows: 64:14:5:3:14=100. The genital segment swollen distally in dorsal aspect; the ventral surface of the segment swollen at the middle section; the distal ventral margin of the segment overlaps the following segment; the lateral distal margin of the segment is furnished with rows of spinules on either side, but absent on the distal dorsal and ventral surfaces. The distal margin of the 2nd and 3rd segments are furnished with denticles. The anal segment is very short, almost concealed beneath the preceding. The furcal rami about as long as wide, furnished with ordinary 4 setae and a small seta.

The 1st antenna extends to the distal margin of the furca. The joints are in the following proportional lengths:

Joint	1	2	3	4	5	6	7	8–9	10	11	12	13	14	15	16
	51	44	29	24	29	27	32	63	24	32	41	51	51	51	51
	17	18	19	20	21	22	23	24–25							
	49	51	51	49	49	46	49	46							

=1000 (left side).

The 2nd antenna has the exopod about 1.4 tiems as long as the endopod (61:43). In the mandible the exopod is longer than the endopod (15:12); the cutting blade has 8 teeth. The 1st maxilla has the following numbers of setae on the various

parts: 9 setae on the outer lobe; 8 setae on the exopod; 7 setae on the 2nd basal; 3 setae on the 3rd inner lobe; 2 setae on the 2nd inner lobe; 12 setae on the 1st inner lobe. The 2nd maxilla has on the endopod 2 small bud-like, and 6 long vermi-form filaments: the 5th lobe has a long spine, a ordinary seta, and 2 vermi-from filaments; the 4th, 3rd, and 2nd lobe has each 3 setae; the 1st lobe has 4 setae. The maxilliped has 3 sensory filaments, of which one is short and bud-like, on the 1st basal joint.

The 1st leg has 3-jointed exopod and 1-jointed endopod. The outer edge

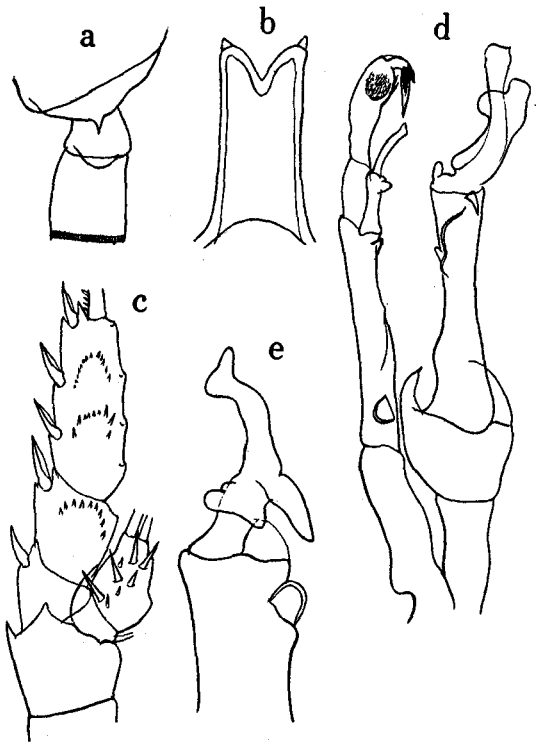

Fig. 106. *Scottcalanus securifrons* (T. SCOTT).
Male: a, last thoracic segment, lateral aspect; b, rostrum; c, 2nd leg, posterior aspect; d, 5th pair of legs; e, distal segments of right 5th leg.

spine of the joints of the exopod is fairly long. The distal outer margin of the 1st basal joint ends in a broadly rounded process. The 2nd leg has 3-jointed exopod and 2-jointed endopod. The 1st basal joint has a small spine on the outer margin about the middle of the joint. The 2nd basal joint has a sharp spine on the inner distal corner. The 2nd and 3rd joints of the exopod are furnished with coronas of spinules on the posterior surface. The 2nd joint of the endopod has several scattered long spinules on the posterior surface; the anterior surface of the 2nd joint of the endopod has 2 spinules along the mid-line of the joint.

The 3rd leg has 3-jointed exopod and endopod. The 2nd and 3rd joints of the endopod are furnished with spinules on the posterior as well as on the anterior surfaces The terminal spine of the exopod has 27 serrations. The 4th leg has no marginal spine on the 1st basal joint. The 2nd and 3rd joints of the endopod have each small spines on the anterior surface.

The 5th pair of legs asymmetrical. The subapical spine of the left leg is thicker than that of the right. The subapical spine has 2 rows of denticles which diminish in size distally. The apical spine is about 1/3 the length of the 2nd joint.

Male. Length, 4.81 mm : cephalothorax, 3.56 mm ; abdomen, 1.25 mm. General appearance as in the female. The last thoracic segment terminates one each side into a small spine at the apex (fig. a). The abomen 5-segmented; the segments and furca are in the proportional lengths : 15 : 29 : 21 : 19 : 6 : 10=100. The 2nd to 4th segments are striated with fine teeth on the distal margin.

The 1st antenna extends to the distal end of the 3rd abdominal segment. The joints 8-9, joints 20-21 are fused on the left side. The mouth parts and swimming legs as those of the female.

The 5th pair of legs (fig. d, e) as figured by A. SCOTT, but the small teeth on the inner margin of the proximal joint of the endopod of the left leg were not observed in the present specimen.

Remarks. The female of *S. securifrons* is easily recognised by the shape of the last thoracic segment and the genital segment which partially overlaps the 2nd abdominal segment, and by the asymmetrical 5th pair of legs. SARS recorded the occurrence of *S. securifrons* from the Atlantic. His description is right, but his figure of the female 5th pair of legs appears to be different from those figured by A. SCOTT. SARS' specimen has 3-jointed 5th legs ; the distal joint has a very small spine at the base of the apical spine the subapical spine is symmetrical and bifid at the apex as is found in those of *S. australis* FARRAN. BRODSKY's figure of *S. securifrons* is not his original one, but reproduced from SARS' (1925).

Occurrence. The species is very common in the deep waters of the Izu region.

Distribution. The species has a fairly wide distribution, and has been recorded from the Atlantic, Pacific, and Indian Oceans. Also recorded from the Malay Archipelago, Arabian Sea, Far-eastern and Polar Seas of the U.S.S.R., and Izu region, the Pacific Coast of Middle Japan.

Scottcalanus helenae (LUBBOCK)

(Fig. 107, a-j)

Scottcalanus securifrons, T. SCOTT, 1894, p. 47, pl. 4 (male) ; *Undina helenae*, GIESBRECHT und SCHMELL, 1898, p. 52 (male) ; *Scottcalanus helenae*, A. SCOTT, 1909, p. 111, pl. 27, figs. 1-9 (male) ; *Scottcalanus helenae*, SEWELL, 1929, p. 188 ; 1947, p. 143 ; WILSON, 1950, p. 338, pl. 36, figs. 543-546.

Female. Length, 4.40 mm: cephalothorax, 3.50 mm; abdomen, 0.90 mm. The head fused with the 1st thoracic segment. The 4th thoracic segment incompletely separates from the 5th. The median crest of the head high (fig. a). The lateral corner of the last thoracic segment produced triangularly with a point at the

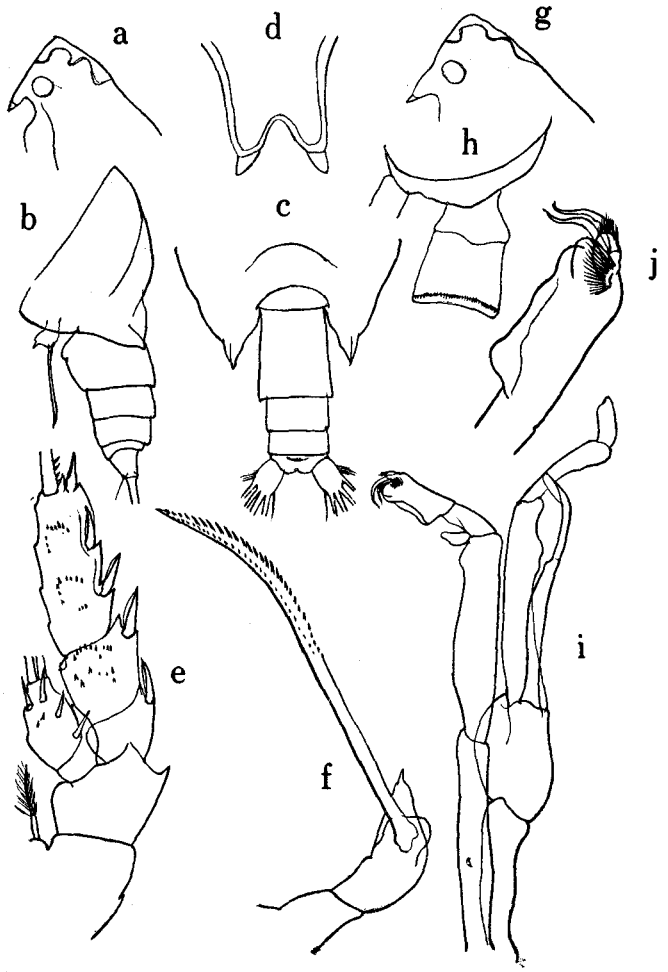

Fig. 107. *Scottcalanus helenae* (LUBBOCK).
Female: a, head, lateral aspect; b, last thoracic segment and abdomen, lateral aspect; c, last thoracic segment and abdomen, dorsal aspect; d, rostrum; e, 2nd leg; f, 5th leg. Male: g, head, lateral aspect; h, last thoracic segment, lateral aspect; i, 5th pair of legs; j, distal joint of left 5th leg.

apex (fig. b). The length of the rostral spines is shorter than half the depth of the excavation (fig. d).

The abdomen 4-segmented; the segments and furca are in the proportional

lengths, 46:20:11:6:17=100. The genital gegment clyndrical in dorsal view, about 2 times as long as wide (fig. c); the ventral surface produced below with a process on the proximal part near the genital orifice when viewed from the lateral. The furcal rami about as long as wide (15:14).

The 1st antenna 24-jointed, extends to the distal margin of the anal segment; the joints 8-9 are partially fused with the joint 10; the joints 24 and 25 are well separated. The 2nd antenna has the exopod 1.4 times as long as the endopod (37:26). The mandible, maxillae, and maxilliped as those of *S. securifrons* (T. SCOTT).

The swimming legs as those of *S. securifrons*. The terminal spine of the exopod of the 2nd to 4th legs have each 25, 26 and 27 teeth respectively.

The 5th pair of legs 2-jointed, reaches back to the distal margin of the 2nd abdominal segment. The 2nd joint swollen at the middle section. The subapical spine is about 3 times the length of the 2nd joint, and is furnished with two rather coarse spines. The basal part of the spine is swollen. The apical spine is short and fine, slightly curved outwardly (fig. f).

Male. Length, 4.5 mm: cephalothorax, 3.2 mm; abdomen, 1.25 mm. The male resembles the female in appearance, but the last thoracic segment rather broadly rounded; the ventral margin of the segment much inflated when viewed from the side (fig. g, h).

The abdomen 5-segmented; the segments and furca are in the proportional lengths, 18:24:23:21:7:7=100. The distal margin of the 2nd to 4th segments are fringed with fine teeth.

The 1st antenna extends to the middle of the 4th abdominal segment. The mouth parts and the 1st to 4th swimming legs as those of the female. The serration on the terminal spine of the exopod of the 2nd to 4th legs are more in number than those of the corresponding legs of the female.

In the 5th pair of legs (fig. i) the endopod of the right leg is long and curved towards the exopod, reaching about to the middle of the 2nd joint of the exopod. The endopod of the left leg is short, about half the length of the 1st joint of the exopod of the same leg. The 2nd joint of the exopod of the left leg dilated much on the inner margin. The 3rd joint of the exopod is represented by two curved stout spines, a pad of stiff hairs, and a leaf-like lamellous process with serrations on the distal end (fig. i).

Remarks. The present female specimen resembles very closely *S. longispinus* A. SCOTT, but there are some minute points of difference in the form of the genital segment and in the length of the subapical spine of the 5th leg. *S. longispinus* described by FARRAN has the genital segment similar in form to the present specimen. The male specimen agrees well with the description and figures of *S. helenae* given by A. SCOTT. According to FARRAN (1936) the male of *S. longispinus* has the 5th thoracic segment with a small spine at its distal end, and the

rostral spine which differs from that of the female. WILSON's specimen of *S. helenae* appears to be identical with the present species. But his male specimen differs from the present male in having angularly pointed corner on the last thoracic segment.

Occurrence. 30 females accompanied with 22 males from the deep waters of the Izu region.

Distribution. The species is widely distributed in the Atlantic, Pacific and Indian Oceans. Also recorded from the Malayan region and from the Arabian Sea.

Scottcalanus australis FARRAN

(Fig. 108, a–f)

Scottcalanus australis, FARRAN, 1936, p. 101, text-fig. 13, a–e.

Female. Length, 3.90 mm : cephalothorax, 3.13 mm ; abdomen, 0.77 mm ; so the abdomen is contained 4.2 times in the length of the cephalothorax. The head is fused with the 1st thoracic segment, and so are the 4th with the 5th (fig. a).

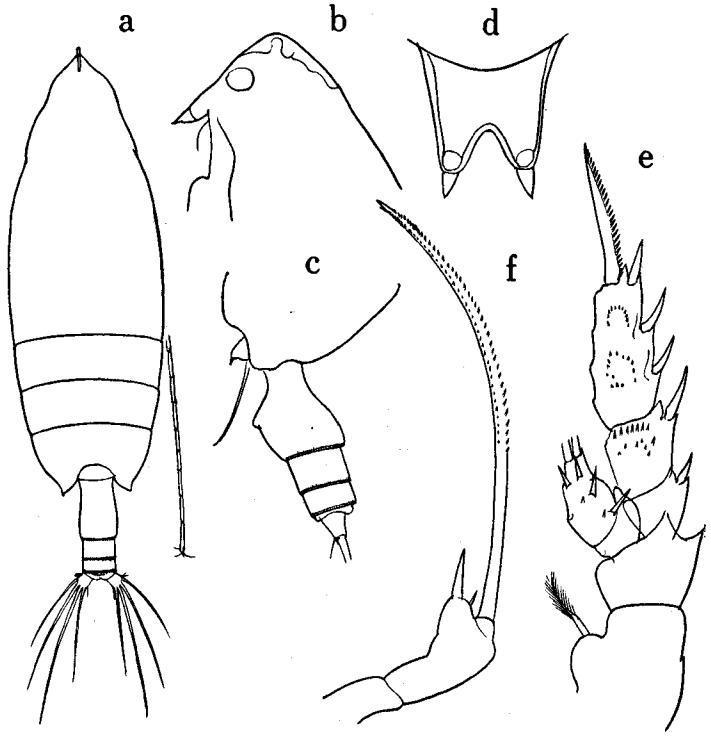

Fig. 108. *Scottcalanus autralis* FARRAN.
Female : a, dorsal aspect ; b, head, lateral aspect ; c, last thoracic segment and abdomen, lateral aspect ; d, rostrum ; e, 2nd leg ; f, 5th leg.

The head has a high median crest (fig. b). The lateral corner of the last thoracic segment narrowly rounded. (fig. c). The rostral spine is half the depth of the excavation. The spine is slightly notched on the posterior margin when viewed from the lateral (fig. d).

The abdomen 4-segmented; the segments and furca are in the proportional lengths, 48 : 17 : 13 : 10 : 12=100. The genital segment, when viewed from the side, produced ventrally into a small triangle at the genital orifice. The first three segments are fringed with fine teeth on the distal margin (fig. c).

The 1st antenna 24-jointed, extends to the distal margin of the anal segment.

The mouth parts and 1st to 4th legs are as those of the other members of the genus. The 2nd leg has 26 serrations on the teaminal spine of the exopod (fig. e).

The 5th pair of legs 2-jointed. The terminal joint has an apical spine which is about half as long as the distal joint, and a small spine at the base of the spical spine. The subapical spine is 4 times as long as the distal joint. The spine is bifid at the apex (fig. f).

Remarks. The specimen agrees quite well with the description and figures given by FARRAN. The 5th pair of legs of *S. securifrons* figured by SARS (pl. 45, fig. 5) resembles that of the present species in having a small spine at the base of the apical spine, and in the subapical spine which is furnished with denticles extending more than half the length of the spine.

Occurrence. 3 females from the depth 0–1000 m. in the Izu region, December 1938.

Distribution. The species has been recorded from the deep waters of the Great Barrier Reef of Australia. The occurrence of the species will indicate that the deep water of the Indo-Pacific has, in some extent, an intercommunication with the waters of the North Pacific.

Scottcalanus rotundatus sp. nov.

(Fig. 109, a-k)

Female. Length, 4.07 mm : cephalothorax, 3.8 mm ; abdomen, 0.69 mm ; so the abdomen is contained about 5 times in the length of the cephalothorax. The head is incompletely separates from the thoracic segment; so are the 4th from the 5th (fig. d). The head has no median crest; the frontal margin obtusely rounded when viewed from the lateral (fig. b). The lateral distal corner of the last thoracic segment trinagularly produced, and pointed at the apex (fig. c). The rostral spine is about as long as the depth of the excavation (fig. d).

The abdomen is composed of 4 segment; the segments and furca are in the proportional lengths : 46 : 20 : 14 : 5 : 51=100. The genital segment swollen below,

and slightly produced on the genital opening in lateral aspect; the lateral margins of the segment are slightly constricted at the distal 1/3 of the segment when viewed from the dorsal. The furcal rami about as long as wide. The first three

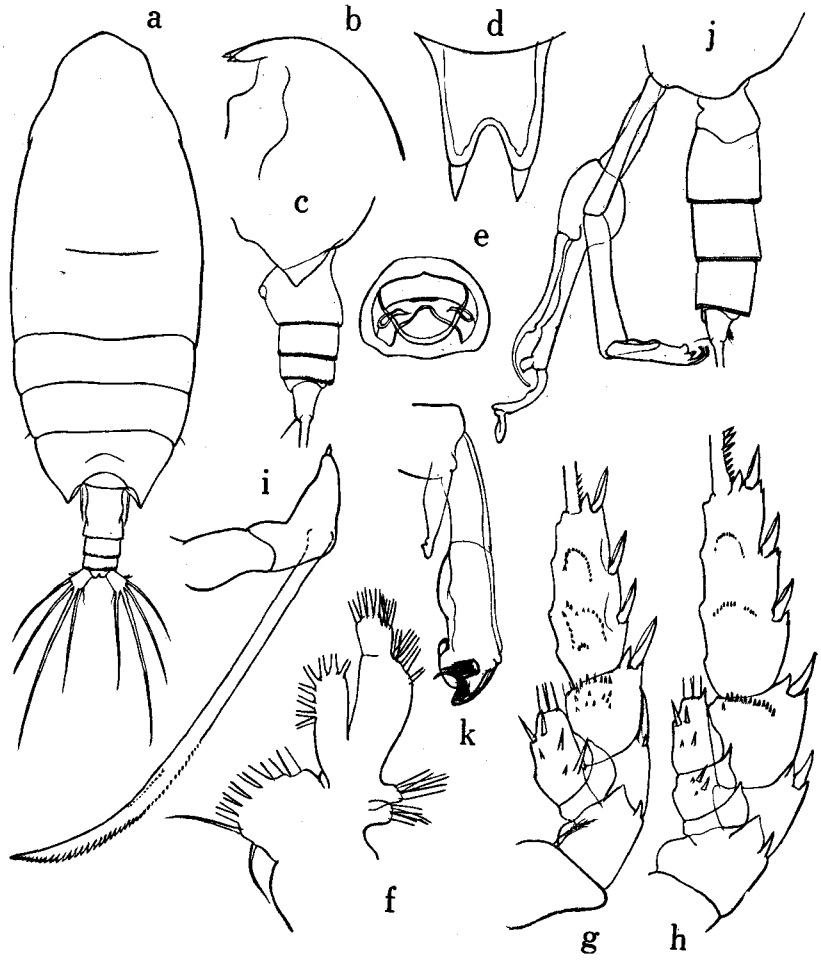

Fig. 109. *Scottcalanus rotundatus* sp. nov.
Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, lateral aspect; d, rostrum; e, genital opening; f, 1st maxilla; g, 2nd leg; h, 3rd leg; i, 5th leg. Male: j, last throacic segment and abdomen, lateral aspect; k, distal joints of left 5th leg.

segments are striated on the distal margin as are observed in other members of the genus.

The 1st antenna 23-jointed, extends to the end of the furca. The joints are in the following proportional lengths:

Joint	1	2	3	4	5	6	7	8–9	10	11	12	13	14
	39	45	22	22	27	29	47	27	27	31	38	52	52
	15	16	17	18	19	20	21	22	23	24–25			
	52	52	52	54	54	52	52	49	54	61	=1000.		

The 2nd antenna has the exopod 1.3 times as long as the endopod. The other mouth parts as those of *S. helenae* (LUBBOCK) (fig. f).

The 1st leg has 3-jointed exopod; the outer edge spine of the 2nd joint of the exopod is equal in length to the 3rd joint itself. The 2nd leg has 3-jointed exopod and 2-jointed endopod; the terminal spine of the exopod has 23 serrations the spinulation of the posterior surface of the exopod and endopod as shown in the figure (fig. g). The 3rd (fig. h) and 4th legs have each 3-jointed exopod and endopod. The 4th leg is devoid of spinules on the posterior surface of the exopod and endopod.

The 5th pair of legs 2-jointed. The distal joint bents inwardly at the proximal 1/3 of the joint. The subapical spine is about 4 times as long as the distal joint; the spine is coarsely serrated on the outer distal margin. The apical spine is very small (fig. i).

Male. Length, 4.8 mm: cephalothorax, 3.25; abdomen, 1.13 mm. The male has a general resemblance to the female. The lateral corner of the last thoracic segment narrowly rounded at the apical portion; the ventral margin of the segment much inflated.

The abdominal segments and furca are in the proportional lengths, 19:25:21:19:8:8=100. The 2nd to 4th segments are finely striated on the distal margin. The furcal rami about as long as wide.

The 1st antenna 20-jointed; the joints 8–13 are fused; the joints 24 and 25 are well separated. The joints are in the following proportional lengths:

Joint	1	2	3	4	5	6	7	8–9–10–11–12–13	14	15
	58	44	22	26	26	26	26	178	37	53
	16	17	18	19	20	21	22	23	24	25
	58	58	60	60	44	44	53	62	47	17=1000. (left side)

The joints 9 and 10, joints 12 and 13 are separated anteriorly. In the right antenna the joints 20 and 21 are fused.

The 2nd antenna has the exopod 1.5 times long as the endopod. The mandible has a robust 2nd basal joint and a narrow biting part. The maxillae and maxilliped as those of the female.

The 1st to 4th swimming legs as those of the female.

The 5th pair of legs resembles that of *S. helenae* (LUBBOCK). The endopod of the right leg is long, reaching the middle of the 2nd joint of the exopod of the same leg. The 1st joint of the exopod of the right leg has a small process

on the distal inner margin. The distal joint of the exopod of the left leg has a pad of stiff hairs and two strong curved spines (fig. j, k).

Remarks. SEWELL has described a species of *Scottcalanus* which has no median crest under the name *S. investigatoris*. The present male specimen differs from *S. investigatoris* in its small size and in having a small process on the 1st joint of the right 5th leg. The female specimen devoid of median crest has never been described before.

Occurrence. 13 females accompanied with 6 males from the depth 1000–0 m. in the Izu region, December 1937.

Genus *Lophothrix* GIESBRECHT

Tow species, *Lophothrix frontalis* GIESBRECHT and *L. quadrispinosa* WOLFENDEN have been reported from the Malay Archipelago and Indian Seas. FARRAN recorded the occurrence of *L. latipes* (T. SCOTT) from the Great Barrier Reef region. SEWELL (1947) has recorded from the Arabian Sea *L. frontalis*, *L. humilifrons*, and *L. quadrispinosa*. From the Pacific WILSON has recorded *L. frontalis*, *L. humilifrons*, *L. latipes*, and *L. sarsi* WILSON. BRODSKY (1950) has recorded the occurrence of *L. frontalis* and *L. laticeps* from the Far-eastern and Polar Seas of the U.S.S.R. Up to the present time two species, *L. frontalis* and *L. humilifrons* have been recorded from the Izu region.

Lophothrix frontalis GIESBRECHT

(Fig. 110, a–j)

Lophothrix frontalis, GIESBRECHT, p. 1895, p. 254, pl. 2, figs. 1–5 and 9–12; A. SCOTT, 1909, p. 99, pl. 26, figs. 11–20, and pl. 29, figs. 1–10; WITH, 1915, p.211, figs. 66, 67 and pl. 7, fig. 7; SARS, 1925, p. 162, pl. 45, figs. 9–12, and pl. 46, figs. 1–7; SEWELL, 1929, p. 193, text-figs. 70–73; JESPERSEN, 1934, p. 87; SEWELL, 1947, p. 148, text-figs. 37, A–D, and 38, A–F; BRODSKY, 1950, p. 244, fig. 154; WILSON, 1950, p. 250.

Female. Length, 6.90 mm: cephalothorax, 5.56 mm; abdomen, 1.34 mm. The proportional lengths of the cephalothorax and abdomen are as 81 to 19. The head fused with the 1st thoracic segment, so are the 4th with the 5th. The head has a median crest (fig. a). The last thoracic segment narrowly rounded laterally (fig. b). The rostrum strongly bifurcate, with small point at the apex (fig. c).

The abdominal segments and furca are in the proportional lengths: 37:20:17:9:17=100. The genital segment about as long as wide, slightly contracts proximally. The lateral margin of the segment carries a small tuft of hairs on the either side near the base when viewed from the lateral (fig. b). The first to 3rd segments are fringed with fine teeth on the distal border. The furcal rami about as long as wide.

The 1st antenna extends to the end of the abdomen. The joints 24 and 25 are well separated; the joint 24 is 1.87 times as long as the 25th. The mouth parts and swimming legs as described and figured by the previous authors (fig. d). But the spinulation on the posterior surface of the 2nd and 3rd legs seems to be variable, and differs even in the right and left legs of the same individual.

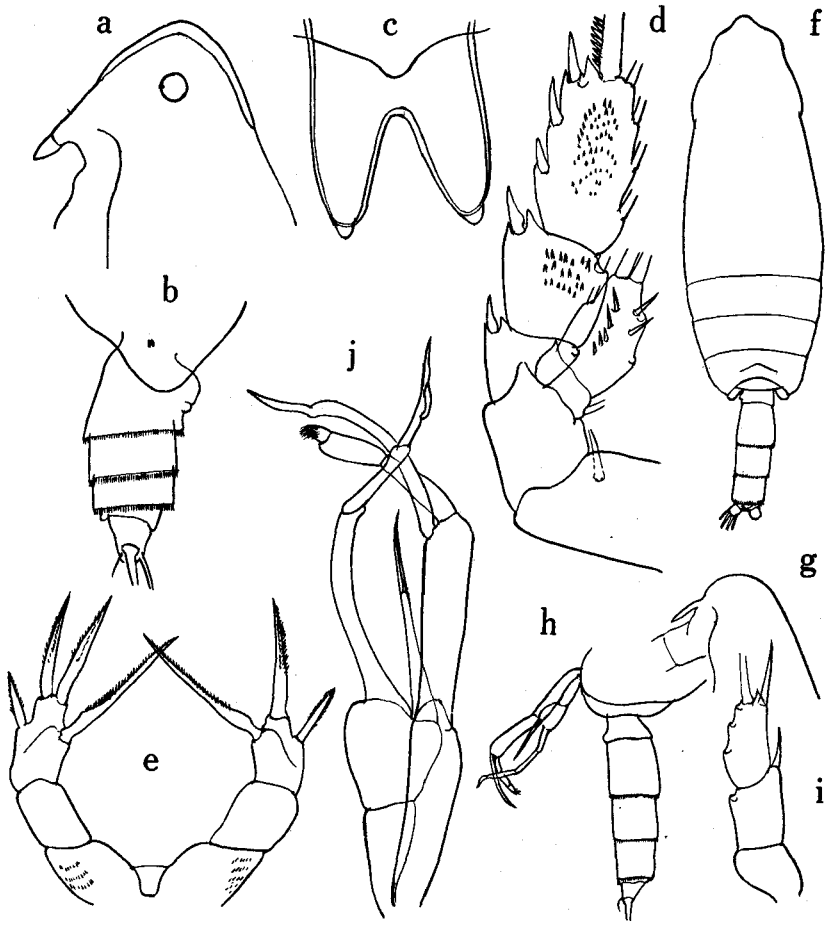

Fig. 110. *Lophothrix frontalis* GIESBRECHT.
Female: a, head, lateral aspect; b, last thoracic segment and abdomen, lateral aspect; c, rostrum; d, 2nd leg; e, 5th pair of legs. Male: f, dorsal aspect; g, head, lateral aspect: h, last thoracic segment and abdomen, lateral aspect; i, exopod of 1st leg; j, 5th pair of legs.

The 5th pair of legs 3-jointed, carries 3 spines on the distal joint. The 1st joint is furnished with rows of spinules on the posterior surface. An individual had and abnormal right 5th leg carrying 4 spines on the distal joint (fig. e).

Male. Length, 5.39mm: cephalothorax, 3.95mm; abdomen, 1.44mm. The head

has no median crest, but highly arched in front (fig. f, g). The rostrum consists of two fairly long spines. The abdominal segments and furca are in the proportional lengths: 13:30:22:22:4:9=100.

The 1st antenna extends to the end of the 2nd abdominal segment. The joints 8 to 12 are fused; the joints 12 and 13 fused posteriorly. The 2nd antenna has the exopod slightly shorter than the endopod (27:29) The mandible has a robust 2nd basal joint. In the 1st maxilla the outer lobe is large and carries 9 setae; the exopod has 9 setae. The 2nd maxilla somewhat reduced. The 1st leg as in the female (fig. i).

The left 5th leg has a fairly long endopod, reaching the distal end of the 2nd basal joint of the right leg (fig. h, j).

Remarks. SEWELL (1929) has called attention to the presence of two size groups in the female of this species. His specimens of the large form measured 6.250 and 6.718 mm. The small from 5.033–5.330 mm, and 4.750–5.633 mm. According to SEWELL (1947) the difference between these two forms, apart from size, the is the presence in forma *minor* of a row of spines on the ventro-posterior surface of the 1st joint of the 1st antenna near the distal margin. My specimens from the Izu region measured 5.80–6.90 mm. These specimens have no row of spines on the 1st joint of the 1st antenna, and belong to form a *major* SEWELL.

Occurrence. The species is fairly common in the deep waters of the Izu region.

Distribution. The specimes has a wide distribution in the Atlantic, Indian, and Pacific Oceans.

Lophothrix humilifrons SARS

(Fig. 111, a–f)

Lophothrix humilifrons, SARS, 1925, p.166, pl. 46, figs. 15–22; JESPERSEN, 1934, p. 87; SEWELL, 1947, p. 152, text-fig. 39, A; WILSON, 1950, p. 250, pl. 25, figs. 370–373.

Female. Length, 6.45 mm: cephalothorax, 5.20 mm; abdomen, 1.25 mm. The proportional lengths of the cephalothorax and abdomen are as 81 to 19. The cephalothorax elongate ovate. The head fused with the 1st thoracic segment, and the last two thoracic segments are fused (fig. a). The head has no median crest; the frontal margin obtusely rounded in lateral aspect (fig. b). The lateral distal corner of the last thoracic segment narrowly rounded (fig. c). The rostrum strong and bifurcate.

The abdomen 4-segmented; the segments and furca are in the proportional lengths, 39:18:14:18:11=100. The genital segment about as long as wide. The furcal rami longer than wide (20:18). The first 3 segments are fringed with fine teeth on the distal margin.

The 1st antenna 24-jointed, exceeds the distal end of the furca by terminal 1 joint; the joints are in the following proportional lengths:

Joint	1	2	3	4	5	6	7	8–9	10	11	12	13	14
	55	58	27	27	30	27	27	60	33	36	42	49	49
	15	16	17	18	19	20	21	22	23	24	25		
	49	49	52	52	52	44	42	38	36	44	22=1000.		

The 2nd antenna has the exopod about as long as the endopod; the distal joint of the exopod is short. The other mouth organs and the swimming leg as those of *L. frontalis* GIESBRECHT (fig. d, e).

The 5th pair of legs 3-jointed, resembles that of *L. frontalis*. The 1st and 2nd joints are furnished coarsely with small spines on the anterior surface (fig. f).

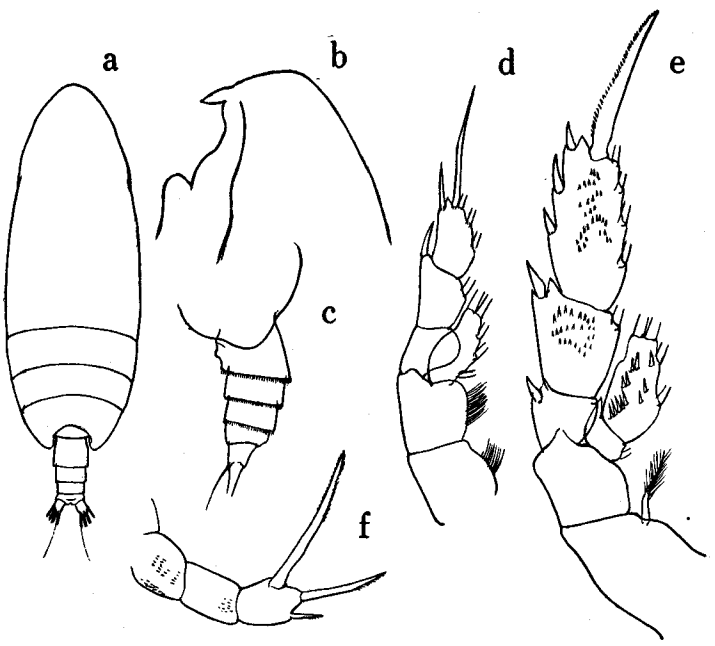

Fig. 111. *Lophothrix humilifrons* G. O. SARS.
Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, lateral aspect; d, 1st leg; e, 2nd leg; f, 5th leg.

Occurrence. One female from the depth 1800–1000 m in Suruga Bay, April 1940.

Distribution. The species has been recorded from the temperate Atlantic near Azores by SARS, west Greenland waters by JESPERSEN, Arabian Sea by SEWELL, and from the Pacific near Philippine Islands by WILSON.

Genus *Undinothrix* gen. nov.

Description. Female. Cephalothorax oblong ovate. Head fused with the 1st thoracic segment. 4th and 5th thoracic segment incompletely separate. Lateral corner of the last thoracic segment produced into a triangular expansion. Rostrum

bifurcate, pointed at the apex, to which a filament-like spines are attached.

Abdomen 4-segmented. Furcal rami furnished with ordinary 4 setae and a short appendicular seta.

1st antenna 23-jointed; the joints 8-9, and 24-25 are fused. 2nd antenna with the exopod about as long as the endopod. Mandible has a slender endopod; biting part as usual. 1st maxilla has 5 setae on the exopod. 2nd maxilla as in *Lophothrix* GIESBRECHT, with sensory appendages on the distal lobes. In maxilliped the 1st basal joint has a slender bud-like sensory appendage about the middle of the anterior margin; the proximal outer margin of the 2nd basal joint is rather coarsely serrated; the distal 2 joints of the endopod have each a well developed outer marginal seta.

1st leg has 3-jointed exopod and unjoined endopod; the joint of the exopod has no outer edge spine. 2nd leg has 3-jointed exopod and 2-jointed endopod. 3rd and 4th legs have each 3-jointed exopod and endopod. Posterior surface of the exopod and endopod of the 2nd to 4th legs are furnished with spinules.

5th pair of legs symmetrical, composed of 3 joints; the terminal joint is furnished with 3 spines, of which the apical two are very strong and coarsely denticulated.

Male unknown.

Undinothrix spinosa sp. nov.

(Fig. 112, a-o)

Female. Length, 2.14 mm: cephalothorax, 1.16 mm; abdomen, 0.98 mm. The cephalothroax oblong ovate. The head fused with the 1st thoracic segment. The last two thoracic segments are incompletely separated (fig. a). The frontal margin of the head broadly rounded in lateral aspect (fig. b). The last thoracic segment asymmetrical; the distal margin of the segment is more produced on the left side (fig. d, e). The lateral distal margins of the segment are outwardly curved when viewed from the dorsal. The abdomen 4-segmented. The segments and furca are in the proportional lengths, 43 : 18 : 18 : 7 : 17 = 100. The genital segment swollen laterally about the middle. The ventral surface of the segment slightly concave at the genital area; the dorsal surface convex. The furcal rami longer than wide. The appendicular seta small.

The 1st antenna 23-jointed, extends to the distal end of the 2nd abdominal segment. The joints are broad in proportion to their lengths. The proportional lengths of the joints are as follows:

Joint	1	2	3	4	5	6	7	8-9	10	11	12	13	14
	51	51	22	23	28	28	31	60	32	32	37	41	42
	15	16	17	18	19	20	21	22	23	24-25			
	46	50	51	51	51	51	51	46	51	74	= 1000.		

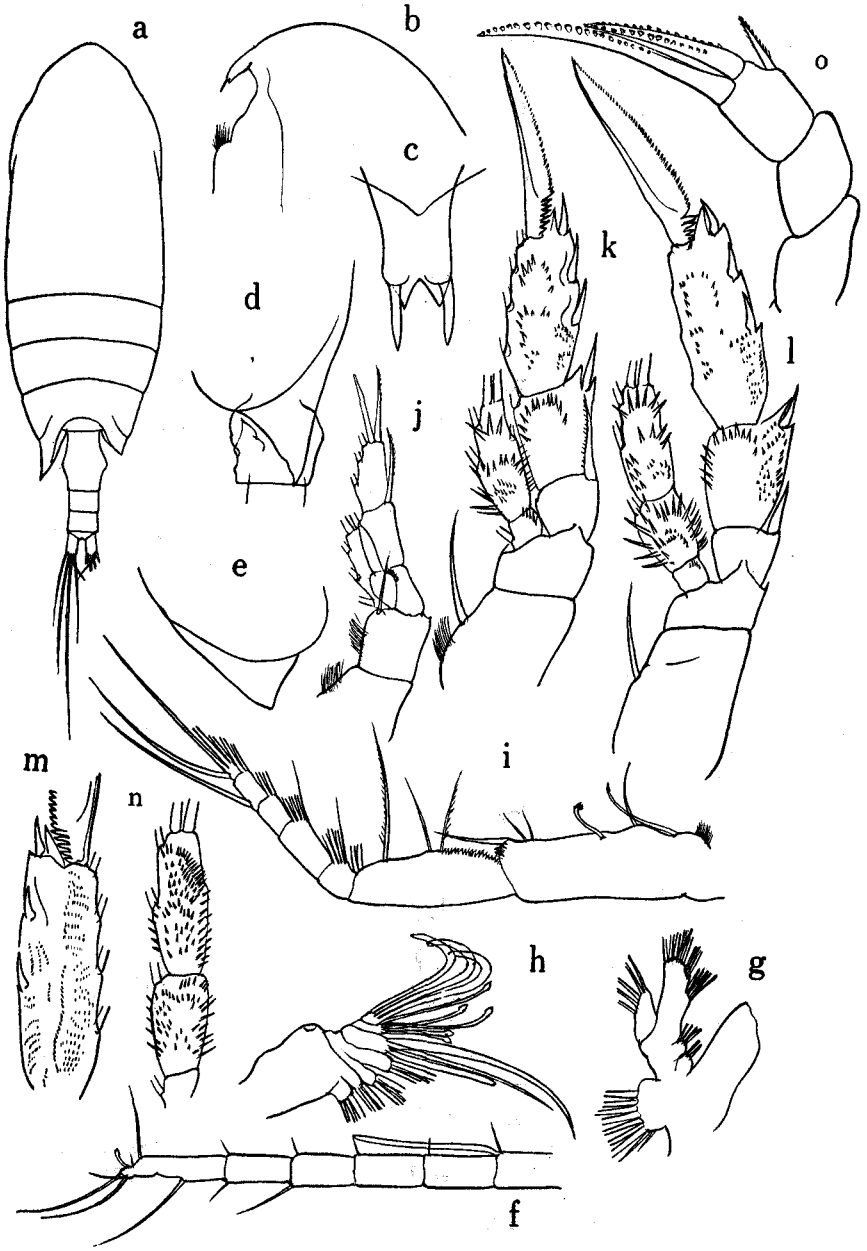

Fig. 112. *Undinothrix spinosa* sp. nov.
Female: a, dorsal aspect; b, head, lateral aspect; c, rostrum; d, last thoracic segment left sides, lateral aspect; e, last thoracic segment, right side, lateral aspect f, distal joints of 1st antenna; g, 1st maxilla; h, 2nd maxilla; i, maxilliped; j, 1st leg; k, 2nd leg; l, 3rd leg; m, 3rd joint of 4th leg; n, endopod of 4th leg; o, 5th leg.

The 2nd antenna has the exopod about as long as the endopod. The mandible has a slender endopod. The 1st maxilla has 9 setae on the outer lobe, 5 setae on the exopod, 9 setae on the endopod, 5 setae on the 2nd basal joint (fig. g). The 2nd maxilla has 3 worm-like, and 5 small bub-like sensory filaments on the endopod (fig. h). The maxilliped is characteristic; the 2nd basal joint is coarsely dentate on the proximal anterior margin; the outer marginal setae on the 4th and 5th joints of the endopod are well developed (fig. i).

The 1st leg has 3-jointed exopod and 1-jointed endopod. The 1st joint of the exopod has no outer marginal spine; the outer marginal spines on the 2nd and 3rd joints of the exopod are slender and long (fig. j). The 2nd leg has 3-jointed exopod and 2-jointed endopod. The outer edge spine of the 1st joint of the exopod is long, and is furnished with fine spinules on the inner margin. The 2nd and 3rd joints of the exopod and the 1st and 2nd joints of the endopod are furnished with rows of spinules on the posterior surface. The terminal spine of the exopod has a characteristic arrangement of teeth as shown in the figure (fig. k). The 3rd and 4th legs have each a 3-jointed exopod and endopod. The posterior surface of the exopod and endopod of the 4th leg is more finely furnished with spinules (fig. l).

The 5th pair of legs symmetrical, 3-jointed. The joints are of about equal length. The terminal joint has 3 spines, of which the apical two are very strong and are furnished with denticles on the outer distal margin; the outer marginal spine is short and is furnished with small denticles on either side of the spine (fig. o).

Remarks. The present specimen has a general resemblance to the members of the genus *Lophothrix* GIESBRECHT in the structure of the appendages but can be distingushed from them by the characteristic features of the rostrum, and by the strong terminal spines of the 5th pair of legs. It is also a character that the distal two joints of the 1st antenna are completely fused.

Occurrence. 7 females from the depth 1000–0 m in Sagami Bay, November 1937.

Genus *Scolecocalanus* FARRAN

The genus was created by FARRAN (1936) to accomodate the species closely allied to *Scottcalanus*. It is distinguished from the latter by the shape of the rostrum, the spinulation on the 2nd and 3rd joints of the exopod of the 4th leg, and the 1-jointed left 5th leg. FARRAN indicates that the genus has some affinities to the genus *Macandrewella* A. SCOTT in having a lenticular thickening at the base of the rostrum. FARRAN has described two species, *Scolecocalanus galeatus* and *S. lobatus* from the Great Barrier Reef Sea. Up to the present time I have failed to detect any of the species in my collection.

Genus *Macandrewella* A. SCOTT

A. SCOTT created the genus *Macandrewella* in 1909 and included *M. jonae* and *M. chelipes* (GIESBRECHT) obtained from the Malay Archipelago. SEWELL has described *M. chelipes* and *M. scotti* SEWELL from the Indian Seas. FARRAN added three more species of the genus, *M. asymmetrica, M. sewelli*, and *M. mera* taken from the Great Barrier Reef Sea. WILSON has (1950) recorded *M. agassizi* WILSON, *M. chelipes*, and *M. sewelli* FARRAN from the Pacific Ocean. I have been unable to find any of the species from the Izu region.

Genus *Scaphocalanus* SARS

A. SCOTT has recorded the occurrence of *Scaphocalanus magnus* (T. SCOTT), *S. major* (T. SCOTT) and *S. elongatus* A. SCOTT from the Malay Archipelago. From the Indian Seas SEWELL (1929) has detected four species *S. affinis* SARS, *S. elongatus, S. magnus*, and *S. medius* SARS, of which he referred the last one to *S. major* (T. SCOTT). FARRAN has recorded *S. echinatus* FARRAN from the Great Barrier Reef, and SEWELL (1947) recorded *S. magnus* (T. SCOTT) from the Arabian Sea. From the Far-eastern and Polar Seas of the U.S.S.R. BRODSKY has recorded *S. magnus, S. affinis, S. medius, S. polaris* BRODSKY, *S. brevicornis*, SARS, *S. subbrevicornis* WOLFENDEN, *S. insignis* BRODSKY, *S. subelongatus* BRODSKY, *S. minutus* TANAKA, *S. gracilicaudatus* TANAKA, *S. obscurus* (ESTERLY), and *S. similis* ?(T. SCOTT). WILSON (1950) has recorded the occurrence of *S. affinis, S. angulifrons* SARS, *S. brevicornis, S. echinatus, S. insolitus* WILSON, *S. magnus, S. medius, S. robustus* (T. SCOTT), *S. subbrevicornis* from the Pacific Ocean.

Up to the present time I have found the following 12 species: *S. magnus, S. affinis, S. elongatus, S. major, S. impar* (WOLFENDEN), *S. brevicornis, S. longifurca* (GIESBRECHT), *S. subbrevicornis, S. echinatus, S. curtus* FARRAN, *S. minutus* TANAKA, and *S. gracilicaudatus* TANAKA. Among these *S. minutus* appears to be the male of *S. brevicornis* SARS, and *S. gracililicaudatus* to be the male of *S. subbrevicornis* WOLFENDEN. *S. impar* WOLFENDEN has been recorded only from the Antarctic, now it extended the geagraphical distribution to the North Pacific.

The species of the genus *Scaphocalanus* resemble each other so closely in general appearance and in the structure of the 5th pair of legs that it is very difficult to discriminate them. Moreover, the 5th legs of the female exhibit a considerable degree of variability in the porportional lengths and the number of spines on the distal joint. The 5th pair of legs is often furnished with abnormal endopod as illustrated by VERVOORT (1957) in *S. brevicornis* SARS. I have detected the similar examples in my specimen of *S. affinis* SARS and *S. echinatus* FARRAN.

Scaphocalanus magnus (T. SCOTT)

(Fig. 113, a–i)

Amallophora magna, T. SCOTT, 1894, p. 55, pl. 4, figs. 5–9; *Scaphocalanus magnus*, A. SCOTT, 1909, p. 97; WITH, 1915, p. 189, pl. 7, figs. 8, a–d, pl. 8, figs. 6, a–g, text-fig. 58, a–k; FARRAN, 1926, p. 257; SEWELL, 1929, p. 207; JESPERSEN, 1934, p. 87; SEWELL, 1947, p. 144, text-fig. 35, a–i; WILSON, 1950, p. 328; BRODSKY, 1950, p. 247, fig. 156; VERVOORT, 1957, p. 111.

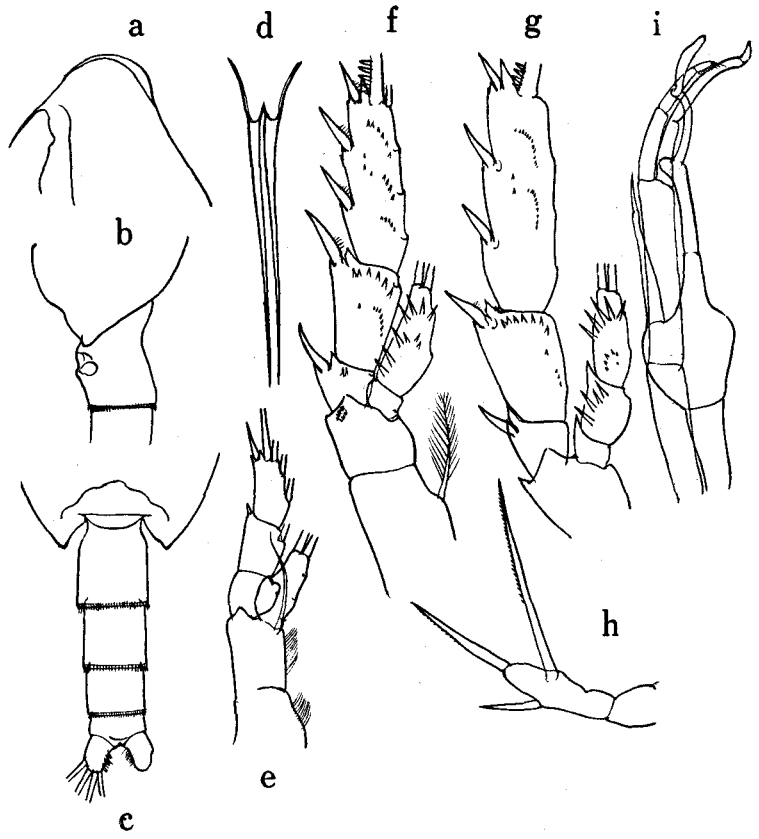

Fig. 113. *Scaphocalanus magnus* (T. SCOTT).
Female: a, head, lateral aspect; b, last thoracic segment, lateral aspect; c, last thoracic segment and abdomen, dorsal aspect; d, rostrum; e, 1st leg; f, 2nd leg; g, 3rd leg; h, 5th leg. Male: i, 5th pair of legs.

Female. Length, 4.39–4.85 mm. The anterior and posterior regions of the body have the proportional lengths as 77 to 23. The head has a median crest and is produced anteriorly, but not so highly arched (fig. a). The last thoracic segment produced triangularly and narrowly rounded at the apex (fig. b) According to WITH the lateral distal corner of the last thoracic segment are variable in shape. The rostral filaments long and slender (fig. d).

The abdomen 4-segmented. The segments and furca are in the following proportional lengths: 36:24:20:6:15=100. The genital segments not produced below on the ventral surface. The 1st to 3rd segments are fringed with fine teeth on the distal margin. The furcal rami 1.7 times as long as wide.

The 1st antenna extends to the distal margin of the genital segment; the 1st joint has a row of short hairs on the posterior distal margin as illustrated by SEWELL. The 2nd antenna has the endopod about 1.4 times as long as the exopod (72:53). The 2nd maxilla has 8 filaments on the diatal joints of which three are long and worm-like, and the remainings are bud-like.

The swimming legs are in the main feature as those figured by previous authors (fig. e). The 2nd leg has the outer edge spine on the 1st joint of the exopod, which extends to the middle of the outer margin of the 2nd joint of the exopod (fig. f); the posterior surface of the joints of the exopod and endopod are furnished with groups of spinules. The anterior surface of the joints of the exopod and endopod of the 2nd to 4th legs are furnished with patches of minute spinules.

In the 5th pair of legs the outer marginl spine reaches the distal margin of the joint. The terminal spine is about as long the 2nd joint. The inner marginal spine 2.5 times as long as the 2nd joint; the spine is furnished with fine spinules on the distal 2/3 of the spine (fig. h).

Male. Length, 4.65 mm: cephalothorax, 3.13 mm; abdomen, 1.52 mm. The anterior and posterior regions of the body have the proportional lengths as 67 to 33. The frontal margin of the head obtusely rounded, and has no median crest. The lateral distal corner of the last thoracic segment rounded.

The abdomen 5-segmented. The segments and furcal rami are in the proportional lengths:

Segment	Abd. 1	2	3	4	5	Furca
	13	33	21	24	2	7 =100.

The furcal rami about as long as wide.

The 1st antenna extends to the distal end of the last thoracic segment. The joints 8 to 12 and joints 24 and 25 are fused; the joints 20 and 21 are fused on the right side. The joints are in the following proportional lengths:

Joint	1	2	3	4	5	6	7	8-9-10-11-12	13	14
	72	90	43	29	32	29	29	150	26	26

	15	16	17	18	19	20	21	22	22	34-25
	32	43	43	43	43	38	40	58	67	67 =1000.

The 1st joint of the 1st antenna has a row of fine spinules on the posterior distal margin.

The 2nd antenna has the exopod about as long as the endopod. The mandible

palp is conspicuous; the exopod 2 times as long as the endopod. The 1st mixilla has 7+2 setae on the outer lobe, 7 setae on the exopod. The 2nd maxilla feeble.

The 1st to 4th swimming legs as in the female.

The 5th pair of legs reaches back to the distal margin of the 2nd abdominal segment. The endopod of the right leg extends a little beyond the distal margin of the 2nd basal joint of the left leg. The exopod of the left leg is about 4/5 the length of the endopod of the same leg. The endopod of the left leg 2-jointed, but there is a notch on the proximal 1/3 of the inner margin of the endopod (fig. i).

Remarks. Sizes hitherto been reported are as follows: GIESBRECHT, 4.50 mm; SARS, 5.0 mm; A. SCOTT, 4.5 mm; WOLFENDEN, 3.70–4.25 mm; WITH, 5.23 mm; SEWELL, 4.90 mm; VERVOORT, 3.90–4.75 mm. According to WOLFENDEN the specimens from the South Atlantic are smaller than those from the North Atlantic. SEWELL (1947) has called attention to the presence of two forms in the female specimens of *S. magnus* taken from the Arabian Sea. The large form measured 4.967 mm, and the small measured 3.550 mm. These forms differ in the proportions of the body segments and also in the proportional lengths of the segments of the 1st antenna. The present specimens, though much larger than SEWELL's specimen of forma *minor*, agree with forma *minor* in the proportional lengths of the abdominal segments and the 1st antenna. A specimen measuring 4.45 mm had the 1st antenna with the segments in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8–9–10	11	12	13	14
	80	80	212	21	27	24	26	70	14	27	37	43

	15	16	17	18	19	20	21	22	23	24–25	
	43	50	51	53	50	48	54	54	59	54	=1000.

These figures agree with those of forma *minor* given by SEWELL. His measurements of the proportional lengths of the segments of the abdominal segments and furca are 33:24:20:8:15=100 in the forma *minor*, and 31:28:20:7:14=100 in the forma *major*. The present specimen comes near to forma *minor* in the proportional lengths of the abdominal segments and the 1st antenna. But the 2nd to 4th swimming legs have patches of very small spinules on the anterior surface of the 2nd basal segment. These patches of fine spinules are present also on the anterior surface of the 1st basal segment, although those of the 2nd leg are extraordinary fine. In the 5th pair of legs the specimen has a moderately long spine on the outer lateral margin of the terminal segment.

Distribution. The species has a wide distribution in the deep waters of the Atlantic, Indian and Pacific Oceans. The species has been recorded from the Malay Archipelago, Arabian Sea and Far-eastern and Polar Seas of the U.S.S.R. VERVOORT has recorded the species from 45°S.

Occurrence. Eight females and one male from Suruga Bay, and one male from Sagami Bay in the hauls from deep waters, July, 1937.

Scaphocalanus affinis (G. O. SARS)

(Fig. 114, a–j)

Amallophora affinis, SARS, 1905, p. 21; *Amallophora gracilis*, WOLFENDEN, 1911, p. 265, fig. 39, a–c; *Scaphocalanus affinis*, SARS, 1925, p. 171, pl. 48, figs. 15–23; FARRAN, 1929, p. 248; SEWELL, 1929, p. 205; JESPERSEN, 1934, p. 89, 131; WILSON, 1950, p. 324, pl. 17, figs. 220, 221, pl. 33, fig. 503; BRODSKY, 1950, p. 249; VERVOORT, 1957, p. 113, figs. 96, 100, 101.

Female. Length, 5.40 mm: cephalothorax, 4.08 mm; abdomen, 1.32 mm. The proportional lengths of the cephalothorax and abdomen are as 75 to 25. The forehead has a median crest. The frontal margin of the head broadly rounded

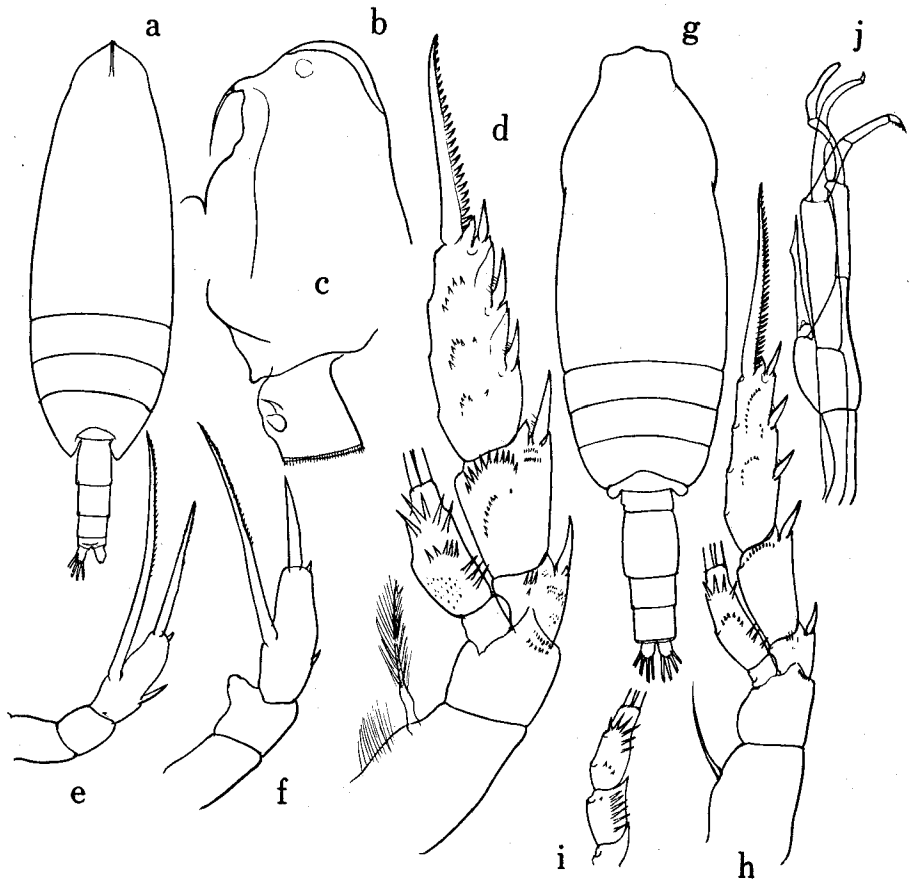

Fig. 114. *Scaphocalanus affinis* G. O. SARS.
Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment, lateral aspect; d, 2nd leg; e, 5th leg; f, 5th leg, other specimen. Male: g, dorsal aspect; h, 2nd leg; i, endopod of 3rd leg; j, 5th pair of legs.

in lateral aspect (fig. a, b). The last thoracic segment produced into triangular expansion which is bluntly pointed at the apex (fig. c). The shape of the apex of the last thoracic segment is variable as in *S. magnus*.

The abdomen 4-segmented. The proportional lengths of the segments and furca are as 34:24:21:6:15=100. The furcal rami 1.8 times as long as broad.

The 1st antenna broken off in the distal segments. The segments 1 to 16 are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8-9-10	11	12	13	14	15	16
	43	47	13	13	14	13	13	32	10	11	17	17	19	21.

The 2nd antenna has the endopod about 1.4 times as long as the exopod. The other mouth parts as in *S. magnus*.

The 2nd leg has an outer edge spine not reaching the middle of the outer margin of the 2nd segment of the exopod (fig. d). The patches of fine spinules are observed on the anterior surface of the 2nd basal joint of the 2nd to 4th legs.

The 5th pair of legs 3-jointed. The distal segment has four spines, of which two outer marginal ones are short. The inner marginal spine is about 2 times as long as the 3rd joint itself. The terminal spine is longer than the 3rd joint itself (fig. e).

A specimen measuring 5.30 mm had the 5th pair of legs whith a rudimentary endopod on the inner distal corner of the 2nd segment. Its apical spine was much shorter than the distal segment (fig. f). Another specimen measuring 4.81 mm had the 5th pair of legs which have a rudimentary endopod furnished with an apical spine. The specimen had the cephalothorax and abdomen in the proportional lengths as 77 to 23. The abdominal segments and furca are in the proportional lengths, 38:23:18:5:15=100. The 1st antenna extends to the distal margin of the last thoracic segment. The segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8-9-10	11	12	13	14
	87	80	25	25	27	25	25	70	22	27	37	40

	15	16	17	18	19	20	21	22	23	24-25	
	42	49	47	49	47	47	47	52	65	65	=1000.

The 1st segment has a row fine spinules on the posterior distal margin. The mouth parts and swimming legs as in *S. affinis*. The specimen, though smaller in size than the specimen above described, is an example of *S. affinis* with abnormal 5th pair of legs.

Male. Length, 4.50 mm: cephalothorax, abdomen, 1.25 mm. The cephalothorax elongate ovate. The head contracts much in front (fig. g). The last thoracic segment broadly rounded in lateral aspect. The rostrum has two slender filaments.

The abbomen is contained 2.6 times in the length of the cephalothorax. The 2nd segment robust, 2 times as long as the 3rd.

The 1st antenna extends a little beyond the distal margin of the 3rd thoracic

segment. The right antenna is 19-jointed; the segment 8 to 12 are completely fused; the segments 12 and 13 are partially fused; the segments 20 and 21 are fused.

The mouth parts well developed except the 2nd maxilla which is soft-skined and bears only long filaments on the distal segment.

The 2nd leg had 36 teeth on the terminal spine of the exopod (fig. h).

The 5th pair of legs has a general resemblance to those of the other members of the genus. It extends to fhe distal margin of the 3rd abdominal segment. The endopod of the right leg is long, reaching the distal margin of the 2nd basal segment of the left leg; there is a small process on the proximal part of the endopod. In the left leg the endopod 2-jointed, and slightly longer than the exopod (fig. j).

Remarks. The present species closely resembles *S. magnus* (T. SCOTT) but can be distinguished from it by the following characters: the head is broadly rounded; the 5th leg 3-jointed; the distal segment has two small outer marginal spines, an apical, and an inner marginal spines. The present specimen is much larger in size than that reported by SARS which measured only 3.6 mm in the female. FARRAN's specimens from the Antarctic measured 5.05-5.10mm. VERVOORT's specimens from the Antarctic are 4.82-5.36 mm in the female and 4.73 mm in the male. *S. gracilis* WOLFENDEN is probably, as has been stated by SARS or FARRAN, identical with *S. affinis* (SARS). It differs from the latter only in the length of the terminal spine on the distal segment of the 5th leg in the female.

Occurrence. Four females and two males from the depth 1000 m to the surface. *Distribution.* The species has a wide distribution in the deep waters of the Atlantic, Incian and Pacific Oceans. It has been recorded also from the Antarctic.

Scaphocalanus elongatus A. SCOTT

(Fig. 115, a-h)

Scaphocalanus elongatus, A. SCOTT, 1909, p. 98, pl. xxxii, figs. 10-16; SEWELL, 1929, p. 205, fig. 77, a-k; *Scaphlcalanus brevicornis*, BRODSKY, 1950, p. 252, fig. 160, ♂H5 (male).

Female. Length, 2.56-3.14 mm. The proportional lengths of the cephalothorax and abdomen are as 76 to 24. The frontal margin of the head evenly rounded. No median crest wast observed on the forehead (Fig. a) The last thoracic segment produced triangularly with a slight projection at the apex, which directs some what ventrally (fig. c).

The abdomen 4-jointed. The segments and furca are in the proportional lengths:

Segment	Abd. 1-2	3	4	5	Furca	
	31	21	20	8	20	=100.

The genital segment about as long as wide, not produced below, but concave at the genital area. There is a patch of fine hairs on the posterior periphery of the genital opening. The distal border of the segment is finely striated with teeth. The 2nd and 3rd segments are also striated on the distal border. The furcal rami 2.5 times as long as wide.

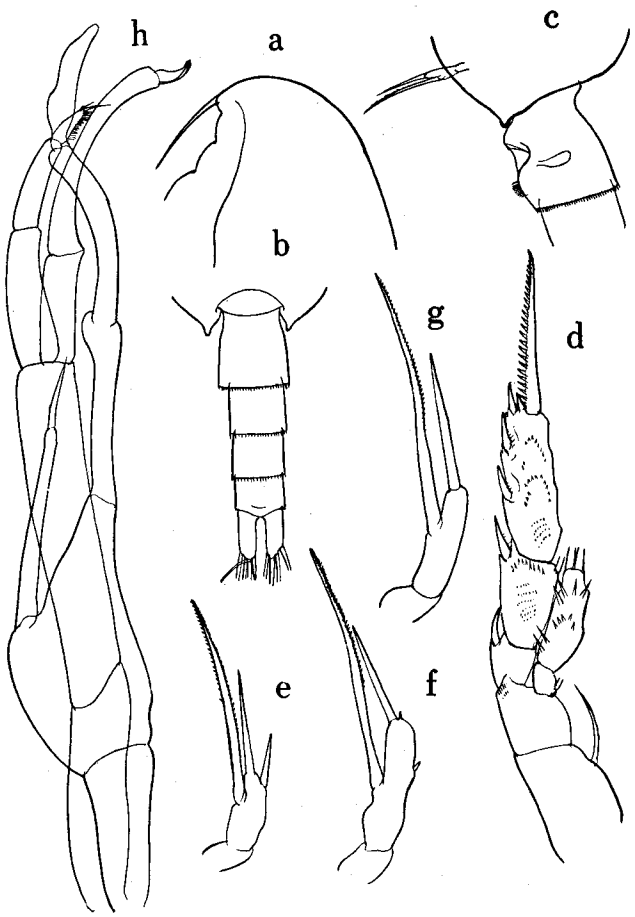

Fig. 115. *Scaphocalanus elongatus* A. SCOTT.
Female: a, head, lateral aspect; b, last thoracic segment and abdomen, dorsal aspect; c, last thoracic segment, lateral aspect; d, 2nd leg; e, 5th leg; f, 5th leg, other specimen; g, 5th leg, another specimen. Male: h, 5th pair of legs.

The 1st antenna broken off in the distal segments. The 1st segment has a row of fine spinules on the posterior distal border.

The 2nd antenna has the endopod 1.3 times as long as the exopod. The other mouth organs are as those of the foregoing species.

In the 2nd leg the terminal spine of the exopod had 21 teeth (fig. d). The

2nd basal segment of the 2nd to 4th legs is furnished with patches of fine spinules as in *S. magnus* and *S. affinis*.

The 5th pair of legs 2-jointed. The terminal segment bears 3 spines, one on each margin and one on the apex (fig. e). In some specimen the segment has only 2 spines, one on the inner margin and one on the apex (fig. g). The another speciemen hnd 4 spines of which two on the outer margin are very small (fig. f).

Male. Length, 2.55-2.86 mm. The cephalothorax and abdomen are in the proportional lengths as 63 to 37, or 64 to 36. The frontal margin of the head truncate in dorsal view. It is obtusely rounded in lateral view. The postero-lateral margin of the last thoracic segment rounded.

The abdomen is composed of 5 segments, has the following proportional lengths: 6 : 36 : 22 : 26 : 2 : 8 = 100. The 4th segments 2 times as long as it is wide at the proximal (28 : 14), and is slightly inflated towards the distal margin. The anal segment very short, concealed benath the foregoing when viewed from the dorsal. The furcal rami divergent, 1.5 times as long as wide.

The 1st antenna extends at least to the end of the 3rd thoracic segment. The left antenna 19-segmented. The segments 8 to 12, 13 and 14 are fused. The distal segments are missing in the specimen dissected. The segments have the following proportional lengths in 0.01 m.:

Joint	1	2	3	4	5	6	7	8-9-10-11-12	13-14
	18	19	10	5	5	5	5	20	11

	15	16	17	18	19	20	21	22	23	
	5	8	9	8	8	6	7	9	10	= 1.000.

The 1st segment has a row of spinules near the posterior distal margin.

In the 2nd leg the outer marginal spine of the 1st segment of the exopod is short and curved inwardly. The spine does not reach the middle of the outer margin of the next segment. The terminal spine of the exopod has about 50 serrations.

The 5th pair of legs reaches back to the distal margin of the 2nd abdominal segment. The endopod of the left leg 3-segmented. The inner margin of the endopod produced at the proximal 1/3 of the endopod where the 1st segment connects with the 2nd. The endopod of the right leg is slender and long, extending about to the distal end of the 2nd basal segment of the left leg (fig. h).

Remarks. It has been generally accepted that *S. elongatus* A. SCOTT, has a close resemblance to *S. affinis* SARS. SARS (1925) regarded *S. elongatus* as identical with his *affinis* which has a distinct median crest. SEWELL (1929) in his description of *S. elongatus* remarks that the forhead bears a linear crest. In A. SCOTT's original description of the species he states that the forehead appears narrowly rounded, and it is faintly thickened in the middle line, which may indicate a

very weak crest, but the material was too limited to make certain. He shows no crest in his figure of the species. In the present specimens the foreheand has neither linear crest nor thickened part on the middle line. SEWELL has described and figured an example of an abnormal 5th pair of legs which has two spines on the terminal segment and a process on the inner margin of the segment. BRODSKY's male specimen of *S. brevicornis* has the endopod composed of three joints on the left leg, which agrees well with that found in the present male specimen. *S. brevicornis* has according to VERVOORT's figure 2-jointed endopod on the male left 5th leg (fig. 99, c).

Occurrence. 7 females and 2 males from deep water of Sagami Bay.

Distribution. The species has been recorded from the Malay Archipelago and Indian Seas.

Scaphocalanus major (T. SCOTT)

(Fig. 116, a-i)

Scolecithrix major, T. SCOTT, 1894, p. 52, pl. 3, 5; *Amallophora media*, SARS, 1907, p. 16; *Scaphocalanus major*, A. SCOTT, 1909, p. 97; *Scolecithrix gracilipes*, FARRAN, 1909, p. 52, pl. vi, figs. 1-4; *Scaphocalanus medius*, SARS, 1925, p. 173, pl. xlix, figs. 1-8; SEWELL, 1929, p. 208; BRODSKY, 1950, p. 250, fig. 158; WILSON, 1950, p. 328, figs. 515-517; *Scaphocalanus major*, VERVOORT, 1957, p. 110.

Female. Length, 2.66 mm. The proportional lengths of the cephalothorax and abomen are as 76 to 24. The cephalothorax elongate ovate, about 2.6 times as long as it is widest at the 1st thoracic segment. The frontal margin of the head narrowly rounded in dorsal view, and obtusely rounded when viewed from the lateral. The last thoracic segment obtusely triangular on the posterior distal corner, but not pointed at the apex (fig. a).

The abdomen is composed of 4 segments. The segments and furcal rami are in the following proportional lengths:

Segment	Abd. 1-2	3	4	5	Furca	
	42	25	23	9	21	=100.

The genital segment slightly produced below. The ventral margin distal to the genital opening is furnished with hairs. The genital, 2nd, and 3rd segments are fringed with fine teeth on the distal margin. The furcal rami about 2 times as long as wide.

The 1st antenna broken off in the distal segments. The 1st segment is furnished with a row of spinules on the posterior distal margin.

The 2nd antenna has the endopod about 1.2 time as long as the exopod. The other mouth parts as those of the foregoing species.

In the 2nd leg (figs. b, b′) the outer marginal spine of the 1st segment of the exopod is slightly shorter than half the length of the 2nd segment of the exopod,

and curved inwardly. The terminal spine of the exopod has about 30 serrations. The 1st basal segment of the 2nd leg has a small patch of minute spinules on the posterior surface near the proximal inner margin. The anterior surface of the segment has also several patches of spinules. The 2nd basal segment is furnished with spinules both on the posterior and anterior surfaces. These patches

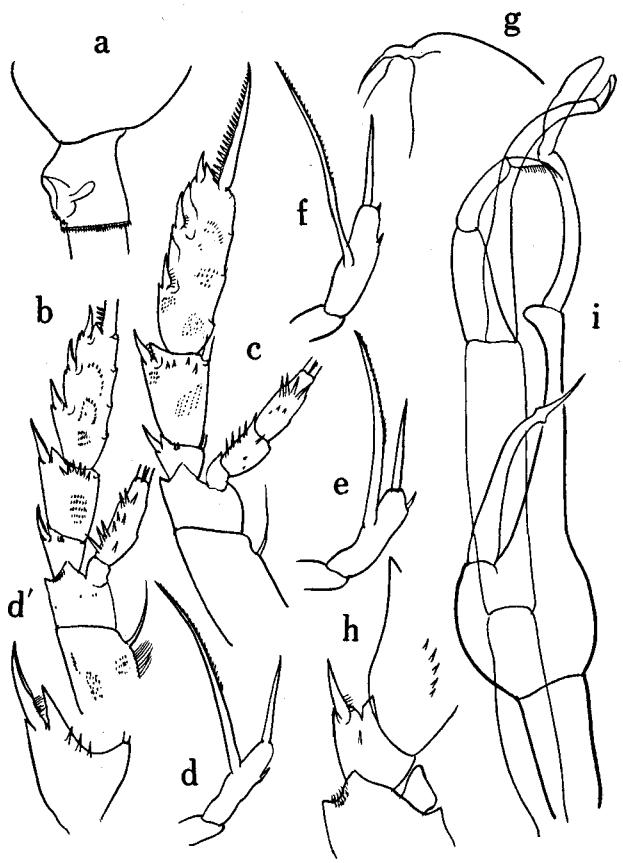

Fig. 116. *Scaphocalanus major* (T. SCOTT).
Famale: a, last thoracic segment, lateral aspect; b, 2nd leg; b′, 1st segment of exopod of 2nd leg (enlarged); c, 3rd leg; d, 5th leg; e, 5th leg, other specimen; f, 5th leg; another specimen. Male: g, head, lateral aspect; h, exopod of 2nd leg; i, 5th pair of legs.

of minute spinules on the basal segments are remarkable in the 3rd and 4th legs. The exopod and endopod of the 2nd to 4th legs are furnished with groups of spinules on the posterior surface, and with patches of minute spinules on the anterior surface. The 3rd leg has about 26 serrations on the terminal spine of the exopod (fig. c).

The 5th pair of legs 2-jointed. The distal segment has 3 spines. The inner marginal spine is about 2 times as long as the terminal one, and is rather finely serrated on the outer border. The outer marginal spine is short, about 1/4 the length of the terminal spine, and arises distal to the line of origin of the inner marginal spine (fig. d, e, f).

Male. Length, 2.55–2.76 mm. The cephalothorax and abdomen are in the proportional length as 65 to 35. The lateral margins of the head constricted much in front. The frontal margin of the head obliquely rounded when viewed from the lateral (fig. g). The 5th thoracic segment separates from the 4th; this is clearly seen from the side.

The abdomen 5-segmented. The segments and furca are in the proportional lengths:

Segment	Abd. 1	2	3	4	5	Furca
	9	35	23	23	1	9 =100.

The furcal rami about 1.4 times as long as wide (15:11).

The 1st antenna 19-segmented; the segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8–9–10–11–12	13–14
	91	103	40	30	27	24	27	121	45

	15	16	17	18	19	20–21	22	23	24–25	
	30	48	45	51	51	76	42	73	76	=1.000.

In the 2nd leg the outer marginal spine on the 1st segment of the exopod is short, not reaching the middle of the outer margin of the following segment (fig. h). The 1st basal segment constricted laterally near the distal end. The outer margin is furnished with poor short hairs about the middle of the segment. The posterior surface of the exopod is furnished with groups of spinules, but they are poorer than those found in the female. The patches of minute spinules found in the anterior surface of the exopod and endopod of the female of the 2nd leg were not detected in the male. The terminal spine of the exopod has about 40 serrations.

The 5th pair of legs reaches back about to the distal end of the 2nd abdominal segment. The endopod of the left leg 2-jointed, and slightly inflated proximally (fig. i). In other respects the 5th pair of legs resemble those of the foregoing species.

Remarks. A. SCOTT in his description of *S. major* (T. SCOTT) states that the last thoracic segment, when viewed from the side, appears very narrowly rounded, but there is no indication of a point as in *S. magnus* (T. SCOTT) or *S. elongatus* A. SCOTT. In the original description of *S. major*, though T. SCOTT gives no account on the shape of the last thoracic segment, his figure shows

(pl. fig. 44) that the lateral corner of the last thoracic segment is obtusely rounded. In *S. medius* SARS the postero-lateral corner of the last thoracic segment is also obtusely rounded.

In the female 5th pair of legs of both *S. major* and *S. medius* the distal segment has 3 spines, of which the one on the outer margin is short, and arises near the face of the terminal spine. This outer marginal spine divides the outer margin of the segment in the proportions as 4 to 1 in SARS' *medius*. In an example measuring 2.67 mm has the 5th legs in which the outer marginal spine divides the outer margin of the segment in the same proportions as found in the SARS' *medius*. The 5th pair of legs of *S. major* has, as shown in T. SCOTT's figure (pl. 3, fig. 26), the outer marginal spine which is placed very near to the base of the terminal spine.

SEWELL (1929, 1947) has laid stress upon the presence of patches of minute spinules on the anterior surface of the 2nd basal segment of the 2nd to 4th legs. This feature is a common character found in the species belonging to the genus *Scaphocalanus*. The present specimen is identical with *S. medius* described by SEWELL. There is no essential differendes between *S. medins* and *S. major* in the structure of the swimming legs. *S. gracillipes* (FARRAN) appears to be identical with *S. major* (T. SCOTT). But FARRAN (1926) agreed with WITH (1915) in regarding *S. gracilipes* to be a synonym of *S. brevicornis* SARS, after he had found a specimen which had the 5th legs similar to the type figured by SARS.

Occurrence. 30 females and 10 males in the hauls from the depth 1000 m to the surface.

Distribution. The species is widely distributed in the deep waters of the Atlantic, Indian, and Pacific Oceans.

Scaphocalanus brevicornis SARS

(Fig. 117, a–h)

Scaphocalanus brevicornis, WITH, 1915, p. 192, pl. 8, fig. 7, text-fig. 59; FARRAN, 1926, p. 258; 1929, p. 248, fig. 15; *Scaphocalanus minuta*, TANAKA, 1937, p. 262, pl. xviii, figs. 1–11 (male); *Scaphocalanus brevicornis*, WILSON, 1950, p. 326, pl. 33, figs. 507–509; BRODSKY, 1950, p. 252, fig. 160; VERVOORT, 1951, p. 113, figs. 60, 61; 1957, p. 107, figs. 97–99; TANAKA, 1960, p. 42, pl. 18, figs. 1–6.

Female. Length, 2.44–2.66 mm. The cephalothorax and abdomen are in the proportional lengths as 76 to 24. The head fused with the 1st thoracic segment, and so are the 4th with the 5th. The cephalothorax elongate ovate (fig. a). The frontal margin of the head rather narrowly rounded in lateral view (fig. b). The lateral corner of the last thoracic segment obtusely rounded when viewed from the side (fig. c). The rostrum has an inflated base to which fairly long filaments are attached.

The abdomen 4-segmented. The segments and furca are in the following proportional lengths measured from the dorsal:

Segment	Abd. 1–2	3	5	5	Furca	
	34	21	19	10	16	=100.

The genital segment slightly produced below. The furcal rami 2 times as long as broad. The first 3 segments are fringed with fine teeth on the distal margin.

The 1st antenna 22-jointed, extends to the posterior margin of the last thoracic segment. The segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8–9–10	11	12	13	14
	71	100	33	29	29	25	29	67	21	21	33	37
	15	16	17	18	19	20	21	22	23	24–25		
	42	50	50	50	46	42	46	46	58	18	=1.000.	

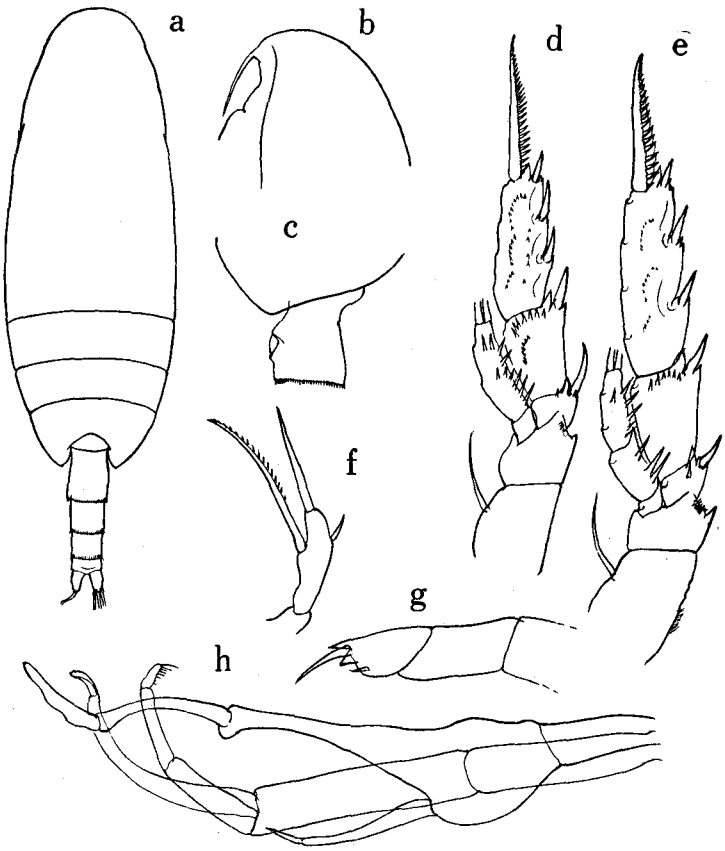

Fig. 117. *Scaphocalanus brevicornis* G. O. SARS.
Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment, lateral aspect; d, 2nd leg; e, 3rd leg; f, 5th leg. Male: g, 1st segment of exopod of 2nd leg; h, 5th pair of legs.

The 1st segment is furnished with a row of minute spine on the posterior distal margin. The segments 8, 12, 14, and 18 have each 2 setae; the segment 10 has a distal seta.

The 2nd antenna has the endopod 1.3 times as long as the exopod. The terminal segment of the 2nd maxilla have 3 long vermiform and 5 amalliform sensory filaments, of which 2 are larger; the setae on the 5th lobe are slender. The maxilliped has a row of fine spinules on the anterior proximal margin.

In the 2nd leg the outer marginal spine on the 1st segment of the exopod is long and curved, exceeding beyond the middle of the outer margin of the 2nd segment. The spinules of the posterior surface of the exopod and endopod as shown in the figure (fig. d). The terminal spine has 23–27 teeth. The 3rd leg has a group of spinules on the outer margin of the 1st basal segment (fig. e). The terminal spine of the exopod of the 3rd leg has 18–21 teeth. In the 4th leg the terminal spine of the exopod has 33 teeth.

The 5th pair of legs 2-jointed. The distal segment has 3 spines. The inner marginal spine is about 1.5 times as long as the apical spine, and is rather coarsely denticulated on the distal outer margin; the number of teeth is about 17. The terminal spine is about as long as the segment itself. The outer marginal spine arises opposite to the inner marginal spine, and divides the outer margin of the segment in the proportions 3:1 (fig. f).

Male. Length, 2.15–2.99 mm. The cephalothorax and abdomen are in the proportional lengths as 64 to 36. The abdomen 5-segmented. The segments and furca are in the proportional lengths:

Segment	Abd. 1	2	3	4	5	Furca	
	6	37	20	24	5	8	=100.

The 1st antenna 20-jointed, extends to the end of the 3rd thoracic segment. The segments 20 and 21 are fused on the right side.

The 2nd leg has a fairly long outer marginal spine on the 1st segment of the exopod. The spine is slightly curved inwards (fig. g.).

The 5th pair of legs reaches the distal end of the 2nd abdominal segment. The left leg has 3-jointed exopod and 2-jointed endopod. The distal segment of the endopod is small and turned at the apical portion. The endopod of the right leg styletform, reaches about the distal end of the 2nd basal segment of the left leg (fig. h).

Remarks. The species resembles closely *S. major* (SCOTT), differing from it in having a long outer edge spine on the 1st segment of the exopod of the 2nd leg. VERVOORT (1957) illustrated an abnormal 5th pair of legs of the female which had a rudimentary endopod. The male specimen described and figured by me under the name *S. minuta* is, as pointed out by VERVOORT, is the male of *S. brevicornis* SARS.

Occurrence. 8 females and 4 males from the deep water of the Izu region.

Distribution. The species has been recorded from the deep waters of the North Atlantic, Bay of Biscay, Antarctic, Far-eastern and Polar Seas of the U.S.S.R, and the Northwestern Pacific.

Scaphocalanus impar (WOLFENDEN)

(Fig. 118, a–d)

Amallophora impar, WOLFENDEN, 1911, p. 263, fig. 38.

Female. Length, 2.45 mm. The cephalothorax and abdomen are in the proportional lengths as 77 to 23. General appearance as in *S. brevicornis* SARS. The cephalothorax elongate ovate (fig. a). The last thoracic segment obtusely rounded in lateral aspect (fig. b).

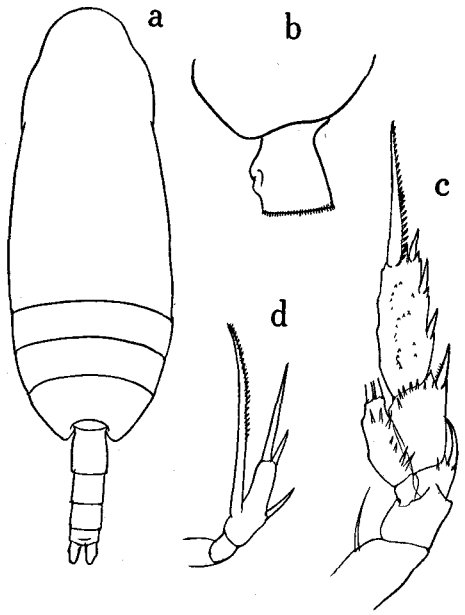

Fig. 118. *Scaphocalanus impar* (WOLFENDEN).
Female: a, dorsal aspect; b, last thoracic segment, lateral aspect; c, 2nd leg; d, 5th leg.

The abdominal segments and furca are in the proportional lengths:

Segment	Abd. 1–2	3	4	5	Furca	
	35	21	18	15	12	=100.

The genital segment swollen slightly below. The furcal rami longer than wide (4:3).

In the 2nd leg the outer edge spine of the 1st segment of the exopod long and curved, reaching the middle of the outer margin of the 2nd segment; the terminal spine of the exopod has 23 teeth (fig. c)

The 5th pair of legs 3-jointed. The distal segment has 4 spines; the outer marginal spine arises opposite to the inner marginal spine, and is about 1/3 the length of the inner distal spine; the outer distal spine is about as long as the outer marginal spine; the inner marginal spine is about 2 times as long as the distal segment, and is rather coarsely serrated on the outer margin (fig. d).

Remarks. The species is closely allied to *S. brevicornis* SARS, but can be distinguished from the former by the armature on the 5th pair of legs. The present specimen has the 5th legs quite similar in structure to those figured by WOLFENDEN.

Occurrence. 2 females from deep water of Sagami Bay.

Distribution. The species has been recorded from the Antarctic.

Scaphocalanus subbrevicornis (WOLFENDEN)

(Fig. 119, a–k; fig. 120, a–f)

Amallophora subbrevicornis, WOLFENDEN, 1911, p. 262, fig. 37; *Scolecithrix glacialis*, WOLFENDEN, 1911, p. 251, fig. 30, (male); *Scaphocalanus subbrevicornis*, FARRAN, 1929, p. 249, fig. 16; *Scaphocalanus gracilicauda*, TANAKA, 1937, p. 262, figs. 12, a–f (male); ? *Scaphocalanus subbrevicornis*, WILSON, 1950, p. 331, pl. 34, fig. 518; *Scaphocalanus subbrevicornis*, VERVOORT, 1951, p. 116, figs. 62–64; BRODSKY, 1950, p. 253, fig. 161; TANAKA, 1953, p. 132; *Scaphocalanus macropes*, TANAKA, 1953, p. 132; *Scaphocalanus subbrevicornis*, VERVOORT, 1957, p. 110; TANAKA, 1960, p. 331, pl. 34, p. 43, pl. xix, figs. 1–8.

Female. Length, 1.95 2.03 mm. The cephalothorax and abdomen have the proportional lengths as 76 to 24. The cephalothorax elongate ovate (fig. a). The postero-lateral corner of the last thoracic segment obtusely triangular (fig. b). The rostal filament long and slender.

The abdominal segments and furca are in the following proportional length;

Segment	Abd. 1–2	3	4	5	Furca	
	31	22	20	9	18	=100.

The genital segment about as long as wide, slightly swollen below. The furcal rami 2.5 times as long as wide.

The 1st antenna broken off in the distal segments. The 2nd antenna has the endopod about as long as the exopod (50:47). The other mouth parts as in *S. major* T. SCOTT.

In the 2nd leg the outer edge spine on the 1st segment of the exopod is short, about 1/3 the length of the outer margin of the 2nd segment of the exopod, and slightly curved inwards (fig. d, d'). The terminal spine of the exopod has about 24 teeth. No small triangular spines was observed on the posterior surface of the basal segments, but there are scattered small spines on the anterior surface of these segments.

The 5th pair of legs 2-jointed. The distal segment is slender. The terminal spine is longer than the segment itself. The inner marginal spine is about 1.8 times as long as the segment, and rather finely toothed on the outher margin (fig. f). The number of teeth about 32. The other specimen had the 5th pair of legs furnished with two small spines on the outer margin, one at the base of

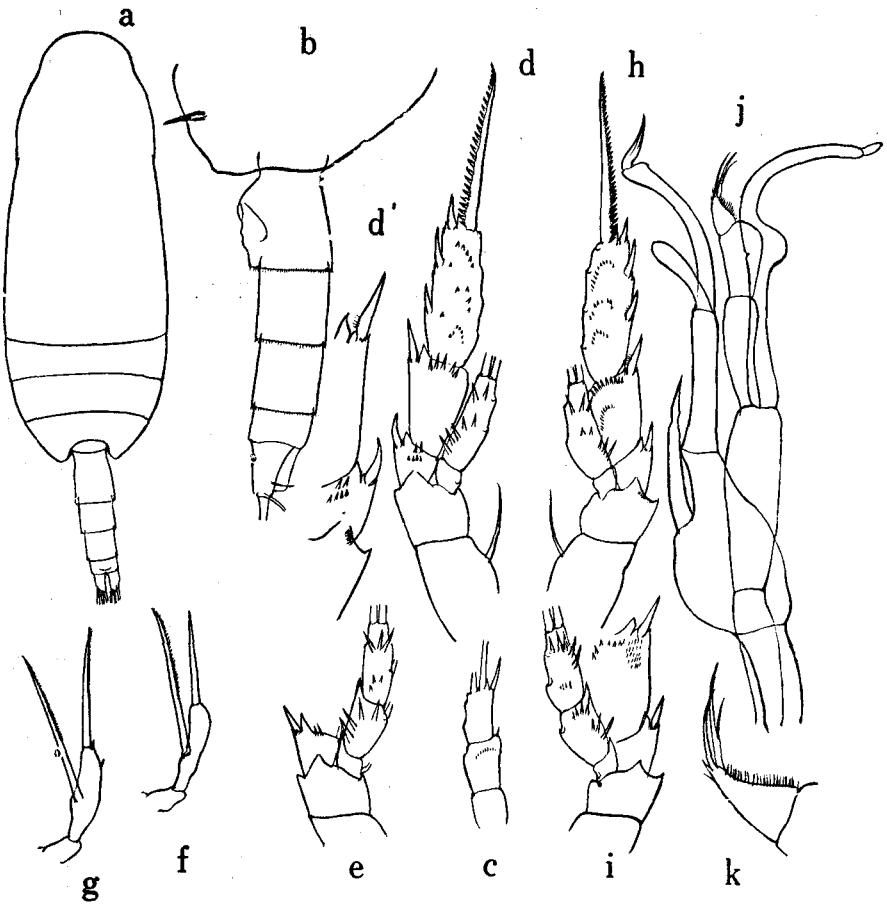

Fig. 119 *Scaphocalanus subbrevicornis* WOLFENDEN.
Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect; c, exopod of 1st leg; *d*, 2nd leg; d', 1st and 2nd segments of exopod of 2nd leg (enlarged); e, 3rd leg; f, 5th leg; g, 5th leg, other specimen. Male: h, 2nd leg; i, 3rd leg; j, 5th pair of legs; k, distal segment of left 5th leg.

the terminal spine, and the other on the distal 1/4 of the outer margin (fig. g).

Male. Length, 1.65–1.80 mm. The cephalothorax and abdomen are in the proportional lengths as 68 to 32. The cephalothorax elongate ovate. The head fused with the 1st thoracic segment. The 4th and 5th thoracic segments are incompletely

separated. The lateral distal corner of the last thoracic segment rounded. The rostral filament attenuates gradually into a fine point.

The abdomen 5-segmented. The segments and furca are in the proportional lengths:

Segment	Abd. 1	2	3	4	5	Furca	
	10	29	25	23	2	11	=100.

The 3rd abdominal segment is usually longer than the 4th.

The 1st antenna 20-jointed on the left side, 19-jointed on the right side, extends to the end of the 3rd abdominal segment. The segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8-9-10	11-12-13	14
	57	67	32	29	32	29	32	77	90	29

	15	16	17	18	19	20	21	22	23	24-25	
	42	45	57	57	61	57	38	38	57	74	=1.000.

The 1st antenna measured 1.56 mm in total length.

The 2nd antenna has the exopod about as long as the endopod. The mandible has the exopod as long as the endopod. The 1st maxilla has 5 setae on the exopod, 7 long and 2 short setae on the outer lobe; the endopod and inner lobes are reduced. The 2nd maxilla reduced, has soft-skined filaments on the distal segments. The maxillipede as those of those of the other member of the genus.

In the 2nd leg the outer edge spine on the 1st segment of the exopod is short and straight (fig. h). The terminal spine of the exopod has 34 teeth.

The 5th pair of legs extends to the distal margin of the 3rd abdominal segment. The right leg has a short endopod which extends slightly beyond the distal margin of the 2nd basal segment of the left leg. The 1st segment of the exopod has a fairly long process on the distal margin of the segment. The endopod of the left leg 1-jointed, but there is a slight notch on the middle of the outer margin where the segment swollen outwardly (fig. j). The distal segment of the exopod of the left leg as figured (fig. k).

Remarks. There has been a considerable confusion on the identification between two species, *S. subbrevicornis* WOLFENDEN and *S. longifurca* GIESBRECHT. These species resemble each other in general appearance and in the structure of the 5th pair of legs. According to WOLFENDEN (1911) the female 5th pair of legs are incompletely 3-jointed. The 3rd segment is 2 times as long as the 2nd. The terminal spine of the 3rd segment is about half as long as the inner marginal spine. In *S. longifurca* the inner marginal spine is according to GIESBRECHT's figure of the female 5th leg (pl. 37, fig. 16). 2.5 times as long as the terminal one. My specimen has the slender 5th leg which comes nearest to those illustrated by VERVOORT (1951). The specimen taken by the Japanese Antarctic

Research Expedition has the 5th leg quite similar in structure given by VERVOORT.

WOLFENDEN has not given any account on the 2nd leg of *S. subbrevicornis*. FARRAN (1929) states that the outer edge spine on the 1st segment of the exopod of the 2nd leg is shorter than that on the 2nd segment in both species. In *longifurca* it is described as "hakig" but it is straight or nearly so in *subbrevicornis*. FARRAN is of opinion that *subbrevicornis* and *longifurca* are identical. On comparing the description and figures of these two species given by WOLFENDEN and

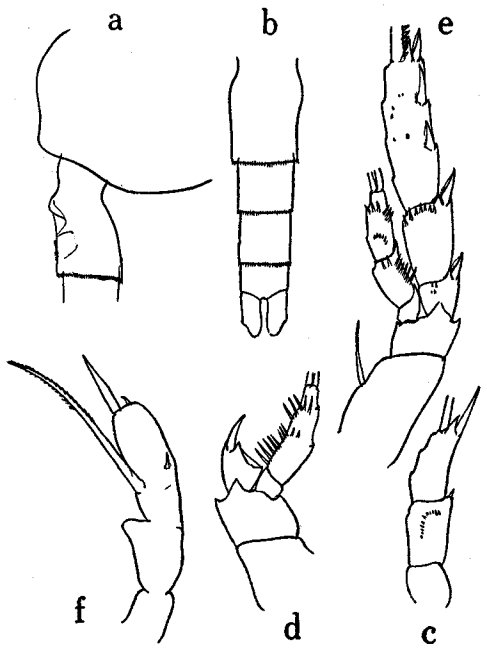

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Fig. 120. ? *Scaphocalanus subbrevicornis* WOLFENDEN. Female: a, last thoracic segment, lateral aspect; b, abdomen, dorsal aspect; c, exopod of 1st leg; d, 2nd leg; e, 3rd leg; f, 5th leg.

GIESBRECHT they differ so little from each other that it seems very likely to regard the both species as different. But there remains, as have been pointed out by FARRAN or VERVOORT, some differences between them in the structure of the 2nd antenna and 2nd leg. It seems better, at present, to keep the both species as distinct. WILSON (1950) has recorded the occurrence of *S. subbrevicornis* from the Hawaiian and Philippine Islands. VERVOORT believes that WILLSON's specimen is an example of *S. longifurca*. But WILSON's figure of the 5th pair of legs comes

near to those given by FARRAN (1929, fig. 16, b) except that inner marginal spine is shorter and the 2nd segment is furnished with a rudimentary endopod in WILSON's specimen. WILSON gives no account on the other characters in his description of the species. I have listed in 1953 a species under the name *Scaphocalanus macropes*. The specimen measured 1.92 and 2.30 mm respectively. These specimens have the 5th pair of legs similar in structure to those of *subbrevicornis* figured by FARRAN (1929), only differing from it in having a rudimentary endopod (Fig. 120, f). But there are some differences between them in the 2nd leg: the outer edge spine on the 1st segment of the exopod is short and slightly curved, but the small spines on the 2nd segment of the endopod are more in numbr in the present specimen (Fig. 120, d).

The male of *subbrevicornis* has been described and figured by VERVOORT (1951). *Scolecithrix glacialis* WOLFENDEN is, as suggested by VERVOORT, the male of *subbrevicornis*. I have in 1937 described a male of *Scaphocalanus* under the name *gracilicauda*. The specimen measured 1.75 mm in total length, and has the 5th pair of legs quite similar to that of *subbrevicornis* figured by VERVOORT.

Occurrence. 5 females and 4 males from the deep water of the Izu region.

Distribution. The species has been recorded from the Antarctic by WOLFENDEN, FARRAN, and VERVOORT. The species appears to have a fairly wide distribution also in the deep waters of the Pacific.

Scaphocalanus longifurca (GIESBRECHT)

(Fig. 121, a–g; fig. 122, a–e)

Scolecithrix longifurca, GIESBRECHT, 1892, p. 266, pl. 13, fig. 19, pl. 37, fig. 16; ? *Scaphocalanus insignis*, BRODSKY, 1950, p. 254, fig. 162; *Scaphocalanus tempolaris*, TANAKA, 1953, p. 132 (male); *Scaphocalanus glacialis*, TANAKA, 1953, p. 132 (male).

Female. Length, 1.48–1.67 mm. The cephalothorax and abdomen are in the proportional lengths as 78 to 22. General appearance as in *S. subbrevicornis* (WOLFENDEN). The lateral distal corner of the last thoracic segment triangularly produced, but narrowly rounded at the apex (fig. a).

The abdominal segment and furca are in the proportional lengths:

Segment	Abd. 1–2	3	4	5	Furca
	37	20	17	9	18 =100.

The genital segment produced below. The furcal rami 2 times as long as wide.

The 1st antenna broken off in the distal segments in the specimen dissected.

The 2nd natenna has the endopod 1.25 times as long as the exopod. The other mouth appendages as those of the other members of the genus.

In the 2nd leg the outer edge spine of the 1st segment of the exopod is about half the length of the outer margin of the following segment, and curved (fig. b).

The terminal spine of the exopod has 24 teeth. The 3rd leg has the basal joints coarsely covered with small triangular spines one the anterior surface.

The 5th pair of legs 2-jointed. The distal segment delated at the distal part. The terminal spine is rather short, about half the length of the distal segment. The inner marginal spine is about 3 times as long as the terminal one, and finely serrated one each side of the spine (fig. c).

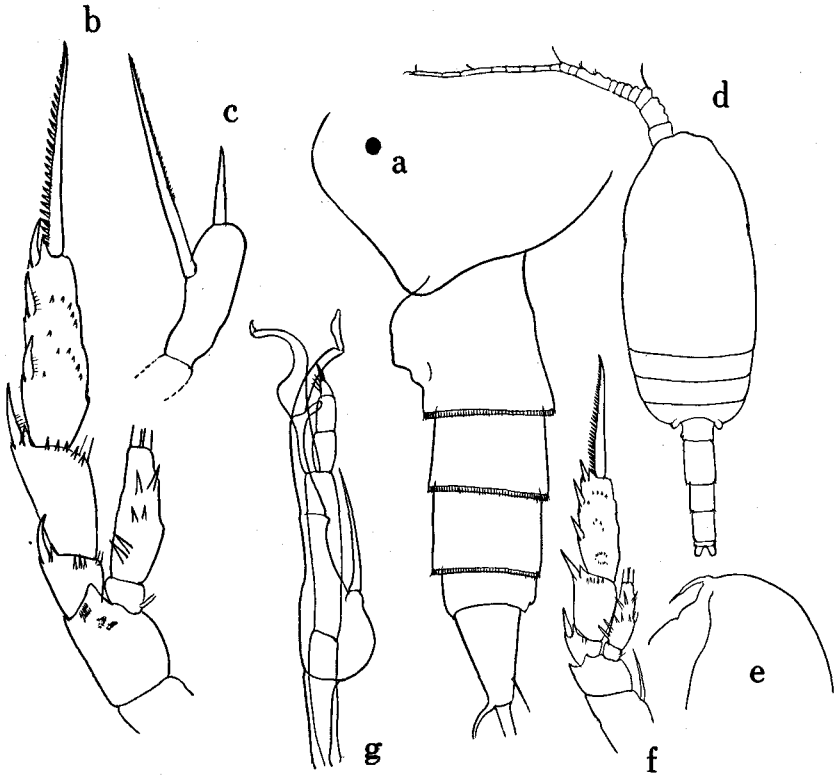

Fig. 121. *Scaphcocalanus longifurca* (GIESBRECHT).
Famale: a, last tharacic segment and abdomen, lateral aspect: b, 2nd leg: c, 5th leg. Male: d, dorsal aspect; f, e, head, lateral aspect; f, 2nd leg; g, 5th pair of legs.

Male. Length, 1.30–1.35 mm. The cephalothorax and abdomen are in the proportional lengths as 69 to 31. The head slightly produced anteriorly in dorsal aspcect (fig. d), and obtusely rounded in lateral aspect. The lateral distal corner of the last thoracic segment rounded. The rostrum strong, gradually attenuates to a fine point (fig. e).

The abdominal segments and furca are in the following proportional lengths:

Segment	Abd. 1	2	3	4	5	Furca
	13	28	23	23	2	12 =100.

The furcal rami slightly divergent.

The 1st antenna 19-jointed on the left side, 18-jointed on the right side, they extend to the posterior margin of the 3rd thoracic segment. The segments are in the following proportional lengths (right side):

Segment	1	2	3	4	5	6	7	8-9-10-11-12-13	14
	65	98	47	33	33	22	33	142	38

	15	16	17	18	19	20-21	22	23	24-25	
	33	49	49	49	49	65	33	77	83	=1.000.

The 2nd antenna has the exopod slightly longer than the endopod (22:19).

The 1st leg has no outer edge spine on the 1st segment of the exopod. The 2nd segment has a small outer edge spine. The posterior surface of the segment has a transverse row of minute spines. In the 2nd leg the outer edge spine on the 1st segment of the exopod is short and straight (fig. f). The terminal spine of the exopod has about 30 teeth.

The 5th pair of legs extends to the distal margin of the 3rd abdominal segment. The endopod of the left leg is swollen at the middle section. The exopod 3-jointed, and short. The endopod of the right leg is long, reaches the distal margin of the 1st segment of the exopod of the left leg (fig. g).

Remarks. Scaphocalanus longifurca has, according to GIESBRECHT, the 2nd antenna which has the exopod longer than the endopod, and the 2nd leg has a curved outer edge spine on the 1st segment of the exopod. The present female specimen has a slightly curved outer edge spine on the 1st segment of the exopod of the 2nd leg. But in the 2nd antenna the exopod is shorter than the endopod. The 5th pair of legs agrees fairly well with the description and figure of the 5th leg given by GIESBRECHT with the exception that the small spine on the outer margin of the distal segment is absent in the present specimen. A specimen measuring 1.57 mm. had the 5th pair of legs furnished with a small outer marginal spine near the baseof the terminal spine (Fig. 122, e). The specimen has a straight outer edge spine on the 1st segment of the exopod of the 2nd leg, and the terminal spine of the exopod is more finely serrated on the outer margin (Fig. 122, c).

The present male resembles also closely *S. subbrevicornis* except the following characters: the 1st antenna is short, only reaching the distal margin of the thoracic segment, and the segments have the proportional lengths which differ from those found in *S. subbrevicornis*; the distal segment of the exopod of the left 5th leg is furnished with only 3 stiff hairs on the inner margin, whereas, it is furnished in *subbrevicornis* with, beside 2 strong spines, fine hairs on the inner margin. The present male has been listed under the name *S. glacialis* by me in 1953. I have in the same year listed the another male specimen under the name *S. tempolaris*. The specimen measured 1.76 mm in total length, and has a general resemblance to the male specimen above described. But the specimen differs

from the foregoing in having a longer abdomen and in having the segments of the 1st antenna which differ from those of the foregoing. The specimen had the cephalothorax and abdomen with the proportional lengths as 95 to 41. The abdominal segments and furca are in the proportional lengths:

Segment	Abd. 1	2	3	4	5	Furca	
	7	38	23	23	2	7	=100.

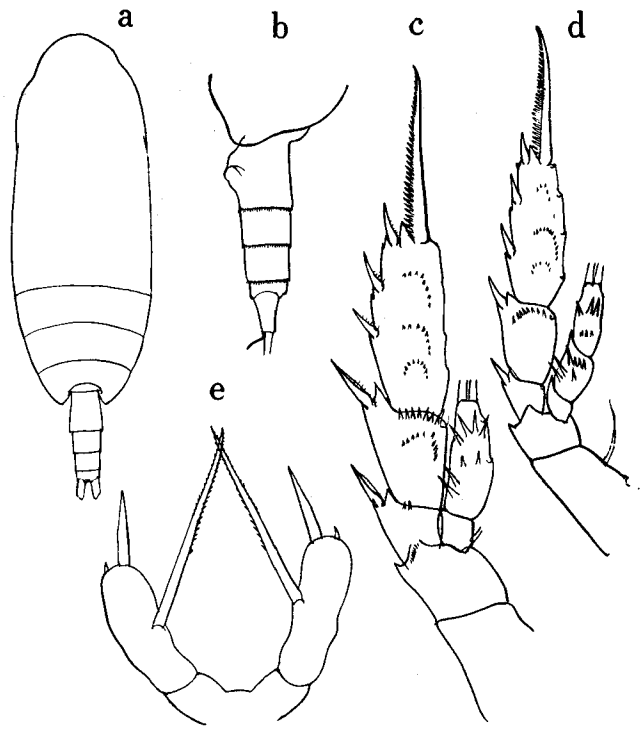

Fig. 122. ? *Scaphcocalanus longifurca* (GIESBRECHT).
Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect; c, 2nd leg; d, 2rd leg; e, 5th pair of legs.

The 1st antenn 19-jointed on the left, 18-jointed on the right side, extend to the end of the 3rd thoracic segment. The segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8-9-10-11-12-13	14
	79	107	51	28	32	23	28	144	37

15	16	17	18	19	20	21	22	23	24-25	
28	46	42	46	46	28	41	42	69	83	=1.00.

The specimen, though slightly larger in size, and differs in some details from

the male above described under the name *longifurca* may perhaps be identical with it in having the 5th pair of legs quite similar in structure to that of *S. longifurca*. *Scaphocalanus insignis* BRODSKY appears to be identical with the present species.

Occurrence. 5 females and 4 males from the deep water of the Izu region.

Distribution. The species has been recorded by GIESBRECHT from the North Pacific between 11°N and 14°N. The species appears to be widely distributed in the North Pacific.

Scaphocalanus echinatus FARRAN

(Fig. 123, a–m)

Scaphocalanus echinatus, FARRAN, 1905, p. 37, pl. 6 and 7; 1929, p. 250, fig. 17; 1937, p. 98; MORI, 1937, p. 50, pl. 24, figs. 12–16.

Female. Length, 1.84–2.48 mm. The cephalothorax and abdomen are in the proportional lengths as 79 to 21. The cephlothorax elongate ovate. (fig. a). The last two thoracic segments are incompletely separated. The lateral corner of the last thoracic segment rounded (fig. d). The rostral filaments are long and slender (fig. c).

The abdominal segments and furca in the proportional lengths:

Segment	Abd. 1–2	3	4	5	Furca	
	32	21	20	10	17	=100.

The genital segment as long as wide, produced slightly below. The furcal rami 2 times as long as wide.

The 1st antenna broken off in distal segments. The 2nd antenna has the exopod about 1.4 times a long as the endopod. The mandible has the exopod about as long as the endopod. The 1st maxilla as figured by FARRAN. The 2nd maxilla has 3 long vermiform and 5 bud-like filaments on the distal segment; the setae on the 4th and 5th lobes are slender (fig. e). In the maxilliped two basal segments are of about equal lengths; the 1st segment has a bud-like sensory filament on the anterior margin about the middle of the segment.

The 1st leg has a small outer edge spine on the 2nd segment of the exopod. The 2nd leg has a long and curved outer edge spine on the 1st segment of the exopod. The terminal spine of the exopod has 20 teeth (fig. f).

In the 5th pair of legs the inner marginal spine is about 1.5 times as long as the terminal one, and is furnished with about 9 teeth on the outer margin (fig. h). The 5th legs are variable in structure as shown in the figure (fig. i, j). Some specimen has a rudimentary endopod, and the terminal spine is much shorter than the segment itself.

Male. Length, 1.26–1.34 mm. The cephalothotax and abdomen are in the proportional lengths as 72 to 28.

The abdominal segments and furca are in the proporitional lengths:

Abd. 1	2	3	4	5	Furca
14	23	21	28	3	11 =100.

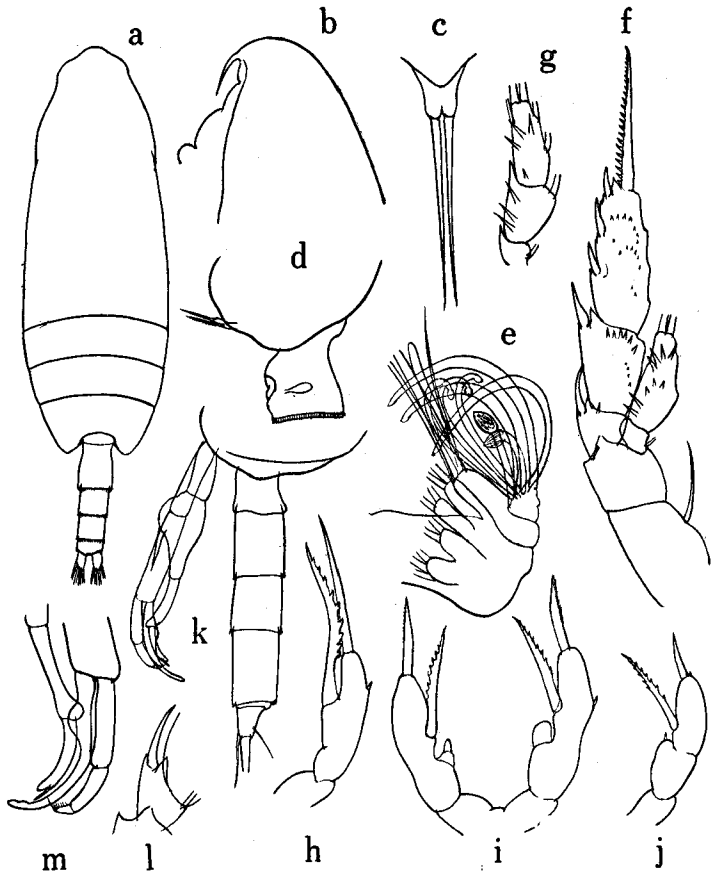

Fig. 123. *Scaphocalanus echinatus* FARRAN.
Female: a, dorsal aspect; b, head, lateral aspect; c, rostrum; d, last thoracic segment, lateral aspect; e, 2nd maxilla; f, 2nd leg; g, endopod of 3rd leg; h, 5th leg: i, 5th pair of legs, other specimen; j, 5th leg; another specimen. Male: k, last thoracic segment and abdomen, lateral aspect; l, 1st segment of exopod of 2nd leg; m, distal segments of 5th pair of legs.

The 1st antenna 20-jointed on the left side, 19-jointed on the right side. They extend to the distal margin of the 2nd abdominal segment. The segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8–9–10–11–12	13	14
	58	62	40	26	31	25	31	128	26	36
	15	16	17	18	19	20–21	22	23	24–25	
	40	53	58	58	62	66	44	71	48	=1.000.

In the 2nd leg the outer edge spine on the 1st segment of the exopod is slender and curved (fig. l). The terminal spine of the exopod has about 40 teeth.

The 5th pair of legs reaches back to the distal end of the 4th abdominal segment (fig. k). The exopod of the right leg 3-jointed, but the distal segment is very small and is represented by a slender proces. The endopod of the left leg 1-jointed.

Remarks. The male has in the 2nd leg a long and curved outer edge spine on the 1st segment of the exopod just as is found in the female.

Occurrence. The species is a common in the deep water of the Izu region. Many females and 2 males were found in the collection.

Distribution. It has been recorded from the Atlantic Slope, New Zealand, Great Barrier Reef of Australia, and Japanese waters.

Scaphocalanus curtus FARRAN

(Fig. 124, a–h)

Scolecithrix curta, FARRAN, 1926, p. 259, pl. 7; 1929, p. 250.

Female. Length, 1.45–1.76 mm. The cephalothorax and abdomen are in the proportional lengths as 75 to 25. The head fused with the 1st thoracic segment. The last two thoracic segments are incompletely separate (fig. a). The postero-lateral margin of the last thoracic segment buntly angular in lateral view (fig. b). The rostral filaments long and slender.

The abdominal segments and furca are in the following proportional lengths:

Segment	Abd. 1–2	3	4	5	Furca	
	34	20	20	10	16	=100.

The furcal rami 2 times as long as wide.

The terminal segments of the 1st antenna missing in the specimen dissected.

The 2nd antenna has the endopod slightly longer than the exopod. The mandible, maxillae, and maxilliped as those of the other members of the genus.

The 2nd leg has a short and curved outer edge spine on the 1st segment of the exopod. The terminal spine of the exopod has 21 teeth (fig. d). The 4th leg has 19 teeth on the terminal spine of the exopod. The posterior surface of the exopod and endopod of the 2nd to 4th legs are furnished with rows of minute spines.

The 5th pair of legs entirely absent.

Male. Length, 1.90 mm. The cephalothorax and abdomen are in the proportional lengths as 64 to 36 (fig. e).

The abdominal segments and furca are in the proportional lengths:

Segment	Abd. 1	2	3	4	5	Furca	
	8	37	22	22	5	8	=100.

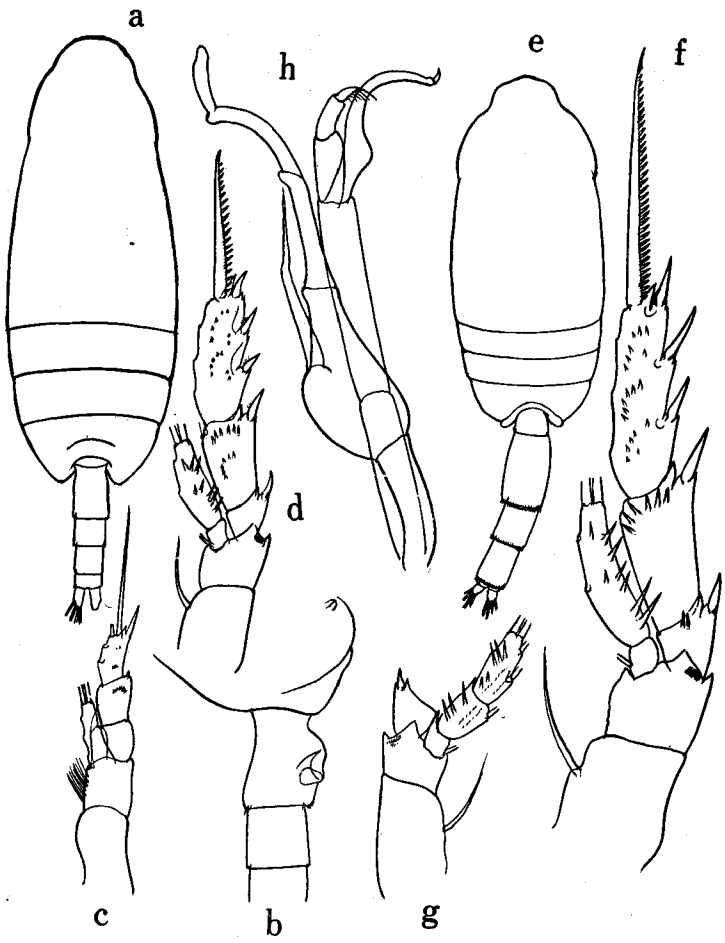

Fig. 124. *Scaphocalanus curtus* FARRAN.
Female: a, dorsol aspect, b, last thoracic segment, lateral aspect; c, 1st leg; d, 2nd leg. Male: e, dorsal aspect; f, 2nd leg; g, 3rd leg; h, 5th pair of legs.

The 1st antenna 20-jointed on the left, 19-jointed on the right side, extend to the end of the thoracic segment. The segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8–9–10–11–12	13	14
	68	95	47	32	32	24	32	119	24	36

	15	16	17	18	19	20	21	22	23	24–25	
	36	47	47	52	47	32	44	40	67	70	=1.000.

In the 2nd leg the outer edge spine on the 1st segment of the exopod straight and short, not reaching the middle of the outer margin of the following segment. The terminal spine of the exopod has about 34 teeth (fig. f).

The 5th pair of legs reaches back to the middle of the 3rd abdominal segment. The right leg has a long endopod. The distal end of the 1st segment of the exopod not produced. The left leg has a short exopod. The endopod 2-jointed. The proximal segment swollen near the proximal (fig. h).

Remarks. The female specimen is easily recognized by the absence of the 5th pair of legs. The male specimen is larger in size than the female, and has a short outer edge spine on the 1st segment of the exopod which corresponds fairly well with that of the female. The species agrees with *Racovitzanus levis* TANAKA in having no 5th pair of legs in the female, which will be described in the following.

Occurrence. 5 females and 2 males from deep water of Sagami Bay.

Distribution. The female specimen has been recorded from the Bay of Biscay and off New Zealand by FARRAN. The species appears to have a fairly wide distribution in the oceans.

Genus *Racovitzanus* GIESBRECHT

The genus was established by GIESBRECHT to accomodate *Racovitzanus antarcticus* collected in the "Belgica" Expedition to the Antarctic. The genus has comprised *R. antarcticus* GIESBRECHT, *R. prorrecta* (GIESBRECHT), and *R. pacificus* (ESTERLY). In the present collection two species *R. porrecta* and *R. levis* were taken, of which the latter appears to be undescribed. BRODSKY (1950) has recorded *R. antarcticus*, *R. pacificus*, and *R. porrecta* from the waters of the Far-eastern and Polar Seas of the U.S.S.R.

The genus *Racovitzanus*, though closely allied to *Scaphocalanus* in the structure of the male 5th pair of leg, comes near to *Scolecithrix* or to *Scolecithricella* in having a rather long outer edge spine on the 2nd segment of the exopod of the 1st leg. The genus is intermediate between *Scaphocalanus* and *Scolecithrix*.

Racovitzanus levis sp. nov.

(Fig. 125, a–m)

Female. Length, 1.95–2.00 mm. The cephalothorax and abdomen are in the

proportional lengths as 72 to 28. The cephalothorax elongate ovate, 3 times as long as it is wide at the 1st thoracic segment. The head fused with the 1st thoracic segment. The last two thoracic segments are incompletely fused (fig. a).

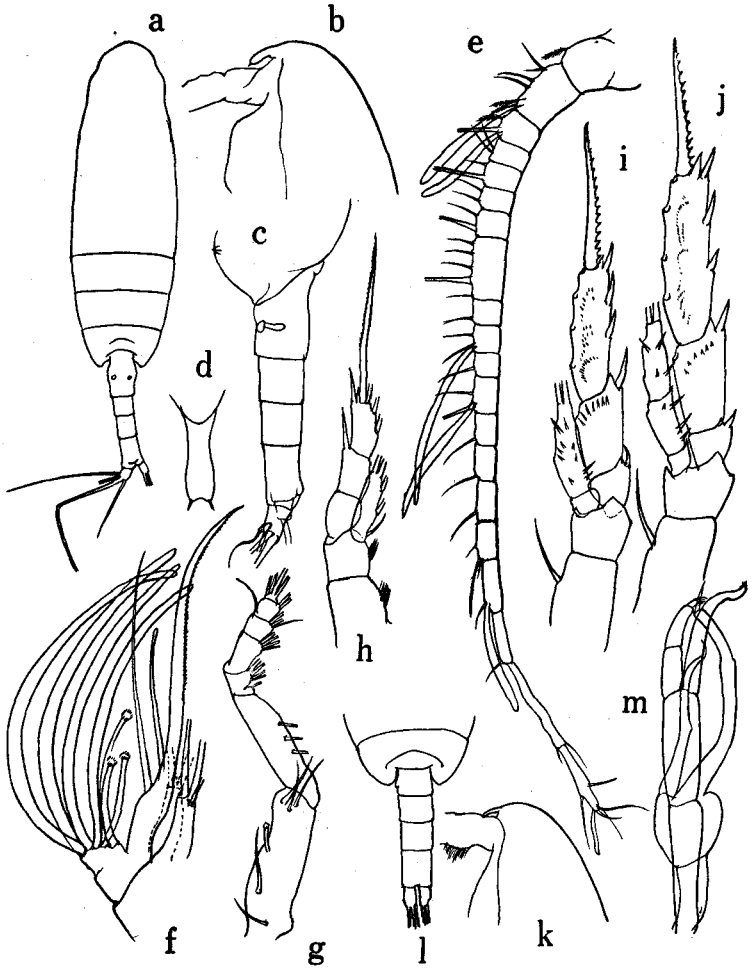

Fig. 125. *Racovitzanus levis* sp. nov.
Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, lateral aspect; d, rostrum; e, 1st antenna: f, 2nd maxilla; g, maxilliped; h, 1st leg: i, 2nd leg; j, 3rd leg. Male: k. head lateral aspect; l, last thoracic segment and abdomen, dorsal aspect; m, 5th pair of legs.

The lateral distal corner of the last thoracic segment bluntly produced (fig. c). The rostrum sausage-shaped, slightly bifurcate at the distal end to which 2 small spines are attached (fig. b, b).

The abdomen 4-segmented. The segments and furca are in the proportional lengths:

Segment	Abd. 1–2	3	4	5	Furca	
	26	16	14	21	9	=100.

The furcal rami asymmetrical, the left side is much larger than the right (9:7). The 2nd inner furcal seta of the left side is much longer than the total length of the body and curved inwardly almost at right angle at the proximal one fifth of the seta.

The 1st antenna 20-jointed, extends to the distal end of the 3rd thoracic segment. The segments are in the dollowing proportional lengths:

Segment	1	2	3	4	5	6	7	8–9–10	11	12	13	14
	49	70	28	28	28	28	32	82	28	31	35	38
	15	16	17	18	19	20	21–22–22		24–25			
	42	49	52	45	59	66	120		93	=1.000.		

a long aesthetaks is found on the segments 2, 3, 12, 14, 19, and 25 (fig. e).

The 2nd antenna has the endopod about as long as the exopod. The mandible and 1st maxilla as in *Scolecithrix danae* (LUBBOCK). The 2nd maxilla has 4 long vermiform and 3 small sheaf-like filaments on the terminal section (fig. f). The maxilliped has a small stalked seta on the middle of the 1st basal segment (fig. g).

The 1st leg has no outer edge spine on the 1st segment of the exopod (fig. h). The 2nd segment of the exopod has a long outer edge spine extending about to the distal end of the 3rd segment of the exopod. The 2nd leg has 3-jointed exopod and 2-jointed endopod. The outer edge spine on the 1st segment of the exopod is small and curved. The posterior surface of the 2nd and 3rd segments of the exopod and the 2nd segment of the endopod have each groups of small spines. The terminal spine of the exopod has 15 teeth (fig. i). The 3rd and 4th legs have each 3-jointed exopod and endopod. The terminal spine of the exopod of the 3rd leg has 12 teeth (fig. j) and that of the 4th leg has 17 teeth. The 4th leg has no inner marginal seta on the 1st basal segment.

The 5th pair of legs eompletely absent.

Male. Length, 1.75 mm. The cephalothorax and abdomen are in the proportional lengths as 75 to 25. General appearance as in the female (fig. k). The abdominal segments and furca are in the proportional lengths:

The 1st antenna 20-jointed, extends to the distal end of the thorax. The segments are in the following porportional lengths:

Segment	Abd. 1	2	3	4	5	Furca	
	21	19	19	26	2	13	=100.

The 1st antenna 20-jointed, extends to the distal end of the thorax. The segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8–9–10	11–12–13	14
	46	66	33	33	33	33	39	72	78	33
	15	16	17	18	19	20	21	22	23	24–25
	33	39	72	66	59	59	65	33	52	66 =1.000.

The 1st segment is furnished with a row of long hairs on the posterior margin.

The 2nd antenna has the endopod longer and wider than the exopod. The other mouth organs are less developed.

The 1st to 4th legs as in the female. The terminal spine of the exopod of the 2nd leg has 19 teeth.

The 5th pair of legs resembles that of the male of *Scaphocalanus*. It extends to the distal end of the furca when reflexed. The endopod of the right leg long, slightly exceeds the distal margin of the 1st segment of the exopod of the left leg. The endopod of the left leg is longer than the 3-jointed exopod (fig. m).

Remarks. The female is characterized by the absence of the 5th pair of legs. The male 5th pair of legs has a general resemblance to that of *Scaphocalanus*.

Occurrence. 2 females from Suruga Bay, and one male from Sagami Bay in the hauls from the depth 1000 m to the surface.

Distribution. Northwestern Pacific (present record).

Racovitzanus porrecta (GIESBRECHT)

(Fig. 126, a–i)

Scolecithrix porrecta, GIESBRECHT, 1892, p. 266,, pl. 13, fig. 4, 41, pl. 37, fig. 11; GIESBRECHT und SCHMEIL, 1898, p. 45; *Racovitzanus prorrecta*, BRODSKY, 1950, p. 274, fig. 185; *Racovitzanus nanus*, TANAKA, 1953, p. 132.

Female. Length, 2.07 mm. The cephalothorax and abdomen are in the proportional lengths as 70 to 30. The cephalothorax elongate ovate. The head fused with the 1st thoracic segment. The last two thoracic segments are incompletely separate (fig. a). The lateral distal corner of the last thoracic segment acutely pointed at the apex (fig. c). The rostrum moderately long, bifid at the apex (fig. b, d).

The abdomen 4-segmented. The proportional lengths of the segments and furca:

Segment	Abd. 1–2	3	4	5	Furca
	28	17	17	27	17 =100.

The genital segment not swollen below. The furcal rami asymmetrical, the left side is much longer and wider than the right. The furcal setae broken off, but the 2nd inner seta may be long as in the foregoing species.

The 1st antenna broken off in the distal segments. The proximal 15 segments are in the following proportions:

Segment	1	2	3	4	5	6	7	8–9–10	11	12	13	14	15
	10	12	5	4	5	5	5	13	5	5	6	6	6

The 2nd antenna has a slender exopod and endopod. The exopod is a little

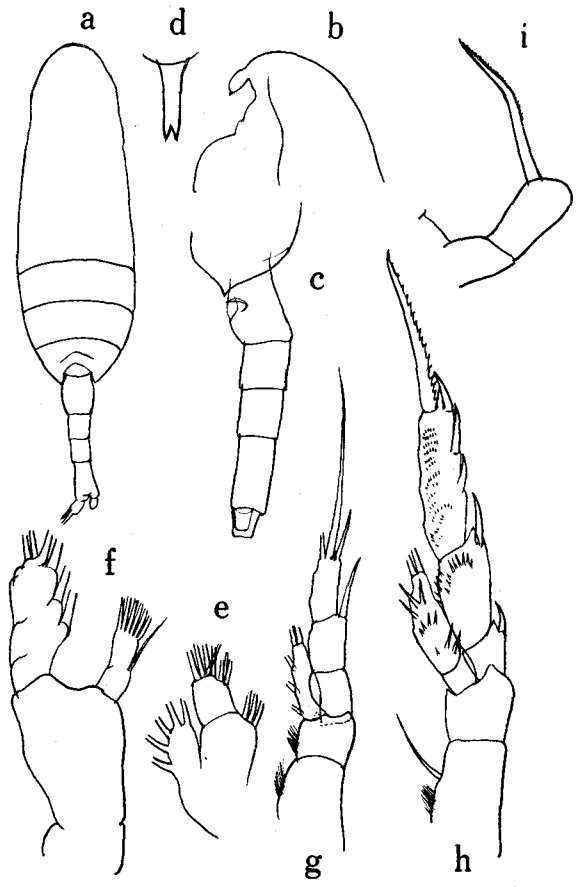

Fig. 126. *Racovitzanus porrecta* (GIESBRECHT).
Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, lateral aspect; d, rostrum; e, distal part of 1st maxilla; f, mandible palp; g, 1st leg; h, 2nd leg; i, 5th leg.

shorter than the endopod. The mandible has a small endopod, about 2/5 as long as the exopod (fig. f). The 1st maxilla has 7 long and 2 short setae on the outer lobe, 5 setae on the exopod, 5+3 setae on the endopod, 2 setae on the 2nd basal segment (fig. e). The 2nd maxilla has 5 long vermiform filaments and 3 short ones on the distal segments. The maxilliped as in the foregoing species.

The 1st leg is slender (fig. g). The outer edge spine on the 1st segment of the exopod absent; that of the 2nd segment is long and reaches the distal margin of the 3rd segment of the exopod. The inner marginal seta on the distal margin of the 2nd basal segment is absent. The 2nd leg has 3-jointed exopod and 2-jointed endopod. The outer edge spine on the 1st segment of the exopod is short and curved, about 1/3 the length of the outer margin of the following segment. The terminal spine of the exopod has 17 teeth. The posterior surface of the 2nd and 3rd segments of the exopod and 2nd segment of the endopod are furnished with groups of small spines, which are more dense than in the foregoing species (fig. h). The 3rd and 4th legs have each 3-jointed exopod and endopod. The left 3rd leg was abnormal in structure in the specimen dissected: it is composed of 2-jointed exopod and 3-jointed endopod.

The 5th pair of legs 2-jointed. The distal segment has a long serrated seta on the inner distal corner (fig. i).

Remarks. The present specimen is much smaller in size than that described by GIESBRRENCHT. The species is identical with *R. nanus* TANAKA listed in 1953.

Occurrence. One adult female from Suruga Bay in the hauls from deep water, Nov. 1938.

Distributions. The species has been recorded from the Pacific by GIESBRECHT (3°S, 99°W), WILSON (40°N), and BRODSKY.