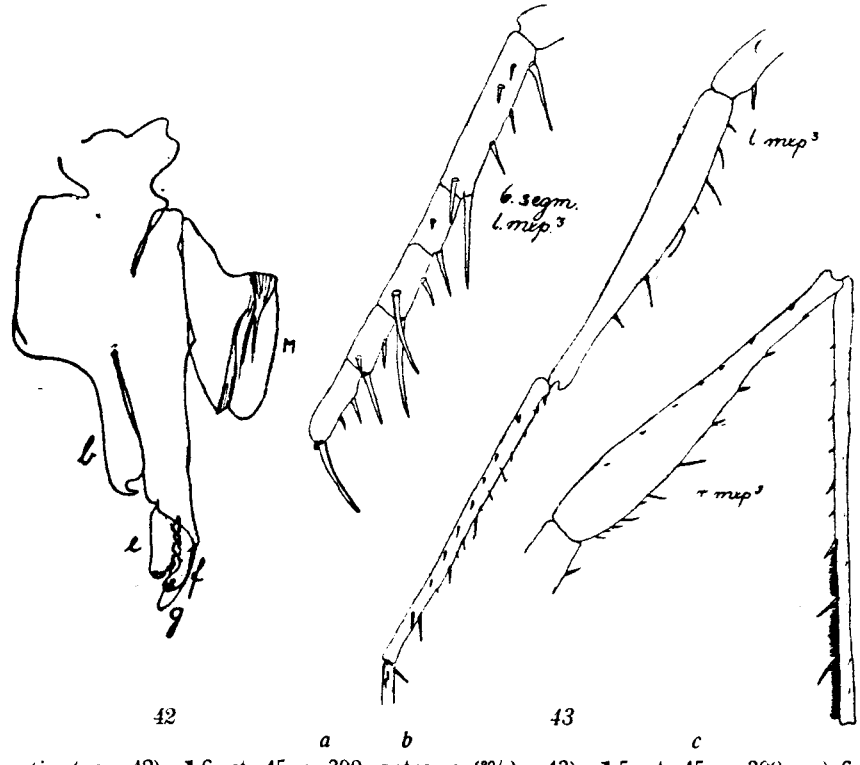
Sergestes pectinatus (Hansen) nomen novum.

Sergestes Henseni (Ortmann) H. J. HANSEN 1896 (partim).

This interesting species was described by HANSEN (1896) from "National" specimens, but it is not, as he believed, identical with the species described from the same sample by ORTMANN (1893) as *Sergia henseni*. On comparing Ortmann's and Hansen's descriptions it appears without doubt that both authors have founded their descriptions on specimens of two distinct (though closely related) species. Ortmann described one species, for which I propose to retain the name *S. Henseni* while Hansen fixed his attention chiefly upon an example of another species, for which I here propose the name *S. pectinatus*, alluding to the peculiar structure of the mxp.[3] first seen by Hansen. That both species were present in the sample in question is certain from the following passage in Hansens description relating to the outer uropods (1896, p. 959): "— — in the one specimen the ciliated part occupies three-fifths, in the other almost four-fifths of its length. In no other species have I met with any similar variation in this feature, but it also exists in the larvæ". One of the specimens must have lost its maxillipeds, otherwise the error cannot be explained. Hansen's description may be completed by the following particulars. The rostrum is rudimentary, consisting of a horizontal spiniform process from the frontal margin, its length at most equalling one-fifth of the breadth of the cornea. The three joints of the antennular peduncles are of nearly equal length. The relative length of the hairfringed portion of the outer uropods is about four-fifths (in one specimen



Figs. 42—43. *Sergestes pectinatus*. 42) ♂ 6, st. 45, y 300. petasma (30/1). 43) ♂ 5, st. 45, y 300. a) 6. joint of left 3. mxp. (40/1). b) 4. and 5. joint of same (15/1). c) 4. and 5. joint of right 3. mxp (15/1).

carefully measured 82 %). The petasma (see fig. 39) is of a type different both from that found in the "robustus-group" and from that of *S. vigilax*.

A peculiar interest is attached to a specimen (♂ 5) from st. 45, y 300 m. w., which presents all the characters of *S. pectinatus*, except in the left mxp.[3], which is shown in fig. 43. The sixth joint is subdivided in the typical manner, but the "comb" is wanting, being replaced by an armature of spines resembling that found in the mastigopus and in the adults of other species. I am inclined to regard this abnormality as an instance of atavistic regeneration pointing to the origin of *S. pectinatus* as a mutation from a nearly allied form. The right mxp.[3] is of the typical *pectinatus*-shape, the fifth joint being adorned with "comb" (the sixth joint is missing).

S. pectinatus is a very small species, apparently not exceeding C = 8 mm., (total length about 25 mm.), and the sexes may be distinguished even in specimens about 10 mm. in total length.

Size (C in mm.)	1	2	3	4	5	6	7	8	Total
Males			3	4	5	3			15
Females				7	10	8	2	1	28
Young	2	17	14						33

The larvæ differ from the adults in the following characters:—(1) the eyes are enormus, their greater diameter being from 31 to 50 % of the length of the carapace; (2) the relative size of the joints in the antennular peduncles shows an approximation towards the proportions found in *S. Henseni* (see under that species); (3) the percentage of hairfringed edge on the outer uropods is less, beeing from 74--78 % against about 80 % in the adult; (4) the sixt joint of the mxp.[3] is subdivided as in the adult, but carries only spines, something like the abnormal mxp.[3] found in an adult male (fig. 43).

It may be that Hansen is right in supposing that *Mastigopus tenuis* Bate (1888, pl. 65) is identical with Ortmann's *S. sargassi*. If so, the structure of the uropods and the process on the mxp.[3] indicate its connection with *S. pectinatus*, the said process not being found in *S. Henseni*. In that case the antennular peduncles must have been incorrectly drawn by Bate.

S. pectinatus was captured only in the southern part of the area explored by the "Michael Sars", and ORTMANN (1893) reports it (and *S. Henseni*!) from the equatorial region of the Atlantic.

It seems to live in the upper waterlayers.

Table of catches

St.	Gear	m. w.	Number	Sex, size
23	1 sn	200	1	♂ 5
34	y	400	1	♀ 4.5,
42	y	300	3	♀ 5, 5, ♂ 4
45	1 sn	100	6	♀ 4, 4, 4, ♂ 4, 4, 3
„	y	300	13	♀ 6, 6, 6, 6, 5, 5, 5, 5, 5, ♂ 6, 5, 5, 5
„	½ sn	1000	1	♀ 4
49	1 sn	100	1	☉ 2.4
„	y	2000	1	♀ 6
„	3 ln	3000	1	♂ 5
51	1 sn	200	1	♂ 6
„	½ sn	700	1	♀ 5
„	y	300	3	♀ 6, 5, ♂ 3
„	y	2000	1	♀ 6
„	y	3000	1	♀ 8
53	1 sn	200	2	♀ 7, 7
56	½ sn	500	1	♀ 4 (def.)
62	1 sn	200	1	♂ 6
64	1 sn	100	7	☉ 3, 2.5, 2,2, 2.2, 2.0, 2.0, 1.8
„	1 sn	200	4	☉ 2.9, 2.7, 2.7, 2.0
„	y	300	5	☉ 2.7, 2.5. 2.3, 1.3, 0.9 (L = 3)
„	¾ sn	600	6	☉ 3, 3, 3, 2.2, 2,2, 2.0
67	1 sn	50	4	☉ 2.8, 2.2, 2.0, 1.5
„	y	200	6	☉ 2.8, 2.6, 2.5, 2.4, 2.4, 2.3
64	y	1000	1	♂ 3.5 (L = 10)
„	y	2000	1	♀ 3.5
67	y	1200	3	♀ 5.5, 3.5, ♂ 2.5
13	26		76	

Sergestes Henseni Ortmann.

Sergia Henseni, ORTMANN 1893.
Sergestes sargassi, do., (mastigopus).
Sergestes Henseni, HANSEN 1896 (partim).
Sergestes vigilax, STEPHENSEN 1913.

In describing *S. Henseni* it will be convenient to compare it with *S. pectinatus*.

The rostrum is of the same shape, but longer than in *S. pectinatus*, its length equalling ⅔ of the breadth of the cornea.

The distal joints of the antennular peduncles are nearly of the same length but the first is much longer. In one specimen the following proportion was found: 19—10—11, in another: 18—11—13.

The third pair of maxillipeds are much more slender than in *S. pectinatus*, and the sixth joint, which also however, is divided into 5 subjoints, is not provided with a "comb", but carries a crowded armature of long and short spines. (See fig. 44). The relative length of the joints is about as 25—36—9—9—20 (in the other species as 34—16—16—16—17).

The hairfringed portion of the outer uropods, which carries sometimes a small tooth, is much shorter than in *S. pectinatus*, about 60 %.

ORTMANN's figure (1893, pl. 3, fig. 3) is drawn from a specimen of the present species. It is easy to understand that HANSEN (1896) found this figure "rather deficient" because he compared it with a specimen of *S. pectinatus* (certainly overlooked by Ortmann). The petasma is slender as in *S. pectinatus*, but very different in shape (see fig. 45). A singular feature, which I have not observed in other species, is the presence of multiple spines on the process *f*, somewhat recalling the "morning-stars" of by-gonetimes (se fig. 46).[1])

The larvæ are easily separated from those of *S. pectinatus* by several characters, viz: (1) the eyes are smaller, their longer diameter (E) compared with the length of the carapace (C)[2]) being as follows:—

C—1·8	2·0	2·3	2·6	3·0	3·1	3·2	3·5
E—0·7	0·65	0·75	0·7	0·7	0·7	0·75	0·8;

in *Serg. pect.*:	C—1·5	2·0	2·0	2·2	2·8
	E—0·85	1·0	0·8	0·9	0·9

(2) the second joint of the antennular peduncles is shorter, though the measurements are rather uncertain owing to the difficulty in securing a horizontal position without injuring the specimens; below the values found:

[1]) A drawing of the petasma is given by STEPHENSEN 1913 as fig. 6, though he refers his specimens to *S. vigilax*.

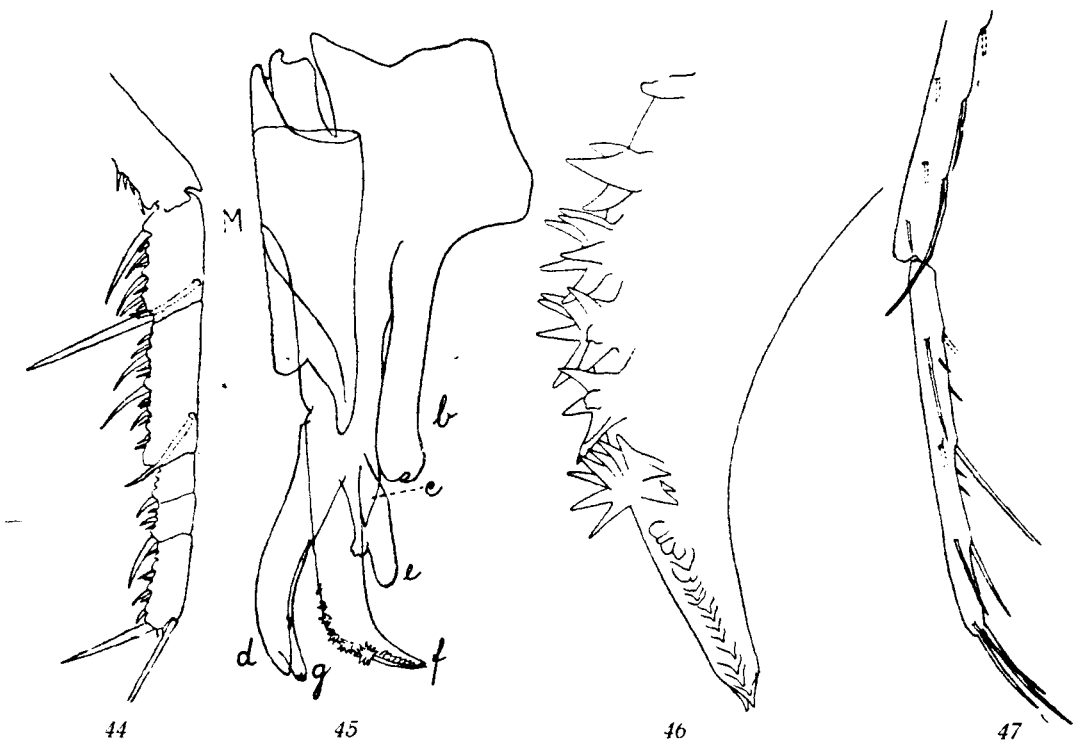
[2]) C is contained a little more than 3 times in the total length.

$$\frac{\text{2nd jnt.}}{\text{3rd jnt.}}\ 100 = 73 \cdot 78 \cdot 73 \cdot 78 \cdot 75 \cdot 82 \cdot 87 \cdot 75;$$

in *S. pect.* 82 · 96 · 82 · 89.

There is no appreciable variation with the size of the specimens. (3) the percentage of hairfringed edge on the uropods, which can be determined rather easily is very different from that in *S. pectinatus.* The following values were found (no appreciable variation with size): 61 · 63 · 64 · 65 · 63 · 63 · 62 · 60 · 64 · 63; in *S. pect.*: 74 · 75 · 78. (4) the external maxilliped is very similar to that of the adult, but there are only 4 subjoints, the fourth being later on divided into two. The armature is undeveloped, but the big spines are present and occupy similar positions as in the adult, see fig. 47. Attention is drawn to the fact that they are situated *in pairs* indicating a more primitive stage of development of the one-sidedness of the member, so pronounced in *S. armatus, vigilax etc.*

Sergestes Henseni is a much larger species than *S. pectinatus*, as the smallest males with petasma developed are about 5 mm. (C), while in *S. pectinatus* the petasma



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Figs. 44—47. *Sergestes Henseni*.. 44) ♀ 7.5, st. 23, y 400, 6. joint of 3. mxp. ($^{20}/_{1}$). 45) ♂ 7, st. 51, y 300, petasma ($^{30}/_{1}$). 46) ♂ 7, st. 51, y 300, process *f* of same ($^{150}/_{1}$), 47) ⊙ 2, st. 64, y 300, 3. mxp. ($^{50}/_{1}$).

is present in males of only 3 mm. (C). Below is a table recording the size of all the specimens taken during the expedition. It should be compared with the corresponding data for *S. pectinatus.*

C (mm.)	2	3	4	5	6	7	8	9	10	11	Total
Males				2	5	8	3				18
Females				4	15	13	1	3	4	1	41
Young	12	15	7								36

From the table of bathymetrical distribution it appears that *S. Henseni* lives in depths of about 150 metres. The data seem too scanty to allow of definite conclusions being drawn as to diurnal migrations or differences in habitat of the young and adult.

Depth (metres)	Hauls		Sizes (C in mm.)				Total		Grand total
			Below 5		5 —				
	D	N	D	N	D	N	D	N	
0—100	4	8	9	3	1	7	10	10	20
150—300	3	9	20	1	1	34	21	35	56
600—1500	3	8	1	0	5	10	6	10	16
Total	10	25	30	4	7	51	37	55	92
Grand total	35[1])		34		58		92		

According to our present knowledge the area of distribution is the same as that of *S. pectinatus*, with one remarkable exception one specimen caught as far north as st. 88 (about 45° N, 26° W).

[1]) On vertical haul not incl.

Table of cathes.

St.	Gear	m. w.	Number	Sex, size
23	1 sn	200	1	♀ 6
„	y	400	3	♀ 11, 10, ♂ 8
„	Tr	1250[1]	1	♂ 7,
29	y	400	1	♀ 9
„	y	2000	2	♀ 7, ♂ 5
34	y	400	2	♀ 10, 8
42	1 sn	200	1	♀ 7
„	y	300	1	♀ 6
45	1 sn	200	1	⊙ 3.5
„	y	300	16	♀: 3 à 7, 5 à 6, 1 à 5, ♂: 3 à 7, 4 à 6 mm.
„	y	2000	1	♂ 7
49	y	370	1	⊙ 3.1
„	3 ln	3000	1	♀ 7
51	1 sn	200	3	♀ 9, 6, ♂ 7
„	y	300	6	♀ 9, 7, 7, 7, ♂ 7, 7,
„	y	3000	2	♀ 7, 6
53	1 sn	0	1	⊙ 4
„	1 sn	100	1	⊙ 3
„	1 sn	200	1	♀ 5
„	y	300	4	♀ 7, 6, 6, ♂ 6
„	3 ln	2600	2	♀ 6, ♂ 8
56	y	2000	1	♀ 10
„	3 ln	3000	1	♀ 10
58	1 sn	200	1	♀ 6
„	y	300	1	♀ 7
62	y	300	1	♀ 6
„	3/4 sn	2500	1	♀ 6
63	3 ln	500—200	3	♀ 5, ⊙ 4, 4
64	1 sn	200	5	⊙ 3.0, 2.7, 2.3, 2.0, 2.0
„	y	300	18	⊙ 2 à 3.5, 5 à 3, 5 à 2.5, 6 à 2 mm.
„	y	2000	1	⊙ 2.0
67	1 sn	50	1	⊙ 1.4
„	y	200	3	⊙ 3.2, 2.6, 2.0
„	3/4 sn	600	2	⊙ 4, 3
„	y	1200	3	♀ 7, 5, ♂ 5
88	1 sn	200	1	♂ 8
15	36		95	

Sergestes Edwardsi Kröyer.

S. Edwardsi KRÖYER 1955.
S. oculatus do. (mastigopus)
S. Edwardsi HANSEN 1896.

Of this species only one specimen was taken during the expedition, a mastigopus about 10 mm. in length (C = 2,88), at st. 67, 1 sn. 50 m. w.

Sergestes (Acantosoma) sp.

Pl. I, fig. 1.

The single specimen was taken at st. 51, 1 sn, 200 m. w. I believe the photograph will give a better idea of the specimen than a description. The total length, excluding rostrum and telson is 2,5 mm. I may suggest that this Acanthosoma-form belongs to Hansen's group II, as the zoëa of *S. arcticus*, figured by WASSERLOOS (1908), is of quite another type. The form of the eyes suggest *S. Henseni* as being the adult.

[1]) Actual depth sounded.

Penæidæ.

Amalopenæus Smith 1882.

Gennadas BATE 1888.
Gennadas BOUVIER 1908.
Amalopenæus KEMP 1910.

Amalopenæus elegans Smith.

Amalopenæus elegans SMITH 1882.
Gennadas parvus BATE 1888.
—.— *elegans* BOUVIER 1908 (ubi syn.)
Amalopenæus elegans KEMP 1910.

This is one of the commonest deep-sea prawns in the Atlantic; it was taken in great numbers in nearly every haul made in sufficient depth, — i. e. deeper than about 400 metres. In all 690 specimens were taken evenly distributed over the area investigated, excluding, of course, the Norwegian Sea. It seems however from the table of catches that the species is more abundant in the waters traversed by the northern route from St. Johns to the banks S.W. of Ireland, in this respect very much resembling the other pelagic prawn of quantitative importance, *Acantephyra multispina*, with which it disagrees in being found also in the southern portion of the area.

In the table of bathymetrical distribution[1]) the catches from the northern and southern sections are kept apart and it appears as if the species ventures to ascend a trifle higher up in the water in the northern section than in the southern.

Depth (metres)	Northern section				Southern section			
	< 5 mm.		5 mm. —		< 5 mm.		5 mm. —	
	Day	Night	Day	Night	Day	Night	Day	Night
200—375		1				3	10	3
450—850	253	2	100	4	14	36	6	14
1000—2100	29		85	2	23	14	32	38

It appears also that the young come somewhat higher up than the adult, though they are also decidedly dwellers of the deeps, even the smallest specimens in the collection displaying a similar red colouring as the adult, only the legs being more transparent. Even the smallest (C = 2 mm.) have gone through the whole metamorphosis. The larvæ, which are presumably very small, could not be detected in the collections.

[1]) St. 10 and vert. hauls not considered.

Table of catches (Hauls during night are marked with an*).

St.	Gear	m.w.	Number	Sex, size
10	?	?	11	6—9.5
19	4 sn	900—0	16	3—8
„	1 sn	900—300	3	6, 5, 3
„	y	400	10	5—8
25*	1/2 sn	3400	2	4, 6
29	y	2000	1	7
34	y	1000	1	☉ 5
35	1/2 sn	4200	2	7, 3
„	T	(2603)	1	4
42*	y	900	10	7, 6, 6, 6, 5, 5, 5, 4, 4, 4
„*	1/2 sn	500	3	7, 5, 3
51*	y	2000	1	5
53*	y	1600	6	5, 5, 5, 4, 4, 3
„*	1/2 sn	2100	5	6, 5, 5, 5, 5
„*	3 ln	2600	13	5—7
56*	1/2 sn	750	3	5, 3, 3 (very defect)
„*	y	1000	29	5, 5, 5, 5 + 25 small (C = ca. 3)
„*	y	2000	8	6, 5, 5, 3, 3, 3, 3, 3
„*	3 ln	3000	4	5—7
62	y	1000	5	3, 3, 3, 3, 3
„*	y	2000	12	6, 6, 6, 5, 5, 3, 3, 3, 3, 3, 3, 3
„*	3/4 sn	2500	7	6, 6, 5, 5, 5, 5, 3
„*	3 ln	3000	1	6
63	4 sn	1850—450	2	6
„	4 sn	4600—1600	2	10, 9
64	y	2000	34	♀ 12.5 + thirteen ☉ with C = 5—6 + 20 small, C = ca. 3
„	3/4 sn	2500	5	10, 6, 6, 6, 4
„	3 ln	3000	3	♀ 12, 9, ♂ 12
66	y	1000	9	3, 3, 3, 3, 3, 3, 3, 3, 3
„	3/4 sn	1500	11	8, 7, 6, 6, 6, 6, 4, 3, 3, 3, 3
67	3 ln	2200	1	♀ 9 (defect)
70	y	1700	8	12, 10, 9, 9, 8, 8, 7, 7
80	y	1000	1	6
„	3/4 sn	1500	1	♀ 10
„	y	2000	10	♀♀ 13, 12.5, 12.5, 11, 9, 7, ♂ 11, 10, 9, 9
„	3/4 sn	2500	5	♀♀ 13, 12, 10, ♂ 10, 7
„	3 ln	3000	5	♀♀ 12, 11, ♂ 10, 9, 9
81	y	2000	2	♀♀ 8, 7
„	3/4 sn	2500	2	2, 2, doubtful
„	3 ln	3000	12	♀♀ 12.5, 11, 9, 8, 7, 7, 7, 7, ♂ 9, 8, 7, 7
82	y	1000	13	♀♀ 8, 8, 8, 8, 7, 6, 6, ♂ 8, 8, 7, 7, 6, ☉ 3
„	3/4 sn	1500	5	♀♀ 8, 7, 7, 6, ♂ 8
„	y	2000	2	♀♀ 11, ♂ 9
83	1 sn	1000	4	3, 3, 3, 3
84	y	1000	57	♀♀ 7, 6, ♂ 7, 7, 7 + 52 small, C = 2-3 mm.
„	3/4 sn	1500	8	♀♀ 7, ♂ 9, 7, ☉ 2, 2, 3, 3, 3
„	y	2000	7	♀♀ 9, 7, ♂ 8, 7, 7, 6, 6
„	3/4 sn	2500	3	♂ 7, ☉ 2.5, 2.5
87	y	1000	4	2—3
„	3/4 sn	1500	36	♂ 6, 5 the rest small, C = ca. 3
„	y	2000	10	♂ 6, 6 do, do.
88	y	1000	49	♀♀ 7, 6, 6, 4, 4 the rest ☉ with C = 3
„	3/4 sn	1500	10	♀♀ 7, 7, 6, 6, ♂ 7, 6, 6, 6, 4, 3
„	y	2000	14	♀♀ 8, 6, 6, ♂ 7, 7 and 9 ☉ with C = ca. 3
90	y	1000	17	♀♀ 7, and sixteen ☉ with C = ca. 4
„	3/4 sn	1500	3	♀ 6, 6, ♂ 6
92*	3/4 sn	600	1	4
„*	y	1000	5	♀ 6, ♂ 6, 6, ☉ 4, 4
„*	3/4 sn	1500	1	♀♀ 7
„*	y	2000	2	♀♀ 9, 8
94	3/4 sn	1500	2	3, 3
98	y	1000	38	♀ 8 + 37 ☉ (3—4)
„	3/4 sn	1450	9	♂ 6, 3, 3, 3, 3, 3, 3, 3, 3
„	3 ln	1500	48	20 ♀ (2 à 8, 4 à 7, 14 à 6), 28 ♂ (1 à 8, 7 à 7, 20 à 6) mm.
101	y	1000	40	C = 3—4
„	3/4 sn	1500	8	♀ 7, ♂ 7, 6, 6 and four ☉, C = 2.5-3
„	y	2000	22	♀♀ 8, 8, 7, 7, 6, 6, 6, 6, ♂ 7, 7, 7, 6, 6, 5 and eight ☉, C = 3—4
„	3 ln	2500	20	13 ♀ (4 à 8, 4 à 7.5, 3 à 7, 2 à 6), 7 ♂ (3 à 8, 3 à 7, 1 à 6) mm.
27	69		705	

Amalopenæus valens Smith.

Amalopenæus valens. SMITH 1882.
Gennadas valens. BOUVIER 1908.

So far as the area investigated by the "Michael Sars" is concerned this species shows a similar distribution to that of *A. elegans*, though it was taken in greatest numbers in the SE part of the area. It has a more pronounced vertical migration than that species as shown in the table below:

Depth	Day	Night
50		1
100—300		55
500—2000	11	43

The blue patches characteristic of most species of the genus *Amalopenæus* are larger and the eyes are larger and darker than in *A. elegans*.

Table of catches. (Hauls made during night marked *)

St.	Gear	m. w.	Number	Sex, size
19	4 ln	900	2	☉ 4, 3
23*	1 sn	200	2	♀ 8, 8
„*	y	400	10	5—8
„*	Tr	1215	7	6—7
„*	1 sn	500—0	1	7
25*	1/2 sn	2600	2	8, 11
29	y	2000	2	9, 8.5
34*	1/2 sn	600	1	4
„*	y	400	8	(5—8 mm.)
35*	4 ln	2400-0	1	♀ 10, ♂ 8, ☉ 6, 4, 3
42*	y	300	2	6, 6
45*	y	2000	1	♂ 9
49*	4 ln	3000	1	8
51*	y	2000	1	5
„*	3 ln	4000	1	♀ 8
52	3 ln	1200	2	♀ 9, ☉ 3
53*	1 sn	100	1	7
„*	y	300	5	6, 6, 6, 5, 2.5
„*	y	1600	2	7, 5
„*	3 ln	2600	12	(5—8 mm.)
56*	y	300	10	♀ 10, 10, 7, ♂ 11, 9, 8, 8, 7, 7, 5
„*	y	1000	1	♀ 10,
„*	y	2000	6	7—9
„*	3 ln	3000	10	6—10
58*	y	300	7	5—8
„*	3 ln	600	6	10, 9, 7, 7, 6, 6
62*	3 ln	3000	1	♀ 10
64	3 ln	3000	1	♀ 10
67	y	1200	2	8, 7
81	3 ln	3000	2	♀ 10, 8
82	y	2000	1	♂ 11
94	3 ln	2000	1	♂ 12
20	32		112	

Amalopenæus Tinayrei Bouvier.

Gennadas Tinayrei, Bouvier 1908.

This species resembles *A. valens* very much in appearance and seems to have a similar distribution horizontally and vertically, though it is probably wanting in the northeastern part of the area.

Depth	Day	Night
50—200		20
300—600	6	5
750—1500	3	7

Table of catches. (Hauls during night marked *).

St.	Gear	m. w.	Number	Sex, size
34*	y	400	1	♀ 6
42*	1 sn	200	2	♀ 7, 7
„*	y	300	4	8, 8, 7, 4
45*	y	300	3	♂ 6, 6, 6
51*	y	300	1	Ca. 6 (defect)
53*	1 sn	200	3	♂ 6, 6, 6
„*	y	600	2	5, 5
„*	3 ln	2600	4	7, 7, 7, 6
56*	1 sn	100	1	♂ 7
„*	1 sn	200	1	♂ 6
„*	y	300	1	♂ 6
„*	1/3 sn	750	3	3, 3, 3 (defect)
„*	3 ln	3000	1	6
58*	1 sn	200	1	6
„*	y	300	2	6, 6
62*	y	2000	1	5
„*	3/4 sn	2500	1	6
64	3/4 sn	2500	1	6
67	y	1200	4	7, 6, 5, 3 [1])
80	y	1000	1	♀ 7
81	3 ln	3000	1	♀ 7
82	3/4 sn	1500	1	♂ 6
84	y	1000	1	♀ 6
	23		41	

Amalopenæus Alicei Bouvier.

Gennadas Alicei, BOUVIER 1908.

The appearance of this species is very different from the other species of the same genus; the bright red is replaced by a strong orange and no blue patches are found. The eyes are very small and their pigment faded. The adult specimens are of much greater size than the other species in the genus. The species is certainly an inhabitant of the very deepest strata where the amount of light is nearly imperceptible. From the table of catches it will be seen that *A. Alicei* was never taken above a depth of 1000 metres, even during night.

The geographical distribution of *A. Alicei* is at present not fully known but is probably very extended. It has been taken during several of the Prince of Monaco's expeditions in the North Atlantic, approximately within the same area where the "Michael Sars" obtained it.

Table of catches. (Hauls during night marked *)

St.	Gear	m. w.	Number	Sex, size
25*	1/2 sn	3400	1	c. 16 (defect)
29	y	2000	8	11, 11, 10, 9, 5, 4, 4, 4
35	1/2 sn	4200	1	8
45*	y	2000	3	12, 12, 10
„*	4 ln	3000	3	12 (two def.)
49*	y	2000	3	4, 4, 4,
„*	4 ln	3000	6	15, 14, 13, 12, 9
51*	y	3000	1	♀ 10
53*	3 ln	2600	32	6—15 (mostly 12—14) mm.
56*	y	2000	2	14, 10
„*	3 ln	3000	4	15, 13, 11, 9
62*	y	2000	1	15
„*	3/4 sn	2500	1	15
„*	3 ln	3000	2	17, 16
64	y	2000	1	7
„	3/4 sn	2500	1	8
„	3 ln	3000	1	♂ 13, ♀ 11
80	3 ln	3000	1	♀ 12
82	y	2000	1	♀ 11
12	19		74	

Benthesicymus Sp. Bate.

Benthesicymus brasiliensis, BATE 1881.

This species was taken by the "Michael Sars" at st. 35 with trawl in a depth of 2603 metres. One defect female, total length 105 mm. The specimen differs from Bate's description by the presence of a very small spine in the hepatical area and a very small tubercle between the first pair of pleopoda. These characters may possibly have been overlooked by Bate, and this assumption is the reason why I do not propose a new name for the single specimen at hand.

B. brasiliensis has formerly been taken in the Southern Pacific and the South Atlantic, in depths between 600 and 4300 metres.

[1]) The smallest may perhaps be an *A elegans.*

Benthesicymus Hjorti n. sp.
(Pl. II, fig. 4).

This species bears a close resemblance to *B. crenatus* Bate sharing with it the outstanding feature of having the posterior edge of the fourth pleosomite saw-toothed (see fig. 48). Our species which might be considered the Atlantic representative of the Pacific species *B. crenatus*, differs from it in carrying only two teeth on the upper edge of the rostrum (the tip not included) and no spine on the carapace behind the rostrum.

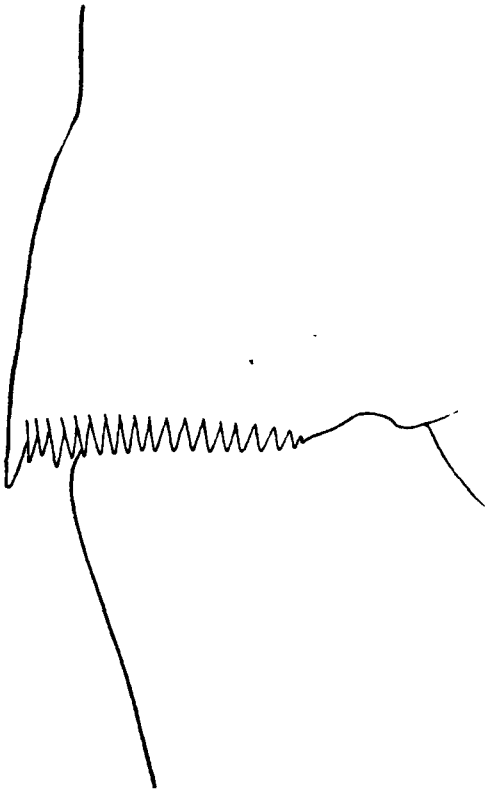

Fig. 48. *Benthesicymus Hjorti*. Detail of abdomen (5/1).

The eyes are devoid of pigment. The cornea is scarcely broader than the stalks which do not reach as far as the tip of the rostrum, neither to the extremity of the first joint of the antennular peduncles. This joint is of about the same length as the two outer joints together. The stylocerite ends in a short triangular tooth.

The carapace is very smooth, the sulci being nearly obliterated. Of spines only the branchiostegal is seen; it is very small.

The tail-fan is large. Telson is long, nearly three fourths as long as the outer uropod.

In all three specimens were taken, two males at st. 53 (trawl, 2615—2865 m.) and one female at st. 35 (trawl 2603 m.). Below is given some measurements, in mm., of these specimens.

	♂ st. 53	♂ st. 53	♀ st. 35
Length of carapace	35	26	44
Do, rostrum included	42	30	55
Length of scaphocerite, to tip of tooth	21	16	24.5
" - outer uropod, do.	20	15	23
" - do., total	24	18	28
" - inner uropod	17	13	20
" - telson	16.5	13	20.5

Benthesicymus longipes Bouvier.
Benthesicymus longipes, BOUVIER 1908.

This species has formerly been taken only once, near the Cap Verde Islands, in a depth 3890 metres.

Two of the specimens obtained by the "Michael Sars" were taken at a depth not exceeding 3000 metres (length of wire paid out 4000 metres) bottom being found in a depth of 3886 metres. The capture must therefore have occurred at a distance of not less than 800 metres ftom the bottom, thus establishing *B. longipes* as a plankton- animal.

"Michael Sars" 1910, st. 51, large net, 4000 metres wire out. Two males, length of carapace (C) 22 and 20 mm. respectively. St. 35, trawl, depth 2603 metres, one defect specimen (C = 19).

Benthesicymus ? carinatus Smith.
Benthesicymus? carinatus, SMITH 1884.

Only one, very mutilated specimen of *B. carinatus* was obtained, a female with a carapace length of about 30 mm., at st. 82, at a depth of about 2000 metres (large tow-net, 3000 metres wire out). Drawings of the very characteristic mouth parts are given in fig. 49. The form of these, especially of the 2. mxp., suggests for this species an intermediate position between the genera *Amalopenæus* and *Benthesicymus*.

Plesiopenæus Edwardsianus I. Y. Johnson.
Penæus Edwardsianus. I. Y. JOHNSON, 1867, p. 897.
Plesiopenæus Edwardsianus, E. L. BOUVIER, 1908, p. 64, ubi. syn.

Of this magnificent species good catches were made with the trawl at the following stations:
at st. 23, depth 1215 metres, 54 males and 83 females, and one young,
at st. 24, depth 1615 metres, one male and one female,
at st. 41, depth 1365 metres, 18 males and 7 females.

The length of carapace was measured in all the specimens except four defect ones. The females are generally much larger as will be seen from the measurements. In addition to those contained in the table four

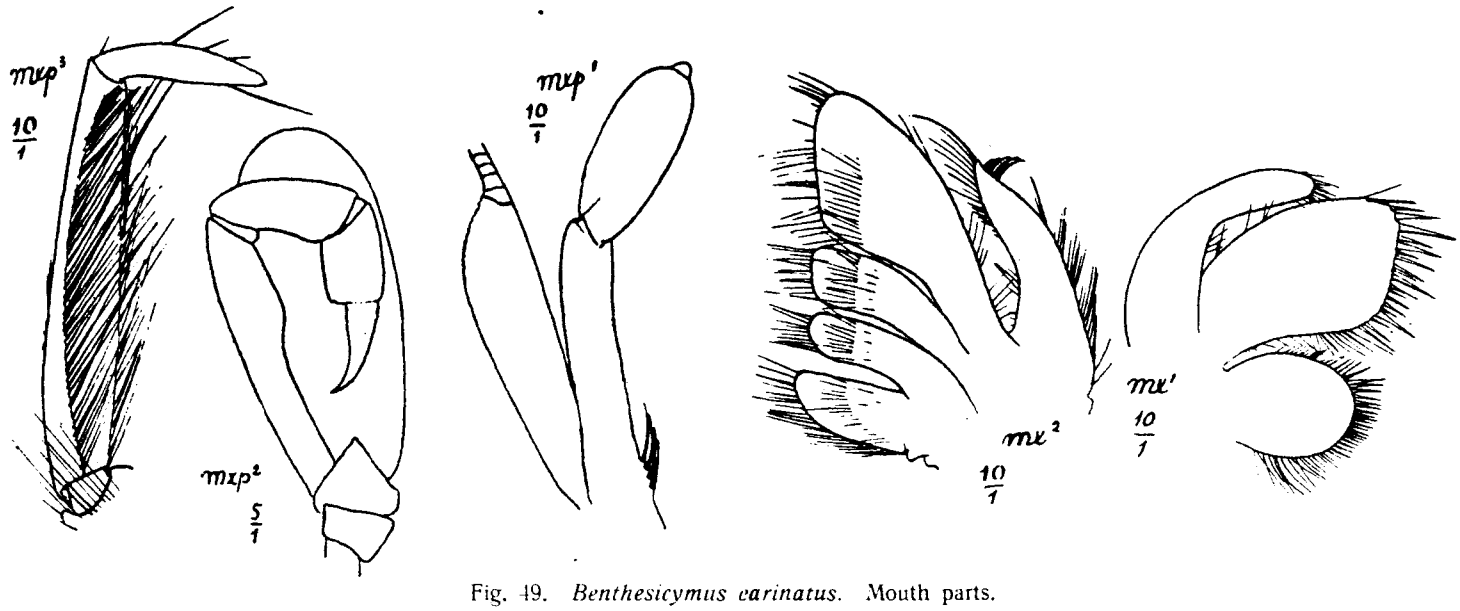

Fig. 49. *Benthesicymus carinatus*. Mouth parts.

defect specimens and one young of indefinite sex, measuring 30 mm. were taken.

The largest specimen, a female with a carapace 104 mm. long measured 334 mm. from tip of telson to tip of rostrum. The species has been taken on both sides of the Atlantic, in the Gulf of Bengal and in the Andaman Sea but not in the Mediterranean. Bathymetrical limits 344 to 1850 metres.

Length of carapace cm.	Number of	
	males	females
4.0	3	3
4.5	2	6
5.0	3	3
5.5	21	1
6.0	33	2
6.5	8	8
7.0	—	12
7.5	—	8
8.0	—	15
8.5	—	14
9.0	—	13
9.5	—	4
10.0	—	—
10.5	—	1

Aristeopsis tridens S. I. Smith.

Aristeus? tridens, S. I. Smith 1884, p. 404, pl. IX, fig. 1—6.
Aristeopsis armatus Sp. Bate var. *tridens*, Bouvier 1908 (ubi syn.).

This large prawn was obtained on two occasions during the expedition, both of the catches within the bathymetrical and horizontal limits of distribution as previously known, viz:

at st. 35, trawl, 2603 metres, 5 males and 3 females,
at st. 53, trawl, 2615—2865 metres, 21 males and 20 females.

The sizes of the specimens were as follows:

Length of carapace cm.	Number of	
	males	females
3.5	2	1
4.0	—	4
4.5	6	8
5.0	12	7
5.5	5	2
6.0	1	1

The total length is about 4 times that of the carapace measured from the orbital sinus.

As the species is perfectly well established by Smith (1884) and clearly distinguishable from *A. armatus* (Bouvier 1909), there seems to be little reason to encumber its name by referring it as a variety of another distinct though nearly related species.

Aristeomorpha foliacea Risso.

Penæus foliaceus, Risso, 1826.
Aristeomorpha foliacea, E. L. Bouvier, 1908, p. 53 (ubi syn.).

This species was taken together with *Parapenæus longirostris*, at st. 21, trawl, 535 metres.

Two females, length of carapace 58 and 65 mm. respectively.

The species is known from the Mediterranean and off Morocco in depths between 500 and 1300 metres.

Funchalia Woodwardi Johnson.

Funchalia Woodwardi, JOHNSON, 1867, p. 995—897.
Grimaldiella Richardi, E. L. BOUVIER, 1905 (juv. solum).
Funchalia Woodwardi, E. L. BOUVIER, 1908, p. 93, ubi syn.

No less than 67 specimens were obtained of this curious species, all of which are immature, the largest only about 7.5 cm. long while the type specimen taken by Johnson at Madeira in 1867 was $6^1/_2$ inches or about $17^1/_2$ cm. BOUVIER (1908) belives that *Funchalia* leads a bathypelagic life though being able to ascend to the upper waterlayers. From the catches of the „Michael Sars" Expedition it would appear that the young, at last of *Funchalia* are denizens of the upper waterlayers though not of the very surface, most of the 67 specimens (43) having been taken between 50 and 150 metres and the rest probably during the hauling up of the gear from greater depths.

As to the geographical distribution it may be noted that the species was taken both in the Sargasso Sea, S. of the Azores and W of North Africa while formerly it was known only from the neighbourhood of the Azores and the Canary Islands.

Table of catchës. (Hauls during night marked *).

St.	Gear	m. w.	Number	Sex, size
23*	y	400	8	4, 4, 5, 6, 7, 7, 7, 8
29	1 sn	200	1	12
„	y	2000	1	11
34*	$^1/_2$ sn	600	1	9
35*	4 ln	2400-0	1	8
38	$^1/_2$ sn	200	1	8
39*	1 sn	150	1	8
42*	y	900	1	5
„*	y	300	5	20, 12. 11, 11, 8
„*	1 sn	100	2	12, 11
45*	1 sn	100	6	8, 8, 7, 4, 3, **2**
„*	1 sn	200	17	18, 10, 9, 9, 8, 8, 7, 6, 6, 6. 6, 5, 4, 4, 4, 3, **2**
„*	3 ln	3000	4	20, 14, 10, 9
49*	4 ln	1000-0	2	9, 7
„*	y	2000	2	9, 5
„*	3 ln	3000	1	8
51*	y	2000	1	18
52	$^1/_2$ sn	100	2	5, 5
53*	1 sn	100	7	5, 3, 3, 3, 3, 2
58	y	300	1	3
67	y	1200	2	5, 3.5
14	21		67	

Parapenæus longirostris H. Lucas.

Penæus longirostris, H. LUCAS, 1849.
Parapenæus longirostris, E. L. BOUVIER, 1908, p. 102 (ubi syn.).

At st. 21 the trawl brought up from a depth of 535 metres four females of the above species. Their length of carapace was 29, 30, 32 and 36 mm. respectively, total length 15—17 cm.

The species has formerly been taken off the coasts of Portugal and Morocco and in the Mediterranean down to a depth of 500 metres.

STENOPIDES.

Spongicola Koehleri Caullery.

Spongicola Koehleri, CAULLERY, 1896.

This interesting species was discovered by the „Caudan" in the Bay of Biscay in a depth of 1410 meters in 1896. Since that time it has probably not been retaken until the "Michael Sars" expedition obtained one specimen at st. 23, from a depth of 1215 metres. C = 9, L = 24 mm.

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Record

of horizontal hauls intended to provide samples of zooplankton during the "Michael Sars" expedition 1910.

The appliances used were:—conical silknets with mesh in end-part of 0.5 mm. ($^1/_4$ square millimeter) and with a diameter at the opening of $^1/_2$, $^3/_4$ or 1 meter (designated in the tables as $^1/_2$ sn, $^3/_4$ sn, 1 sn); conical nets made of shrimp-trawl net, diameter at the opening 3 m. ("3 ln"); and young-fish trawls og C. G. Joh. Petersen's model ("y"). In the first table (I) each haul is represented by a figure showing length of wire between the appliance in question and the ship. The actual depth is, of course unknown, but may roughly be guessed as about two thirds of the length of wire, in hauls near the surface perhaps somewhat less.—The surface-hauls were alle made by means of a one-meter silk net. Table II shows the duration of each haul in minutes. Table III giwes a view af all the horizontal zooplankton hauls, distributed over the different depths (i. e. wire out) and over the four are as into which the regions travesed during the voyage may conveniently be divided. NE comprises station 1—12 and 87—116, NW stations 70—86, SE stations 13—59 and SW stations 60—69. Operations began on the the 9th of april 1910, at st. 1 and ended aug. 14 1910 at st. 116.

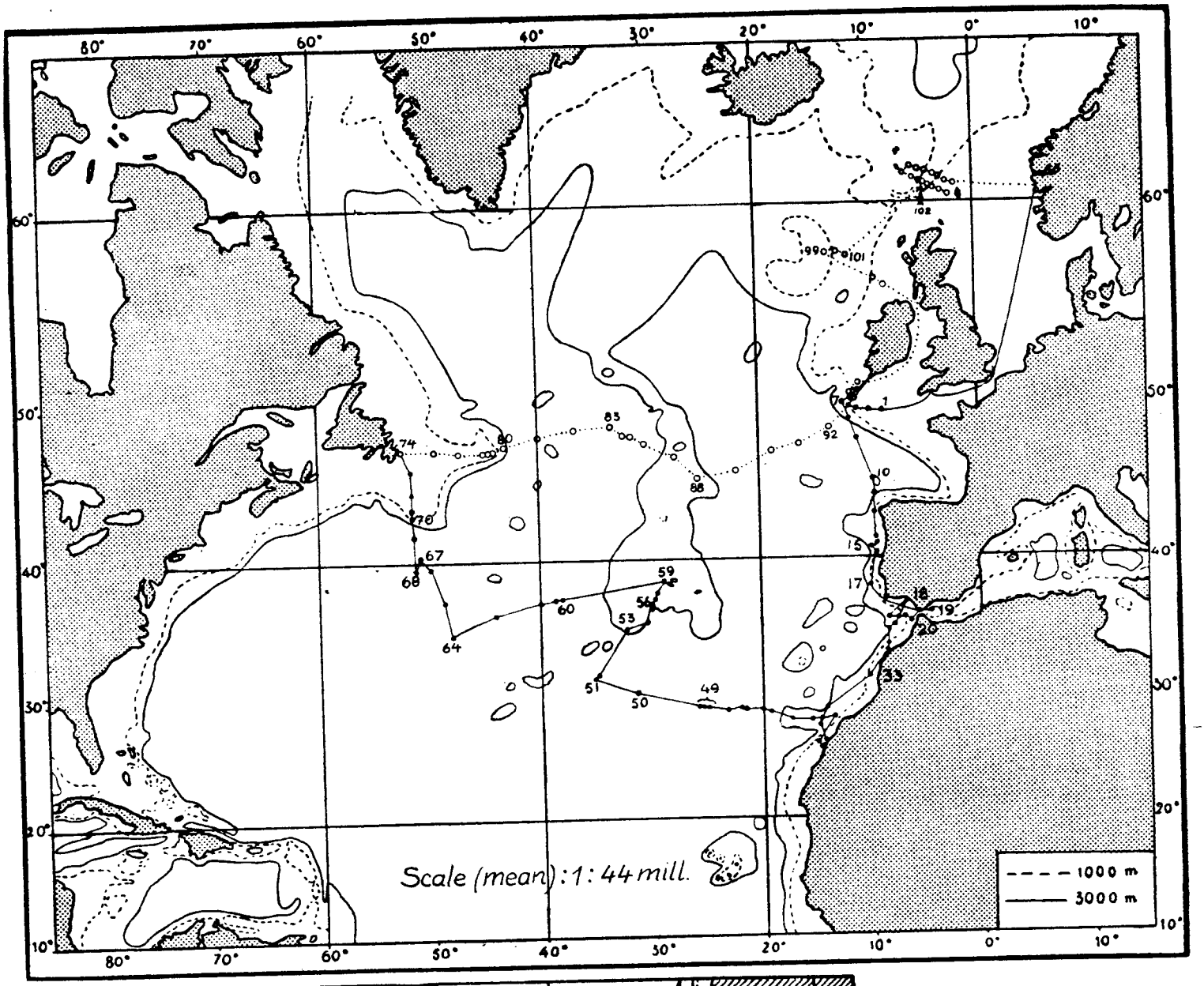
The position of the stations may be gathered from the three charts, pag. 35.

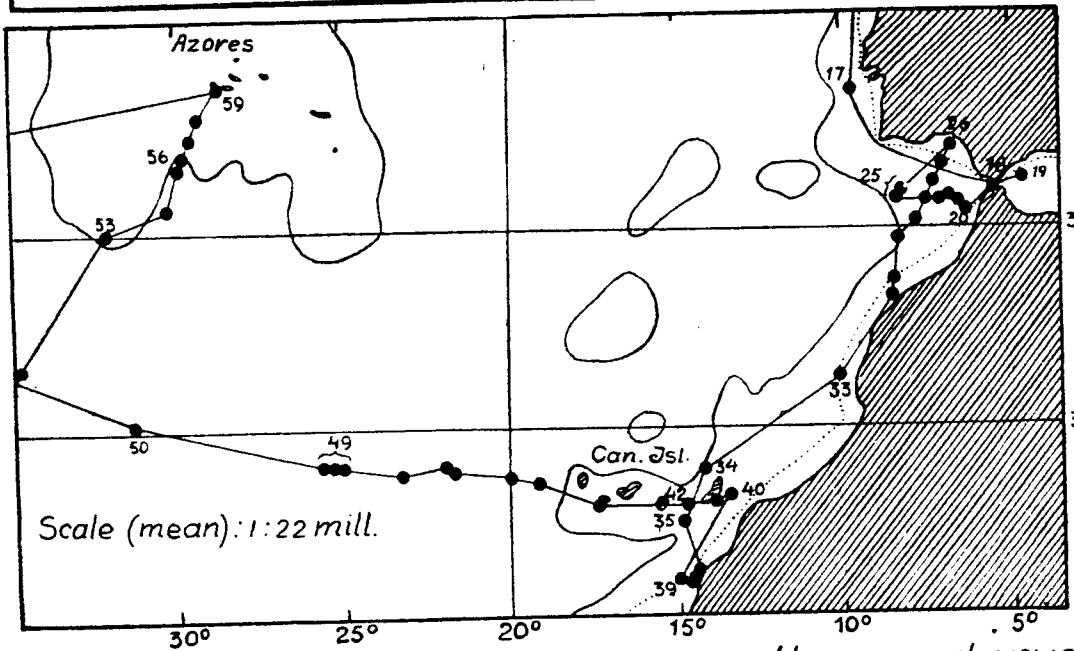
Table I. (Table I) (Table I)

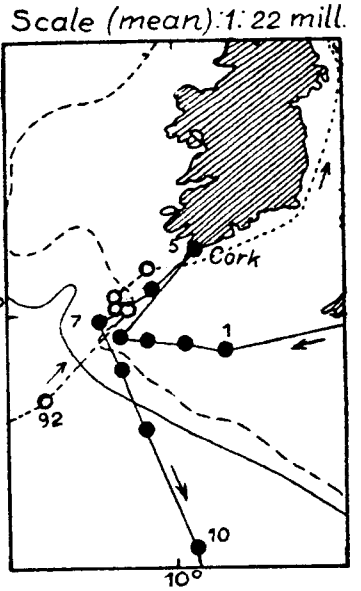
St.	Date	Dur. of haul	Appliances towed simult.					St.	Date	Dur. of haul	Appliances towed simult.					St.	Date	Dur. of haul	Appliances towed simult.				
			1/2 sn	3/4 sn	1 sn	3 ln	y				1/2 sn	3/4 sn	1 sn	3 ln	y				1/2 sn	3/4 sn	1 sn	3 ln	y
		hours	m. w.	m. w.	m. w.	m. w.	m. w.			hours	m. w.	m. w.	m. w.	m. w.	m. w.			hours	m. w.	m. w.	m. w.	m. w.	m. w.
10	19-21/4	2 1/4			100*)		300[1])	53*	8-9/6	6	1100				1600	83	14/7	1	1000[3])				
"	"	"			200*)			"	"	"	2100					84	15/7	4		600	100		300
"	"	3			970		1570	56*	11-12/6	10	500		100[2])	3000	300[2])	"	"	"		1500	200		1000
15*	22-23/4	1 2/3			100		300	"	"	"	750		200[2])		1000	"	"	"		2500			2000
"	"	"			200			"	"	"					2000	"	"	"					3000
"	"	"			600			58*	10-11/6	c. 10			100	600	300	86	16/7	1/2	100[3])				
19*	2-3/5	8					400	"	"	"			200			"	"	"	300[3])				
23*	5-6/5	6 1/2			200		400	62*	20-21/6	6 1/2		600	100	3000	300	"	"	"	600[3])				
"	"	"					1500	"	"	"		2500	200		1000	"	"	1	1000[3])				
25 A	7/5	3	2600					"	"	"					2000	"	"	"	2000[3])				
25 B*	8/5	5	3400					64	24/6	6		600	100	3000	300	87	17/7	3	300	600	100		300
29	9/5	1 1/4	1100		200		400	"	"	"		2500	200		1000	"	"	"		1500	200		1000
"	"	"					2000	"	"	"					2000	"	"	"		2500			2000
34*	13-14/5	4	600				400	66	26/6	2		200			1500	"	"	"					3000
"	"	"					1000	"	"	"		500				88*	18/7	6 1/2	300	600	100		300
35*	18-19/5	2	4300					"	"	"		1000				"	"	"		1500	200		1000
38	20/5	1 1/2	215		60		215	67	27/6	2		600	50	2200	200	"	"	"					2000
"	"	"			140			"	"	"		800			1200	90	21/7	3	300	600	100		300
39 A*	20-21/5	7	240		75		300	"	"	"		1700				"	"	"		1500	200		1000
"	"	"			150			69	29/6	2			100		300	"	"	"					2000
42*	23-24/5	7	500		100		300	"	"	"			200			92*	23-24/7	4		600	100	3000	300
"	"	"			200		900	70	30/6	5		100	200		300	"	"	"		1500	200		1000
45*	28-29/5	9 1/4	1000		100[1])	3000	300[1])	"	"	"		700			1700	"	"	"					2000
"	"	"			200[1])		2000	"	"	"		1200				94	26/7	3	250	600	100	2000	300
47	30/5	c. 10	45					71	"	2			100		300	"	"	"		1500	200		1000
"	"	"	6800					"	"	"			200			96	27/7	1		100			300
48	"	c. 12	150					80	11/7	c. 6		600		3000	300	97	4/8	3/4					50
"	"	"	7550					"	"	"		1500				98*	5/8	4		600	100	1500	300
49 B	1/6	c. 8	750		100	3000	370	"	"	"		2500				"	"	"		1450	200		1000
"	"	"	1000		270		2000	81	12/7	3		600	100	3000	300	99	6/8	1/2					75
51*	5-6/6	c. 11	700		100	4000	300	"	"	"		1500	200		1000	101	7/8	3		600	100	2500	300
"	"	"	1000		200		2000	"	"	"		2500			2000	"	"	"		1500	200		1000
"	"	"					3000	82	13/7	3 1/2		600	100	3000	300	"	"	"					2000
52	6/6	2 1/2	100			1200	600	"	"	"		1500	200		1000	102*	9-10/8	3		400	100	1500	300
53*	8-9/6	6	60		100	2600	300	"	"	"		2500			2000	"	"	"		1400	200		600
"	"	"	120		200		600	83	14/7	1/2	100[3])					"	"	"					1000

[1]) Appl. 100, 200, 300, m. w. only 6 1/4 hours. [2]) Appl. 100, 200, 300 m. w. only 7 hours. [3]) Fine silk horisontal closing net, d = 1/2 m.

Cruises of the "Michael Sars" 1910.







Outward voyage ——— Homeward voyage ·····o·····o·····

Table II.

Surface-hauls (with silknet, 1 m. diam.)

Duration of hauls given in minutes.

St.	Dur.	Ended at	St.	Dur.	Ended at	St.	Dur.	Ended at
5	10	14.40	44	10	14.00	70	300	13.10
10	90	21.45	46	10	day	71	120	sunset
„	60	11.00	47	10	day	73	15	day
15	100	23.30	48	720	23.30	75	5	day
18	15	23.30	49	240	16.30	78	15	17.00
19	10	9.15	50	10	8.30	80	360	18.09
25	60	22.50	51	15	20.45	81	180	18.30
26	10	21.40	„	660	5.30	82	60	16.00
27	10	1.10	52	150	24.00	84	240	17.30
28	10	7.10	53	390	4.30	87	180	13.30
29	75	20.15	56	150	4.30	88	390	8.45
31	10	16.10	58	500	4.15	90	180	18.00
32	10	20.10	59	15	16.45	92	240	2.30
35	45	19.45	60	10	9.05	94	180	15.00
37	10	9.15	62	390	4.30	97	45	20.10
38	10	12.00	64	600	17.00	98	240	6.30
39	10	4.00	66	120	17.40	99	20	9.20
42	10	5.00	67	120	15.15	101	180	16.00
43	10	18.00	69	120	10.30	102	180	night

Table VI.

Summary of hauls.

Wire out (m.)	Silk-net				Total	Large nets etc.				Total
	NE	NW	SE	SW		NE	NW	SE	SW	
During day (hours 6—18)										
Surface	8	6	14	5	33	—	—	—	—	—
40—150	5	7	6	3	21	2	—	—	—	2
151—450	7	6	3	3	19	6	5	3	3	17
450—1250	5	9	2	5	21	5	4	2	2	13
1251—2250	4	5	—	1	10	4	5	2	3	14
3251—4750	1	4	1	2	8	2	4	1	1	8
4751—7751	—	—	2	—	2	—	—	—	—	—
Total (day)	30	37	28	19	114	19	18	8	9	54
During night (hours 18—6)										
Surface	5	—	15	1	21	—	—	—	—	—
40—150	5	—	11	1	17	—	—	—	—	—
151—450	7	—	9	1	17	4	—	11	1	16
451—1250	3	—	9	1	13	4	—	5	1	10
1251—2250	4	—	1	—	5	5	—	5	1	11
2251—4300	—	—	2	1	3	1	—	5	1	7
Total (night)	24	—	47	5	76	14	—	26	4	44

Table III.

Number and duration of horizontal hauls.

Length of wire metres	Silknets (diam. 0.5, 0.75 and 1 m.)										Large nets or y. fish trawl of shrimp net									
	Number of hauls					Hours towed					Number of hauls					Hours towed				
Limits	NE	NW	SE	SW	Tot.	NE	NW	SE	SW	Tot.	NE	NW	SE	SW	Tot.	NE	NW	SE	SW	Tot.
0.....	12	6	28	6	52[1]	39.2	23.5	65.2	18.5	146.4										
40—50.....			1	1	2			10	2	12	1				1	0.5				0.8
51—150.....	10	7	16	3	36	32.8	18.5	101	14.5	166.8	1				1	0.5				0.5
151—250.....	10	5	11	4	30	34.8	17.5	65	16.5	133.8			1	1	2			1.5	2	3.5
251—450.....	4	1	1		6	15.5	0.5	8		24	10	5	13	3	31	33.8	17.5	83.8	14.5	149.6
451—750.....	7	6	6	4	23	26.5	22	40.7	16.5	105.7	1		3		4	3		18.5		21.5
751—1250.....	1	3	5	2	11	3	7	35.5	4	49.5	8	4	4	3	19	29.5	16.5	23.5	14.5	84.0
1251—1750.....	8	4		1	13	29.5	16.5		2	48	3	1	2	1	7	10	5	12.5	2	29.5
1751—2250.....		1	1		2		1	6		7	6	4	5	3	18	22.5	16.5	39.5	14.5	93
2251—2750.....	1	4	1	2	8	3	16.5	3	12.5	35	1		1		2	3		6		9
2751—3250.....											2	4	4	2	12	7	16.5	38.3	12.5	74.3
3251—4750.....			2		2			7		7			1		1			11		11
4751—6250.....																				
6251—6750.....																				
6751—7250.....			1		1			10		10										
7251—7750.....			1		1			12		12										
	53	37	74	23	187[1]	184.3	123	364.4	86.5	757.2	33	18	34	13	98	110.1	72	234.6	60	476.7

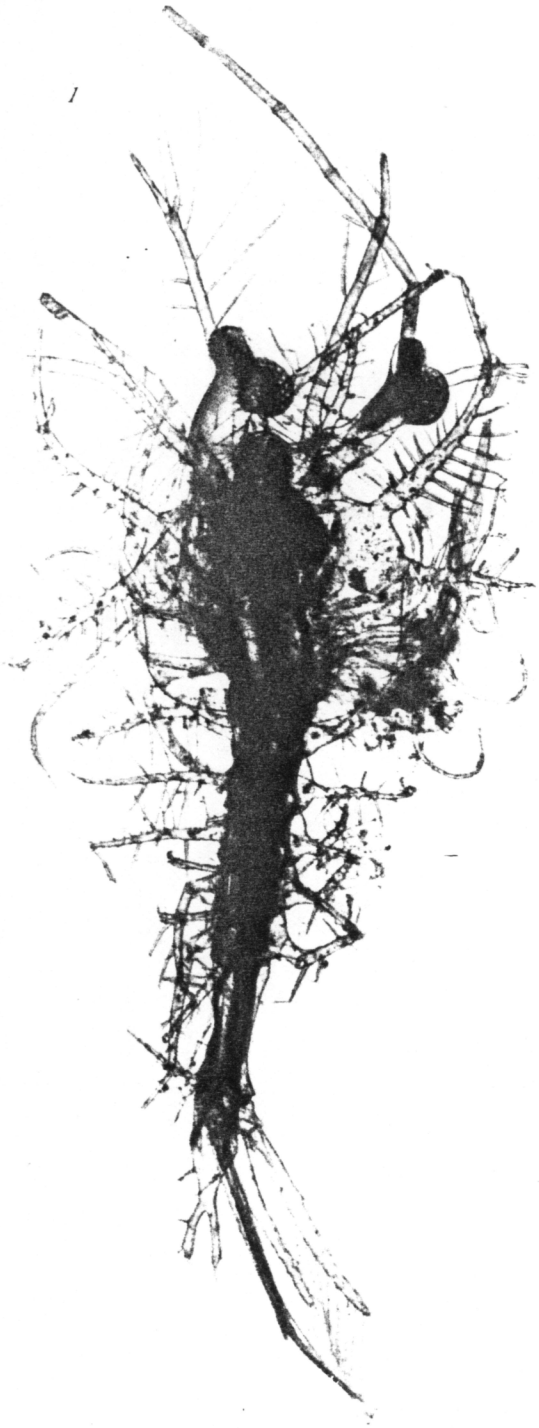
[1]) Series of of surface hauls at the same station here considered as one haul.

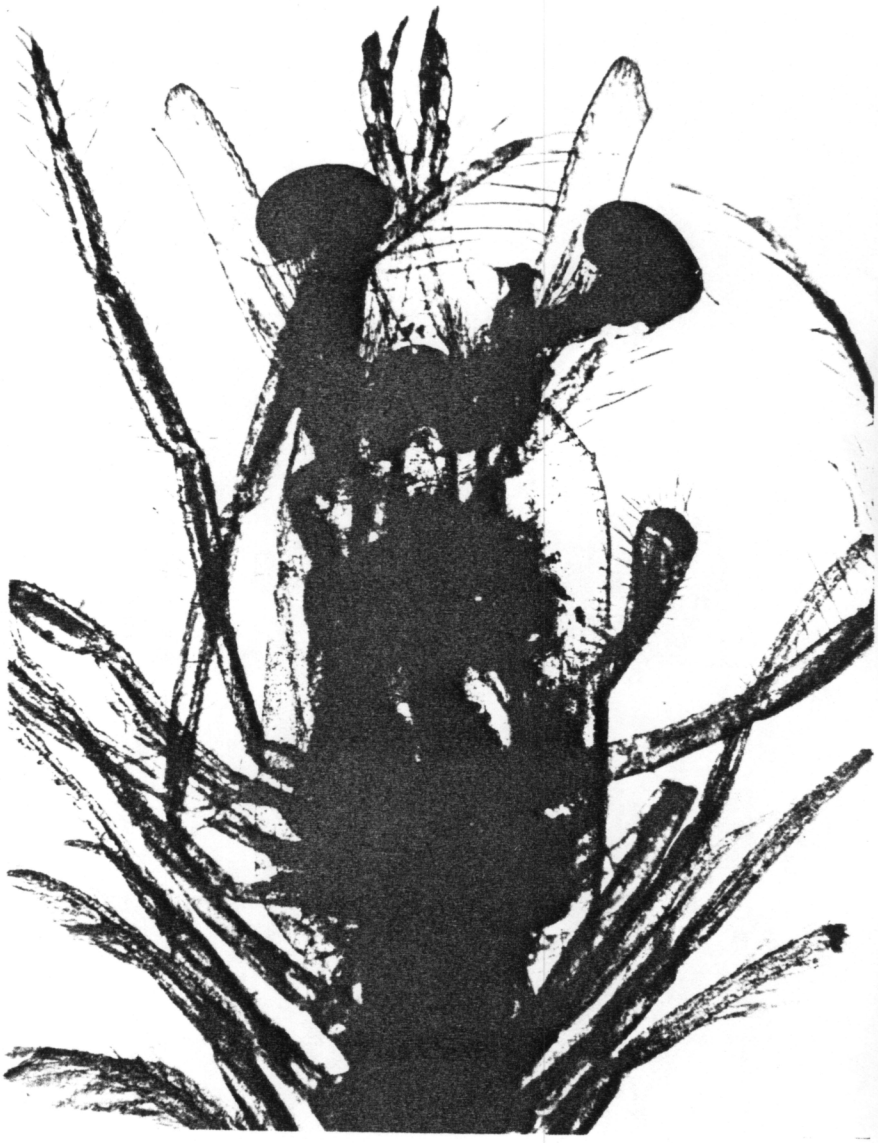
Plate I.

Fig. 1. *Sergestes* (Acanthosoma) sp. ($^{35}/_{1}$)

Fig. 2. *Sergestes robustus* (juv.) Forepart, st. 64, y 300 m. w. ($^{42}/_{1}$).

Fig. 3. *Sergestes robustus* (juv.) Tail-fan of the same specimen ($^{42}/_{1}$).





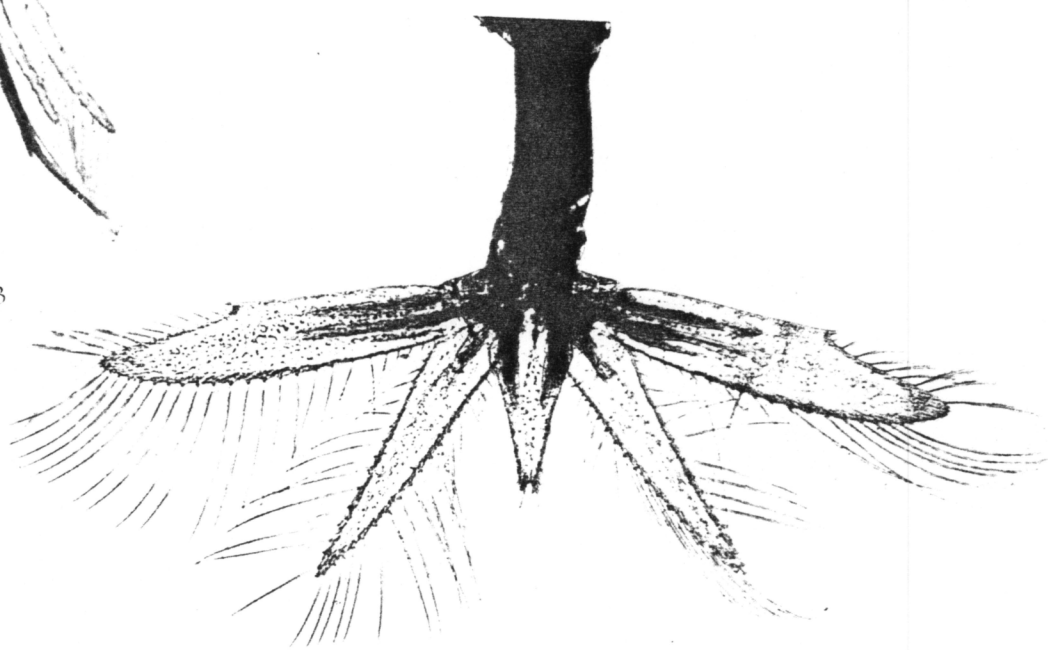


Plate II.

Fig. 1. *Sergestes corniculum*, ♀ 17, st. 51, y 300 m. w. Rasmussen del. ($^{2}/_{1}$).

Fig. 2. *Sergestes splendens*, head-parts of a young specimen, st, 64, 1 sn, 100 m. w. ($^{45}/_{1}$).

Fig. 3. *Sergestes splendens*, tail-fan of the same specimen ($^{45}/_{1}$).

Fig. 4. *Benthesicymus Hjorti* ♀ 44, st. 35, trawl, 2603 m. Rasmussen del. ($^{1}/_{1}$).