POLYCHAETA

FROM THE

"MICHAEL SARS" NORTH ATLANTIC DEEP-SEA EXPEDITION 1910

BY

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INTRODUCTION

During the cruise of 1910 the "Michael Sars" gathered a rich material of Polychaeta, which has been handed to me for examination.

The material contains representatives of 75 species dispersed on 51 genera and 20 families. Five of these species are new to science, one of them being so aberrant as to form a new genus (*Watelio*). We should perhaps have expected a greater number of new species, but the polychaete fauna of the northern and central Atlantic is already comparatively well known. Thus LANGERHANS has studied the fauna of Madeira and the Canary Islands, and FAUVEL, who has examined the abundant polychaete material from the collections of Prince Albert I. of Monaco, has given a very good account of the polychaete fauna of the northern Atlantic.

By far the largest part of the material consists of pelagic species, belonging chiefly to the five families *Aphroditidae* (subfamily *Polynoïnae*), *Phyllodocidae* (subfamily *Lopadorhynchinae*), *Alciopidae, Tomopteridae* and *Typhloscolecidae*. Pelagic species are found all over the examined field, both along the European and the African coast and in the open sea, whereas benthonic species are taken only along the European and African coast from north of Scotland (St. 102) to the Canary Islands, at one station (56) by the Azores (? *Pygospio elegans*), and at one station in the open sea (St. 70, S of New Foundland, where only benthonic and some bathypelagic species are collected). Most of the pelagic species are taken in greater quantities. Of the benthonic species only one (*Hyalinœcia tubicola*) is brought home from more than one station.

The study of this great material is zoogeographically of certain importance, as it allows us to make some comparisons between the pelagic polychaete fauna of the northern and of the central Atlantic. Last follow five tables showing the horizontal and vertical distribution &c of the pelagic species, and a list of stations with the species found at each of them.

Most of the material originates from horizontal hauls, several appliances having been towed simultaneously in the same wire in different depths. Thus the actual depth of each gear is not known. I have followed some of the previous authors in calculating the depth of the gear as one half of the length of wire paid out.

In the determination of the material my best help has been the excellent works of FAUVEL: "Polychètes errantes" and "Polychètes sédentaires", published as nos. 5 (1923) and 16 (1927) in the series "Faune de France", and without which my task would have been much more difficult.

A difficulty has been the great uncertainty prevailing as to the conception of species of the pelagic polychaeta. A great many forms have been described, many of them have never been found again, many are also too incompletely described to allow a certain decision as to their identity. In order to get a survey of these intricate families I have examined the descriptions of all (as far as the accessible literature allows) published species of the genus *Lopadorhynchus* and of the families *Alciopidae, Tomopteridae* and *Typhloscolecidae,* mentioning them under the species with which I think them conspecific, or, if they are not represented in the present material, treating them particularly (in brevier). I do not claim to have given a complete diagnosis of these species, my object being only to note their determining characters.

For most of the pelagic species a complete synonymy does not exist. I have therefore tried to give the completest possible synonymy for these species, noting all the different names or forms of names under which the species in question has been published, and I have mentioned for each the principal paper or papers on it. But because of evacuation from the University Library and from other Norwegian Libraries, and as it has been impossible during the war to get books from abroad, there are too many of these papers that I have not had occasion to see myself. In the literature list such papers are marked with an asterisk (*). — For the other species I have noted, besides the synonyms which I have seen myself, also papers for a more complete synonymy.

As to the names of the genera and species I have tried to find the correct one according to the International Rules of Zoölogical Nomenclature, and for that purpose SHERBORN'S "Index Animalium" has been of very

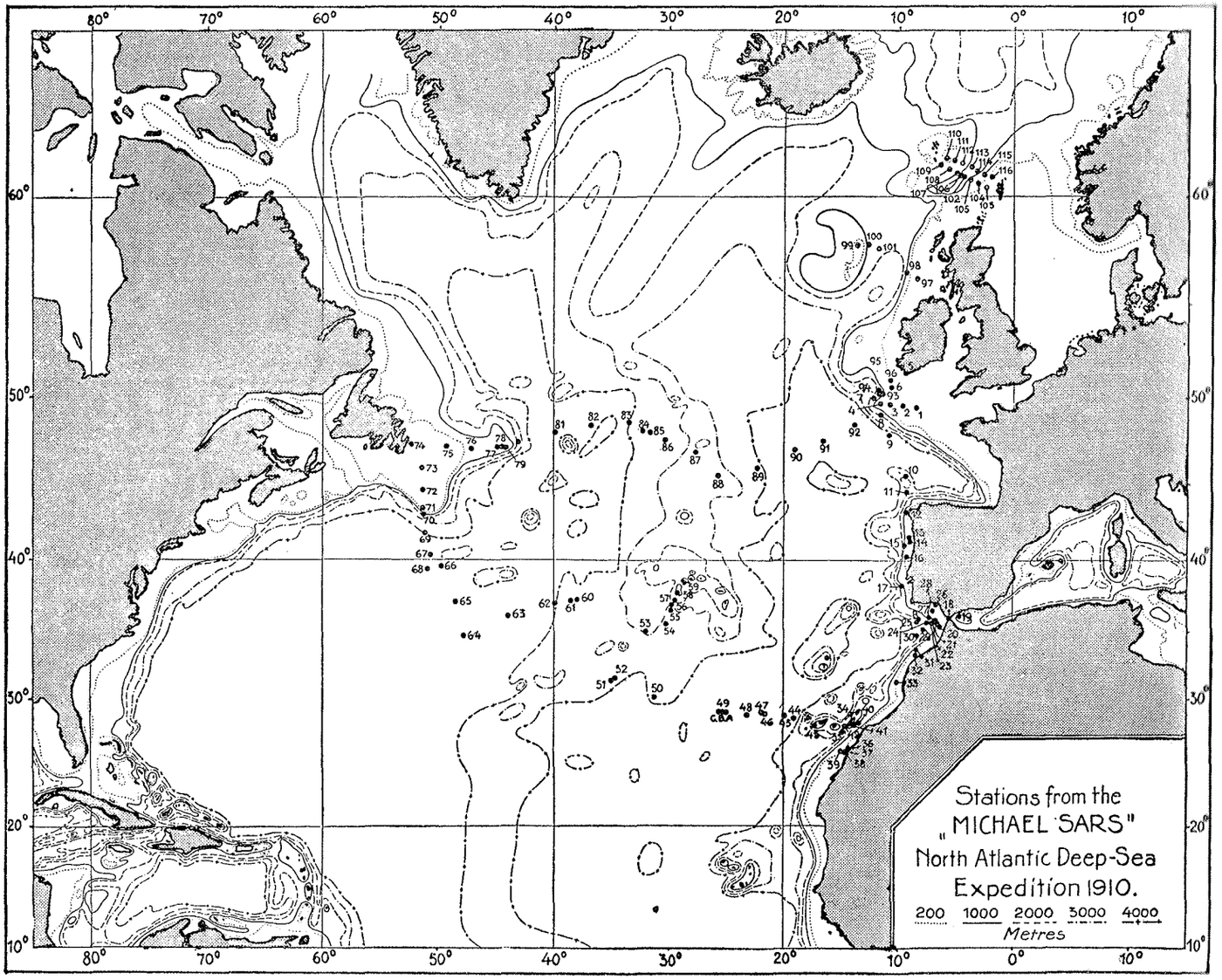


Fig. 1.

great use to me. On account of the law of priority some well-known and commonly used names had to be changed, especially in the family *Alciopidae*, where no less than seven of the eight best known genera had to change their names. Several of these changes have, however, already been indicated by CHAMBERLIN (1919).

In the station lists of the Systematic part the following abbreviations are used to assign the fishing gear:

1 sn. = silk net of 1 meter's diameter. End part with meshes of 1/4 square millimeter.

3/4 sn. = silk net of 3/4 meter's diameter and same quality of silk cloth.

y. = Dr. C. G. Joh. Petersen's young-fish trawl.

3 ln. = large net. Ring 3 meters' diameter. Net a shrimp net.

cn. = Nansen's closing net 1/2 meters' diameter, fine silk cloth.

Trawl = an otter-trawl of 50 feet hand-rope.

Figs. 2—15 a are drawn by Mrs. KIRSTEN ARNEBERG, figs. 15 b—49 by Mrs. MARIT SOMMERFELDT.

SYSTEMATIC PART

Family ***Aphroditidae*** Savigny.

Many of the more recent authors have divided this family into four families, viz. *Aphroditidae, Polynoïdae, Acoëtidae* and *Sigalionidae;* but as these four groups show important common characters (presence of elytra (scales) that are peculiar to the family, of the four curved jaws and of the caecums of the intestine &c.), I am inclined to agree with FAUVEL (1923) and more previous authors in uniting them as subfamilies in a single family, the *Aphroditidae.* Three of these four subfamilies are represented in the material, viz. *Aphroditinae, Polynoïnae* and *Sigalioninae.*

Subfamily *Aphroditinae.*

(*Hermioninae* Grube).

The *Aphroditinae* are benthonic forms living in mud or sand. Most of them inhabit shallow water near the coasts, some are also found on greater depths. Only two of the four common genera are represented in the material, viz. *Aphrodita* Linné and *Laetmatonice* Kinberg, each of them by one species.

Genus **Aphrodita** Linné.

Aphrodita aculeata Linné, 1758.

Aphrodita aculeata Linné 1758, 1767, Müller 1776, Örsted 1843 a, McIntosh 1900.
Aphrodite aculeata Fauvel 1914 b, 1923 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100			1

The single specimen is a young one, about 25 mm long and about 12 mm broad without the bristles, and it has 33 segments. It is comparatively well preserved and the ventral barbed bristles, so characteristic of the young specimens of this species, are well developed. There are no anal cirri.

Aphrodita aculeata has a wide distribution, both horizontally and vertically, as it is comparatively frequent along the west coast of Europe at different depths up to a few meters and also occurs near the American coast up to a depth of 1100 m.

Genus **Laetmatonice** Kinberg.

(*Laetmonice* auct.).

Laetmatonice filicornis Kinberg, 1857.

Laetmatonice filicornis Kinberg, 1857—8, Malmgren 1865, McIntosh 1885, 1900, Fauvel 1914 b, 1923 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W		4700	yellow mud		2
10	19-20/4	—»—		»	—»—	trawl	1

The length of the specimens varies from about 25 mm to about 32 mm and the breadth from abouth 8 mm to 10 mm. The number of segments is about 31. Only the largest specimen is well preserved, showing the typical harpoon-formed dorsal bristles and barbed ventral bristles with a tooth below the barbs. The two other individuals are lacking both most of the bristles and of the cirri, but the long palpi are present.

Laetmatonice filicornis has a cosmopolitan distribution and it is often found at considerable depths.

Subfamily *Polynoïnae* Grube.

The adult *Polynoïnae* are benthonic or bathypelagic forms, but their larvæ usually live pelagically. The so-called post-larval stage is the transitional phase during their descent through the water.

The material contains three species taken pelagically, viz. *Harmothoë Johnstoni, Podarmus atlanticus* and *Lepidasthenia Grimaldii;* to them must be added the bathypelagical *Lagisca Hubrechti;* and there are further seven species taken probably on the bottom (the labels do not give sufficient informations on this point), viz. *Macellicephala atlantica* sp. n., *Malmgrenia castanea, Harmothoë longisetis, Antinoë pelagica, Scalisetosus assimilis, Lagisca extenuata, Polynoë antillicola.* As the material brought home by the "Michael Sars" mainly consists of pelagic forms, only mixed with a few benthonic ones, this list contains almost what we should expect to find.

As the differences between the various genera of this subfamily are often quite minute and often have not been

defined precisely, I intend to mention the chief characters by which it is possible to identify the genus, without repeating the full diagnosis.

Genus **Macellicephala** McIntosh.

The most important characters of this aberrant genus are the lack of lateral antennæ, the slender, transparent ventral bristles and the very small but nearly constant number of segments, viz. 18, and therefore there are also only 8 or 9 pair of scales.

It is difficult to say whether the genus *Macellicephala* presents an ancient type or a reduced form, but the small, thin scales, the rudimentary shape of the dorsal branch of the parapodia, and the lack of the antennæ, make me most inclined to consider it a reduced form originating from a form near *Lepidasthenia* (*Nectochaeta*).

McIntosh (1885) introduced the name *Macellicephala* as that of a subgenus, describing a new species of *Polynoë*, viz. *P.* (*Macellicephala*) *mirabilis* from New Zealand. In 1886 Levinsen describes a new genus and species, viz. *Oligolepis violacea* from the Kara Sea, and Wirén (1907) names this form *Macellicephala violacea*, thus introducing the genus *Macellicephala*, but he considers the species of Levinsen for a form distinct from that of McIntosh. Fauvel (1914 b) shows, however, that they are identical, and he has found it also near the Azores. I further fully agree with Fauvel (1914 b) when he thinks that the *Polynoë mirabilis* of Treadwell (1906) from Hawaii is not identical with this species, and as Treadwell describes it as having more than 70 somites and 25 or 28 elytrophores, and it also seems to have had lateral antennæ, I think moreover that it is no *Macellicephala* at all, but must belong to a very different genus. — In addition to the *Macellicephala mirabilis* Fauvel (1914 b) describes also 3 new species of this genus, viz. *M. abyssicola* from the Bay of Biscay, *M. Grimaldii* from the Banc de la Joséphine and *M. ? macrophthalma*, also from the Bay of Biscay, and in another paper (1914 a) he describes still one more, *M. affinis* from Madeira. The following year (1915) he describes a *M. incerta* from the Azores. Thus there are now at least 6 distinct species of this aberrant genus, but the three specimens in the "Michael Sars" collection I have not been able to refer to any of these species.

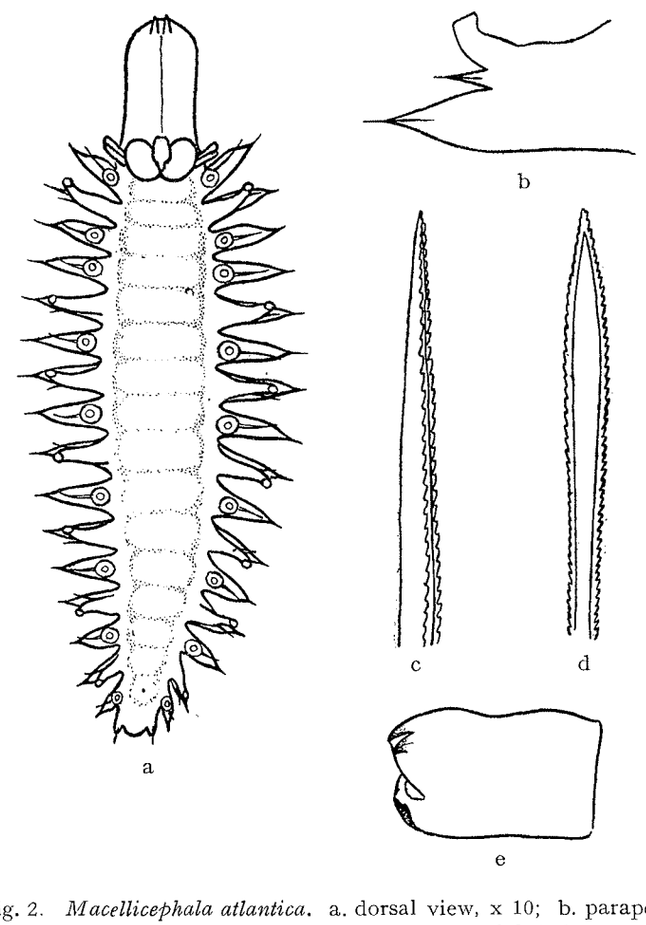


Fig. 2. *Macellicephala atlantica*. a. dorsal view, x 10; b. parapodium, x 25; c. dorsal bristle, x 100; d. ventral bristle, x 150; e. proboscis from the left, x 20.

Macellicephala atlantica sp. n.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100		y.	3

Holotypus: In the Bergen Museum, No. 41436.

Description. The body (fig. 2 a) is thick and massive, little tapered posteriorly and very little anteriorly. The colour is brownish yellow. There are 18 parapodial segments. The prostomium (fig. 2 a) consists of two widely separated, rounded lobes *without eyes and frontal horns*. Between them and far backwards is placed a great tentaculophore, but the median tentacle itself is lacking. There is *no trace of lateral antennæ*, and there is *no facial tubercle*. The palpi and the tentacular cirri are lacking, but two cirrophores on each side of the head show that there have been two pair of tentacular cirri. The dorsal cirri and the elytra (scales) are all lacking, but there have been 9 pair of elytra, as there are elytrophores on the segments 2, 4, 5, 7, 9, 11, 13, 15, 17. — The parapodia are long and massive, carrying a not very large, short, cylindrical elytrophore. The segments without elytra carry long cirrophores, which lie along the dorsal division of the parapodium (fig. 2 b), the tip of which they reach,

but there seems to be no dorsal tubercles. The dorsal division of the parapodium is small and pointed with a projecting, covered acicula and one (or a few?) short, strong bristles (fig. 2 c) with two rows of spines on one side. The ventral division is much longer than the dorsal one, pointed, with a saliant, cased acicula and a bundle of short, flattened, diaphanous bristles (fig. 2 d) with a row of spines on each side. The ventral cirrus remains in a few of the parapodia, being thin and short, and not reaching the base of the ventral bristles. There are no large nephridial papillæ. — The holotype has its proboscis everted, and the base of the proboscis is seen in one of the two others. The fully everted proboscis (fig. 2 e) is as long as the five first segments, i. e. 2 mm. It is quite smooth, without papillæ, but with four brown teeth, two dorsal and two ventral ones.

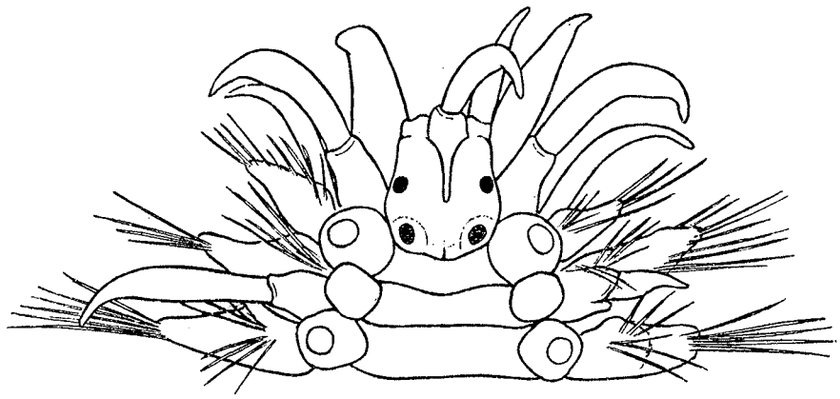


Fig. 3. *Malmgrenia castanea*, anterior part, dorsal view, x 25.

The length of the specimens varies from 8 to 11 mm without the proboscis and the breadth from 1.5 to 2 mm without the parapodia and bristles, from 3 to 5 mm from tip to tip of the bristles.

All three specimens are in a bad condition, all the appendages except some of the ventral cirri, and nearly all the bristles being lost, and many of the parapodia being in dissolution. Only in two or three of the parapodia some of the bristles remain.

This interesting species in certain characters approaches the *M. mirabilis* McIntosh and the *M. affinis* Fauvel. From the former it differs by the lack of the facial tubercle, frontal horns, dorsal tubercle and large nephridial papillæ, and from the latter by the lack of the facial tubercle, frontal horns and dorsal tubercle and by the possession of 9 instead of 8 pair of elytra. It differs even more from the other species of *Macellicephala*.

M. atlantica sp. n. was found at station 70, the richest in benthonic annelids, especially of the family *Aphroditidae*, e. g. *Aphrodita aculeata, Antinoë pelagica, Polynoë antillicola, Lagisca Hubrechti* and *Leanira Yhleni*, but also of other families, viz. *Eulalia longicirrata* sp. n., *Nephthys rubella, Lumbriconereïs impatiens, Phylo norvegica, Brada villosa, Ophelina cylindricaudata, Terebellides Stroemii*.

Genus **Malmgrenia** McIntosh.

The genus *Malmgrenia* is characterized by having 15 pair of elytra and by the subterminal insertion (type *Halosydna*, Fauvel) of the lateral antennæ. — Fauvel (1923) says in his diagnosis of the genus: "2 longs palpes glabres", but in that of the species: "Palpes courts, glabres". Here we must change the first assertion, the palpi being in reality quite short.

Malmgrenia castanea McIntosh, 1876.

Malmgrenia castanea McIntosh 1876 a, 1900, Fauvel 1914 b, 1923 (synonymy).

St	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
96	27/7	50°57′N 10°46′W		184			1
96	27/7	—»—	200	»			1

One of the two specimens has 37 parapodial segments, being 19 mm long and 1.5 mm broad, the other has 40 parapodial segments by a length of 20 mm and a breadth of 2 mm without parapodia and bristles. From tip to tip of the bristles they are 8 and 9 mm. Both of them are broken into two pieces, and they are well preserved. The former has lost all its scales, on the other most of them remain. Most of the other appendages are also present.

The specimens agree very well with the descriptions of McIntosh (1900) and Fauvel (1923), there is only one disagreement. Fauvel (1923) says: "Cirres tentaculaires fusiformes plus courts que les palpes" but the tentacular cirri in my specimens (fig. 3) are at least half as long again as the palpi. Median tentacle, palpi, lateral antennæ, tentacular, dorsal and ventral cirri are all smooth, without papillæ.

Malmgrenia castanea lives at not very great depths, from a few meters down to about 200 m, as a commensal on different Echinoderms, but the labels of these specimens do not say anything about where they are taken, except station and depth. — The species is distributed both in the Arctic and the Atlantic and in the Mediterranean.

Genus **Harmothoë** Kinberg (*sensu* de Saint-Joseph).

The genus *Harmothoë* is characterized by having 15 pair of elytra that completely cover the dorsum, by the ventral insertion of the lateral antennæ and by bifid ventral bristles without spinous pockets.

Harmothoë Johnstoni (McIntosh, 1876), juv.

Evarne Johnstoni McIntosh 1876 b, 1900.
?Lagisca tenuisetis McIntosh 1885.
Harmothoë Johnstoni Fauvel 1914 a, b, 1916, 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
90	21/7	46°58′N 19° 6′W	200			1 sn.	1
92	24/7	48°29′N 13°55′W	600			¾ sn.	1
94	26/7	50°13′N 11°23′W	1500	1565		¾ sn.	2

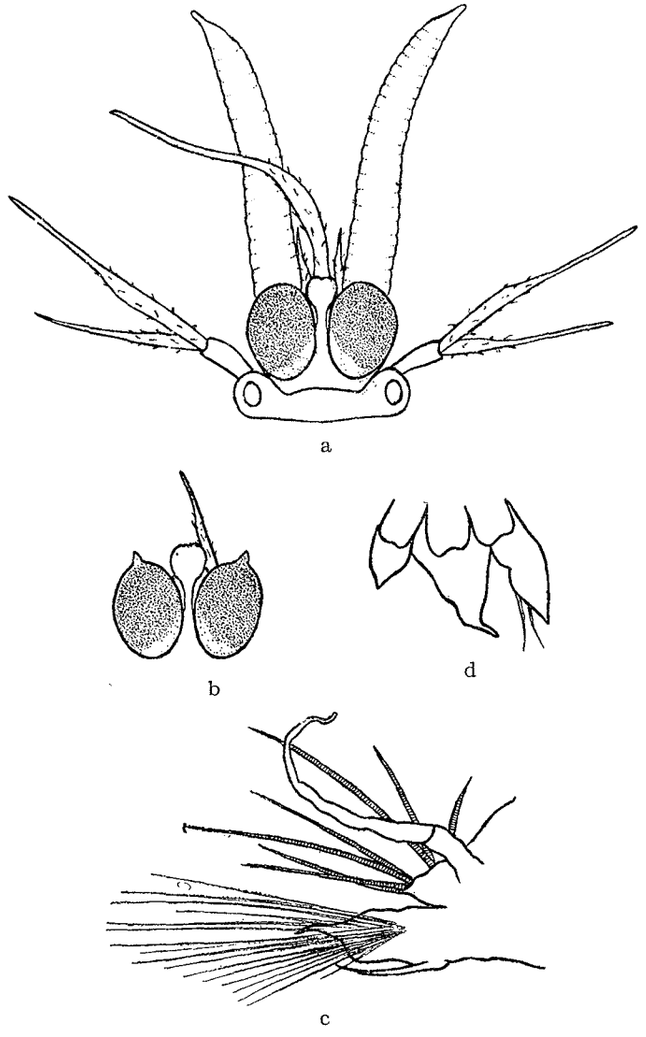


Fig. 4. *Harmothoë Johnstoni*. a. prostomium without frontal horns, x 40; b. prostomium with frontal horns, x 40; c. parapodium, x 30; d. caudal appendage, x 100.

The four specimens vary in length from 4 mm to 5.5 mm and in breadth from 0.5 mm to 1 mm without parapodia and bristles, from 2.5 mm to 3.5 mm from tip to tip of the bristles. The number of parapodial segments varies from 21 to 23. The specimens are all comparatively well preserved, but only a few scales remain on two of them.

The body is a little tapering posteriorly. The two lobes of the prostomium are ovally rounded; in two of the specimens each of these lobes is provided with a short, acute frontal horn (fig. 4 b), in the two other specimens I am not able to see any horns (fig. 4 a). The prostomial lobes are intensely pigmented with brown, but no eyes can be seen. The median tentacle is long and slender, tapering toward the end; a series of short, cylindrical papillæ are sparsely scattered over its surface except over the filiform termination. The lateral antennæ are short and attenuate with a few papillæ on their surface. The palpi are long and robust with a narrow tip; their surface is rough, there seems to be a sort of bifid papillæ as McIntosh (1885) mentions from his *Lagisca tenuisetis*. The tentacular cirri are of the same length as the palpi and the median tentacle, of the same form as the latter and with the same kind of small, cylindrical papillæ. — In one of the specimens the proboscis is everted; it is pigmented with brown and carries 18 great papillæ round the opening. In the other specimens the pigment of the proboscis is visible through the integument. One of the specimens has three elytra, another has one, the remaining two specimens having lost all their elytra. The foremost of the elytra is rounded, the following ones more reniform. Scattered on the elytra are found small conical papillæ among which there are some cylindrical ones. The large cylindro-conical papillæ occur in none of the present elytra. — The ventral branch of the parapodia (fig. 4 c) is much larger than the dorsal one, both having a filiform prolongation. The bristles of the dorsal branch are quite strong; the largest ones are almost straight, the smaller ones curved, all with close rows of spikes and a very short smooth tip. The ventral bristles are slender and much longer than the dorsal ones, serrate and with a thin, smooth tip; I am unable to detect bifid tips. — The dorsal cirri reach to the tip of the ventral bristles; they are of the same form as the median tentacle, with the same kind of papillæ. The ventral cirri reach to the base of the ventral bristles, being attenuate and smooth. — *There is a well developed caudal appendage* (fig. 4 d).

The small size of this form, the small number of segments and its pelagical life indicate a juvenile form that has not yet attained its full development, but is a post-larval pelagic stage. Because of the many points of resemblance (the caudal appendage, the form of the para-

podia and dorsal bristles and of the tentacle, antennæ, palpi and cirri &c.) I consider it a *H. Johnstoni*; the eyes and the bifid tips of the ventral bristles may develop later. FAUVEL (1914 b) states that the large cylindro-conical papillæ do not occur on all the elytra. They may therefore have been present on some of the missing ones.

FAUVEL (1914b) declares that *Lagisca tenuisetis* McIntosh is identical with *Harmothoë Johnstoni* (McIntosh). They have indeed many points of resemblance, but because of the large eyes and the too long palpi I must put a sign of interrogation before this name in the list of synonyms.

Harmothoë Johnstoni is distributed in the Atlantic from the Norwegian coast, along the coasts of Ireland and to Morocco and the Azores. It lives pelagically. The present specimens are found SW of Ireland between 100 and 750 m deep.

? Harmothoë longisetis (Grube, 1863).

Polynoë longisetis Grube 1863.
Harmothoë setosissima McIntosh 1900 (*non* Savigny).
Harmothoë longisetis Fauvel 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
53	8/6	34°59′N 33° 1′W		2615-yellow hard 2865 clayish mud			1

A very badly preserved specimen, 20 mm long, 2 mm broad without parapodia and bristles, 8 mm from tip to tip of the bristles. The median tentacle, lateral antennæ, palpi and all the cirri are missing, as are also the elytra and the ventral bristles, the whole animal being very soft. There are about 35 parapodial segments, but it is impossible to decide the number exactly. The prostomium seems to be without frontal horns, which agrees with *Harmothoë longisetis*, but also the eyes of the specimen are invisible. The form of the body and of the parapodia too, seems to agree with *H. longisetis*, and so do the dorsal bristles, of which some are still remaining. In some of the parapodia one of the dorsal bristles is longer than the other ones.

Genus **Antinoë** Kinberg.

The genus *Antinoë* is characterized by having 15 pair of elytra that completely cover the dorsum, by the ventral insertion of the lateral antennæ and by the ventral bristles having fine, hairlike tips.

Antinoë pelagica Monro, 1930.

Antinoë pelagica Monro 1930.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N51°15′W		1100		y.	1

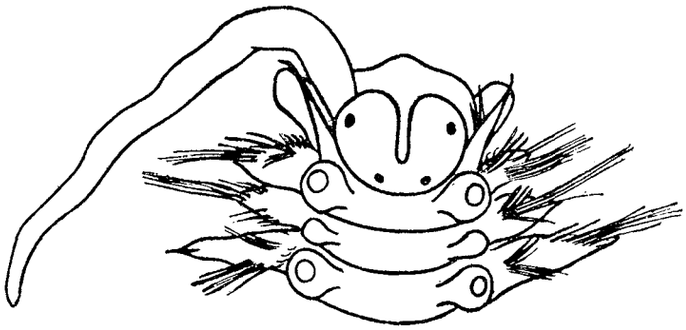


Fig. 5. *Antinoë pelagica*, anterior part, dorsal view x 25.

The length of the single specimen is about 12 mm, and the breadth about 1.2 mm without parapodia and bristles, 6 mm from tip to tip of the bristles. The animal is broken into two pieces which have together about 30 segments, but it is impossible to give the exact number, the hinder part being in regeneration. All the appendages, inclusive of the scales, are lacking, except some of the ventral cirri and one of the palpi, and the whole specimen is not very well preserved.

This specimen agrees quite well with the description and the figures of MONRO'S *Antinoë pelagica* from South Georgia. Its head (fig. 5) is of the same shape, and the remaining palp is very long and slender, but the eyes are smaller and less conspicuous. The parapodia with the long, sheathed acicula and the bristles closely agree with the figures of MONRO; in the dorsal branch the two differing bristles are distinct; in some of the parapodia there seems moreover to be two bristles of the largest kind. The first parapodial segment carries the tentacular cirri, an acicula and one bristle on each side. The palp has a few very small papillæ, but on the ventral cirri the papillæ are much more conspicuous.

MONRO (1930) is of opinion that the *Herdmanella gracilis* Ehlers (1908), which has only eight pair of elytra, "may be a young stage of the present species, just as the present species is probably the pelagic phase of some bottom living form." As our specimen seems to be taken at the bottom, it may be the bottom living stage of the *Antinoë pelagica*, the smaller eyes being probably due to this fact.

Genus **Scalisetosus** McIntosh.

The genus *Scalisetosus* is characterized by having 15 pair of elytra not completely covering the dorsum, by the ventral insertion of the lateral antennæ and by the translucent bifid ventral bristles with spinous pockets.

Scalisetosus assimilis (Mc Intosh, 1875).

Hermadion assimile McIntosh 1875, 1876 a.
Scalisetosus assimilis McIntosh 1900, Fauvel 1923 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
96	27/7	50°57′N 10°46′W		184			1

There are four fragments which seem to belong to one specimen. This is, however, incomplete, as the last segments are wanting. The length of the largest fragment (head and 23 parapodial segments) is 8 mm without the everted proboscis, the breadth is without parapodia and bristles 1 mm, from tip to tip of the bristles 3.5 mm. The number of parapodial segments seems to have been at least 50, as the four fragments together have 38. The body is very fragile.

The prostomium (fig. 6 a) has no frontal horns. The four eyes form a trapezium. The two anterior eyes are larger than the posterior ones and provided with a lens; they are situated at the broadest part of the prostomium. The median tentacle is absent, but a large tentaculophore is inserted between the two prostomial lobes. The lateral antennæ, of which one is absent, are short. The palpi are longer than the lateral antennæ. Only one of the tentacular cirri is present and is a little shorter than the palpi. Some of the dorsal cirri are comparatively short, but most of them are very long (fig. 6 a, b); as the long ones are also very flaccid and soft, the difference may be due to the preservation. The ventral cirrus of the first parapodium is longer than the parapodium, in the following parapodia they are shorter than the parapodia. All these appendages (lateral antennæ, palpi, tentacular cirri, dorsal and ventral cirri) are smooth, having a long, filiform tip. The lateral antennæ, the tentacular, dorsal and ventral cirri have a pigmented line along the middle from the base of the cirrus to the base of the filiform tip, under which the pigmented line widens considerably.

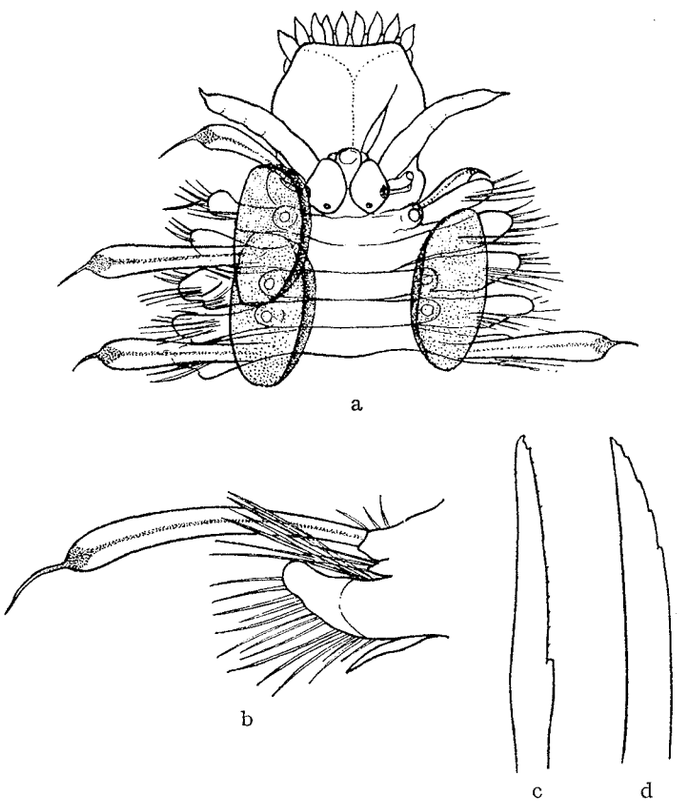


Fig. 6 *Scalisetosus assimilis*. a. anterior part, dorsal view, x 16; b. parapodium, x 24; c. ventral bristle, x 235; d. dorsal bristle, x 235.

The proboscis is everted and provided with 18 large papillæ round its opening. In the largest fragment, consisting of head and 23 parapodial segments, ten scales remain. They are small and rounded or oval, translucent and leaving the middle of the dorsum uncovered. The posterior edge and most of the surface are provided with small papillæ (fig. 6 a).

The dorsal branch of the parapodia (fig. 6 b) is very small; the dorsal bristles (fig. 6 d) are short and slightly curved, with rows of not much conspicuous spines, and with rounded tip. The ventral branch consists of two rounded lobes, the anterior lobe, being much longer than the posterior one, containing the acicula. The ventral bristles (fig. 6 c) are longer and more slender than the dorsal ones, but like those translucent as crystal. The inner part is smooth and ends in a small enlargement with a spinous pocket, the outer part being slightly spinous, rounded at the end and provided with a small curved beak, very characteristic.

The specimen agrees very well with the *Scalisetosus assimilis* (McIntosh). Only the number of segments seems to have been too great and the dorsal cirri too long. This last fact, however, is probably due to an imperfect preservation.

Scalisetosus assimilis lives commensalistically on various species of *Echinus* in the shore region from Scotland and Ireland to the Bay of Biscay.

Genus **Lagisca** Malmgren.

The genus *Lagisca* is characterized by having 40—50 parapodial segments and 15 pair of elytra which leave the 8—20 hindmost segments uncovered.

Lagisca extenuata (Grube, 1840).

Polynoë extenuata Grube 1840 (*fide* McIntosh).
Lagisca rarispina (Sars) Malmgren 1865.

Lagisca propinqua Malmgren 1867.
Lagisca extenuata Marenzeller 1875 (*fide* Fauvel), McIntosh 1900, Fauvel 1914 b, 1923 (synonymy).
Lagisca Jeffreysii McIntosh 1876 b, 1900.
Lagisca floccosa McIntosh 1900.
Lagisca Elisabethæ McIntosh 1900.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
96	27/7	50°57′N 10°46′W		184			1

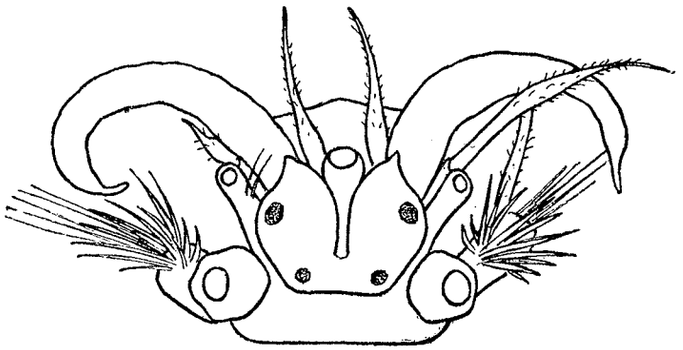


Fig. 7. *Lagisca extenuata*, prostomium. x 32.

The body of the single specimen is complete, having only 38 parapodial segments, a fact which may indicate that it is a young one. The length is 15 mm, the breadth 1.5 mm without parapodia and bristles, and 5 mm from tip to tip of the bristles.

The prostomium (fig. 7) is nearly hexagonal and prolonged into two frontal peaks. The anterior eyes are rather small and situated on the broadest part of the head. The median tentacle is absent, but the large tentaculophore is inserted between the two prostomial lobes. The lateral antennæ are short with attenuate tips and provided with clavate papillæ. The palpi are longer, smooth and with a filiform tip. The tentacular cirri are as long as the palpi, slightly dilated below the filiform tip and coated with clavate papillæ. All the dorsal cirri are absent. The ventral cirri are short and attenuate, with a few papillæ. — All the elytra are absent, but there are 15 pair of elytrophores.

Both branches of the parapodia are well developed. The dorsal branch has a bundle of numerous, strong bristles, elevated on the dorsum, provided with numerous transversal rows of small spines and with a short, smooth tip. The superior and inferior ventral bristles are unidentate, the middle ones bidentate. The spinous region decreases in the inferior ventral bristles; the spines are considerably long.

Lagisca extenuata is found along the west coast of Europe from the Arctic to the Mediterranean.

Lagisca Hubrechti (McIntosh, 1900).

Evarne Hubrechti McIntosh 1900.
Lagisca Hubrechti Fauvel 1914 a, b, 1916, 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
62	20-21/6	36°52′N 39°55′W	1000			y.	1
62	»	—»—	3000			3 ln.	1
70	30/6	42°59′N 51°15′W		1100			1
81	12/7	48° 2′N 39°55′W	1000			y.	1
87	17/7	46°48′N 27°46′W	1000	2157	sand, yellow mud	y.	6
88b	19/7	45°26′N 25°45′W	1000			y.	1
90	21/7	46°58′N 19° 6′W	1000			y.	4
92	24/7	48°29′N 13°55′W	600			¾ sn.	1
92	23/7	—»—	3000			ln.	1
98	5/8	56°33′N 9°30′W	1000	1000-1360		y.	2
98	5/8	—»—	1500	»		3 ln.	5
101	7/8	57°41′N 11°48′W	2000	1853	hard clay	y.	2

The 26 specimens of *Lagisca Hubrechti* all belong to the young, bathypelagic stage. The length varies from 8.5 mm to 21 mm, the breadth from 1.5 mm to 2 mm without parapodia and bristles, from 7 mm to 11 mm from tip to tip of the bristles. The number of parapodial segments varies from 22 to 32 whereas adult specimens have up to 46.

The young specimens differ from the adult ones by a couple of characters: the eyes seem to be a little larger; the dorsal bristles are very large and diverging, and cross each other from one parapodium to the other; but I have not been able to detect bidentate ventral bristles as described by FAUVEL (1923). There are up to 15 pair of elytra, which completely cover the body, but they are wanting in most of the individuals. It seems that the posterior part of the body, which is not covered with scales, develops very late. The very characteristic caudal appendage is present already in the smallest specimen.

Most of the specimens are taken with a young-fish trawl and 1000 m wire out. All the finds brought home by the "Michael Sars" are taken in or near the Gulf Stream (Fig. 8). Thus it seems that the young, post-larval stages of this species live in the deeper water-layers of the stream, drifting with it. The present specimens are taken between 300 and 1500 m. *Lagisca Hubrechti* is formerly found near the Azores, New-Foundland and in the Bay of Biscay.

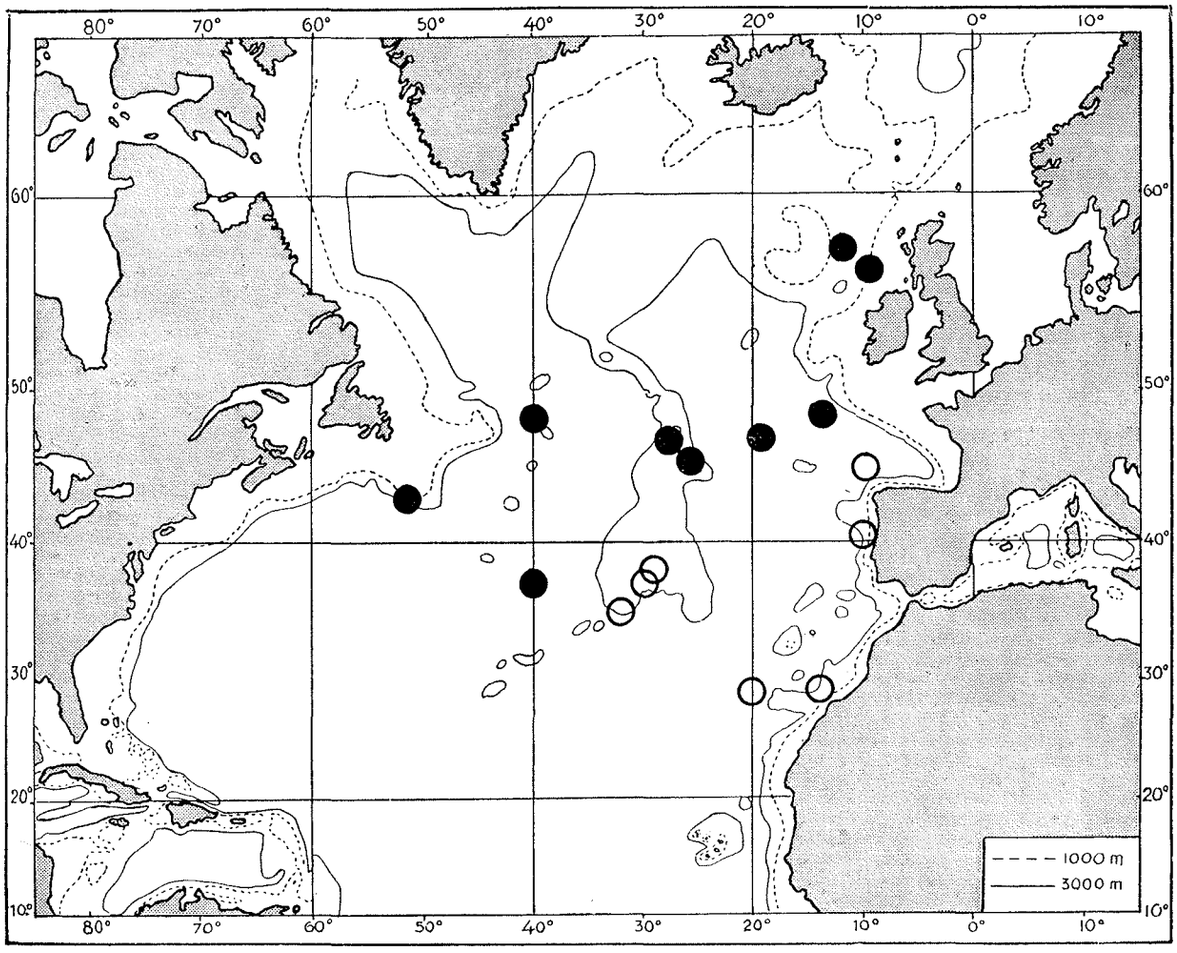


Fig. 8. ● *Lagisca Hubrechti.* ○ *Lopadorhynchus uncinatus.*

Genus **Polynoë** Savigny (*pro parte, sensu* Fauvel).

The genus *Polynoë* in the strict sense is characterized by having 15 pair of elytra which leaves a good deal of the more than 50 segments uncovered.

Polynoë antillicola (Augener, 1906).

Nemidia antillicola Augener 1906.
Polynoë antillicola Fauvel 1914 b.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100			7
70	30/6	—»—		1100		y.	9

The length of the specimens varies from 23 mm to 46 mm, the breadth from 3 mm to 3.5 mm without parapodia and bristles, and from 9 mm to 10 mm from tip to tip of the bristles. The largest of the complete specimens has 60 parapodial segments.

The present specimens quite agree with the description of AUGENER, to which there is not much to be added. In one of the specimens one of the palpi was twice as long as the lateral antennæ.

The two long urites (filiform anal appendages) remain in only two specimens. They sit on a short caudal tube or appendage, somewhat resembling that of *Travisia Forbesii* Johnston.

This new locality for *Polynoë antillicola,* south of New-Foundland, is not very far from the type locality: south of Nova Scotia. Further the species is mentioned by FAUVEL from the Azores. It seems to be a deep-water form, the specimens of AUGENER being taken at 980 resp. 340 fms., that of FAUVEL at 1919 m and the present ones at 1100 m.

FAUVEL (1914 b) is of opinion that this species belongs rather to the genus *Polynoë* than to *Nemidia,* but in his "Faune de France" (1923) he unites MALMGREN's genera

Enipo and *Nemidia* with the genus *Polynoë*. Now it is generally accepted that MALMGREN divided the *Polynoïnae* into too many genera, based upon non-essential characters, but on the other hand THÉEL (1879) and ARMAUER HANSEN (1882) exaggerate the reduction of genera, putting all the various species into one genus, viz. *Polynoë*. It is, however, difficult to find the happy medium. FAUVEL (1923) divides the short forms into many genera, uniting the long forms with 15 pair of elytra to one genus, viz. *Polynoë*. The species which in this way are gathered in the genus *Polynoë* are, however, quite as different from each other as the short forms placed in the four genera *Gattyana, Eunoë, Antinoë, Harmothoë*. Almost the only possible means of differentiating these genera is the varying shapes of the bristles, but there are quite as great differences between the bristles of the various species of *Polynoë*. It is difficult to refer the present species to any of MALMGREN'S genera, though it seems to be more closely allied to *Polynoë* than to *Nemidia*. In this paper I therefore follow FAUVEL until a revision of these forms can be made.

Genus **Podarmus** Chamberlin.

The genus *Podarmus* is characterized by having 14 pair of elytra inserted on the parapodial segments 2, 4, 5, 7, ... 21, 23, 26, 29, by the subterminal (?) insertion of the lateral antennæ and by the long, sesquiramous parapodia with a cylindrical process which adjoins the ventral cirrus.

Podarmus atlanticus Monro, 1930.

Podarmus atlanticus Monro 1930.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
62	20/6	36°52′N 39°55′W	100			1 sn.	1
67	27/6	40°17′N 50°39′W	800			¾sn.	1

Both specimens of this interesting species are fragmentary, one consisting of prostomium and the first 21 parapodial segments, the other consisting of prostomium with the 11 first and the 4 last parapodial segments. The breadth of the specimens is 0.5 mm without parapodia and bristles, and about 4 mm from tip to tip of the bristles.

The specimens closely agree with MONRO'S description of his *Podarmus atlanticus*, there being only a few less important differences. The prostomium (fig. 9 a) consists of two oval, rounded lobes. The median tentacle is long and filiform, tapering towards the end, of the same length as the everted proboscis. The proboscis is everted in one of the specimens, it is brown of colour and provided with 9 + 9 papillæ round the opening. The lateral antennæ are inserted, as it seems, subterminally, they are very slender, shorter than the median tentacle. The palpi are of the same length as the lateral antennæ, stout and with a short, nearly conical tip without any delation below it. The tentacular cirri are as long as the median tentacle, but stouter and tapering towards the end. I am not able to see eyes on the prostomium.

The parapodia (fig. 9 c) are exactly corresponding to MONRO'S figure. They are very long, indicating a pelagic life of the animal, and sesquiramous, the dorsal branch being scarcely perceptible and without bristles. The ventral branch consists of two bluntly conical lobes, the anterior of which is a little longer than the posterior, and between which the bristles are placed in a vertical row.

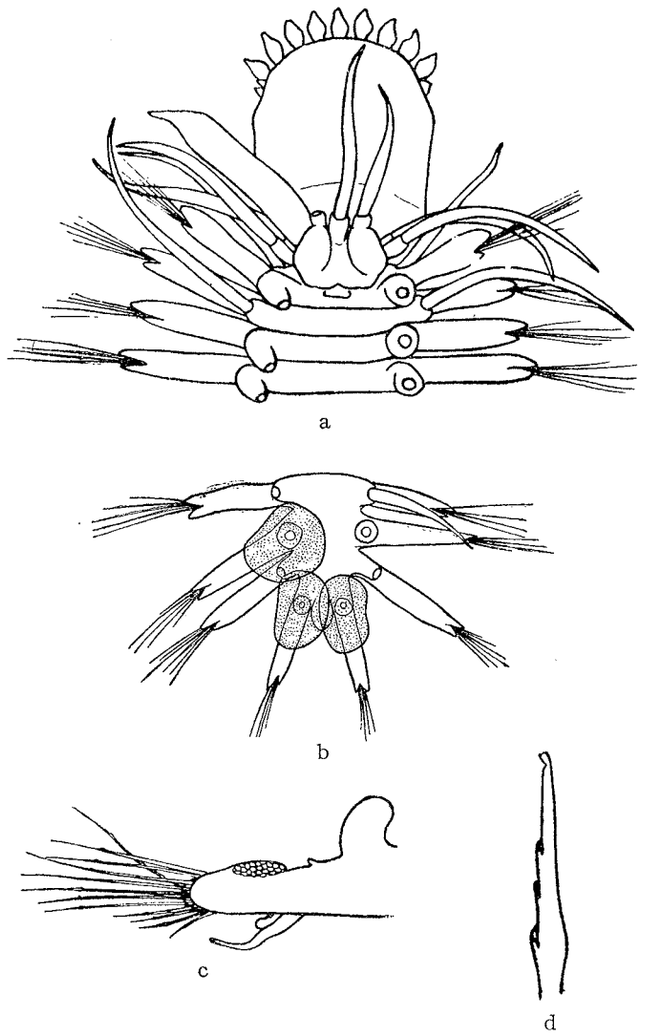


Fig. 9. *Podarmus atlanticus*. a. anterior part, dorsal view x 30; b. posterior part, dorsal view, x 15; c. parapodium, x 30; d. inferior ventral bristle, x 260.

On its upper border this ventral branch of the parapodium has a salient gland filled with large, round cells. This gland is seen also in MONRO's figure, but he does not mention it in the text. As many pelagic annelids have their gonads in the parapodia, this is possibly the ovarium filled with eggs. The dorsal cirri reach to the tip of the bristles, the ventral ones do not reach to the tip of the parapodia. Only the ventral cirri of the first segment are very long. From the 6th or 7th parapodium a cylindrical process is found beside the ventral cirrus; it is about half as long as the cirrus. — The bristles are dilated below the tip which in the upper ones is long and capillary and scarcely toothed, the lower (fig. 9 d) ones have a short tip with a few spines and with an incision below the rounded termination.

The fragmentary state of both specimens makes it impossible to indicate the number of the segments or of the elytra, but both CHAMBERLIN (1919) and MONRO (1930) give 14 pair of elytra. The elytra themselves have hitherto been unknown, but on the fragment consisting of the four last segments (fig. 9 b) the last pair and the left scale of the last pair but one are present. These elytra are comparatively large and translucent and set with small, warty papillæ. The last pair of elytra, being fixed on the last pair of parapodia, covers the fragment to the end. The last elytron but one is fixed on the last segment but two, there being accordingly not two segments with dorsal cirri between two provided with elytra. If there have been only 14 pair of elytra, there cannot have been 45 segments as MONRO states. CHAMBERLIN gives 30 segments of his *Podarmus ploa*, but adds: "probably even the largest is not fully grown." I therefore think that the present specimens represent the post-larval pelagic stage of the *Podarmus atlanticus*. They differ from MONRO's type only by having a little shorter and stouter palpi, and in the shape of the termination of the lower bristles. The absence of eyes may be due to the preservation. These differences, however, are not in my opinion sufficiently important to establish a new species on them; on the other hand they are not too great to be characteristics of the young form.

MONRO found his type specimen in the Gulf of Guinea; the actual specimens are both found in the Sargasso Sea. Such a wide distribution should not, however, be very strange for a pelagic species. At the first station (st. 62) it was taken about 50 m deep; the other specimen was taken in a depth of about 400 m.

Genus **Lepidasthenia** Malmgren.

The genus *Lepidasthenia* is characterized by the numerous small elytra that cover the body from one end to the other, by the terminal insertion of the lateral antennæ, and by the very much reduced dorsal branch of the parapodia.

Lepidasthenia Grimaldii (Marenzeller, 1892).

Lepidasthenia maculata Potts 1909 (*fide* Fauvel), Fauvel 1914b, 1923.
Forma juvenis:
Nectochaeta Grimaldii Marenzeller 1892b, Fauvel 1914a, 1916, 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W	0,45	4700	yellow mud	1sn.	1
10	20/4	—»—		4700	—»—		5
92	24/7	48°29′N 13°55′W	600			¾ sn.	2
94	26/7	50°13′N 11°23′W	1500	1565		¾ sn.	1

Most of the nine specimens are well preserved. The number of parapodial segments varies from about 22 to 31, the length from 4.5 mm to 12 mm, the breadth without parapodia and bristles from 0.5 mm to 1.5 mm and from about 3 mm to 6 mm from tip to tip of the bristles.

These specimens quite agree with FAUVEL's (1923) *Nectochaeta Grimaldii* Marenzeller, and I have nothing to add to his excellent description except that the two urites are quite short.

In two of the specimens (from st. 92) eyes cannot be seen, the prostomium being intensely pigmented with brown in the same way as mentioned about *Harmothoë Johnstoni*.

Most of the specimens have lost all their elytra; only in one of them three scales remain on the hindmost segments.

The number of elytrophores varies from 13 to 15 pairs, but the smallest specimen, the one of 22 parapodial segments, is not so well preserved that I have been able to count them.

FAUVEL (1916) has thoroughly discussed the *Nectochaeta Grimaldii* showing that it must be a so-called post-larval pelagic stage of a probably benthonic species, and that this species in all probability is *Lepidasthenia maculata* Potts. He also states that if this is really the fact, the name of the species must be *Lepidasthenia Grimaldii*. Further (1923) FAUVEL describes two species belonging to two different genera, viz. *Nectochaeta Grimaldii* Marenzeller with the following remark: "Cette espèce est très vraisemblablement le stade pélagique de la *Lepidasthenia maculata* Potts, espèce de Zanzibar retrouvée aux Açores par le Prince de Monaco" and *Lepidasthenia maculata* Potts with the following remark, still more decided: ". . . je la mentionne ici parce que sa forme jeune (*Nectochaeta Grimaldii*) a été recueillie dans le golfe de Gascogne et dans la Méditerranée." And when we read the descriptions of the two species, the accordance in every detail is immediately striking. The only difference is to be

found in the number of segments and elytra (by *L. maculata* resp. 50—100 and about 31 pairs, by *N. Grimaldii* resp. 15—34 and 5—15 pairs). The small and varying number of segments and especially of elytra in *Nectochaeta Grimaldii* and also its pelagic life, indicate really a post-larval stage. FAUVEL also places *Nectochaeta* after *Lepidasthenia* and not together with the short forms, but still he does not take the full consequence and unite them under the same name. This seems, however, to be quite justifiable, the more so because, according to FAUVEL (1932), the name *Nectochaeta* has also been used to designate more generally a larval stage of *Aphroditidae*. As the generic name *Lepidasthenia* Malmgren, 1867, takes precedence over *Nectochaeta* Marenzeller, 1892, but *Grimaldii* Marenzeller, 1892, takes precedence over *maculata* Potts, 1909, the correct name of the species would be: *Lepidasthenia Grimaldii* (Marenzeller, 1892) Fauvel 1916.

The young stage of this species is formerly found in the Mediterranean and in the Bay of Biscay, and now also SW of Ireland; the adult form is found near Zanzibar and at the Azores. It lives pelagically from the surface down to about 750 m.

Subfamily *Sigalioninae* Grube.

The *Sigalioninae* are mainly bottom living forms in shallow or deeper waters. The material contains only one species, *Leanira Yhleni*.

Genus **Leanira** Kinberg.

Leanira Yhleni Malmgren, 1867.

Leanira Yhleni Malmgren 1867, Fauvel 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100		y.	1
70	30/6	—»—		1100			2

The first specimen is a fragment consisting of the prostomium and the first 43 parapodial segments; it is 15 mm long, 1 mm broad without parapodia and bristles and 3.5 mm from tip to tip of the bristles. The other two specimens are also fragments of about the same size.

The specimens agree quite well with FAUVEL'S (1923) description, but no eyes are visible. They have lost all their elytra but one, which is without fringes. The proboscis is inverted. The palpi are very long and slender. The median tentacle is absent, but the tentaculophore has two small "cténidies". The bristles are characteristic. In many of the parapodia the branchia (gill) and the three "cténidies" are present. The dorsal cirrus of the 3rd segment in *L. tetragona*, which FAUVEL (1923) mentions with a sign of interrogation, and which I have really seen very clearly in that species, is completely absent in *L. Yhleni*. The parapodia are set with digitiform papillæ being much fewer than in *L. tetragona*. The colour is yellowish brown.

Leanira Yhleni is previously known from the French coast and from the Adriatic. The present find shows that it lives also on the American side of the Atlantic. According to FAUVEL (1923) it lives in depths from 0 to 300 m, but the depth of the station where the actual specimens are taken, is indicated to be 1100 m.

Family ***Amphinomidae*** Savigny.

The *Amphinomidae* that live on wreckage or drifting pieces of wood between the *Lepas*, are mainly included in the three genera *Amphinome*, *Hermodice* and *Hipponoë*. Of these genera only *Hipponoë* is represented in our material. We should expect to find also the other genera, as they are known from the Antilles and the Azores, and their absence may be due only to chance.

Genus **Hipponoë** Audouin and Milne Edwards.

Hipponoë Gaudichaudi Audouin and Milne Edwards, 1830.

Hipponoë Gaudichaudi Audouin & Milne Edwards 1830, McIntosh 1885, Fauvel 1914 b, 1923.

Hipponoë gandichandi Augener 1910.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
91	22/7	47°32′N 16°38′W	surface	4922	yellow mud		1

This species lives among the *Lepas* on drifting pieces of wood or between the valves of the *Lepas*. The label of the present specimen says only: "In the Lepas bundle". It is a large specimen, 42 mm long and 7 mm broad. There are 32 parapodial segments.

On the prostomium there are four very small eyes forming a trapezium; the posterior ones are situated quite close to the anterior. The median tentacle and the lateral antennæ are absent, but the short, filiform palpi are present. The first gill is found on the 3rd parapodial segment. The posterior end is a little rolled in ventrally. The colour is dirty white.

AUGENER (1910) has made clear that the young specimens are fixed to the ventral side of the female, lying in the segmental furrows. No such young specimens are found on the present specimen.

The species has a cosmopolitan distribution, being found in the Bay of Biscay, at the Azores and the Antilles, and also in the north Pacific and near Australia. The present specimen is taken SW of Ireland.

Family ***Phyllodocidae*** Grube.

BERGSTRÖM (1914) has based his subdivision of the family *Phyllodocidae* into five subfamilies on number and position of the tentacular cirri. This character being, however, very difficult to utilize on preserved material and therefore unpractical, also theoretically is not without deficiencies. He is also inclined to establish new genera upon too unimportant characters, and he considers the aberrant groups *Iospilidae*, *Lacydoniidae* and *Pontodoridae* as proper families. FAUVEL (1923) divides the family *Phyllodocidae sensu* Bergström into two subfamilies only, viz. *Phyllodocinae* and *Lopadorhynchinae*. This subdivision is perhaps more practical than natural, as the various genera of the *Lopadorhynchinae* according to BERGSTRÖM probably have developed independently from different *Phyllodocinae*. Also the *Iospilinae*, *Lacydoniinae* and *Pontodorinae* FAUVEL considers as subfamilies of the *Phyllodocidae*, which he thus divides into five subfamilies. — In this paper I adopt FAUVEL'S subdivision of the family as being the more practical. Only two of his subfamilies are represented in the material, viz. *Phyllodocinae* and *Lopadorhynchinae*.

Subfamily *Phyllodocinae* Bergström, *sensu* Fauvel.

The *Phyllodocinae* which includes the veritable Phyllodocides in the strict sense, are benthonic forms inhabiting shallow water near the coasts. Only very few of them are found at greater depths far off the coast. In the "Michael Sars" material the subfamily is represented only by two species, viz. *Phyllodoce mucosa* and *Eulalia longicirrata* sp. n., of which the last one is a deep water form.

Genus **Phyllodoce** Savigny (1822).

SHERBORN'S Index Animalium says:

Phyllodoce C. Ranzani, Opusc. Sci. (Bologna) I. 1817, 109. — Verm.

Phyllodoce J. C. Savigny, Egypte, Hist. Nat. I (3) (Ann.) 1822, 43. — Verm.

Phyllodoce Savigny is either to be considered as preoccupied, or, if both RANZANI and SAVIGNY mean the same worm, the author of the genus *Phyllodoce* is RANZANI. Not having seen the work of RANZANI, and finding no indications, I am unable to decide upon this point.

Subgenus **Anaïtides** Czerniavsky.

Phyllodoce (Anaïtides) mucosa Örsted, 1843.

Phyllodoce mucosa Örsted 1843a, Malmgren 1867, Fauvel 1914b, 1923
Anaitides mucosa Bergström 1914.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
38	20/5	26° 3′N 14°36′W	200	83	red sand, shingle	trawl	1

The single specimen is not very well preserved, and has probably been dried. The body is filiform with numerous segments, 19 mm long and 0.5 mm broad without parapodia and bristles and 1.5 mm from tip to tip of the bristles.

As far as I have been able to see it agrees quite well with the *Phyllodoce mucosa*. According to FAUVEL (1923) this species is distinguished from the *P. maculata* (L.) by its lighter colour and by the ventral cirrus of the parapodia being longer and more pointed. The present specimen is yellowish brown, but as it seems to have been dried, this is probably the cause of the too dark colour. The ventral cirrus, which is elliptical and clearly pointed, reaches distinctly, but does not go very much beyond, the parapodium. On the whole the parapodium with the cirri agrees very well with FAUVEL'S fig. 54 c (1923). There are six rows of papillæ on each side of the base of the proboscis, and nine papillæ in the middle rows.

The distribution of the *Phyllodoce mucosa* reaches from the west coast of Sweden through the Channel and to the coast of France. It is also mentioned from the Mediterranean, and from North America, but according to BERGSTRÖM (1914) these localities are not quite safe. Now the species is also found near the west coast of Africa.

Genus **Eulalia** Savigny.

Eulalia longicirrata sp. n.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N51°15′W		1100			1

Holotypus: In the Bergen Museum, No. 29495.

Description. The body is linear, there are more than 100 segments. The prostomium (fig. 10 a) is rounded, a little longer than broad. There are *no eyes*. The four anterior tentacles are subulate, of moderate length; the median tentacle is a little longer, dilated below a small pointed tip (fig. 10 b), and arises from the middle of the prostomium. There are four pair of tentacular cirri, subulate, of moderate length. Only two of these cirri remain in the specimen. *The segment of the first pair of tentacular cirri is united with the prostomium and not visible from the dorsum.* The parapodia (fig. 10 c) are bilobate, both lobes being acuminate, the dorsal lobe longer than the ventral one. The dorsal cirrus is comparatively thick and short narrowly elliptical and acuminate. It is intensely pigmented with brown. The ventral cirrus is long and filiform, reaching beyond the tip of the parapodium. The bristles (fig. 10 d) have a long and translucent shaft, slightly dilated and obliquely cut at the end.

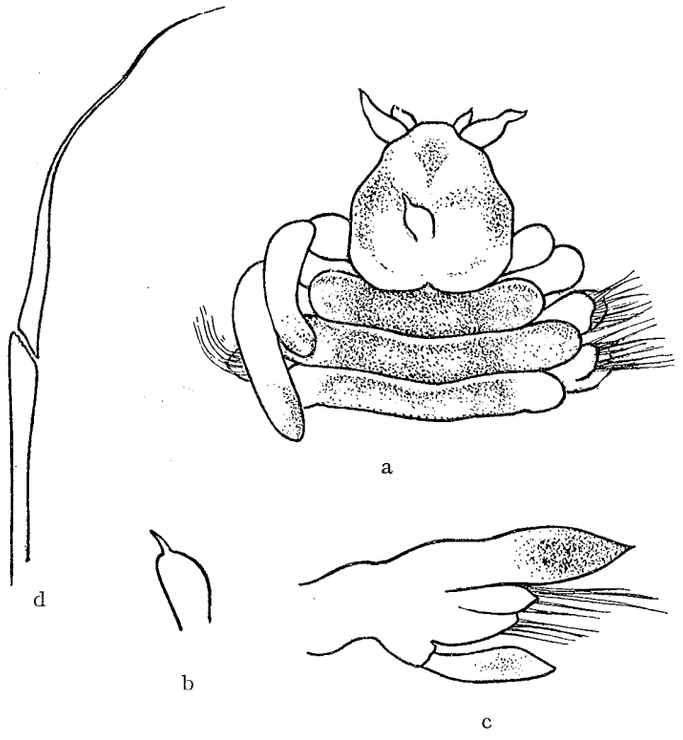


Fig. 10. *Eulalia longicirrata*. a. anterior part, dorsal view, x 50; b. median tentacle, x 60; c. parapodium, x 50; d. bristle, x 300.

The terminal blade is slightly curved and, as it seems, smooth, without spines. The animal lies in a tube resembling that of *Hyalinœcia tubicola!*

The length of the single specimen is 29 mm, the breadth 0.75 mm without parapodia and bristles and 2 mm from tip to tip of the bristles. The colour is yellowish brown, the two distinct segments of tentacular cirri are on the dorsum intensely pigmented with brown, and so are also the dorsal cirri. The prostomium is less intensely pigmented, and there is a transversal stripe of pigment spots on each of the body segments.

Eulalia longicirrata sp. n. seems to approach, in many respects, *E. bilineata* Johnston, from which it differs chiefly by the form of the dorsal and ventral cirri. As the proboscis is not everted, I am not able to say anything about it.

Eulalia longicirrata sp. n. was found at st. 70, the richest in benthonic and bathypelagic species, such as various *Aphroditidae, Nephthys rubella, Lumbriconereïs impatiens, Phylo norvegica, Brada villosa, Ophelina cylindricaudata, Terebellides Stroemii.* It is a deep-water form, being found in a depth of 1100 m, whereas most of the species of *Eulalia*, and of the *Phyllodocinae* on the whole, inhabit the shallow water near the coasts.

Subfamily *Lopadorhynchinae* Claparède, *sensu* Reibisch.

The *Lopadorhynchinae* are true *Phyllodocidae* which have adopted a pelagic life. Most of the *Lopadorhynchinae* are known both from the Mediterranean and from the Atlantic, but only two of the four genera are represented in the present material, viz. *Lopadorhynchus* and *Pelagobia*. The absence of the other genera is probably due to their diminutiveness. — The other three subfamilies, viz. *Iospilinae, Pontodorinae* and *Lacydoniinae* contain more aberrant forms, not so closely allied to the *Phyllodocidae sensu stricto*. As most of these too are very small forms, they also may easily have escaped the attention of the collector.

The material contains four species of *Lopadorhynchus*, viz. *L. uncinatus, L. Nationalis, L. appendiculatus* and *L. Henseni*. These species are just what we *a priori* should expect to find, because they are widely spread in the Atlantic, whereas the other two chief species of this genus, *L. brevis* and *L. Krohnii* mainly inhabit the Mediterranean. The material contains also a few specimens of *Pelagobia longicirrata*, a species with a comparatively wide distribution in the Atlantic.

Being so small and at the same time not very abundant, the *Lopadorhynchinae* as compared with e. g. the *Alciopidae* and *Tomopteridae* certainly are of no importance quantitatively in the plancton, as already stated by E. Wesenberg-Lund (1939).

Genus **Lopadorhynchus** Grube.
Subgenus **Lopadorhynchus** *sensu stricto.*

Lopadorhynchus (Lopadorhynchus) uncinatus Fauvel, 1915.

Lopadorhynchus uncinatus Fauvel 1915, 1923, Monro 1936, Wesenberg-Lund 1939.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W	0.45	4700	yellow mud	1 sn.	1
15	22/4	40°56′N 9°28′W	600			1 sn.	1
34	13/5	28°52′N 14°16′W	400	2170	sand, yellow mud	y.	1
34	13/5	—»—	1000	2170	—»—	y.	1
45	28-29/5	28°42′N 20° 0′W	200			1 sn.	1
53	8/6	34°59′N 33° 1′W	200	2615-2865	yellow hard clayish mud	1 sn.	3
56	10/6	36°53′N 29°47′W	100	3239	clayish mud	1 sn.	1
58	12/6	37°38′N 29°20′W	200	948	hard bottom		1

All the specimens are well preserved. The number of parapodial segments varies from 21 to 32, the length from 4.5 mm to 20 mm, the breadth from 0.5 mm to 2 mm without parapodia and bristles and from 2 mm to 6.5 mm including these organs.

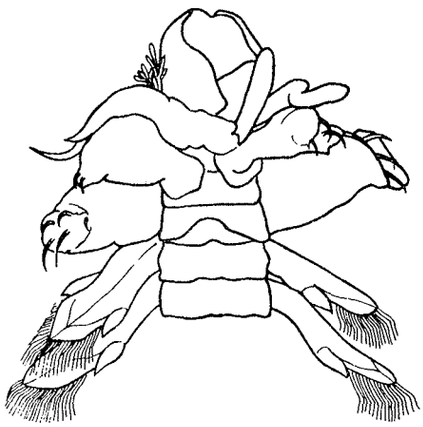


Fig. 11. *Lopadorhynchus uncinatus*, anterior part with parasites, ventral view, x 15.

The body tapers towards the posterior end. The prostomium is broader than it is long and provided with two distinct eyes. The bell-shaped proboscis has a small cirrus on each side near its opening. There are four antennæ, the two posterior ones being half the length of the others. There are three pair of tentacular cirri; the first and second pair are short and stout but considerably longer than the antennæ, the third pair is only two small appendages at the base of the second pair. The two first segments are much stouter than the rest; their parapodia are nearly cylindrical and very strong, directed sidewards and with a group of large, brown, sickle-shaped bristles (*uncini*). The ventral cirrus and the rounded lamella of these parapodia are reduced and form a "ruff" (FAUVEL: "collerette") around the group of bristles. The dorsal cirrus is quite small. The following segments are shorter with their parapodia turned backwards. The parapodia consist of a pointed setigerous lobe behind a large rounded lamella, and of a dorsal and a ventral cirrus, both comparatively short and thick. The bristles are all compound and arranged in a fan. Their terminal blade is oval, finely denticulate on one side.

Three of the specimens are infested with parasites. In the first of these cases (st. 45) a nematode-like animal juts out from the dorsum of the fourth segment. In the second specimen (from st. 53) a similar nematode-like animal juts out from the everted proboscis dorsally, and two shorter ones are fixed to the base of the proboscis on the right side (fig. 11). The prostomium of this specimen is absent, so are also the tentacular cirri on the right side, and even the first parapodium on that side is damaged. The third specimen (from st. 58) has a parasite inside the everted proboscis dorsally, one on the left side of the proboscis and one at the base of the proboscis ventrally, but in this case the specimen itself is not damaged by the parasites. E. WESENBERG-LUND (1939) has also found *Lopadorhynchus uncinatus* with one or two parasites of the same kind adhering to the cephalic region; she is of opinion that they are parasitic copepods.

In all with parasites infested specimens there is a ramified organ in each corner of the mouth between the antennæ and tentacular cirri (fig. 11). This organ is not visible in any of the other specimens, which all have the proboscis inverted.

The "Michael Sars" material has greatly added to our knowledge of the distribution of *Lopadorhynchus uncinatus* in the Atlantic (fig. 8). It is found off the north-western point of Spain, off the west coast of Portugal, near the Canary Islands and near the Azores. E. WESENBERG-LUND (1939) reports that this species is very common in the Mediterranean; she has also found it outside the Strait of Gibraltar and SW and S of Ireland, and her chart shows a find in the Bay of Biscay. The species is further reported from the South Atlantic and from the Indian Ocean.

The home of this species thus seems to be off the west coast of Europe and North Africa and in the Mediterranean. As to its vertical distribution the present material agrees very closely with the report of E. WESENBERG-LUND, when she states that it "seems to be most numerous in the first 100 to 300 m from the surface".

Lopadorhynchus (Lopadorhynchus) errans
(Chamberlin, 1919).

Mastigethus errans Chamberlin, 1919.

CHAMBERLIN (1919) describes a new genus *Mastigethus* which differs from *Lopadorhynchus* in having a long, finger-like papilla on each side of the proboscis, and on each side of the prostomium a branchiform nuchal organ composed of many simple branches or filaments. His pl. 17, fig. 8 shows that those organs are placed on both sides of the mouth. Thus *L. uncinatus* should belong to the genus *Mastigethus*. The *M. errans* Chamberlin differs from *L. uncinatus* by missing the ventral cirri of the four first segments, and by having the simple bristles much less curved. — I do not think it necessary to introduce a new genus *Mastigethus* on the base of the mentioned characters. Further comparisons with the other species of the subgenus *Lopadorhynchus* will show if it is justifiable to make a new subgenus *Mastigethus* of the *L. uncinatus* and the *M. errans*.

Lopadorhynchus (Lopadorhynchus) brevis Grube, 1855.

Lopadorhynchus brevis Grube 1855, Wesenberg-Lund 1939.
? Lopadorrhynchus parvum Chamberlin 1919.

This species is not represented in the material. It is chiefly distributed in the Mediterranean, but E. WESENBERG-LUND (1939) has found it also in the Bay of Biscay. It is characterized by wanting ventral cirri on the three first pair of parapodia, which are stouter and shorter than the following ones.

The *Lopadorrhynchus parvum* Chamberlin from SW of Mexico may be a young *L. brevis*, for E. WESENBERG-LUND (1939) has shown that the presence of eyes is no characteristic of the species.

Lopadorhynchus (Lopadorhynchus) Krohnii (Claparède, 1870).

Hydrophanes Krohnii Claparède 1870 (*fide* Fauvel), Viguier 1886.
Lopadorhynchus Viguieri Reibisch 1895.
Lopadorhynchus krohni Bergström 1914.
Lopadorhynchus Krohnii Fauvel 1923, Wesenberg-Lund 1939.

Also this species, being reported from the Mediterranean, the Atlantic and the Indian Ocean, is not represented in the samples, probably because of its small size. The two first pair of parapodia are larger than the following ones, which have a simple bristle beside the compound ones; there is no rudimentary third pair of tentacular cirri.

Subgenus **Prolopadorhynchus** Bergström.

Lopadorhynchus (Prolopadorhynchus) Nationalis Reibisch, 1895.

Lopadorhynchus nationalis Reibisch 1895, Ehlers 1913, Fauvel 1916.
Prolopadorhynchus nationalis Bergström 1914.
Lopadorrhynchus nans Chamberlin 1919.
Lopadorhynchus (*Prolopadorhynchus*) *nationalis* Fauvel 1923, Wesenberg-Lund 1939.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
53	8/6	34°59′N 33° 1′W	100	2615-2865	yellow hard clayish mud	1 sn	1
58	12/6	37°38′N 29°20′W	100	948	hard bottom		1
64	24/6	34°44′N 47°52′W	300			y.	2

One of the specimens from st. 64 is a giant of 36 segments, 15 mm long and 1.5 mm broad without parapodia and bristles and with a total breadth of 5 mm. The other three specimens, of which one is rather badly preserved, has 24 or 25 segments, their length varies from 7 to 10 mm, their breadth is 1 mm without parapodia and bristles and the total breadth 3—4 mm.

In this species the third pair of tentacular cirri is not so rudimentary as in the preceding species; they are nearly half the length of the two anterior pairs, and about the same length as the antennæ. — No eyes can be seen. The first three parapodia are shorter and stouter than the rest, but they are not nearly so conspicuous as in *L. uncinatus*. The form of the setigerous lobe of these anterior parapodia is very characteristic, as it is triangular with one corner directed sidewards. Also the ventral cirrus of these parapodia is characteristic, being nearly cylindrical and parallel to the ventral side of the triangular lobe, and thus directed obliquely upwards.

There are some simple bristles even in the median parapodia.

Fauvel (1916) compares *L. Nationalis* Reibisch with *L. brevis* Grube, from which it is distinguished only by the presence of the ventral cirrus on the first three parapodia and by the absence of eyes. For the rest the descriptions and figures of *L. brevis* are so incomplete that it is impossible to say anything about the form of the parapodia and the bristles. Now Fauvel has seen traces of depigmented eyes also in *L. Nationalis;* and as the ventral cirri of the parapodia of the three first segments in this species are parallel and close to the ventral edge of the parapodia and therefore easily overlooked except by an attentive examination, he supposes that the two species may be identical. In "Faune de France", however, he still describes them as two different species.

More recently E. Wesenberg-Lund (1939) has found both species in the Mediterranean and has given a good completing description of *L. brevis*. She does not mention the eyes, but the arrangement of the bristles seems to be exactly the same as in *L. Nationalis*. On the other hand, its three first parapodia are really missing the ventral cirrus, and the figure given by her of the fourth right parapodium shows that the parapodia are quite different from those of *L. Nationalis*.

Lopadorrhynchus nans Chamberlin (1919) from off Peru seems to me to be conspecific with *L. Nationalis* Reibisch rather than with *L. brevis* Grube as E. Wesenberg-Lund (1939) supposes. Chamberlin mentions in the anterior parapodia a small "postsetal process with a low, membranous extension ventrad", which on a closer examination certainly would have proved to be the ventral cirri lying parallel to the ventral parapodial edge.

According to Reibisch (1895) and Ehlers (1913) *L. Nationalis* is distributed in the equatorial part of the Atlantic Ocean from about 28° N to 10° S. Fauvel (1916) reports it from between the Canary Islands and the Azores and (1923) from Monaco; E. Wesenberg-Lund (1939) states that it has a comparatively wide distribution in the Mediterranean. The "Michael Sars" has brought home the species from the Azores and from the open ocean between the Azores and North America. It seems thus to have a comparatively wide distribution also in the Atlantic.

Both Fauvel (1916) and E. Wesenberg-Lund (1939) state that *L. Nationalis* is a surface form. Also the "Michael Sars" material supports this, as all the specimens were found between 50 and 150 m.

Lopadorhynchus (Prolopadorhynchus) Henseni Reibisch, 1894.

Lopadorhynchus Henseni Reibisch 1894, 1895.
Reibischia henseni Bergström 1914.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
84	15/4	48° 4′N 32°25′W	1500			¾ sn.	1

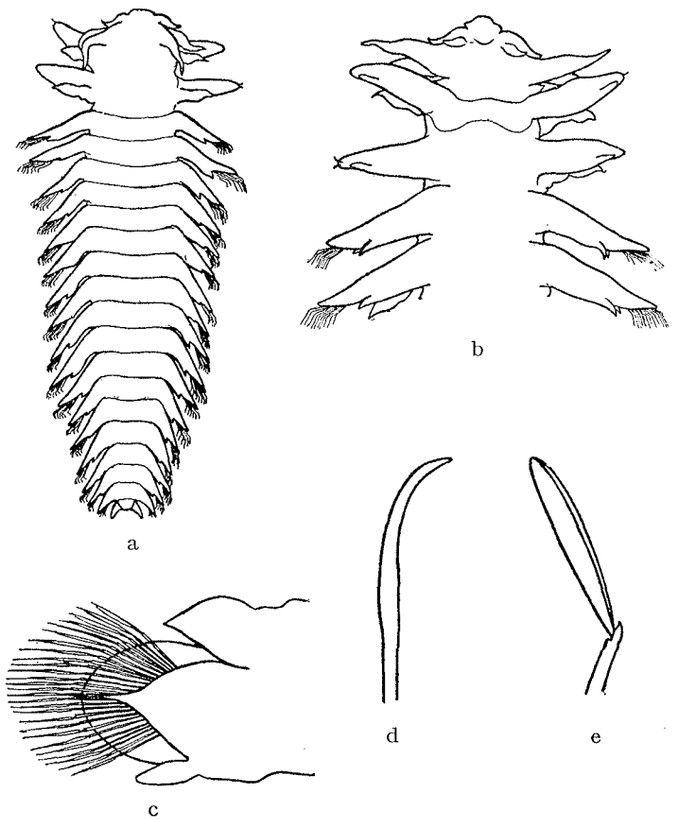


Fig. 12. *Lopadorhynchus Henseni*. a. dorsal view, x 10; b. anterior part, ventral view, x 20; c. parapodium, x 33; d. *uncinus*, x 150; e. compound bristle, x 125.

The single specimen is well preserved. The length is 7 mm, the breadth 1 mm without parapodia and bristles, and with a total breadth of 3 mm.

The body (fig. 12 a) is comparatively slender and tapered posteriorly. The colour is yellowish brown. There are 20 parapodial segments. The prostomium is rounded anteriorly, and carries two pair of subulate antennæ, the hindmost being the shorter ones. There are two pair of tentacular cirri and a very short, rudimentary third pair at the base of the second, with a pair of rounded lobes behind it (fig. 12 b). No eyes can be seen. The first two pair of parapodia are stouter and shorter than the following ones. They are lanceolate and carry both dorsal and ventral cirri. As in *L. Nationalis* the ventral cirrus is nearly cylindrical, lying parallel to the ventral edge of the triangular setigerous lobe and so close up to it that only a profound examination makes it visible. These foremost parapodia carry only a few simple, curved, and transparent bristles (*uncini*) (fig. 12 d). From the third pair the parapodia are typical with a pointed parapodial lobe and a large, rounded lamella (fig. 12 c). The dorsal cirrus is pear-shaped with an attenuate tip. The ventral cirrus is more oval with a very short tip. Only in the third segment the ventral cirrus is more lanceolate. From the third segment the parapodia carry a fan of compound bristles only; the shafts of these bristles end in a small point, the blade having one thickened edge (fig. 12 e). — The species is closely allied to *L. Nationalis*, from which it differs by having only compound bristles in the third and following parapodia.

The specimen is found in the middle of the North Atlantic, between New Foundland and Ireland in a depth of 750 m. It is previously known from the central part of the Atlantic, between Brazil and North Africa.

Lopadorhynchus (Prolopadorhynchus) appendiculatus Southern, 1909.

Lopadorhynchus appendiculatus Southern 1909, Fauvel 1916.
Prolopadorhynchus appendiculatus Bergström 1914.
Lopadorhynchus (*Prolopadorhynchus*) *appendiculatus* Fauvel 1923, Wesenberg-Lund 1939.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W	0,45	4700	yellow mud	1 sn.	1
56	10/6	36°53′N 29°47′W	200	3239	clayish mud	1 sn.	2
56	10/6	—»—	500	3239	—»—	1/2 sn.	2
64	24/6	34°44′N 47°52′W	2000			y.	1
67	27/6	40°17′N 50°39′W	800			3/4 sn.	1

All the specimens are relatively well preserved. The number of parapodial segments varies from 17 to 20, the length from 5 mm to 8 mm, the breadth from 0.5 mm to 1 mm without parapodia and bristles, and from 2 mm to 3.5 mm including these organs.

The animal is comparatively broader than the preceding species, and it is easily distinguished from all other species of *Lopadorhynchus* by the filiform appendage at the tip of the ventral cirri. The two first parapodia are stouter but shorter than the rest, having only simple, curved bristles. Both dorsal and ventral cirri are present in all the parapodia. Beside the third, rudimentary pair of tentacular cirri there is also a pair of comparatively large, rounded papillæ. No eyes can be seen.

SOUTHERN (1909) knew this species from the coasts of Ireland. FAUVEL (1916) reports it from Gibraltar, the Azores and the Canary Islands and E. WESENBERG-LUND (1939) has also a specimen from the waters west of Casablanca; she further states that it has a comparatively wide distribution in the Mediterranean. The "Michael Sars" has brought home this species from four stations on its way out only. The first off the NW corner of Spain, the second near the Azores and the two last ones in the open sea between the Azores and Nova Scotia.

These finds show that this species too has a comparatively wide distribution also in the Atlantic. The statement of E. WESENBERG-LUND that it seems to be a surface form living over great depths, is supported by the present material, and so is her opinion that the species is evidently a rarity, for it is not present in any of the numerous stations in the neighbourhood of Gibraltar and round the Canary Islands.

Lopadorhynchus (Prolopadorhynchus) macrophthalmus Reibisch, 1894.

This species found by REIBISCH in the central Atlantic, differs from *L. Henseni* chiefly by possessing two great eyes with well developed lenses. It is not present in the material at hand.

Genus **Pelagobia** Greeff.

Pelagobia longicirrata Greeff, 1879.

Pelagobia longicirrata Greeff 1879 a, Viguier 1886, Reibisch 1895, Bergström 1914, Fauvel 1916.
Pelagobia Viguieri Gravier 1911.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
62	20-21/6	36°52′N 39°55′W	2500			¾ sn.	1 (♀)
94	26/7	50°13′N 11°23′W	1500	1565		¾ sn.	4 (2 ♀ ♀)

Only two of the five specimens were comparatively well preserved with the bristles still remaining. The number of parapodial segments varies from 14 to 19, the length of the specimens from 6 mm to 7 mm, the breadth of the body is 1 mm, from tip to tip of the bristles 2 mm to 3 mm.

The prostomium has the form of a truncated cone, with two small eyes, two pair of short antennæ and two pair of long, subulate tentacular cirri. One of the specimens has the proboscis partly everted, only the anterior thickening being visible. Both dorsal and ventral cirrus of the parapodia are long, slender and digitiform, much longer than the conical parapodium. The bristles are compound, the terminal blade being comparatively broad. The shaft seems smooth by a medium enlargement.

Three of the specimens are mature females with ova in the body and in the parapodia, even in the parapodial cirri.

The species is taken at two widely separated stations, viz. 62, in the open sea W of the Azores and 94 SW of Ireland. According to FAUVEL (1916) it is found everywhere in the Atlantic Ocean from Greenland to Antarctis, in the Mediterranean and in the Indian Ocean. It thus seems to be a cosmopolitan species, but it has probably because of its small size often been overlooked; otherwise we should have expected to find it at more than two stations. — It seems to be a rather bathypelagic or eurybath form, being found only between 750 and 1250 m.

According to EHLERS (1913) the *Pelagobia longicirrata* Greeff is identical with the *P. Viguieri* Gravier, and FAUVEL (1916) is of the same opinion.

Pelagobia serrata Southern, 1909.

This small species, previously known from the northern Atlantic and the Mediterranean, and characterized by absence of eyes and by conspicuously dentate setal shafts, is not represented in the material.

*

The other genera of the subfamily *Lopadorhynchinae*, viz. *Pedinosoma* Reibisch, *Maupasia* Viguier (= *Haliplanes* Reibisch) and *Nans* Chamberlin, as well as the other aberrant subfamilies of *Phyllodocidae*, viz. *Iospilinae*, *Pontodorinae* and *Lacydoniinae*, are not represented in the material, although these animals are all (except *Nans*) reported from the Atlantic. They have probably been overlooked because of their small size.

Family ***Alciopidae*** Ehlers.

The *Alciopidae* in reality are only *Phyllodocidae* adapted to pelagic life. Some authors, therefore, have also treated them as a subfamily of the *Phyllodocidae*, whereas others (EHLERS 1864, APSTEIN 1900, FAUVEL 1923 &c.) regard them as a distinct family. In my opinion this view is well-founded, the family being well characterized by the enormous large, red, spheric eyes with a globular lens, and also by the transparency of the body. The prostomium, being somewhat reduced between the eyes, carries two pair of short tentacles anteriorly and a fifth tentacle dorsally, which may be rudimentary or transformed into a sort of crest. The body is long with a great number of segments. The foremost segments carry a various number of tentacular cirri. The parapodia consist of a pedal lobe with an acicula and bristles, and a dorsal and a ventral, more or less foliaceous, cirrus. There is an intensely pigmented, brown dorsal gland at the base of each parapodium and most frequently also a corresponding ventral gland.

Even HERING (1892) and APSTEIN (1900) divided the family *Alciopidae* into two distinct groups, the chief characters of which are the following:

1st group: Only one pair of tentacular cirri on each of the first three segments; the females with one or two pair of *receptacula seminis* (transformed dorsal cirri of the anterior, rudimentary parapodia); proboscis with two long, lateral tentacles; only one sort of bristles, which are capillary and may be simple or compound. Genera: *Torrea, Naiades, Vanadis, Alciopa.* (*Receptacula seminis* are not described in *Alciopa.*)

2nd group: Two pair of tentacular cirri on the second and third (or only on the third) segment; females without *receptacula seminis* (*Krohnia* and *Rhynchonerella* carry their sperm between pedal lobe and ventral cirrus); proboscis without lateral tentacles; two sorts of bristles (the bristles may be simple or compound). Genera: *Alciopina, Plotohelmis, Krohnia, Rhynchonerella, Watelio* g.n.

The *Alciopidae* being very fragile animals, there are often only fragments in the samples. Therefore it is in most cases impossible to indicate dimensions and number of segments, but APSTEIN (1900) has given a key to the genera by which we may determine a specimen from only one well-preserved parapodium. This key forms also the base of FAUVEL'S (1923) key.

As to the names of genera and species of *Alciopidae* great confusion prevails. Of the eight generic names used by FAUVEL (1923) e. g. only one (*Vanadis*) will be kept as used by him. The details will be discussed under the different genera.

The present collection contains almost all that we should expect to find. Only some more southern forms occasionally visiting the Canary Island (*Vanadis longissima* (Levinsen), *Plotohelmis capitata* (Greeff)), or more seldom forms (*Rhynchonerella cincinnata* (Greeff), *Rh. gracilis* Costa (= *Callizona nasuta* Greeff = *C. Henseni* Apstein)) are not represented.

The best survey of the distribution of the species is given by APSTEIN (1900).

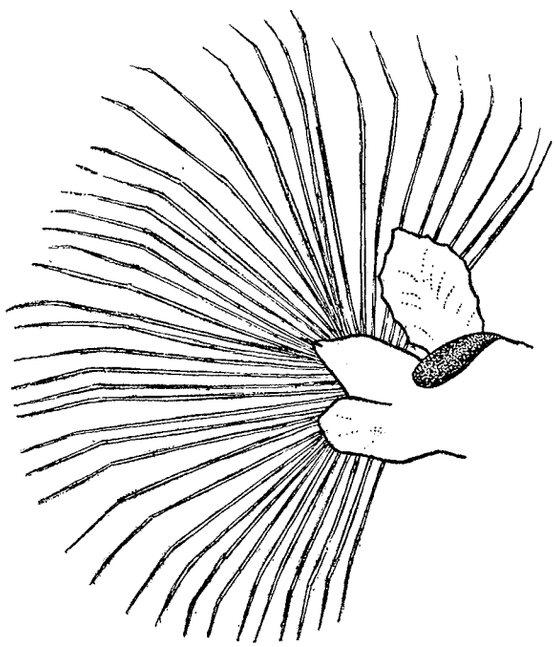


Fig. 13. *Torrea candida*, parapodium, x 30.

1st group.

Genus **Torrea** de Quatrefages.

(*Asterope* Claparède).

Compound capillary bristles only. Pedal lobe without cirriform appendage.

As CHAMBERLIN (1919) and MONRO (1930) have shown, the name *Asterope* Claparède, 1870, has not only been preoccupied by *Asterope* Philippi, 1840, in *Crustacea* and even by *Asterope* Huebner, 1818, in Lepidoptera, but also antedated by *Liocapa* Costa, 1862, and this name again by *Torrea* de Quatrefages, 1850. (Later on DE QUATREFAGES (1865) and subsequent authors spelled this name *Torea*.) Even the type species of these three genera, viz. *Torrea vitrea* de Quatrefages, 1850, *Liocapa vertebralis* Costa, 1862 and *Asterope candida* (Delle Chiaje, 1841) have proved to be identical. I cannot agree with FAUVEL (1916) when he declares that *Torrea* de Quatrefages (and *Liocapa* Costa) are to be rejected because of the identity of *T. vitrea* (and *L. vertebralis*) with the still more ancient *Alcyope candida* Delle Chiaje, and because the genus *Torrea* (and *Liocapa*) is based upon inexact characters.

Torrea candida (Delle Chiaje, 1841).

Alcyope candida Delle Chiaje 1841 (*fide* Apstein and Sherborn).
Alciopa candida Krohn 1845.
Torrea vitrea de Quatrefages 1850.
Torea vitrea de Quatrefages 1865.
Alciopa vittata Hering 1860, 1892.
Liocapa vertebralis Costa 1862 (*fide* Chamberlin).
Liocapa candida Levinsen 1885.
Asterope candida Claparède 1870 (*fide* Fauvel), Carus 1885, Apstein 1891, 1900, Izuka 1914, Fauvel 1916, 1923.
Torrea candida Monro 1930, Wesenberg-Lund 1939.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
18	30/4	35°56′N 5°43′W	surface	400	rock	1 sn.	1 (♀)
48	31/5	28°54′N 24°14′W	0			1 sn.	1
53	8/6	34°59′N 33° 1′W	300	2615-2865	yellow hard clayish mud	y.	1 (♀)
56	10/6	36°53′N 29°47′W	300	3239	clayish mud	y.	1
62	20-21/6	36°52′N 39°55′W	surface			1 sn.	1
64	24/6	34°44′N 47°52′W	200			1 sn.	1 (♂)
67	27/6	40°17′N 50°39′W	surface			1 sn.	3 (2 ♀♀, 1 ♂)
67	27/6	—»—	200			y.	1 (♀)

All the specimens are fragmentary, but in most samples one or more head pieces are present.

The body is long and very slender. The prostomium carries two pair of antennæ, the dorsal pair being the shorter; the median tentacle is very short and rounded. The eyes are directed sideward. The proboscis is long and slender with two long lateral tentacles. Three pair

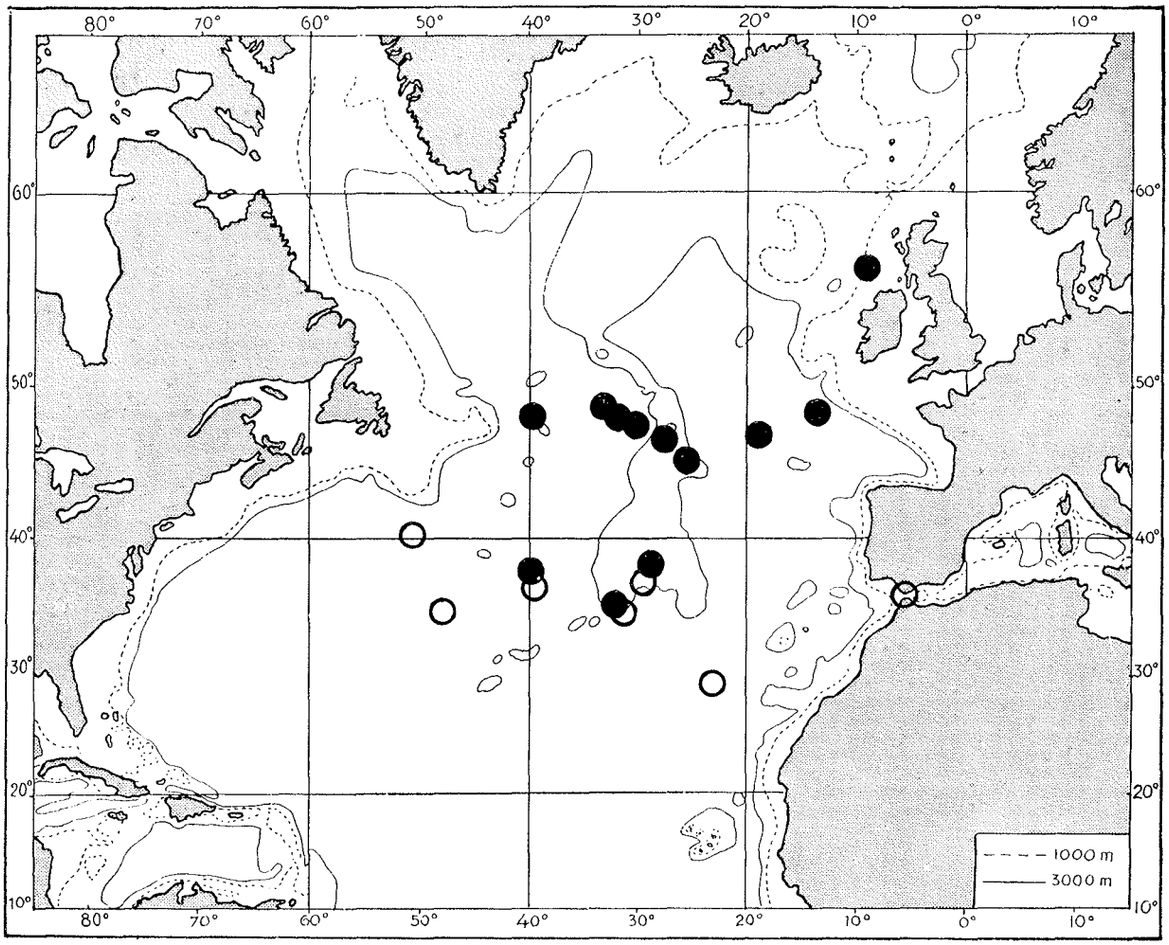


Fig 14. ○ *Torrea candida.* ● *Rhynchonerella Angelini.*

of tentacular cirri, the first pair being the larger. A parapodium (fig. 13) consists of a dorsal and a ventral cirrus and a pedal lobe without terminal appendage, but with an acicula reaching out of its tip and with a bundle of compound capillary bristles; the dorsal cirrus is lanceolate, of about the same length as the pedal lobe, the ventral cirrus is oval and a little shorter. The two first pair of parapodia are somewhat rudimentary, having more spindle-shaped cirri and shorter pedal lobe, but retaining acicula and bristles. In the females the dorsal cirri of these two pair of parapodia are transformed into globular *receptacula seminis*. The segmental glands are intensely pigmented with brown and very conspicuous. They are placed over and just behind the dorsal cirri. In the anterior segments the glands unite in pairs to form a transverse cincture which is narrower in the middle of the dorsum. The pigment may also reach into the *receptacula seminis* of the females.

The material brought home by the "Michael Sars" does not add very much to our knowledge of the distribution of *T. candida*. There is one specimen from the Straits of Gibraltar, two from between the Canary Islands and the Azores, one from the Azores and some specimens from the open sea between the Azores and Nova Scotia (fig. 14). The species is previously known from the Canary Islands, from several localities in the south Atlantic, from Japan and from the Indian Ocean. But its true home seems to be the Mediterranean, where E. WESENBERG-LUND (1939) reports it from a great many localities. It lives in or near the surface, 5 of the 8 specimens being taken at the surface, the other 3 down to 150 m.

Torrea pelagica (Chamberlin, 1919).

Torea pelagica Chamberlin 1919.

This species from the Pacific differs from *T. candida* in having no small papillæ between the two long tentacles of the

proboscis, those tentacles being very long; the median prostomial tentacle is long and slender, and also the parapodial cirri are differently shaped.

Genus **Naiades** Delle Chiaje.

(*Alciopa* auct.).

Capillary simple bristles only. Pedal lobe without cirriform appendage.

This genus was first published under the name *Naiades* Delle Chiaje, 1830, and there is no reasen for rejecting this name.

Naiades Cantrainii Delle Chiaje, 1830.

Naiades Cantrainii Delle Chiaje 1830 (*fide* Sherborn).
Alciopa Reynaudii Krohn 1845 (*non* Aud. & M. Edw.).
Alciopa Edwardsii Krohn 1847 (*fide* Apstein), Hering 1860, 1892.
Liocapa vitrea Costa 1862 (*fide* Fauvel).
Krohnia Edwardsii de Quatrefages 1865.
Liocapa Cantrainii Claparède 1868.
Alciope Cantrainii Carus 1885.
Alciope microcephala Viguier 1886.
Alciopa Cantrainii Apstein 1891, 1900, Izuka 1914, Fauvel 1916, 1923, Monro 1930, 1936, Wesenberg-Lund 1939.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
39a	20-21/5	26° 3′N 15° 0′W	300	214	fine grey sand	y.	1 (♂)
45	28-29/5	28°42′N 20° 0′W	2000			y.	1 (♂)
49b	1/6	29° 8′N 25°16′W	100			1 sn.	1 (♀)
52	6/6	31°24′N 34°47′W	100			½sn.	1 (♂)
52	7/6	—»—	100			½sn.	5 (2♀♀, 3♂♂)
53	8/6	34°59′N 33° 1′W	60	2615-2865	yellow hard clayish mud	½sn.	4 (♂♂)
53	8-9/6	—»—	surface	»	—»—	1 sn.	1 (♀)
56	10/6	36°53′N 29°47′W	300	3239	clayish mud	y.	1
62	20-21/6	36°52′N 39°55′W	surface			1 sn.	2 (1♂,1♀)
64	24/6	34°44′N 47°52′W	100			y.	1 (♀)
64	24/6	—»—	100			1 sn.	4 (2♂♂, 1♀)
64	24/6	—»—	200			1 sn.	10(3♀♀, 6♂♂)
64	24/6	—»—	300			y.	1
64	24/6	—»—	600			¾sn.	1
64	24/6	—»—	2000			y.	1 (♀)
67	27/6	40°17′N 50°39′W	50			1 sn.	1 (♂)

Most of the specimens are more or less fragmentary, some of the samples containing only a piece of the body without head and tail. In these cases the sex is not determinable.

The body is comparatively short and thick, abruptly attenuate toward both ends. It is extremely translucent. The prostomium (fig. 15 a) carries two pair of short and equal antennæ. The median tentacle is even shorter. The eyes are considerably smaller than in the preceding species, leaving a broader space between them. They are directed aslant downward and sideward. The proboscis (fig. 15 a) is short and bell-shaped with short lateral processes. The first pair of tentacular cirri is comparatively long and inserted just below the eyes, the two following pairs are very small, and it is often difficult to see them. A parapodium (fig. 15 b) consists of a pedal lobe with projecting acicula and with a bundle of simple capillary bristles, and a dorsal and a ventral cirrus, both foliaceous, lanceolate, the ventral being the shorter one. The segmental glands are small, but intensely pigmented and placed just behind the pedal lobe. The males have also a conspicuous white ventral gland just beneath the 15th to the 29th parapodium. HERING (1892) designates this organ as "Samenblase".

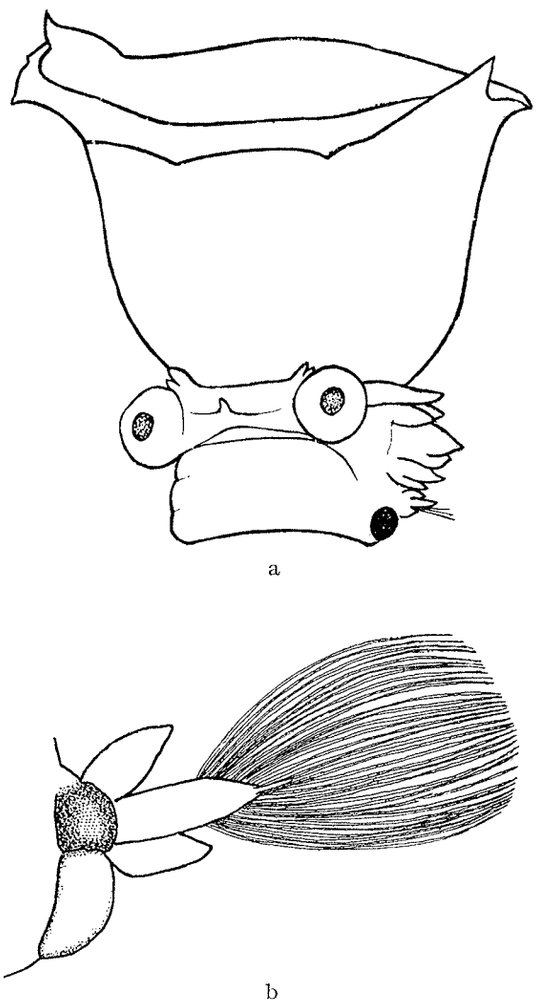


Fig. 15. *Naiades Cantrainii*. a. prostomium. with everted proboscis, x 20; b. parapodium of ♂, x 30.

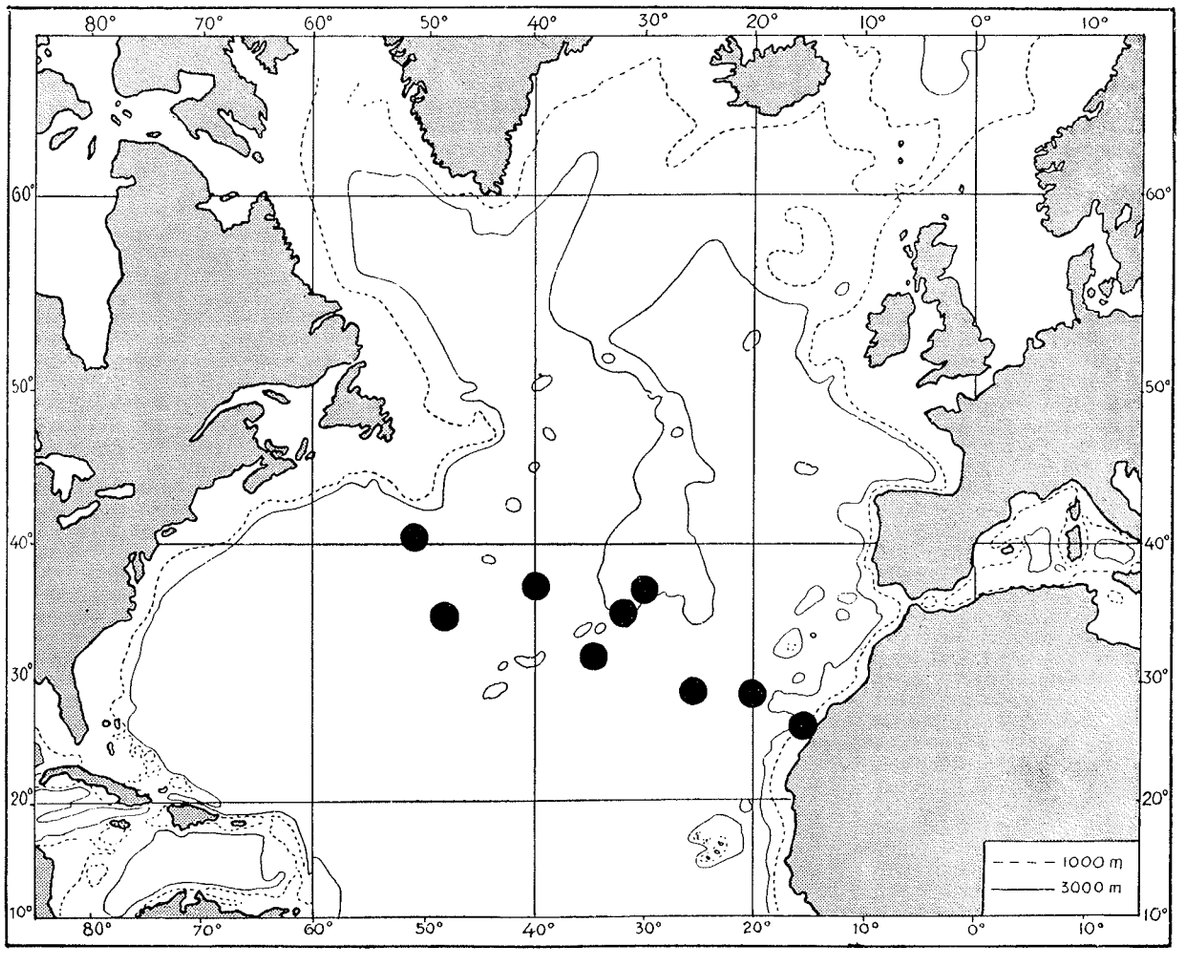


Fig. 16. *Naiades Cantrainii.*

The three first pair of parapodia are rudimentary, consisting of a dorsal and a ventral cirrus with a very small pedal lobe, most frequently without bristles. The segmental glands are absent in these three foremost segments. The dorsal cirri of the second pair of rudimentary parapodia are in the females transformed into large *receptacula seminis*.

Naiades Cantrainii is widely distributed in the tropical and temperate zones of the Atlantic and Pacific and in the whole Mediterranean. The "Michael Sars" has brought home the species from a series of localities between Cape Bojador (Africa) and the Azores and farther towards the west, but it is not taken on the way home, which followed a more northern route. It seems more seldom to pass the 40th degree N (fig. 16). — The species is most frequently taken at the surface or in a depth of 30 to 150 m. E. WESENBERG-LUND (1939) believes that the specimens from hauls with long wire out (600—2000 m) are taken on hauling in the apparatus. Neither do such specimens (three) numerically play any rôle in the present material.

Genus **Vanadis** Claparède.

Compound capillary bristles only. Pedal lobe with one cirriform appendage.

Vanadis formosa Claparède, 1870.

Alciopa Krohnii Hering 1860 (*nomen nudum*), 1892 (*non* Greeff).
Vanadis formosa Claparède 1870 (*fide* Fauvel), Carus 1885, Apstein 1900, Southern 1911, Fauvel 1916, 1923, 1932, Monro 1930, 1936, Wesenberg-Lund 1939.
Vanadis pelagica Greeff 1876, Carus 1885.
Vanadis Greeffiana Grube 1878.
Vanadis longicauda Apstein 1891.
Vanadis latocirrata Apstein 1891.
?Vanadis fusca punctata Treadwell 1906.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
44	28/5	28°37′N 19° 8′W	4000-0			1 sn.	1
48	31/5	28°54′N 24°14′W	surface			1 sn.	8 (3♂♂)
49b	1/6	29° 8′N 25°16′W	370			y.	1 (♀)
53	8/6	34°59′N 33° 1′W	60	2615-2865	yellow hard clayish mud	½sn.	1 (♂)
53	8/6	—»—	100	»	—»—	1 sn.	3
53	8/6	—»—	600	»	—»—	y.	1
56	10/6	36°53′N 29°47′W	0	3239	clayish mud	1sn.	1
56	10/6	—»—	100	»	—»—	1sn.	3(1♂)
56	10/6	—»—	300	»	—»—	y.	1 (♀)
58	12/6	37°38′N 29°20′W	100	948	hard bottom		1 (♂)
62	20-21/6	36°52′N 39°55′W	1000			y.	1 (♀)
64	24/6	34°44′N 47°52′W	100			1sn.	5 (2♀♀, 3♂♂)
64	24/6	—»—	600			¾sn.	1 (♂)
87	17/7	46°48′N 27°46′W	200	2157	sand, yellow mud	1 sn.	1
87	17/7	—»—	300	»	—»—	y.	5
88	18/7	45°26′N 25°45′W	100	3120	—»—	1 sn.	1 (♂)
92	24/7	48°29′N 13°55′W	100			1 sn.	2 (1♀,1♂)
92	24/7	—»—	1500			¾ sn.	2 (1♂)

Most of the specimens are only fragments, a sample often containing only a head with a few segments, or only a few segments from the middle of the body. The preservation is very variable, the parapodial cirri and the bristles are often absent.

Most of the descriptions of this species are not very good, especially as to the anterior, rudimentary parapodia. They seem to be copied, one from the other and based upon a first, rather superficial one. The only really good and solid description is that of HERING (1892) (who describes the species under the name *Alciopa Krohnii*).

The body is long and slender, tapering toward both ends. The prostomium carries four small lateral antennæ, the lower pair being the longer one, and dorsally one median tentacle, which is also digitiform. The eyes look sideward and a little forward and downward. The proboscis is long and cylindrical with two long lateral tentacles.

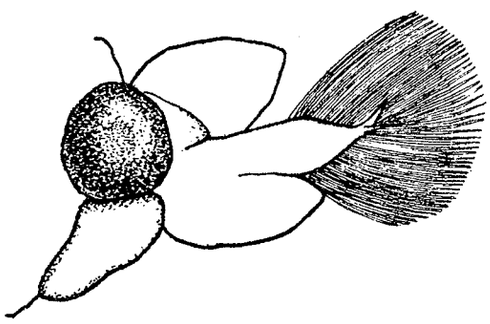


Fig 17. *Vanadis formosa*, parapodium of ♂, x 20.

Straight behind and below the eyes there are three pair of tentacular cirri, the first pair being the longer one. The first two pair of parapodia are rudimentary (not only one pair), consisting of a lanceolate dorsal cirrus and a very small ventral branch. In the females the dorsal cirri of these two pair of parapodia are transformed into *receptacula seminis*. The parapodia of the third segment consist of a pedal lobe with acicula and some short bristles and a dorsal and a ventral cirrrus, but like the preceding still without segmental glands. The parapodia of the following, fourth, segment are quite complete, with segmental gland and longer bristles. The first complete parapodia are increasing in length till they reach their normal size. Toward the posterior end they diminish gradually. Fig. 17 shows a parapodium from the middle of the body of a male. The pedal lobe is elongated with a long, cirriform terminal appendage and a bundle of compound, capillary bristles. Both dorsal and ventral cirrus are oval and somewhat pointed at the extremity, the dorsal being the larger, of about the same length as the pedal lobe. The segmental gland is comparatively large and intensely brown pigmented. It is placed just behind the pedal lobe and the dorsal cirrus. The males have also a ventral gland from the 25th parapodium. These glands are unpigmented and placed just below the pedal lobe and the dorsal segmental gland. They has a narrower continuation toward the ventral mid-line of the body. There is one unpaired, long anal cirrus.

In one of the males from st. 64 the right eye is placed on the proboscis, whose right lateral tentacle is placed more dorsally. This misplaced eye is without a lens. The tentacular cirri and rudimentary parapodia of the right side are lacking.

I agree with CHAMBERLIN (1919) in thinking that the *Vanadis fusca punctata* Treadwell from the Hawaiian Islands probably is identical with the present species, as I cannot find any important difference between them.

Vanadis formosa is beside *Rhynchonerella Angelini* the most common Alciopid in the material. It is most frequently found between the Canary Islands and the Azores and west of the Azores, but is present both at three stations from the more northern way home in the middle of the north Atlantic, and SW of Ireland (fig. 18). It seems to be a typical surface form being most frequently taken in depths less than 150 m. The few specimens caught with 600—4000 m wire out may have come into the apparatus when hauling in.

Vanadis formosa is widely distributed in the temperate and the tropical zones of the Atlantic, and is further known from the Pacific and from the Indian Ocean. E. WESENBERG-LUND (1939) states that it is the most common Alciopid in the Mediterranean.

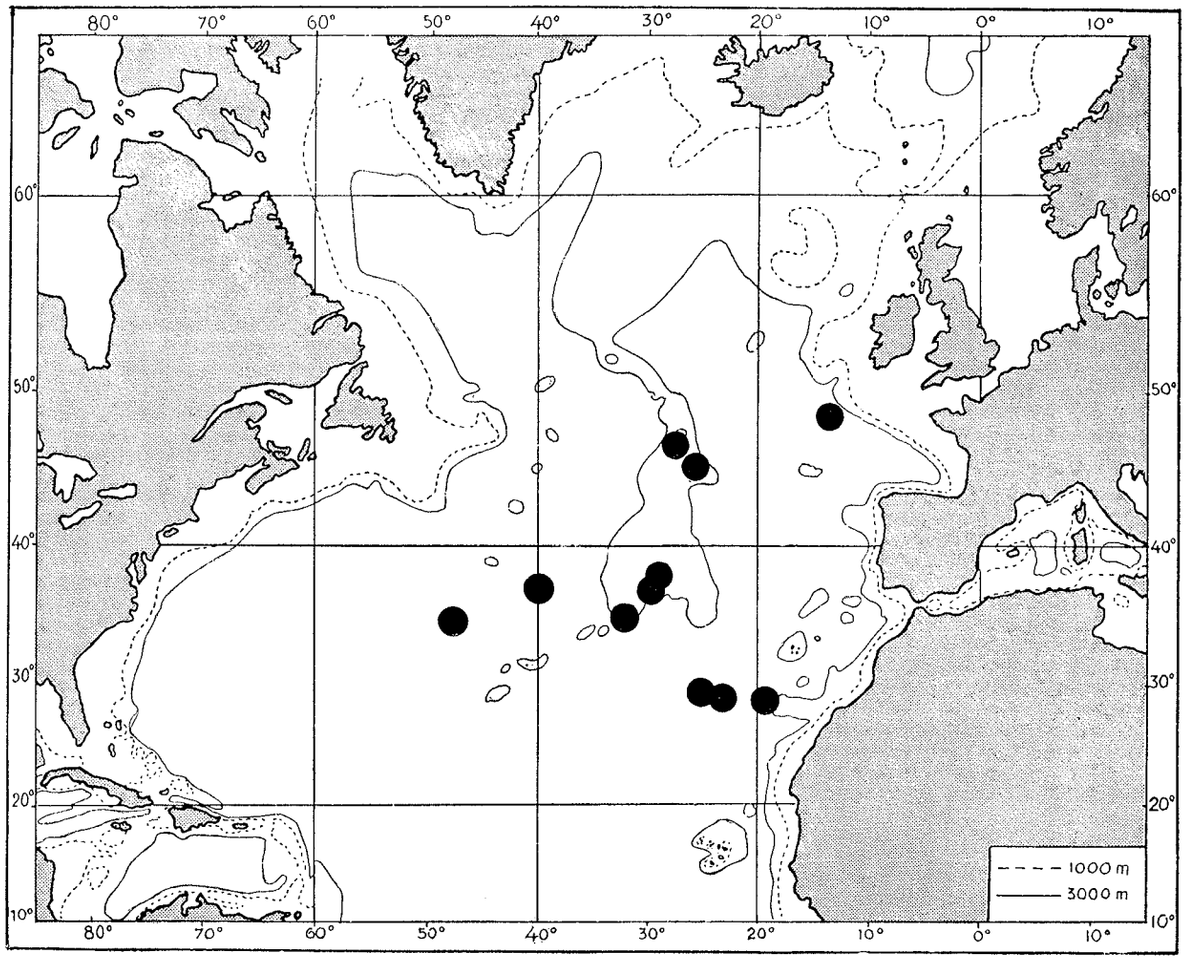


Fig. 18. *Vanadis formosa.*

Vanadis crystallina Greeff, 1876.

Vanadis crystallina Greeff 1876, Carus 1885, Apstein 1900, Fauvel 1916, 1923, 1932, Monro 1936, Wesenberg-Lund 1939.
?Vanadis ornata Greeff 1876.
Alciopa longirhyncha Greeff 1885 (*fide* Apstein).
Alciopa candida Hering 1892 (*non* Delle Chiaje).
Vanadis augeneri Benham 1929.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5/5	35°32′N 7° 7′W	200	1215	yellow mud	1sn.	4 (1♂)
35	18/5	27°27′N 14°52′W	4200	2603	—»—	½ sn.	1 (♀)
45	28-29/5	28°42′N 20° 0′W	200			1 sn.	3 (2♂♂)
48	31/5	28°54′N 24°14′W	surface			1 sn.	1 (♂)
52	6/6	31°24′N 34°47′W	0			1 sn.	1 (♀)
53	8/6	34°59′N 33° 1′W	100	2615-2865	yellow hard clayish mud	1 sn.	1
58	12/6	37°38′N 29°20′W	100	948	hard bottom		1 (♀)
58	12/6	—»—	300	948	—»—		2
60	20/6	37° 9′N 38° 5′W	surface			1 sn.	1
62	21/6	36°52′N 39°55′W	2000 surface animals				1 (♂)
64	24/6	34°44′N 47°52′W	200			1 sn.	1
64	24/6	—»—	300			y.	? (1♂)
90	21/7	46°58′N 19° 6′W	200			1 sn.	1

Of this species the samples contain frequently only one or some fragments, as was the case with *V. formosa*, but in most cases the prostomium is present. The preservation is as variable as that of *V. formosa*.

The descriptions of *Vanadis crystallina* are even more inaccurate than those of *V. formosa* both as to tentacular cirri and to anterior parapodia, the only accurate description being that of Hering (1892) (who describes this species under the name *Alciopa candida*).

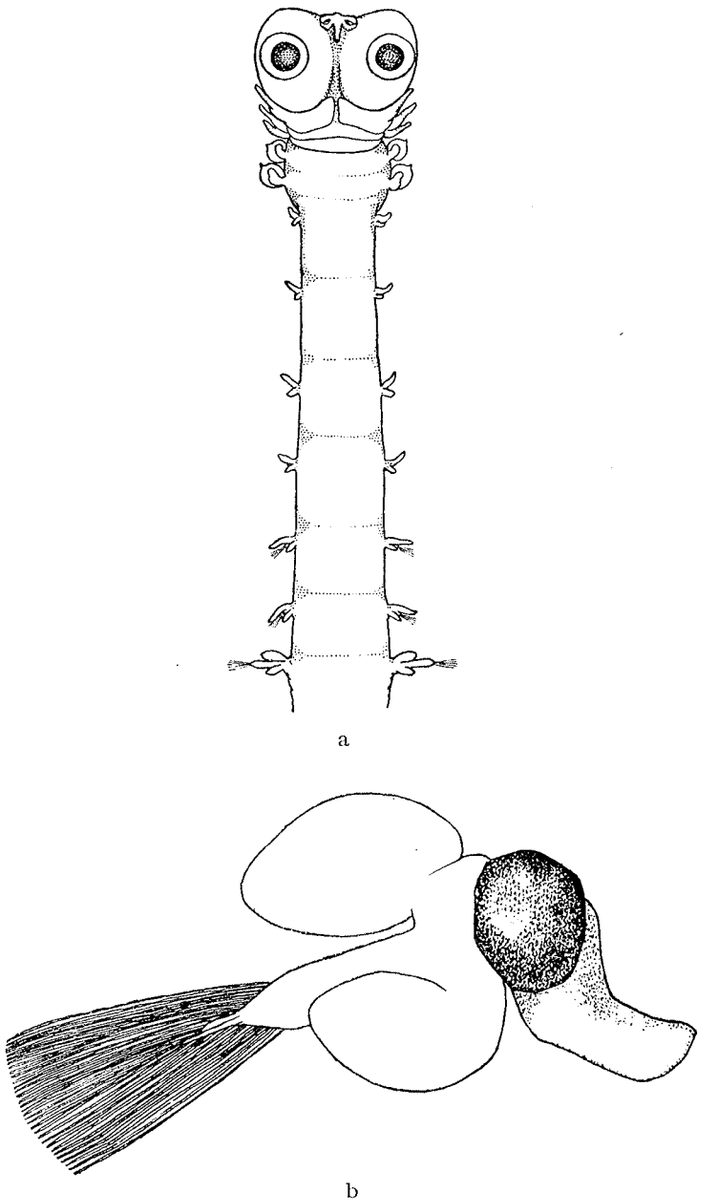


Fig. 19. *Vanadis crystallina*. a. anterior part of ♀, ventral view, x 10; b. parapodium of ♂, x 60.

The body is very long and thread-like. The prostomium (fig. 19 a) carries two pair of antennæ, the lower pair being much longer than the upper one. The digitiform median tentacle is inserted dorsally between the eyes, which are very large and directed sideways and downwards. The proboscis is very long and cylindrical. Just below and behind the eyes there are *three* pair of ordinary tentacular cirri, the first pair being the longest one. Most authors state that there are four pair of tentacular cirri, but the fourth cirrus, as HERING (1892) has already noticed, is more lanceolate and inserted more dorsally. I also found a very small ventral branch below it, so that this "cirrus" must be considered as the first rudimentary parapodium. The following four segments have also very short, rudimentary parapodia consisting of a dorsal cirrus with a very small ventral branch; the next, or the sixth, parapodium has already a small pedal lobe with sometimes a few short bristles. Also the third parapodium may sometimes have some short bristles. The seventh parapodium has a bundle of normal bristles, but only the ninth is as completely developed as the following ones (fig. 19 a).

According to all previous authors, including HERING (1892), the females of *Vanadis crystallina* have only one pair of *receptacula seminis*, the dorsal cirri of the second pair of parapodia, — thus of the fifth segment behind the prostomium, as each pair of tentacular cirri corresponds to a segment — being transformed into such organs. In the actual material three specimens could be designated as females, and in all of them also the dorsal branch of the first rudimentary parapodium, thus of the so-called fourth tentacular cirrus, is swollen to a slightly smaller *receptaculum seminis*, so that *V. crystallina* as well as *V. formosa* and *V. longissima* have two pair of those organs (fig. 19 a).

A complete parapodium (fig. 19 b) consists of an elongated pedal lobe with a long, cirriform appendage, an acicula, a bundle of compound capillary bristles, a segmental gland and a dorsal and a ventral cirrus. Both those cirri are oval, the dorsal being considerably larger than the ventral, and nearly as long as the pedal lobe. The first segmental gland I find approximately on the seventh parapodium. The first glands are very small, but they gradually increase backwards. The gland is intensely pigmented with brown, and placed just behind the pedal lobe and the dorsal cirrus. The males have also a white ventral gland beginning from the ninth or tenth parapodium, and forming a ventral continuation of the segmental gland.

Vanadis longirhyncha Greeff is recognized as a synonym to *V. crystallina*. And I think that so may also be the case with *V. ornata* Greeff from the Canary Islands. GREEFF'S specimen seems to have been strongly contracted so that the tentacular cirri and the first rudimentary parapodium are not seen. His five pair of tentacular cirri may be the rudimentary parapodia, their form and size sustaining this supposition. The first pair, being the largest one, may be the empty female *receptacula seminis*. The pedal lobe, the dorsal and the ventral cirrus and the two anal cirri also closely agree with those of *V. crystallina*. Only the segmental glands which are present commencing from the segment with the *recepta-*

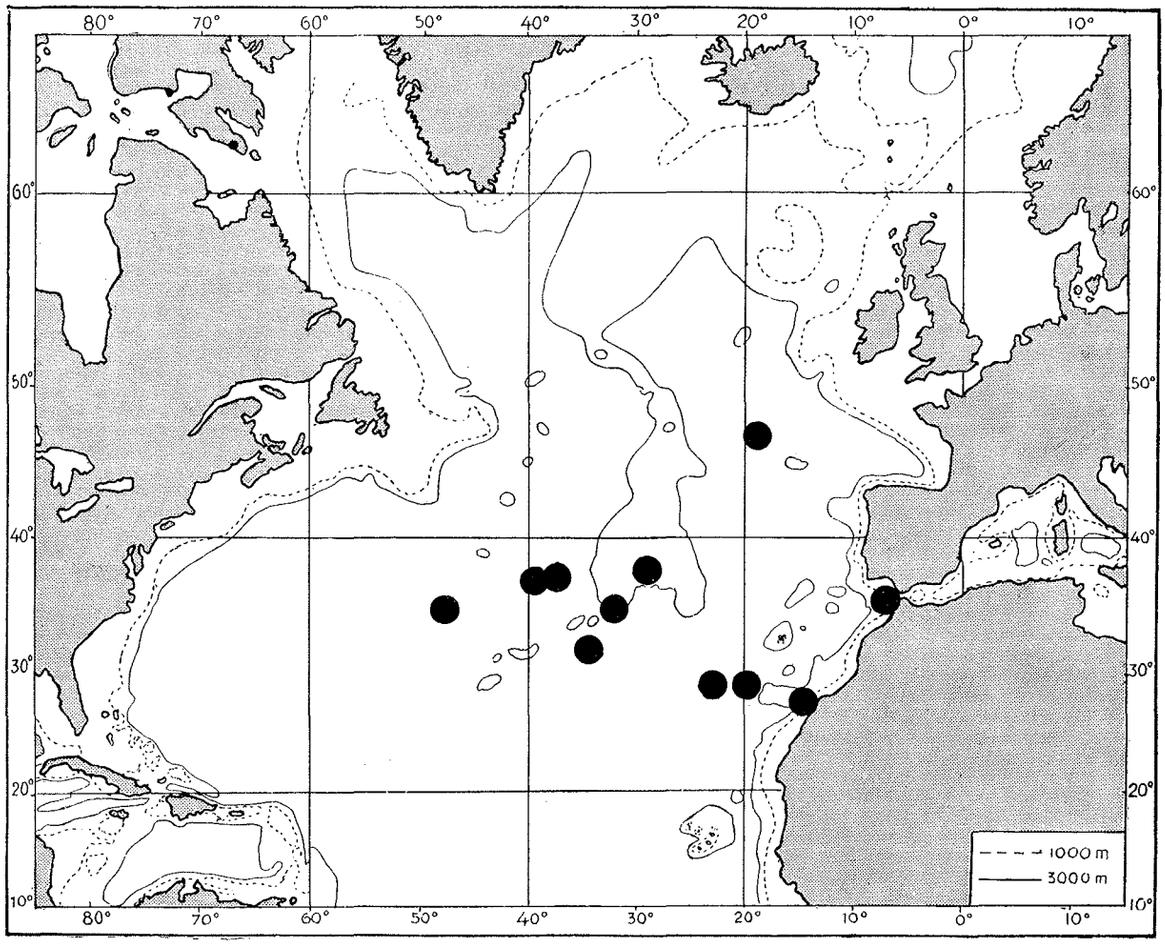


Fig. 20. *Vanadis crystallina.*

cula seminis, seem to contradict my theory of identity of the two species, but, the first glands being very small, it is possible that they may prove to be present in very well preserved specimens already from the second segment.

BENHAM'S (1929) description of his *Vanadis augeneri* is a good description of *V. crystallina*; he has described it as a new species, because most of the existing descriptions of *V. crystallina* are very incorrect as to the tentacular cirri and rudimentary parapodia.

The "Michael Sars" has brought home *V. crystallina* from a locality outside the Straits of Gibraltar, from several localities between the Canary Islands and to the Azores, and from the open ocean to the west of the Azores (fig. 20). From st. 90 in the open ocean SW of Ireland there is further a fragment consisting of some segments from the middle of the body, the dimensions, glands and parapodia of which seem to suggest that it has belonged to a *V. crystallina*. — Like the preceding species also *V. crystallina* is widely distributed in the temperate and the tropical parts of the Atlantic, and E. WESENBERG-LUND (1939) has shown that it is very common in the Mediterranean. Further BENHAM (1929) has reported it from New Zealand. *V. crystallina* occurs most frequently in the upper water-layers, and E. WESENBERG-LUND (1939) states, that it is often taken during the night.

Vanadis longissima (Levinsen, 1885).

Rhynchonerella longissima Levinsen 1885.
Vanadis fasciata Apstein 1891.
Vanadis longissima Fauvel 1923.

This species seems to be a more southern form in the Atlantic, and it is not represented in the samples. It is distinguished from other species of *Vanadis*, by the segmental glands not being present on all segments but disposed on 1—3 successive segments followed by 5—6 segments without glands. According to MONRO (1930) the proboscis is without long tentacles.

Vanadis antarctica (McIntosch, 1885).

Alciopa antarctica McIntosh 1885.

This species has behind the three pair of tentacular cirri one pair of rudimentary parapodia, then follow 8—10 pair of small, complete parapodia of which the two first ones in the females have the dorsal cirrus transformed into *receptacula seminis*. Thus there is a bundle of bristles also below the *receptacula seminis*. The rudimentary parapodia consist of a foliaceous dorsal cirrus with only an indication of a ventral one. The neck is characteristically pigmented and there are pigmented areas further back. MONRO (1936) states that there are no long tentacles on the proboscis. The eyes look nearly downward. I have examined AUGENER'S (1932) female from the Peter Island. The species seems to come very near *V. longissima* and *V. violacea*.

Vanadis Studeri Apstein, 1893.

This species from Australia has six pair of rudimentary parapodia behind the three pair of tentacular cirri, and is characterized by a deep incision in the prostomium.

Vanadis violacea Apstein, 1893.

This species from the south Atlantic (MONRO 1936) is characterized by its purplish brown colour. MONRO (1936) states that the second pair of tentacular cirri is the longest. Two pair of rudimentary parapodia, the second pair with bristles. No long tentacles on the proboscis.

Vanadis macrophthalma Greeff, 1876.

This seems to be a *nomen nudum* only.

Vanadis minuta Treadwell, 1906.

This species originates from the Hawaiian Islands and is characterized by having 4 (?) pair of tentacular cirri followed by 3 (?) pair of rudimentary parapodia, the first of which in the female is transformed into *receptacula seminis*. The median tentacle is only a rounded lobe.

Vanadis grandis Izuka, 1914.

Originating from Japan this species seems to come near *V. longissima*, but differs from it by its great dimensions (408 mm long, 688 segments!), and in number of tentacular cirri (?) and rudimentary parapodia, being 2 and 4 respectively.

Vanadis nans (Chamberlin, 1919).

Mauita nans Chamberlin 1919.

CHAMBERLIN has described this species from the Pacific. It is characterized by having the two first segments coalesced and carrying the two first pair of tentacular cirri, the third pair sitting on the next segment. The second pair is the longest. Parapodial cirri rounded, sublobate. A longitudinal band on the prostomium anteriorly. — CHAMBERLIN'S genus *Mauita* is separated from *Vanadis* only by the two first segments being coalesced.

Genus **Alciopa** Audouin and Milne Edwards.

(*Greeffia* McIntosh, *Nauphanta* Greeff).

Compound capillary bristles only. Pedal lobe with two short cirriform appendages.

AUDOIN and MILNE EDWARDS established in 1833 this genus with one species, viz. *A. Reynaudii* of which they gave a description and figures. In the description the compound bristles are mentioned, and the figures clearly show the two appendages of the parapodium. Later on various species have been referred to the genus *Alciopa*, which has then been divided into different genera. The only species remaining in the genus *Alciopa* was *A. Cantrainii* (= *Naiades Cantrainii* Delle Chiaje), and thus *Alciopa* was characterized by having simple, not compound bristles. GREEFF (1876), amongst others, has proposed a new genus *Halodora* for the original *Alciopa Reynaudii* with compound bristles, but he supposes that this species is closely allied to his *Nauphanta spectabilis* (which he afterwards describes under the name *N. celox*) and may perhaps even be identical with it. GREEFF of course ought to have retained the name *Alciopa* for *Alciopa Reynaudii* and separated the species which he described as *Alciopa Cantrainii* from it under another name. APSTEIN (1900) has examined a parapodium from AUDOIN and MILNE EDWARDS' holotype of *Alciopa Reynaudii* and ascertained that it is really identical with GREEFF'S *Nauphanta celox*, but in a foot-note he makes the following remark to this statement: "Hoffentlich wird diese Erkenntniss nicht für »*Alciopa*« gefährlich. Greeff hätte der *Alciopa Reynaudii* den Namen *Alciopa* lassen und von ihr unter anderem Namen *Alciopa Cantrainii* trennen müssen. Die *Alciopa Reynaudii* war nach der Beschreibung aber nicht zu erkennen, wohl aber die *Greeffia celox*, da aber die beiden Arten identisch sind, muss der Name *Alciopa Reynaudii* fallen und damit würde unter den Alciopiden die *Alciopa* nicht mehr existieren." But even if *Alciopa Reynaudii* is not recognizable by the description, it is so by the figures. It seems also to be more in accordance with the International Rules of Zoölogical Nomenclature when F. W. EDWARDS says (Diptera, Fam. Culicidae. Genera Insectorum, Fasc. 194, Bruxelles 1932): "Where a type exists a specific name must be regarded as valid from the date of its publication, even if the original description is hopelessly inadequate or even inaccurate". On this account I find it to be the only correct manner of proceeding to leave the name *Alciopa* to the original *A. Reynaudii* Audouin and Milne Edwards (= *Nauphanta celox* Greeff, *Greeffia celox* (Greeff) McIntosh), and to give the *Alciopa Cantrainii* (Delle Chiaje) its first name: *Naiades Cantrainii* Delle Chiaje.

Alciopa Reynaudii Audouin and Milne Edwards, 1833.

Alciopa Reynaudii Audouin and Milne Edwards in Cuvier 1829 (*nomen nudum*), 1833.
Halodora Reynaudii Greeff 1876, Chamberlin 1919.
Nauphanta spectabilis Greeff 1876 (*nomen nudum*).
Nauphanta celox Greeff 1876, Levinsen 1883, 1885.
Greeffia celox McIntosh 1885, Apstein 1891, 1900, Fauvel 1916, 1923, Reibisch 1905, Southern 1911.

Greeffia oahuensis McIntosh 1885, Monro 1936, Wesenberg-Lund 1939.
Greeffia aohuensis Apstein 1900.
Greefia oahuensis Treadwell 1906.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W	300 pelagically	4700	yellow mud	y.	1 (♂)
62	20-21/6	36°52′N 39°55′W	surface			1 sn.	5 (2♀♀, 3♂♂)
101	7/8	57°41′N 11°48′W	200	1853	hard clay	1 sn.	1 (♂)

The specimen from st. 10 is a comparatively well preserved fragment consisting of the prostomium and the anterior part of the body. All the other specimens, being more or less complete, have unfortunately been dried.

The body is comparatively short and large with a not very great number of segments. The prostomium carries the two enormous eyes, the usual two pair of antennæ and the median tentacle. The proboscis is short and cylindrical with two long, lateral processes, which are projecting from the mouth even when the proboscis is inverted. Just beneath and behind the eyes there are three pair of tentacular cirri. Even the very first parapodium is complete, consisting of a pedal lobe with acicula, a bundle of compound capillary bristles and two short terminal appendages, a dorsal and a ventral cirrus, both foliaceous. The dorsal cirri are imbricate, nearly covering the parapodia. LEVINSEN (1883, 1885) states that in the females the centre of the *ventral* cirrus of the third to the sixth parapodium is swollen and pigmented. These swellings are probably *receptacula seminis*. The dorsal cirri of those four parapodia are quite normal. LEVINSEN gives no figure of the swollen cirrus. The two specimens in the present collection, which proved to be females, show the same phenomenon, but as they have unfortunately been dried, it is impossible to give a good figure of them. The dorsal segmental glands are present from the first parapodium. In most of the specimens they are very intensely pigmented, nearly black and slightly bilobate, situated just behind the dorsal cirrus and with a prolongation downward. From about the tenth parapodium in the males there is also an intensely pigmented ventral gland just behind the ventral cirrus, and just below this ventral gland there is a larger, whitish organ which may perhaps be a nephridial papilla (fig. 21). It is mentioned and figured by LEVINSEN (1885). GREEFF (1876) does not mention it, but his Tab. IV, Fig. 42 contains it just inside the ventral gland, so that he may perhaps have taken it for part of this gland. In the females the ventral glands are absent, but the ventral papillæ are present from about the tenth segment. The anal cirrus mentioned by FAUVEL (1923) is not present in any of the specimens at hand.

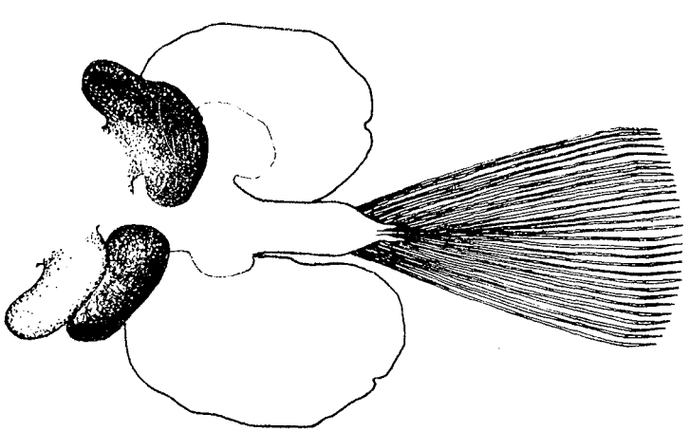


Fig. 21. *Alciopa Reynaudii*, parapodium of ♂, x 26.

MCINTOSH (1885), stating that GREEFF's name of the genus, *Nauphanta*, is preoccupied, introduces a new name, *Greeffia*, and establishes a new species, *G. oahuensis* from off Honolulu. This new species was characterized by having only three pair of tentacular cirri. GREEFF (1876) gives four pairs in his *Nauphanta celox* from the south Atlantic, whereas LEVINSEN (1885) says: "Cirrorum tentacularium paria tria". APSTEIN (1900), spelling the name *Greeffia aohuensis*, does not find any real difference between the two species, but more recent authors as MONRO (1936) and E. WESENBERG-LUND (1939) have found only three pair of tentacular cirri in all their specimens from the Atlantic, thus referring them to *G. oahuensis*. I think that GREEFF's statement of four pair of tentacular cirri must be due to an error of observation, which statement REIBISCH (1905) and later on FAUVEL (1923) have copied; the two species would thus be identical.

In the present material *Alciopa Reynaudii* is represented from three stations only, viz. off the Bay of Biscay, west of the Azores and NW of Ireland. The species seems, however, to have an almost cosmopolitan distribution, as it is found both in the north and the south Atlantic, in the Indian Ocean and in the Pacific. It is not found in the Mediterranean. The species lives at or near the surface.

Alciopa quadrioculata McIntosh, 1885.

Alciopa (?) quadrioculata McIntosh 1885.
Greefia quadrioculata Treadwell 1906.

This species form the Hawaiian Islands seems to belong to the genus *Alciopa*. It is characterized by having a pair of rudimentary accessory eyes below the ordinary ones.

Incertae sedis.

KINBERG's (1866 ?) new species *Alciopa atlantica*, *A. (?) splendida* and *A. (?) pacifica* and his *A. candida* d. Chiaje belong to the 1st group of *Alciopidae*, but the descriptions are too insufficient to allow a specific or even generic identification.

2nd group.

Genus **Alciopina** Claparède.

(*Corynocephalus* Levinsen).

Simple capillary bristles and acicular bristles. In the anterior parapodia only acicular ones. Pedal lobe without terminal appendage.

Alciopina parasitica Claparède, 1868.

Alciopina parasitica Claparède 1868, Carus 1885, Granata 1911 (*fide* Fauvel).
? Alciopina Pancerii Buchholz 1869 (*fide* Fauvel), Carus 1885.
Corynocephalus albomaculatus Levinsen 1885, Apstein 1891, 1900.
Corynocephalus albo-maculatus Fauvel 1916, 1923, Wesenberg-Lund 1939.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
67	27/6	40°17′N 50°39′W	50			1 sn.	1

Only the anterior part of a small and not very well preserved specimen. — The four antennæ are more foliaceous and lanceolate than in other Alciopids, and the median tentacle forms a sort of carina between the large eyes. The axes of the eyes form a straight transverse line. There seems to have been five pair of tentacular cirri, though some of them are lost. A parapodium consists of a pedal lobe without cirriform appendage and with a large rounded dorsal and a smaller, oval ventral cirrus. In the anterior segments the parapodia carry only acicular bristles, but from the fourth parapodium there are also capillary bristles between them, and further backward the number of acicular bristles in each parapodium is reduced to 1—3. The anterior segments are very indistinctly biannulate. The segmental glands are small, and situated just behind the dorsal cirrus. In some of the anterior segments I am unable to see the glands, but this may be due to the preservation. From about the tenth segment there is also an unpigmented ventral gland or papilla.

According to Granata (1911) and Fauvel (1916) Claparède's *Alciopina parasitica* is only the young stage of *Corynocephalus albomaculatus* Levinsen, which thus under article 27 b of the International Rules of Zoölogical Nomenclature must take the name *Alciopina parasitica* Claparède.

Alciopina parasitica is previously known from the central part of the Mediterranean and from some localities in the warmer parts of the Atlantic. The present specimen was found south of New-Foundland in a depth of 25 m.

Alciopina tenuis (Apstein, 1900).

Corynocephalus tenuis Apstein 1900.

This species from the Atlantic near the Equator and from Neapel is not present in the material. It is characterized by its oval dorsal cirri, and by very small ventral cirri, and by the axes of the eyes meeting at a right angle.

Alciopina Gazellae (Apstein, 1893).

Corynocephalus Gazellae Apstein 1893, 1900.

This species from West Australia, which according to Apstein is distinguished from *A. parasitica* chiefly by the form of the median tentacle, which is long and slender, may perhaps be only a variety of *A. parasitica*. An examination of types is necessary to decide on this point.

Alciopina paumotanus (Chamberlin, 1919).

Corynocephalus paumotanus Chamberlin 1919.

Also this species, originating from the Pacific, according to the description is distinguished from *A. parasitica* by the median tentacle forming a short, blunt papilla only. As for *A. Gazellae* I suppose it to be a variety of *A. parasitica* merely, but an examination of the type would be desirable. That the segments are bipartite ventrally in *A. parasitica* cannot be considered as specific character.

Genus **Plotohelmis** Chamberlin.

(*Rhynchonerella* auct.).

Compound capillary bristles and acicular bristles. Pedal lobe without cirriform appendage.

Chamberlin (1919) has shown that the genus *Rhynchonerella* Costa is identical with *Callizona* Greeff, as its type species, *R. gracilis*, is identical with *C. nasuta*, the type species of *Callizona*. For Greeff's *Rhynchonerella capitata* (= *R. fulgens*), thus being without a generic name, and for a new species Chamberlin proposed the new generic name *Plotohelmis*, the type species of which is his new species *P. alata*.

Plotohelmis capitata (Greeff, 1876).

Rhynchonerella capitata Greeff 1876.
Rhynchonerella fulgens Greeff 1885 (*fide* Fauvel), Fauvel 1923.

This species is not represented in the material. It seems to be a rather south-Atlantic form, which only occasionally visits the Canary Islands or the Mediterranean. It is a small species, the dorsal tentacular cirri of the third segment being much longer than those of the first and second segments.

Plotohelmis alata Chamberlin, 1919.

This species from the Pacific is characterized by its much larger size and by the dorsal tentacular cirri of the third segment being of the same length as those of the second.

Genus **Krohnia** de Quatrefages.

(*Callizonella* Apstein).

Simple capillary bristles and acicular bristles. Pedal lobe with a terminal appendage.

De Quatrefages (1865) established the genus *Krohnia* including the *Alciopa lepidota* Krohn, the *A. Edwardsii* Krohn and the *A. candida* Delle Chiaje. Later on Apstein (1891) introduced a new genus, *Callizonella*, for the first of these species, the two other ones being referred to other genera. Granata (1911) takes up again the generic name *Krohnia*. Fauvel (1916) is of opinion that this name

is not available, because it included animals now referred to three different genera, and because it has afterwards been used for a Chaetognathe. In my opinion this point of view has no warrant in the International Rules of Zoölogical Nomenclature, and according to article 29 the name *Krohnia* should be quite valid.

Krohnia lepidota (Krohn, 1845).

Alciopa lepidota Krohn 1845, Hering 1860, 1892, Langerhans 1880.
Krohnia lepidota de Quatrefages 1865.
Alciopa cirrata Greeff 1876.
Alciope lepidota Carus 1885.
Callizonella lepidota Apstein 1891, 1900, Fauvel 1916, 1923, Wesenberg-Lund 1939.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
42	23-24/5	28° 2′N 14°17′W	200			1 sn.	1
45	28-29/5	28°42′N 20° 0′W	200			1 sn.	1
48	31/5	28°54′N 24°14′W	7550			$^1/_2$ sn.	1
64	24/6	34°44′N 47°52′W	100			1 sn.	1

All the specimens are fragmentary; only the very small specimen from st. 64 consists of the prostomium with the 16 anterior segments; the other specimens consist only of fragments from the middle or hinder part of the body. The fragments are in a not very good condition, all the dorsal and many of the ventral cirri being lost.

The prostomium does not reach beyond the eyes, which may, however, be due to its bad condition. The median tentacle is digitiform, the antennæ are foliaceous, lanceolate and comparatively long, but apparently without papillæ. The eyes look aslant forward and upward. Most of the tentacular cirri are absent, but judging from their remaining bases there must have been five pairs, the first pair on the first segment, the two following segments carrying each two pairs. The dorsal pair on the third segment seems to have been very large and foliaceous. The pedal lobe is long and lanceolate, carrying a very small terminal appendage, a bundle of simple capillary bristles, and ventrally in the anterior segments some acicular bristles, the number of which is further back reduced to one. The remaining ventral cirri are lanceolate and provided with a long point, their ventral border being considerably thickened. Only the large rounded cirrophores of the dorsal cirri are present.

Various authors state that the species is sprinkled over with brown spots, and HERING (1892) found a certain regularity in the distribution of these spots. The present specimens show, however, that this regularity is not quite as great as HERING states. The small and badly preserved prostomium shows no spots. Dorsally there is in each segment one spot at the base of the cirrophore and sometimes one on the cirrophore itself and one on the pedal lobe, also shown by HERING, tab. VI, fig. 7. Ventrally there are three rows of pigment spots, one along the middle of the body and one row on each side at the base of the parapodia. In the middle row there seems to be originally three spots per segment, two along the median line of the animal, the third beside one of them; often one or two of these spots are invisible on the preserved specimens. In the collateral rows there are two spots per segment, situated at the base of the ventral cirrophore; in the fragment from the anterior part of the body one of these spots is sometimes situated on the cirrophore itself. The segmental gland forms a not very conspicuous fold behind the parapodium, and is provided with two or three pigment spots, which form a row from the dorsum downward between the parapodia. The upper or lower of these spots are often seen in dorsal, resp. ventral view of the animal, thus seeming to be supernumerary spots in the collateral rows. In one of the specimens most of the glands were bean-shaped and quite pigmented with brown. — Some of the fragments were from females, filled with ova penetrating even into the parapodia and the cirrophores.

Krohnia lepidota is previously known from the temperate parts of the eastern Atlantic, and FAUVEL (1916) and E. WESENBERG-LUND (1939) report it from the Mediterranean. The actual specimens are from the Canary Islands and from the open sea west of these islands. Three of them were taken near the surface, the fourth may have come into the apparatus when hauling in.

Krohnia lepidota, var. **Krohnii** (Greeff, 1879).

Alciopa Krohnii Greeff 1879 a.
Alciopa Bartelsii Hering 1892.

This variety from South Italy is chiefly characterized by its dorsal cirri having longer and more acute tips.

Krohnia Bongraini (Gravier, 1911).

Callizona Bongraini Gravier 1911.
Callizona bongraini Benham 1929.
Callizonella bongraini Monro 1936.

This species from Antarctic waters seems to come near *K. lepidota*, but it is much smaller and apparently without pigment spots. It seems to differ also in the shape of the parapodial cirri and in having segmental glands only from about the tenth segment.

Genus **Rhynchonerella** Costa.

(*Callizona* Greeff).

Compound capillary bristles and acicular bristles. Pedal lobe with a terminal appendage. Parapodial cirri foliaceous.

Under the genus *Plotohelmis* I have mentioned that COSTA'S genus *Rhynchonerella* is identical with GREEFF'S *Callizona*. *Rhynchonerella* as the oldest name takes precedence over *Callizona*.

Rhynchonerella Möbii (Apstein, 1893).

Callizona Möbii Apstein 1893, 1900.
Callizona Mœbii Fauvel 1923.
Callizona Moebii Wesenberg-Lund 1939.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
49b	1/6	29° 8'N 25°16'W	270			1 sn.	1

The single specimen consists of three fragments, and is in a bad state of preservation. The prostomium is slightly conical with two pair of short and thick lateral antennæ and one short median tentacle. There are five pair of tentacular cirri, the first pair on the first segment, the two following segments carrying each two pairs, the dorsal pair being much longer than the ventral one. The dorsal cirri of the second and the third segment are of equal length. The pedal lobe is conical with a small cirriform appendage. The dorsal cirri are oval or lanceolate, the ventral ones oval and somewhat smaller. There are two sorts of bristles, long and fine compound capillar bristles, and stouter, curved, acicular ones. In the anterior segments there are 3—5 acicular bristles in each parapodium, further backward only one. The segmental glands are small and placed just behind the base of the dorsal cirri; they are wanting in the anterior part of the body.

Rhynchonerella Möbii is previously known from a few localities in the Atlantic, and E. WESENBERG-LUND (1939) reports it from several localities in the Mediterranean. The specimen at hand is found west of the Canary Islands in a depth of 135 m.

Rhynchonerella Petersii (Langerhans, 1880).

Alciope (Halodora) Petersii Langerhans 1880.
Vanadis heterochæta Viguier 1886.
Vanadis setosa Greeff 1885 (*fide* Fauvel).
Alciopa Cari Hering 1892.
Callizona setosa Apstein 1900, Southern 1911, Fauvel 1916, 1923, Wesenberg-Lund 1939.
Alciope (Halodora) petersi Ehlers 1913.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
48	31/5	28°54'N 24°14'W	0			1 sn.	1

A very small and slender species. The single specimen consists of prostomium with the 32 anterior segments. The prostomium seems truncated; it carries a small median tentacle and two pair of considerably longer, fusiform lateral antennæ. The first segment has one pair of tentacular cirri, on each of the two following segments there are two pairs, the ventral pair being much shorter than the dorsal one. The dorsal tentacular cirri of the third segment are much longer than all the other ones. The pedal lobes are conical with a very small cirriform appendage. Dorsal and ventral cirri are oval or lanceolate. There are two sorts of bristles, both compound: long, capillary bristles and stouter and shorter acicular ones. Backwards the number of acicular bristles in each parapodium is reduced to 1—2. The terminal piece of these acicular bristles is comparatively large and stout with one concave border, which only under great enlargement appears to be serrate. The terminal piece of most of the acicular bristles is wanting. Because of decoloration in the spirit most of the segmental glands have become invisible, only in some of the posterior segments a small spot is found just behind the dorsal cirrus.

LANGERHANS' name *Halodora Petersii* for this species, being the oldest, takes precedence, and accordingly *Rhynchonerella Petersii* (Langerhans) is its correct name.

Rhynchonerella Petersii seems to be a southern species, the distribution of which reaches into the Mediterranean, where, however, E. WESENBERG-LUND has not found it. The actual specimen is found west of the Canary Islands at the surface. Because of its small size it has certainly often been overlooked.

Rhynchonerella Angelini (Kinberg, 1866).

Kronia Angelini Kinberg 1866.
Rhynchonerella Angelini Greeff 1876.
Callizona Grubei Greeff 1876, Apstein 1891, 1900.
Callizona Angelini Apstein 1900, Southern 1911, Fauvel 1916, 1923, 1932, Monro 1930, 1936, Wesenberg-Lund 1939.
Callizona Henseni Apstein 1900.
Rhynchonerella pycnocera Chamberlin 1919.
(?) *Rhynchonerella parva* Chamberlin 1919.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
53	8/6	34°59'N 33° 1'W	200	2615-2865	yellow hard clayish mud	1sn.	1
58	12/6	37°38'N 29°20'W	200	948	hard bottom	1sn.	1
62	20-21/6	36°52'N 39°55'W	200			1 sn.	3
62	20-21/6	—»—	2000			¾ sn.	1
81	12/7	48° 2'N 39°55'W	200			1 sn.	1
83	14/7	48°30'N 33°35'W				cn.	1
84	15/7	48° 4'N 32°25'W	3000			y.	1 (♀)
86	16/7	47°29'N 30°20'W	1000			cn.	1
87	17/7	46°48'N 27°46'W	200	2157	sand, yellow mud.	1 sn.	6 (1 ♀)
87	17/7	—»—	300	2157	—»—	y.	3 (1 ♀)
87	17/7	—»—	2000	2157	—»—	y.	2
88	18/7	45°26'N 25°45'W	100	3120	—»—	1 sn.	2
88	18/7	—»—	300	3120		y.	1
88	18/7	—»—	2000	3120	—»—	y.	1
88b	19/7	—»—	100			1 sn.	3
88b	19/7	—»—	200			1 sn.	3
90	21/7	46°58'N 19° 6'W	600			¾ sn.	1
92	23/7	48°29'N 13°55'W	100			1 sn.	1
92	24/7	—»—	600			¾ sn.	1
98	5/8	56°33'N 9°30'W	1000	1000—1360		y.	1 (♀)

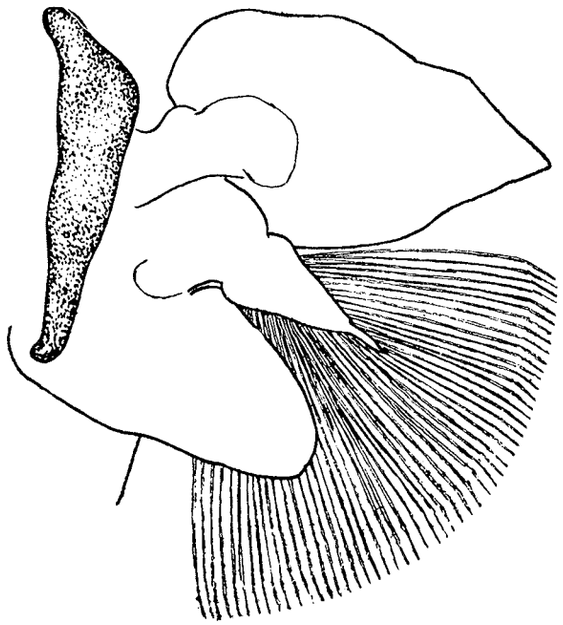


Fig. 22. *Rhynchonerella Angelini*, parapodium, x 30.

Most of the specimens are comparatively well preserved. — The body gradually tapers backwards, ending in a nearly filiform tail. The prostomium is very characteristic, its anterior part forming a high, rounded, subhemispherical tubercle from which the two pair of lateral antennæ arise. The lateral antennæ are pear-shaped, comparatively short and thick, the dorsal ones being shorter than the ventral ones. The digitiform median tentacle arises just behind the prostomial tubercle. The proboscis is barrel-shaped, wrinkled and provided with a number of papillæ round the opening. The five pair of tentacular cirri are arranged as usual in *Rhynchonerella*. The pedal lobe of the parapodia (fig. 22) is cylindro-conical with a comparatively long, digitiform terminal appendage. The dorsal cirri are foliaceous, nearly triangular, with an acute point, and imbricate; only the anterior cirri are rather rounded or cordiform. Also the ventral cirri are foliaceous, but oval. Backwards the cirri, and at last also the pedal lobe, disappear, the "tail" being nearly smooth. There are two sorts of bristles, the superior ones are long and fine, compound capillary bristles, the inferior ones are short, stout, compound acicular bristles, the end piece of which is short and very fine. In the anterior parapodia may be found up to 15 acicular bristles, but their number decreases backwards to 1—2. Well developed segmental glands are present from about the 15th setigerous segment; they are normally very distinct and very intensely pigmented with dark brown or even nearly black. In the anterior segments there may be traces of pigment instead of well developed glands. In some, especially young, specimens the glands are hardly visible. The gland is placed just behind the parapodium and encompassing it from behind. — The general colour of the body is yellow. The eyes dorsally, the prostomial tubercle, the median tentacle, the labium and the ventral pair of the lateral antennæ are also pigmented with brown, but less intensely than the glands; some pigment is also sprinkled over the tentacular cirri and the anterior parapodial cirri, and in the most intensely pigmented specimens there are some irregular transversal stripes of pigment across the dorsum. — Some of the specimens proved to be females, the body being filled with ova, even into the cirrophores and parapodia.

SOUTHERN (1911) has shown the identity of *Kronia Angelini* Kinberg with *Callizona Grubei* Greeff. And also the description of *Rhynchonerella pyconcera* Chamberlin appears to be a good description of *Rhynchonerella Angelini*, which already MONRO (1930) has suggested. When CHAMBERLIN (1919) in his key to species notes three different species, viz. *Rhynchonerella pycnocera*, *R. grubei* and *R. angelini*, it is because he attributes to the two latter improper qualities, having probably not seen these species.

Callizona Henseni Apstein has by most authors been considered as a synonym of *R. gracilis* Costa (= *Callizona nasuta* Greeff). In the actual material I have some specimens which comparatively well agree with APSTEIN's description of *C. Henseni*, but there can be no doubt that these specimens are young *R. Angelini*. APSTEIN calls the lateral antennæ "kräftige Fühler", which reminds of their thick and strong form in *R. Angelini*. Of the parapodial cirri of *C. Henseni* APSTEIN says: "Die dorsalen Cirren sind herzförmig, oft an der Oberseite S-förmig gebogen, die ventralen oval nach der Spitze etwas verschmälert." This statement applies very well to *R. Angelini*, whereas *R. gracilis*, according to FAUVEL (1923), has: "Cirres dorsaux foliacés, ovales lancéolés, non imbriqués. Cirres ventraux de même forme, mais plus petits." But the chief reason for taking the *C. Henseni* for a *R. gracilis* has certainly been the number of acicular bristles in the anterior segments, which APSTEIN states to be 1—2. He does not, however, mention whether these bristles are simple or compound, and therefore subsequent authors have thought that they were simple. In the young specimens at hand the number of the acicular bristles in the anterior parapodia varies greatly and goes even down to three or four, but always with the fine end piece. The number of these bristles may increase with the age of the animal, and *C. Henseni* may be founded upon very young specimens. Further I should say with SOUTHERN (1911) that "there is no abrupt change between the two kinds of setae. In the first few segments the thick setae are in a majority, and the transition from

one kind to the other is very gradual." When APSTEIN (1900) states that the segmental glands are present from the third parapodial segment, it may be due to the pigmented spots that are often seen behind the parapodia even in the anterior segments. The lack of a long protruding prostomium in *C. Henseni* indicates also that it cannot be identical with *R. gracilis*. Another fact which may point in the same direction, is the distribution of the different species. *R. gracilis* seems to be a comparatively rare species, only single specimens being found near the Canary Islands, in the Mediterranean and once off Ireland, while *R. Angelini*, being a cosmopolite, has a comparatively wide distribution both in the north and the south Atlantic, what also APSTEIN (1900) found to be the case with his *C. Henseni*.

While CHAMBERLIN'S description of his *R. pycnocera*, as mentioned above, only is a good description of the present species, his *R. parva*, resembling very much the *Callizona Henseni*, is in all probability, like this, only a young *R. Angelini*.

The young specimens of *R. Angelini* are smaller in size than the older ones, less intensely pigmented, the number of acicular bristles in the anterior parapodia is lower, and the terminal appendage of the pedal lobes is comparatively smaller. Apparently E. WESENBERG-LUND (1939), and perhaps also CHAMBERLIN (1919), have had such young specimens at hand, as they mention the variability of the pigment intensity. The left specimen on E. WESENBERG-LUND'S Fig. 27 (1939) shows this young form, whereas the right one is older.

Rhynchonerella Angelini is, as mentioned above, a cosmopolite, being very commonly found in various parts of the Atlantic; it is reported from the Mediterranean (where E. WESENBERG-LUND (1939), however, has not found it), from the Indian Ocean, from off Peru (CHAMBERLIN, 1919) and from the Chinese waters, where KINBERG (1866) originally found the species. The "Michael Sars" has brought home some specimens from the environs of the Azores, but many more were taken on the way home from 40 ° W to north of Ireland. On the whole, all the current specimens of this species are taken in the Gulf Stream or its south-going branch with which the species drifts along (fig. 14). This fact explains also that *R. Angelini* is the most northern Alciopid. It is an oceanic form, living most commonly near the surface, as most of the specimens are caught in a depth of 50 to 150 m.

Rhynchonerella gracilis Costa, 1861.

Rhynchonerella gracilis Costa 1861 (*fide* Fauvel).
? *Kronia Auroræ* Kinberg 1866.
Callizona nasuta Greeff 1876, Fauvel 1923.
Callizona japonica Izuka 1914.

COSTA (1861) based his genus *Rhynchonerella* upon this species, which is accordingly the type species of the genus. This comparatively rare species is previously known from the Canary Islands, from off Ireland and from the Mediterranean, where also E. WESENBERG-LUND (1939) found a specimen. It is, however, not represented in the samples of the "Michael Sars". It is distinguished from other *Rhynchonerella*-species by its club-shaped prostomium, projecting far in front of the eyes, and by having but one or two acicular bristles in the anterior parapodia. — As to its supposed identity with *Callizona Henseni* Apstein, see under *R. Angelini*. *Kronia Auroræ* Kinberg (1866) may perhaps be identical with *R. gracilis*, and in IZUKA's (1914) description of his *Callizona japonica* I find no character of importance that separates this species from *R. gracilis*.

Rhynchonerella cincinnata (Greeff, 1876).

Callizona cincinnata Greeff 1876.

GREEFF (1876) found this species near Arrecife on Lanzarote, one of the Canary Islands, and CHAMBERLIN (1919) reports it from the west coast of America. It is, however, not present in the actual material. According to the description it is characterized by having antennæ and tentacular cirri provided with papillæ, by the hindmost tentacular cirri being very long, and by having two pair of rudimentary parapodia behind the tentacular cirri. The body is sprinkled with brown pigment. The pedal lobes carry a cirriform appendage and simple capillary and acicular bristles.

Rhynchonerella melanophthalma (Greeff, 1885).

Vanadis melanophthalmus Greeff 1885 (*fide* Apstein).

This species from the Guinea Islands should be characterized by its square prostomium and its first dorsal cirrus being larger than the other ones.

Rhynchonerella tentaculata (Langerhans, 1880).

Vanadis tentaculata Langerhans 1880.

This species from Madeira also seems to be a *Rhynchonerella* rather than a *Vanadis*, but with comparatively narrow parapodial cirri and stout bristles only in the second parapodium. An examination of the type specimen is necessary to decide whether it is identical with any other species or not.

Genus **Watelio**[1] gen. nov.

Body long with numerous segments. Prostomium reaching beyond the eyes. Two pair of lateral antennæ and one median tentacle. Two globular eyes, comparatively small to be those of an Alciopid. Proboscis cylindrical with equal papillæ round the opening; no long, cirriform papillæ. *Four* (or three ?) pair of tentacular cirri. Dorsal and ventral parapodial cirri long, ribbon-shaped (or cylindrical ?). Pedal lobes with a short, papilla-shaped terminal appendage and long, protruding acicula. Two sorts of bristles, both capillary: 1. long, compound ones, and 2. shorter, simple ones. Small segmental glands.

[1] The name is formed according to Article 8, Recommendation k in the International Rules of Zoölogical Nomenclature.

Large nephridial papillæ. One anal cirrus. Genotype: *Watelio longifoliata* sp. n.

Watelio longifoliata sp. n.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
56	10-11/6	36°53′N 29°47′W	100	3239	clayish mud	1sn.	1

Holotypus: In the Bergen Museum, No. 41438.

Description. The single specimen is complete and comparatively well preserved. It is about 11 cm in length, the greatest breadth is 2 mm without parapodia and bristles and about 5 mm from tip to tip of the bristles.

The body is very long and slender with about 190 segments, but the posterior ones are very indistinct. The prostomium (fig. 23 a) is comparatively small, arched in front and somewhat protruding beyond the eyes, its anterior part is a little depressed. It carries two pair of very small, equal, oviform lateral antennæ anteriorly, and one conical median tentacle inserted between the eyes. The eyes are of the usual type, but comparatively small to be those of an Alciopid, somewhat resembling those of *Naiades Cantrainii*, and directed sideward and slightly forward. The distance between the eyes is equal to the eye's diameter. The extruded proboscis is 2 mm long; it is slightly annulated, the opening compressed laterally and surrounded by 12 lingulate, pointed papillæ. A papilla is on each side equipped with a thinner membrane which, however, does not surround its tip (fig. 23b). — There are *four* pair of tentacular cirri, placed on the three first segments. They are all short, of the same length, digitiform, only the fourth pair being a little thicker. The third and the fourth pair of cirri sit on short cirrophores. The first, the second and the fourth pair stand on the same level, only the third pair a little more ventrally. I am quite unable to discover any trace of a fifth pair below the second, which is usually found in the second group of *Alciopidae* to which, however, *Watelio* belongs. The annulation of these first three segments is very indistinct; it looks as if each pair of tentacular cirri has its annulum, but in the normal position the third cirrus stands just below the fourth, so that the two last annuli probably belong to one segment. — The first parapodial segments are 4-annulate; the broadest ring carries the parapodia and the segmental glands, then follow two narrower rings, and then a very narrow one. Backwards this last one soon disappears, and further backwards the annulation becomes very indistinct.

A parapodium (fig. 23 c) consists of a pedal lobe with acicula, bristles, and dorsal and ventral cirrus. The pedal lobe is cylindrical with a conical tip ending in a very

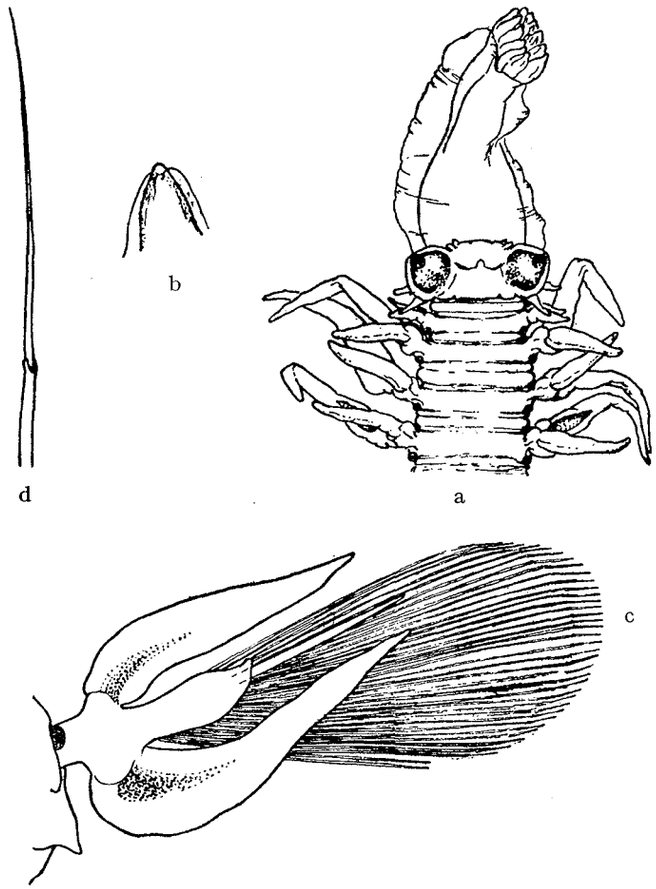


Fig. 23. *Watelio longifoliata*. a. anterior part with everted proboscis, x 22; b. prostomial papilla, x 120; c. 16. right parapodium, x 40; d. compound bristle, x 64.

short, thick, papilla-shaped terminal appendage. In the first two segments the pedal lobe is very small, gradually increasing in length backwards. The dorsal cirri are long and ribbon-shaped or slightly lanceolate, of about the same length in all segments, viz. hardly twice as long as the normally developed pedal lobes; they are inserted at the base of the pedal lobe. The ventral cirri of the anterior parapodia are very long and ribbon-shaped, or very slightly lanceolate, about three times as long as the dorsal cirri. Backwards they gradually become shorter till they reach only the length of the dorsal cirri. The ventral cirrus is inserted on the pedal lobe ventrally, on a short cirrophore. In the third, fourth and fifth ventral cirri there is a long, brown gland near the base. The acicula is very stout and transparent, protruding as much again, or even more, beyond the tip of the pedal lobe as the length of the latter. Backwards the acicula reaches beyond the tip of the cirri. The two first parapodia have no bristles, in the third there are a few, the number rapidly increasing backwards. There are two sorts of

bristles: numerous, long, compound, capillary bristles (fig. 23 d), about twice as long as the acicula, and a few (only 1 or 2?) likewise capillary, simple bristles, placed ventrally in the pedal lobe, and shorter than the acicula. The segmental glands appear like small, but conspicuous brown spots just behind the base of the dorsal cirrus from the first parapodium, a rudiment is being even seen behind the last tentacular cirrus. Just at the base of the parapodia there is ventrally a large nephridial papilla. In the anterior segments it is very small, from about the eleventh with a nipple-like tip, and becoming gradually larger backwards and more conical. In the hindmost part of the body the parapodia with cirri and bristles gradually become shorter. The bristles disappear first, the pedal lobes and cirri become only smal tubercles, that are completely lacking in the posterior, indistinct segments. There is one short, digitiform anal appendage ventrally.

Watelio evidently belongs to the second group of *Alciopidae*, having two sorts of bristles, proboscis without lateral tentacles, and prostomium reaching beyond the eyes. But it shows no special relationship to any of the other genera of this group as it has only four pair of tentacular cirri, and because of the capillary ventral bristles, the shape of the terminal appendage of the pedal lobes, and the shape of the parapodial cirri.

Watelio longifoliata sp. n. is found south of the Azores at st. 56, where the associated faunule consists of *Lopadorhynchus uncinatus, L. appendiculatus, Torrea candida, Naiades Cantrainii, Vanadis formosa*, 7 different species of Tomopterids and one small Spionid. It seems to be a surface form, being taken in a depth of only 50 m.

Watelio Gravieri (Benham, 1929)

Callizona gravieri Benham 1929.

This species from New Zealand is evidently a *Watelio*. It differs from *W. longifoliata* in having only three (?) pair of tentacular cirri, in having cylindrical parapodial cirri instead of flat and ribbon-shaped ones, in the form of these cirri, in the parapodia being turned upward, in the anterior parapodia not being smaller than the following ones, in the terminal appendage of the parapodia increasing posteriorly, in the acicula being brownish, and in the ventral simple bristles being stouter than the dorsal compound ones. Most of these differences, however, may be due to the bad state of preservation of BENHAM'S specimen, or perhaps to an error of observation. Further examination may therefore perhaps show that *W. longifoliata* and *W. Gravieri* are identical. The correct name of the species would then be *Watelio Gravieri* (Benham, 1929). But provisionally I find it better not to unite them.

Family ***Tomopteridae*** Grube.

This very aberrant family has generally been placed in connection with the *Phyllodocidae* and *Alciopidae*, although it is very uncertain whether there is any relationship between them. Like the *Alciopidae* also the *Tomopteridae* are exclusively pelagically-living animals, their body being more or less transparent.

The prostomium carries two flattened lateral antennæ. There are two eyes and two epaulette-shaped nuchal organs. There are two pair of setigerous appendages, the first pair being small and slender, and often lacking in the adult specimens, the second pair being very long with an enormous acicular bristle. The proboscis is comparatively short and unarmed. The parapodia are biramous, without aciculæ and bristles, but bordered with a thin pinnule, containing glands of different types. In some species the body of the adult specimens is elongated posteriorly so as to form a sort of tail. The reproductive organs are placed in the parapodia.

The glands of the parapodia form the chief base of the specific determination of the Tomopterids. There are three (or four) sorts of these glands:

1. *Chromophile glands*, comparatively large glands, situated in the ventral pinnule of the parapodia. They are most frequently very distinct.

2. *Rosettes*, very small glands situated on the parapodial rami and in the pinnules. Most frequently they are distinct because of a red pigment.

3. *Hyaline glands*, comparatively small glands, situated in the dorsal and the ventral pinnules. They are more or less indistinct. Rosettes and hyaline glands seem to exclude each other, and MALAQUIN and CARIN (1922) consider them as homologous organs.

4. Species provided with a "spur" (*TomopterisApsteini*) have in addition a special "*spur gland*" in connection with this organ.

For a thorough examination of the glands it is necessary to colour and mount some parapodia, but for the determination of species it is not necessary to do so. Even in specimens, that were not very well preserved, the glands became more or less distinctly visible by convenient through-falling light. Only rosettes situated on the parapodia (i. e. not in the pinnules) could not be seen in this manner.

Beside the glands also the ornaments (i. e. small indentations) of the acicular bristles seem to be comparatively constant within a species and to vary a good deal from one species to another.

ROSA (1908 b) has divided the family *Tomopteridae* into two genera, viz. *Enapteris* and *Tomopteris*, and now most authors follow him. — The best survey of the distribution of species is given by APSTEIN (1900).

Genus **Enapteris** Rosa.

This genus is characterized by its nearly rectangular parapodial rami with pinnules not bordering their inner edge, and by the second pair of setigerous appendages being much longer than the body.

Enapteris euchaeta (Chun, 1888).

Tomopteris euchaeta Chun 1888 (*fide* Apstein), Apstein 1900.
Enapteris euchaeta Rosa 1908b (*fide* Fauvel), Fauvel 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
48	31/5	28°54′N 24°14′W	7550			½ sn.	1
49b	1/6	29° 8′N 25°16′W	370			y.	1
51	5-6/6	31°20′N 35° 7′W	300	3886	yellow mud	y.	4
53	8/6	34°59′N 33° 1′W	300	2615-2865	yellow hard clayish mud	y.	1
53	8/6	—»—	600	»	—»—	y.	2
53	8/6	—»—	2100	»	—»—	½ sn.	2
56	10/6	36°53′N 29°47′W	300	3239	clayish mud	y.	1
57	11/6	37°33′N 29°29′W	300			y.	1
58	12/6	37°38′N 29°20′W	300	948	hard bottom		1
62	20-21/6	36°52′N 39°55′W	2500			¾ sn.	1
64	24/6	34°44′N 47°52′W	300			y.	1
64	24/6	—»—	600			¾ sn.	1
64	24/6	—»—	2000			y.	1
81	12/7	48° 2′N 39°55′W	200			1 sn.	3

The body is attenuate posteriorly forming a "tail" without parapodia or with only rudimentary ones. There are about 15 pair of parapodia. The largest specimen measured 13 mm including the "tail", by a breadth of 1.2 mm without parapodia, 4 mm including these appendages. — The lateral antennæ are very long. The eyes are very small and it is often difficult to see them. The first pair of setigerous appendages is lacking. The second pair is exceptionally long, the acicular bristles being three or even four times longer than the body, quite smooth or with very fine, irregular incisions near the base. The parapodial (fig. 24) rami are broadly rounded or nearly rectangular, the pinnules border their external edge and the end, but not the internal edge. — There are no rosettes. Chromophile glands are present from the 4th to about the 13th parapodium; they are quite conspicuous and situated apico-inferiorly. The hyaline glands are smaller and indistinct, situated more apically. The gonads are situated in the dorsal ramus from the second parapodium.

Enapteris euchaeta is previously known from a few localities in the Mediterranean, where, however, E. WESENBERG-LUND has not found it, but it is much more common both in the southern and the northern Atlantic. The actual specimens are nearly all taken between the Canary Islands and the Azores and west of the Azores, only three specimens being taken in the Gulf Stream (fig. 25). The species thus belongs to the warmer parts

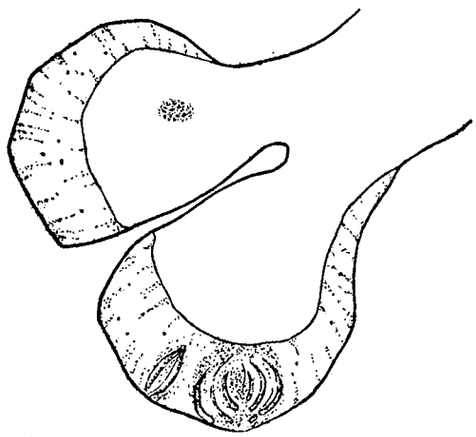


Fig. 24. *Enapteris euchaeta*, 6. parapodium x 60.

of the Atlantic, where it most frequently lives in the upper water-layers and especially over greater depths.

Genus **Tomopteris** Eschscholtz.

This genus is characterized by its more or less conical parapodial rami with pinnules completely bordering them, and by the second pair of setigerous appendages usually being not longer than the body. The genus is divided into two subgenera.

Subgenus **Johnstonella** Gosse.

Rosettes present, hyaline glands (nearly always) lacking. "Tail" and first pair of setigerous appendages (nearly always) present. Gonads usually in both dorsal and ventral parapodial rami.

Tomopteris (**Johnstonella**) **Apsteini** Rosa, 1908.

Tomopteris onisciformis Grube 1848 (*partim*) (*non* Eschscholtz).
? *Tomopteris scolopendra* Keferstein 1861 (*partim*), Apstein 1900.
Tomopteris Apsteini Rosa 1908 b (*fide* Fauvel), Malaquin and Carin 1922, Fauvel 1923.
Tomopteris rosaea Ehlers 1917.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
19	2/5	36° 5′N 4°42′W	900			4 sn.	1
23	5/5	35°32′N 7° 7′W	400	1215	yellow mud	y.	1
29	9/5	35°10′N 7°55′W	400			y.	1
42	23/5	28° 2′N 14°17′W	300			y.	1
53	8/6	34°59′N 33° 1′W	300	2615-2865	yellow hard clayish mud	y.	1 (♀)
53	8/6	—»—	600	»	—»—	y.	3
56	10/6	36°53′N 29°47′W	500	3239	clayish mud	½ sn.	1
58	12/6	37°38′N 29°20′W	300	948	hard bottom		1
88	18/7	45°26′N 25°45′W	600	3120	sand, yellow mud	¾ sn.	1

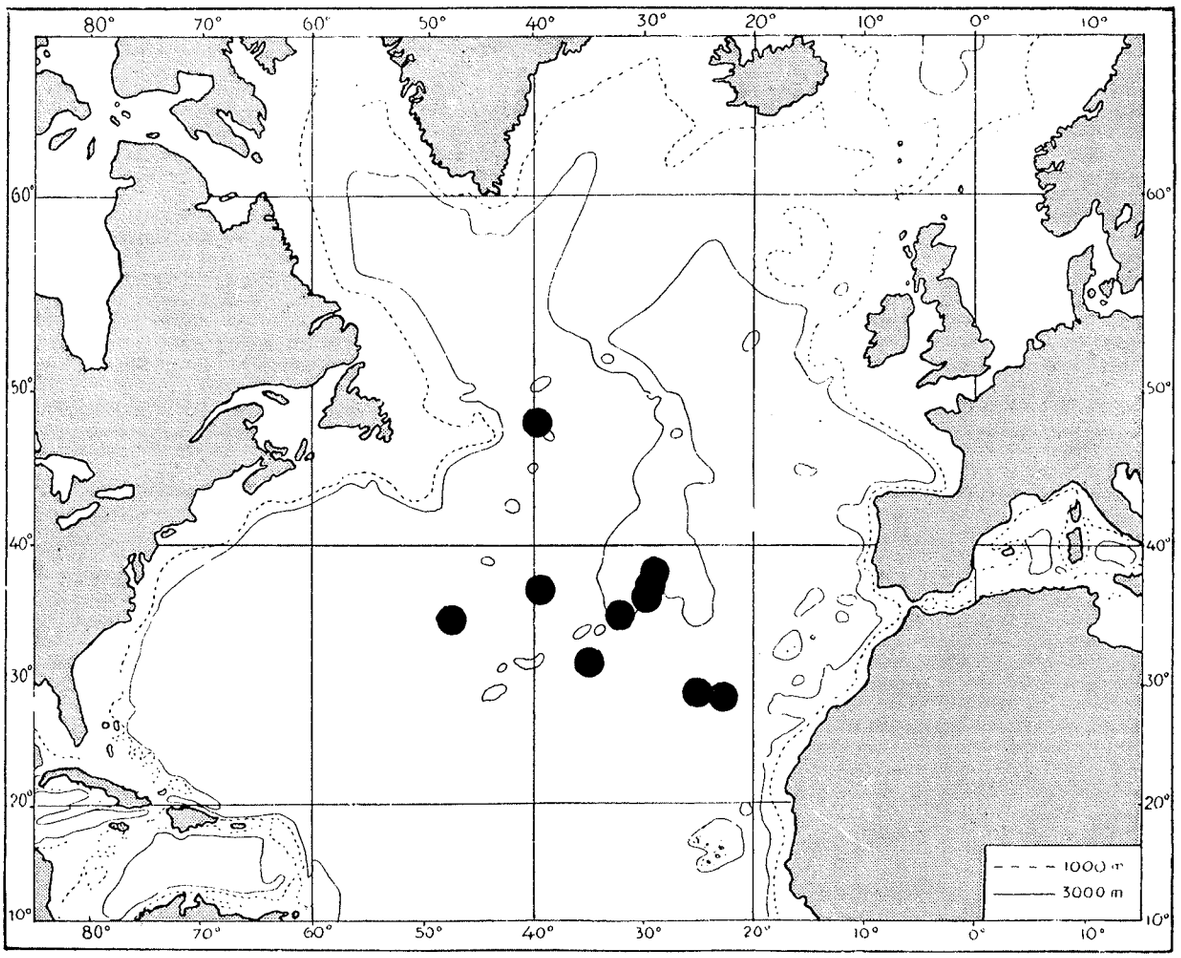


Fig 25. *Enapteris euchaeta.*

The body is gradually attenuate backwards, forming a long, vermiform "tail". There are 18—24 pair of parapodia, beside about 4 pair of rudimentary ones on the "tail". The length of the largest specimen is 32 mm, breadth of the body 2 mm and from tip to tip of the parapodia 6 mm. The lateral antennæ are not very long and have a somewhat flattened anterior edge. The eyes are not much pigmented. First pair of setigerous appendages is present, second pair reaching about 2/3 of the body. The acicular bristles have very fine, irregular incisions in their whole length. The parapodial rami are conical and surrounded by the pinnules, those of the "tail" being more elongated. In the two first pair of parapodia there is a small rosette on the trunk of the parapodium ventrally, in the following ones there is a rosette in the dorsal and the ventral pinnules close to the internal edges of the parapodial ramus and near its apex. The rosettes of this species are very small and very often difficult to see as their pigment easily disappears in alcohol. Chromophile glands are present from the third pair of parapodia, they increase rapidly backwards, and become enormous globes that hang under the ventral ramus, and make a "hernia" into the cavity of the ramus, this appearance being a very characteristic trait of the species. A "spur" (*aculeo*), i. e. a pointed expansion of the ventral pinnule ventrally, is present from the second pair of parapodia, perhaps there is a trace of it also in the first pair; the "spur gland" is well developed even in the first pair, and is from the third pair associated with the chromophile. Gonads are present in both dorsal and ventral rami from the first pair of parapodia (Fig. 26).

Tomopteris Apsteini is previously known from the western Mediterranean and from the Atlantic off north Africa. It thus seems to be a coastal form. The material brought home by the "Michael Sars", adding a good deal to our knowledge of its distribution, sustains this point

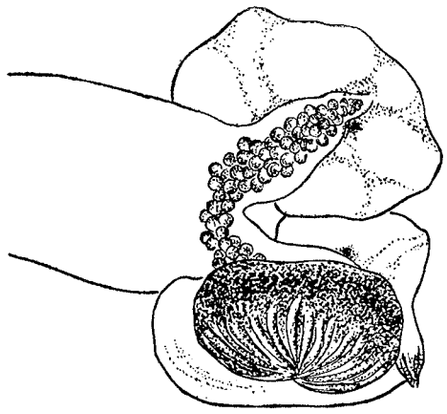


Fig. 26. *Tomopteris Apsteini*, 7. parapodium, x 30.

of view. It is found just inside and outside the Straits of Gibraltar and between the Canary Islands. Further there are some specimens from three stations south of the Azores, some farther from land, but the only oceanic find is that from st. 88, taken in the middle of the north Atlantic during the homeward voyage (fig. 27). It is not really a surface form, being found only in depths between 150 and 450 m.

GRUBE (1848) describes some *Tomopteris* from the Peterburg Museum, identifying them with *T. onisciformis* Eschscholtz. There are one large and some small specimens, of which the large one seems to be identical with *T. Apsteini* Rosa. I have come to this interpretation through GRUBE's description of the chromophile glands: "Besonders auffallend ist eine schon bei der Betrachtung mit der Loupe sichtbare dunklere Stelle am Unterrande der untern Flossenlappen (Fig. 10, π), welche man für eine Papille halten möchte, und die mit ihrem schmalen Ende

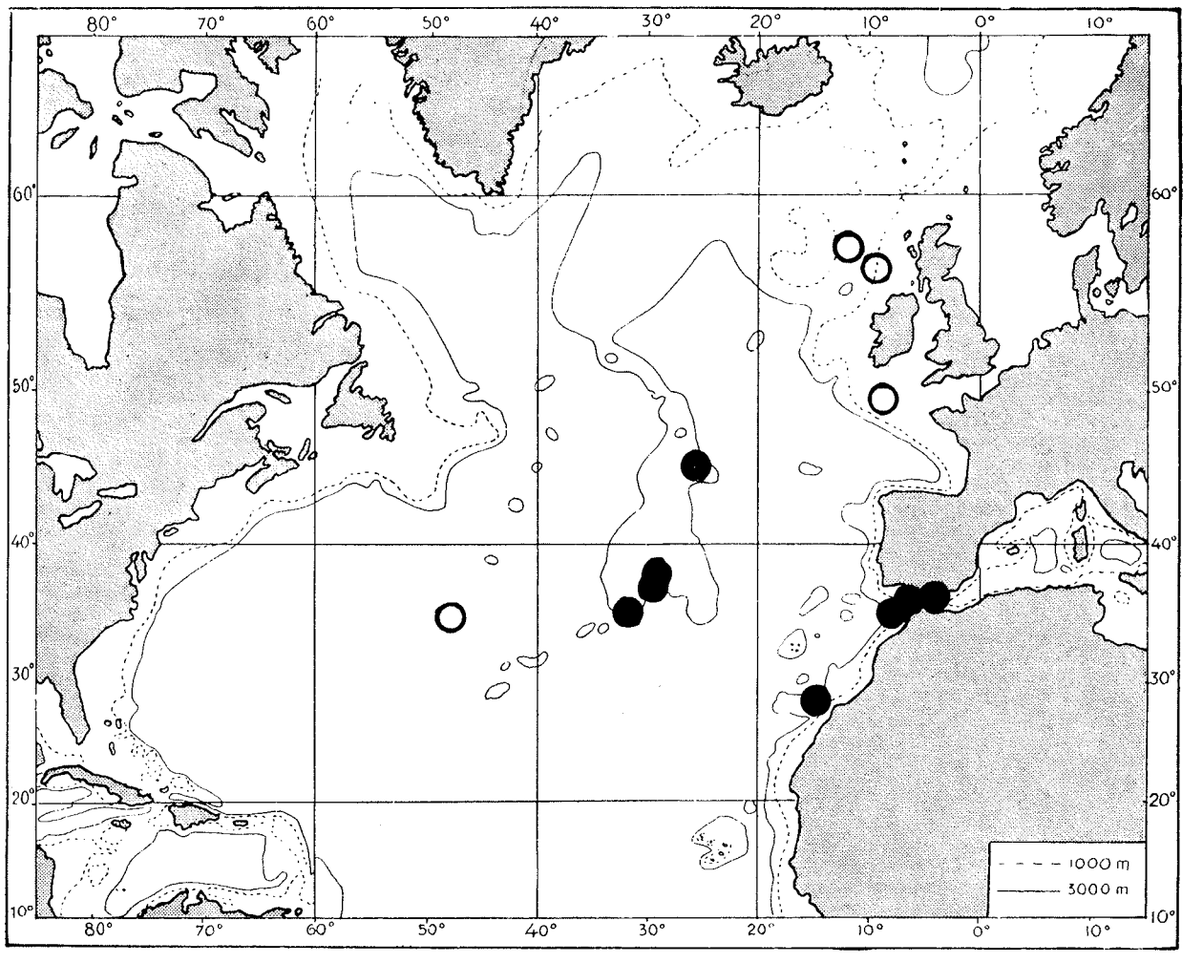


Fig. 27. ● *Tomopteris Apsteini.* ○ *Tomopteris helgolandica.*

etwas hervortritt", which seems to indicate the "spur". It is most probable that it is not identical with *T. onisciformis* Eschscholtz, which seems to have no "tail". Also the species which KEFERSTEIN (1861) identified with *Briaraea scolopendra* Quoy and Gaimard (1827), afterwards mentioned by APSTEIN (1900) under the same name, is, at all events partly, identical with the present species; this appears from APSTEIN's pl. XI fig. 18 with the enormous chromophile gland making a "hernia" into the ventral parapodial ramus. APSTEIN most likely has not noticed the "spur", while the "spur gland" is slightly indicated. But as neither *T. onisciformis* Eschscholtz nor *Briaraea scolopendra* Quoy and Gaimard are recognizable with certainty from the original descriptions, and holotypes probably do not exist, neither of those names are applicable. It is also impossible to consider KEFERSTEIN as author, writing *T. scolopendra* Keferstein, as APSTEIN (1900) has done, because the specific name *scolopendra* must be considered as preoccupied, the genus *Briaraea* Quoy and Gaimard being undoubtedly identical with *Tomopteris* Eschscholtz. The only available name for the present species is therefore *Tomopteris Apsteini* Rosa, 1908.

Tomopteris (Johnstonella) pacifica Izuka, 1914.

This species seems to be very closely related to *T. Apsteini*, only the "spur" is lacking.

Incertae sedis.

ROSA (1907, 1908 a, b) has further described three new species, viz. *Tomopteris Aloysii Sabaudiae*, *T. Dunckeri* and *T. Duccii*, all with a "spur"; none of them has, however, been found again. If they are not identical with *T. Apsteini*, they are at least very closely related to it.

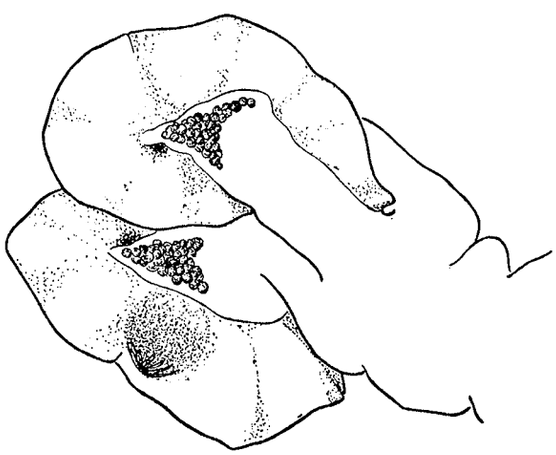


Fig. 28. *Tomopteris helgolandica*, 8. parapodium, x 30.

Tomopteris (Johnstonella) helgolandica Greeff, 1879.

Tomopteris onisciformis Busch 1847, Grube 1848 (*partim*) (*non* Eschscholtz).
? *Johnstonella Catharina* Gosse 1853.
? *Tomopteris quadricornis* Leuckart and Pagenstecher 1858 (*fide* Southern).
? *Eschscholtzia quadricornis* de Quatrefages 1865.
? *Tomopteris vitrina* Vejdovski 1878 (*fide* Fauvel).
Tomopteris helgolandica Greeff 1879 a, Apstein 1900, Southern 1911. Malaquin and Carin 1922, Fauvel 1923, Wesenberg-Lund 1935,
Tomopteris nationalis Apstein 1900.
Tomopteris Catharina Rosa 1908 b (*fide* Fauvel).
? *Tomopteris eura* Chamberlin 1919.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
1	9/4	49°27′N 8°36′W	50-30	146	fine sand	trawl	11
64	24/6	34°44′N 47°52′W	300			y.	1
98	5/8	56°33′N 9°30′W	100	1000—1360		1 sn.	2
98	5/8	—»—	1500	»		3 ln.	1
101	7/8	57°41′N 11°48′W	200	1853	hard clay	1 sn.	3
101	7/8	—»—	2000	1853	—»—	y.	3

The body gradually tapers backwards, and terminates in a long, naked "tail". The largest specimen, which has lost the "tail", has 21 pair of parapodia, it is 37 mm long, its body has a breadth of 4 mm, and 12 mm from tip to tip of the parapodia. The longest complete specimen has also 21 pair of parapodia and a length of 35 mm including the "tail".

The lateral antennæ are of middle length. The prostomium carries two small, but conspicuous, dark eyes. Remnants of first pair of setigerous appendages are present only in two or three specimens, being absent in the older ones. Second pair about 2/3 of the body, in young specimens the pair may be of the length of the body or even somewhat longer. The acicular bristles have very fine irregular incisions in nearly their whole length. The parapodial rami are conical and surrounded by the pinnules, those of the "tail" being more elongated. In the two first pair of parapodia there is a small rosette in the ventral ramus (I succeeded in seing them in only one specimen). In both dorsal and ventral pinnule, beginning from the first parapodium, there is also a comparatively large red rosette close to the internal edge of the parapodial ramus and near its apex (fig. 28). Chromophile glands are also present from the first parapodium, in a ventral position in the ventral pinnule; they are comparatively small and not very conspicuous, but ordinarily not difficult to see with through-falling light. Gonads are present from the first to about the 13th parapodium in both rami.

Tomopteris helgolandica is previously known from the Mediterranean and from the Atlantic, where it is especially

common in the North Sea and round Great Britain. DONS (1909) has found it near Drøbak in the Kristianiafjord (Oslofjord). But it is also found off New Foundland, in the Sargasso Sea and off South America. The "Michael Sars" found this species at only four stations, three of which were from the environs of Great Britain, the fourth being from the middle of the Sargasso Sea (fig. 27). It thus seems to be chiefly a coastal form, what already APSTEIN (1900) has stated. It lives most frequently near the surface, but may go down to 1000 m.

The older descriptions of Tomopterids are most frequently so incomplete, that the species is not recognizable. It seems, however, certain that the *Tomopteris onisciformis* Eschscholtz from the South Sea, being without a "tail", cannot be identical with any of the European forms. The *T. onisciformis* Busch from Heligoland is at all events another species, and, only two species (viz. *T. helgolandica* and *T. septentrionalis*) being known from the North Sea, a confusion is here hardly possible, as it is clearly not a *T. septentrionalis*. Several subsequent authors have also mentioned the present species under the same name (*T. onisciformis*) which, however, is not available, because it is preoccupied. GRUBE'S (1848) small specimens may perhaps belong to the present species. *T. quadricornis* Leuckart and Pegenstecher is most likely only the young stage of the same species, and DE QUATREFAGES' new genus *Eschscholtzia* for the forms with two pair of setigerous appendages has no reason, as these appendages may be present in the young specimens and disappear in the adult ones. Also the *T. vitrina* Vejdovsky is probably identical with the present species. If an examination of type specimens will show that the species of LEUCKART and PAGENSTECHER or that of VEJDOVSKY in reality is identical with the present one, this will have to take the name *T. quadricornis* or *T. vitrina*. Provisionally I think it better to use the oldest available name that with certainty refers to the actual species, viz. *Tomopteris helgolandica* Greeff. I cannot agree with ROSA (1908 b) in reviving GOSSE'S (1853) specific name *Catharina*. GOSSE'S description of his *Johnstonella Catharina* (later on (1855) he calls it *Tomopteris scolopendra* and (1863) *T. onisciformis*) is too incomplete to identify the species, and SOUTHERN (1911) can scarcely be right in declaring that "it is highly improbable that there is more than one species of *Tomopteris* near the coast of Devonshire, where Gosse obtained his specimen" and in grounding an identity between *Johnstonella Catharina* and *Tomopteris helgolandica* on this view solely. GOSSE says of the second pair of setigerous appendages that they are "directed divergently backwards to a greater length than the body" (author's underlining). This statement may perhaps indicate *T. Nisseni* Rosa, which is also found round the British Isles. — As to *Briaraea scolopendra* Quoy and Gaimard, *Eschscholtzia Leuckarti* de Quatrefages, *Tomopteris briarea* de Quatrefages, *T. Pagenstecheri* de Quatrefages and *Nereis phasma* Dalyell, which have all by various authors been taken for identical with *T. helgolandica*, a certain identification is likewise impossible, the first of them being perhaps identical with *T. Nisseni* Rosa. *T. Mariana* Greeff (1885) and *T. Rolasi* Greeff (1885) seem not to differ considerably from young specimens of *T. helgolandica* whose "tail" has not yet been developed, and as to *T. nationalis* Apstein I can find nothing which really distinguishes it from *T. helgolandica*. The lack of rosettes and chromophile glands in the anterior parapodia of the three last named species is most likely due to an imperfect examination. Finally *T. eura* Chamberlin that has a "tail", but the parapodial glands of which are not described, may perhaps be identical with *T. helgolandica*.

Incertae sedis.

Tomopteris Danae McIntosh, *T. Huxleyi* de Quatrefages, both mentioned by APSTEIN (1900), *T. opaca* Treadwell and *T. tentaculata* Treadwell, both mentioned by MONRO (1930), and *T. Smithii* Verrill (1879) are all too insufficiently described to be recognizable.

Tomopteris (Johnstonella) levipes Greeff, 1879.

Tomopteris levipes Greeff 1879 a.

This species, known only from the Canary Islands and from Algiers, is not present in the actual material. It is characterized by having rosettes only on the trunk of the parapodia and, as it seems, no glands in the pinnules. The first pair of setigerous appendages is present, but very short.

The lack of glands in the pinnules seems very curious; it is perhaps due to an insufficient examination by GREEFF, and thus there is a possibility that this species, which has not recently been found again, is identical with some other species.

Tomopteris (Johnstonella) Kempi Monro, 1930.

This species, described by MONRO (1930) from Tristan da Cunha, being characterized by having the rosettes placed in the pinnules at the apex of the parapodial rami, is not present in the "Michael Sars" collection.

Tomopteris (Johnstonella) Mortenseni Augener, 1927.

Tomopteris Mortenseni Augener 1927.

AUGENER (1927) had only one specimen of this species from south-eastern Australia, and it has not afterward been found again. According to his description the parapodia with the wrinkled pinnules and the chromophile glands resemble very much those of the *T. Nisseni*, and there is a hyaline gland just above the chromophile and partly covered by this. But AUGENER mentions also a rosette in the dorsal parapodial ramus and a "rosette-like organ" near the base of the parapodium. Gonads are found in the dorsal rami only. The body has 25 segments including the "tail". The first pair of setigerous appendages are lacking. — Because of the presence of rosettes I refer this species to the subgenus *Johnstonella*.

Tomopteris (Johnstonella) australiensis Augener, 1927.

AUGENER (1927) had 3 not very well preserved specimens of this species, which is likewise from south-eastern Australia, and has not afterwards been found again. Is is characterized as follows: first pair of setigerous appendages present; 18—22 segments including a short "tail". Chromophile glands placed subterminally-ventrally. A rosette in the ventral parapodial ramus.

Subgenus **Tomopteris** *sensu stricto.*

Rosettes absent, hyaline glands (nearly always) present. "Tail" and first pair of setigerous appendages (nearly always) lacking. Gonads usually in the dorsal parapodial rami only.

Tomopteris (Tomopteris) Nisseni Rosa, 1908.

? *Briaraea scolopendra* Quoy and Gaimard 1827 (*fide* Fauvel's description).

Tomopteris Nisseni Rosa 1908 a, Southern 1911, Malaquin and Carin 1922, Fauvel 1923, Wesenberg-Lund 1935.

? *Tomopteris innatans* Chamberlin 1919.

? *Tomopteris idiura* Chamberlin 1919.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5/5	35°32′N 7° 7′W	300	1215	yellow mud	1 sn.	1
23	5/5	—»—	400	1215	—»—	y.	1
42	23/5	28° 2′N 14°17′W	600			½ sn.	1
44	28/5	28°37′N 19° 8′W	4000—0			1 sn.	1 (♀)
45	28-29/5	28°42′N 20° 0′W	2000			y.	1
48	31/5	28°54′N 24°14′W	surface			1 sn.	1
52	6/6	31°24′N 34°47′W	0			1 sn.	2
53	8/6	34°59′N 33° 1′W	100	2615-2865	yellow hard clayish mud	1 sn.	1
53	8/6	—»—	2600	»	—»—	3 ln.	1
53	8-9/6	—»—	100	»	—»—	1 sn.	1
53	8-9/6	—»—	2100	»	—»—	bottom net	1
56	10-11/6	36°53′N 29°47′W	2000	3239	clayish mud	y.	1
58	12/6	37°38′N 29°20′W	100	948	hard bottom	1 sn.	1
62	20/6	36°52′N 39°55′W	2000			y.	1
62	20-21/6	—»—	1000			y.	1
64	24/6	34°44′N 47°52′W	2000			y.	1
67	27/6	40°17′N 50°39′W	1200			y.	2
84	15/7	48° 4′N 32°25′W	1000			y.	2
84	15/7	—»—	2500			¾ sn.	1
90	21/7	46°58′N 19° 6′W	600			¾ sn.	2
92	23/7	48°29′N 13°55′W	200			1 sn.	1
92	23/7	—»—	300			y.	6
92	23/7	—»—	600			¾ sn.	1
92	23/7	—»—	2000			y.	5
92	24/7	—»—	300			y.	1
94	26/7	50°13′N 11°23′W	1500	1565		¾ sn.	1
98	5/8	56°33′N 9°30′W	200	1000-1360		1 sn.	1
98	5/8	—»—	600	»		¾ sn.	1
98	5/8	—»—	1000	»		y.	2
101	7/8	57°41′N 11°48′W	2000	1853	hard clay	y.	2 (1 ♀)

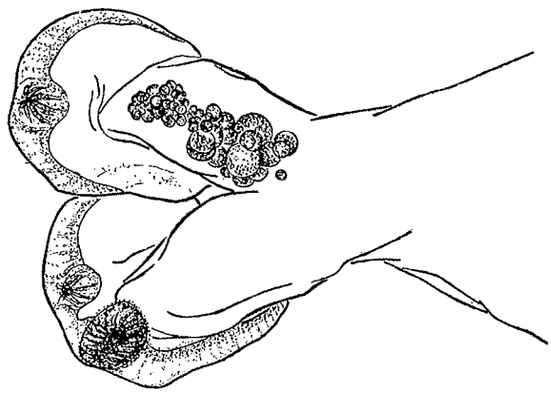


Fig. 29. *Tomopteris Nisseni*, 12. parapodium, x 16.

The body gradually tapers backwards to a "tail" with some rudimentary parapodia. Most of the specimens have a length of 20—50 mm with between 25 and 30 pair of parapodia. Also a giant occurs, the length of which is 105 mm including the "tail", the breadth of the body is 5 mm, and from tip to tip of the parapodia 18 mm. It has 39 pair of parapodia excluding the rudimentary ones on the "tail".

The lateral antennæ are comparatively long, first pair of setigerous appendages is lacking. Two small, unconspicuous eyes are seen in some of the specimens. The second pair of setigerous appendages is very long, very often reaching the length of the body, and sometimes even twice as long as the body. The acicular bristles have very fine, nearly regular incisions, especially distally, but as the skin that covers the bristles is more persistent than in other species, it is difficult to see the incisions. The parapodia (fig. 29) are long, their two rami, however, are comparatively short and conical, surrounded by the pinnules. These are rounded and consist of a brighter central and a darker marginal zone, separated by a darker line. The marginal zone is pleated and contains the glands. Chromophile glands are present from the fourth pair of parapodia. They are very large and conspicuous, globular or disciform, and situated in the ventral pinnule, just below the apex of the ventral parapodial ramus. Also the hyaline glands are conspicuous and situated apically in the marginal zone of the pinnules of both rami, often making a "hernia" into the central zone. The ventral hyaline gland is always found from the third parapodium. As to the dorsal hyaline gland FAUVEL (1923) says that it is found from the eighth or ninth parapodium, E. WESENBERG-LUND (1935) has found it from the fifth, ROSA (1908 a) even from the third one. One of the present specimens had its first dorsal gland in the fourth parapodium on the left and in the fifth on the

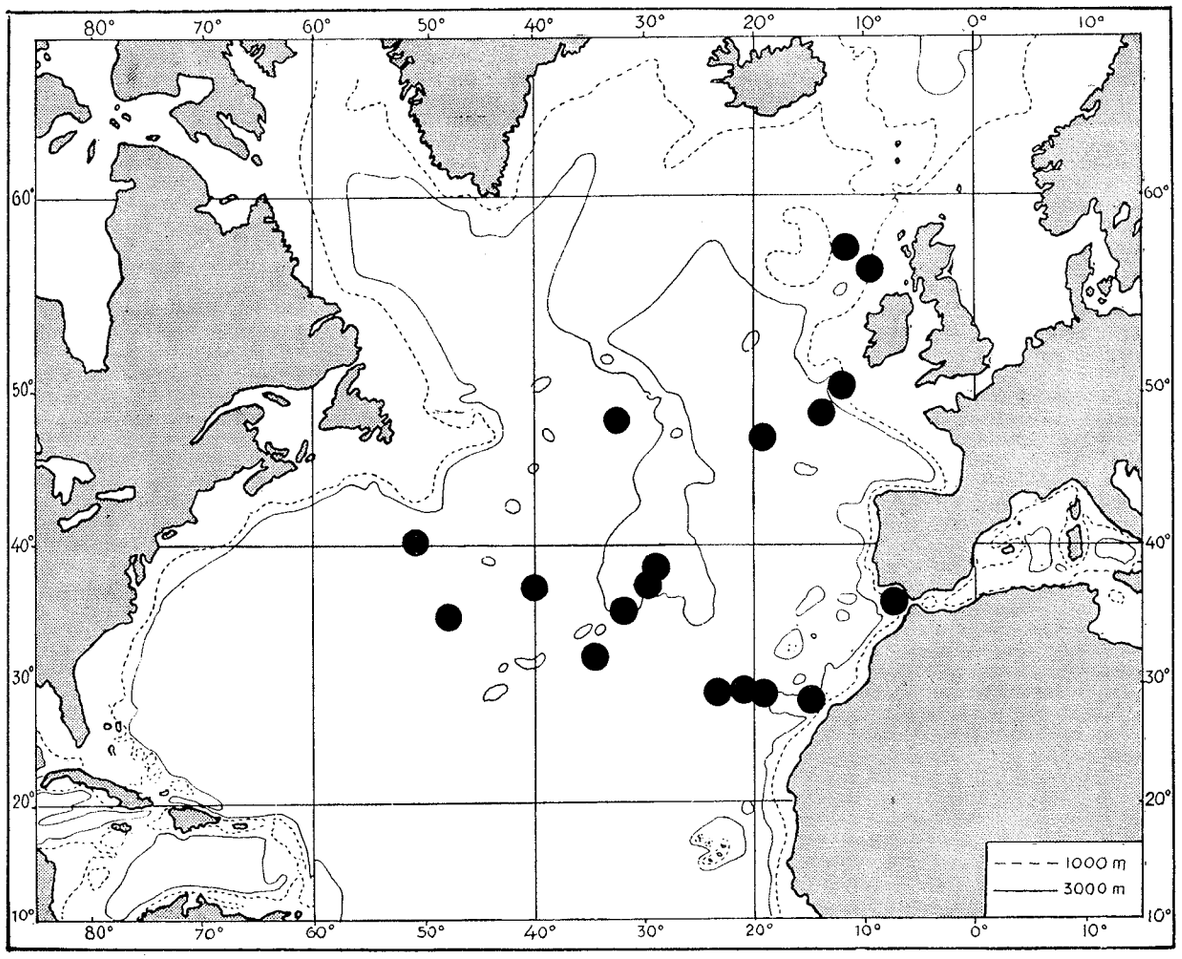


Fig. 30. *Tomopteris Nisseni.*

right side, several had it in the fifth parapodium on both sides. The gonads are found in the dorsal rami only and beginning from the second or even from the first parapodium.

Two specimens (from st. 23 and st. 101) had an ectoparasitical Crustacean, the first in a parapodium, the other in the dorsum.

E. WESENBERG-LUND (1935) gives a good account of the known distribution of *Tomopteris Nisseni*. The species occurs as well in the south as in the north Atlantic, being very common round Ireland and Iceland, and it is even found west of Greenland. SOUTHERN (1911) and E. WESENBERG-LUND (1935) state that it follows the northern offshoot of the Gulf-Stream, and MALAQUIN and CARIN (1922) record it from the Atlantic between North Africa and North America. E. WESENBERG-LUND (1935) says further: "We are allowed to presume that larger materials of pelagic polychetes collected in the future in the northern Atlantic will prove that the species is widely scattered over the greater part of this area, . . .". The "Michael Sars" material confirms this supposition. The species is found just outside the Straits of Gibraltar, between the Canary Islands, at numerous stations between these Islands and the Azores, and west of the Azores. It is further taken at some stations from the middle of the Atlantic to SW of Ireland and finally at two stations NW of Ireland (fig. 30). All these finding places are situated in or near the various branches of the Gulf-Stream, with which the species thus seems to drift and to which it seems to be more or less tied. As to the vertical distribution of this species it seems to be quite eurybath, being found quite frequently from the surface down to 1000 m, some specimens even deeper, down to 1300 m.

The *Briaraea scolopendra* Quoy and Gaimard has hitherto been regarded as identical with *Tomopteris helgolandica*, though the original description is too incomplete

to allow a certain identification. Because of its great size, however, (3—4 inch) I think it more probably that it is identical with *T. Nisseni*. Also the *Johnstonella Catharina* Gosse may perhaps be a small *T. Nisseni*, for one thing because of the second pair of setigerous appendages being longer than the body. The description also of this species is, however, too incomplete to permit a certain identification, so that I apply ROSA's name of the species as the oldest certain one. *T. innatans* Chamberlin and *T. idiura* Chamberlin are also too incompletely described, especially because he does not describe the parapodial glands, but it is possible that they are closely allied to or even identical with *T. Nisseni*.

Tomopteris (Tomopteris) Cavalli Rosa, 1907.

Tomopteris Cavalli Rosa 1907, 1908 b.
Tomopteris Cavallii Southern 1911, Fauvel 1923, Wesenberg-Lund 1935, 1936.
Tomopteris cavallii Benham 1929, Monro 1930, 1936.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
34	14/5	28°52′N 14°16′W	600	2170	sand, yellow mud.	½ sn.	1
64	24/6	34°44′N 47°52′W	600			¾ sn.	3
66	26/6	39°30′N 49°42′W	1500			y.	1
69	29/6	41°39′N 51° 4′W	300			y.	3
80	11/7	47°34′N 43°11′W	1000	>2000		y.	2

The body tapers backwards without forming a "tail". All the specimens at hand are young ones, with up to 17 pair of parapodia. One of the largest specimens has a length of 5 mm, the breadth of the body is about 0.3 mm, and from tip to tip of the parapodia 1.75 mm. They are comparatively well preserved. The lateral antennæ are short. There are two large eyes. The first pair of setigerous appendages is absent in all the specimens, the second pair reaches about 2/3 of the length of the body,

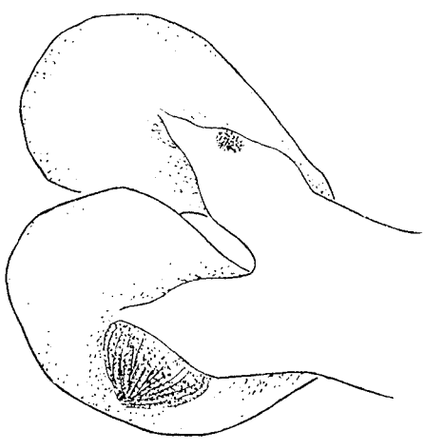


Fig. 31. *Tomopteris Cavalli*, 5. parapodium, x 130.

or some more. The acicular bristles have broad, open indentations with regular intervals in nearly their whole length, their edge forming an undulating line. The dorsal and the ventral pinnules partly cover each other; they are spoon-shaped, the concavity backwards. Chromophile glands are present from the fourth parapodium; they are large and cupuliform, and are situated in the ventral pinnule, just below the ventral parapodial ramus (fig. 31). Neither rosettes nor hyaline glands are present. Gonads are present in the dorsal ramus from the first or second parapodium to the ninth or tenth.

Tomopteris Cavalli has an almost cosmopolitan distribution, being found as well in the southern (Bahia, Buenos Aires) as in the northern Atlantic (Ireland, Scotland, Iceland, Davis Strait), in the Mediterranean, in the Red Sea, in the Indian Ocean (Ceylon), in the Pacific (Valparaiso, Callao, New Caledonia) and in the South Sea (New Zealand, Falkland Islands, Cape Town, Ross Sea). The "Michael Sars" recorded it from a few localities between the Canary Islands and New Foundland (fig. 32). It is probably due to the small size of the species that the material at hand is not more abundant. It seems to live in the middle water layers, between 150 and 750 m.

Tomopteris (Tomopteris) elegans Chun, 1888.

Tomopteris elegans Chun 1888 (*fide* Fauvel), Izuka 1914, Malaquin and Carin 1922, Fauvel 1923, Benham 1929.
Tomopteris Kefersteini Apstein 1900 (*non* Greeff, Viguier).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
34	14/5	28°52′N 14°16′W	600	2170	sand, yellow mud.	½ sn.	1
49b	1/6	29° 8′N 25°16′W	1000			½ sn.	1
53	8/6	34°59′N 33° 1′W	60	2615-2865	yellow hard, clayish mud.	½ sn.	1
53	8/6	—»—	2100	»	—»—	½ sn.	1
56	10/6	36°53′N 29°47′W	750	3239	clayish mud	½ sn.	13
62	20-21/6	36°52′N 39°55′W	2500			¾ sn.	4
64	24/6	34°44′N 47°52′W	200			1 sn.	4
64	24/6	—»—	600			¾ sn.	5
64	24/6	—»—	2000			y.	9

Most of the specimens are in a good condition. The body tapers somewhat backwards, but there is no trace of a "tail". The body of the full grown specimens (fig. 33 a) has 14 segments. One of the best preserved specimens has a length of 5 mm, the body is 0.5 mm broad and there is 2.5 mm from tip to tip of the parapodia. The parapodia are comparatively very long, which gives the species a delicate and elegant appearance. The lateral antennæ are longer than in the preceding species, and as FAUVEL (1923) says: "ressemblant à une queue de Baleine". The two eyes are conspicuous. The first pair of setigerous

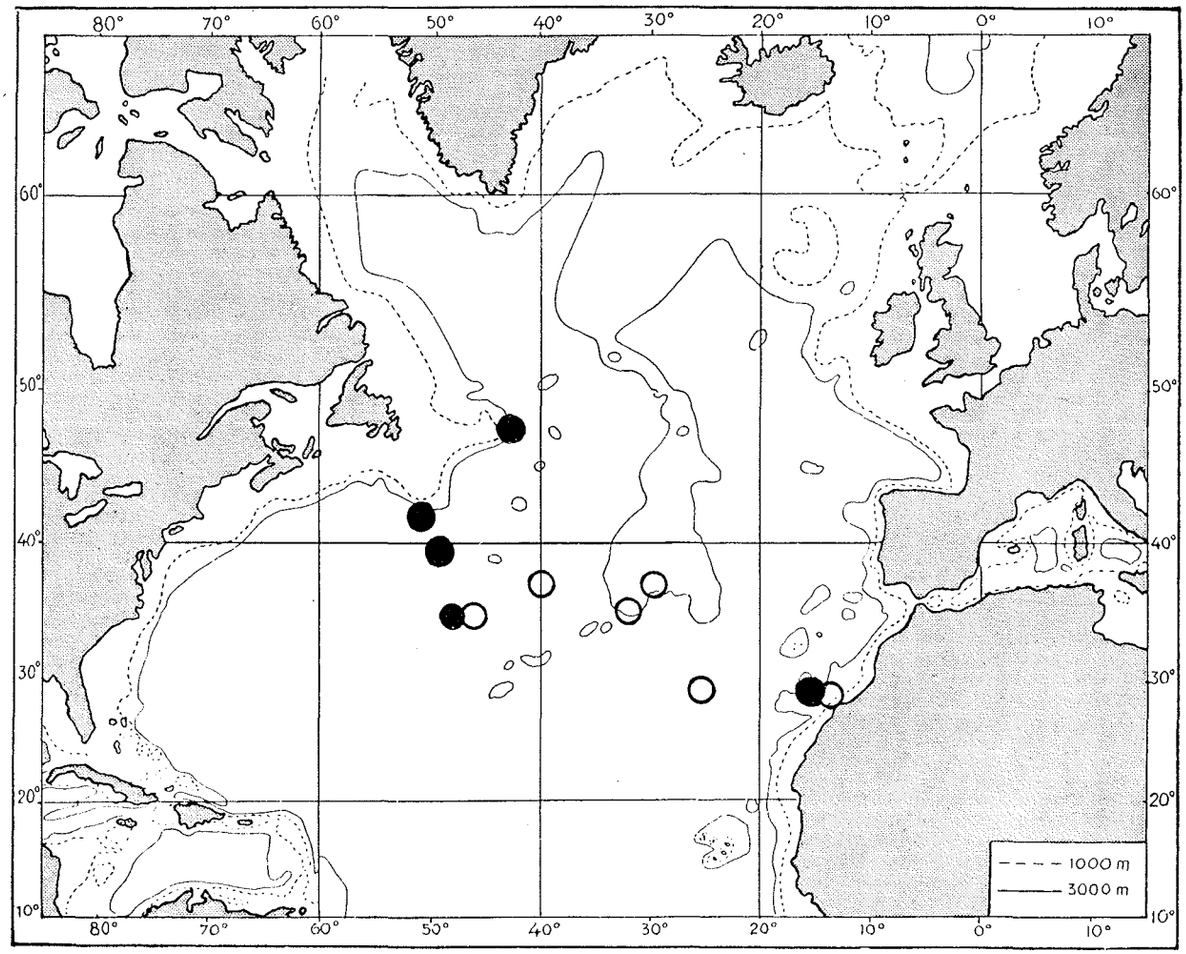
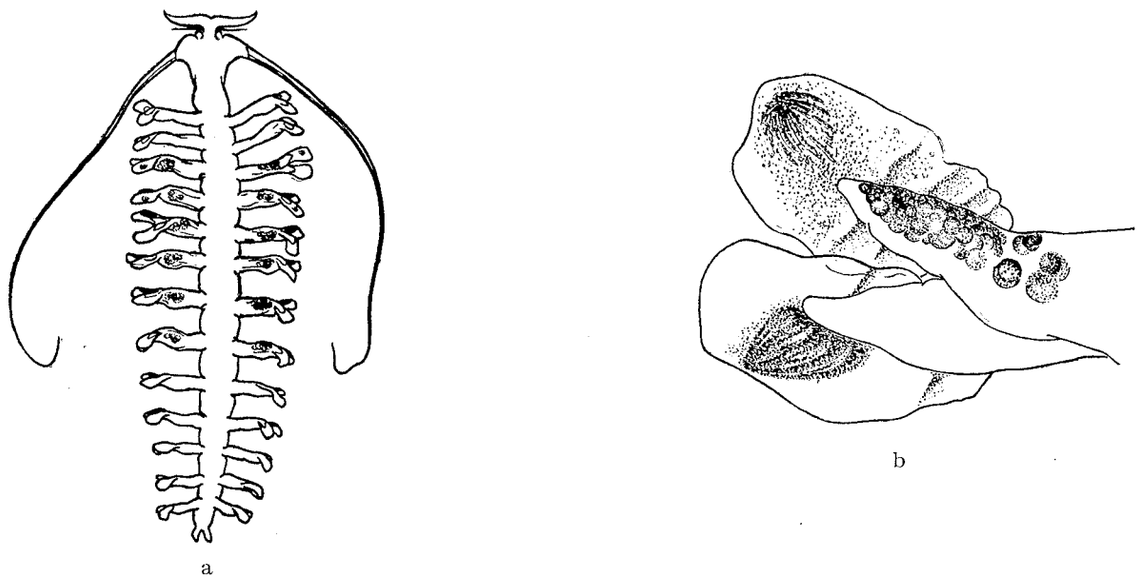


Fig. 32. ● *Tomopteris Cavalli.* ○ *Tomopteris elegans.*



a b

Fig. 33. *Tomopteris elegans.* a. dorsal view, x 15; b. 4. parapodium, x 60.

appendages is always present and well developed, the second pair attains 2/3 of the length of the body, their base being more or less globular. The acicular bristles have with more or less regular intervals small indentations, some broader than in *Enapteris* and subgenus *Johnstonella*, some of them standing aslope. Chromophile glands (fig. 33 b) are present from the fourth parapodium, being large and very conspicuous; they are situated in the ventral pinnule apico-inferiorly. Hyaline glands are present in the dorsal pinnule of the third and fourth parapodium only; they are situated apico-superiorly, but are often difficult to see. Gonads are present in the dorsal parapodial ramus only, from the third to about the eighth parapodium. They are placed very characteristically close to the superior border of the parapodium (fig. 33 b), just above its point of bifurcation.

Tomopteris elegans is according to APSTEIN (1900) very common in the warmer part of the Atlantic, and it is found in the Mediterranean. It is further reported from New Zealand and Japan. The "Michael Sars" has got the species at some stations on its way from the Canary Islands to the Azores and further westward, but after it turned northward from st. 64 it found the species no more (fig. 32). This line may therefore approximately indicate the northern limit of its distribution in the Atlantic. The species seems to be comparatively eurybath, being found from the surface down to 1250 m.

Tomopteris (Tomopteris) Krampi Wesenberg-Lund, 1936.

Tomopteris Krampi Wesenberg-Lund 1936.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W	0.45	4700	yellow mud	1 sn.	3
49b	1/6	29° 8′N 25°16′W	270			1 sn.	1
53	8/6	34°59′N 33° 1′W	600	2615-2865	yellow hard clayish mud	y.	2
56	10/6	36°53′N 29°47′W	750	3239	clayish mud	½ sn.	2
56	10/6	—»—	2000	»	—»—	y.	1
80	11/7	47°34′N 43°11′W	1000	>2000		y.	2
80	11/7	—»—	1500	»		¾ sn.	5
80	11/7	—»—	2000	»		y.	1
81	12/7	48° 2′N 39°55′W	2000			y.	2
81	12/7	—»—	2500			¾ sn.	1
84	15/7	48° 4′N 32°25′W	2500			¾ sn.	1
87	17/7	46°48′N 27°46′W	1000	2157	sand, yellow mud	y.	1
87	17/7	—»—	1500	»	—»—	¾ sn.	3
92	23/7	48°29′N 13°55′W	300			y.	1
92	23/7	—»—	2000			y.	1
92	23-24/7	—»—	1500			¾ sn.	1
94	26/7	50°13′N 11°23′W	1500	1565		¾ sn.	1
98	5/8	56°33′N 9°30′W	1000	1000-1360		y.	1

The specimens are all, more or less, in a bad condition. The body tapers gradually backwards to a very short "tail" or only an indication of such a one. One of the larger specimens had 21 pair of parapodia inclusive those of the "tail"; it had a length of 10 mm, the breadth of the body being 1 mm and from tip to tip of the parapodia 4 mm. The lateral antennæ are comparatively very long and slender. The prostomium carries two very distinct, brown eyes. First pair of setigerous appendages is always present, being long and very slender. Second pair of setigerous appendages is a little longer than the body, their base being drawn out, not globular as in *T. elegans*. The acicular bristles have with small, regular intervals small indentations, somewhat similar to those of the preceding species. Chromophile glands are present from the fourth parapodium in the ventrale pinnule; they are situated under the apex of the ventral parapodial ramus, being large and conspicuous (fig. 34). There are no rosettes. Hyaline glands are present from the third parapodium and in both dorsal and ventral pinnule. They are spindle-shaped and situated apically, but in most cases they are difficult to discover; in through-falling light, however, the outer glandular tubes of each gland are often easily visible (fig. 34). — The gonads are found in the dorsal parapodial ramus only, from third to about thirteenth segment. In some cases ova may penetrate also into the ventral ramus.

I quite agree with E. WESENBERG-LUND (1936) in believing that *T. Krampi* is nearly allied to *T. elegans*, from which, however, it is immediately recognizable by the possession of the short "tail".

E. WESENBERG-LUND originally described the species from SW of Iceland and from west of the southern Greenland. The "Michael Sars" material shows that *T. Krampi*, like most other Tomopterids, has a much wider distribution in the Atlantic. It is found between the Canary Islands and the Azores as well as at several stations between New Foundland and the SW coast of Ireland,

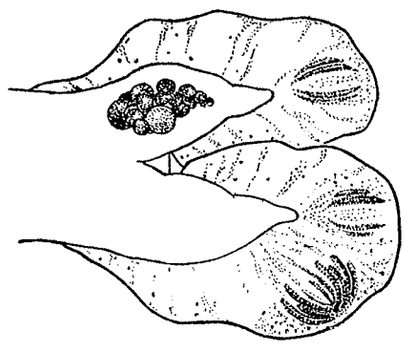


Fig. 34. *Tomopteris Krampi*, 6. parapodium, x 40.

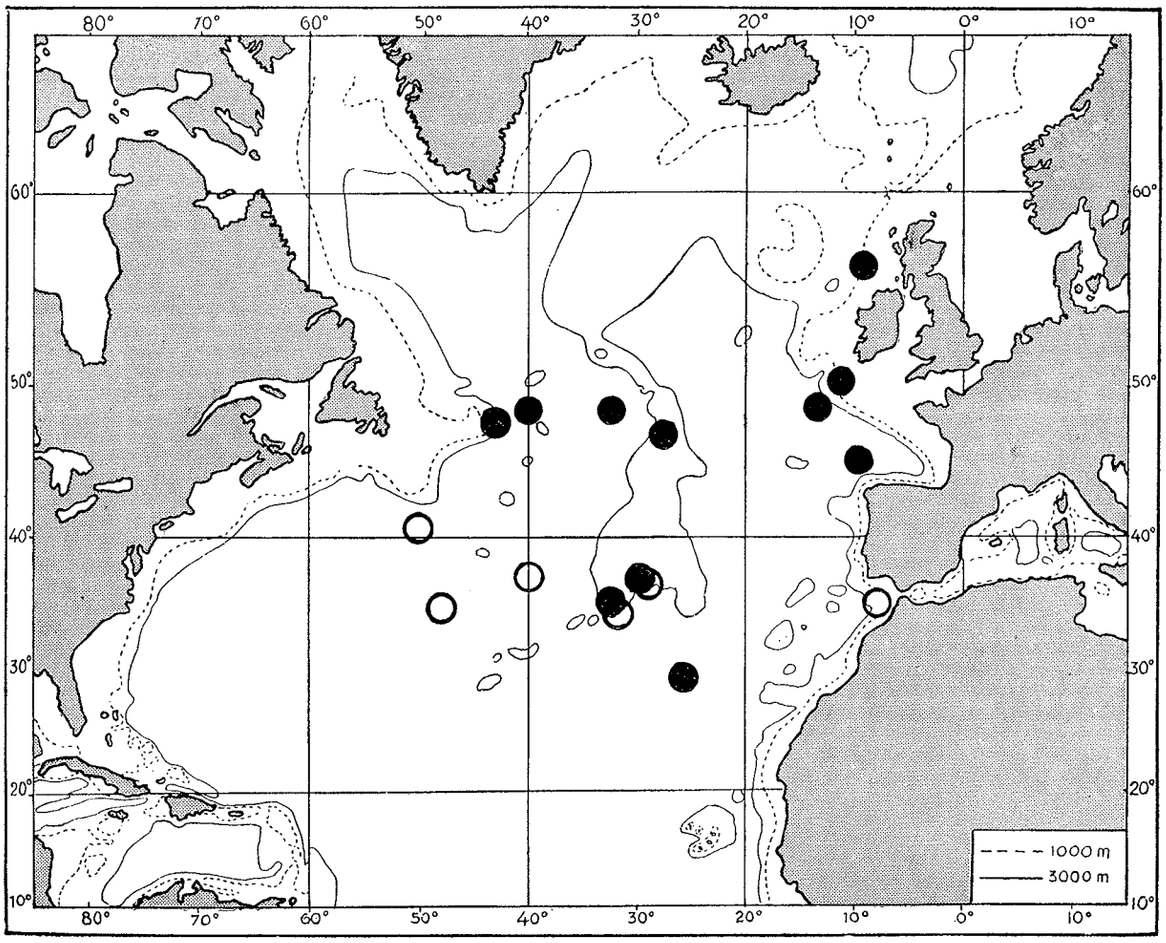


Fig. 35. ● *Tomopteris Krampi.* ○ *Tomopteris ligulata.*

in the Bay of Biscay and off northern Ireland. West of the Azores it is not found (fig. 35). Its distribution seems to be very similar to that of *T. Nisseni;* like this species it seems to drift with the different branches of the Gulf Stream, and it has probably reached the areas round Iceland and Greenland in the same way as E. WESENBERG-LUND (1935) describes for *T. Nisseni.*

E. WESENBERG-LUND (1936) concludes from the length of the wire that *T. Krampi* is an abyssal form. Also this view is confirmed by the "Michael Sars" material, as the species was usually caught with comparatively long wire (1000—2500 m). Though it is once taken near the surface, it most frequently occurs between 100 and 1250 m. It is a surprising fact that just the specimens from the stations between the Canary Islands and the Azores are caught with the shortest wire, so that they must live nearer the warm surface. They are all taken together with *T. elegans,* from which, however, they are distinguished by their short "tail" and by having more than 14 pair of parapodia. Their condition is too bad to permit an exact examination of the hyaline glands.

Tomopteris (Tomopteris) septentrionalis de Quatrefages, 1865, *ex* Steenstrup.

? *Tomopteris septentrionalis* Steenstrup 1850 (*nomen nudum*).
Tomopteris septentrionalis de Quatrefages 1865, Apstein 1900, Reibisch 1905, Izuka 1914, Malaquin and Carin 1922, Fauvel 1923, Benham 1929, Monro 1930, 1936, Wesenberg-Lund 1935, 1936.

Tomopteris Eschscholtzii Greeff 1879 a.
Tomopteris Eschscholzii Apstein 1900.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W	100	4700	yellow mud	1 sn.	10
10	19/4	—»—	200	»	—»—	1 sn.	20
10	19/4	—»—	830	»	—»—	1 sn.	1
15	22/4	40°56′N 9°28′W	600			1 sn.	2

St.	Date	Position	Wire out in m	Depth in m	Botton	Gear	Number of specimens
19	2/5	36° 5'N 4°42'W	0			1 sn.	8
19	2/5	—»—	900				10
29	9/5	35°10'N 7°55'W	200			1 sn.	1
34	14/5	28°52'N 14°16'W	600	2170	sand, yellow mud	½ sn.	1
42	23/5	28° 2'N 14°17'W	300			y.	6
48	31/5	28°54'N 24°14'W	7550			½ sn.	1
53	8/6	34°59'N 33° 1'W	1600	2615-2865	yellow hard clayish mud	y.	1
62	20/6	36°52'N 39°55'W	2000			y.	13
62	20-21/6	—»—	2500			¾ sn.	1
64	24/6	34°44'N 47°52'W	300			y.	3
64	24/6	—»—	2000			y.	15
64	24/6	—»—	2500			¾ sn.	26
66	26/6	39°30'N 49°42'W	1500			y.	1
80	11/7	47°34'N 43°11'W	600	>2000		¾ sn.	1
80	11/7	—»—	1000	»		y.	25
80	11/7	—»—	1500	»		¾ sn.	2
80	11/7	—»—	2000	»		y.	1
81	12/7	48° 2'N 39°55'W	2500			¾ sn.	1
84	15/7	48° 4'N 32°25'W	2000			y.	3
84	15/7	—»—	2500			¾ sn.	3
90	21/7	46°58'N 19° 6'W	30				2
90	21/7	—»—	600			¾ sn.	3
90	21/7	—»—	1000			y.	1
92	23/7	48°29'N 13°55'W	100			1 sn.	1
92	23/7	—»—	300			y.	3
96	27/7	50°57'N 10°46'W	100	184		¾ sn.	1
98	5/8	56°33'N 9°30'W	100	1000-1360		1 sn.	1
98	5/8	—»—	300	»		y.	2
101	7/8	57°41'N 11°48'W	200	1853	hard clay	1 sn.	1

The condition of the specimens varies greatly. The body tapers somewhat backwards, but without any trace of a "tail". One of the largest specimens has 24 pair of parapodia, and is 15 mm long, the body is 1.5 mm broad and 6 mm from tip to tip of the parapodia. The lateral antennæ are of moderate length. The prostomium carries two conspicuous, brown eyes. First pair of setigerous appendages is lacking, second pair attaining nearly the length of the body. The acicular bristles have conspicuous incisions with nearly regular intervals. Some of the incisions stand aslope. In the proximal part of the bristles incisions are lacking. — A characteristic trait is that the dorsal pinnule is more oblong than the rounded ventral one. Chromophile glands are present in the ventral pinnule from the fourth parapodium. They are situated apically, being not very large and comparatively inconspicuous. Ventrally in the pinnule, just below the parapodial ramus, we find a slack bundle of glandular tubes (fig. 36) probably also belonging to the chromophile gland, which thus in this species forms no distinct organ, being quite indistinctly limited. The hyaline glands are small and placed just above the chromophile ones, but it is often difficult to detect them. The first hyaline gland may be found in the first, second, third or fourth parapodium. Gonads are present in the dorsal parapodial ramus only, from the second parapodium to about the fifteenth, but ova may often penetrate into the ventral ramus too.

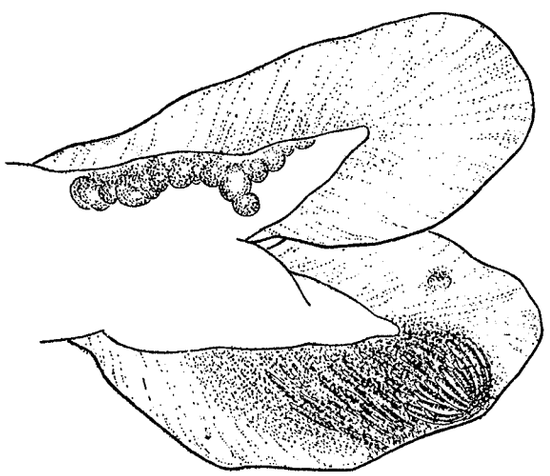


Fig. 36. *Tomopteris septentrionalis*, 6. parapodium, x 30.

Tomopteris septentrionalis is by far the most common Tomopterid in the material, being taken along nearly the whole route of the "Michael Sars" (fig. 37). Even from st. 19, the single Mediterranean station of the expedition, there are 18 specimens. The species is previously known to be very common in the northern part of the Atlantic, round the British Isles, in the North Sea and Skagerrak, in the Norwegian Sea, between Scotland and Iceland, in the Irminger Sea and the Davis Strait. It is, moreover, reported from the Atlantic coast of North America. The present material shows that *Tomopteris septentrionalis* is also common in warmer areas of the Atlantic, along the west coast of Portugal and North Africa to the Canary Islands, in the open sea between these Islands and the Azores, and west of the Azores. The "Michael Sars" has also found it in the northern Atlantic between New Foundland and Ireland and NW of Ireland. — Several authors have reported *T. septentrionalis* from the southern hemisphere. MONRO (1930) has mentioned it from South Georgia and BENHAM (1929) from New Zealand and the Ross Sea. IZUKA (1914) reports it from Japan. ROSA (1908 b) mentions it from the Pacific (coast of Chile), further it is reported from the Mediterranean.

E. WESENBERG-LUND (1936) states that *Tomopteris septentrionalis* is an oceanic species living over greater depths. The present material confirms this, as only a few of the stations where *T. septentrionalis* is found, are within the 1000 m line. It is a typical eurybath species, being found in nearly the same number in all the depth

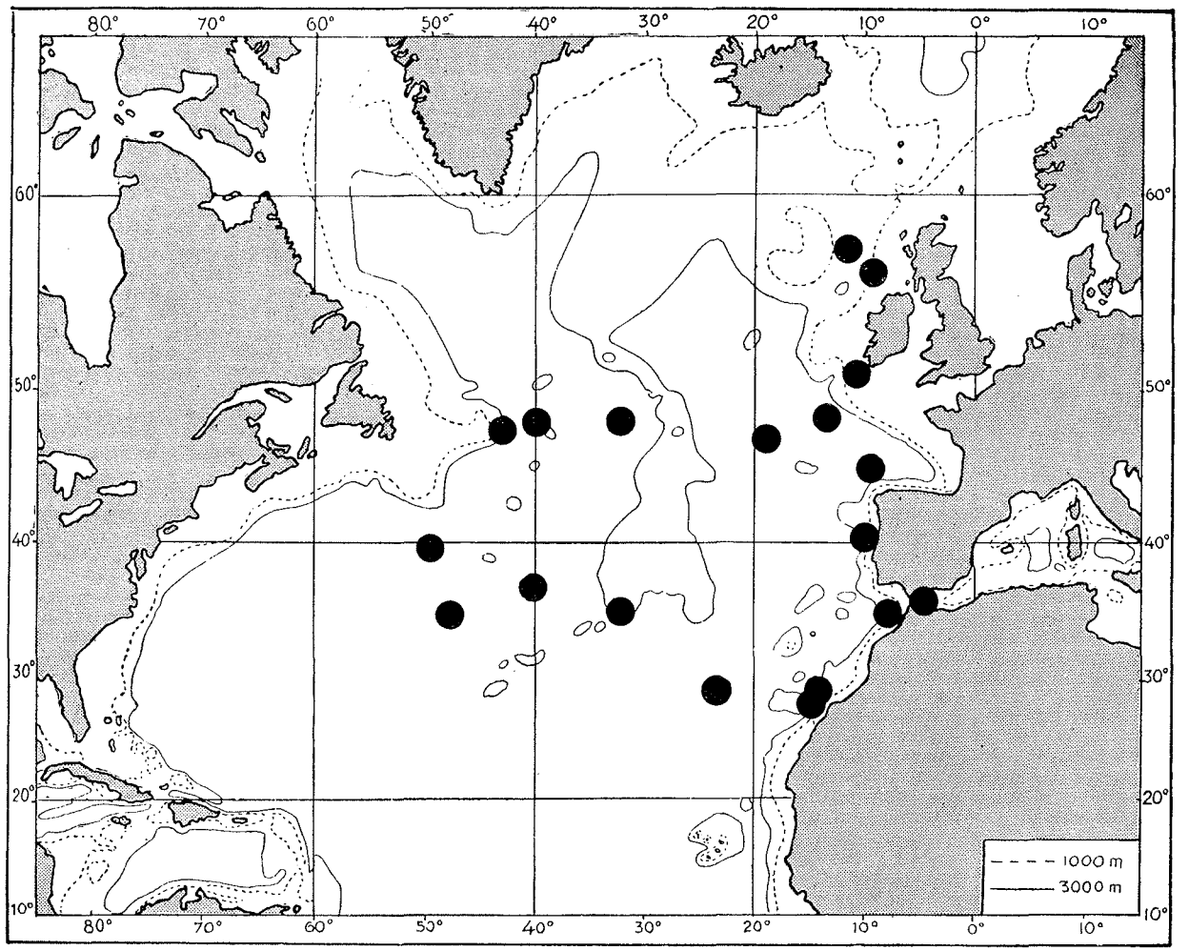


Fig 37. *Tomopteris septentrionalis.*

regions from the surface down to 1250 m. But *T. septentrionalis* does not avoid the coast, if the depth near it is great enough. Thus all the stations 15, 19, 29, 34 and 42 are coast stations. The only find within the 200 m line is from st. 96, where the depth was 184 m. Only one specimen was taken here.

The name *Tomopteris septentrionalis* is first introduced by STEENSTRUP (1850). He has received a great many specimens from the North Sea and the Atlantic, off the Norwegian coast and round the Orkney Islands and the Faeroes, and he considers it identic with the species which JOH. MÜLLER and BUSCH found and described from Heligoland, whereas he considers the species described by QUOY and GAIMARD, KROHN and ESCHSCHOLTZ as quite different ones. But STEENSTRUP does not give any description of his species, and *Tomopteris septentrionalis* must be considered as a *nomen nudum*. Later on DE QUATREFAGES (1865) and APSTEIN (1900) revive the name, applying it to one of the two northern species, which has subsequently been known under that name. Without an examination of the original material of STEENSTRUP and DE QUATREFAGES it is impossible to say whether the name is available or not, and I therefore provisionally use this name. — The *T. Eschscholtzii* Greeff (APSTEIN (1900) writes *T. Eschscholzii*) is evidently identic with *T. septentrionalis*, its only distinguishing mark being lack of hyaline glands, which in *T. septentrionalis* are very easily overlooked because of their lack of pigment.

Tomopteris (Tomopteris) ligulata, Rosa, 1908.

Tomopteris ligulata Rosa 1908 a, Malaquin and Carin 1922, Fauvel 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
29	9/5	35°10′N 7°55′W	400			y.	2
53	8/6	34°59′N 33° 1′W	100	2615-2865	yellow hard clayish mud	1 sn.	1
53	8/6	—»—	200			1 sn.	5
53	8/6	—»—	300			y.	3
53	8/6	—»—	600			y.	2
53	8/6	—»—	2100			½ sn.	2
56	10/6	36°53′N 29°47′W	100	3239	clayish mud	1 sn.	1
56	10/6	—»—	1000	»	—»—	y.	1
62	20/6	36°52′N 39°55′W	100			1 sn.	3
64	24/6	34°44′N 47°52′W	2000			y.	1
67	27/6	40°17′N 50°39′W	800			¾ sn.	5
67	27/6	—»—	1200			y.	1

The specimens are generally well preserved. The body tapers somewhat backwards, but there is no "tail". There are about 22 pair of parapodia. The length of one of the larger specimens is 11 mm, the breadth of the body 0.75 mm and 3.5 mm from tip to tip of the parapodia. The prostomium carries two dark eyes. The lateral antennæ are of moderate length. First pair of setigerous appendages is lacking, the second pair reaching about 2/3 of the length of the body, their base being globular. The acicular bristles are very slender with apparently a series of notches along nearly their whole length. The intervals between the notches are not quite regular, and they decrease toward the tip. Chromophile glands are present from the fourth parapodium; they are very large and ordinarily very distinct, being situated in the ventral pinnule below the parapodial ramus. Hyaline glands are on the contrary, very indistinct, being present in the ventral pinnule only, from the third parapodium, and situated apico-superiorly. The most characteristic distinguishing mark of the species is, however, the pinnules, which border the dorsal and the ventral edge of the parapodia nearly to their base (fig. 38). Gonads are present in the dorsal parapodial ramus from the third parapodium.

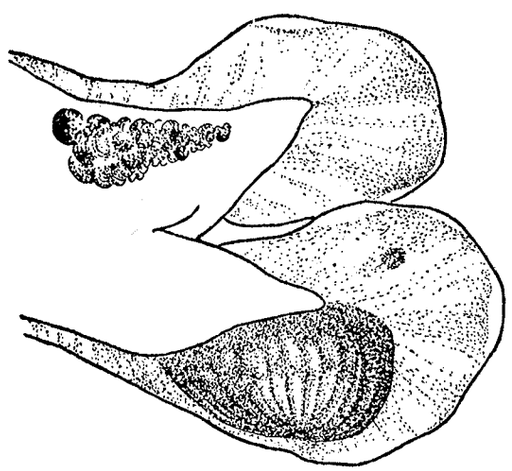


Fig. 38. *Tomopteris ligulata,* 7. parapodium, x 40.

In his original description of the species ROSA (1908 a) reports it from the Atlantic between 22° N and 33° S and from the Pacific at 31° S. MALAQUIN and CARIN (1922) report it from the sea round the Canary Islands and the Azores. In the present material there are two specimens from st. 29, just outside the Straits of Gibraltar. It will not be astonishing, therefore, if further investigations will show that it occurs also in the Mediterranean. Moreover there are some specimens from round the Azores and from west of these Islands (fig. 35). Like *T. septentrionalis* also *T. ligulata* is an eurybath, oceanic form, living over great depths and being found between 50 and 1050 m.

Tomopteris (Tomopteris) planktonis Apstein, 1900.

Tomopteris planktonis Apstein 1900, Malaquin and Carin 1922, Fauvel 1923, Monro 1936.

Tomopteris planctonis Rosa 1908 a.

Tomopteris carpenteri Ehlers 1917 (*partim*) (*non* de Quatrefages, *nec* McIntosh).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
25b	8/5	35°46′N 8°16′W	3400	2055	yellow mud	½ sn.	2
53	8/6	34°59′N 33° 1′W	300	2615-2865	yellow hard clayish mud	y.	1
53	8/6	—»—	600	»	—»—	y.	3
56	10/6	36°53′N 29°47′W	200	3239	clayish mud	1 sn.	1
56	10/6	—»—	500	»	—»—	½ sn.	2
64	24/6	34°44′N 47°52′W	1000			y.	2
67	27/6	40°17′N 50°39′W	800			¾ sn.	1
90	21/7	46°58′N 19° 6′W	600			¾ sn.	1

The specimens are generally well preserved. The appearence of the species resembles that of *T. elegans.* The body tapers backwards without forming a "tail". There are about 17 pair of parapodia. One of the largest specimens is 11 mm long, the body is about 0.5 mm broad and 3 mm from tip to tip of the parapodia.

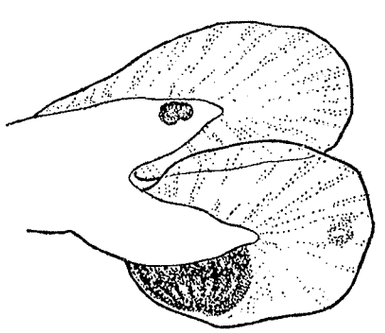


Fig. 39. *Tomopteris planktonis,* 6. parapodium, x 40.

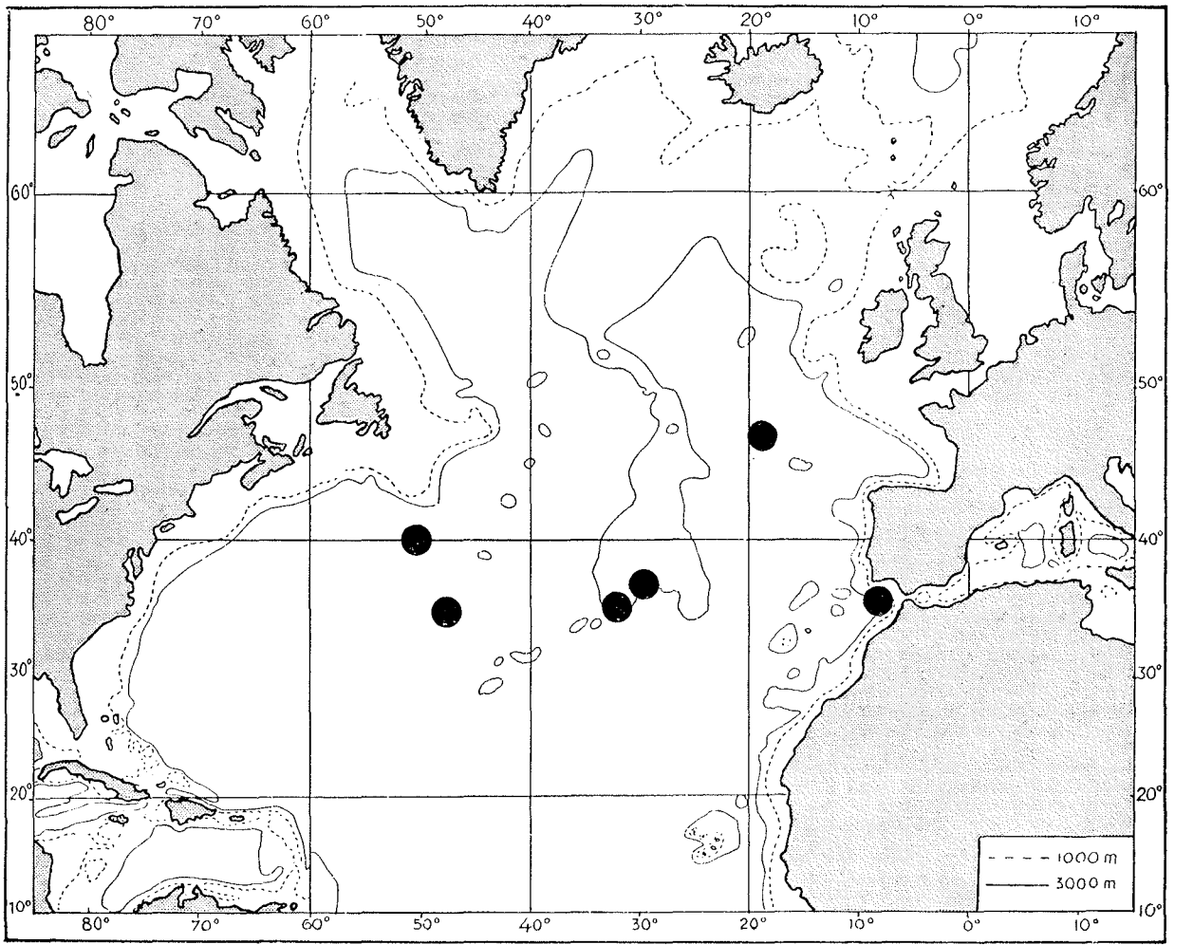


Fig. 40. *Tomopteris planktonis.*

The lateral antennæ are of moderate length. The prostomium carries two dark eyes. First pair of setigerous appendages is lacking, at least in the adult ones. Second pair of appendages with globular base, attaining about 3/4 of the length of the body. The acicular bristles have a series of conspicuous indentations, placed aslope and with irregular intervals. Round the indentations the bristle is somewhat thickened so that it appears articulate. The arrangement of the glands is the same as in *T. ligulata*. Chromophile glands are present from the fourth parapodium. They are voluminous and situated below the parapodial ramus in the ventral pinnule near the point where the free edge of the latter meets the trunk of the parapodium. Hyaline glands are present from the first parapodium; they are situated apically in the pinnule of the ventral ramus, but are often very difficult to see. Gonads are present in the dorsal ramus only, as far as I can see from the second parapodium; they are situated near the tip of the ramus (fig. 39).

It is only with doubt that I refer to *T. planktonis* the two specimens from st. 25 b. Most of their chromophile glands are indistinct and not situated so near the point where the free edge of the pinnule meets the trunk of the parapodium, as is characteristic of the species. But on the other hand their whole appearance with the long and slender parapodia, the slender acicular bristles, the incisions on the bristles and the number of segments in the largest specimen indicate *T. planktonis*. This specimen has a length of 7 mm and 17 pair of parapodia, the other specimen is only 3 mm long with 11 pair of parapodia. In this small specimen the first pair of setigerous appendages is present; they are short, but well developed. MALAQUIN and CARIN (1922) mention also a small specimen of 3 mm length, with first pair of setigerous appendages,

and which they with doubt refer to *T. planktonis*. If their identification and mine is correct, these appendages are present in the young specimens disappearing in the adult ones of *T. planktonis* as is the case with *T. helgolandica*.

Tomopteris planktonis is very like *T. ligulata*, *T. elegans* and *T. Cavalli*, its best distinguishing mark being perhaps the position of the chromophile glands near the point where the ventral pinnule meets the parapodial trunk. From *T. ligulata* it is recognizable by the pinnules not bordering the dorsal and the ventral edges of the parapodial trunk. As the hyaline glands are not very distinct, they are not very useful in distinguishing *T. planktonis* from *T. elegans* and *T. Cavalli*. From *T. elegans* it may be distinguished by the position of the chromophile glands and the gonads and, for adult specimens, by the absence of first pair of setigerous appendages. From *T. Cavalli* it is distinguishable by its whole appearance being more like that of *T. elegans* and by the pinnules not being spoon-shaped; but the most conspicuous characteristic is perhaps the indentations of the acicular bristles, which in *T. Cavallii* are broad and open giving the edge of the bristle the appearance of an undulating line, whereas those of *T. planktonis* are of the ordinary narrow type with slight thickenings round them.

Tomopteris planktonis seems to have a very wide distribution in the Atlantic. APSTEIN (1900) reports it from the sea between West Africa and Brazil, from the Irminger Sea and off New Foundland, and he mentions that VANHÖFFEN (1893) has found it even in Karajakfjord in west Greenland, 70$^1/_3$° N. MALAQUIN and CARIN (1922) report it from the sea between the Canary Islands, the Azores and Portugal, further it is reported from the Weddel Sea and from the South Atlantic. The species thus seems to be bipolar. The present material has been found at a few stations from just outside the Straits of Gibraltar to south of New Foundland and from one station SW of Ireland (fig. 40). Like the two preceding species also *T. planktonis* seems to be an oceanic species living over great depths, but being probably more stenobath, as it is most frequently found between 100 and 500 m. The single find with 3400 m wire out is probably taken on hauling in.

Tomopteris (Tomopteris) Carpenteri de Quatrefages, 1865.

Under the name *Tomopteris Carpenteri* DE QUATREFAGES (1865) described a Tomopterid from the Antarctic Sea, to which BENHAM (1929) referred his species from the Antarctic, although the species of DE QUATREFAGES is hardly recognizable from the short description. This species is found again by AUGENER (1929) and MONRO (1930, 1936). According to MONRO (1936) it is distinguishable from *T. planktonis*, which it otherwise resembles very much, by its much larger size, by the wrinkled pinnules being continued much further up the feet and by the presence of gonads in both rami of the parapodia. The species described by MCINTOSH (1925) from South Africa under the same name may perhaps be another form. Only a renewed examination of the types of MCINTOSH and DE QUATREFAGES can definitely decide the questions regarding *T. Carpenteri*, and according to BENHAM (1929), at least the type of DE QUATREFAGES still existed in 1928. At any rate *T. Carpenteri* seems to be an exclusively antarctic species, which is not present in the collections at hand. I have seen only AUGENER'S badly preserved specimen.

Tomopteris Kefersteini Greeff, 1879.

Tomopteris Kefersteini Greeff 1879 a, Wesenberg-Lund 1935 (*non* Apstein).

Tomopteris Kefersteinii Viguier 1886.

This small species was originally described from the Canary Islands, but later on it was found to have a much wider distribution (Bermudas, Mediterranean, between Scotland and Iceland.) It is recognizable by its small size, lack of "tail", by a voluminous chromophile gland and a distinct gland apically in both dorsal and ventral ramus; this gland has not yet been recognized as a rosette or a hyaline gland, so that it is uncertain to which of the subgenera the species belongs. Gonads are present in both dorsal and ventral parapodial ramus. *T. Kefersteini* is not represented in the present material; because of its small size it may, however, easily have been overlooked.

Family ***Typhloscolecidae*** Uljanin.

The family *Typhloscolecidae* is, like the *Tomopteridae*, a very aberrant group of Polychaeta exclusively adapted to pelagic life. Its relationship to other Polychaeta is problematic.

The *Typhloscolecidae* have a spindle-shaped or nearly cylindrical body with a pointed prostomium ending in a small palpod. Prostomium and peristomium are coalesced. There are noe eyes, but the nuchal organs are more or less conspicuous and well developed. Above the pharynx there is a characteristic retort-shaped organ. Peristomium and the two following segments carry each one pair of foliaceous cirri; further back the segments have both dorsal and ventral cirri. There are two anal cirri, which are also foliaceous. The parapodia are more or less rudimentary, each with one shorter acicula between two longer, simple bristles, which are often a little curved at the tip. Bristles are absent from the anterior segments.

Genus **Typhloscolex** Busch.

The genus *Typhloscolex* is characterized by a dorsal and a ventral semicircular vibratile cushion on the prostomium. On each side of the dorsal cushion is a vibratile button (nuchal organ).

Typhloscolex phyllodes Reibisch, 1895.

Typhloscolex phyllodes Reibisch 1895, Fauvel 1916.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
102	9/8	60°57′N 4°38′W	1400	1098	dark sand, clay	¾ sn.	1

The single specimen is not too well preserved, and it is only with doubt that I refer it to this species. Its length is 9 mm, breadth 1 mm, number of segments is less than 30. The body tapers gradually backwards. Prostomium has the form of a trunkated cone ending in a small button (fig. 41 a, b). Both the dorsal and the ventral cushion has the form of semi-circular narrow folds running across the prostomium at its base. On the ventral cushion only one long flagellum is seen, but a slightly marked line along the cushion indicates their place. On the dorsal cushion a similar line is seen. Just behind the dorsal cushion there is a nuchal organ in form of two small, rounded lobes, widely separated, one at each end of the cushion (fig. 41 a); they are fixed to the cushion lying freely upon the neck of the animal. The mouth is situated behind the ventral cushion, the proboscis is partly everted. Parapodia are more prominent than in other *Typhloscolecidae*, though not as much as in the figure of REIBISCH (1895, Tab. V, fig. 6). Only two or three cirri are present, viz. the ventral one of the fourth left parapodium being comparatively large and reniform, and one or two cirri further back, being, however, too much damaged to allow a description. There are two very small oval anal cirri (fig. 41 c).

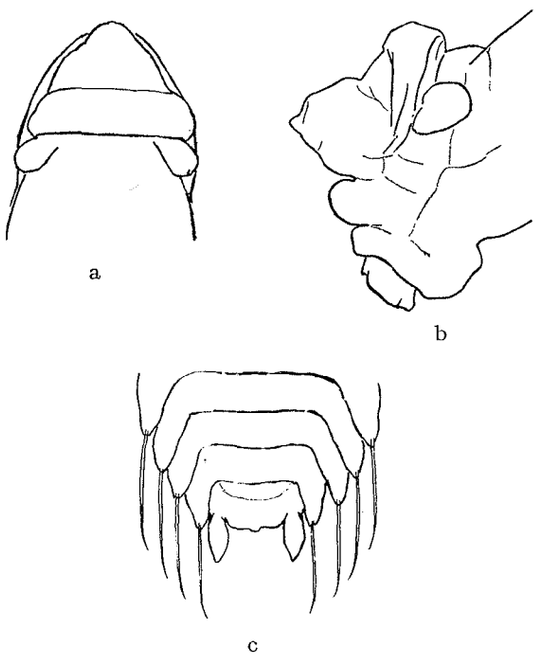


Fig. 41. *Typhloscolex phyllodes*. a. prostomium, dorsal view, x 30; b. do. from the left, x 30; c. caudal end, x 70.

REIBISCH (1895) has found the *Typhloscolex phyllodes* between West Africa and Brazil only, and FAUVEL (1916) reports it from the Azores. EHLERS (1913) mentions it from the warmer part of the Atlantic and from the Antarctic. If my determination is right, the species is now found also north of Scotland. It thus seems to have a very wide distribution in the Atlantic and to be quite eurythermal. The specimen at hand is taken in the considerable depth of 550 m.

Sagitella præcox Uljanin is generally taken for a synonym of *T. Mülleri* Busch. I will not omit to mention that in certain respects, as e. g. in the shape of the body, it resembles even more *T. phyllodes*.

Typhloscolex Mülleri Busch, 1851.

Typhloscolex Mülleri Busch 1851, Reibisch 1895, Fauvel 1923.
Sagitella Kowalevskii forme b N. Wagner 1872 (*fide* Uljanin).
? *Sagitella Bobretskii* N. Wagner 1872 (*fide* Fauvel).
Sagitella barbata Uljanin 1878.
? *Sagitella præcox* Uljanin 1878.
Acicularia Virchowii juv. Greeff 1879 a (*non* Langerhans).
Typhloscolex mülleri Ehlers 1913, Augener 1929, Monro 1930,

This small species is characterized by the dorsal and ventral transverse vibratile cushions being high and nearly foliaceous, so that the prostomium looks like a plate perpendicular to the length axis of the body and with a small cone ending in a palpod in the centre. — It is not represented in the material.

Typhloscolex Leuckarti Reibisch, 1895.

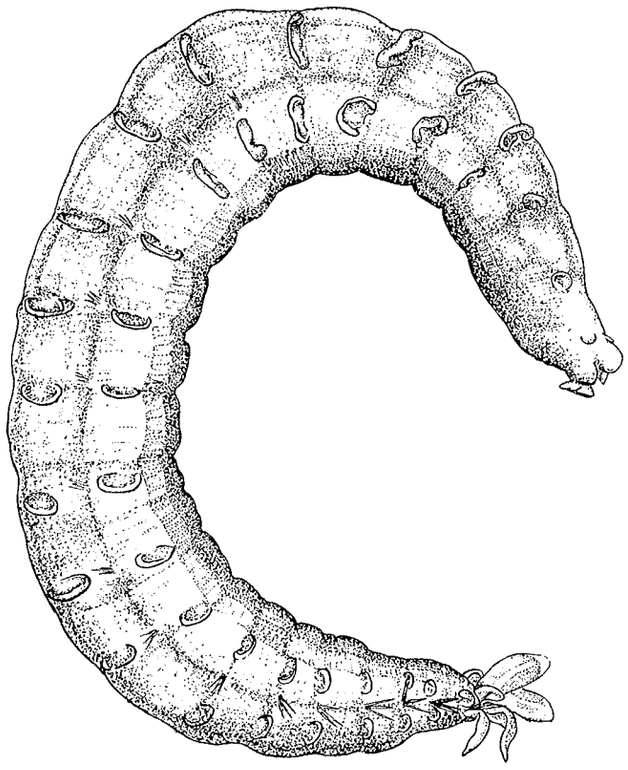
This small species which REIBISCH (1895) has found in the warmer part of the Atlantic and EHLERS (1913) in the same area and in the Antarctis, is not represented in the present material. It is characterized by its very prominent vibratile cushions.

? **Typhloscolex grandis** sp. n.

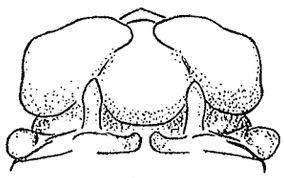
St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
64	24/6	34°44′N 47°52′W	2500			¾ sn.	2

Holotypus: In the Bergen Museum, No. 29611.

Description. The shape and dimensions of the body are those of a *Travisiopsis*. The prostomium terminates in a conical tip with a slight ledge, continuing backwards into a semi-globular vault between two large, globular cushions (fig. 42 a, b). In the paratype these lateral cushions are much damaged. I take the median vault and the two lateral cushions for a trilobate dorsal vibratile cushion. Latero-posteriorly to the median vault there are



a



b

Fig. 42. *Typhloscolex grandis*. a. from the right, x 10; b. prostomium, dorsal view, x 50.

two small nuchal organs, each consisting of two branches, one streching toward the mid-line of the body, the other straight forward (fig. 42 b). The ventral cushion is large and vaulted, with the mouth on its summit. Proboscis is partly everted, showing a lobate, thin membrane only. No line indicating the place of the flagella can be seen on the cushions. — The segment limits are well marked off, each segment being slightly annulated. The parapodia are only very slight eminences round the base of the bristles. In each parapodium there are the usual two simple bristles and one acicula. All these three bristles are pointed, slightly curved at the tip, translucent and of about the same length. Bristles are lacking in the seven first segments. The prostomium and each of the two first segments carry only one pair of cirri, the following segments having each two pairs. The cirri are quite small, those on the middle of the body being only half as long as a segment. They are spoon-shaped with their concavity backwards, and stand perpendicularly to the surface of the body, thus resembling those of a *Sagitella Kowalevskii*. The cirri of the anterior segments are rounded, towards the middle of the body they become more quadratic, the dorsal ones of the two last segments being longer and lanceolate. The anal cirri (fig. 42 b) of the holotype are damaged, but those of the paratype are well preserved, being large, oval and supported by an opaque middle rib.

Number of segments is 24. Length of body without anal cirri 17 mm, breadth 2.5 mm.

It is only with doubt that I refer this species to the genus *Typhloscolex*, for I am not quite convinced that the prostomial cushions are really homologous with those of *T. phyllodes* (which is at all events a real *Typhloscolex*). But because of the nuchal organs I cannot refer it to *Sagitella*, and because of the shape of the prostomium and the small cirri I think it cannot be a *Travisiopsis*. However, the genera of the *Typhloscolecidae* are so closely allied that it has often been difficult to separate them.

The only two specimens of *T. grandis* sp. n. are from st. 64 in the middle of the Atlantic, between the Azores and North America, where they have been caught with 2500 m wire out, thus in a depth of about 1250 m. This, however, is not sufficient reason to designate them as bathypelagical animals, as they may perhaps have come into the net on hauling in. The station is the richest of all in pelagic Polychaeta, most of the species of *Lopadorhynchinae*, *Alciopidae*, *Tomopteridae* and *Typhloscolecidae* being found there.

Genus **Sagitella** N. Wagner.

The genus *Sagitella* is characterized by having no vibratile cushions and no caruncle before or between the nuchal organs.

Sagitella Kowalevskii N. Wagner, 1872.

Sagitella Kowalevskii forme a N. Wagner 1872 (*fide* Uljanin).
Acicularia Virchowii Langerhans 1877 (*fide* Fauvel), Greeff 1879 a.
Sagitella Kowalevskii Uljanin 1878.
Typhloscolex Mülleri Greeff 1879 b (*non* Busch).
Sagitella Kowalewskii Reibisch 1895, Southern 1911, Fauvel 1916, 1923.
Sagittella kowalewskii Ehlers 1913.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
62	20/6	36°52′N 39°55′W	100			1 sn.	1
64	24/6	34°44′N 47°52′W	2000			y.	4
64	24/6	—»—	2500			¾ sn.	1
92	23-24/7	48°29′N 13°55′W	1500			¾ sn.	1

The specimens are comparatively well preserved, though some of them have lost most of the cirri. The length varies from 6 mm to 12 mm, the breadth is 0.5—1 mm, and the number of segments is in all the specimens greater than 40, in one specimen from st. 64 it is about 50. The prostomium (fig. 43 a, b) is conical with a small terminal palpod and with a dorsal thickening over the retort-shaped organ. Behind this thickening there are two longitudinal cushions, curved in towards their posterior end. The anterior end of the animals thus agrees well with the figures of SOUTHERN (1911, Pl. II, fig. 11, 12). The body is very slender with slightly indicated parapodia. The cirri are small in comparison with those of *Travisiopsis*, more or less rounded or triangular or rectangular. Posteriorly they become more lanceolate, the last ones being nearly filiform. The anal cirri (fig. 43 c) are spatulate, being broadest at their free end and forming together a tail-fin resembling that of *Sagitta*. They are supported by a very slightly indicated middle rib.

SOUTHERN (1911) mentions the variations in length and in number of segments of this species given by the various authors: GREEFF (1879 a) 5—9 mm with 26—39 (misprint by SOUTHERN: 29) segments, LANGERHANS (1877) 5—10 mm and 24—33 segments, ULJANIN (1878) 5 mm and 21—28 segments, REIBISCH (1895) 10—15 mm and 32—50 segments. SOUTHERN himself gives 10—17 mm and 42—47 segments, and suggests that "The number of segments in the fully grown members of this family seems to be very constant, and it is quite possible that two different species have been confused under the above name". Differences in length and in number of segments can, however, hardly be sufficient to separate two species, and I am unable to discover any other real difference between the description and the figures of GREEFF (1879 a, b) and those of SOUTHERN (1911), or between my specimens of 6 mm and of 12 mm, which all of them have more than 40 segments. Probably the number of segments depends on the age of the animal.

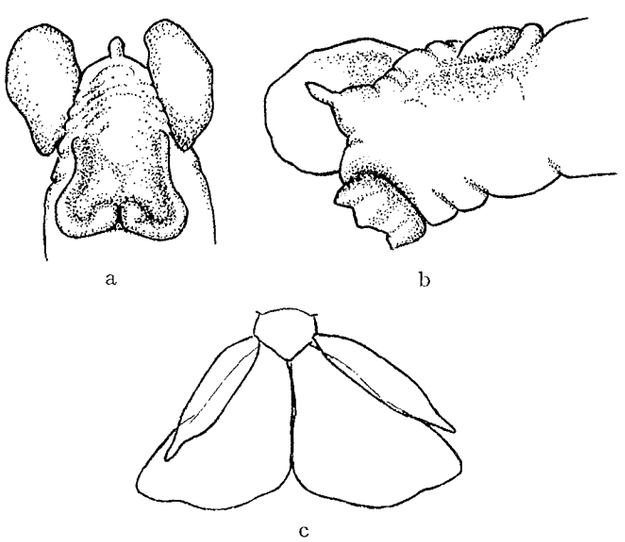


Fig. 43. *Sagitella Kowalevskii*. a. prostomium, dorsal view, x 60; b. do. from the left, x 80; c. anal cirri, x 30.

Sagitella Kowalevskii is widely distributed in the Atlantic up to the west coast of Ireland, in the Mediterranean and in the Black Sea. EHLERS (1913) has found it in the Southern Atlantic, in the Antarctic Ocean and in the Indian Ocean, but the *Sagitella kowalewskii* of GRAVIER (1911), BENHAM (1927) and MONRO (1930) is another species (*Travisiopsis Levinseni*). The finding-places where the "Michael Sars" has taken the species, between the Azores and North America and SW of Ireland, lie within the area from which the species is previously known. Most of the specimens are taken between 750 m and 1250 m, only a single one in a depth of 50 m.

Sagitella sp. Southern, 1911.

This animal from SW of Ireland is so insufficiently described that nothing can be said about its identity.

Genus **Travisiopsis** Levinsen.

The genus *Travisiopsis* is characterized by having no vibratile cushions, but a caruncle more or less encompassed by the two elongated nuchal organs.

Travisiopsis lobifera Levinsen, 1885.

Travisiopsis lobifera Levinsen 1885, Reibisch 1895, Fauvel 1916, 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
49b	1/6	29° 8′N 25°16′W	270			1 sn.	2
49b	1/6	—»—	370			y.	1
51	6/6	31°20′N 35° 7′W	0	3886	yellow mud	1 sn.	2
51	6/6	—»—	300	»	—»—	y.	1
52	6/6	31°24′N 34°47′W	0			1 sn.	26
62	20/6	36°52′N 39°55′W	100			1 sn.	1
64	24/6	34°44′N 47°52′W	200			1 sn.	15
64	24/6	—»—	600			¾ sn.	2
67	27/6	40°17′N 50°39′W	800			¾ sn.	1
69	29/6	41°39′N 51° 4′W	300			y.	1

The body is cylindrical, more slender than in the following species, and consisting of 21 segments. The length varies from 8 mm to 21 mm (without anal cirri) by a breadth of 1—2 mm. Prostomium is conical, long and pointed, not so rounded as in SOUTHERN'S (1911) figure (pl. I, fig. 4). The mouth part is not protruded like a cushion as in *Typhloscolex grandis*. Behind the prostomium, dorsally, there is an oval caruncle

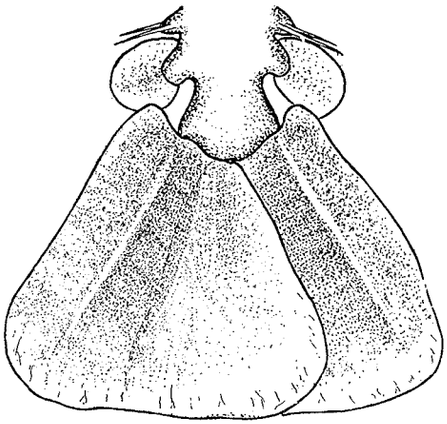


Fig. 44. *Travisiopsis lobifera*, anal cirri, x 23.

encompassed by two listels (nuchal organ) which continue backwards like two short fingers; it may be sufficient to refer to the figure of SOUTHERN (1911) which is also reproduced by FAUVEL (1923). Cirri are large and nearly cordiform. The anal cirri are oval, or more or less triangular, supported by a hyaline middle rib (fig. 44). LEVINSEN (1885) saw segmental furrows more conspicuous in the posterior part of the body, which may be due to contraction in the spirit. Like SOUTHERN I have not been able to see that the prostomium is jointed at the base, as LEVINSEN figures it.

Travisiopsis lobifera is known only from the warmer area of the Atlantic, northward to Nova Scotia. All the present specimens are from the northern part of this region, i. e. between the Canary Islands and Nova Scotia (fig. 46). The species is a typical surface form, being found from the surface down to 500 m.

Travisiopsis lanceolata Southern, 1911.

Travisiopsis lanceolata Southern 1911, Fauvel 1916, 1923, Wesenberg-Lund 1935, 1939.
? *Sagittella cornuta* Ehlers 1913.
? *Plotobia simplex* Chamberlin 1919.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W	50	4700	yellow mud		2
34	13/5	28°52′N 14°16′W	400	2170	sand, yellow mud	y.	1
53	8/6	34°59′N 33° 1′W	600	2615-2865	yellow hard clayish mud	y.	1
53	8/6	—»—	1000	»	—»—	½ sn.	1
53	8/6	—»—	2600	»	—»—	3 ln.	1
84	15/7	48° 4′N 32°25′W	1000			y.	1
92	23/7	48°29′N 13°55′W	2000			y.	1
92	23/7	—»—	3000			ln.	1
94	26/7	50°13′N 11°23′W	2000	1565		ln.	1
101	7/8	57°41′N 11°48′W	2000	1853	hard clay	y.	1

The body is fusiform, thicker than the preceding species, and consists of 22 segments. The length varies from 12 mm to 25 mm (without anal cirri), the breadth from 3 mm to 4 mm. The prostomium forms a cone, shorter, and broader at the base than that of *T. lobifera*, often provided with a small terminal palpod. As in *T. lobifera* the mouth is not protuded. The caruncle is T-shaped and encompassed by two lateral listels (nuchal organ) which are elongated backwards, like two fingers, much longer than those of *T. lobifera* (see the figures of SOUTHERN (1911) or reproduced by FAUVEL (1923)). The cirri of the first three segments are reniform, further backwards they become nearly quadratic and then more lengthened in the way showed by SOUTHERN (1911). The shape of the anal cirri is varying; they are more or less oval or a little broader at their base, and supported by a hyaline middle rib (fig. 45). As E. WESENBERG-LUND (1935) has stated, they are never so pointed as SOUTHERN (1911) draws them.

Sagittella cornuta Ehlers is most probably identical with *Travisiopsis lanceolata*. EHLERS (1913) does not mention the T-shaped caruncle between the nuchal organs, which he may have overlooked (these nuchal appendices are often difficult to see as their colour is quite the same as that of the body, viz. whitish opaque); he also gives only 19 segments, which is explicable if he has counted only those with two pair of cirri. Also the *Plotobia simplex* Chamberlin comes very near the actual species, being probably identical with it. The only differences are found in the caruncle, which is stated to be hemispherical and apparently not encompassed by the lateral processes, and in the cirri, which are more rounded; pl. 66, fig. 1, however, shows a basal cushion from which the three nuchal appendices arise and which probably represents the anterior

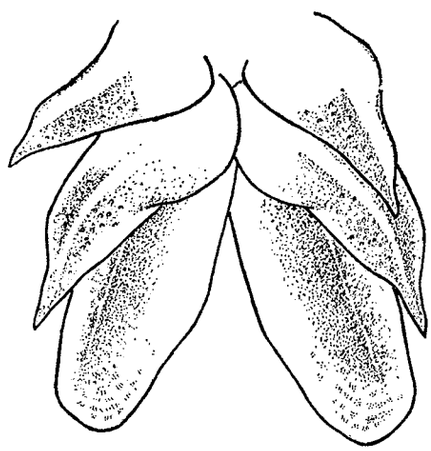


Fig. 45. *Travisiopsis lanceolata*, anal cirri, x 15.

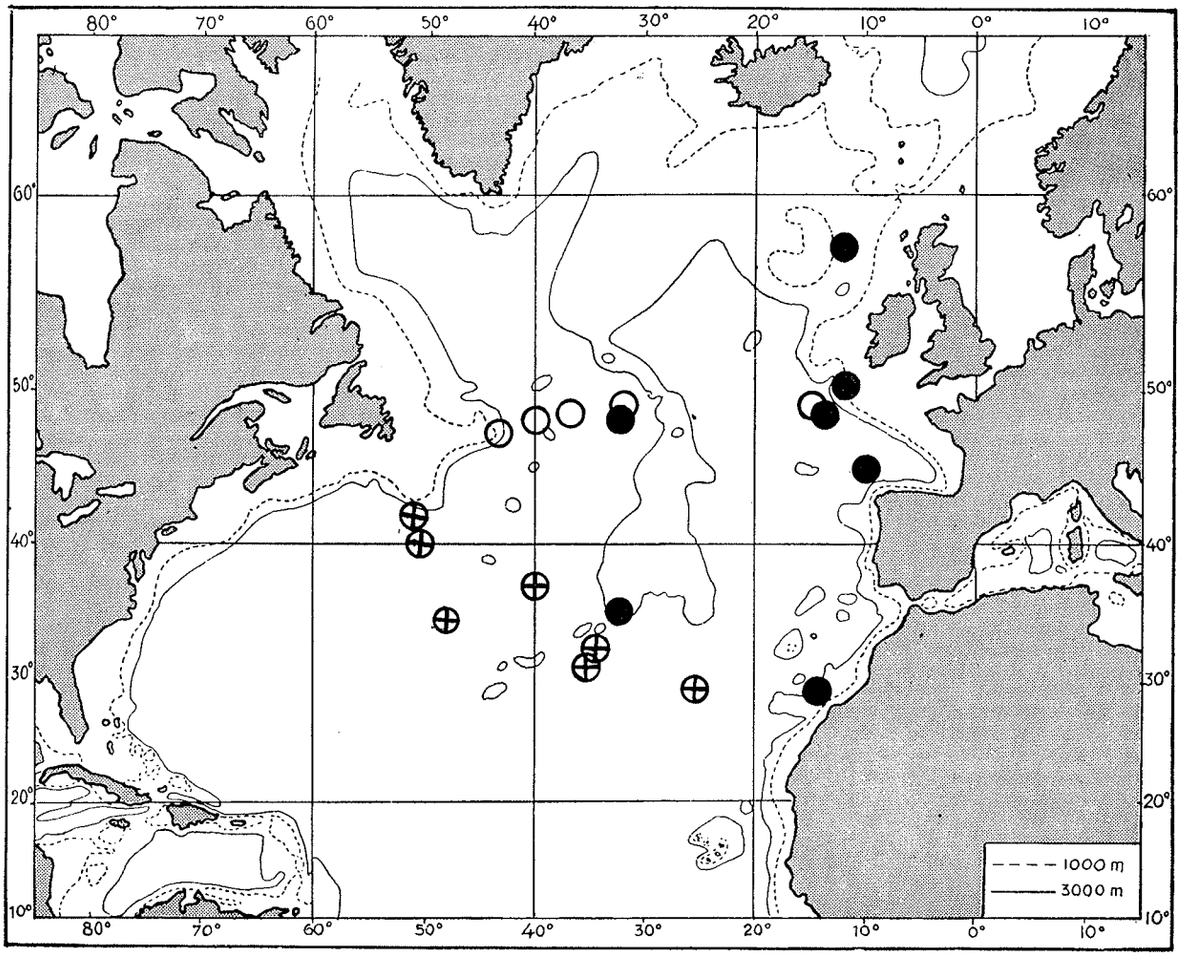


Fig. 46. ● *Travisiopsis lanceolata.* ○ *Travisiopsis Levinseni.* ⊕ *Travisiopsis lobifera.*

part of the lateral processes and perhaps also of the caruncle. — FAUVEL (1916) suggests that *T. lanceolata* and *T. lobifera* perhaps represent only two extreme varieties of one species, as he has found young specimens apparently being intermediary between them. I have never seen such intermediary specimens, even the smallest ones having quite characteristic nuchal appendages.

Travisiopsis lanceolata is distributed over the north Atlantic from the Canary Islands to south of Iceland. The "Michael Sars" has found the species in all parts of this area, round the Canary Islands, round the Azores, midway between New Foundland and Ireland, in the Bay of Biscay, SW and NW of Ireland (fig. 46). If my identification of *Sagittella cornuta* and *Plotobia simplex* with the actual species is correct, it is distributed also in the Antarctic Ocean and the south Atlantic up to the Cape Verde Isles (*S. cornuta*) and in the Pacific (*P. simplex*). — Being taken in different depths from 25 m down to 1500 m the species seems to be quite eurybath.

Travisiopsis Levinseni Southern, 1911.

Travisiopsis Levinseni Southern 1911, Fauvel 1916, 1923, Wesenberg-Lund 1935, 1939.
Sagitella Kowalewskii Gravier 1911 (*non* Wagner).
Sagitella kowalewskii Benham 1927, 1929, Monro 1930.
? *Sagittella opaca* Ehlers 1913.
Travisiopsis sp. Monro 1930.
Travisiopsis benhami Monro 1936.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
80	11/7	47°34′N 43°11′W	1000	>2000		y.	6
80	11/7	—»—	1500	»		¾ sn.	5
80	11/7	—»—	2000	»		y.	1
80	11/7	—»—	2500	»		¾ sn.	3
81	12/7	48° 2′N 39°55′W	1500			¾ sn.	1
81	12/7	—»—	2000			y.	1
81	12/7	—»—	2500			¾ sn.	3
82	13/7	48°24′N 36°53′W	1500			¾ sn.	1
84	15/7	48° 4′N 32°25′W	2000			y.	4
84	15/7	—»—	2500			¾ sn.	1
92	23/7	48°29′N 13°55′W	2000			y.	5

The body is fusiform, a little more slender than in the preceding species, and consists of 25 segments. The segmental limits are rather distinct. The length goes up to 18 mm by a breadth of 1.5 mm. The prostomium is conical, as in the preceding species with a small palpod terminally. In some specimens the proboscis is everted; it is 1 mm long, forming a slender cone, slightly curved downward, and with a fringed collar near the base (fig. 47 a). Behind the prostomium dorsally there is a large, oval caruncle between two smaller warts. The nuchal organs at first sight seem to consist of only two oval processes arising obliquely outward from the outer and hinder angles of the caruncle, but a closer examination shows that the posterior end of these lobes by a narrow neck at the sides of the head is connected with the lateral wart in the way described and figured by MONRO (1936) in his *T. benhami*, thus not being coalesced in the way described and figured by E. WESENBERG-LUND (1936). The cirri are nearly quadratic, but often some of them are more triangular; backwards they become more lengthened and lanceolate in the same way as in the preceding species. The anal cirri are larger than the others, and oval-triangular; their free corner is often doubled in to give them the spatulate shape mentioned and figured by SOUTHERN (1911) and subsequent authors; they are supported by an opaque middle rib (fig. 47 b).

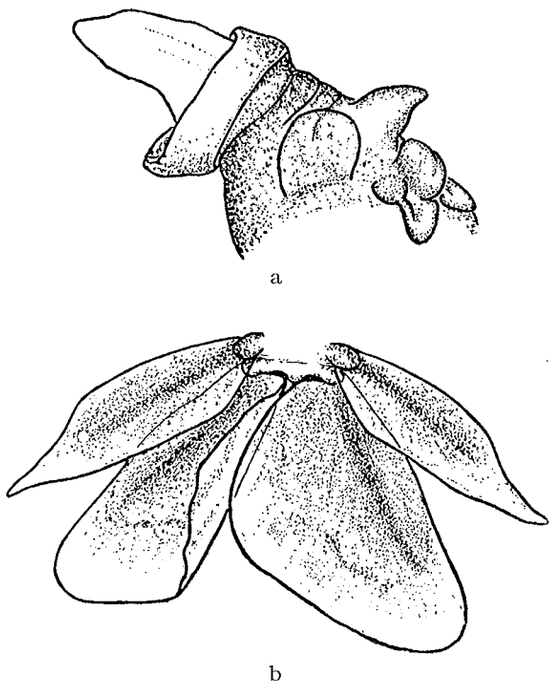


Fig. 47. *Travisiopsis Levinseni*. a. prostomium with everted probosis, x 40; b. anal cirri, x 20.

It is evident from what is said above, that the species mentioned by GRAVIER (1911), BENHAM (1927) and MONRO (1930) under the name *Sagitella kowalewskii*, and later on established by MONRO (1936) as a new species, *Travisiopsis benhami*, and also MONRO'S (1930) *Travisiopsis sp.* are identical with *Travisiopsis Levinseni*. Also *Sagittella opaca* Ehlers is in all probability conspecific with *T. Levinseni;* the number of segments is the same but all the cirri are absent in the specimens of EHLERS; the nuchal organ is described as consisting of two separate hemispherical lobes. But seen in profile also the nuchal organs of *T. Levinseni* look like two separate hemispherical lobes, the caruncle being the low vault between the prostomium and the nuchal organs in the figures of EHLERS. Judging from the figures of EHLERS (1913), his *Sagittella kowalewskii* is, however, not conspecific with *T. Levinseni* but with *Sagitella Kowalevskii* N. Wagner.

Travisiopsis Levinseni is reported in the north Atlantic from the Azores, from the coasts of Ireland, SW of Iceland and from the Davis Strait. It is further found in the south Atlantic and in the Antarctic Ocean. The "Michael Sars" has found it at several stations in the open sea east of New Foundland and at one station SW of Ireland (fig. 46). As E. WESENBERG-LUND (1936) has stated, this species in northern waters belongs to deeper water-layers. The present specimens are all taken between 500 m and 1250 m.

Travisiopsis dubia sp. n.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
66	22/6	39°30′N 49°42′W	1000			¾ sn.	1
82	13/7	48°24′N 36°53′W	15				1

Holotypus: In the Bergen Museum, No. 29656.
Type locality: St. 66: 39°30′ N, 49°42′ W.
Description: The body is small and slender. The prostomium (fig. 48 d, e) terminates in a conical tip with a slight ledge. The caruncle is semiglobular and not encompassed by the nuchal organs, which form only two short, not very widely separated, backwards directed processes. Behind the prostomium there is a thinner neck. Only a few cirri are present, but they are in a too bad state of preservation to allow a description. In the paratype the anal cirri are comparatively well preserved, being quite large and oval with an opaque middle rib (fig. 48 c).

Only two specimens have been found, both of them being in a rather bad state of preservation. The length of the holotype (from St. 66) is 6 mm, breadth 0.75 mm, the paratype (from St. 82) is 10 mm long without anal

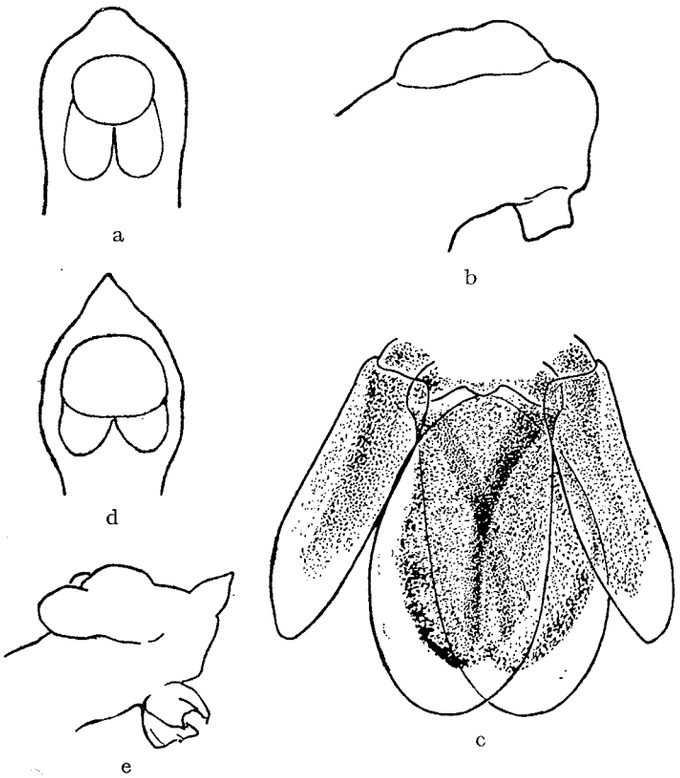


Fig. 48. *Travisiopsis dubia.* a. paratype, prostomium, dorsal view, x 27; b, do. from the right, x 27; c. do. anal cirri, x 36; d. holotype, prostomium, dorsal view, x 63; e. do. from the right, x 63,

cirri, by a breadth of 1.25 mm. The number of segments is difficult to count, but seems to be about 28 in the holotype and 23 in the paratype. In the paratype the tip of the prostomium is lacking, the prostomium being rounded in front (fig. 48 a, b).

In spite of the shape of body resembling more a *Sagitella* I refer this species to the genus *Travisiopsis* because of the possession of a caruncle, and the size of the anal cirri.

Travisiopsis lumbricoïdes Reibisch, 1895.

This species, of which but one specimen from the Sargasso Sea is known, is not represented in the material. It is characterized by the nuchal organ encompassing the caruncle but being without posterior continuations, and by the very distinct segment limits. Number of segments is 45.

Travisiopsis coniceps (Chamberlin, 1919).

Sagittella lobifera Ehlers 1912, Monro 1930, 1936.
Plotobia coniceps Chamberlin 1919.

Sagittella lobifera Ehlers from the Ross Sea is later found by MONRO (1930, 1936) in the south Atlantic. It is at once recognizable by its "backwardly directed tongue-shaped" caruncle and the branched nuchal organs; the number of segments is 22. CHAMBERLIN'S *Plotobia coniceps* from off Peru, having quite the same caruncle and nuchal organs, is without doubt conspecific with it. — These nuchal appendages are, however, not those of a *Sagitella*, but of a *Travisiopsis*, The specific name *lobifera* being preoccupied in this genus, the species must take the name *coniceps* Chamberlin. —Being an exclusively southern species, it is not represented in the present material.

Family ***Hesionidae*** Grube.

Genus **Dalhousiella** McIntosh.

Dalhousiella Carpenteri McIntosh, 1901.

Dalhousiella Carpenteri McIntosh 1901, 1908, Fauvel 1914 b, 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5/5	35°32′N 7° 7′W		1215	yellow mud	trawl	1

The single specimen is 17 mm long, 2 mm broad without parapodia and bristles and 6 mm from tip to tip of the bristles. There are 17 setigerous segments. The colour in spirit is brownish. The specimen agrees very well with FAUVEL'S (1923) description.

This interesting species is previously found by MCINTOSH (1908) south of Ireland and by FAUVEL (1914) near the Azores. The present specimen, being taken just outside the Straits of Gibraltar, indicates a somewhat wider distribution in the north Atlantic. Of its biology FAUVEL (1923) says: "Dragages profonds sur fonds de roche ou de vase, parmi Éponges siliceuses." Being taken in yellow mud at a depth of 1215 m our specimen supports this statement. From the same station there are also some other mud Polychaeta.

Genus **Nereïmyra** de Blainville.

(*Castalia* Savigny).

The generic name *Castalia* Savigny (1822) being preoccupied (according to SHERBORN) by LAMARCK (1819), the oldest available name for this genus seems to be *Nereïmyra* de Blainville (1828).

Nereïmyra punctata (O. F. Müller, 1776).

Nereis punctata O. F. Müller 1776, Gmelin 1791.
Nereis rosea Fabricius 1780.
Nereimyra rosea de Blainville 1828.
Castalia punctata Örsted 1843 a, McIntosh 1908 (synonymy), Fauvel 1914 b, 1923.
Halimede venusia Rathke 1843.

St.	Date	Position	Wire out in m.	Depth in m	Bottom	Gear	Number of specimens
96	27/7	50°57′N 10°46′W		184			1

The specimen is a young one, consisting of 36 segments, being 11 mm long and 1 mm broad without parapodia and bristles and 2.5 mm from tip to tip of the bristles. It is of a brownish colour, and it agrees very well with FAUVEL's (1923) description.

Nereïmyra punctata has a very wide distribution in the north Atlantic, being found from the Azores to northern Norway, from Kattegat and the Bay of Biscay to New Foundland. It lives on hard bottom and is rather eurybath. The actual specimen is taken SW of Ireland at a not very great depth (184 m). The type of the bottom is not indicated.

Family ***Syllidae*** Grube.

Subfamily ***Syllinae.***

Genus **Syllis** Lamarck.

Subgenus **Typosyllis.**

? Syllis (Typosyllis) prolifera Krohn, 1852.

Syllis prolifera Krohn 1852 (*fide* McIntosh).
Typosyllis (*Syllis*) *prolifera* Langerhans 1879.
Syllis (*Typosyllis*) *prolifera* Fauvel 1923.
Pionosyllis prolifera McIntosh 1908 (synonymy).
Pionosyllis (*Syllis*) *hyalina* McIntosh 1908 (*non* Grube).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5-6/5	35°32′N 7° 7′W		1215	yellow mud	trawl	1

The single specimen is comparatively well preserved. It is 20 mm long, 1 mm broad and consists of numerous segments. Unfortunately most of the bristles are lacking, and in the remaining ones the end piece is absent. As the bristles are of importance for the specific determination in this genus, I cannot be quite sure as to the identity of the present specimen, but apart from this it agrees well with FAUVEL's (1923) description.

Syllis prolifera has a wide distribution in the Atlantic, from South Africa to Spitzbergen, and in the Mediterranean. Being rather eurybath, it lives "in fissures and cracks of the rocks" (MCINTOSH, 1908), or between Algae. The present specimen is taken just outside the Straits of Gibraltar at a depth of 1215 m. The bottom is indicated as consisting of yellow mud.

Family ***Nereïdae*** (de Quatrefages).

Genus **Nereïs** Linné.

Subgenus **Neanthes** Kinberg.

Nereïs (Neanthes) succinea Frey & Leuckart, 1847.

Nereis succinea Frey and Leuckart 1847.
Nereis (*Neanthes*) *succinea* Fauvel 1923 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
26	8/5	36°53′N 6°48′W	0	50		1 sn.	1

The single specimen is a fragment consisting of prostomium and 41 segments. It is 16 mm long, 2 mm broad without parapodia and bristles and 6 mm from tip to tip of the bristles. Proboscis is inverted so that it is difficult to decide about the disposition of the paragnathi, but on opening the anterior region I believe that I see all groups represented. It agrees very closely with FAUVEL's (1923) description and figures also in other respects, excepting the eyes, which are larger than on his fig. 135 f.

Nereïs succinea is widely spread round the northern Atlantic, both on the European and the American side, and in the Mediterranean. The present specimen is taken off the south coast of Spain just outside the Straits of Gibraltar. The large eyes and the information that it is taken with 0 m wire out, indicate a specimen that is about to turn into a *Heteronereïs*.

Genus **Platynereïs** Kinberg.

Platynereïs Dumerilii (Audouin and Milne Edwards, 1833).

Nereis Dumerilii Audouin and Milne Edwards 1833, Levinsen 1883, McIntosh 1910.
Nereis zostericola Örsted 1843 a.
Leontis Dumerilii Malmgren 1867, Langerhans 1880, McIntosh 1885.
Platynereis Dumerilii Fauvel 1914 b, 1923 (synonymy).
Forma epitoca:
Heteronereis fucicola Örsted 1843 a.
Nereilepas variabilis Örsted 1843 a.
Iphinereis fucicola Malmgren 1865.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
66	26/6	39°30′N 49°42′W	surface			1 sn.	3

Only three small specimens are found, the largest having 45 segments by a length of 6 mm and a breadth of 0.5 mm without parapodia and bristles, and 1.5 mm from tip to tip of the bristles. Proboscis is inverted in all the specimens. On opening the anterior part of one of them I could find no paragnathi, but the jaws were pale, having 10 or 12 teeth. The tentacular cirri are very long, reaching backwards to the 10th—15th segment. The dorsal cirri of the parapodia are also very long, and on the whole the specimens agree very well with FAUVEL's (1923) description and figures.

Being nearly cosmopolitan the *Platynereïs Dumerilii* has a very wide distribution in the Atlantic and the Mediterranean. The present specimens are taken in the open sea south of New Foundland, at the surface between the Sargasso Algae.

Platynereïs coccinea (Renier, ? 1804).

Nereis coccinea Renier (1804) (*fide* Sherborn).
Platynereis coccinea Fauvel 1914 b, 1923 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
69	29/6	41°39′N 51° 4′W	surface			1 sn.	19

All the specimens are small or very small, the largest one having about 60 segments by a length of 13 mm and a breadth of 1 mm without parapodia and bristles, and 2.5 mm from tip to tip of the bristles. When I opened the anterior part of the body of the largest specimen, the inverted proboscis showed the palish jaws, but it was impossible to see the paragnathi with certainty. Prostomium is more rounded in front than in the preceding species. The tentacular cirri are very long, reaching backwards to the 20th segment. Also the dorsal cirri of the parapodia are very long, and the specimens agree very well with FAUVEL's (1923) description and figures. There are two filiform anal cirri.

Platynereïs coccinea is distributed over the central part of the Atlantic (the Azores and Sargasso Sea) and in the Mediterranean. The present specimens are taken in the Gulf Stream south of New Foundland, at the surface between the Sargasso Algae.

Family ***Nephthydidae*** Grube.

Genus **Nephthys** Cuvier.

According to SHERBORN's "Index Animalium" LAMARCK (1818) seems to be the first to introduce the name *Nephthys* (or *Nephtys*), but according to various authors (AGASSIZ 1846, MCINTOSH 1908) the name has already been introduced by CUVIER (1817).

Nephthys incisa Malmgren, 1865.

Nephthys incisa Malmgren 1865, Levinsen 1883, McIntosh 1908, Fauvel 1914 b, 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5/5	35°32′N 7° 7′W		1215	yellow mud	trawl	2

The two specimens have both lost the posterior part, the larger one counting 68 segments, probably only some few lacking. This specimen is 50 mm long, 2 mm broad without parapodia and bristles, and 6 mm from tip to tip of the bristles. Both specimens had the proboscis inverted, but in the form of their parapodia with very short lamellæ, and also in other respects, they agree very closely with FAUVEL's (1923) description and figure.

Nephthys incisa is distributed in the northern part of the Atlantic, in the Arctic Ocean and in the Mediterranean. It lives in sand or mud at various depths. The present specimens are taken just outside the Straits of Gibraltar in yellow mud at 1215 m depth.

Nephthys rubella Michaelsen, 1896

Nephthys rubella Michaelsen 1896, Fauvel 1914 b, 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100		y.	2

Both specimens are fragmentary, the larger one consisting of 34 segments and 6 small regenerated ones. It is 30 mm long, 2.5 mm broad without parapodia and bristles, and 6.5 mm from tip to tip of the bristles. The species is at once recognizable by the parapodial lamellæ, the posterior dorsal one being bilobate, the posterior ventral one having a little spur (FAUVEL: ergot) on its upper edge.

Nephthys rubella is distributed in the northern Atlantic and in the Mediterranean at various depths. The present specimens are taken south of New Foundland at 1100 m depth.

Family ***Glyceridae*** Grube.

Genus **Glycera** Lamarck.

Glycera tesselata Grube, 1863.

Glycera tesselata Grube 1863 , McIntosh 1885, Fauvel 1914 b, 1923 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5-6/5	35°32′N 7° 7′W		1215	yellow mud	trawl	1

The single specimen measures 17 mm in length, 1 mm in breadth without parapodia and bristles, and 2 mm from tip to tip of the bristles. The body is much attenuate backwards, consisting of almost 75 segments. The specimen in every respect agrees with FAUVEL's (1923) description and figures of *G. tesselata*, which is separated from *G. sphyrabrancha* Schmarda by its lack of branchiæ.

Glycera tesselata is widely distributed in the temperate part of the Atlantic and in the Mediterranean. It lives at various depths and on various sorts of bottom — from mud and sand to gravel. The present specimen is taken just outside the Straits of Gibraltar at a depth of 1215 m in yellow mud.

Family ***Eunicidae*** *sensu* Grube.

Subfamily ***Eunicinae*** Kinberg.

Genus **Eunice** Schinz.

(*Leodice* Savigny).

Eunice torquata de Quatrefages, 1865.

Eunice torquata de Quatrefages 1865, Fauvel 1914 b, 1923 (synonymy)

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5-6/5	35°32′N 7° 7′W		1215	yellow mud	trawl	1

The specimen consists of prostomium and the 54 anterior segments. It is 75 mm long, 5 mm broad without parapodia and bristles, and 10 mm from tip to tip of the bristles. The first pair of branchiæ with one filament occurs on the third setigerous segment. The maximum of branchial filaments is only 5. For the rest the specimen agrees fully with FAUVEL's (1923) description and figures.

Eunice torquata is distributed in the warmer part of the Atlantic and in the Mediterranean on rocky bottom. The present specimen is taken just outside the Straits of Gibraltar at a depth of 1215 m. The label gives "yellow mud", but as several hard-bottom species are recorded from this station, there have probably been some fragments of rock in the neighbourhood.

Eunice norvegica (Linné, 1767).

Nereis norvegica Linné 1767, Gunnerus 1768 (*non Leodice norvegica* Malmgren 1867, *nec Eunia norvegica* Augener 1928).
Nereis madreporæ pertusæ Gunnerus 1768.
Leodice Gunneri Storm 1881.
Eunice floridana, Fauvel 1914 b, 1923 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5/5	35°32′N 7° 7′W		1215	yellow mud	trawl	1
23	6/5	—»—		1215	—»—	»	1

In the first tube there was only a fragment from the anterior part of the body with the prostomium. In the other tube there was a similar fragment in a papery tube, 60 mm long, 4 mm broad without parapodia and bristles, 7 mm from tip to tip of the bristles. The two fragments agree very well with FAUVEL's (1923) description and the figures of his *Eunice floridana*, the first pair of branchiæ being found on the seventh or eighth setigerous segment.

STORM (1881) has shown that *Eunice floridana* is identic with *Nereis norvegica* of LINNÉ and GUNNERUS, but his work being in Norwegian it has probably not been sufficiently attended to. The correct name of the species should thus be *Eunice norvegica* (Linné). MÜLLER (1776) and subsequent authors are wrong when they identify *Nereis norvegica* Gunnerus with his *N. pennata*.

Eunice norvegica is distributed in the northern and central Atlantic and in the Mediterranean. It lives at greater depths as a commensale on polyps. The present specimens are taken just outside the Straits of Gibraltar at 1215 m depth.

Eunice Oerstedii Stimpson, 1853.

Eunice Oerstedii Stimpson 1853, Fauvel 1914 b, 1923.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	6/5	35°32′N 7° 7′W		1215	yellow mud	trawl	1

Only a fragment consisting of the 101 posterior segments. Length 110 mm, breadth 6 mm without parapodia and bristles, and 10 mm from tip to tip of the bristles. On a few of the first segments of the fragment the branchiæ are indicated by a small tubercle at the base of the dorsal cirrus, on the rest of the fragment no branchiæ are found. On this account, and because of its black aciculæ, I refer it to *E. Oerstedii*, which has a great portion of abranchiate posterior segments, and it agrees also in other respects with FAUVEL's (1923) description and figures of this species. There are two long, filiform anal cirri.

Eunice Oerstedii is distributed in the warmer part of the Atlantic and in the Mediterranean. It lives at greater depths on hard bottom and on polyps. The specimen at hand originates from just outside the Straits of Gibraltar at a depth of 1215 m in yellow mud.

Subfamily ***Onuphidinae*** Levinsen.

Genus **Onuphis** Audouin and Milne Edwards.

Onuphis conchylega M. Sars, 1835.

Onuphis conchylega M. Sars 1835, McIntosh 1910, Fauvel 1914 b, 1923.
Onuphis Eschrichtii Örsted 1843 b.
Northia conchylega Malmgren 1867.
Onuphis hyperboræa Hansen 1879.
Nothria conchylega Tauber 1879, McIntosh 1885.
Onuphis hyperborea Hansen 1882.
Onuphis britannica McIntosh 1910.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
23	5-6/5	35°32′N 7° 7′W		1215	yellow mud	y.	1

The single specimen is only a fragment consisting of prostomium and the 13 first segments. Length of the fragment is 5 mm, breadth 1 mm without parapodia and bristles, 2 mm from tip to tip of the bristles. The first pair of branchiæ is found to be present on the eighth

segment. But for this fact the specimen quite agrees with FAUVEL's (1923) description and figures. The anterior part of the tube is present; it is flat and membranaceous, and as usual covered with shell fragments.

Onuphis conchylega is distributed in the northern part of the Atlantic, in the Arctic Ocean and in the Mediterranean. It lives in sand and mud at various depths. The present specimen is taken just outside the Straits of Gibraltar at a depth of 1215 m in yellow mud.

Genus **Hyalinœcia** Malmgren.

Hyalinœcia tubicola (O. F. Müller, 1776).

Nereis Tubicola O. F. Müller 1776.
Onuphis tubicola M. Sars 1835.
Hyalinœcia tubicola Malmgren 1867, McIntosh 1910 (synonymy), Fauvel 1914 b.
Hyalinoecia tubicola Tauber 1879, Fauvel 1923 (synonymy).

St.	Date	Position		Wire out in m	Depth in m	Bottom	Gear	Number of specimens
24	6/5	35°34′N	7°35′W		1615	yellow mud	trawl	18
25a	7/5	35°36′N	8°25′W		2300	—»—	»	9
25b	8/5	35°46′N	8°16′W		2055	—»—	»	26
38	20/5	26° 3′N	14°36′W	200	77-83	red sand, shingle	y	1
39b	21/5	26° 3′N	15° 0′W		267-280	fine, grey sand		3
41	23/5	28° 8′N	13°35′W		1365	yellow mud	trawl	2

The largest specimens are a little less than 10 cm in length by a breadth of about 4.5 mm. The first pair of branchiæ occurs on various segments, from the 20th to the 25th. In some specimens the first branchia does not occur on the same segment on both sides, but e. g. on the 24th on one side and on the 25th segment on the other. FAUVEL (1923) says about the branchiæ: "...., d'abord très petites, puis plus longues que le cirre dorsal...."; I find on the contrary that even the first branchia may be much longer than the cirrus, increasing in length in the two or three following segments till the branchiæ from both sides cross each other on the dorsum, or even reach nearly to the base of the parapodium on the opposite side of the animal. On one specimen (fig. 49) the first branchia on the left side is found on the 21st segment, being even longer than the somewhat stunted dorsal cirrus; on the right side the 21st and 22nd segments have only very short rudiments of branchiæ, but even from the 23rd segment the branchia is longer than the dorsal cirrus. Only the three first segments have real ventral cirri, the fourth segment having only a very short process. From the fifth segment the ventral cirrus is transformed into a semiglobular, backwards a little flattened, wart. But for the length of the first branchiæ the specimens

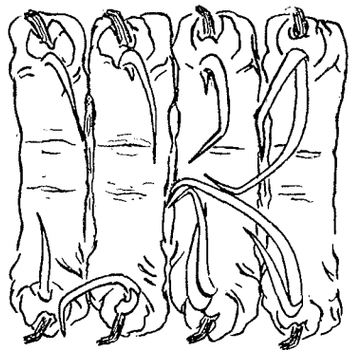


Fig. 49. *Hyalinœcia tubicola*, 20. to 23. segment. dorsal view, x 12.

agree very well with the description and the figures of FAUVEL (1923). — The tubes are up to 16 mm in length, often filled with a mass of rounded clods in the posterior part, behind the animal. — One specimen was observed with ova in the body cavity.

Hyalinœcia tubicola seems to have a quite cosmopolitan distribution being found in the north and south Atlantic, in the Mediterranean, the Pacific and the South Sea (New Zealand). It lives mostly in deeper water, in mud or sand. The present specimens are found just outside the Straits of Gibraltar and between Gran Canaria and Cape Bojador (Africa). Outside the Straits of Gibraltar there are 9 to 26 specimens per station, between the Canary Islands and the coast of Africa only 1 to 3. Most of the specimens were found in yellow mud, some also in sand or between shingle.

Subfamily *Lumbriconereïnae* Grube.

Genus **Lumbriconereïs** (de Blainville).

According to SHERBORN the name used by DE BLAINVILLE (1828) was *Lumbrineris*, which by GRUBE (1840) and AGASSIZ (1846) was corrected to *Lumbriconereïs*. I think that the form used by DE BLAINVILLE must be considered as an error of transscription, so that, under Article 19 of the Rules of Zoölogical Nomenclature the form *Lumbriconereïs* is to be used.

Lumbriconereïs impatiens Claparède, 1868.

Lumbriconereïs impatiens Claparède 1868, Fauvel 1914 b, 1923 (synonymy) (*non* McIntosh).
? *Lumbriconereïs hibernica* McIntosh 1910.

St.	Date	Position		Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N	51°15′W		1100			1

The single specimen consists of prostomium and 101 setigerous segments, being incomplete posteriorly. Length of the fragment is 34 mm, breadth of the body 1.5 mm, from tip to tip of the bristles 3 mm. The species is characterized by its conical prostomium, the lack of compound bristles and its yellow aciculæ.

Lumbriconereïs impatiens is distributed in the northern Atlantic, in the Mediterranean and in the Red Sea. It lives in deeper water in sand. The present specimen is taken south of New Foundland at a depth of 1100 m.

Family ***Phylonidae*** nom. nov.

(*Ariciidae* Audouin and Milne Edwards).

According to SHERBORN *Aricia* Savigny, 1822, is preoccupied by R. L. 1817 in *Lepidoptera*. DE QUATREFAGES' name *Orbinia* is also preoccupied in the form *Dorbinia* (*rectius Orbignya*) by A. J. B. Robineau-D., 1847 in *Diptera*. The only available name for the genus *Aricia* should thus be *Phylo* Kinberg, 1866? Under Article 5 in the Rules of Zoölogical Nomenclature also the name of the family is therefore to be changed into *Phylonidae*.

Genus **Phylo** Kinberg.

(*Aricia* Savigny).

Phylo norvegica (Sars, 1872).

Aricia norvegica M. (G. O.) Sars 1872, 1873, Tauber 1879, McIntosh 1910, Fauvel 1914 b, 1927 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100			1

The single specimen is a fragment consisting of prostomium and 39 anterior segments; it is 20 mm long and 3 mm broad. There are 17 thoracic segments, the first of which is without bristles. The vertical row of stout ventral bristles is present in the four last thoracic segments. These bristles are brown of colour and comparatively very short. The bundle of stout dorsal bristles in the abdomen begins at the 19th segment, for in the 18th I can find no stout bristles at all. There are no ventral papillæ. The branchiæ are present from the seventh (sixth setigerous) segment. Otherwise the specimen quite agrees with FAUVEL's (1927) description. Also SARS (1873) has a very good and minute description in Norwegian after his Latin diagnosis. He has the best figures.

Phylo norvegica is distributed from the Arctic Ocean over the Atlantic down to Brazil, and in the Mediterranean. It lives in sand at various depths. The present specimen is taken south of New Foundland at 1100 m depth.

Family ***Spionidae*** Sars.

Genus **Pygospio** Claparède.

? **Pygospio elegans** Claparède, 1863.

♂*Spio seticornis* Örsted 1843 a (*non* Fabricius).

♀*Pygospio elegans* Claparède 1863, Söderström 1920, Fauvel 1927 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
56	10/6	36°53′N 29°47′W	200	3239	clayish mud	1 sn.	1 (♀)

The single specimen is in a bad state of preservation. It is quite small, being 5 mm in length and 0.75 mm in breadth, and consisting of about 35 segments. Its bad condition makes it impossible to be quite secure of its identity. Prostomium has no frontal horns, but is slightly curved in anteriorly. The two long palpi are absent. The fifth setigerous segment is not modified as in *Polydora*. I am unable to detect branchiæ on the anterior segments, not even on the second setigerous one, so that it cannot be a male. The ventral capillary bristles of the anterior region are very long, posteriorly all the capillary bristles are long, though shorter than the anterior ones. Pygidium seems to be horse-shoe-shaped, open ventrally, but there are some indentations in the edge, which perhaps indicate the four anal appendages of *Pygospio elegans*.

Pygospio elegans is distributed in the North Sea, even into the Baltic, in the northern Atlantic and in the Mediterranean. It lives on various bottom and depth. The present specimen is taken near the Azores at 3239 m depth, but with only 200 m wire out, which seems to indicate a pelagic occurrence.

Family ***Flabelligeridae*** de Saint-Joseph.

(*Chloraemidae* Malmgren).

As *Chloraema* has proved to be a synonym of *Flabelligera* also the name of the family is to be changed from *Chloraemidae* to *Flabelligeridae*.

Genus **Brada** Stimpson.

Brada villosa (Rathke, 1843).

Siphonostoma villosum Rathke 1843.

Siphonostomum villosum Grube 1851.

Pherusa villosa de Quatrefages 1865.

Brada villosa Malmgren 1867, Fauvel 1914 b, 1927, Haase 1915, McIntosh 1915.

(?) *Brada parthenopeia* Lo Bianco 1893.

(?) *Brada pilosa* Moore 1906.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100			1

The single specimen has a length of 13 mm and a greatest breadth of 3 mm. It consists of 15 segments, but it seems to have lost some of the posterior ones. The body is not covered with a layer of sand as by other species of the genus *Brada*; it is further characterized by its well developed dorsal bristles and by its papillæ, which are a little larger on the dorsum than on the ventral surface. The bristles of the first two segments are few in number, of the same delicate type as the dorsal ones of the following parapodia, and all directed forward.

HAASE (1915) thinks that *Brada pilosa* Moore (1906) from the Pacific is identic with *B. villosa*. Indeed, there are many points of resemblance between them, but as *B. pilosa* should be characterized by having much longer papillæ sitting more closely together, and as the papillæ present an important specific character in this genus, I dare not with certainty designate it as a synonym of *B. villosa* till I have seen the type specimen. HAASE (1915) gives further as synonyms for *B. villosa: Trophonia rugosa* Hansen and *T. arctica* Hansen (a description of these species in Norwegian appeared as early as 1880 in a preliminary note). I have examined the type of *T. rugosa*, which is clearly a *Brada*, but because of its larger size and above all because of its rugose skin without papillæ, it is really a distinct species. As to *T. arctica* the type is not found again in the Bergen Museum, but the imperfect description and the bad figures make it seem quite possible that it is identic with *B. rugosa*.

Brada villosa is distributed in the Arctic Ocean and the northern Atlantic down to the Mediterranean. It lives in mud or sand. The present specimen is taken south of New Foundland at a depth of 1100 m.

Family ***Opheliidae*** Grube.

Genus **Ophelina** Örsted.

As v. MARENZELLER (1892 a) has shown, *Ophelina* Örsted (1843) takes precedence over *Ammotrypane* Rathke (1843).

Ophelina cylindricaudata (Hansen, 1879).

Ammotrypane cylindricaudatus Hansen 1879, Fauvel 1914 b, 1927, McIntosh 1915.
Ammotrypane cylindricaudata Levinsen 1893.
Ophelina cylindricaudata Michaelsen 1896, Augener 1928, Støp-Bowitz 1945.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100			1

The specimen is comparatively large, 21 mm in length and 1 mm in breadth. The species is characterized by the form of the anal tube, by the branchiæ being reduced in size or even lacking in the middle of the body, and by the ventral ridges being divided into pedal protuberances in the four last segments. The actual specimen is not quite complete as the anal tube is lacking, and so are many of the branchiæ, only some of the anterior and two of the posterior ones being still present.

Ophelina cylindricaudata is previously known from the Norwegian coast (Drøbak and west coast) and from Spitzbergen. It lives at various depths, up to 30 m in the fjords, but it prefers depths of 1000 m and more. It lives in mud, sometimes mixed with sand. The specimen at hand, taken south of New Foundland at 1100 m, indicates a much wider distribution of the species. All the hitherto known localities of this rare species are in or near the Gulf Stream, to which the species thus seems to be chiefly bound.

Family ***Maldanidae*** Malmgren.

Subfamily ***Euclymeninae*** Arwidsson.

Genus **Maldanella** McIntosh.

Maldanella Harai (Izuka, 1902).

Clymene Harai Izuka 1902 (*fide* Fauvel).
Axiothea campanulata Moore 1906.
Maldanella Harai Fauvel 1914 b, 1927.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
10	19/4	45°26′N 9°20′W		4700	yellow mud	trawl	1
10	19-20/4	—»—		4700	—»—	»	1 (+ 2 tubes.)
10	20-21/4	—»—		4700	—»—	»	3 (+ 10 tubes.)

All the specimens are fragmentary, three of them having even been dried. The largest and best preserved specimen consists of two fragments having prostomium and 15 segments by a length of about 50 mm; the breadth is 3 mm. Pygidium is not present in any of the specimens. The species is recognizable by having a plate on prostomium with a short and small median carina and an even edge, by having no ventral acicular bristles and no bristles at all on the first setigerous segment. The membranaceous tube is covered with a thick layer of mud. In the glasses there are beside the animals some empty tubes.

Maldanella Harai is known only from Japan and from the Bay of Biscay, where it lives at considerable depths. The present specimen is from the Bay of Biscay, depth 4700 m; the bottom was yellow mud.

Family ***Terebellidae*** Grube.

Subfamily *Terebellinae*.

Genus **Lanice** Malmgren.

Lanice conchilega (Pallas, 1766).

Nereis conchilega Pallas 1766 (*fide* Sherborn).
Terebella artifex M. Sars 1863.
Lanice conchilega Malmgren 1865, Fauvel 1914b, 1927 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
96	27/7	50°57′N 10°46′W		184			3 empty tubes

As is often the case, only empty tubes of this species are present in the collection, but these tubes are very characteristic and easily recognizable: they are cylindrical, covered with sand, and provided with long, sanded, ramified fringes round their anterior opening. Most frequently only the anterior end of the tube or the animal is found. M. SARS (1863) mentions in the Norwegian text that the tube probably stands vertically in the sand, so that the dredge can take only the anterior part that projects from the sand. FAUVEL (1927) says: "tube collé sous les pierres ou dans des vieilles coquilles".

Lanice conchilega is distributed in the Atlantic from the North Sea to the Mediterranean, being also found in the Antarctic and the Pacific. It lives at various depths, FAUVEL (1914) gives: 155—1732 m. The present tubes were found near the SW coast of Ireland in 184 m.

Subfamily *Canephorinae* Malmgren.

Genus **Terebellides** M. Sars.

Terebellides Stroemii M. Sars, 1835.

Terebellides Stroemii M. Sars 1835.
Terebellides Stroemi Malmgren 1865.
Terebellides Strömii Malm 1874.
Terebellides gracilis Malm 1874.
Terebellides Strömi Wollebæk 1912.
Terebellides Stræmi Fauvel 1914 b, 1927 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
70	30/6	42°59′N 51°15′W		1100			1

The single specimen seems to have been quite large. It has broken into two pieces, and has lost all the tentacles, but the species is easily recognizable by one, quadripartite, pectiniform branchia. The tube is not present.

Terebellides Stroemii has a very wide distribution, in the Atlantic and the Mediterranean, in Arctic and Antarctic waters and in the Pacific. It lives in mud and fine sand, at various depths. The present specimen is taken south of New Foundland at 1100 m.

Family ***Sabellidae*** Malmgren.

Subfamily *Sabellinae* Rioja.

? Genus **Bispira** Kröyer.

? **Bispira volutacornis** (Montagu, 1804).

Amphitrite volutacornis Montagu 1804 (*fide* Fauvel).
Bispira Mariae Lo Bianco 1893.
Bispira volutacornis Fauvel 1927 (synonymy).

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
102	10/8	60°57′N 4°38′W		1098	dark sand, clay.	trawl	1

The single specimen is in a bad condition. It is about 50 mm in length and 2 mm in breadth, of a brownish violet colour. The two spiral bundles ot branchiæ are broken away but one of them is present in the glass. Each of the filaments in the bundle is provided with numerous barbules, which are shortest near the base, increase upwards, but decrease a little again towards the tip of the filament, which is long and naked. I find no eye-spots on the filaments. The spiral branchiophores are nearly equal, each forming one turning only. I cannot find the palpi, but the dorsal and the ventral pairs of lobes of the "collerette" are present, and so are the two vesiculous ampullæ of the ventral lip. The ventral surface of the anterior segments is undivided, that of the following ones being divided into two by the "sillon copragogue" (FAUVEL, 1927). Some of the hindmost segments are lacking. On the thoracic segments I find two sorts of dorsal bristles, some being longer and more curved than the others, all with a narrow limb. I am unable to see the scimitar bristles and all ventral ones (*uncini* and *mattocks*). On the abdomen the dorsal bristles (*uncini*) are not to be seen either, but the ventral bristles with a limb, and also the long, capillary ones, are present. A short piece of the membranaceous tube is present, covering the middle part of the body; other pieces of it, covered with mud, are present in the glass. The defectiveness and bad state of preservation of the specimen makes me uncertain as to its identity, but it seems to agree best with *Bispira volutacornis*.

Bispira volutacornis is previously known to be distributed in the Atlantic from the Channel to the Mediterranean. It lives on different sorts of bottom at considerable depth. The present specimen is taken north of Scotland from 1098 m in dark sand with clay.

In the same glass there are also some indeterminable membranaceous tubes or tubes covered with mud.

Family ***Serpulidae*** Burmeister.

Subfamily *Serpulinae* Rioja.

Genus **Hydroïdes** Gunnerus.

Hydroïdes norvegica Gunnerus, 1768.

Hydroides norvegica Gunnerus 1768, Mörch 1863, Malmgren 1867, Fauvel 1914 b, 1927 (synonymy).
Serpula norvegica O. F. Müller 1776.
Serpula norwegica Gmelin 1791.
Hydroides pectinata Lo Bianco 1893.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
96	27/7	50°57′N 10°46′W		184			2

Two tubes of this species are fixed on the tube of a *Ditrupa arietina*. The tubes are white, cylindrical and sinuous. The characteristic operculum of *Hydroïdes norvegica* projects from one of them. This operculum consists of a funnel, in the centre of which rises a crown of pointed spines denticulated on both sides.

Hydroïdes norvegica is distributed in the Atlantic from the Arctic Ocean down to the Mediterranean and is also found in the Persian Gulf. It lives at various depths, the tube being fixed to stones and shells. The present specimens are taken SW of Ireland at a depth of 184 m.

Genus **Ditrupa** Berkeley.

Ditrupa arietina (O. F. Müller, 1776).

Dentalium arietinum O. F. Müller 1776, Gmelin 1791.
Brochus arcuatus Brown 1827 (*fide* Mörch).
Ditrupa subulata Lo Bianco 1893.
Serpula libera M. Sars 1835.
Ditrupa arietina M. Sars 1851, Wollebæk 1912, Fauvel 1914 b, 1927 (synonymy).
Ditrypa arietina Mörch 1863, Malmgren 1867.
Ditrypa arcuata Mörch 1863.
Ditrypa libera Malmgren 1867.

St.	Date	Position	Wire out in m	Depth in m	Bottom	Gear	Number of specimens
96	27/7	50°57′N 10°46′W		184			1 empty tube

Only one empty tube is present, on which the two tubes of the preceding species are fixed. The length of the tube is 26 mm, greatest breadth 2 mm. The narrowest end is broken off; towards the other end it is a little constricted.

Ditrupa arietina is distributed in the Atlantic from the North Sea down to the Mediterranean. It is further found in the Red Sea and near the Philippines. It lives in mud or sand at various depths. The present tube is found SW of Ireland at a depth of 184 m.

GENERAL REMARKS ON THE PELAGIC SPECIES.

GEOGRAPHICAL AND HYDROGRAPHICAL FACTORS.

In order to try to throw some light on the distribution of the pelagic species in the actual part of the Atlantic, it is necessary first to study the various factors which may influence the life of the animals.

The deposits of the sea-bottom must be expected to be of less importance for pelagic animals. At most of the coast stations of Europe, Africa and New Foundland the bottom was covered with terrigenous deposits, whereas both oceanic crossings passed over areas with Globigerina ooze or Pteropod ooze, only stations 64, 66 and 68 touching the Red clay.

Depths and the great traits of bottom configuration are of importance especially in so far as they influence the currents of the ocean. Here the longitudinal Atlantic ridge may be of certain significance.

The northern Atlantic is dominated by the so-called Gulf Stream with its branches. On its way home from New Foundland the "Michael Sars" followed the main stream of the Gulf Stream, which after leaving the American Continent crosses the northern Atlantic and before reaching Europe divides into two branches. The north-eastern branch, after reaching the British Isles, runs through the Faroe-Shetland Channel into the Norwegian Sea, the south-eastern branch passes the Azores, and when reaching the African coast it turns southwards and westwards, merging into the Canary Stream and the enormous whirl-pool of the Sargasso Sea. Between these two current-branches and the European Continent there are two small whirl-pools, a cyclonic one between Portugal and the Azores, and there seems to be another anticyclonic off the Bay of Biscay. Further a surface current of light water runs through the Strait of Gibraltar into the Mediterranean, whereas a deeper current of heavier and more saline water runs from the Mediterranean into the Atlantic.

As to the factors of the water itself, the values of temperature (t), salinity (s), and density (σ_t) at standard depths for most of the stations have been published by HELLAND-HANSEN (Rep. on the Sci. Res. of the "Michael Sars" North Atl. Deep-Sea Exp. 1910, Vol. I, Bergen), wherefore special attention has here been paid to these factors. If we compare the values in the area of the expedition for three different depths, e. g. 1 000 m, 500 m and 150 m below the surface, we get a survey of their variations in this area (Table I). Here we must pay attention to the fact that there exists a correlation between these three factors: "When 2 out of the 3 quantities, temperature, salinity and density, are known, the third can be computed. The 3 curves must, therefore, correspond at all points in such a way that any one is determined by the two others". (HELLAND-HANSEN, *loc. cit.*, p. 17).

At 1 000 m the temperature of all oceans is very uniform, about 4°—6° C., and consequently abyssal animals often show a very wide distribution. This temperature is found also in the western basin of the northern Atlantic, whereas the eastern basin shows a somewhat higher temperature of 6°—8.5°. Along the European—African coast the temperature at 1 000 m rises to 7°—9°, and off the entrance to the Mediterranean even to 10°—11°.

Higher up the difference is more distinct between the northern and the southern crossing. At 500 m we find in the northern crossing temperatures between 9° and 11°, along the European—African coast 10°—11.5° without any remarkable higher value off the entrance to the Mediterranean, and in the southern crossing 11.5°—14.5°. Only between stations 66 and 70 the variations are greater (4°—15.5°) because of the heterogenous water-masses in this part of the ocean.

At 150 m the temperature in the northern crossing varies from 10° to 14°. Along the European—African coast it gradually increases from 9°—10° south of Ireland to 16°—17° round the Canary Islands. In the southern crossing we find 15°—18°, with some greater variations south of New Foundland.

The variations of salinity and density prove to be very closely parallel to those of the temperature.

At 1 000 m the salinity variation in the western basin is 34.9—35.1 $^0/_{00}$ and density 27.5—27.8; in eastern basin:

salinity 35.0—35.5‰, density 27.6—27.7; European—African coast: salinity 35.2—35.6‰ and density 27.6—27.9. Off the entrance to the Mediterranean salinity rises to 35.8—36.4‰.

At 500 m, in the northern crossing: salinity 34.9—35.4‰, density 27.1—27.4; in southern crossing: salinity 35.5—36.0‰, density 26.6—27.1; European—African coast: salinity 35.4—35.6‰, density 27.2—27.3.

At 150 m, in the northern crossing: salinity 35.5—35.8‰, density 26.9—27.2; in southern crossing: salinity 36.0—36.7 ‰, density 26.6—26.8; European — African coast: salinity 35.2—35.5‰, rising to 35.5 — 37.0 ‰ off the entrance to the Mediterranean, while density decreases from 27.2—27.3 off Ireland and to 26.6—26.8 round the Canary Islands.

Also for salinity and density there are greater variations south of New Foundland.

A striking fact is the high salinity off the entrance to the Mediterranean at 1 000 m and 150 m without any corresponding variation at 500 m. — It must further be mentioned that on the only Mediterranean station (st. 19) the water appears to be very uniform below 150 m, temperature being about 13°, salinity 38‰ and density 29, while temperature increases and salinity and density rapidly decrease from 150 m to the surface.

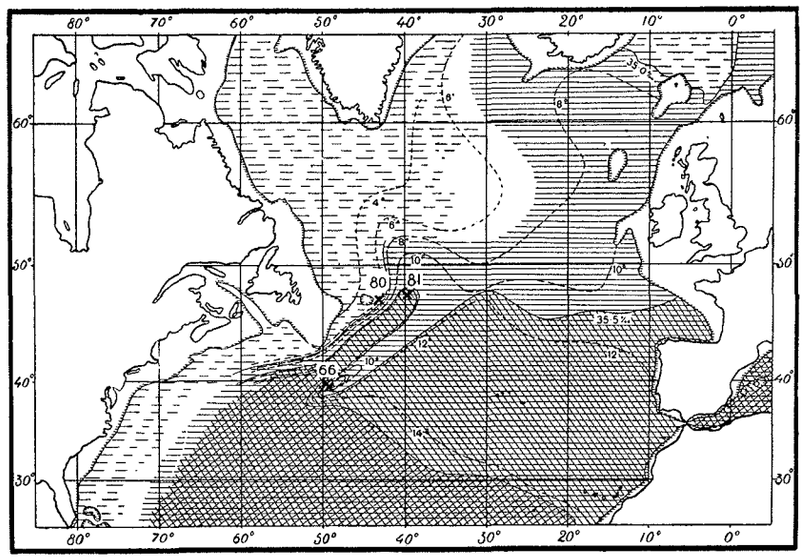


Fig. 50. (From Bonnevie, 1913, fig. 33).

Of greater interest is the well-marked cold-water wedge which, at the time of the expedition, from the area round the stations 82—85 penetrated as far towards SW as to include St. 66, while at the same time a wedge of warm water ran towards NE, attaining st. 81 (fig. 50).

The content of oxygen in the water seems not to have been stated, wherefore it has been impossible to pay attention to this factor.

As mentioned in the introduction, most of the pelagic *Polychaeta* originate from horizontal hauls from which only the length of wire out has been noted, while the exact depths in which the animals were caught, are not known. The depth in which an apparatus has gone with a certain length of wire out, may of course have varied, and depends on the navigation of the ship in relation to direction and velocity of current, but it has in this paper been calculated equal to half the length of the wire out, as this way of calculation seems to come near the true values and has been applied to other animals groups in this series. ("Depth" in the locality lists of the different species means "depth to bottom").

With only some very few exceptions all the pelagic material has been taken with open appliances, i. e. silk net ½, ¾ or 1 m in diameter at the entrance, young-fish trawl or large net with ring 3 m in diameter (net — a shrimp net). It should therefore be borne in mind that beside the animals caught while the apparatus was towed horizontally, animals may also have come into the appliance on lowering, or especially on hauling in. Here we have in all probability the explanation why the few specimens of otherwise surface species are taken with very long wire out.

DIVISIONS OF THE REGION IN QUESTION.

In her paper on the "Michael Sars" *Pteropoda*, BONNEVIE follows MEISENHEIMER's division of the surface-waters of the ocean "into three large zones surrounding the whole globe, viz. a warm circumtropiçal zone and two cold circumpolar zones. On the border between these three zones are to be found transitional regions, which are geographically and faunistically well defined, and in their essential characters may be considered as belonging to the cold zones." As will be seen from fig. 51 the northern limit of the circumtropical zone runs in the Atlantic from Cape Hatteras off the American coast (35° N.) to the NW corner of Spain (44° N.), while the transitional region includes the northern parts of the Gulf Stream, and the circumpolar zone follows the coasts of Greenland, Labrador and New Foundland. The "Michael Sars" crossed all these three zones, its southern crossing of the ocean lying chiefly within the circumtropical zone, its northern within the transitional. From the short visit into the circumpolar zone near New Foundland no polychaete material is brought home.

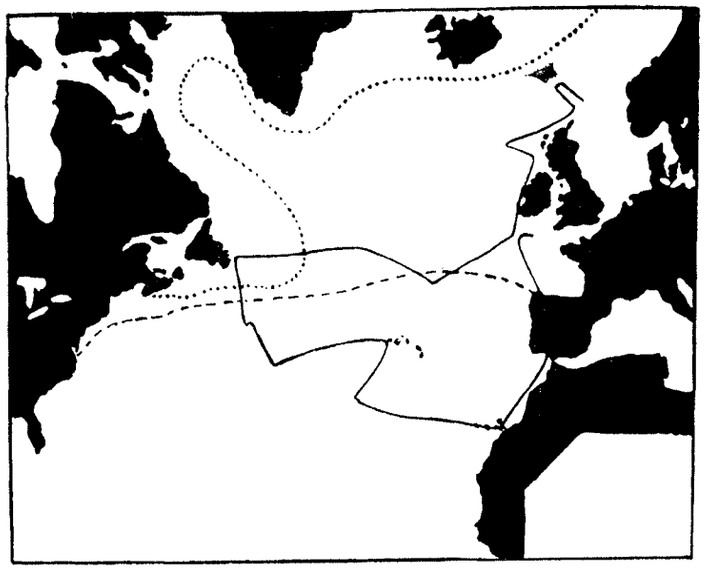


Fig. 51. The route of the "Michael Sars" Expedition———. Boundary line between the circumtropical and the transitional zones - - - - - - - -. Boundary line between the transitional and the circumpolar zones ..... (From Bonnevie 1913, fig. 32).

Bonnevie has further grouped the stations according to their geographical position: "The European-African coastline is divided according to its position within the warm-water and the transitional zones, while the stations (71 to 79) in the cold zone off New Foundland form another group. The open ocean is divided into four parts, the stations belonging to the eastern half and the western half of each crossing being taken as a separate group (SE, SW, NW, NE)". Also the stations of the Azores (51 to 59), situated over the longitudinal Atlantic ridge, are taken as a separate group.

In order to get more uniform treatment of various animal groups, I tried to apply these divisions of the ocean also to the pelagic *Polychaeta*, which proved to be very advantageous.

In Table II the stations are arranged after the above mentioned regions, and the number of specimens of each species is given for each region. Of special interest is here the group of stations of the Azores (51—59). If we compare temperature and salinity of these stations with temperature and salinity of the stations in SE and SW, we see that at 1 000 m depth the Azores stations belong to the eastern half of the ocean, at 150 m to the western half. At 500 m temperature and salinity are quite uniform from st. 44 to st. 64. On the other hand, the density is quite uniform over this area in each depth. As nearly all the material of pelagic *Polychaeta* from the Azores stations originates from the upper water layers, the stations are in this paper reckoned as belonging to the western half of the ocean.

HORIZONTAL DISTRIBUTION.

Table II clearly shows the difference between the pelagic polychaete fauna in the western part of the ocean (stations 51 to 86) and that in the eastern part (stations 44 to 50 and 87 to 92). The western half is richer as to species (35 against 24 in the eastern half), and much richer as to specimens (457 against 130). This difference is least striking in the northern crossing, where it is indicated only by the occurrence of *Vanadis formosa, Harmothoë Johnstoni* and *Lepidasthenia Grimaldii* in the eastern half, while they are absent in the western half (fig. 18). In the southern crossing the difference is much more striking, 18 species being found in the western half by absolute absence in SE. (figs. 8, 14 &c.) (some of these species have, however, by other expeditions been reported from localities near the "Michael Sars" SE stations). On the other hand, five of these 18 species, viz. *Tomopteris Apsteini, T. Cavalli, T. ligulata, T. planktonis* and *Travisiopsis lanceolata*, are found also along the African coast (figs. 27, 32, 35, 40, 46). Bonnevie has observed quite the same phenomenon in the thecosomatous *Pteropoda*, where three species are present in SW and near the African coast, being quite absent in SE. The phenomenon thus seems to be general. In order to find its cause it will be advantageous to study the further distribution in the northern Atlantic of the mentioned species (Table III). Four of the 18 species are found in NW. Of the 5 species found in SW (inclusive of the Azores stations) and off Africa but not in SE, only the widely distributed, eurybath and euryhaline *Travisiopsis lanceolata* is found also in NW. In NE 7 of the 18 species are found, and if we to this area reckon also the European coast from north of Ireland to the NW corner of Spain, the number of species increases to 11, including all the species found in SW and off Africa, but not in SE, with the only exception of *Tomopteris ligulata*.

Bonnevie thinks it most probable that these species are coastal forms, and that specimens from the American coast are, like the Sargasso weed, carried along with the currents, while "the currents prevent the African fauna from spreading into the neighbouring eastern part of the ocean". The actual species of pelagic *Polychaeta* can scarcely be considered as coastal forms, most of them being rather oceanic, but if we compare what is said above of the distribution of the species with our knowledge of the system of currents in the northern Atlantic, the hypothesis seems for the rest to hold good. The specimens, coming from more southern parts of the ocean, are carried along with the Gulf Stream, especially on its right side. Thus specimens easily come into the Sargasso Sea, while very few are found at the stations 80 to 86, which are situated near the left border of the Gulf Stream. When the current

in the middle of the ocean divides, some specimens follow the northern branch to the European coast, while others are carried along with the south-going branch to Gibraltar and the African coast, passing north of the "Michael Sars" stations of the group SE. If the ship had taken a more northern route, from Gibraltar directly to the Azores, it would probably have found more of the species now missing in SE. The stations of this group are situated between a northern east-going and a more southern west-going current, and therefore animals carried along with the currents, do not easily reach these stations.

A comparison with the finds reported by MALAQUIN and CARIN (1922) for the Tomopterids and by FAUVEL (1916) for the other pelagic *Polychaeta* in the northern Atlantic during the nearest foregoing years, supports the above indicated theory: Not less than nine of the actual species are reported from the area between the Azores and North Africa, north of the "Michael Sars" stations 44 to 50, viz. *Lagisca Hubrechti, Lopadorhynchus Nationalis, Pelagobia longicirrata, Alciopina parasitica, Rhynchonerella Angelini, Tomopteris ligulata, T. planktonis, Sagitella Kowalevskii, Travisiopsis lanceolata.* Only two of these species (*Alciopina parasitica* and *Sagitella Kowalevskii*) and one of the others (*Alciopa Reynaudii*) are reported also from the area here designated SE.

When we compare the northern and the southern crossing, the difference is still more marked, showing the influence of temperature, salinity and perhaps density. Broadly the pelagic *Polychaeta* belong to warmer waters, and only very few of them penetrate into northern waters. This fact is also indicated in the two crossings, 35 species being taken during the southern as against 19 during the northern crossing. The numbers of specimens are 400 on the southern and 187 on the northern crossing.

A glance at the maps of distribution indicates that not less than 13 of the more abundant species of the material have a more or less pronounced southern distribution, viz. *Lopadorhynchus uncinatus, L. Nationalis, L. appendiculatus, Torrea candida, Naiades Cantrainii, Vanadis crystallina, Enapteris euchaeta, Tomopteris Apsteini, T. Cavalli, T. elegans, T. ligulata, T. planktonis, Travisiopsis lobifera.* For most of these species there seems to exist a limit of temperature, salinity, and density on 11.5° C, $35.5^0/_{00}$ and 27.0, which they do not cross (Table IV). The intimate correlation between these factors explains why it is impossible to indicate one single of them as the limiting factor for a species. It may perhaps be due to mere chance that *Vanadis crystallina, Tomopteris elegans, T. ligulata* and *T. planktonis* are scarcely or not at all found in the northern crossing, as the two first species have been reported also from New Zealand, *T. ligulata* from the Antarctic Sea and *T. planktonis* as well from Greenland as from Antarctic waters.

Among these chiefly southern forms there are also two pronounced eurybath ones, viz. *Tomopteris elegans* and *T. ligulata,* for which the above mentioned limit of temperature, salinity and density is not valid. Why are they, nevertheless, not to be found at more northern stations? *T. elegans* has, it is true, been reported also from New Zealand and *T. ligulata* from the Antarctic Sea, but generally they seem to be tied to the central parts of the Atlantic and the Pacific. If we imagine a specimen of one of these species from e. g. st. 64, 500 m transported to e. g. st. 88, 500 m, we find a considerable difference in the values of temperature, salinity and density, viz. at st. 64: t = 13.72°, s = $35.77^0/_{00}$, σ_t = 26.86, at st. 88: t = 10.57°, s = $35.41^0/_{00}$, σ_t = 27.19. The difference thus amounts to 3.15°, $0.36^0/_{00}$, 0.33 respectively. It thus seems that the limiting factor for eurybath species with a not very wide distribution N—S is not the absolute value of temperature, salinity, or density, but a certain correspondance between depth, i. e. pressure, and temperature, salinity, or density; even if a species can live in t = 13.72°, s = $35.77^0/_{00}$, σ_t = 26.86 in a depth of 500 m, it may be unable to live under the same values in 100 m. It would be of interest to control this hypothesis also for other animals.

On the other hand, seven species are more or less common to both crossings, viz. *Vanadis formosa, Alciopa Reynaudii, Rhynchonerella Angelini, Tomopteris Nisseni, T. Krampi, T. septentrionalis, Travisiopsis lanceolata.* As might be expected, several of these, viz. the four last ones, are eurybath species with a more or less wide distribution; thus *Tomopteris Krampi* is reported from Iceland and Greenland, and *T. septentrionalis* both from Arctic and from Antarctic waters. But also the three others, and more stenobath, species are evidently more eurythermal, euryhaline and eurypycnal than the pronounced southern forms.

Of more or less pronounced northern species there are but three, viz. *Lagisca Hubrechti, Tomopteris helgolandica* and *Travisiopsis Levinseni,* the first and third of which are bathypelagic and the second very sparsely represented in the material. It has, therefore, been impossible to show, from the present material, if there exists a southern limit of temperature, salinity and density corresponding to the northern limit of the southern species. It must, however, be mentioned that *Tomopteris helgolandica* has been reported from South America and *Travisiopsis Levinseni* from Arctic as well as from Antarctic waters.

If we study the families separately, we see a well-marked difference. The *Aphroditidae* chiefly belong to both crossings, the *Phyllodocidae* (*Lopadorhynchinae*) to the southern. The *Alciopidae* belong chiefly to the southern crossing (figs. 14, 16, 20), only *Vanadis formosa, Alciopa Reynaudii* and *Rhynchonerella Angelini* belong to both

(figs. 14, 18). The *Tomopteridae* are to a great extent found along both crossings (especially *Tomopteris Nisseni, T. septentrionalis, T. Krampi,* figs. 30, 35, 37), *T. elegans* and *T. ligulata* being more pronounced southern species (figs. 32, 35), while *T. helgolandica* seems to be a chiefly northern species (fig. 27). The other four species, viz. *Enapteris euchaeta, Tomopteris Apsteini, T. Cavalli* and *T. planktonis* are chiefly southern species (figs. 25, 27, 32, 40). The *Typhloscolecidae* vary much more; *Sagitella Kowalevskii* seems to be a chiefly southern species, and so is clearly *Travisiopsis lobifera,* whereas *T. Levinseni* is a pronounced northern form and *T. lanceolata* belongs to both crossings (fig. 46).

Summing up these observations we may say that *Lopadorhynchus* and the *Alciopidae* are chiefly southern forms, whereas the *Aphroditidae, Tomopteridae* and *Typhloscolecidae* belong to both the circumtropical and the transitional zone.

Just as among the *Pteropoda* some exceptions occur also amongst the pelagic *Polychaeta.* The occurrence of the warm-water species *Enapteris euchaeta* on st. 81 may be explained by the warm-water wedge that at the time of the expedition ran northward to st. 81. Further, the occurrence of *Tomopteris Cavalli* on st. 80, *T. planktonis* on st. 90 and *Sagitella Kowalevskii* on st. 92 may be due to deviation caused by the Gulf Stream. On the other hand it is difficult to explain the occurrence of the cold-water species *Tomopteris helgolandica* on st. 64.

VERTICAL DISTRIBUTION.

Generally temperature and salinity decrease, while density and pressure increase with increasing depth. The effect of these factors on the pelagic species of the material has been treated in the foregoing parts. It is, therefore, sufficient here to give a summary of the vertical distribution of the species in question.

In Table V the pelagic *Polychaeta* from the "Michael Sars" expedition are arranged according to the occurrence of each species at different depths. The table shows that the different species find their optimum life-conditions in various depths. Four species are found bathypelagically, living deeper than 250 m, viz. *Lagisca Hubrechti, Pelagobia longicirrata, Sagitella Kowalevskii* and *Travisiopsis Levinseni.* Most of the *Alciopidae* and *Travisiopsis lobifera* are stenobath surface-species, whereas most of the *Tomopteridae* are more or less pronounced eurybath, and so is *Travisiopsis lanceolata* among the *Typhloscolecidae.*

A comparison between Tables II and V shows, what is already mentioned above, that those species that are common to both the northern and the southern crossing, have often also the widest vertical distribution; they are eurythermal, euryhaline and eurypycnal forms, penetrating into the cold and deeper water-layers as well as into the cold northern waters. — Most of the species belonging to the southern crossing only are more or less strictly tied to the upper water-layers down to 250 m, the only exceptions being *Tomopteris elegans* and *T. ligulata,* which are found from the surface down to 1 250 m. Of the species belonging to the northern crossing only, *Tomopteris helgolandica* is chiefly a surface form from coastal waters, whereas *Travisiopsis Levinseni* lives bathypelagically.

"BIPOLARITY" OF PELAGIC ANIMALS.

The material contains 6 species which are distributed from the Arctic (Greenland, Iceland) to the Antarctic, viz. *Pelagobia longicirrata, Tomopteris Cavalli, T. septentrionalis, T. planktonis, Typhloscolex phyllodes, Travisiopsis Levinseni.* Further *Tomopteris ligulata* has been reported from the Azores to Antarctic and *Sagitella Kowalevskii* from Ireland to Antarctic. *Vanadis crystallina* and *Tomopteris elegans* have been reported from the warmer parts of the Atlantic to New Zealand. Here especially the six first mentioned species are of interest.

None of these six species shows a discontinuous distribution in Arctic and Antarctic only, all of them being found also in the warmer central part of the Atlantic. There is, however, a distinct difference. *Pelagobia longicirrata* and *Tomopteris septentrionalis* are eurybath, eurythermal, euryhaline species, being found in the warmer region in all depths down to about 1 200 m, while they, at least in Antarctic, are hardly reported from greater depths than 300 m. On the other hand, *Tomopteris Cavalli, T. planktonis* and *Travisiopsis Levinseni* in the central Atlantic show a more or less conspicuously bathypelagic occurrence (*T. planktonis:* 150—500 m. *T. Cavalli:* 150 800 m, *Tr. Levinseni:* 500—1 200 m), while they in Antarctic seem to live a little higher up in the water (*T. planktonis:* 0—200 m, *T. Cavalli:* 0—100 m, *Tr. Levinseni:* 100—950 m). These three species, therefore, more or less clearly seem to suffer the equatorial submergence.

I have not made investigations into the comparative anatomy of the pelagic *Polychaeta,* but judging from the external morphology, *Travisiopsis Levinseni* seems to be an archaic form, and the three species of *Travisiopsis* seem to form an evolutionary series from the more stenothermal deep-sea species *T. Levinseni* through the eurythermal *T. lanceolata* to the stenothermal surface species *T. lobifera.*

These scattered observations support the view of CHUN and BONNEVIE, according to which "the apparently discontinuous faunas at the poles are still connected with each other through the cold-water fauna of the deep-sea", so that "the deep-sea fauna should give the clue to the solution of the bipolarity question".

Table I. *Variation of temperature, salinity and density at 150, 500 and 1000 m. depth along the route of the expedition.*

	Temperature			Salinity			Density		
	150 m	500 m	1000 m	150 m	500 m	1000 m	150 m	500 m	1000 m
Ireland . . . . . St. 1—9	9.13—10.67	9.94—10.44	7.83— 8.85	35.24—35.50	35.45—35.46	35.46—35.62	27.22—27.34	27.25—27.34	27.57—27.68
Sp.-Portug. . . . St. 10—17	11.10—13.48	10.17—11.00	9.90—11.21	35.55—35.89	35.54—35.65	35.84—36.44	27.00—27.20	27.27—27.30	27.64—27.88
Mediterranean St. 18—19	12.91—13.05	12.90	12.83	38.19—38.38	38.41	38.40	28.87—29.05	29.08	29.08
Gibraltar . . . . . St. 20—32	14.05—14.78	11.00—11.34	10.00—10.80	36.00—36.98	35.52—35.64	35.87—36.08	26.88—27.01	27.17—27.26	27.65—27.70
Canary Islands St. 34—40	15.78—17.20	11.17—11.37	7.12— 7.75	36.22—36.46	35.52—35.60	35.22—35.35	26.59—26.82	27.17—27.19	27.59—27.61
SE. . . . . St. 44—50	17.40—17.92	12.00—13.00	7.96— 8.64	36.53—36.69	35.63—35.75	35.39—35.48	26.50—26.63	26.99—27.10	27.57—27.64
Azores . . . . . St. 51—59	15.05—17.60	11.65—13.38	7.50— 8.73	36.04—36.45	35.54—35.74	35.31—35.53	26.50—26.79	26.91—27.10	27.58—27.67
SW. . . . . St. 60—65	15.83—17.54	11.55—14.63	5.65— 6.45	36.10—36.35	35.46—35.89	35.05—35.15	26.44—26.65	26.76—27.05	27.55—27.74
SW. . . . . St. 66	9.05	5.72	4.27	34.84	34.93	34.99	27.00	27.55	27.77
SW. . . . . St. 67—68	17.42—18.12	12.60—15.63	4.52— 5.30	36.19—36.41	35.61—36.04	34.95—34.96	26.34—26.34	26.65—26.96	27.63—27.71
SW. . . . . St. 69—70	8.18—13.50	4.34—6.86	3.70— 4.02	34.85—35.56	34.90—35.02	34.90—34.92	26.74—27.15	27.47—27.69	27.74—27.76
New Foundland St. 71—79	—0.97—7.40			33.16—34.74			26.69—27.55		
NW. . . . . St. 80	7.30	4.56	3.29	34.71	34.96	34.88	27.17	27.71	27.78
NW. . . . . St. 81—86	11.47—13.78	9.00—10.76	4.33— 5.28	35.47—35.85	34.93—35.38	34.94—35.03	26.91—27.08	27.13—27.33	27.68—27.75
NE. . . . . St. 87—92	10.66—12.84	9.40—10.77	6.00— 8.43	35.50—35.76	35.38—35.45	35.06—35.46	27.02—27.25	27.15—27.37	27.59—27.69
Ireland . . . . . St. 93—101	9.23—10.54	8.33—10.05	6.53— 8.27	35.32—25.44	35.27—35.44	35.17—35.47	27.22—27.35	27.30—27.45	27.58—27.62

Table II. *Horizontal distribution of pelagic species.*

Station	Spanish-African coast 10—43	S. E. 44—50	Azores 51—59	S. W. 60—70	New-Found-land 71—79	N. W. 80—86	N. E. 87—92	Ireland 1—9, 93—101	Scotland 102	Total number		Total number	
										Northern crossing	Southern crossing	Eastern basin	Western basin
Harmothoë Johnstoni juv.	—	—	—	—	—	—	2	2	—	2	—	2	—
Lagisca Hubrechti	—	—	—	3	—	1	13	9	—	14	3	13	4
Podarmus atlanticus	—	—	—	2	—	—	—	—	—	—	2	—	2
Lepidasthenia Grimaldii	6	—	—	—	—	—	2	1	—	2	—	2	—
Hipponoë Gaudichaudi	—	—	—	—	—	—	1	—	—	1	—	1	—
Lopadorhynchus uncinatus	4	1	5	—	—	—	—	—	—	—	6	1	5
—,,— *Nationalis*	—	—	2	2	—	—	—	—	—	—	4	—	4
—,,— *appendiculatus*	1	—	4	2	—	—	—	—	—	—	6	—	6
—,,— *Henseni*	—	—	—	—	—	1	—	—	—	1	—	—	1
Pelagobia longicirrata	—	—	—	1	—	—	—	4	—	—	1	—	1
Torrea candida	1	1	2	6	—	—	—	—	—	—	9	1	8
Naiades Cantrainii	1	2	12	20	—	—	—	—	—	—	34	2	32
Vanadis formosa	—	10	11	7	—	—	11	—	—	11	28	21	18
—,,— *crystallina*	5	4	5	5	—	—	1	—	—	1	14	5	10
Alciopa Reynaudii	1	—	—	5	—	—	—	1	—	—	5	—	5
Alciopina parasitica	—	—	—	1	—	—	—	—	—	—	1	—	1
Krohnia lepidota	1	2	—	1	—	—	—	—	—	—	3	2	1
Rhynchonerella Möbii	—	1	—	—	—	—	—	—	—	—	1	1	—
—,,— *Petersii*	—	1	—	—	—	—	—	—	—	—	1	1	—
—,,— *Angelini*	—	—	2	4	—	4	24	1	—	28	6	24	10
Watelio longifoliata	—	—	1	—	—	—	—	—	—	—	1	—	1
Enapteris euchaeta	—	2	12	4	—	3	—	—	—	3	18	2	19
Tomopteris Apsteini	4	—	6	—	—	—	1	—	—	1	6	1	6
—,,— *helgolandica*	—	—	—	1	—	—	—	20	—	—	1	—	1
—,,— *Nisseni*	3	3	8	5	—	3	16	7	—	19	16	19	16
—,,— *Cavalli*	1	—	—	7	—	2	—	—	—	2	7	—	9
—,,— *elegans*	1	1	15	22	—	—	—	—	—	—	38	1	37
—,,— *Krampi*	3	1	5	—	—	12	7	2	—	19	6	8	17
—,,— *septentrionalis*	59	1	1	59	—	36	10	5	—	46	61	11	96
—,,— *ligulata*	2	—	15	10	—	—	—	—	—	—	25	—	25
—,,— *planktonis*	2	—	7	3	—	—	1	—	—	1	10	1	10
Typhloscolex phyllodes	—	—	—	—	—	—	—	—	1	—	—	—	—
—,,— *grandis*	—	—	—	2	—	—	—	—	—	—	2	—	2
Sagitella Kowalevskii	—	—	—	6	—	—	1	—	—	1	6	1	6
Travisiopsis lobifera	—	3	29	20	—	—	—	—	—	—	52	3	49
—,,— *lanceolata*	3	—	3	—	—	1	2	2	—	3	3	2	4
—,,— *Levinseni*	—	—	—	—	—	26	5	—	—	31	—	5	26
—,,— *dubia*	—	—	—	1	—	1	—	—	—	1	1	—	2
Nereïs succinea	1	—	—	—	—	—	—	—	—	—	—	—	—
Platynereïs Dumerilii	—	—	—	3	—	—	—	—	—	—	3	—	3
—,,— *coccinea*	—	—	—	19	—	—	—	—	—	—	19	—	19
? *Pygospio elegans*	—	—	1	—	—	—	—	—	—	—	1	—	1
Number of species	18	14	20	27	0	11	15	11	1	19	35	24	35
Number of specimens	99	32	146	221	0	90	97	54	1	187	400	130	457

Table III. *Further distribution in the Northern Atlantic of species lacking in SE. in the "Michael Sars" material.*

	NW.	NE.	N. Irel.	Irel.-Sp.	Eur.-Afr.	SE.	Gibr.-Az.	Azor.	SW.
Lagisca Hubrechti	×	×	×	○	—	—	○	○	×
(*Podarmus atlanticus*)	—	—	—	—	—	—	—	—	×
Lopadorhynchus Nationalis	—	—	—	—	—	—	○	×	×
—,,— *appendiculatus*	—	—	—	×	○	—	—	○ ×	○ ×
Pelagobia longicirrata	—	—	—	○ ×	○	—	○	○	×
(*Alciopa Reynaudii*)	—	—	×	×	—	○	—	—	○ ×
(*Alciopina parasitica*)	—	—	—	—	—	○	○	—	×
Rhynchonerella Angelini	×	×	×	—	—	—	○	○ ×	×
(*Watelio longifoliata*)	—	—	—	—	—	—	—	×	—
Tomopteris Apsteini	—	×	—	—	○ ×	—	—	○ ×	—
(—,,— *helgolandica*)	—	—	×	×	○	—	—	—	×
—,,— *Cavalli*	—	×	—	—	×	—	—	—	×
—,,— *ligulata*	—	—	—	—	×	—	○	○ ×	○ ×
—,,— *planktonis*	—	×	—	—	○ ×	—	○	○ ×	○ ×
(*Typhloscolex grandis*)	—	—	—	—	—	—	—	—	×
(*Sagitella Kowalevskii*)	—	×	—	—	○	○	○	○	○ ×
Travisiopsis lanceolata	×	×	×	○ ×	○ ×	—	○	○ ×	—
(—,,— *dubia*)	×	—	—	—	—	—	—	—	×

○ = previous records, × = new records.

Table IV. *Variation in depth, temperature, salinity and density for the pelagic species.*

	Calculated depth in m	t	s	σ_t
Harmothoë Johnstoni juv.	100— 300 (750)	10.50—11.85	35.47—35.60	27.10—27.25
Lagisca Hubrechti	300—1000 (1500)	6.92—10.77	35.20—35.47	27.14—27.61
Podarmus atlanticus	(50)— 400	14.70	35.90	26.75
Lepidasthenia Grimaldii	0— 300 (750)	10.5 —12.3	35.47—35.56	26.98—27.25
Lopadorhynchus uncinatus	0— 500	11.37—16.63	35.56—36.32	26.54—27.19
—,,— *Nationalis.*	50— 150	17.54—17.85	36.18—36.35	26.28—26.44
—,,— *appendiculatus*	0— 400	12.3 —14.70	35.56—35.90	26.75—26.98
—,,— *Henseni*	(750)			
Pelagobia longicirrata	(750—1250)			
Torrea candida	0— 150	16.0 —20.6	36.03—36.39	25.40—26.64
Naiades Cantrainii	0— 150	17.20—20.78	36.13—36.50	25.43—26.59
Vanadis formosa	0— 150	12.05—19.60	35.54—36.50	25.91—27.03
—,,— *crystallina*	0— 150	11.85—19.8	35.60—36.39	25.79—27.20
Alciopa Reynaudii	(0) 100— 150	9.53—11.10	35.33—35.55	27.20—27.30
Alciopina parasitica	25	20.78	36.13	25.43
Krohnia lepidota	50 (100)	19.6	36.50	26.03
Rhynchonerella Möbii	(135)			
—,,— *Petersii*	(0)			
—,,— *Angelini*	50— 500	9.07—16.63	35.33—36.20	26.54—27.39
Watelio longifoliata	(50)			
Enapteris euchaeta	150— 300	13.70—17.60	35.75—36.45	26.44—26.88
Tomopteris Apsteini	150— 300	11.55—16.00	35.55—36.14	26.64—27.12
—,,— *helgolandica*	50— 150	9.53—17.54	35.33—36.35	26.44—27.30
—,,— *Nisseni*	50—1400	5.90—17.85	35.08—36.25	26.28—27.78
—,,— *Cavalli*	150— 800	4.52—16.85	34.96—36.26	26.53—27.73
—,,— *elegans*	25—1000 (1250)	6.25—19.25	35.08—36.39	25.91—27.67
—,,— *Krampi*	0—1000 (1250)	3.29—13.70	34.86—35.79	26.88—27.78
—,,— *septentrionalis*	0—1200	3.29—17.78	34.79—36.35	25.81—27.78
—,,— *ligulata*	50—1000	6.27—17.85	35.08—36.25	26.28—27.67
—,,— *planktonis*	150— 500	11.12—16.00	35.51—36.14	26.64—27.17
Typhloscolex phyllodes	(700)			
—,,— *grandis*	1200	5.10	35.02	27.70
Sagitella Kowalevskii	800—1200	5.10— 8.73	35.02—35.44	27.53—27.70
Travisiopsis lobifera	0— 400	13.50—20.6	35.56—36.61	25.85—26.75
—,,— *lanceolata*	25—1400	4.30—15.98	34.99—36.32	26.78—27.78
—,,— *Levinseni*	500—1200	3.27— 7.20	34.86—35.35	27.51—27.80
—,,— *dubia*	10— 500	5.72—15.35	34.93—35.32	26.16—27.55

Table V. *Vertical distribution of pelagic species.*

Calculated depth in m	0—50	50—100	100—250	250—500	500—750	750—1000	1000—1250	1250—1500
Harmothoë Johnstoni juv.	—	—	1	1	2	—	—	—
Lagisca Hubrechti	—	—	—	1	16	5	2	2
Podarmus atlanticus	—	1	—	1	—	—	—	—
Lepidasthenia Grimaldii	6	—	—	2	1	—	—	—
Hipponoë Gaudichaudi	1	—	—	—	—	—	—	—
Lopadorhynchus uncinatus	1	1	6	2	—	—	—	—
—,,— *Nationalis*	—	2	2	—	—	—	—	—
—,,— *appendiculatus*	1	2	2	1	—	(1)	—	—
—,,— *Henseni*	—	—	—	—	1	—	—	—
Pelagobia longicirrata	—	—	—	—	—	4	1	—
Torrea candida	6	2	2	—	—	—	—	—
Naiades Cantrainii	19	10	3	(1)	—	(2)	—	—
Vanadis formosa	11	15	8	(3)	(2)	—	—	—
—,,— *crystallina*	7	9	4	—	—	—	—	—
Alciopa Reynaudii	5	1	1	—	—	—	—	—
Alciopina parasitica	1	—	—	—	—	—	—	—
Krohnia lepidota	2	2	—	—	—	—	—	—
Rhynchonerella Möbii	—	—	1	—	—	—	—	—
—,,— *Petersii*	1	—	—	—	—	—	—	—
—,,— *Angelini*	6	16	4	4	—	(4)	—	(1)
Watelio longifoliata	1	—	—	—	—	—	—	—
Enapteris euchaeta	—	3	10	4	—	(1)	(3)	—
Tomopteris Apsteini	—	—	5	6	—	—	—	—
—,,— *helgolandica*	13	3	1	—	(1)	(3)	—	—
—,,— *Nisseni*	6	2	9	10	3	12	2	1
—,,— *Cavalli*	—	—	3	5	1	—	—	—
—,,— *elegans*	1	4	—	20	—	9	5	—
—,,— *Krampi*	3	—	2	7	10	6	2	—
—,,— *septentrionalis*	24	22	15	18	29	33	31	—
—,,— *ligulata*	5	5	5	8	1	1	2	—
—,,— *planktonis*	—	1	3	7	—	—	—	(2)
Typhloscolex phyllodes	—	—	—	—	1	—	—	—
—,,— *grandis*	—	—	—	—	—	—	2	—
Sagitella Kowalevskii	1	—	—	—	1	4	1	—
Travisiopsis lobifera	29	15	5	3	—	—	—	—
—,,— *lanceolata*	2	—	1	3	—	3	—	2
—,,— *Levinseni*	—	—	—	6	7	11	7	—
—,,— *dubia*	1	—	—	1	—	—	—	—
Nereïs succinea	1	—	—	—	—	—	—	—
Platynereïs Dumerilii	3	—	—	—	—	—	—	—
—,,— *coccinea*	19	—	—	—	—	—	—	—
? *Pygospio elegans*	—	1	—	—	—	—	—	—
Number of species	27	20	22	22	14	15	11	5
Number of specimens	176	117	93	114	76	99	58	8

LIST OF POLYCHAETA FROM THE VARIOUS STATIONS.

The stations where Polychaeta are taken and the distribution of the Polychaeta along the route of the "Michael Sars" are seen from the following list:

St. 1. *Tomopteris helgolandica.*

St. 10. *Laetmatonice filicornis, Lepidasthenia Grimaldii, Lopadorhynchus uncinatus, L. appendiculatus, Alciopa Reynaudii, Tomopteris Krampi, T. septentrionalis, Travisiopsis lanceolata, Maldanella Harai.*

St. 15. *Lopadorhynchus uncinatus, Tomopteris septentrionalis.*

St. 18. *Torrea candida.*

St. 19. *Tomopteris Apsteini, T. septentrionalis.*

St. 23. *Vanadis crystallina, Tomopteris Apsteini, T. Nisseni, Dalhousiella Carpenteri, ? Syllis prolifera, Nephthys incisa, Glycera tesselata, Eunice torquata, E. norvegica, E. Oerstedii, Onuphis conchylega.*

St. 24. *Hyalinœcia tubicola.*

St. 25a. *Hyalinœcia tubicola.*

St. 25b. *Tomopteris planktonis, Hyalinœcia tubicola.*

St. 26. *Nereïs succinea.*

St. 29. *Tomopteris Apsteini, T. septentrionalis, T. ligulata.*

St. 34. *Lopadorhynchus uncinatus, Tomopteris Cavalli, T. elegans, T. septentrionalis, Travisiopsis lanceolata.*

St. 35. *Vanadis crystallina.*

St. 38. *Phyllodoce mucosa, Hyalinœcia tubicola.*

St. 39a. *Naiades Cantrainii.*

St. 39b. *Hyalinœcia tubicola.*

St. 41. *Hyalinœcia tubicola.*

St. 42. *Krohnia lepidota, Tomopteris Apsteini, T. Nisseni, T. septentrionalis.*

St. 44. *Vanadis formosa, Tomopteris Nisseni.*

St. 45. *Lopadorhynchus uncinatus, Naiades Cantrainii, Vanadis crystallina, Krohnia lepidota, Tomopteris Nisseni.*

St. 48. *Torrea candida, Vanadis formosa, V. crystallina, Krohnia lepidota, Rhynchonerella Petersii, Enapteris euchaeta, Tomopteris Nisseni, T. septentrionalis.*

St. 49b. *Naiades Cantrainii, Vanadis formosa, Rhynchonerella Möbii, Enapteris euchaeta, Tomopteris elegans, T. Krampi, Travisiopsis lobifera.*

St. 51. *Enapteris euchaeta, Travisiopsis lobifera.*

St. 52. *Naiades Cantrainii, Vanadis crystallina, Tomopteris Nisseni, Travisiopsis lobifera.*

St. 53. *? Harmothoë longisetis, Lopadorhynchus uncinatus, L. Nationalis, Torrea candida, Naiades Cantrainii, Vanadis formosa, V. crystallina, Rhynchonerella Angelini, Enapteris euchaeta, Tomopteris Apsteini, T. Nisseni, T. elegans, T. Krampi, T. septentrionalis, T. ligulata, T. planktonis, Travisiopsis lanceolata.*

St. 56. *Lopadorhynchus uncinatus, L. appendiculatus, Torrea candida, Naiades Cantrainii, Vanadis formosa, Watelio longifoliata, Enapteris euchaeta, Tomopteris Apsteini, T. Nisseni, T. elegans, T. Krampi, T. ligulata, T. planktonis, ? Pygospio elegans.*

St. 57. *Enapteris euchaeta.*

St. 58. *Lopadorhynchus uncinatus, L. Nationalis, Vanadis formosa, V. crystallina, Rhynchonerella Angelini, Enapteris euchaeta, Tomopteris Apsteini, T. Nisseni.*

St. 60. *Vanadis crystallina.*

St. 62. *Lagisca Hubrechti, Podarmus atlanticus, Pelagobia longicirrata, Torrea candida, Naiades Cantrainii, Vanadis formosa, V. crystallina, Alciopa Reynaudii, Rhynchonerella Angelini, Enapteris euchaeta, Tomopteris Nisseni, T. elegans, T. septentrionalis, T. ligulata, Sagitella Kowalevskii, Travisiopsis lobifera.*

St. 64. *Lopadorhynchus Nationalis, L. appendiculatus, Torrea candida, Naiades Cantrainii, Vanadis formosa, V. crystallina, Krohnia lepidota, Enapteris euchaeta, Tomopteris helgolandica, T. Nisseni, T. Cavalli, T. elegans, T. septentrionalis, T. ligulata, T. planktonis, Typhloscolex grandis, Sagitella Kowalevskii, Travisiopsis lobifera.*

St. 66. *Tomopteris Cavalli, T. septentrionalis, Travisiopsis dubia, Platynereïs Dumerilii.*

St. 67. *Podarmus atlanticus, Lopadorhynchus appendiculatus, Torrea candida, Naiades Cantrainii, Alciopina parasitica, Tomopteris Nisseni, T. ligulata, T. planktonis, Travisiopsis lobifera.*

St. 69. *Tomopteris Cavalli, Travisiopsis lobifera, Platynereïs coccinea.*

St. 70. *Aphrodita aculeata, Macellicephala atlantica, Antinoë pelagica, Lagisca Hubrechti, Polynoë antillicola, Leanira Yhleni, Eulalia longicirrata, Nephthys rubella, Lumbriconereïs impatiens, Phylo norvegica, Brada villosa, Ophelina cylindricaudata, Terebellides Stroemii.*

St. 80. *Tomopteris Cavalli, T. Krampi, T. septentrionalis, Travisiopsis Levinseni.*

St. 81. *Lagisca Hubrechti, Rhynchonerella Angelini, Enapteris euchaeta, Tomopteris Krampi, T. septentrionalis, Travisiopsis Levinseni.*

St. 82. *Travisiopsis Levinseni, T. dubia.*

St. 83. *Rhynchonerella Angelini.*

St. 84. *Lopadorhynchus Henseni, Rhynchonerella Angelini, Tomopteris Nisseni, T. Krampi, T. septentrionalis, Travisiopsis lanceolata, T. Levinseni.*

St. 86. *Rhynchonerella Angelini.*

St. 87. *Lagisca Hubrechti, Vanadis formosa, Rhynchonerella Angelini, Tomopteris Krampi.*

St. 88. *Lagisca Hubrechti, Vanadis formosa, Rhynchonerella Angelini, Tomopteris Apsteini.*

St. 90. *Harmothoë Johnstoni, Lagisca Hubrechti, Vanadis crystallina, Rhynchonerella Angelini, Tomopteris Nisseni, T. septentrionalis, T. planktonis.*

St. 91. *Hipponoë Gaudichaudi.*

St. 92. *Harmothoë Johnstoni, Lagisca Hubrechti, Lepidasthenia Grimaldii, Vanadis formosa, Rhynchonerella Angelini, Tomopteris Nisseni, T. Krampi, T. septentrionalis, Sagitella Kowalevskii, Travisiopsis lanceolata, T. Levinseni.*

St. 94. *Harmothoë Johnstoni, Lepidasthenia Grimaldii, Pelagobia longicirrata, Tomopteris Nisseni, T. Krampi, Travisiopsis lanceolata.*

St. 96. *Malmgrenia castanea, Scalisetosus assimilis, Lagisca extenuata, Tomopteris septentrionalis, Nereïmyra punctata, Lanice conchilega, Hydroïdes norvegica, Ditrupa arietina.*

St. 98. *Lagisca Hubrechti, Rhynchonerella Angelini, Tomopteris helgolandica, T. Nisseni, T. Krampi, T. septentrionalis.*

St.101. *Lagisca Hubrechti, Alciopa Reynaudii, Tomopteris helgolandica, T. Nisseni, T. septentrionalis, Travisiopsis lanceolata.*

St.102. *Typhloscolex phyllodes, ? Bispira volutacornis.*

KEY TO GENERA AND SPECIES

of pelagic *Polychaeta* of the families *Phyllodocidae* (subfam. *Lopadorhynchinae*), *Alciopidae, Tomopteridae* and *Typhloscolecidae.*

Subfamily ***Lopadorhynchinae***, p. 17.

I. Dorsal and ventral cirri thick, lanceolate; first setigerous segments modified with simple bristles . . . . . Gen. *Lopadorhynchus*, p. 17.
  A. No ventral cirri on the 2 first setigerous segments. . . . . Subgen. *Lopadorhynchus*, p. 17.
    1. A "ruff" around the bristles of the 2 first segments.
      a. Ventral cirri on the 3rd and 4th pair of parapodia . . . . . *L. uncinatus*, p. 17.
      b. No ventral cirri on the 3rd and 4th pair of parapodia. . . . . *L. errans*, p. 18.
    2. No "ruff" around the bristles of the 2 first segments.
      a. 2 first pair of parapodia stouter than the following ones . . . . . *L. Krohnii*, p. 19.
      b. 3 first pair of parapodia shorter than the following ones . . . . . *L. brevis*, p. 18.
  B. Ventral cirri on the 2 first setigerous segments. . . . . Subgen. *Prolopadorhynchus*, p. 19.
    1. A filiform appendage at the tip of the ventral cirri . . . . . *L. appendiculatus*, p. 20.
    2. No filiform appendage at the tip of the ventral cirri.
      a. Some simple bristles among the compound ones in the middle of the body *L. Nationalis*, p. 19.
      b. Only compound bristles in the parapodia of the middle of the body.
        α. No eyes . . . . . *L. Henseni*, p. 19.
        β. 2 large eyes with lenses . . . . . *L. macrophthalmus*, p. 21.
II. Dorsal and ventral cirri cylindrical . . . . . Gen. *Pelagobia*, p. 21.
  A. 2 eyes . . . . . *P. longicirrata*, p. 21.
  B. No eyes . . . . . *P. serrata*, p. 21.

Family ***Alciopidae***, p. 21.

I. One sort of bristles.
  A. Simple capillary bristles only . . . . . Gen. *Naiades*, p. 24.
    One species . . . . . *N. Cantrainii*, p. 24.
  B. Compound capillary bristles only.
    1. Pedal lobe without cirriform appendage . . . . . Gen. *Torrea*, p. 22.
      a. Small papillæ between the 2 long tentacles of the proboscis; median prostomial tentacle very short and rounded . . . . . *T. candida*, p. 22.
      b. No small papillæ between the long tentacles of the proboscis; median prostomial tentacle long and slender . . . . . *T. pelagica*, p. 23.
    2. Pedal lobe with one cirriform appendage . . . . . Gen. *Vanadis*, p. 25.
      a. Segmental glands on all setigerous segments.
        α. 2 first segments not coalesced.
          x. No deep incision in the prostomium.
            u. Median prostomial tentacle digitiform; 3 pair of tentacular cirri.

φ. 2 long tentacles on the proboscis.
*. 2 pair of rudimentary parapodia ..... *V. formosa*, p. 25.
**. 5(—6) pair of rudimentary parapodia ..... *V. crystallina*, p. 27.
χ. No long tentacles on the proboscis.
*. Body anteriorly with transverse pigment bands ..... *V. antarctica*, p. 30.
**. Body purplish brown ..... *V. violacea*, p. 30.
v. Median prostomial tentacle short and rounded ..... *V. minuta*, p. 30.
y. A deep incision in the prostomium ..... *V. Studeri*, p. 30.
β. 2 first segments coalesced ..... *V. nans*, p. 30.
b. Segmental glands not on all setigerous segments.
α. Eyes directed outwards, not touching each other dorsally; 3 pair of tentacular cirri ..... *V. longissima*, p. 29.
β. Eyes directed downwards, touching each other dorsally; 2 pair of tentacular cirri ..... *V. grandis*, p. 30.
3. Pedal lobe with 2 cirriform appendages ..... Gen. *Alciopa*, p. 30.
a. No rudimentary eyes below the ordinary ones..... *A. Reynaudii*, p. 30.
b. A pair of rudimentary eyes below the ordinary ones ..... *A. quadrioculata*, p. 31.

II. More than one sort of bristles.
A. Simple capillary bristles and acicular bristles.
1. Pedal lobe with cirriform appendage ..... Gen. *Krohnia*, p. 32.
a. Parapodial cirri with an acute tip; body with pigment spots..... *K. lepidota*, p. 33.
b. Parapodial cirri oval, without acute tip; body without pigment spots. ... *K. Bongraini*, p. 33.
2. Pedal lobe without cirriform appendage ..... Gen. *Alciopina*, p. 32.
a. Axes of the eyes forming a straight transverse line.
α. Median prostomial tentacle a longitudinal carina. ..... *A. parasilica*, p. 32.
β. Median prostomial tentacle long and digitiform..... *A. Gazellae*, p. 32.
γ. Median prostomial tentacle a short, blunt papilla..... *A. paumotanus*, p. 32.
b. Axes of the eyes meeting at a right angle ..... *A. tenuis*, p. 32.
B. Compound capillary bristles and acicular bristles.
1. Pedal lobe without cirriform appendage ..... Gen. *Plotohelmis*, p. 32.
a. Dorsal tentacular cirri of the 2nd and 3rd segment of the same length .. *P. alata*, p. 32.
b. Dorsal tentacular cirri of the 3rd segment longer than those of the 2nd . *P. capitata*, p. 32.
2. Pedal lobe with cirriform appendage.
a. Parapodial cirri foliaceous; eyes large ..... Gen. *Rhynchonerella*, p. 33.
α. Antennæ and tentacular cirri without papillæ.
x. First dorsal cirrus not larger than the others.
u. Acicular bristles not only in the 2nd parapodium.
φ. More than 2 acicular bristles in the anterior parapodia.
*. Acicular bristles simple ..... *R. Möbii*, p. 34.
**. Acicular bristles compound with very small, fine end piece ..... *R. Angelini*, p. 34.
***. Acicular bristles compound with large, serrate end piece *R. Petersii*, p. 34.
χ. 1 or 2 simple acicular bristles in the anterior parapodia; prostomium voluminous ..... *R. gracilis*, p. 36.
v. Acicular bristles only in the 2nd parapodium; parapodial cirri narrow ..... *R. tentaculata*, p. 36.
y. First dorsal cirrus larger than the others; prostomium square .... *R. melanophthalma*, p. 36.
β. Antennæ and tentacular cirri with papillæ; hindmost tentacular cirrus very long ..... *R. cincinnata*, p. 36.
b. Parapodial cirri ribbon-shaped; eyes comparatively small ..... Gen. *Watelio*, p. 36.
α. 4 pair of tentacular cirri; acicular bristles not stouter than the dorsal ones ..... *W. longifoliata*, p. 37.
β. 3 pair of tentacular cirri; acicular bristles stouter than the dorsal ones .. *W. Gravieri*, p. 38.

Family ***Tomopteridae,*** p. 38.

I. Parapodial rami rectangular, pinnules not bordering their inner edge. .....Gen. *Enapteris*, p. 39.
One species .....*E. euchaeta*, p. 39.
II. Parapodial rami more or less conical, pinnules completely bordering them ... Gen. *Tomopteris*, p. 39.
A. Rosettes present; hyaline glands (nearly allways) lacking; "tail" present Subgen. *Johnstonella*, p. 39.
1. Rosettes on the parapodia and in the pinnules.
a. Rosettes on the trunk of the parapodia 1 and 2; chromophile glands large.
α. "Spur" present .....*T. Apsteini*, p. 39.
β. "Spur" absent.....*T. pacifica*, p. 42.
b. Rosettes in the ventral ramus of the parapodia 1 and 2; chromophile glands small .....*T. helgolandica*, p. 42.
2. Rosettes in the pinnules only .....*T. Kempi*, p. 43.
3. No rosettes in the pinnules.
a. Rosettes on the parapodial trunks only; no glands in the pinnules?.....*T. levipes*, p. 43.
b. Rosettes on the dorsal rami, and on the ventral ramus of parapodium 2; hyaline glands near the chromophile ones .....*T. Mortenseni*, p. 43.
c. Rosettes in the ventral rami only .....*T. australiensis*, p. 44.
B. Rosettes absent; hyaline glands (nearly allways) present; "tail" nearly allways lacking ..... Subgen. *Tomopteris*, p. 44.
1. "Tail" present; hyaline glands in both pinnules.
a. Pinnules with a brighter central and a darker marginal zone; hyaline glands distinct, in the marginal zone; "tail" long.....*T. Nisseni*, p. 44.
b. Pinnules not divided into zones; hyaline glands distinct; "tail" short....*T. Krampi*, p. 48.
2. "Tail" absent.
a. No hyaline glands in the ventral pinnules.
α. Hyaline glands in the dorsal pinnules of the parapodia 3 and 4 .....*T. elegans*, p. 46.
β. No hyaline glands in the dorsal pinnules .....*T. Cavalli*, p. 46.
b. Hyaline glands in the ventral pinnules only.
α. Chromophile glands apically, small, indistinct .....*T. septentrionalis*, p. 49.
β. Chromophile glands ventrally, large, distinct.
x. Pinnules bordering the parapodial trunk dorsally and ventrally ....*T. ligulata*, p. 52.
y. Pinnules not bordering the parapodial trunk.
u. Chromophile glands from the fourth, hyaline glands from the first parapodium; about 17 pair of parapodia.....*T. planktonis*, p. 52.
v. Chromophile glands from the fifth, hyaline glands from the third parapodium; 29—37 pair of parapodia .....*T. Carpenteri*, p. 54.
Subgen. incert......*T. Kefersteini*, p. 54.

Family ***Typhloscolecidae,*** p. 54.

I. Prostomium with a transverse dorsal and ventral vibratile cushion, flanked by small nuchal organs ..... Gen. *Typhloscolex*, p. 54.
A. Vibratile cushions high, foliaceous.
1. Hight of the cushions equal to diameter of the body .....*T. Mülleri*, p. 55.
2. Hight of the cushions greater than diameter of the body .....*T. Leuckarti*, p. 55.
B. Vibratile cushions lower than diameter of the body.
1. Parapodial cirri large, anal cirri small; dorsal cushion not trilobate .....*T. phyllodes*, p. 55.
2. Parapodial cirri small, anal cirri large; dorsal cushion trilobate .....*T. grandis*, p. 55.
II. Prostomium with a caruncle more or less encompassed by the nuchal organs. Gen. *Travisiopsis*, p. 57.
A. Caruncle triangular or T-shaped.
1. Nuchal organs elongated backwards, finger-shaped.....*T. lanceolata*, p. 58.
2. Nuchal organs branched .....*T. coniceps*, p. 61.

B. Caruncle rounded or rectangular.
1. Nuchal organs encompassing the caruncle.
a. Nuchal organs continued behind the caruncle.
α. Nuchal organs directed obliquely outward behind the caruncle. . . . . *T. Levinseni*, p. 59.
β. Nuchal organs directed backwards, parallel. . . . . *T. lobifera*, p. 57.
b. Nuchal organs not continued behind the caruncle; segmental furrows deep *T. lumbricoïdes*, p. 61.
2. Nuchal organs not encompassing the caruncle . . . . . *T. dubia*, p. 60.
III. Prostomium without cushions and caruncle; longitudinal nuchal organs. . . . . Gen. *Sagitella*, p. 56.
One species . . . . . *S. Kowalevskii*, p. 56.

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