A MONOGRAPH ON THE POLYCHAETA OF SOUTHERN AFRICA

PART 2. SEDENTARIA

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A MONOGRAPH ON THE POLYCHAETA OF SOUTHERN AFRICA

PART 2. SEDENTARIA

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INTRODUCTION

NOTES ON USING THE MONOGRAPH

When identifying material from a particular area it is first necessary to know what papers contain original records or descriptions of the fauna. These are not easy to recognise in a long list of references such as that at the end of this monograph. For this reason a complete chronological list is given below.

1. Peters, W. C., 1854
2. Stimpson, W., 1856
3. Kinberg, J. G., 1858–1910
4. Schmarda, L. K., 1861
5. Baird, W., 1865b
6. Quatrefages, A. de, 1865
7. Kinberg, J. G., 1867
8. Grube, E., 1867
9. Grube, E., 1869
10. McIntosh, W. C., 1885
11. Marenzeller, E. von, 1887
12. Willey, A., 1904
13. McIntosh, W. C., 1904
14. Gravier, C., 1905c
15. Ehlers, E., 1908a
16. Ehlers, E., 1908
17. Gravier, C., 1909
18. Ashworth, J., 1910
19. Ashworth, J., 1911
20. Pixell, H., 1913
21. Ehlers, E., 1913
22. Ramsay, L., 1914
23. Horst, R., 1917
24. Ehlers, E., 1917
25. Horst, R., 1918
26. Augener, H., 1918
27. Fauvel, P., 1919
28. Fauvel, P., 1921
29. Treadwell, A. L., 1921
30. Seidler, H. J., 1923
31. Fauvel, P., 1923a
32. McIntosh, W. C., 1925
33. Monro, C. C. A., 1930
34. Augener, H., 1931
35. Monro, C. C. A., 1933
36. Day, J. H., 1934
37. Monro, C. C. A., 1936
38. Monro, C. C. A., 1937
39. Treadwell, A. L., 1943
40. Day, J. H., 1951
41. Day, J. H., 1953
42. Tebble, N., 1953
43. Tebble, N., 1953a
44. Day, J. H., 1955
45. Day, J. H., 1957
46. Banse, K., 1957
47. Wilson, D. P., 1958
48. Kirkegaard, J. B., 1959
49. Tebble, N., 1960
50. Day, J. H., 1960
51. Day, J. H., 1961
52. Uschakov, P. V., 1962
53. Day, J. H., 1962
54. Laubier, L., 1962
55. Day, J. H., 1963
56. Day, J. H., 1963a
57. Bellan, G. and Picard, J., 1965

— Day, J. H., unpublished records

In biogeographical studies one must know what species are found in the area covered by the monograph, where and at what depth they occur and what synonyms have been used in earlier works. It is hoped that the species lists appended to each

family will supply this information rapidly and that the "Records" and "Distribution" will supply the further details that may be required.

All the published records of polychaetes from southern Africa, Angola and Madagascar have been extracted from the list of papers given above and other, more recent unpublished records have been added. The complete list of valid species is given family by family. Each list is arranged alphabetically for ease of reference with synonyms and incorrect identifications preceded by the word "as". All species names are annotated by a code showing which workers used that name and the province and depth in which the records were made. The code is explained as follows:

Authority for the record
Shown by a number which refers to the numbered list of references given above.

Province where collected
A = Angola
C = Cape Province
M = Madagascar
N = Natal
P = Portuguese East Africa (Mocambique)
W = South West Africa

Depth range
a = abyssal (over 1000 metres)
d = deep (100–999 metres)
e = estuarine
i = intertidal
p = planktonic
s = shallow (1–99 metres)
vd = very deep (500–999 metres)

The use of the code is best shown by an example. *Lepidonotus semitectus* is listed among the Polynoinae on p. 37 (Part 1) as follows:

Lepidonotus semitectus Stimpson 2Ci (and other code numbers)
as *Lepidonotus wahlbergi* Kinberg 3CiNi (and other code numbers)
as *Polynoe trochiscophora* Schmarda 4Ci

The first record shows that the valid name is *Lepidonotus semitectus* first used by Stimpson 1856 (code number 2 in the literature list) and his record was made in the Cape Province (code letter C) in the intertidal zone (code i). The same specific name has been used by several other workers as shown by the other code numbers against it. The first synonym is *Lepidonotus wahlbergi* Kinberg and the code 3CiNi gives the reference to Kinberg's publication in 1858–1910 and the information that these specimens were collected in the intertidal zone in the Cape Province and Natal. The second synonym is *Polynoe trochiscophora* Schmarda and the code letters 4Ci show that Schmarda's name was published in 1861 and the specimens came from the intertidal zone of the Cape Province. Other synonyms and records follow and all of them together show the full range of synonyms which appear in the polychaete literature of southern Africa and that *Lepidonotus semitectus* is a common intertidal and shallow water species which extends from South West Africa around the Cape of Good Hope to Natal.

More detailed information is appended to the description of each species. If there are only three or four locality records, all of them are given, and if there are many, a summary shows the limits of the geographical and bathymetric range. After careful consideration, it was decided that place names would not be as helpful as latitude and longitude since the names of many collecting stations would not be found on ordinary maps and, in any case, dredged and plankton records would have to be given in degrees of latitude and longitude. Minutes of latitude and longitude

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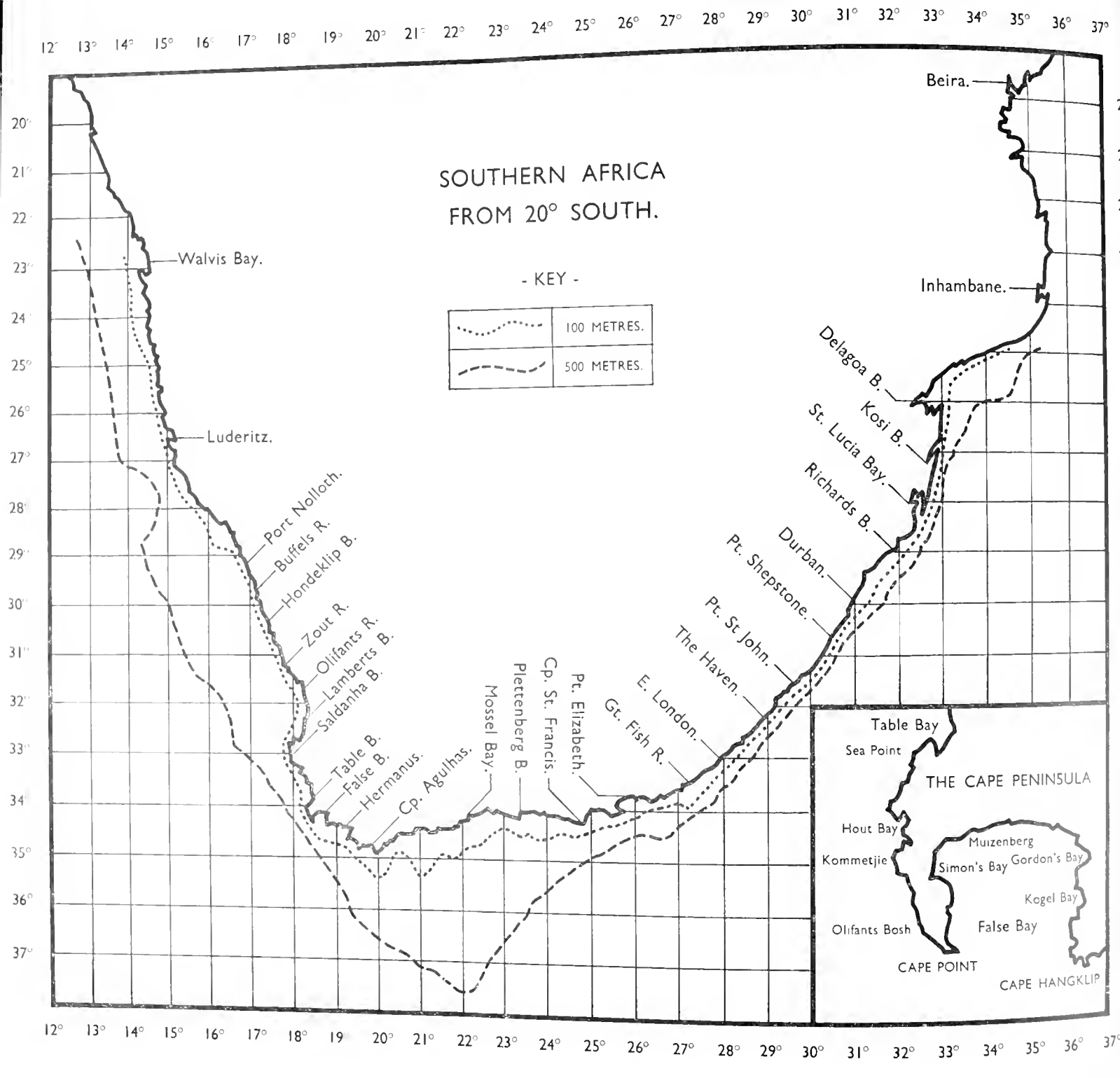

SOUTHERN AFRICA
FROM 20° SOUTH.
- KEY -
100 METRES.
500 METRES.
Walvis Bay.
Luderitz.
Port Nolloth.
Buffels R.
Hondeklip B.
Zout R.
Olifants R.
Lamberts B.
Saldanha B.
Table B.
False B.
Hermanus.
Cp. Agulhas.
Mossel Bay.
Plettenberg B.
Cp. St. Francis.
Pt. Elizabeth.
Gt. Fish R.
E. London.
The Haven.
Pt. St John.
Pt. Shepstone.
Durban.
Richards B.
St. Lucia Bay.
Kosi B.
Delagoa B.
Inhambane.
Beira.
Table Bay
Sea Point
THE CAPE PENINSULA
Hout Bay
Kommetjie
Muizenberg
Simon's Bay
Gordon's Bay
Kogel Bay
Olifants Bosh
False Bay
CAPE POINT
CAPE HANGKLIP

have also been omitted for the sake of brevity and this means that unless the reader refers to the publication from which the record has been extracted, he will not be able to pinpoint the record more accurately than somewhere in the 60 mile square formed by a degree of latitude and longitude. For most purposes this is sufficient. Luckily the whole of southern Africa is covered by degrees of south latitude and east longitude so that the words "south" and "east" are omitted. Thus the locality can be expressed in four figures and the depth range by a letter. For example the records for *Hermonia hystrix* described in Part 1 are shown as Cape (31/15/d);? Natal (29/31/s). This means that the species has been recorded in Cape waters in the latitude/longitude square 31° S/15° E, in the depth range 100–499 metres; there is also a doubtful record from Natal in the latitude/longitude square 29° S/31° E, in the depth range 1–99 metres. Reference to the map opposite will show that the Cape record is off Lamberts Bay and the doubtful Natal record is close to Durban.

Distribution beyond the limits of southern Africa is given in the conventional form and a code letter signifying the depth range has been added when this information is available. It is urged that some indication of depth range should always be added to summaries of distribution since the fauna at different depths may differ markedly. For example tropical species are restricted to intertidal and shallow depths while the very deep and abyssal bottoms may be colonised by cold water species. It may also be noted that the summary of distribution given in this monograph has been deliberately selected from twentieth century reports of well-known taxonomists since earlier works are not always reliable.

THE SYSTEMATICS OF THE POLYCHAETA OF SOUTHERN AFRICA

CLASSIFICATION

The phylum Annelida to which the Polychaeta and several other groups of worms belong, is difficult to classify into classes and orders. Early workers included the Archiannelida, Polychaeta, Myzostomida, Oligochaeta, Hirudinea, Echiura, Sipuncula and Priapulida. Recent workers including Dales (1963), regard the last three groups as distinct and consider each of the other groups as a separate class of the phylum Annelida.

The division of the class Polychaeta into orders has been attempted by Benham (1896) and Dales (1963). They have based their divisions on the structure of the head and the nature of the feeding organs, the regions of the body and the nature of the parapodia and setae. As shown in Part 1 the method of feeding and the habitat whether it be planktonic, active crawling on the surface, burrowing in the mud or tubicolous does have an important effect on the structure of the head and body. However there are still many doubts regarding the homologies of the feeding organs and there is still no general agreement as to which families should be included in the various orders which have been erected. For this reason it is better to leave the matter open and agree with Fauvel (1923) and many earlier workers that for practical purposes the arbitrary grouping into *Polychaeta Errantia* and *Polychaeta Sedentaria* should be used.

The *Polychaeta Errantia* includes active carnivores and a few others while the *Polychaeta Sedentaria* includes the remaining microphagous feeders. There are no mutually exclusive characters which define these two groups and a summation of characters is used in the following key.

Key to the Families of Polychaeta

Note Some families have such a wide range of characters that they appear twice in the key. In these cases a number in brackets refers to the other couplet in which the family appears.

Most of the following characters:
Prostomium with sensory appendages. Pharynx armed with jaws or teeth. Parapodia well developed and often bear compound setae . (Polychaeta Errantia) Part 1 p. 20

Most of the following characters:
Prostomium seldom with sensory appendages and often fused to the peristome which may bear grooved palps, buccal cirri or a branchial crown. No jaws or teeth. Parapodia often reduced and compound setae very rare (Polychaeta Sedentaria) Part 2 p. xii (2)

Polychaeta Sedentaria

1 Body short and stout with a tuft of filamentous anal gills (fig. 0.5.8) . . . Sternaspidae (p. 648)

Body elongate. No anal gills 2

2 Head modified by the development of frilly membranes (fig. 0.6.1b), buccal tentacles fig. 0.6.6 or a branchial crown around the mouth (fig. 0.6.7). Prostomium often reduced and indistinguishable from the buccal segment 3

– Head not greatly modified. Prostomium usually well developed and obvious. Buccal segment sometimes with parapodia and may bear a pair of adhesive palps (fig. 0.4.1b) or a few grooved tentacles fig. 0.4.6b 17

3 Buccal segment with tentacles retractile into the mouth (fig. 0.6.5) . . . . . Ampharetidae (22) (p. 686)

– Buccal segment with a pair of adhesive palps (often broken off) or several grooved tentacles dorsally 4

– Buccal segment without food-gathering appendages of any sort 10

4 Hooded hooks (fig. 0.4.1.v) present in the posterior segments at least. Parapodia always well developed 5

Hooded hooks entirely absent. Parapodia sometimes reduced to mere ridges . . . 6

5 Head flattened and spade-shaped. Gills absent. Palps papillose (fig. 0.4.2) . . . . . Magelonidae (p. 494)

— Head not flattened. Gills often present. Palps grooved (fig. 0.4.1) . . Spionidae (p. 459)

6 Long filamentous gills at least on anterior segments. Parapodia reduced to ridges . 7

— Gills not long and filamentous. Parapodia not in the form of ridges 8

7 Body divided into an anterior region of short segments and a posterior region of long segments (fig. 0.4.5) . . . . . Heterospionidae (p. 518)

— Body not divided into regions; segments do not differ greatly in length (fig. 0.4.6) . . . . . Cirratulidae (p. 498)

8 Both rami of anterior parapodia well developed and provided with long setae (fig. 0.4.4) . . . . . Trochochaetidae (p. 519)

— Either the notopodium or the neuropodium of anterior segments reduced or absent . 9

9 Anterior segments uniramous having no neuropodia. Posterior segments biramous with neurosetae in the form of minute uncini (fig. 0.4.3) . . . Chaetopteridae (p. 522)

— Anterior segments with notopodia reduced to cirriform lobes with an internal acicula but not setae (fig. 0.4.8) . . . . . Aspitobranchidae (p. 521)

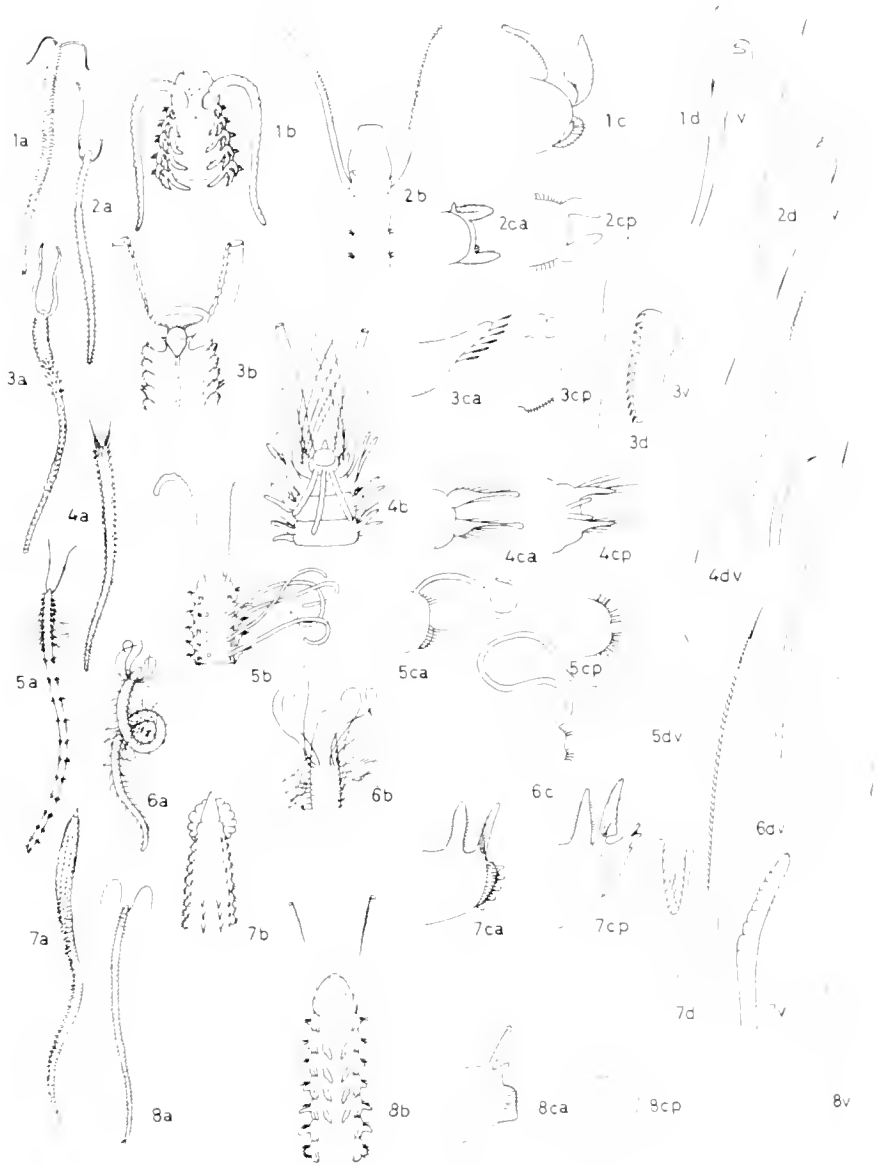


FIG. 0.4. *Illustrations of Family Characters.* 1, Spionidae. 2, Magelonidae. 3, Chaetopteridae. 4, Trochochaetidae. 5, Heterospionidae. 6, Cirratulidae. 7, Orbiniidae. 8, Aspitobranchidae. (A) Entire worm. (B) Head. (CA) Anterior foot. (CP) Posterior foot. (D) Notoseta. (V) Neuroseta.

10 Dentate-crested hooks (fig. 0.5.7v) present in posterior segments if not earlier . . . 15
— No dentate-crested hooks 11
11 Capillary setae crenulate (fig. 0.4.7d) . . . . . ORBINIDAE (p. 533)
Capillary setae not crenulate 12
12 A single long filiform gill arising from the dorsum of setiger 2 or 3 (fig. 0.5.3)
COSSURIDAE (p. 581)
— Gills, if present, not single and median 13
13 Capillary setae winged in anterior segments. A median antenna may be present (fig. 0.5.1)
PARAONIDAE (p. 555)
— Capillary setae not winged. A median antenna is never present 14
14 Prostomium a tapered cone. Body fusiform, often grooved ventrally (fig. 0.5.2)
OPHELIIDAE (p. 570)
— Prostomium notched or lobed. Body swollen anteriorly but not grooved ventrally (fig. 0.5.4) . . . . . SCALIBREGMIDAE (p. 583)
15 Dentate-crested hooks with hoods (fig. 0.5.5). Body resembling an oligochaete
CAPITELLIDAE (p. 591)
— Dentate-crested hooks without hoods. Body not resembling an oligochaete . . . 16
16 Middle segments greatly elongated but never annulated (fig. 0.5.7). Gills rare
MALDANIDAE (p. 613)
— Middle segments not greatly elongated but always annulated (fig. 0.5.6). Gills always present . . . . . ARENICOLIDAE (p. 606)

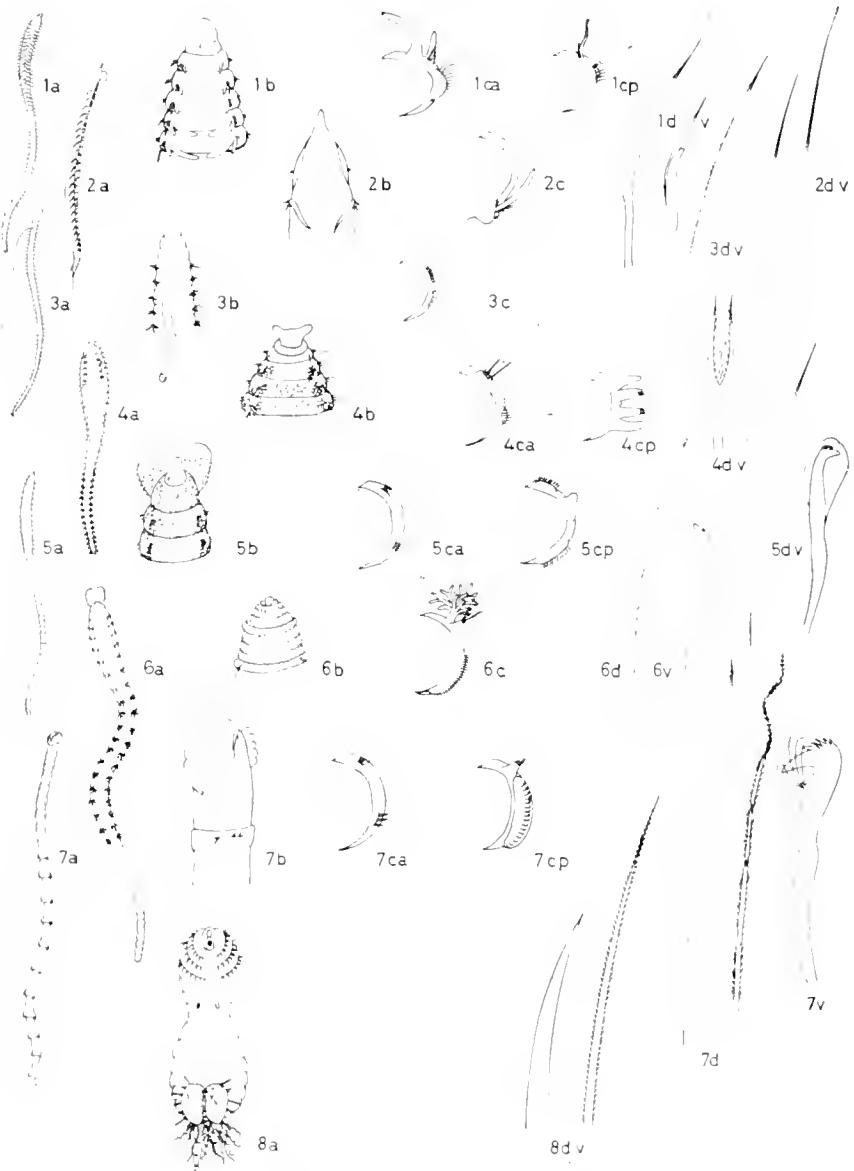


FIG. 0.5. *Illustrations of Family Characters.* 1, Paraonidae. 2, Opheliidae. 3, Cossuridae. 4, Scalibregmidae. 5, Capitellidae. 6, Arenicolidae. 7, Maldanidae. 8, Sternaspidae. (A) Entire worm. (B) Head. (CA) Anterior foot. (CP) Posterior foot. (D) Notoseta. (V) Neuroseta.

17 Head usually with a frilled food-gathering membrane. Never any tentacles, palps or bipinnate radioles (fig. 0.6.1) . . . . . OWENIIDAE (p. 649)
– Head without a frilled food-gathering membrane but has either tentacles or palps or bipinnate radioles 18
18 Head with stout setae 19
Head without setae 21
19 Capillary setae annulated. No marked body regions. Setae on head usually in the form of a cephalic cage (fig. 0.6.2) . . . . . FLABELLIGERIDAE (p. 652)
– Capillary setae not annulated. Body regions well marked. Setae on head are paleae which form part of an operculum 20
20 Two to three rows of paleae. Caudal region long and cylindrical. Tube attached (fig. 0.6.3) . . . . . SABELLARIIDAE (p. 667)
— One row of paleae. Caudal region short and flattened. Tube free (fig. 0.6.4) PECTINARIIDAE (p. 678)
21 Head with soft tentacles for deposit feeding. Gills often present on the first few segments. Setal types not inverted in the posterior region 22
— Head with a crown of bipinnate radioles (fig. 0.6.7) for suspension feeding. No gills behind the head. Setal types inverted in the posterior region 23
22 Tentacles retractile into the mouth. They are either grooved or papillose (fig. 0.6.5) AMPHARETIDAE (3) (p. 686)
— Tentacles not retractile into the mouth. They are grooved, never papillose (fig. 0.6.6) TEREBELLIDAE (p. 706)
23 Tube sandy or muddy. An operculum is never present among the radioles (fig. 0.6.7) SABELLIDAE (p. 751)
— Tube calcareous. A stalked operculum often present among the radioles (fig. 0.6.8) SERPULIDAE (p. 791)

FIG. 0.6. *Illustrations of Family Characters.* 1, Oweniidae. 2, Flabelligeridae. 3, Sabellariidae. 4, Pectinariidae. 5, Ampharetidae. 6, Terebellidae. 7, Sabellidae. 8, Serpulidae. (A) Entire worm. B Head. CA Anterior foot. CP Posterior foot. D Notoseta. H Palea from operculum. T Tube. V Neuroseta.

Family SPIONIDAE Grube, 1850

Body vermiform and rather flattened consisting of numerous segments. Body regions not marked except by the shape of the parapodia. Prostomium variable in shape and sometimes with lateral projections but without true antennae. A pair of long, grooved peristomial palps. Proboscis unarmed. Parapodia biramous. Branchiae dorsal and often straplike or united to the notopodial lamellae. Neuropodia as lateral ridges or lamellae. Sensory areas extend back from the prostomium over a variable number of anterior segments. Pygidium with anal cirri or a glandular ventral cushion. Notosetae are winged capillaries anteriorly but hooks or specialised notosetae may be present posteriorly. Neurosetae are winged capillaries for the first few feet but hooded hooks appear in later segments.

Records from southern Africa

Aonides oxycephala (Sars)	44Ci, 45Pi, 48Cs, 51Cs, —Ms
Boccardia ligerica Ferronière	? 44Ce
Boccardia polybranchia (Haswell)	40Ni, 44Ci
as *Polydora polybranchia* Haswell	26Ws
Boccardia pseudonatrix Day	51Cs
Dispio magna (Day)	
as *Spio magnus* Day	44Ci
Laonice cirrata (Sars)	48Cd, 51Csd
Malacoceros indica (Fauvel)	
as *Scolelepis indica* Fauvel	40Ni, 45 PiNi
Nerinides gilchristi Day	51Csd
Polydora antennata Claparède	44Ci, 51Cs
Polydora armata Langerhans	32? Ci
Polydora caeca (Oersted)	45Ni
Polydora capensis Day	44Ci, 51Cs
Polydora ciliata (Johnston)	27Mi, 45Pi
Polydora flava Claparède	51Cs
Polydora hoplura Claparède	44Ci, 51Cs
Polydora hoplura var. *inhaca* Day	45Pi
Polydora cf. *giardi* Mesnil	44Ci, 51Cs
Polydora kempi Southern	45Pi
Polydora maculata Day	53Cs
Polydora normalis Day	42NiPi
Prionospio bocki Soderström	—Ms
Prionospio cirrifera Wiren	51Cs
Prionospio cirrobranchiata Day	51Csd
Prionospio ehlersi Fauvel	48As, —Nsd, Pd
Prionospio malmgreni Claparède	15Cs, 21Ci, 34Cd, 56Csd
as ? *Prionospio capensis* McIntosh	10Cs
as *Prionospio malmgreni* var.	15Cs

Prionospio pinnata Ehlers	21AsCs, 31As, 48WsdCd, 51Csd, Ns
Prionospio sp.	56Cd
Prionospio saldanha Day	51Csd
as *Prionospio* sp.	44Ci
Prionospio sexoculata Augener	26Ws, 44Ci, 45Ni, 51Ci
Prionospio steenstrupi Malmgren	55Ca, 56Csd, Nsd
as *Prionospio malmgreni* var. *dubia* Day	51Csd
as *Prionospio chlorsi* (nom Fauvel)	48Csd
Pygospio elegans Claparède	51Ci
Rhynchospio glutaea (Ehlers)	51Cs
Scolelepis lefebvrei (Gravier)	53Mi
Scolelepis squamata (Muller)	
as *Nerine cirratulus* (Delle Chiaje)	44Ci, 45PiNi, 53Mi
as *Nerine cirratulus* var. *capensis* McIntosh	32Ci
Spio filicornis (Muller)	44Ci
Spiophanes bombyx (Claparède)	48Cs, 51Csd
Spiophanes soederstromi Hartman	51Csd, 55Ca, Nsd

BIOLOGICAL NOTES

The spionids are typical deposit feeders. All of them have a pair of long peristomial tentacles or "palps" which they stretch out over the substratum to gather food particles. These particles travel along a ciliated groove to the lips where they are sorted and the smaller edible particles ingested; however the sorting mechanism does not seem to be very efficient for the gut contains many sand grains as well as detritus.

All spionids live in burrows which they line with a fragile mucoid secretion. *Scolelepis* (olim *Nerine*) burrows in intertidal sandbanks where there is sufficient water movement to keep the detritus moving. *Malacoceros* (olim *Scolelepis*) burrows in the mud-filled crevices between stones; *Spio* often forms dense colonies on sandbanks and when the current washes away the loose sand between the tubes, they stand out like a host of tiny chimneys. Many other genera are common in dredgings on sandy mud. The various species of *Prionospio* must be very abundant for their larvae are present in enormous numbers in neritic plankton samples. The larvae of *Polydora* are very common too but the worms of this genus burrow in calcareous materials using the stout hooks on the fifth setiger for the purpose. Some species of *Polydora* live in soft limestone, others in dead coral and quite a number bore into living mollusc shells. Most of the shells of abalone (*Haliotis midae*) on Cape coasts are riddled with *Polydora* and *P. ciliata* is notorious for forming "mud blisters" in oyster shells. The burrow is roughly pear-shaped and lined with black mud which is easily seen through the nacreous lining of the shell. Such mud blisters weaken and may even lead to the death of the oyster though *Polydora* does not feed on oyster flesh. Like all other spionids it is a detritus feeder and its palps may be seen projecting from the little mud chimney which is continuous with the mud of the blister.

Most spionids lay large eggs enclosed in tough egg-capsules. These may be

liberated directly into the sea water so that all development takes place in the plankton, or, they may be protected inside the burrow during the early developmental stages. *Polydora* does not release the larvae until they have reached the three-setiger stage. *Pygospio* has a more complex life history. The individual ova are small and contain little yolk. Groups of ova are enclosed in brood capsules and strings of brood capsules are then attached to the lining of the mother's tube. Only a few of the ova are fertilised and these grow rapidly and at an early stage develop an enormous embryonic mouth. By this means the other ova are engulfed. The surviving embryos then grow into ten-setiger larvae before they are liberated for a brief planktonic existence.

THE MAIN DIAGNOSTIC CHARACTERS

Important studies on the Spionidae have been made by Mesnil (1896), Söderstrom (1920) and Fauvel (1927).

The head. The prostomium may be pointed, rounded, notched or develop lateral peaks anteriorly and is often produced back as a ridge with or without an *occipital tentacle*. Eyes are of doubtful value as they may coalesce or be hidden beneath the skin. The peristome supports and may enfold the sides of the prostomium or even be produced upwards as lateral "wings" in some species. The peristome bears a pair of grooved, food-gathering "palps" which are not homologous with the palps of the Errantiate families; they are often lost when the animal dies.

Body regions. These are not marked but there are changes in the setae, in the shape of the parapodia and the development of gills. The first setiger is often small or fused to the peristome and if overlooked will cause confusion.

Branchiae. The segmental arrangement and shape of the gills is of the first importance, also the degree of fusion between the gill and the postsetal lobe of the notopodium. In *Prionospio* the gills may develop lateral papillae (pennate gills), but unfortunately the gills fall off easily.

Parapodia. The postsetal lamella of the notopodium is often well developed anteriorly but low posteriorly. It may be joined to its fellow by a ridge across its back in some segments. The neuropodium usually forms a low rounded postsetal lamella and is of minor importance.

The setae. These include capillaries, hooded hooks and specialised forms whose shape and segmental position is important. The capillaries have a flange or wing in anterior segments but this is reduced or absent posteriorly. The hooded hooks appear first in the neuropodia but may also be present in posterior notopodia. The segmental arrangement and number of teeth above the main fang or rostrum is surprisingly constant. Specialised setae provide very useful characters but it should be noted that those in the posterior notopodia of *Polydora* only appear near the end of the body and if this is absent the worm is unidentifiable.

The pygidium. This is glandular in the larva and may remain in the adult as a ventral cushion or become flattened and saucer-like or be produced into two to four anal cirri.

Key to Genera

1 Fourth or fifth segment with enlarged and modified hooks (fig. 18.1.a) . . . 2
– Fourth and fifth segment with normal setae only 4
2 Fourth segment with enlarged hooks . . . . . ***POLYDORELLA****
– Fifth segment with enlarged hooks 3
3 Branchiae start on setiger 2 (fig. 18.1.k) . . . . . ***BOCCARDIA*** (p. 462)
– Branchiae start after setiger 5 . . . . . ***POLYDORA*** (p. 465)
4 Branchiae absent. (A specialized neuroseta in the first foot (fig. 18.5.d)) ***SPIOPHANES*** (p. 474)
– A single pair of large branchiae on setiger 1 . . . . . ***STREBLOSPIO****
– A few branchiae starting well back or a pair on setiger 1 and then a gap before the rest ***PYGOSPIO*** (p. 475)
– Branchiae start on setiger 1 or 2 and continue over a few or many consecutive segments 5
5 Branchiae continue almost to the posterior end and may be partly or completely fused to the notopodial lamellae 6
– Branchiae absent from posterior segments. Branchiae never fused to the notopodial lamellae 11
6 Prostomium with laterally projecting peaks 7
– Prostomium without laterally projecting peaks 8
7 Branchiae from setiger 1 . . . . . ***MALACOCEROS*** (p. 477)
– Branchiae from setiger 2 . . . . . ***RHYNCHOSPIO*** (p. 478)
8 Branchiae from setiger 1. No notopodial hooks. Either a ventral cushion or anal cirri below the anus 9
– Branchiae from setiger 2. Notopodial hooks may be present in posterior feet. A ventral cushion below the anus (fig. 18.7.g) 10
9 Branchiae mainly fused to dorsal lamellae anteriorly. Small accessory branchiae between the notopodia of middle segments. A ventral cushion below the anus ***DISPIO*** (p. 431)
– Branchiae mainly free from dorsal lamellae anteriorly. No accessory branchiae. Anal cirri present . . . . . ***SPIO*** (p. 480)
10 Notopodial hooks present in posterior segments. Neuropodial lamellae bilobed posteriorly . . . . . ***SCOLELEPSIS*** (p. 482)
– No notopodial hooks. Neuropodial lamellae not notched . . ***NERINIDES*** (p. 484)
11 Less than 12 pairs of branchiae which may be pennate or smooth and start on setiger 1 or 2 . . . . . ***PRIONOSPIO*** (p. 485)
– More than 12 pairs of branchiae which are never pennate and never start on setiger 1 . 12
12 Prostomium pointed. Notopodial hooks in posterior segments . . ***AONIDES*** (p. 478)
— Prostomium rounded. Notopodial hooks absent . . . . ***LAONICE*** (p. 480)

BOCCARDIA Carazzi, 1895

Prostomium blunt to bilobed anteriorly and with a tapering keel posteriorly. Eyes usually present. Branchiae start on setiger 2, are absent from setiger 5 and then continue. Fifth segment enlarged and provided with stout burrowing hooks. Anterior segments with winged capillaries in both rami. Posterior notopodia with capillaries only. Middle and posterior neuropodia with hooded bidentate hooks. Pygidium glandular and often saucer-shaped.

Type species: *Polydora polybranchia* Haswell, 1885.

Key to Species

1 Special setae of fifth setiger are all simple hooks (fig. 18.1.j) . . . . ***B. ligerica***
– Special setae of fifth setiger in two rows, only the second row being simple hooks . . 2

2 First row of special setae have swollen ends surmounted with a fibrillar brush (fig. 18.1.d) No notosetae on setiger 1 . . . . . ***B. polybranchia***
– First row of special setae have swollen ends with a central cone surrounded by a raised rim (fig. 18.1.m). No notosetae present on setiger 1 . . . . ***B. pseudonatrix***

Boccardia cf. ***ligerica*** Ferronière, 1898
(fig. 18.1.j)

? *Boccardia ligerica* Ferronière, 1898: 109, pl. 6 figs. a–i; Fauvel, 1937: 57, fig. 19 n–s.
Boccardia cf. *ligerica*: Day, 1955: 415.

Length about 25 mm. Prostomium notched anteriorly and with the keel extending back to setiger 2. Four eyes. Notosetae present on setiger 1. Branchiae from setiger 2, absent from 5 and continuing to setiger 30. Enlarged setae of setiger 5 (fig. 18.1.j) are plain blunt hooks. Bidentate hooded hooks appear in the neuropodium of setiger 7. No specialised notosetae in posterior segments.

TYPE LOCALITY: Estuary of Loire, France.

RECORDS: ? Cape (33/18/e).

DISTRIBUTION: France (e).

Boccardia polybranchia (Haswell, 1885)
(fig. 18.1.a–h)

Polydora polybranchia Haswell, 1885: 275.
Polydora (*Boccardia*) *polybranchia*: Fauvel, 1927: 58, fig. 20 a–i.

A large species reaching 25 mm. for 80 segments (fig. 18.1.a). Prostomium (fig. 18.1.b) outlined in black, notched anteriorly and with a keel extending back to setiger 2. Nought to ten eye-spots. No notosetae on setiger 1. Branchiae (fig. 18.1.c) united to the dorsal lamellae and present on setigers 2–4, absent from setiger 5 and then continue to the middle of the body. Enlarged hooks of setiger 5 of two types; front row (fig. 18.1.d) with expanded and truncate ends surmounted by a dense brush of fibrils and second row of simple hooks (fig. 18.1.e). Bidentate hooded hooks (fig. 18.1.f) appear in the neuropodium of setiger 7. No specialised notosetae in posterior segments. Pygidium (fig. 18.1.h) small, concave posteriorly.

TYPE LOCALITY: S.E. Australia.

RECORDS: South West Africa (22/14 i and 26/15 s), Cape (from 33/18 i and 34/21 e, i to 28/32 e).

DISTRIBUTION: English Channel (i, s), Bay of Biscay, Brazil, Subantarctic (Magellan area), Kerguelen (i), Macquarie Is. (i), New Zealand (i, s), Mediterranean, Japan, Australia.

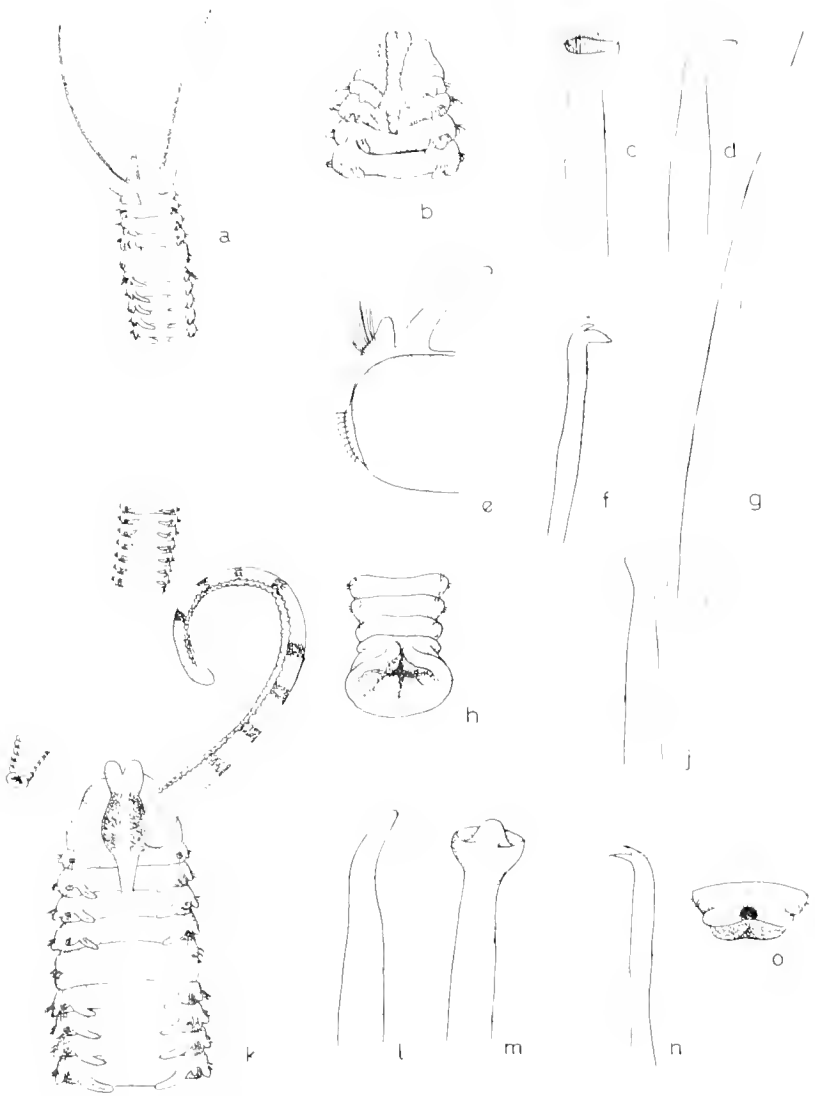


FIG. 18.1. *Boccardia polybranchia*. (A) Entire worm (four times natural size). (B) Head. (C and D) Anterior and posterior types of enlarged setae of setiger 5. (E) Tenth foot. (F) Hooded hook. (G) Posterior notoseta. (H) Pygidium. *Boccardia* cf. *ligerica*. (J) Enlarged hook of setiger 5. *Boccardia pseudonatrix*. (K) Anterior end. (L and M) Enlarged setae of setiger 5. (N) Hooded hook. (O) Pygidium.

Boccardia pseudonatrix Day, 1961
(fig. 18.1.k–o)

Boccardia pseudonatrix Day, 1961 : 493, fig. 5 e–j.

Body about 10 mm. long with 70 segments. Prostomium (fig. 18.1.k) bilobed with a posterior keel reaching setiger 2. Two eye-spots. First setiger with a well developed notopodium and several notosetae. Branchiae on setigers 2, 3, 4, 6 and all subsequent segments to setiger 40. Fifth setiger without notosetae and with two types of large hooks. The three hooks of the first row (fig. 18.1.m) each end in a blunt cone partially surrounded by a raised margin. The four hooks of the second row (fig. 18.1.l) are each simple and curved. Bidentate hooded hooks (fig. 18.1.n) appear in the neuropodium of setiger 7. No special posterior notosetae. Pygidium (fig. 18.1.o) very small.

Type locality : Knysna Estuary, South Africa.

Records : Cape (34 23′c).

Distribution : No other record.

POLYDORA Bosc, 1802

Small tubicolous worms burrowing in shell or limestone. Prostomium blunt or bilobed anteriorly but extending back as a dorsal keel. Eyes present or absent. Anterior parapodia with winged capillaries in both rami. Setiger 5 enlarged and bears stout hooks for burrowing. Posterior notosetae may include specialised setae as well as capillaries. Bidentate and usually hooded hooks present in the neuropodia from setiger 7–10 onwards. Branchiae start behind setiger 5 and are not united to the notopodial lamellae. Pygidium swollen, glandular and often saucer-shaped.

Type species : *Polydora cornuta* Bosc, 1802.

Key to Species

1 Posterior neuropodial hooks without hoods and unidentate (fig. 18.2.f, g, h). (Posterior notosetae include two to three straight needles) . . . . . ***P. capensis*** (p. 466)
– Posterior neuropodial hooks hooded and bidentate 2
2 Posterior notosetae include specialized types 3
– Posterior notosetae are all capillaries 6
3 Enlarged hooks of setiger 5 bidentate. Posterior notosetae include one to two stout hooks (fig 18.2.l, m) 4
– Enlarged hooks of setiger 5 hooded. Posterior notosetae include a cone of stout needles (fig. 18.2.i, j) . . . . . ***P. armata*** (p. 466)
– Enlarged hooks of setiger 5 unidentate. Posterior notosetae include a bundle of fine needles or three to four spines 5
4 Enlarged fifth hooks with a minor spur twisted around the main terminal tooth (fig. 18.2.l) ***P. hoplura hoplura*** (p. 468)
– Enlarged fifth hooks end in a shelf from which two unequal teeth arise side by side (fig. 18.2.n) . . . . . ***P. hoplura inhaca*** (p. 468)
5 Posterior notosetae include a bundle of minute needles (fig. 18.3.d) . . . ***P. flava*** (p. 468)
– Posterior notosetae include three to four straight stout spines (fig. 18.3.g) . ***P. caeca*** (p. 469)

6 Hooded hooks start in the neuropodium of setiger 7. Enlarged hooks of setiger 5 either unidentate or bidentate. Branchiae may start on setiger 7, 8 or 9 7
– Hooded hooks start after setiger 7. Enlarged hooks of setiger 5 always unidentate. Branchiae always start on setiger 7 8
7 Enlarged hooks of setiger 5 with a spur (fig. 18.3.j). Branchiae from setiger 7 to posterior end . . . . . ***P. ciliata*** (p. 469)
– Enlarged hooks of setiger 5 with a basal sheath simulating a spur (fig. 18.4.b). Branchiae from setiger 9 to setiger 25 . . . . . ***P.*** cf. ***giardi*** (p. 471)
– Enlarged hooks of setiger 5 without a spur (fig. 18.3.l). Branchiae from setiger 8 to the posterior end . . . . . ***P. normalis*** (p. 471)
8 Hooded hooks start on setiger 8. Branchiae do not reach the posterior end. Prostomium with one occipital tentacle 9
– Hooded hooks start on setiger 9. Branchiae reach the posterior end. Prostomium with two occipital tentacles (fig. 18.4.c) . . . . . ***P. maculata*** (p. 472)
9 Enlarged fifth hooks like pointed spoons accompanied by normal winged capillaries (fig. 18.4.f, g) . . . . . ***P. antennata*** (p. 473)
– Enlarged fifth hooks are plain and blunt accompanied by setae like curved fangs with a basal swelling (fig. 18.4.j, k) . . . . . ***P. kempi*** (p. 473)

Polydora capensis Day, 1955
(fig. 18.2.a–h)

Polydora capensis Day, 1955: 416, fig. 1 k–s.

Body (fig. 18.2.b) up to 20 mm. long with 100 segments. Prostomium (fig. 18.2.b) not notched anteriorly, posterior keel extending to setiger 3. Buccal segment forms supporting lobes on either side of prostomium. Notosetae present on setiger 1. Enlarged fifth setae (fig. 18.2.e) are plain blunt hooks. Branchiae (fig. 18.2.c) from setiger 7 to 37. Neuropodial hooks from setiger 7; they number three to five and are both hooded and bidentate anteriorly (fig. 18.2.f). Posteriorly they lose their hoods (fig. 18.2.g), become unidentate (fig. 18.2.h) and are reduced to two to three. Posterior notosetae include about three straight spines as well as capillaries. Pygidium (fig. 18.2.d) small. Found boring in living gastropod shells.

Type locality: Simonstown, South Africa.

Records: Cape (from 32°17′ S and 34°18′ E, S to 32°28′ S).

Distribution: South African endemic.

Polydora armata Langerhans, 1880
(fig. 18.2.i–j)

Polydora armata Langerhans, 1880: 93, pl. 4 fig. 5; Fauvel, 1927: 55, fig. 19 a–e.

Body small, about 5 mm. long with 24–45 segments. Prostomium bilobed anteriorly and produced back as a dorsal ridge reaching setiger 2. No eyes. Two to three notosetae in the first foot. Branchiae from setiger 7 to 14. Enlarged setae of fifth foot (fig. 18.2.i) number two to three, each bluntly hooked with a stout hood. Three to four bidentate and hooded hooks from the neuropodium of setiger 7

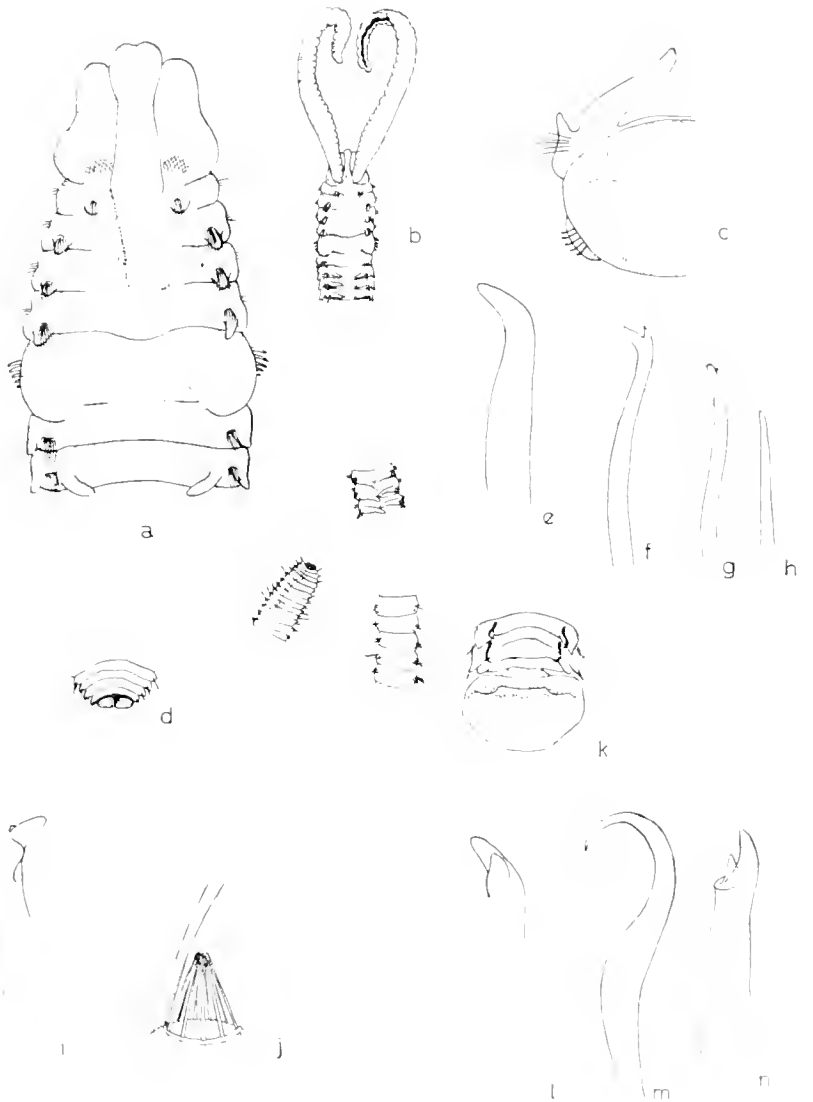


FIG. 18.2. *Polydora caprensis*. (A) Anterior end. (B) Entire worm six times natural size. (C) Ninth foot. (D) Pydigium. (E) Enlarged fifth hook. (F) Anterior bidentate hooded hook. (G) Posterior bidentate hooded hook. (H) Far posterior hook from neuropodium. *Polydora armata* (after Fauvel, 1927). (I) Enlarged fifth hook. (J) Cone of spines from a posterior notopodium. *Polydora hoplura*. (K) Pygidium. (L) Enlarged fifth hook. (M) Posterior notopodial hook. *Polydora hoplura inhaca*. (N) Enlarged fifth hook.

onwards. Posterior notosetae include eight to twelve spines which form a cone when retracted (fig. 18.2.j) and a funnel when everted.

TYPE LOCALITY: Madeira.

RECORDS: One doubtful record from an unknown locality.

DISTRIBUTION: North Atlantic from the English Channel (i, s) to Morocco (i) and Madeira Is.; Gulf of Mexico (d); Mediterranean; Ceylon; North Pacific (Japan).

Polydora hoplura hoplura Claparède, 1870
(fig. 18.2.k–m)

Polydora hoplura Claparède, 1870: 58, pl. 22 fig. 2; Fauvel, 1927: 50, fig. 17 a–g.

Large worms reaching 50 mm. in length which burrow in soft limestone. Prostomium fairly deeply notched, often blackened but eyes few or absent. No notosetae on first foot. Branchiae from setiger 7 to end of body. Enlarged hooks of fifth foot (fig. 18.2.l) each with a lateral twisted spur. About eight bidentate and hooded hooks from setiger 7 onwards. On the last few segments before the pygidium the notosetae include one to two enlarged, yellow, recurved hooks (fig. 18.2.m). Pygidium (fig. 18.2.k) saucer-like and often blackened.

TYPE LOCALITY: Naples.

RECORDS: Cape (from 33 18 i, s to 34 23 i).

DISTRIBUTION: North Atlantic from Ireland to the English Channel (e, i, s); Mediterranean.

Polydora hoplura inhaca Day, 1957*
(fig. 18.2.n)

Polydora holplura var. *inhaca* Day, 1957: 99, fig. 6 k, l.

Generally similar to typical *P. h. hoplura* but prostomium rounded, eyes absent, gills from setiger 7 to middle of body and enlarged hooks of setiger 5 distinctive. Each ends in a shelf from which a large and a small tooth arise side by side (fig. 18.2.n).

TYPE LOCALITY: Inhaca Is., Delagoa Bay.

RECORD: Mocambique (26 32 i).

DISTRIBUTION – no other records.

Polydora flava Claparède, 1870
(fig. 18.3.a–d)

Polydora flava Claparède, 1870: 487; Fauvel, 1927: 52, fig. 17 n–u.

Length up to 45 mm. for 150 segments. Prostomium (fig. 18.3.a) notched anteriorly and produced back as a ridge reaching setiger 2. No eyes. A few notosetae on the first foot. Branchiae start on setiger 7–9 and extend back past the

*Probably conspecific with *Polydora colonia* Moore 1907 from Massachusetts, U.S.A.

middle of the body. Enlarged hooks of fifth foot (fig. 18.3.c) have curved blunt tips flattened on the concave side and are accompanied by fine straight spear-bladed capillaries (c^1). Three to four bidentate and hooded hooks from the neuropodium of setiger 7 onwards. Posterior notopodia have packets of very fine needles embedded near the base of the normal capillaries.

TYPE LOCALITY: Gulf of Naples.

RECORDS: Cape (33°18′S and 34°18′S).

DISTRIBUTION: English Channel (s); Mediterranean (i, s); Ceylon: Sumatra; Japan and far northern Pacific.

Polydora caeca (Oersted, 1843)
(fig. 18.3.e–h)

Leucodorum caecum Oersted, 1843: 39.
Polydora caeca: Fauvel, 1927: 52, fig. 18 a–k.

Length reaching 40 mm. for 130 segments. Prostomium (fig. 18.3.e) deeply notched anteriorly and produced back as a dorsal ridge reaching setiger 2. Eyes four or absent. A few notosetae on the first foot. Branchiae start on setiger 7–9 and extend past the middle of the body. The special setae of setiger 5 include a row of fine hastate setae and an oblique row of stout hooks excavated on the concave side (fig. 18.3.f). Bidentate and hooded neuropodial hooks from setiger 7. Posterior notopodia (fig. 18.3.g) with three to four stout straight spines as well as the capillaries. Pygidium (fig. 18.3.h) saucer-shaped with a dorsal notch.

TYPE LOCALITY: Oresund, Sweden.

RECORDS: Natal (29°31′S); Mocambique (26°32′S).

DISTRIBUTION: Arctis (s); North Atlantic from Greenland (s) to North Carolina (s) and English Channel (i, s) to Morocco (i); Mediterranean; tropical Indian Ocean.

Polydora ciliata (Johnston, 1838)
(fig. 18.3.i–j)

Leucodore ciliatus Johnston, 1838: 67.
Polydora ciliata: Fauvel, 1927: 49, fig. 16 i–p.

Length up to 30 mm. for 100 segments. Prostomium (fig. 18.3.i) slightly notched anteriorly and produced back as a ridge reaching setiger 2. Four eyes in juveniles but these may be lost later. No notosetae on the first foot. Branchiae from setiger 7 to near the end of the body. Enlarged hooks of fifth segment (fig. 18.3.j) are stout hooks with an accessory tooth. Hooded and bidentate hooks start in the neuropodium of setiger 7. No specialised notosetae in posterior feet. Pygidium saucer-

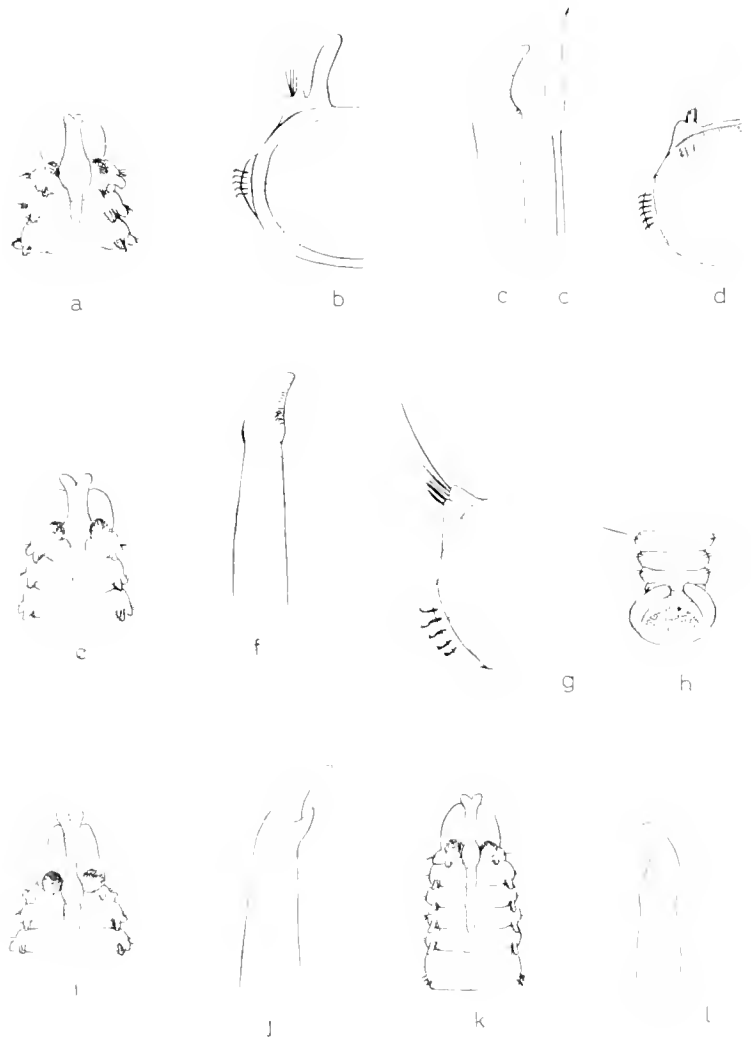


Fig. 3. *Polydora flava*. A Head. B Branchiferous foot ninth . C Enlarged hook and accompanying winged capillary from setiger 7. D Far posterior foot. *Polydora caeca*. E Head. F Enlarged fifth hook. G Far posterior foot. H Pygidium. *Polydora ciliata*. I Head. J Enlarged fifth hook. *Polydora normalis*. K Head. L Enlarged fifth hook.

like and incised dorsally. Both the anterior and the posterior end often blackened. Forms burrows in calcareous rock and "lithothamnion".

TYPE LOCALITY: Berwick, Scotland.

RECORDS: Mocambique (23/35/e, s)

DISTRIBUTION: Baltic Sea; North Atlantic from Scotland (i) and the English Channel (i, s) to Senegal (s); Falkland Is. (i); Mediterranean; Red Sea (s); India (i); Madagascar (i); N. W. Japan.

Polydora normalis Day, 1957
(fig. 18.3.k–l)

Polydora normalis Day, 1957: 97, fig. 6 f–j.

Body rather small, seldom more than 10 mm. for 72 segments. Prostomium (fig. 18.3.k) deeply notched anteriorly and continued back as a ridge to setiger 4. No eyespots. One to two notosetae on the first foot. Branchiae start on setiger 8 and continue to near the end of the body. Enlarged setae of fifth foot as plain lightly curved hooks (fig. 18.3.l). Bidentate and hooded hooks appear in the neuropodium of setiger 7. No obviously modified notosetae in posterior segments but the shorter capillaries have blades that are more striated than usual.

TYPE LOCALITY: Inhaca Island, Delagoa Bay.

RECORDS: Natal (30/30/s and 29/32/i); Mocambique (26/32/i and 25/35/e).

DISTRIBUTION: S.W. Indian Ocean.

Polydora cf. ***giardi*** Mesnil, 1896
(fig. 18.4.a–b)

? *Polydora giardi* Mesnil, 1896: 195, pl. 13 figs. 1–12; Fauvel, 1927: 50, fig. 17 h–m.
Polydora cf. *giardi*: Day, 1961: 493, fig. 5 k.

Body thread-like, about 12 mm. long. Prostomium (fig. 18.4.a) deeply notched anteriorly and continued back as a ridge to setiger 3. No eyes. One to two notosetae on the first setiger. Branchiae start on setiger 9–10 and continue to the 25th or 30th. Enlarged setae of fifth foot as three to four stout hooks (fig. 18.4.b) each with a subterminal sheath which simulates an accessory tooth. Bidentate hooded hooks appear in the neuropodium of setiger 7. No specialised notosetae in posterior segments. Pygidium small, saucer-shaped.

TYPE LOCALITY: Saldanha Bay, South Africa.

RECORDS: Cape (33/18/s to 32/28/i).

DISTRIBUTION: (of *P. giardi*) Ireland; English Channel (i); ? Mediterranean; Pacific from Alaska to western Mexico.

Fig. 18.4. *Polydora* cf. *giardi*. a Head. b Enlarged fifth hooks. *Polydora maculata*. c Head. d Enlarged fifth hooks. *Polydora antennata*. e Head. f Lateral view of setiger 5 showing position of enlarged hooks below notopodial capillaries. g Enlarged fifth hooks. *Polydora kempfi*. h Head. i Lateral view of setiger 5 to show distribution of setae. j Lance-like seta from setiger 5. k Enlarged hook from setiger 5.

Polydora maculata Day, 1963
(fig. 18.4c–d)

Polydora maculata Day, 1963: 117, fig. 9.a–d.

Tubes occur in old gastropod shells inhabited by hermit crabs. Body up to 20 mm. long by 1·0 mm. for 130 segments. Palps barred with black but no other colour markings. Prostomium fig. 18.4c bilobed anteriorly and continued back as a ridge to setiger 2. Two small tentacles one behind the other on the prostomial ridge between the bases of the palps. Branchiae from setiger 7 to the end of the body. Notosetae absent from the first foot. No specialised notosetae in posterior feet. Bidentate hooded hooks in the neuropodia from setiger 9, anteriorly eight to ten

in number, but only four posteriorly. Enlarged hooks of setiger 5 (fig. 18.4.d) have plain, curved and slightly flattened ends. They alternate with a row of normal winged capillaries but there is no separate tuft of setae on segment 5.

TYPE LOCALITY: Off East London, South Africa.

RECORDS: Cape (32/28/s).

DISTRIBUTION: No other record.

Polydora antennata Claparède, 1870
(fig. 18.4.e–g)

Polydora antennata Claparède, 1870: 320, pl. 21 fig. 3; Fauvel, 1927: 56, fig. 19 i–m; Day, 1955: 415.

Length up to 30 mm. for 100 segments. Prostomium (fig. 18.4.e) deeply notched anteriorly and produced back as a dorsal ridge with one free occipital tentacle. Two to four eyes. No notosetae on the first foot. Branchiae start on setiger 7, are poorly developed and end about setiger 40. The enlarged hooks of setiger 5 (fig. 18.4.g) have ends like spoons and are arranged in a horse-shoe (fig. 18.4.f). Bidentate hooded hooks start in the neuropodium of setiger 8. No specialised setae in posterior notopodia. Pygidium saucer-shaped with dorsal and ventral notches.

TYPE LOCALITY: Italy.

RECORDS: Cape (33/18/s and 34/18/i).

DISTRIBUTION: Mediterranean (i); Arabian Sea (d); Ceylon; Gulf of Manaar; Japan.

Polydora kempi Southern, 1921
(fig. 18.4.h–k)

Polydora kempi Southern, 1921: 636, pl. 28 fig. 20 a–j, Day, 1957: 99.

Length about 12 mm. Prostomium (fig. 18.4.h) faintly notched anteriorly and bears one occipital tentacle posteriorly. Four eyes. No notosetae on the first foot. Branchiae from setiger 7 to 14. Setiger 5 (fig. 18.4.i) with normal notopodial capillaries, a double row of specialised setae and normal neuropodial setae. The specialised setae include an anterior row of recurved fang-like forms with a swelling at the base of the blade (fig. 18.4.j) and a posterior row of stout, simple, faintly curved hooks (fig. 18.4.k). Bidentate hooded hooks start in the neuropodium of setiger 8. No specialised notosetae in posterior segments. Pygidium small and saucer-like.

TYPE LOCALITY: Chilka Lake, India.

RECORDS: Mocambique (23/35/e).

DISTRIBUTION: India (e).

SPIOPHANES Grube, 1860

Prostomium with or without lateral peaks, tapered posteriorly and bearing an occipital tentacle. Eyes present or absent. No branchiae. Dorsal lamellae markedly tapered. Notosetae are winged capillaries throughout there being no notopodial hooks. Neurosetae of first foot include numerous winged capillaries plus one to two stout curved setae; the next few neuropodia have winged capillaries only while those further back bear hooded hooks plus an inferior sabre-like seta. Pygidium with anal cirri.

Type species: *Spiophanes kroyeri* Grube, 1860.

Key to Species

1	Prostomium with pointed lateral peaks. Hooks bidentate	***S. bombyx***
–	Prostomium broadly oval anteriorly. Hooks tridentate	2
2	Genital setae smooth	***S. soederstromi***
–	Genital setae furry	***S. kroyeri****

Spiophanes bombyx (Claparède, 1870)
(fig. 18.5.a–e)

Spio bombyx Claparède, 1870: 485, pl. 12 fig. 2.
Spiophanes bombyx: Fauvel, 1927: 41, fig. 14 a–i.

Body up to 60 mm. in length with 180 segments. Prostomium (fig. 18.5.a) broad and straight in front with large, pointed lateral peaks anteriorly and an occipital tentacle posteriorly. Four eyes. A pair of interrupted dorsal sensory grooves from prostomium back to setiger 4. Fibrous glands in the fifth to fifteenth foot. Notopodial lamella of first foot slender, succeeding ones (fig. 18.5.b) broadened basally. Low dorsal ridges join the notopodia from setiger 3 onwards. Neuropodial lamellae of setigers one to four triangular, succeeding ones (fig. 18.5.c) low and rounded. Notosetae of the first foot very long. Enlarged setae in neuropodium of first foot have recurved blades (fig. 18.5.d). From the fifteenth foot onwards the neurosetae include bidentate hooks (fig. 18.5.e) with a partial guard below the rostrum plus an inferior sabre-like seta. Anal cirri cylindrical.

Type locality: Naples.

Records: Cape (34/18,i, s and 34 22,d); Natal (30/30,s).

Distribution: Atlantic from Sweden (d), Scotland (s) and English Channel (i) to North Carolina (i); Mediterranean; Gulf of Mexico; Cape Verde Is. (s); Liberia (s); Angola (s); Falkland Is.; N. Pacific from Japan and W. Canada to S. California.

Spiophanes soederstromi Hartman, 1953
(fig. 18.5.f–j)

Spiophanes söderstromi Hartman, 1953: 41, fig. 14 a–c; Day, 1961: 484.

A slender species up to 25 mm. long with about 60 segments. Prostomium (fig. 18.5.f) transversely oval anteriorly, supported by the buccal segment laterally and narrowed with an occipital tentacle posteriorly. Two pairs of subdermal eyes may be seen. A pair of raised nuchal ridges extend back to setiger 4. Postsetal lobes of first four notopodia pointed, the next 5–8 broader and blunt and succeeding notopodia (fig. 18.5.g) again pointed and slender. Well marked transverse ridges across the dorsum from setiger 16 to 35. Postsetal lamellae of the first four neuropodia pointed but low and rounded on all subsequent feet. Notosetae are winged capillaries throughout, those of the first foot are long but from setiger 4 they are much shorter. A stout and strongly curved seta (fig. 18.5.h) in the neuropodium of the first foot. Tridentate hooks (fig. 18.5.i) with a partial guard or none at all from setiger 15. Sabre-like genital setae (fig. 18.5.j) without fibrils become evident from setiger 15 but may also be present in the anterior segments. Juveniles have brownish parapodia from segment 9–14.

Type locality: Uruguay and South Georgia.

Records: Cape (from 32/17/d, and 34/17/d, v.d, 31/23/s, d to 33/25/s); Natal (31/29/s, d) and 30/30/s).

Distribution: Sweden (d); Greenland (a); Uruguay (s); S. Georgeia (d); ? Okhotsk Sea; ? Behring Sea.

PYGOSPIO Claparède, 1863

Prostomium without lateral peaks but pointed posteriorly. Eyespots present. In the female, branchiae start well back and are limited to a few segments but in the male there is an additional single pair on setiger 2. Branchiae united to the dorsal lamellae. Notosetae are capillaries throughout. Neurosetae are winged capillaries anteriorly and hooded hooks posteriorly. Pygidium with four glandular lobes.

Type species: *Pygospio elegans* Claparède, 1863.

Pygospio elegans Claparède, 1863
(fig. 18.5.k–o)

Pygospio elegans Claparède, 1863: 137, pl. 14 figs. 27–31; Fauvel, 1927: 46, fig. 16 a–h.

A small species 10–15 mm. long with about 60 segments. Prostomium (fig. 18.5.k) faintly bilobed in front and pointed posteriorly. Eyes four to eight, irregular. Notopodial and neuropodial lamellae subequal. Branchiae (fig. 18.5.o) fused to dorsal lamellae. In the female (fig. 18.5.l) they are limited to about eight pairs starting on setiger 11. In the male (fig. 18.5.k) there are double this number and in addition there is a large pair on setiger 2 separate from the notopodial lamellae.

FIG. 18.7. *Spiophanes bombyx*. (A) Head. (B) Fourth foot. (C) Posterior foot. (D) Enlarged hook from neuropodium of first foot. (E) Hooded hook from a posterior neuropodium. *Spiophanes soederstromi*. (F) Head. (G) Posterior foot. (H) Enlarged hook from neuropodium of first foot. (I) Hooded hook from a posterior neuropodium. (J) Sabre-seta from same foot. *Pygospio elegans* (modified from Fauvel, 1927). (K) Head of male. (L) Head of female. (M) Pygidium. (N) Anterior foot. (O) Branchiferous foot. *Malacoceros indica*. (P) Head. (Q) Anterior foot. (R) Posterior foot. (S) Hooded hook. (T) Notopodial capillary. (U) Sabre-seta.

Notosetae are winged capillaries throughout. Anterior neurosetae are capillaries but four to five bidentate hooded hooks are present from setiger 8. Pygidium (fig. 18.5.m) with four glandular lobes.

TYPE LOCALITY: St. Vasst la Hogue, France.

RECORDS: Cape (34/18/i).

DISTRIBUTION: Arctic; Baltic; Scotland (i); English Channel (i, e, s); ? Greenland; Mediterranean; N. Pacific; Okhotsk Sea.

MALACOCEROS Quatrefages, 1843
(= *SCOLELEPIS auctorum sed non* Blainville, 1828)

Prostomium with lateral peaks and a tapered process posteriorly. Eyes may be present. Branchiae start on setiger 1 and continue to near the end of the body; they are incompletely united to the dorsal lamellae in anterior segments. Ventral lamellae not notched. Notosetae are capillaries throughout. Neurosetae are capillaries in anterior segments and hooded hooks posteriorly. Pygidium with anal cirri.

TYPE SPECIES: *Spio vulgaris* Johnston, 1827

KEY TO SPECIES

1	Hooded hooks bidentate, less than 20 per neuropodium	2
–	Hooded hooks tridentate, 20 or more per neuropodium	***M. girardi****
2	Posterior neuropodial lamellae smoothly rounded	***M. fuliginosa****
–	Posterior neuropodial lamellae with a nipple-like projection	***M. indica***

Malacoceros indicus (Fauvel, 1928)
(fig. 18.5.p–u)

Scolelepis indica Fauvel, 1928: 4, fig. 2 g–n; Fauvel, 1930: 35, fig. 7 g–n.

Body up to 60 mm. long by 1 to 1·5 mm. broad. Prostomium (fig. 18.5.p) broad and shield-shaped with laterally projecting frontal peaks. Posterior end of cephalic keel free. Numerous eye specks. Long cirriform branchiae from setiger 1. They are united to the bases of the lanceolate dorsal lamellae which are long anteriorly (fig. 18.5.q) but are reduced to about one-third the length of the branchiae posteriorly (fig. 18.5.r). Neuropdial lamellae rounded in anterior feet but develop a nipple-like projection posteriorly. Notopodial capillaries (fig. 18.5.t) not dotted. Anterior neurosetae include five to six large capillaries with abruptly pointed tips; long bidentate hooded hooks (fig. 18.5.s) appear in the neuropodia from the fortieth or seventieth segment. Sabre-like setae (fig. 18.5.u) present in posterior neuropodia.

TYPE LOCALITY: Krusadai Is., Gulf of Manaar.

RECORDS: ? Cape (34/22/d); Natal (29/31/i and 27/32/i); Mocambique (26/32/i and 23/35/e).

DISTRIBUTION: India (e, i), New Caledonia.

RHYNCHOSPIO Hartman, 1936

Generally similar to *Malacoceros* but branchiae start on setiger 2. Prostomium with frontal peaks. Notosetae are capillaries throughout. Neurosetae are capillaries anteriorly and hooded hooks posteriorly. Anal cirri present.

Type species: *Rhynchospio arenincola* Hartman, 1936a.

Rhynchospio glutaea (Ehlers, 1897)
(fig. 18.6.a–c)

Scolecolepis glutaea Ehlers, 1897: 83, fig. 129–135.
Rhynchospio glutaea: Day, 1961: 491.

A small species only 10–18 mm. long. Prostomial peaks (fig. 18.6.a) directed obliquely forwards. No free occipital tentacle. A variable number of eye-spots. First setiger small. Branchiae (fig. 18.6.b) from setiger 2 to the end of the body; they are strap-like and free from the dorsal lamellae. Neuropodial hooded hooks (fig. 18.6.c) are tridentate and first appear in setiger 16. They have two small teeth side by side above the main fang.

Type locality: Punta Arenas, South America.

Records: Cape (34°18'S) – ? introduced by ship.

Distribution: Antarctica (d); subantarctic (Magellan area (s) and S. Georgia (s)).

AONIDES Claparède, 1864

Prostomium pointed anteriorly and with a tentacular process posteriorly. Eyes may be present. Branchiae start on setiger 2 and are restricted to anterior segments. They are separate from the notopodial lamellae. Neuropodial lamella not notched. Capillaries in both notopodia and neuropodia anteriorly and hooded hooks in both posteriorly. Pygidium with anal cirri.

Type species: *Aonides auricularis* Claparède, 1864 (= *Nerine oxycephala* Sars, 1862).

Aonides oxycephala (Sars, 1862)
(fig. 18.6.d–g)

Nerine oxycephala Sars, 1862: 24.
Aonides oxycephala: Fauvel, 1927: 39, fig. 13 a–e.

Body rounded in section, up to 100 mm. long with 200 well marked segments. Prostomium (fig. 18.6.d) pointed anteriorly with an occipital tentacle posteriorly. Four eyes. Peristomium not forming lateral lobes on the side of the prostomium. Branchiae (fig. 18.6.e) cirriform and completely separate from the large triangular notopodial lamellae and present from setiger 2 to 25. Notopodial and neuropodial postsetal lobes flattened and triangular throughout but gradually decreasing in size posteriorly (fig. 17.6.f). No genital pouches between the parapodia. Narrow

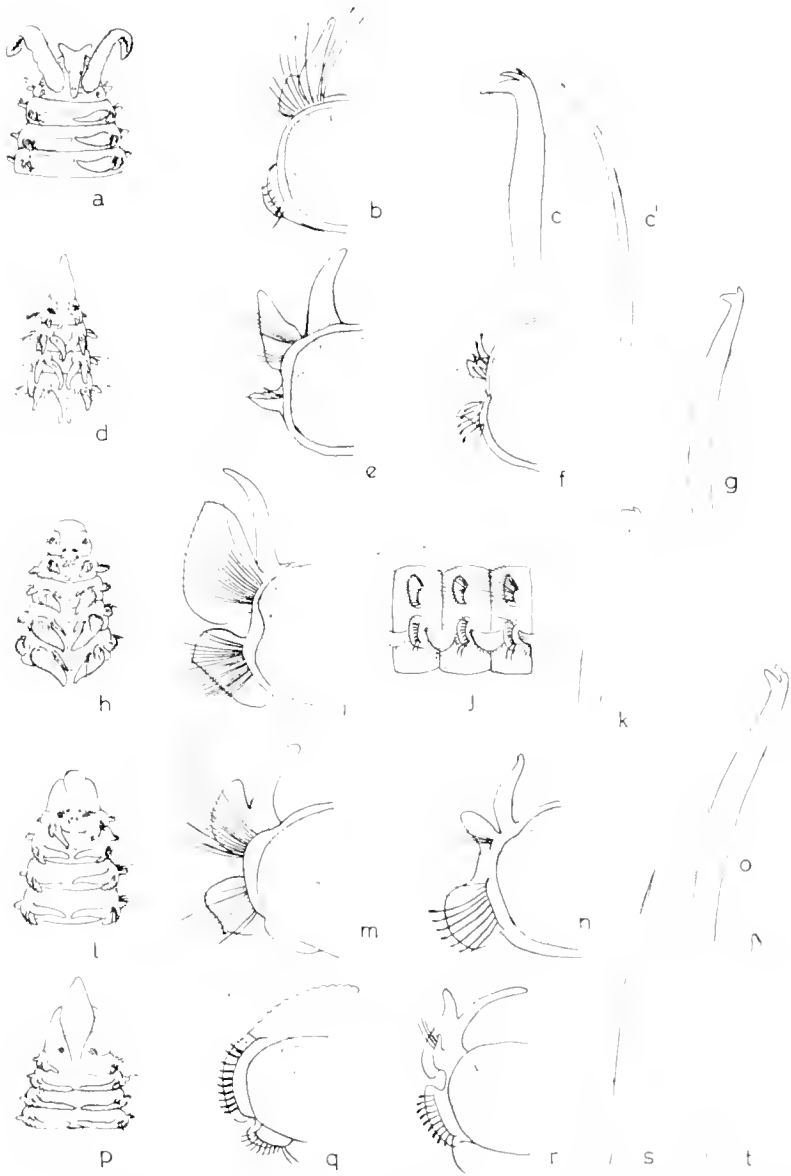


FIG. 18.6. *Rhynchospio glutaea*. (A) Head. (B) Middle foot. (C) Hooded hook. (C') Sabre-seta. *Aonides oxycephala*. (D) Head. (E) Branchiferous foot (tenth). (F) Posterior foot. (G) Hooded hook. *Laonice cirrata*. (H) Head. (I) Branchiferous foot. (J) Lateral view of three segments showing genital pockets. (K) Hooded hook. *Spio filicornis*. (L) Head. (M) Anterior foot. (N) Posterior foot. (O) Hooded hook. *Dispio magna*. (P) Head. (Q) Anterior foot. (R) Posterior foot. (S) Speckled seta. (T) Hooded hook.

bladed capillaries in both rami of the parapodia anteriorly. Between three and four bidentate hooded hooks (fig. 18.6.g) appear in the notopodia from setiger 35–42 onwards and four to five in the neuropodia from setiger 32–35 onwards. Pygdium with four to eight anal cirri.

Type locality: Floro, Norway.

Records: Cape (from 33 17 s and 34 23 e to 33 25 s); Mocambique (26 32 i); Madagascar (s).

Distribution: N. Atlantic from Norway, English Channel (e, i) to Morocco (s); Mediterranean; ? Persian Gulf (s).

LAONICE Malmgren, 1867

Prostomium broadly rounded in front and having an erect occipital tentacle posteriorly. Two eyes. Branchiae free from the notopodial lamellae and present from setiger 2 to the middle of the body. Neuropodial lamellae not notched. Genital pouches between the parapodia in the middle of the body. Notosetae are capillaries throughout. Neurosetae are capillaries anteriorly and hooded hooks posteriorly. Pygidium with anal cirri.

Type species: *Nerine cirrata* Sars, 1851.

Laonice cirrata (Sars, 1851)
(fig. 18.6.h–k)

Nerine cirrata Sars, 1851: 64.
Laonice cirrata: Fauvel, 1927: 38, fig. 12 a–e.

A large species reaching 100 mm. in length for 160 segments. Prostomium (fig. 18.6.h) broadly rounded in front with two large eyes. An occipital tentacle posteriorly followed by a long dorsal ciliated ridge extending over 28–40 segments. Membraneous ridges across middle segments. Branchiae (fig. 18.6.i) long and cirriform and present from setiger 2 to 40. Notopodial lamellae large and auricular in the branchial region. Lateral membraneous pockets (fig. 18.6.j) between the parapodia from setiger 25 in sexually mature specimens. Bidentate hooded hooks (fig. 18.6.k) appear in the neuropodia from setiger 15.

Type locality: Northern Norway.

Records: Cape (from 31 16 d and 34 18 s to 36 21 d and 33 28 s).

Distribution: Cosmopolitan from the Arctic to the Antarctic between shallow and abyssal depths.

SPIO Fabricius, 1785

Prostomium rounded; lateral peaks never present. Eye spots often present. Branchiae from setiger 1 to near the end of the body. They are partly fused to the notopodial lamellae anteriorly and almost separate posteriorly. No accessory

branchiae between notopodia of middle segments. Neuropodial lamellae not notched. Notosetae are capillaries throughout. Neurosetae are capillaries anteriorly and hooded hooks posteriorly. Pygidium with anal cirri.

TYPE SPECIES: *Nereis filicornis* Müller, 1766.

KEY TO SPECIES

1 Neuropodial hooded hooks bidentate and start from setiger 10–11. Prostomium not brown ..... *S. filicornis*

– Neuropodial hooded hooks tridentate and start from setiger 11. Prostomium brown . *S.* sp.*

Spio sp.*
(NAD.29.W)

Spio filicornis (Müller, 1776)
(fig. 18.6.l–o)

Nereis filicornis Muller, 1776: 218.
Spio filicornis: Fauvel, 1927: 43, fig. 15 a–g.

A small worm reaching 30 mm. for 90 segments, but usually smaller. Prostomium (fig. 18.6.l) blunt anteriorly and pointed posteriorly. Branchiae (fig. 18.6.m) attached to the bases of the notopodial lamellae anteriorly but free posteriorly (fig. 18.6.n). Notopodial lamellae auricular. Neuropodial lamellae broadly oval anteriorly but narrower posteriorly. Neuropodial hooded hooks (fig. 18.6.o) bidentate, about eight to ten per neuropodium, and start from setiger 10–11. Two inferior sabre setae in posterior neuropodia.

TYPE LOCALITY: Denmark.

RECORDS: Cape (33/18 i and 34 18 s).

DISTRIBUTION: Arctic; North Atlantic from Greenland (s, d) and the North Sea (i, s) to the Bay of Biscay; Pacific from the Behring Sea and Japan to California (i).

DISPIO Hartman, 1951

Prostomium fusiform, pointed anteriorly and without frontal horns but with an occipital ridge extending posteriorly. Peristome enfolding the sides of the prostomium. Branchiae from setiger 1 to near the posterior end; they are partly or completely fused to the notopodial lamellae anteriorly but are mainly free posteriorly. Accessory branchiae on the posterior part of the notopodia of middle and posterior parapodia. No hooded hooks in the notopodia but present in the neuropodia. Pygidium as a ventral cushion below the anus.

TYPE SPECIES: *Dispio uncinata* Hartman, 1951a.

*Only one broken specimen. Prostomium blunt and brown. Peristome brown. Hooded hooks tridentate with the third tooth much smaller than the second. Hooks from setiger 11 onwards, about eight per neuropodium and accompanied by two to three inferior sabre setae with speckled blades.

Key to Species

1 Accessory branchiae as minute digitiform branches. Anterior branchiae serrated ***D. uncinata****
– Accessory branchiae lamellar, not branched. Anterior branchiae not serrated . ***D. magna***

Dispio magna (Day, 1955)
(fig. 18.6.p–t)

Spio magnus Day, 1955: 413, fig. 2 a–g.

A large species reaching 100 mm. by 3 mm. for 200 segments. Prostomium (fig. 18.6.p) smoothly conical with a ridge extending back to setiger 2. No eyes. Peristome closely applied to the sides of the prostomium. Branchiae from setiger 1 to the posterior end. They are completely fused to the notopodial lamellae anteriorly (fig. 18.6.q) but from the middle of the body the distal part of the notopodium separates as a triangular lobe (fig. 18.6.r). Accessory branchiae as minute lamellae (not digitiform lobes) behind the neuropodia from about setiger 35 onwards. Neuropodia with a small oval presetal lobe and a dorsoventrally longer postsetal lobe. This develops a free superior projection in later segments which project upwards towards the notopodium. Some notopodial and neuropodial capillaries with speckled axes (fig. 18.6.s). About nine hooded hooks in the neuropodia from setiger 30–44 onwards according to size. In juveniles they have faintly bilobed ends (fig. 18.6.t) but in adults they are bluntly unidentate. One to two sabre setae at the inferior edge of the neuropodia from setiger 14 onwards.

Type locality: Simonstown, South Africa.

Records: Cape (34/18 i).

Distribution: No other records.

SCOLELEPIS Blainville, 1828
(= *NERINE* Johnston, 1838 *et auctorum**)

Prostomium often pointed anteriorly and with an occipital tentacle or keel posteriorly. Eyes present or absent. Branchiae partly or completely fused to the notopodial lamellae; they start on setiger 2 and continue to near the posterior end. Neuropodial lamellae simple anteriorly but more or less notched posteriorly. Winged capillary setae in both rami of the parapodia anteriorly but hooded hooks appear in both rami posteriorly. Pygidium as a ventral glandular cushion.

Type species: *Lumbricus squamatus* Muller, 1806.

Key to Species

1 Hooded hooks unidentate . . . . . ***S. lefebvrei***
– Hooded hooks bidentate . . . . . *S. squamata*

* The synomy of *Scolelepis* was discussed by Pettibone (1963a).

Scolelepis lefebvrei (Gravier, 1905)
(fig. 18.7.a–b)

Nerine Lefebvrei Gravier, 1905: 43, pl. 2 fig. 185, text-figs. 322–326; Day, 1962: 648.

Body large, up to 80 mm. long by 3 mm. broad for 150 segments. Prostomium (fig. 18.7.a) pointed anteriorly and extending posteriorly as a tapered keel which reaches setiger 2. No free occipital tentacle. Four eyes in a transverse row. Lateral folds of the peristomium enclose the sides of the prostomium. Branchiae from setiger 2 to the last few segments. Neuropodial lamellae smoothly oval anteriorly but deeply notched posteriorly. Notopodial lamellae almost completely fused to the branchiae anteriorly but become more and more separate posteriorly and by the sixtieth segment they are joined only at the base. The two lamellae become joined across the back by a dorsal fold from the middle of the body onwards. Anterior notosetae are numerous winged capillaries with punctuations towards the distal end. Posterior notosetae few, fine and elongated. No hooded hooks in the notopodia of posterior segments. Anterior neurosetae are winged capillaries but unidentate hooded hooks (fig. 18.7.b) appear about setiger 40 and increase to a maximum of six posteriorly; meanwhile the capillaries decrease to a small tuft of fine setae. Pygidium with a ventral cushion below the anus.

Type locality: Maskali Is. (Red Sea).

Records: Not recorded from southern Africa.

Distribution: Red Sea (i), Madagascar (i).

Scolelepis squamata (Müller, 1806)
(fig. 18.7.c–h)

Lumbricus squamatus Muller, 1806: 39.
Lumbricus cirratulus Delle Chiaje, 1825: 196.
Nerine cirratulus: Fauvel, 1927: 36, fig. 11 g–n; Day, 1955: 412, fig. 1, j.

Length up to 80 mm. for 200 segments. Prostomium (fig. 18.7.c) pointed anteriorly with four to six eyes in a row and a well marked occipital ridge reaching setiger 2. Notopodial lamellae fused to the branchiae anteriorly (fig. 18.7.e) but auricular and mainly free posteriorly (fig. 18.7.f) with the inferior margin produced downwards towards the neuropodium. Bidentate hooded hooks (fig. 18.7.h) in the neuropodia from setiger 30–35 onwards and in the notopodia from setiger 60. A maximum of twelve neuropodial hooks. Pygidial cushion (fig. 18.7.g) small, broader than long.

Type locality: Denmark.

Records: South-west Africa (26/15/i); Cape (from 32/18/e and 34/18/e, i to 33/25/e); Natal (29/31/i, 27/32/e); Mocambique (26/32/i, 23/35/e).

Distribution: Atlantic from Scotland (i) and English Channel (i) to Senegal (i) and North Carolina (i); Mediterranean; ? India, Madagascar (i); Pacific from W. Canada to Southern California.

FIG. 18.7. *Scolelepis lefebvrei*. A. Head. B. Hooded hook. *Scolelepis squamata*. C. Head. D. Entire worm (1.5 times natural size). E. Anterior foot. F. Posterior foot. G. Pygidium. H. Hooded hook. *Nerinides gilchristi*. I. Head. J. Hooded hook. K. Anterior foot. L. Middle foot.

NERINIDES Mesnil, 1896

Prostomium blunt or pointed anteriorly and with an occipital tentacle posteriorly. Eyes present or absent. Branchiae present from setiger 2 and partly or completely fused to the notopodial lamellae; they continue over most of the body. Neuropodial lamellae not notched. Winged capillary setae in both rami of the parapodia anteriorly, but hooded hooks appear in the neuropodia of later segments. No notopodial hooks. Pygidium as a ventral cushion.

TYPE SPECIES: *Malacoceros longirostris* Quatrefages, 1843.

KEY TO SPECIES

1. Hooded hooks with one denticle above the main fang 2
   Hooded hooks with two denticles above the main fang . . . . . ***N. tridentata****
   Hooded hooks with three denticles above the main fang. (Posterior branchiae flag-shaped) ***N. gilchristi***

2 Branchiae united to the posterior lamellae by a pleated web. Neuropodial lamellae not notched . . . . . *N. cantabra**
– Branchiae separated from notopodia lamellae and tipped with two to six clavate papillae in middle segments. Neuropodial lamellae notched . . . . . *N. williami**

Nerinides gilchristi Day, 1961
(fig. 18.7.i–l)

Nerinides gilchristi Day, 1961 : 491, fig. 5 a–d.

Length about 25 mm. for 100 segments. Prostomium (fig. 18.7.i) sharply pointed anteriorly and with an erect occipital tentacle posteriorly. Two pairs of subdermal eyes. Short nuchal bands extend back from the prostomium to setiger 2. First setiger small but possesses both notosetae and neurosetae. Branchiae from setiger 2; the anterior ones (fig. 18.7.k) are large, strap-like organs completely fused to the notopodial lamellae; from setiger 16 onwards a notch appears between the branchia and the lamella and deepens until the two are mainly separate. The branchia then becomes a narrow stalk with a flag-like end (fig. 18.7.l) and the lamella becomes broadly triangular and lateral in position. Neuropodia ear-shaped throughout. Anterior notosetae and neurosetae are winged capillaries. Punctate setae absent. Posterior notosetae unknown. Neuropodial hooded hooks appear on setiger 16–18 and soon replace the winged capillaries. Individual hooks (fig. 18.7.j) show three long teeth above the main fang. No inferior sabre setae. Body usually broken in the middle and the characters of the posterior segments are unknown.

Type locality: Saldanha Bay, South Africa.

Records: South-west Africa (26 15′s); Cape (from 32 17′d and 32 18′s to 34 22′s); Natal (30/30′s).

Distribution: Endemic.

PRIONOSPIO Malmgren, 1867

Prostomium rounded or pointed anteriorly and supported by the buccal segment which may develop wing-like lateral expansions. No posterior occipital tentacle. Eyes present or absent. Notopodial lamellae often large and erect in anterior segments. Branchiae free from the notopodial lamellae and restricted to a few anterior segments. They are often pennate and start on setiger 1 or 2. Neuropodial lamellae not notched. Winged capillaries present in both rami of the parapodia anteriorly but are partly replaced by hooded hooks in both rami posteriorly. Pygidium with a median cirrus.

Type species: *Prionospio steenstrupi* Malmgren 1867.

Key to Species

1 Gills start on setiger 2 and always exceed four pairs; none pinnate 2
– Gills start on setiger 1 or 2 and never exceed four pairs; at least one pinnate 3

2 Gills increase in size to setiger 4 and then decrease. Four eyes (fig. 18.8.a)
P. cirrifera (p. 486)
Gills all uniform in size and about equal to the notopodial lamellae. No eyes (fig. 18.8.e)
P. cirrobranchiata (p. 488)

3 Gills start on setiger 1 and number three pairs, all pinnate. Setiger 1 not small. (Wing-like peristomial expansions enfold the sides of the prostomium) fig. 18.8.i
P. pinnata (p. 488)
– Gills start on setiger 2; setiger 1 small 4

4 Gills two to three pairs, pinnate (fig. 18.8.m) . . . . . ***P. sexoculata*** (p. 489)
– Gills four pairs, not pinnate 5

5 First pair of gills pinnate, the rest smooth. Fourth pair of gills slender and tapering.) Lateral pockets between anterior neuropodia (fig. 18.9.d) . . . ***P. ehlersi*** (p. 490)
– Large fourth pair of gills, pinnate, the rest smooth (fig. 18.9.j . (Hooks with a single tooth above the main fang.) No lateral pockets . . . . . ***P. saldanha*** (p. 492)
Both first and fourth pair of gills pinnate, the other two smooth 6

6 Lateral pockets between anterior neuropodia. A low ridge across setiger 7 ***P. bocki*** (p. 490)
– No lateral pockets 7

7 A membraneous ridge across setiger 7. Eyes obvious . . . ***P. malmgreni*** (p. 492)
– No membraneous ridges across anterior segments. Eyes indistinct or absent
P. steenstrupi (p. 489)

Prionospio cirrifera Wiren, 1883
(fig. 18.8.a–d)

Prionospio cirrifera Wiren, 1883: 499; Soderstrom, 1920: 237, fig. 134 a–b, fig. 146; Fauvel, 1927: 62, fig. 21 k–n; Day, 1961: 487.

Length 30 mm. for 90 segments. Prostomium (fig. 18.a) bluntly pointed in front with a keel posteriorly which reaches setiger 2. Four subdermal eyes not easily seen in large specimens. Buccal segment more or less fused to setiger 1 which is reduced. Long, smooth, tapered gills from setiger 2 to 10. Longest gill on setiger 2–3. It is three times the length of the corresponding notopodial lamella. Anterior notopodial lamellae (fig. 18.8.b) pointed; the first one small but the second and later ones increase in size to the sixth and then decrease. Posterior lamellae (fig. 18.8.c) subequal. No dorsal ridges. Neuropodial lamellae small and triangular with lateral pouches between them from about the 5th foot in mature specimens. Hooded hooks in the neuropodia from setiger 15–18 and in the notopodia after setiger 30. Hooks with two series of four long teeth above the main fan in northern forms (fig. 18.8.d[1]) but only two paired teeth in South African forms (fig. 18.8.d).

Type locality: Behring Sea.

Records: Cape from 34° 18′ S to 34° 23′ S).

Distribution: Arctic; North Atlantic from Greenland (a), North and South America (d, vd, a) and Sweden (d, vd) to the North Sea (d), English Channel and Portugal (?) India (); North Pacific from the Behring Sea to southern California.

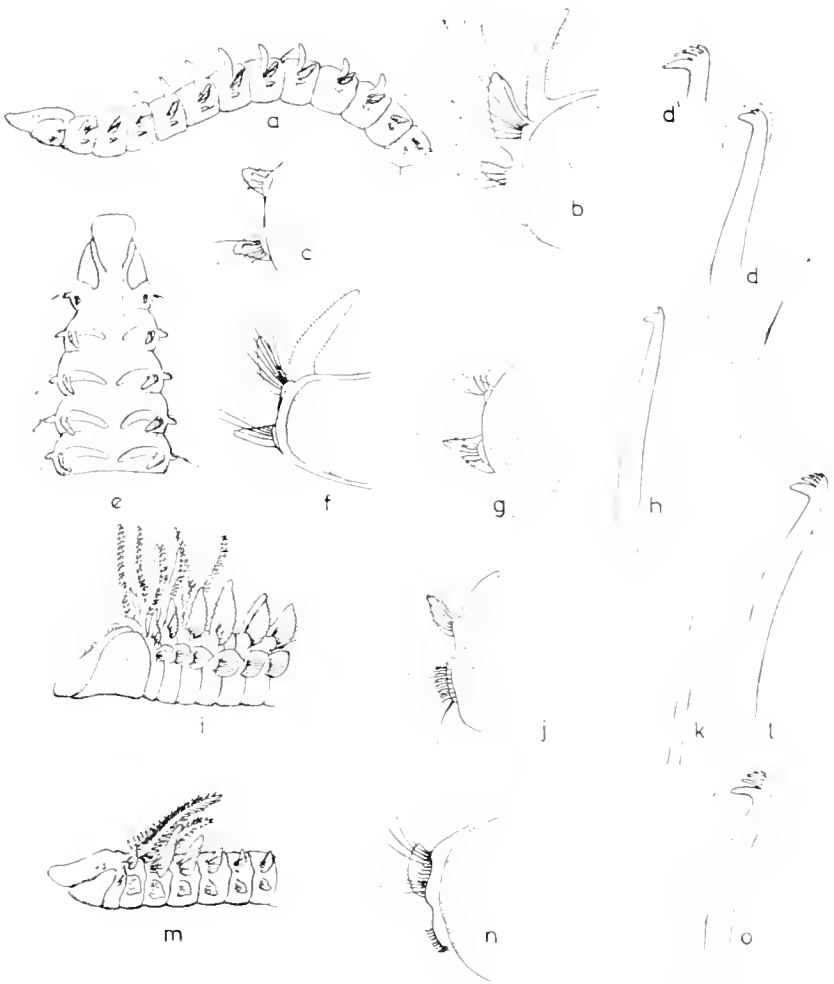


FIG. 18.8. *Prionospio cirrifera*. (A) Head and branchiferous region. (B) Branchiferous foot. (C) Posterior foot. (D) Hooded hook of Cape specimen. (D1) Hooded hook according to Soderstrom, 1920. *Prionospio cirrobranchiata*. (E) Anterior end. (F) Branchiferous foot. (G) Posterior foot. (H) Hooded hook. *Prionospio pinnata*. (I) Anterior end. (J) Posterior foot. (K) Notopodial capillary. (L) Hooded hook. *Prionospio sexoculata*. (M) Anterior end. (N) Middle foot. (O) Hooded hook.

Prionospio cirrobranchiata Day, 1961
(fig. 18.8.e–h)

Prionospio cirrobranchiata Day, 1961 : 488, fig. 4 a–d.

Body small and thread-like, only 15 mm. long with 60 segments. Prostomium fig. 18.8.e depressed, square in front and produced back as an inconspicuous plate but not keeled posteriorly. Two pairs of small eyes not visible in adults. About eleven to twelve pairs of smooth gills starting on setiger 2. Gills (fig. 18.8.f) uniform in length and two to three times as long as the notopodial lamellae. Notopodial lamellae triangular, pointed and subequal after the first one which is small. Neuropodial lamellae small but similar in shape to the notopodial ones, even in posterior segments (fig. 18.8.g). About five hooded hooks in the neuropodia from setiger 18–19 onwards. Each hook (fig. 18.8.h) with a single tooth above the main fang. Four subequal anal cirri.

Type locality : Off Saldanha Bay, South Africa.

Records : Cape from 32 17 d to 36 21 d and 34 21 s to 34 22 d).

Distribution : North Carolina (s).

Prionospio pinnata Ehlers, 1901
(fig. 18.8.i–l)

Prionospio pinnata Ehlers, 1901, 163 ; Hartman, 1960 : 114, pl. 9 figs. 1–5.

A large species reaching 60 mm. Prostomium (fig. 18.8.i) bluntly pointed and produced back as a ridge enfolded by large, wing-like lateral expansions of the peristome. Eyes seldom visible in adults. A membraneous ridge across the dorsum immediately behind the origin of the palps. First setiger well developed. Three pairs of large pinnate gills on setigers 1–3 but one or more are often lost. Postsetal lamellae of notopodia large and pointed on the first five setigers and smaller and more rounded thereafter ; from setiger 21 onwards to the middle of the body they unite across the dorsum to form low ridges. Neuropodial lamellae prominent and pointed anteriorly, low and rounded posteriorly (fig. 18.8.j). Winged capillary setae (fig. 18.8.k) in both rami anteriorly. Hooded hooks appear in the neuropodia from setiger 9 ; they attain a maximum of 12–15 per neuropodium and are accompanied by an inferior sabre seta. Individual hooks (fig. 18.8.l) with four pairs of teeth above the main fang.

Type locality : Talcahuano, Chile.

Records : South West Africa (23 14 s, d to 26 15 s) ; Cape (from 32 17 d and 33 18 s, d to 35 20 d and 34 26 d) ; Natal (30 30 s to 29 31 s).

Distribution : Atlantic from North Carolina (s, d) and Morocco (s, d) along tropical west Africa (s, d) to S. Africa (s, d) ; tropical Indian Ocean (s, d) ; Pacific from W. Canada and Japan to Chile (s) ; New Zealand.

Prionospio sexoculata Augener, 1918
(fig. 18.8.m–o)

Prionospio sexoculata Augener, 1918: 405, pl. 6 figs. 159, 172; text-fig. 52 (partim.); Day, 1955: 414 (partim.).

A small species 10–20 mm. long. Prostomium (fig. 18.8.m) rounded in front and supported by small peristomial ridges on either side. Six eyes. Setiger 1 very small and without branchiae or notosetae. Two pairs of pinnate branchiae on setigers 2 and 3. Triangular notopodial lamellae on setigers 3–5 and smaller, more rounded ones later (fig. 18.8.n). No membraneous dorsal crests. Tridentate hooded hooks (fig. 18.8.o) appear in the neuropodia from setiger 14–16 and in the notopodia from setiger 30. Inferior sabre setae in the neuropodia from setiger 12.

Type locality: Walvis Bay, South West Africa.

Records: South West Africa (22/14/s and 26/15/s); Cape (from 33/17/s and 33/18/i, s); Natal (27/32/c).

Distribution: Endemic.

Prionospio steenstrupi Malmgren, 1867
(fig. 18.9.o–r)

Prionospio steenstrupi Malmgren, 1867: 202, pl. 10 fig. 55; Fauvel, 1927: 60, fig. 21 f–i.
Prionospio malmgreni var. *dubia* Day, 1961: 489, fig. 3 j–n.

Length up to 45 mm. for 100 segments. Prostomium (fig. 18.9.o) rounded in front and continued as a raised keel which reaches setiger 2. Erect lamellae of the peristome are fused to the notopodia of setiger 1. Eyes indistinct or absent. Four pais of gills on setigers 2–5; the first pair pinnate and much larger than the rest, the second and third pairs smooth, stout and no longer than the notopodial lamellae, the fourth pair (fig. 18.9.r) again pinnate but short. Notopodial lamellae triangular and pointed; they increase in length to the fourth but then decrease and later ones are low and rounded (fig. 18.9.p). No membraneous ridges across the dorsum. No genital pockets between anterior neuropodia. Neuropodial lamellae low and oval after the first few. Hooded hooks in the neuropodia from setiger 18–19 and in the notopodia from setiger 50. Each hook (fig. 18.9.q) with four double rows of teeth above the main fang. An inferior sabre seta in the neuropodia from setiger 18.

Type locality: Iceland.

Records: South West Africa (28/14/d); Cape (from 32/17/d and 34/18/s, d to 36/21/d and 34/26/d; Natal (29/31/s, d).

Distribution: North Atlantic from Greenland and Iceland to Norway and the North Sea (s); North Carolina (s).

Prionospio bocki Soderstrom, 1920

Prionospio bocki Soderstrom, 1920: 234, figs. 142–143.

Length up to 20 mm. Prostomium blunt in front and tapering back as a keel reaching setiger 2. Two pairs of eyes, the anterior pair small, the posterior pair large and comma-shaped. Setiger 1 small, but with broad notopodial and neuropodial lobes. Four pairs of gills on setigers 2–5, the first pair large and beset with numerous short papillae, the second and third pairs short and smooth and the fourth pair tapered and fringed with a row of short papillae. Notopodia of setigers 3 and 4 are the largest and subsequent notopodia decrease in size. From setiger 6, they are united across the dorsum by low, inconspicuous ridges. Neuropodial lamellae all low and oval; from setiger 2 onwards they are united by membranus genital pockets which become conspicuous after the first 10 segments. Hooded hooks with 4–5 pairs of long denticles above the main fang, appear in the neuropodia from setigers 16–18 onwards.

Type locality: Kobe Bay, Japan.

Records: Madagascar (s).

Distribution: Japan (s).

Prionospio ehlersi Fauvel, 1936
(fig. 18.9.d–f)

Prionospio ehlersi Fauvel, 1936: 61, fig. 4 a–e.

Length up to 20 mm. Prostomium (fig. 18.9.d) expanded anteriorly and narrowed posteriorly forming an elevated keel between the peristomial folds. Two to four small eyes and black pigment flecks. First setiger with small notopodial and neuropodial lobes. Four pairs of gills on setigers 2–5; the first pinnate, the second and third short and smooth and the fourth long, smooth and tapered. Notopodial lamellae triangular and pointed; they reach maximum size on setigers 3–5 and then decrease. A low membraneous ridge unites the notopodial lamellae for 20–30 segments starting on setiger 5 or 6. Hooded hooks appear in the neuropodia on setiger 19–21 and in the notopodia from setiger 37. A punctate sabre seta appears in the inferior neuropodium from setiger 19–23 onwards. Genital pockets (fig. 18.9.e) between the neuropodia of adult specimens from setiger 2 for about 20 segments. Hooks (fig. 18.9.f) with numerous teeth. Neuropodia lamellae rounded, at first longer than broad, later oval.

Type locality: Dredged off Morocco.

Records: Natal (30/30 s, 29/31 d); Mocambique (26/33 d).

Distribution: Morocco (s, d).

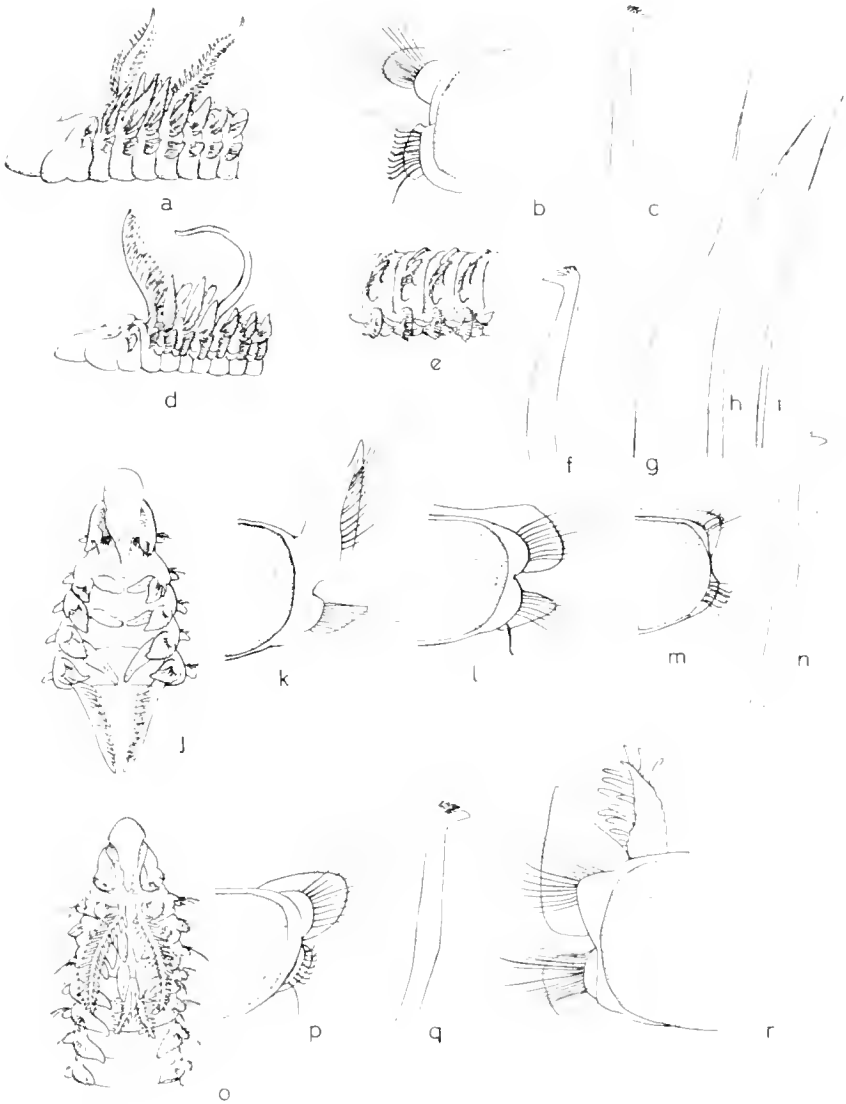


Fig. 18.9. *Prionospio malmgreni*. (A) Anterior end. (B) Posterior foot. (C) Hooded hook. *Prionospio ehlersi*. (D) Anterior end. (E) Lateral view of middle segments to show genital pockets. (F) Hooded hook. *Prionospio saldanha*. (G) Notopodial capillary. (H) Sabre-seta. (I) Neuropodial capillary. (J) Anterior end. (K) Sixth foot. (L) Middle foot. (N) Hooded hook. *Prionospio steenstrupi*. (O) Anterior end. (P) Middle foot. (Q) Hooded hook. (R) Fourth gill on fifth foot.

Prionospio saldanha Day, 1961
(fig. 18.9.g–n)

Prionospio saldanha Day, 1961 : 485, fig. 3 a–h.

Body thread-like, up to 25 mm. long for 80 segments. Prostomium (fig. 18.9.j) rounded anteriorly and produced back as a keel reaching setiger 2. Four eyes. Setiger 1 small and fused to the peristomium. Four pairs of gills on setigers 2–5; the first three pairs smooth and the fourth, larger pair pinnate. Anterior notopodial lamellae pointed and face outwards (fig. 18.9.k); they reach maximum size on setigers 6–9 and then decrease and become rounded. From setiger 20 onwards the lamellae are united by dorsal ridges (fig. 18.9.l). A maximum of six hooded hooks in the neuropodia from setiger 15 onwards and in the notopodia from setiger 25–35. Each hook (fig. 18.9.n) with a single tooth above the main fang. An inferior sabre seta (fig. 18.9.h) in the neuropodium from setiger 12.

Note: A closely related form *P. cavjensi* Laubier (1961) from the Mediterranean differs in having a square prostomium, a dorsal membranous ridge on segment 7 only, and notopodial hooks never before segment 40.

Type locality: Saldanha Bay, South Africa.

Records: South West Africa (26 15 s); (Cape 33 18 i, s to 34 22 d); Natal (30 30 s).

Distribution: Endemic.

Prionospio sp.

Prionospio sp. Day, 1967b : 418.

Only juveniles measuring 4 mm. are known. Prostomium shovel-shaped with four eyes. No wing-like peristomial expansions. Setiger 1 small and without gills. Very long cirriform branchiae on setigers 2–10. Anterior notopodial lobes small, later ones inconspicuous. No dorsal crests. Neuropodial hooded hooks seen on setiger 15 but possibly occur earlier.

Prionospio malmgreni Claparède, 1870
(fig. 18.9.a–e)

Prionospio malmgreni Claparède, 1870 : 333, pl. 22 fig. 3; Fauvel, 1927 : 61, fig. 21 a–e; Day, 1963a : 418.

A thread-like species about 25 mm. long for 60 segments. Prostomium (fig. 18.9.a) bluntly rounded in front and produced back as a ridge which reaches setiger 2. Four eyes, the second pair large and elongate. Peristome with small lateral folds fused to setiger 1. First setiger small. Four pairs of gills on setigers 2–5; the first and fourth pairs are both long and pinnate and the second and third pairs are both short and smooth. Anterior notopodial lamellae triangular; the largest is on setiger 4 but later ones decrease and from setiger 8 onwards they are low and

rounded (fig. 18.9.b). A well marked membraneous ridge unites the lamellae across setiger 7 and smaller incomplete ridges are present on the next few segments. Ventral lamellae all low and rounded. No genital pockets. Pluridentate hooded hooks (fig. 18.9.c) appear in the neuropodia from setiger 12–14 and in the notopodia after setiger 40. An inferior sabre seta in the neuropodium from setiger 12.

TYPE LOCALITY: Gulf of Naples.

RECORDS: Cape (33/17/s, d, 34/25/s); Natal (30/30/s).

DISTRIBUTION: Atlantic from North Carolina (s) and the North Sea (s) to Madeira (s); Mediterranean (s); S. California (s); Japan.

Family **MAGELONIDAE** Cunningham and Ramage, 1888

Body slender and divided into two distinct regions. Prostomium flattened, roughly oval in outline and lacks eyes. Two very long palps which are papillose distally. Proboscis large and eversible but unarmed. No branchiae. Parapodia biramous with lamellar lobes. Thoracic region of nine segments with capillary setae in the first eight segments but sometimes specialised setae in the ninth. Abdominal setae are mainly hooded hooks. Pygidium with anal cirri.

Records from southern Africa

Magelona capensis Day	51Cs, —Nsd
Magelona cincta Ehlers	15Cs, 45 PiNi, 46Cs, Pi, 51Cs
Magelona papillicornis Muller	44Ci, 51Cs

Remarks: This family contains only one valid genus, *Magelona*. Jones (1963) gave a key to the 21 known species.

The magelonids burrow in muddy sand and use the spade-like head and large distensible proboscis to force their way through the substrate. Like the spionids they are detritus feeders and the food particles are gathered by a pair of very elongated palps which bear sticky papillae. There is no food groove along the palp instead the particles are brought to the mouth by muscular contraction. The gut is usually full of sand grains so there appears to be little selection of what is ingested.

MAGELONA Muller, 1858

Body divided into an anterior region with nine setigers and a posterior region of numerous setigers. Prostomium large and flattened. Two long papillose palps. Parapodia biramous with lamellar notopodia and neuropodia. No branchiae. Setae are simple capillaries anteriorly, mainly hooded hooks posteriorly and on the ninth setiger, sometimes special setae. Anal cirri present.

Type species: *Magelona papillicornis* Muller, 1858.

Key to Species

1 Setiger 9 with specialised setae having a subterminal expansion (fig. 19.1d). Prostomium spathulate and smoothly oval. Hooded hooks with two teeth side by side above the main fang . . . . . ***M. papillicornis***

– Setiger 9 without specialised setae. Prostomium with antero-lateral angles or projections. Hooded hooks with two teeth side by side above the main fang 2

2 A red band on setigers 5, 8. Parapodial lamellae of abdomen ligulate . . . . ***M. cincta***

– No red band. Parapodial lamellae of abdomen oval and constricted at the base ***M. capensis***

Magelona papillicornis Müller, 1858
(fig. 19.1.a–d)

Magelona papillicornis Muller, 1858: 216; Fauvel, 1927: 64, fig. 22 a–h.

Length up to 170 mm. with 150 segments and uniformly white in colour. Prostomium (fig. 19.1.a) bluntly spear-shaped with a median thickening. Anterior end smoothly rounded. In the anterior region the notopodia (fig. 19.1.b) have low, rounded presetal lips and much larger tongue-shaped lamellae. In addition setigers 1–8 have a small, erect digitiform lobe above the notosetae. The anterior neuropodia have smaller lamellae than the notopodia. The presetal lamella of the neuropodium is produced inferiorly below the neurosetae. The postsetal lip is small except on setigers 7 and 8. Setiger 9 is short with subequal presetal and postsetal lobes in both rami. Abdominal segments from setiger 10 onwards (fig. 19.1.c) have equal, tongue-shaped postsetal lamellae in both rami curving towards one another. Lateral pockets are present on several segments after setiger 25.

Setigers 1–8 have narrow-winged capillaries in both rami. Setiger 9 has a few capillaries and numerous setae each with a subterminal expansion preceding the fine capillaries and numerous setae each with a subterminal expansion preceding the fine tip (fig. 19.1.d). Abdominal setae are rows of hooks each with two teeth side by side above the main fang.

Type locality: St. Catherine Is., Brazil.

Records: South West Africa (26/15/s and 28/18/s); Cape from 33/18/s and 34/23/e, s to 33/27/s.

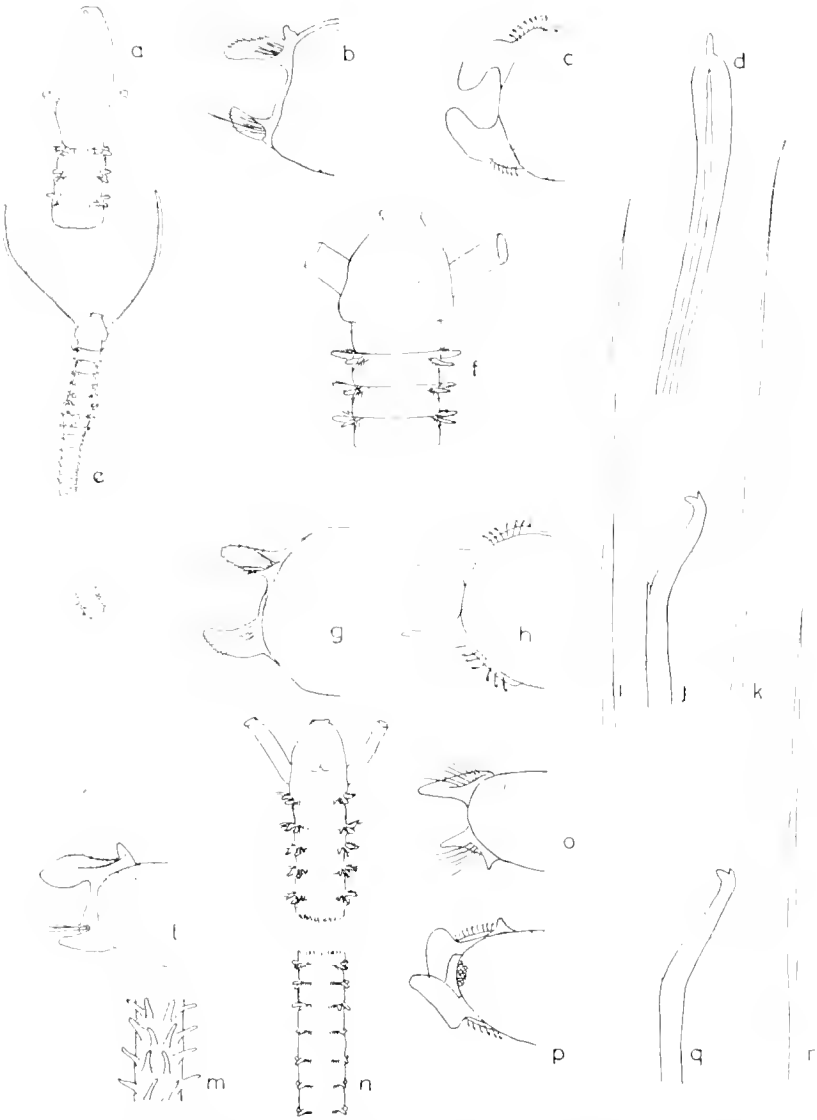
Distribution: Atlantic from Scotland (i, s, d) and English Channel (e, i) to North Carolina (s) and Brazil and tropical W. Africa (s); Mediterranean; Madagascar (i).

Magelona cincta Ehlers, 1908
(fig. 19.1.e–k)

Magelona cincta Ehlers, 1908: 111, pl. 15 figs. 9–12; Wilson, 1958: 620, figs. 2–3.

Body (fig. 19.1.e) up to 30 mm. long with a reddish or purple band from setiger 5 to 8. Prostomium (fig. 19.1.f) a truncate triangle with a pair of muscular strands diverging anteriorly to end in antero-lateral projections. The whole prostomium about as broad as long. The anterior region has slightly larger lamellae on the neuropodia. The notopodial postsetal lamellae (fig. 19.1.g) are ligulate and there is no erect superior lobe or "dorsal cirrus". The neuropodial lamellae are more infrasetal than postsetal and that on setiger 8 is distinctly larger than the notopodial lamella. Presetal lamellae absent. Setiger 9 short. Abdominal parapodia from setiger 10 onwards (fig. 19.1.h) have subequal, tongue-shaped postsetal lamellae on both rami which curve towards one another and end in pointed tips. Lateral pocket-like folds are present in front of some posterior parapodia in adults.

Setigers 1–8 have simple capillary setae in both rami (fig. 19.1.i). Setae of setiger



FIGS. 104.1. *Magelona papillicornis*. (A) Head. (B) Third foot. (C) Abdominal foot. (D) Notoseta from ninth foot. *Magelona cincta*. (E) Entire worm (three times natural size). (F) Head. (G) Thoracic foot. (H) Abdominal foot. (I) Thoracic notoseta. (J) Hooded hook. (K) Notoseta from ninth foot. *Magelona capensis*. (L) Thoracic foot. (M) Part of palp. (N) Anterior end and part of abdomen. (O) Ninth foot. (P) Abdominal foot. (Q) Hooded hook. (R) Notoseta from ninth foot.

9 (fig. 19.1.k) similar to those of setiger 8. Abdominal setae are rows of hooks with two teeth side by side above the main fang (fig. 19.1.j).

TYPE LOCALITY: Algoa Bay, South Africa.

RECORDS: Cape (from 34/18/s to 33/25/s); Natal (30/30/s and 29/31/i); Mocambique (26/32/i and 23/35/e).

DISTRIBUTION: Morocco (s) and tropical western Africa (s, d).

Magelona capensis Day, 1961
(fig. 19.1.l–r)

Magelona capensis Day, 1961: 495, fig. 6 a–h.

Body about 35 mm. long for 40 segments, uniformly pale in colour without a red band on setigers 5–8. Prostomium (fig. 19.1.n) 1·3 times as long as broad with antero-lateral corners. Notopodia of setigers 1–8 (fig. 19.1.l) with a small superior lobe united to a much larger inferior lobe. Neuropodia with a tapered inferior lobe. Setiger 9 without a superior lobe to the notopodium but with a small projection below the neuropodium (fig. 19.1.o). Abdominal parapodia (fig. 19.1.p) with subequal notopodial and neuropodial postsetal lamellae which are oval in outline with constricted bases. Setiger 9 with broad-winged capillaries (fig. 19.1.r) similar to those of setigers 1–8. Abdominal hooded hooks with two teeth side by side above the main fang.

TYPE LOCALITY: Agulhas Bank, South Africa.

RECORDS: South West Africa (26/15/s); Cape (from 32/18/s to 34/23/s); Natal (29/31/s, d).

DISTRIBUTION: Endemic.

Family **CIRRATULIDAE** Carus, 1863

Body cylindrical with numerous similar segments and tapered at both ends. Prostomium small and usually without projections. Proboscis unarmed and not evaginable. Peristomial segment triannulate and achaetous. A pair of grooved palps or several grooved tentacular filaments are inserted at the posterior end of the peristomium which may extend back above the anterior setigers. Long cylindrical branchial filaments arise above the notopodia of the first and a variable number of succeeding setigers. Parapodia biramous but the parapodial lobes are not developed so that the two bundles of setae arise directly from the sides of the body. Setal types include simple capillaries, acicular hooks or in a few cases compound hooks. No anal cirri.

Records from southern Africa

Caulleriella acicula Day . . . . . 57Cs, —Ns
Caulleriella bioculata (Keferstein) . . .
as *Heterocirrus flavo-viridis* St. Joseph . . 26Ai
Caulleriella capensis (Monro) 51Cs
as *Heterocirrus caput-cvocis* var. *capensis* Monro . 33Cs
as *Heterocirrus capensis* Monro . . . 44Ci, 48Cs
? as *Dodecaceria afra* Augener . . . 26Wi
Chaetozone setosa Malmgren 51Cs
Cirratulus africanus Gravier 45Pi
Cirratulus chrysoderma Claparède . . . 44Ci
Cirratulus cirratus (Muller) . . . . 44Ci, ?45Pi
Cirratulus concinnus Ehlers 15Cs
Cirratulus filiformis Keferstein 48Ad, 51Cs
Cirratulus gilchristi Day 51Csd
Cirratulus sp. 51Cs
Cirriformia capensis (Schmarda) . . . 51Cs
as *Cirratulus capensis* Schmarda . . . 4Ci, 10Ci, 11Ci, 12Ci, 16Wi, 26Wis
as *Cirratulus australis* Stimpson (non Blanchard) 2Ci
as *Cirratulus cirratus* (non Muller) . . . 13Ci
as *Audouinia filigera* var. *capensis* . . . 33Cs, 35Ci, 36Ci
as *Audouinia australis* (Stimpson) . . . 44Ci
Cirriformia afer (Ehlers) . . . . .
as *Cirratulus afer* Ehlers 15As
Cirriformia filigera (Della Chiaje) . . .
as *Audouinia filigera* Delle Chiaje . . . 45NiPi
Cirriformia punctata (Grube) . . . . .
as *Audouinia punctata* (Grube) . . . 40Ni, 45Pi
as *Audouinia filigera* var. *capensis* (partim) . 36Ni
Cirriformia saxatilis (Gravier) . . . .
as *Audouinia saxatilis* Gravier . . . 45Pi

Cirriformia tentaculata (Montagu)	51Cs
as *Audouinia tentaculata* (Montagu)	40Ni, 44Ci, 45PiNi, 48WsCs
as *Cirratulus tentaculus* Montagu	11Wi, 13Ci, 32Ci
as *Cirratulus atrocollaris* Grube	12Ci
as *Cirratulus tentaculus* var. *meridionalis* (Marenz.)	26Wis
as *Audouinia filigera* var. *meridionalis* (Marenz.)	35Ci, 36NiCi
Dodecaceris capensis Day	51Cs
Dodecaceria laddi Hartman	41Cs, 45Ni
Dodecaceria pulchra Day	44Ci
as *Dodecaceria fistulicola* (non Ehlers)	38Ci
Tharyx annulosus Hartman	—Ns
Tharyx dorsobranchialis (Kirkegaard)	51Csd, —Nsd
as *Cirratulus dorsobranchialis* Kirkegaard	48AsCs
Tharyx filibranchia Day	51Cs
Tharyx marioni (St. Joseph)	51Cs, 56Ws
as *Tharyx multifilis* Moore	48Cs

BIOLOGICAL NOTES

Cirratulids are deposit feeders and gather food particles from the sea bottom by means of a single pair of grooved palps or numerous grooved tentacular filaments which appear to arise from the first few setigerous segments. The homologies of these structures will be described later.

Cirratulids are sluggish worms and commonly bury their bodies just below the surface of the sea bottom so that only the long gills and tentacular filaments are visible. These are usually bright red or orange. *Cirriformia capensis* is common among closely packed mussels on rocky shores, in the hold-fasts of kelp and among massed colonies of *Pyura*. This species seems to be limited to well oxygenated habitats. *Cirriformia tentaculata* on the other hand is found under stones lying on black mud and presumably tolerates low oxygen tensions. *Cirratulus chrysoderma* seems to have similar habits and is often gregarious.

Dodecaceria is an interesting genus which burrows in thick encrustations of lithothamnion, *Dodecaceria pulchra* being very common on Cape shores at the *Patella cochlear* level. If the lithothamnion in a shallow rock pool is examined carefully, many minute holes will be seen through which *Dodecaceria* extrudes its palps and gills. If undisturbed, these spread out around the head like the petals of a tiny black flower. How the worm burrows in the dense matrix of the coralline is unknown but the worm appears to do little damage to the plant which grows up around the hole so that the whole surface is covered with volcano-like knobs.

While *Dodecaceria* produces eggs and sperm like other polychaetes it is also capable of asexual reproduction by fragmentation. It is said that even a single isolated segment may regenerate into a small worm.

THE MAIN DIAGNOSTIC CHARACTERS

The body consists of numerous rounded segments without parapodial projections but with two bundles of setae and long *filiform branchiae*. The main diagnostic features include the head and feeding appendages, the number and disposition of the branchial filaments and the nature of the setae.

The head and feeding appendages. The prostomium is a well developed conical lobe, antero-dorsal to the mouth. The eye-spots are seldom well developed and always subdermal but their number is important in certain species. Prostomial projections are absent in all genera except *Acrocirrus* and *Macrochaeta* which possess a pair of fronto-lateral lobes or "palpes frontal". The buccal segment or peristomium is vaguely triannulate and has been regarded by some workers as representing three fused and achaetous "metastomial segments". Dissection shows that there is in fact only one elongated buccal segment. The last peristomial annulus bears either one pair of large grooved palps or several pairs of smaller tentacular cirri. These appendages usually originate close to the intersegmental constriction which separates the last peristomial annulus from the first setiger. In the genera *Cirratulus* and *Cirriformia* however, the last part of the peristome bearing the tentacular filaments may extend back over the first few setigerous segments so that the tentacular filaments seem to arise from the dorsal surface of these segments; in *Cirriformia tentaculata* for example the tentacular filaments arise from the dorsal surface above setigers 6 to 7. Dissection, however, shows that the tentacular filaments are truly peristomial in origin.

In several species the distinction between the tentacular filaments and the branchial filaments of the setigerous segments is not immediately obvious. However the tentacular filaments are always slightly stouter and more dorsal in origin and careful examination will show that they are always grooved whereas the branchial filaments are cylindrical; finally the tentacular filaments have a single blood vessel while the branchial filaments have two.

The arrangement of the branchial filaments. Apart from the genus *Timarete* which possesses several branchial filaments per segment there is only a single branchial filament per parapodium. In the species of *Dodecaceria* branchial filaments are restricted to the first few setigers, in *Caulleriella* there are more and in *Cirratulus*, branchial filaments usually extend to the posterior end. Typically, the branchial filaments arise just above the notopodial setae but in some species the branchiae of middle segments arise further above the notosetae than the distance which separates the notosetae and neurosetae. It is emphasised that this applies to the middle segments for the branchiae of the first few segments always arise close to the notosetae. The extreme cases occur in *Tharyx dorsobranchialis* where the branchiae of the middle segments arise from the mid-dorsal line and *Tharyx filabranchia* where they arise between the notosetae and neurosetae.

Setae. Compound acicular setae occur only in the neuropodia of *Acrocirrus* and *Macrochaeta*. In other genera the setae are all simple and are either acicular or capillary or both. The shape of the acicular hooks varies from simple spines to

forms with excavated spoon-shaped ends or even bidentate hooks approaching those of the Spionidae. The capillaries are usually somewhat flattened distally with one margin very finely spinulose or hispid. In *Tharyx* these capillaries are the only type of setae; in other genera, however, where both capillaries and acicular hooks occur, the capillaries tend to be more numerous in the notopodia and in the anterior segments while the hooks are more numerous in the neuropodia and in the posterior segments. Thus two or three hooks may appear in the middle notopodia and six or seven hooks in the anterior neuropodia. The exact segment in which hooks first appear seems to change with the size of the individual so that only major differences in the distribution of hooks and capillaries are of systematic importance.

SUBDIVISIONS OF THE FAMILY

The family Cirratulidae has been used as a dumping ground for a variety of genera. *Streblospio* has now been referred to the Spionidae and other aberrant genera have been placed in the new families Heterospionidae and Cossuridae. The genera that remain may be grouped into two sub-families. All the large and common genera with branchiae are included in the Cirratulinae and three small genera without branchiae are included in the Ctenodrilinae. No member of the latter has been reported from southern Africa.

KEY TO SUBFAMILIES AND GENERA

1 Branchial filaments absent . . . . . Subfamily CTENODRILINAE*
– Branchial filaments present (subfamily CIRRATULINAE) 2
2 Prostomium with fronto-lateral lobes. Compound hooks in the neuropodia . . . 3
– Prostomium without projections. Compound setae absent 4
3 One to two pairs of branchiae on the first metastomial segment . . . *ACROCIRRUS**
– Branchiae absent from the first metastomial segment . . . *MACROCHAETA**
4 More than one pair of branchial filaments on each parapodium . . . *TIMARETE**
– One pair of branchial filaments on each parapodium 5
5 Two large grooved palps (fig. 20.1.g) 6
– Several grooved tentacular filaments (fig. 20.3.l) 9
6 Seven or less pairs of gills (fig. 20.1.c) . . . . . *DODECACERIA* (p. 501)
– 12 or more pairs of gills (fig. 20.1.l) 7
7 Capillary setae only present . . . . . *THARYX* (p. 504)
– Acicular hooks and capillaries present 8
8 Acicular setae at the posterior end of the body form a continuous dorso-ventral arc of spines (fig. 20.1.n) . . . . . *CHAETOZONE* p. 509
– Setae remain in two distinct bundles to the posterior end of the body *CAULLERIELLA* p. 506
9 The first branchiae appear on the same segment as the tentacular filaments (fig. 20.3.g) *CIRRATULUS* p. 510
– The first branchiae appear anterior to the tentacular filaments (fig. 20.4.a) *CIRRIFORMIA* (p. 514)

DODECACERIA Oersted, 1843

Small worms commonly found burrowing in calcareous encrusting algae. Prostomium blunt and forming a hood over the mouth. Buccal segment long and achaetous but bearing two stout grooved palps at its junction with setiger 1. Two

to eight pairs of branchial filaments on the buccal segment and the first few setigers. Setae are all simple and include capillaries and stout acicular hooks with spoon-shaped ends.

TYPE SPECIES: *Dodecaceria concharum* Oersted, 1843.

KEY TO SPECIES

1 Two pairs of gills, the first on the buccal segment and the second on the first setiger (fig. 20.1.g) . . . . . ***D. laddi***
– Four to five pairs of gills 2
2 Gills arranged in an inverted V with the first pair close together on the buccal segment. Setiger 1 with notosetae (fig. 20.1.c) . . . . . ***D. pulchra***
– Gills not in an inverted V. The first two pairs on the buccal segment, one above and one below the palps. Setiger 1 without notosetae (fig. 20.1.j) . . . . ***D. capensis***

Dodecaceria laddi Hartman, 1954
(fig. 20.1.g–i)

Dodecaceria laddi Hartman, 1954: 638, figs 176C and 177D–H; Day, 1957: 102.

A small species about 7 mm. long. Palps long and lateral in origin (fig. 20.1.g). Two pairs of gills both smaller than the palps, the first pair arising dorso-laterally on the posterior margin of the buccal segment and the second, more dorsal pair on the first setiger. Capillaries in both rami except in the neuropodia of middle segments. Hooks in both rami from setiger 11–15 onwards, the anterior ones (fig. 20.1.h) with slightly flattened tips, later ones spoon-shaped and posterior neuropodial ones (fig. 20.1.i) with a boss below the excavation.

TYPE LOCALITY: North Marshall Islands.

RECORDS: Cape (34°18,8'; 34°22'8).

DISTRIBUTION: Marshall Is. (Pacific).

Dodecaceria pulchra Day, 1955
(fig. 20.1.a–f)

Dodecaceria pulchra Day, 1955: 418, fig. 2 h–m.

Black gregarious worms up to 20 mm. long boring in encrusting calcareous algae (fig. 20.1.a). Prostomium (fig. 20.1.c) a stout hood overhanging the mouth. Palps lateral in origin. Four pairs of gills which are longer and more slender than the palps, the first pair arising from the dorsal surface of the buccal segment above the palps, the second pair wider apart and on setiger 1, and the third and fourth pairs still wider apart and on setigers 2 and 3 so that the whole group forms an inverted V. Saw-edged capillaries (fig. 20.1.e) present in the notopodia of setigers 1–12, then

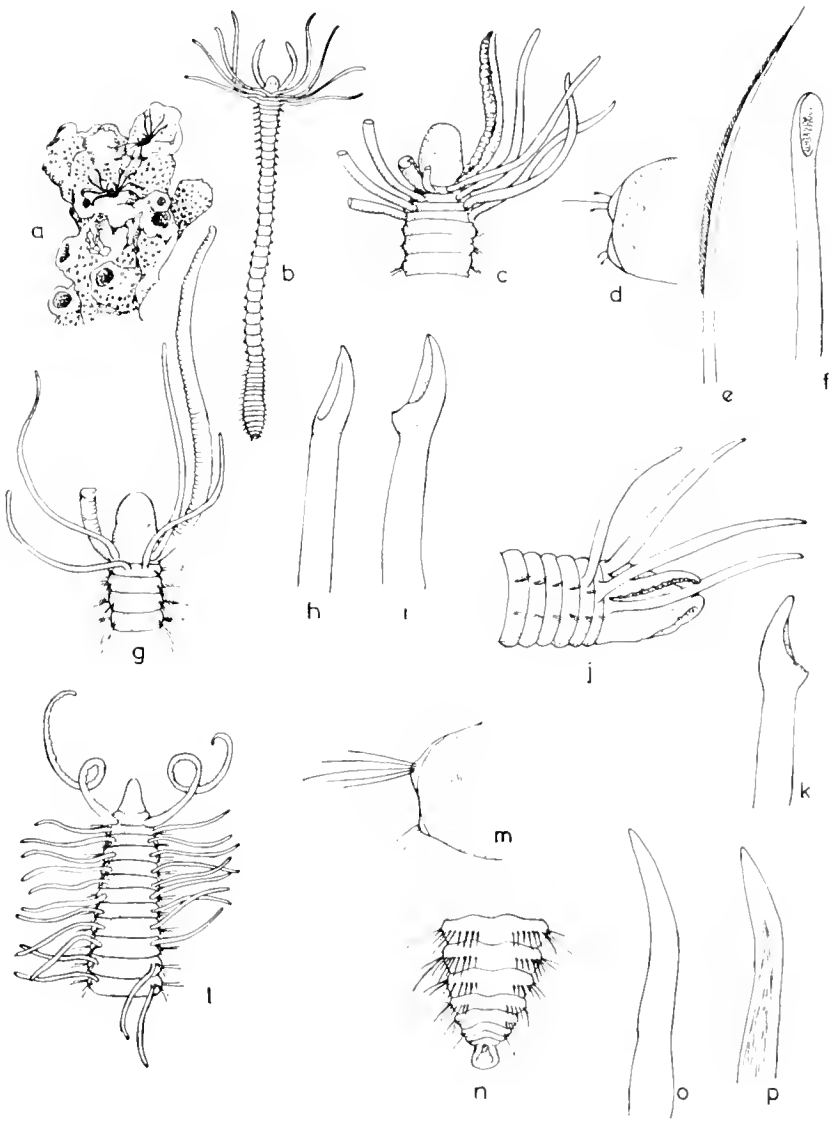


FIG. 20.1. *Dodecaceria pulchra*. (A) Coralline alga with burrows of *Dodecaceria*. (B) Entire worm (three times natural size). (C) Head. (D) Posterior foot. (E) Capillary seta. (F) Spoon-shaped hook. *Dodecaceria laddi*. (G) Head. (H) Anterior spoon-shaped hook. (I) Posterior hook. *Dodecaceria capensis*. (J) Head. (K) Hook. *Chaetozone setosa*. (L) Anterior end. (M) Middle foot. (N) Posterior end showing spines and pygidium. (O) Anterior hook. (P) Posterior spine.

often missing from middle segments only to reappear and continue to the posterior end (fig. 20.1.d). Capillaries absent from the neuropodia after the first 12. Spoon-shaped hooks (fig. 20.1.f) present in the neuropodia from setiger 10 and in the notopodia from setiger 12. Posterior hooks with a boss below the excavation.

Type locality: False Bay, South Africa.

Records: South West Africa (26°15′S); Cape (from 29°16′S to 32°28′S) in encrusting coralline algae.

Distribution: Endemic.

Dodecaceria capensis Day, 1961
(figl. 20.1.j–k)

Dodecaceria capensis Day, 1961: 504, fig. 7 j–k.

Gregarious worms boring in calcareous algae. Length up to 15 mm. for 60 segments. Prostomium (fig. 20.1.j) a stout hood overhanging the elongate mouth. Palps short and arise laterally just in front of setiger 1. Four pairs of gills longer than the palps; the first two pairs arise immediately above and immediately below the palps, the third pair on the dorso-lateral surface of setiger 1 and the fourth pair on the sides of setiger 2. Setiger 1 with neurosetae only. Notosetae are all capillaries up to setiger 12 where they are replaced by acicular hooks for about 10 segments; later notopodia with both hooks and capillaries. Neurosetae are all capillaries for the first seven segments, then both capillaries and hooks from setiger 8 to 11, then hooks only for the next few segments and then capillaries reappear again and both types of setae continue to the posterior end. The acicular hooks (fig. 20.1.k) have the usual spoon-shaped ends.

Type locality: Dredged in False Bay, South Africa.

Records: South West Africa (26°15′S); Cape (34°18′S).

Distribution: Endemic.

THARYX Webster and Benedict, 1887

Body elongate with numerous segments. Prostomium conical. Buccal segment elongate and achaetous, with a pair of long grooved palps arising at its junction with setiger 1. Branchiae from setiger 1 at least to the middle of the body. Hooks absent, the setae being all capillaries.

Type species: *Tharyx acutus* Webster and Benedict.

Key to Species

1 Setal blades short and coarsely toothed . . . . . ***T. annulosus***
– Setal blades long and finely spinulose to smooth 2
2 Eyes present. Posterior branchial filaments arise between the notosetae and neurosetae (fig. 20.2.b) . . . . . ***T. filibranchia***
– Eyes absent. Branchial filaments arise above the notosetae throughout . . . 3

3 Branchial filaments in the middle of the body arise laterally just above the notosetae (fig. 20.2.e) . . . . . ***T. marioni***

– Branchial filaments in the middle of the body arise from the mid-dorsal line (fig. 20.2.g) ***T. dorsobranchiata***

Tharyx filibranchia Day, 1961
(fig. 20.2.a–d)

Tharyx filibranchia Day, 1961 : 503, fig. 7 e–h.

Body elongate, up to 20 mm. in length with 180 very short segments and filamentous branchiae. Prostomium (fig. 20.2.a) pointed and with a single pair of subdermal eyes. A pair of large grooved palps arises from the junction of the buccal segment and the first setiger. Very fine branchial filaments from setiger 1 to near the posterior end. At first they arise above the notosetae but later from between notosetae and neurosetae (fig. 20.2.b). Capillaries (fig. 20.2.d) present in both rami throughout, but in posterior neuropodia there are pointed setae (fig. 20.2.c) intermediate between capillaries and acicular setae.

Type locality : False Bay, South Africa.

Records : (Cape 34/18/s and 34/23/s, d) ; Natal (30/30/s, 29/31/s, d).

Distribution : Only three records.

Tharyx marioni (Saint-Joseph, 1894)
(fig. 20.2.e)

Heterocirrus marioni Saint-Joseph, 1894 : 56, pl. 3 figs. 62–64.
Tharyx marioni: Fauvel, 1927 : 100, fig. 35 a–b ; Day, 1961 : 503.

Body up to 100 mm. long by 1 mm. but swollen anteriorly and tapered at both ends. Prostomium broadly conical and without eyes. Buccal segment triannulate with the third annulus distinct and bearing a pair of very stout grooved palps at the junction with setiger 1. Anterior segments short, about 12 times as broad as long but posterior ones longer, only two to three times as broad as long. Long branchial filaments from setiger 1 to near the end of the body. They arise immediately above the notosetae throughout (fig. 20.2.e). Notosetae and neurosetae are all smooth capillaries, the notosetae being longer than the neurosetae and in the posterior region some are as long as the body is broad.

Type locality : France.

Records : South West Africa (26/14/d and 28/16/s) ; Cape (33/18/s and 34/21/s) ; Natal (29/31/d).

Distribution : N. Atlantic from North Carolina (s) and Scotland (s, d) via English Channel (i, s) to Morocco ; Mediterranean (s). Also recorded as *T. multifilis* from Persian Gulf (s) and Madras (i, s, d).

Tharyx dorsobranchialis (Kirkegaard, 1959)
(fig. 20.2.f–h)

Cirratulus dorsobranchialis Kirkegaard, 1959: 34, figs. 2–3.
Tharyx dorsobranchialis: Day, 1961: 501.

A thread-like species about 35 mm. long (fig. 20.2.f). Prostomium sharply conical. No eyes. Buccal segment expanded and triannulate, with two large caducous grooved palps arising from the junction of the third annulus and setiger 1. Very slender branchial filaments on all setigers from the first onwards; a fusiform interbranchial dorsal area extends from the first setiger to about the twentieth and behind this the branchiae arise from the mid-dorsal line (fig. 20.2.g). Anterior segments short, posterior ones about as broad as long. Setae are all saw-edged capillaries (fig. 20.2.h); acicular hooks entirely absent.

Type locality: Dredged in 20 fth. off Angola.

Records: South West Africa (26°15′S); Cape (from 32°17′S and 34°18′S to 33°25′S; Natal (29°31′S, d).

Distribution: Angola (s).

Tharyx annulosus Hartman, 1965

Tharyx annulosus Hartman, 1965: 167, pl. 34.

Body up to 18 mm. long, cylindrical anteriorly but with marked segmental constrictions giving a beaded effect in the middle of the body and the final segments are short and somewhat flattened. Prostomium bluntly conical and without eyes; buccal segment elongate without annuli. A pair of grooved palps mounted dorsolaterally at the junction of the buccal segment and the first setiger. Branchial filaments inserted immediately above the notosetae. The first few pairs are almost as long as the palps but later ones are progressively shorter and they disappear before the middle of the body. The setae are all serrated capillaries; some of the anterior ones are fairly long but the rest are short and about a third the segmental width. They have thick, expanded blades which taper abruptly to filiform tips and under high power the blade is seen to have well marked teeth like the edge of a saw.

Type locality: Continental slope off Massachusetts.

Records: Natal (29°31′S).

Distribution: Massachusetts (d, vd, a) to N.E. South America (vd, a).

CAULLERIELLA Chamberlin, 1919

Body vermiform and rounded in section. Prostomium conical. Buccal segment elongate and triannulate. A pair of large grooved palps and the first pair of branchial filaments at the junction of the third annulus of the buccal segment and setiger 1. Branchiae from setiger 1 and extend over the first half of the body. Notopodial and

neuropodial setae not widely separated but never form a continuous arc. Capillary setae and hooks both present in some part of the body.

TYPE SPECIES: *Cirratulus bioculatus* Keferstein, 1862.

KEY TO SPECIES

1 Acicular hooks unidentate. Capillaries and hooks present in both rami of posterior feet ***C. capensis***
– Acicular hooks bidentate. Capillaries may be absent from posterior neuropodia . . 2
2 Acicular hooks with narrow dorsal hood (fig. 20.2.p). (Posterior neuropodia without capillaries) . . . . . ***C. acicula***
– Acicular hooks without hoods 3
3 Middle and posterior neuropodia with capillaries. Notopodial hooks absent ***C. zetlandica***†
– Middle and posterior neuropodia without capillaries. Hooks present in the notopodia from setiger 6–9 onwards . . . . . ***C. bioculatus***

Caulleriella capensis (Monro, 1930)
(fig. 20.2.i–l)

Heterocirrus capulesocis var. *capensis* Monro, 1930: 156, fig. 61.

Body yellow, rather swollen, about 20–30 mm. long, with rather stout gills and rather long segments. Prostomium (fig. 20.2.i) short, conical and depressed with a pair of dark ocular bars formed of three to four eyes across the posterior margin. Buccal segment swollen, its third annulus bearing a pair of stout palps much thicker than the branchial filaments. Branchial filaments restricted to the anterior part of the body, seldom more than 15 pairs, each filament arising close above the notosetae (fig. 20.2.j). Parapodial tori prominent anteriorly. Capillary setae with finely spinulose margins (fig. 20.2.k) and present in both rami throughout. Unidentate acicular hooks (fig. 20.2.l) from setiger 15–20 onwards.

TYPE LOCALITY: Simonstown, South Africa.

RECORDS: ? South West Africa (26/15/s); Cape (from 33/18/s and 34/18/i to 34/22/i, s and 34/25/s).

DISTRIBUTION: ? Endemic.

Caulleriella acicula Day, 1961
(fig. 20.2.m–p)

Caulleriella acicula Day, 1961: 501, fig. 7 a–d.

Body up to 20 mm. long with 200 segments. Prostomium (fig. 20.2.m) a sharply pointed cone with a pair of small subdermal eyes. Buccal segment swollen with a pair of palps at its junction with setiger 1. Body segments short, rather flattened, with prominent parapodial ridges on either side. Slender branchial filaments arise just above the notosetae (fig. 20.2.n) and extend at least to the middle of the body. Parapodial rami well separated. Very few capillaries (fig. 20.2.o) in the

†A doubtful record for South Africa.

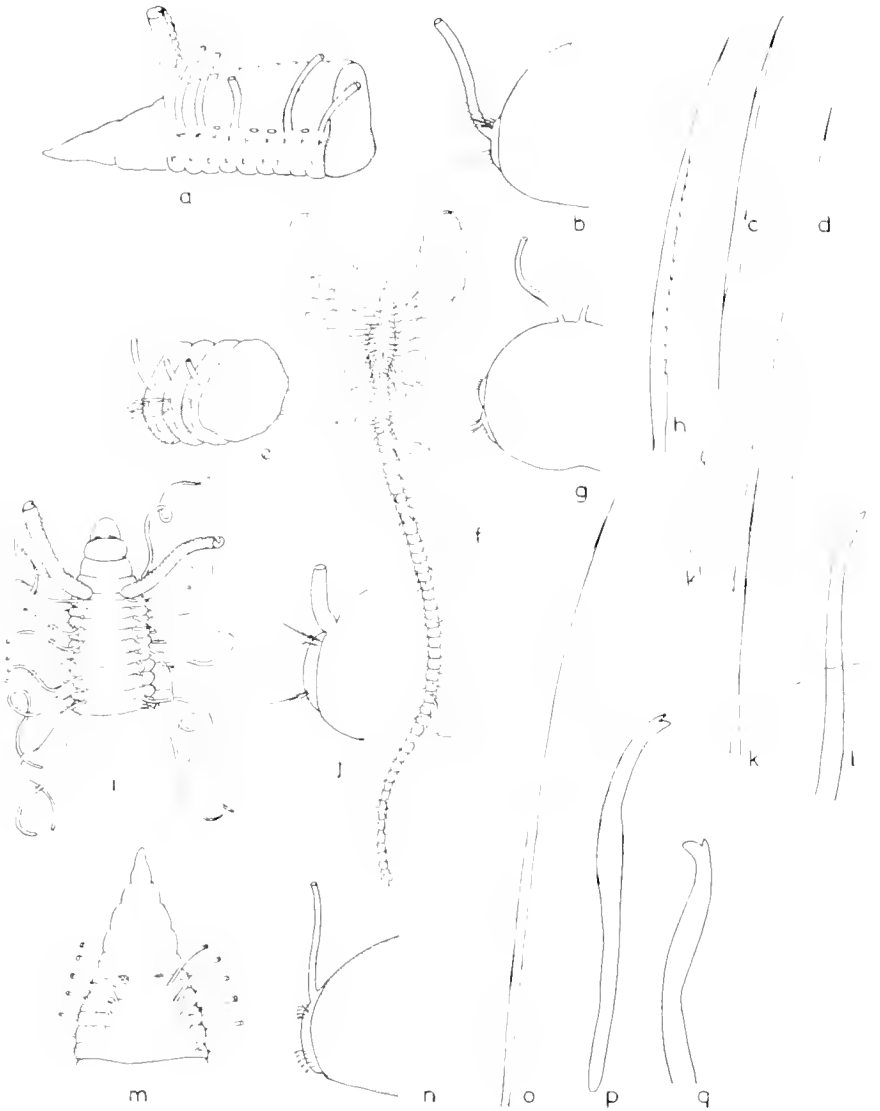


FIG. 202. *Tharyx filibranchia*. A Anterior end. B Middle segment. C Intermediate form of seta. D Capillary seta. *Tharyx marioni*. E Three-quarter view of three middle segments. *Tharyx dorsobranchialis*. F Entire worm (three times natural size). G Middle segment. H Capillary seta. *Caulleriella capensis*. I Anterior end. J Middle segment. K Capillary seta. L Sigmoid hook. *Caulleriella zetlandica*. M Anterior end. N Middle segment. O Capillary seta. P Bidentate hook. *Caulleriella bioculatus* (after Eliuveb). Q Bidentate hook.

notopodia and none in the neuropodia. Acicular hooks in both rami throughout. Individual hooks (fig. 20.2.p) bidentate with a small secondary tooth and a narrow hood on the convex side of the shaft.

TYPE LOCALITY: Dredged in False Bay, South Africa.

RECORDS: Cape (from 32/18/s to 34/22/s); Natal (29/31/s).

DISTRIBUTION: Endemic.

Caulleriella zetlandica (McIntosh, 1911)

Chaetozone zetlandica McIntosh, 1911: 16; Southern, 1914: 115, pl. 12 and 13 figs 29 a–k.
Heterocirrus zetlandica: Fauvel, 1927: 99, fig. 34 i–n.

Body thread-like, up to 25 mm. long, pale in alcohol. Prostomium a long cone without visible eyes. Peristome stout and triannulate. A pair of stout grooved palps at the junction of the peristome and setiger 1. Body rounded in section with short, crowded segments. Branchial filaments arise immediately above the notosetae, are always slender and become shorter posteriorly. Notosetae and neurosetae close together. Notosetae are all capillaries, some longer with more slender blades, some shorter with broader, curved blades. Neurosetae include short broad-bladed capillaries similar to those in the notopodia plus two to four stout sigmoid hooks. In juveniles the hooks are obviously bidentate but in adults the teeth are very blunt and the end of the hook is almost truncate. The hooks have no hoods.

TYPE LOCALITY: Ireland.

RECORDS: ? ? South Africa.

Caulleriella bioculatus (Keferstein, 1862)
(fig. 20.2.q)

Cirratulus bioculatus Keferstein, 1862: 121, pl. 10 figs. 23–27.
Heterocirrus bioculatus: Fauvel, 1927: 96, fig. 33 i.

Body up to 40 mm. long with 140 segments. Prostomium pointed and with two eye-spots. A pair of long grooved palps inserted at the junction of the buccal segment and setiger 1. Branchial filaments from setiger 1 to the middle of the body. Notopodia with capillaries throughout and one to three acicular hooks from setiger six to nine onwards. Neuropodia with capillaries in setigers 1 and 2 but only hooks thereafter. Hooks (fig. 20.2.q) bidentate with a minute secondary tooth but without hoods.

TYPE LOCALITY: France.

RECORDS: Not recorded from southern Africa.

DISTRIBUTION: English Channel (s); ? Angola (l).

CHAETOZONE Malmgren, 1867

Body elongate, rounded in section and tapered at both ends. Prostomium conical. Buccal segment triannulate. A pair of elongate, grooved palps at the

junction between the third annulus and setiger 1. Branchial filaments on numerous segments. Setae include slender capillaries and simple acicular hooks; the latter form a continuous dorso-ventral arc on posterior segments.

TYPE SPECIES: *Chaetozone setosa* Malmgren, 1867.

Chaetozone setosa Malmgren, 1867
(fig. 20.1.l–p)

Chaetozone setosa Malmgren, 1867: 206, pl. 15 fig. 4; Fauvel, 1927: 101, fig. 35 d–k.

An elongate worm about 20–25 mm. in length with 70–90 segments. Prostomium (fig. 20.1.l) conical. No eyes. Two stout palps at the anterior margin of setiger 1. Branchial filaments from setiger 1 to the middle of the body; they arise close above the notosetae. Capillary setae from the first setiger to the posterior end. Notosetae up to four times the segmental width. Simple sigmoid acicular hooks (fig. 20.1.o) appear in the notopodia from setiger 3 onwards and in the neuropodia from setiger 1. The notopodial and neuropodial setae are separate bundles over most of the body (fig. 20.1.m) but form a continuous dorso-ventral arc of spines (fig. 20.1.p) in posterior segments (fig. 20.1.n). Pygidium with a dorsal anus.

TYPE LOCALITY: Sweden.

RECORDS: Cape (34 22 s and 34 23 s).

DISTRIBUTION: Arctic: Greenland (s, d); North Carolina (s); Sweden (d) and Scotland (s) to Morocco (s, d); and tropical West Africa to Angola (d); Mediterranean s; Aden (s); subantarctic Heard Is. (s); N. Pacific from Behring Sea and Japan to California (i, s).

CIRRATULUS Lamarck, 1801

Body elongate, rounded in section and tapered at both ends. Prostomium conical. Buccal segment triannulate. A few grooved tentacular filaments above one of the anterior setigers. Branchial filaments appear on the same segment as the tentacular filaments and extend over the greater part of the body. Setae are slender capillaries usually with acicular hooks as well.

TYPE SPECIES: *Lumbricus cirratus* Muller, 1776.

KEY TO SPECIES

1 Acicular hooks absent, only capillary setae present even in posterior segments . . . 2
– Both acicular hooks and capillaries present – – – – – – – – – 3
2 Tentacular filaments arise above setigers 4–7 (fig. 20.3.a . . . ***C. chrysoderma*** (p. 511)
– Tentacular filaments arise at the anterior margin of setiger 1 (fig. 20.3.e) ***C. filiformis*** (p. 511)
3 Tentacular filaments arise on the anterior margin of setiger 1. Prostomium with or without eyes 4
– Tentacular filaments arise above setigers 2–3. Prostomium without eyes (fig. 20.3.g) ***C. africanus*** (p. 511)
4 Middle and posterior neuropodia with hooks only. Two to four pairs of eyes ***C. gilchristi*** (p. 513)
– Capillaries present in both rami throughout. Eyes present or absent 5

5 Acicular hooks present in both rami after setiger 12. Two to four pairs of eyes
C. cirratus (p. 513)
– Acicular hooks absent from the notopodia. Eyes absent . . . *C. concinnus* (p. 514)

Cirratulus chrysoderma Claparède, 1868*
(fig. 20.3.a–d)

Cirratulus chrysoderma Claparède, 1868: 262, pl. 23 fig. 4; Fauvel, 1927: 95.

Body (fig. 20.3.b) slender, up to 25 mm. in length, greenish brown in colour. Segments much broader than long. Prostomium (fig. 20.3.a) bluntly conical with two indistinct eyes. Two to four pairs of tentacular filaments above setigers 4–7. Branchial filaments start on the same segment and extend over the anterior half of the body; they are fairly stout and arise closer to the notosetae than the distance between notosetae and neurosetae (fig. 20.3.c). Acicular setae absent and only long capillaries (fig. 20.3.d) in both rami of the parapodia.

Type locality: Italy.

Records: Cape (from 29/16/i and 34/18/i to 34/21/i).

Distribution: Mediterranean (s); Gulf of Manaar; India; Malaya; Japan.

Cirratulus filiformis Keferstein, 1862
(fig. 20.3.e–f)

Cirratulus filiformis Keferstein, 1862: 122, pl. 10 fig. 28–31; Fauvel, 1927: 94, fig. 33 h; Day, 1961: 499.

Body very slender, up to 50 mm. long and greenish brown when alive. Prostomium (fig. 20.3.e) pointed and without eyes. Buccal segment swollen. About four tentacular filaments arise at the junction of the buccal segment with setiger 1. Branchial filaments from setiger 1 to near the posterior end and arise just above the notosetae throughout (fig. 20.3.f). Parapodial ridges well marked. Setae are slender flattened capillaries throughout, hooks being entirely absent.

Type locality: Western Europe.

Records: South West Africa (23/14/d and 26/15/s); Cape (from 34/18/s to 35/20/d).

Distribution: Eastern Atlantic; ? Sweden (d, vd), Scotland (s) to Morocco (s); Senegal (s); ? tropical western Africa (s); ? South Georgia; Persian Gulf (s).

Cirratulus africanus Gravier, 1906
(fig. 20.3.g–k)

Cirratulus africanus Gravier, 1906c; 152, pl 1 fig. 179, text-figs. 315–317; Day, 1957: 102.

Body about 50 mm. long, brown in colour. Prostomium (fig. 20.3.g) long, pointed and without eyes. Three to four tentacular filaments arise above setigers 2–3. Branchiae from setiger 3 and extend over most of the body, arising close above

* Imajima and Hartman (1964) have transferred this species to *Cirriformia* on the basis that the tentacular cirri do not arise from setiger 1. As shown earlier, the cirri really originate from the peristomium.

FIG. 20.3. *Curatulus chrysoderma*. (A) Anterior end. (B) Entire worm (four times natural size). (C) Middle foot. (D) Capillary seta. *Curatulus platyurus*. (E) Anterior end. (F) Middle foot. *Curatulus africanus*. (G) Anterior end. (H) Middle foot. (I) Capillary seta. (J) Abruptly tapered seta. (K) Sigmoid hook. *Curatulus gilchristi*. (L) Anterior end. (M) Middle foot. *Curatulus curatus* (after Fauvel). (N) Middle foot. *Curatulus concinnus* (after Ehlers). (O) Lateral view of anterior end.

the notosetae (fig. 20.3.h). Capillary setae (fig. 20.3.i) in both rami of the parapodia throughout. From the tenth foot setae appear which taper abruptly (fig. 20.3.j) and are thus intermediate between capillaries and acicular hooks. They change to normal sigmoid hooks (fig. 20.3.k) about the middle of the body.

TYPE LOCALITY: Djibouti, Gulf of Aden.

RECORDS: Mocambique (26/32,i).

DISTRIBUTION: Gulf of Aden.

Cirratulus gilchristi Day, 1961
(fig. 20.3.l–m)

Cirratulus gilchristi Day, 1961: 500, fig. 6 j–m.

Body thread-like, only 12 mm. long and markedly tapered. Prostomium (fig. 20.3.l) bluntly rounded with four pairs of eyes (or only one to two in juveniles). Three to five pairs of stout tentacular filaments arise from the anterior margin of setiger 1 in a transverse row. Long branchiae from setiger 1 to the posterior end. In the middle of the body (fig. 20.3.m) each branchial filament arises as far above the notosetae as the distance between notosetae and neurosetae. Unidentate acicular hooks in both rami of the parapodia from setiger 3–6 onwards. Capillaries present in all notopodia but absent from the neuropodia from setiger 6 onwards.

TYPE LOCALITY: Saldanha Bay, South Africa.

RECORDS: Cape (33/17's, 34/18,i, s).

DISTRIBUTION: Three records only.

Cirratulus cirratus (Müller, 1776)
(fig. 20.3.n)

Lumbricus cirratus Müller, 1776: 215.
Cirratulus cirratus: Fauvel, 1927: 94, fig. 33 a–g.

Body elongate and cylindrical, up to 50 mm. long and 1–2 mm. in diameter. Prostomium bluntly conical with two to four pairs of eyes in a row. Peristome as long as the first three to four segments. Numerous tentacular filaments form a row above setiger 1. Segments two or three times as broad as long. Stout branchial filaments from setiger 1 to the end of the body; on middle segments (fig. 20.3.n) they arise higher above the notosetae than the distance between notosetae and neurosetae. Capillary setae in both rami of the parapodia throughout. One to two sigmoid acicular setae in the notopodia from setiger 20 onwards and two to four in the neuropodia from about setiger 12 onwards.

TYPE LOCALITY: Danish seas.

RECORDS: No certain southern African record.

DISTRIBUTION: Arctic (s); North Atlantic from the North Sea to the English Channel; subantarctic from Magellan area and the Falkland Islands to Kerguelen.

Cirratulus concinnus Ehlers, 1908
(fig. 20.3.o)

Cirratulus concinnus Ehlers, 1908: 128, pl. 17 figs. 13–14.

A small thread-like worm about 25 mm. long for 80 segments. Prostomium (fig. 20.3.o) an elongate cone without eyes. Buccal segment elongated with one to two pairs of grooved tentacular filaments arising at the junction of the peristome with setiger 1. Branchial filaments from the first setiger onwards. In the middle of the body individual branchiae arise (?) close above the notosetae. Long capillaries in both rami of the parapodia throughout. Acicular hooks absent from the notopodia but present in the neuropodia from setiger 32 onwards.

Type locality: Agulhas Bank, South Africa.

Records: Cape (35, 23/d).

Distribution: Only one record.

CIRRIFORMIA Hartman, 1936

Prostomium conical and usually without eyes. Buccal segment triannulate. Numerous grooved tentacular filaments arise in a group from an extension of the peristome above setigers 2–7. Branchial filaments start on setiger 1 and are present as single filaments on all subsequent segments over the greater part of the body. Rami of parapodia well separated and bear both capillary setae and simple acicular hooks.

Type species: *Terebella tentaculata* Montagu, 1808

Key to Species

1 Branchiae of middle segments arise closer above the notosetae than distance between notosetae and neurosetae (fig. 20.4.b) 2
– Branchiae of middle segments arise farther above the notosetae than distance between notosetae and neurosetae (fig. 20.4.j) 5
2 Tentacular filaments arise above setiger 5–6. Branchiae slender and thread-like (fig. 20.4.a) 3
– Tentacular filaments arise above setigers 2–4. Branchiae fairly stout (fig. 20.4.e) . . . 4
3 Capillary setae in both rami throughout the body . . . . . ***C. tentaculata*** (p. 515)
– No capillaries in the neuropodia after the 45th setiger . . . . . ***C. maryae****
4 Hooks sigmoid and present from the eighth neuropodium and from the 40th notopodium ***C. saxatilis*** (p. 515)
– Hooks straight; they are absent from anterior segments . . . . ***C. afer*** (p. 515)
5 Body a uniform brown; gills and tentacles uniform yellow or orange 6
– Body speckled with black; gills and tentacles barred (fig. 20.4.k) . ***C. punctata*** (p. 517)
6 Tentacular filaments arise above setiger 3 . . . . . ***C. capensis*** (p. 517)
– Tentacular filaments arise above setiger 4–5 . . . . . ***C. filigera*** (p. 518)

Cirriformia tentaculata (Montagu, 1808)
(fig. 20.4.a–d)

Terebella tentaculata Montagu, 1808: 110.
Audouinia tentaculata: Fauvel, 1927: 91, fig. 32 a–g.

Length up to 200 mm. in European forms but never more than 80 mm. in South Africa. Prostomium pointed (fig. 20.4.a). Numerous tentacular filaments arise in two clusters above setigers 5–7. Slender branchial filaments from setiger 1 to the end of the body. They arise close above the notosetae (fig. 20.4.b). Segments narrow and crowded. Capillary setae (fig. 20.4.d) in both rami of the parapodia throughout. Four to five unidentate acicular hooks (fig. 20.4.c) per ramus after about the first third of the body (i.e. about segment 50 onwards). Body uniformly brown, gills red in life.

Type locality: South Devon, England.

Records: South West Africa (22/14/1, 26/15/i, s and 29/16/i); Cape (from 20/17/i to 34/23/e, i, s and 33/27/i); Natal (from 31/29/i, s to 27/32/i); Mocambique (from 26/32/i to 23/35/e, s).

Distribution: Eastern Atlantic from the North Sea (i) to the English Channel (i, e) and south to Morocco (i, s) and tropical western Africa (s); Persian Gulf (s); tropical Indian Ocean (i, s); Pacific from Japan and New Caledonia to New Zealand (d) and Campbell Is. (i).

Cirriformia saxatilis (Gravier, 1906)
(fig. 20.4.e–g)

Audouinia saxatilis Gravier, 1906c: 154, pl. 1 figs. 180–182 text-fig. 318.

Body about 50 mm. long, yellowish brown with the anterior segments darker ventrally. Prostomium (fig. 20.4.e) rounded. Tentacular filaments arise above setigers 2–4. Branchiae from setiger 1 to the posterior half of the body; they arise immediately above the notosetae (fig. 20.4.f). Saw-edged capillaries are present in both rami of all parapodia. Sigmoid hooks (fig. 20.4.g) first appear in the neuropodium of setiger 8 and in the notopodium of setiger 42.

Type locality: Djibouti, Gulf of Aden.

Records: Mocambique (23/35/s).

Distribution: Gulf of Aden (s).

Cirriformia afer (Ehlers, 1908)
(fig. 20.4.h–i)

Cirratulus afer Ehlers, 1908: 127, pl. 17 figs. 10–12.
[Non] *Cirratulus afer* Monro, 1930: 156, fig. 60 (= *Timarete* sp).

Body up to 20 mm. long, fairly stout with the parapodia forming ridges at the sides. Prostomium (fig. 20.4.h) broadly rounded and without eyes. Tentacular filaments arise above setiger 2 and number five to six on each side. Branchiae from setiger 1 and extend to the posterior half of the body; they arise close above the

FIG. 204. *Cirriformia tentaculata*. (A) Anterior end. (B) Foot from mid-region. (C) Hook. (D) Capillary seta. *Cirriformia savatilis*. (E) Anterior end. (F) Foot from mid-region. (G) Hook. *Cirriformia afer* (after Ehlers). (H) Head end. (I) Foot from mid-region. *Cirriformia punctata*. (J) Foot from mid-region. (K) Head end. (L) Hook. (M) Capillary seta. *Cirriformia capensis*. (N) Head end. (O) Foot from mid-region. *Cirriformia filigera*. (P) Head end. (Q) Foot from mid-region.

notosetae (fig. 20.4.i). Capillaries in both rami of all parapodia. No hooks anteriorly but in some of the posterior segments a single spine may accompany the capillaries.

TYPE LOCALITY: Great Fish Bay, Angola.

RECORDS: Not recorded from South Africa.

DISTRIBUTION: Angola (s).

Cirriformia punctata (Grube, 1859)
(fig. 20.4.j–m)

Cirratulus punctatus Grube, 1859: 107.
Audouinia punctata: Day, 1951 : 47.
Audouinia semicincta Ehlers, 1905a: 292; Fauvel, 1953: 330, non fig. 174C.

Body about 40 mm. long and fairly broad. It is brown flecked with black pigment and the tentacles and branchiae are barred. Prostomium (fig. 20.4.k) rounded in front without obvious eyes. Numerous tentacular filaments arose about setiger 4. Branchiae from setiger 1 to near the posterior end. In the middle of the body (fig. 20.4.j) they arise further above the notosetae than the distance between notosetae and neurosetae. Capillaries (fig. 20.4.m) in both rami of all parapodia. Slender sigmoid hooks (fig. 20.4.l) appear about setiger 12.

TYPE LOCALITY: West Indies.

RECORDS: Natal (31, 29, i to 27, 32, i); Mocambique (26, 32 i).

DISTRIBUTION: Circumtropical (i, s).

Cirriformia capensis (Schmarda, 1861)
(fig. 20.4.n–o)

Cirratulus capensis Schmarda 1861: 56, pl. 27 fig. 213.
Cirratulus australis Stimpson, 1856: 391. [Preoccupied by *Cirratulus australis* Blanchard, 1849 = *Cirriformia filigera* (Delle Chiaje, 1828).]
Audouinia australis: Day, 1955: 418.

Body large, reaching 150 mm. by 6 mm. with numerous segments. It is uniformly brown with orange gills and tentacles. Prostomium (fig. 20.4.n) broadly rounded in front without obvious eyes. Numerous tentacular cirri arise above setigers 3–4. Branchiae from setiger 1 to the posterior end. Individual filaments are stout and in the middle of the body they arise further above the notosetae than the distance between notosetae and neurosetae (fig. 20.4.o). Capillaries present in both rami of all parapodia. Sigmoid hooks appear about setiger 12.

TYPE LOCALITY: False Bay, South Africa.

RECORDS: South West Africa (22 14 i, s and 26 15 i, s : Cape from 30 17 i and 34 18, i, s to 34 23, e and 32 28 i).

DISTRIBUTION: Angola (s)

Cirriformia filigera (Delle Chiaje, 1825)
(fig. 20.4.p–q)

Lumbricus filigerus Delle Chiaje 1825: 178.
Audouinia filigera: Fauvel, 1927: 92, fig. 32 h–m.

Body uniformly brownish in colour with reddish gills. Length up to 250 mm. Prostomium (fig. 20.4.p) bluntly conical. Eyes not visible in adults. Numerous tentacular cirri arise above setigers 4–6. Branchiae from setiger 1 to near the posterior end and in the middle of the body (fig. 20.4.q) they arise further above the notosetae than the distance between notosetae and neurosetae. Capillary setae in both rami of all parapodia. Sigmoid hooks appear about setiger 12.

Type locality: Naples.

Records: Natal (29/31 i, s); Mocambique (26/32/i and 23/35/s).

Distribution: Warm and tropical Atlantic (Morocco (i, d), San Thome; North Carolina (i); Gulf of Mexico (s); Mediterranean (i, s); Persian Gulf; tropical Indian Ocean (i); ? Pacific.

Family **HETEROSPIONIDAE** Hartman, 1965
(including LONGOSOMIDAE Hartman, 1944)

Body long and slender, rounded in section and divided into two regions. Prostomium a blunt depressed cone without appendages. Pharynx soft, eversible and unarmed. Peristomium well developed with a pair of grooved palps but no parapodia or setae. An anterior region of nine short segments with poorly developed biramous parapodia and a pair of cirriform branchiae above the notosetae. Simple capillaries in both rami and sometimes acicular spines in the first neuropodium. Posterior region with greatly elongated segments without parapodial projections or branchiae. Posterior setae are simple capillaries and/or acicular spines.

Remarks: Hartman (1944b and 1965) gives a general account of the family and the few known species. None has been recorded from southern Africa.

Family **TROCHOCHAETIDAE** Pettibone, 1963
(= DISOMIDAE Mesnil)

Prostomium rounded ; peristome reduced, with or without posterior tentaculiform appendages. Dorsal lip with or without an anterior digitiform projection. Two long grooved palps. Body divided into distinct regions. Parapodia well developed and usually biramous with prominent postsetal lobes but some of the middle segments lack notopodia in *Trochochaetus*. Setae of several types but always simple ; they include acicular neurosetae on setigers 2, 3 and 4, also slender capillaries and barbed and spiniform forms on posterior parapodia. No hooded hooks.

Key to Genera

1 Parapodia all biramous. One or more tentaculiform lobes behind the prostomium ***POECILOCHAETUS***

– Middle region uniramous (without notopodia). No free tentaculiform lobes behind the prostomium though a keel may be present . . . . . ***TROCHOCHAETA**** (= *Disoma* auctorum)

Records from southern Africa

Poecilochatus serpens Allen 51Cs, 55Ca

REMARKS

The larvae of *Poecilochaetus*, which are easily recognised, were known long before the adult. They may be found even in oceanic plankton samples which suggests that the larval stage is prolonged. Allen (1904) gave a very careful account of the morphology of the adult and some interesting notes on its habits. Apparently near Plymouth they make burrows in mud-filled crevices and stretch out their very long, grooved tentacles in search of detritus. In other areas they may be dredged from deep water on muddy bottoms and appear to live in friable mucus tubes covered with foraminiferan shells.

POECILOCHAETUS Ehlers, 1874

Prostomium rounded with two pairs of eyes. Peristome reduced, with 1–3 tentaculiform lobes posteriorly. Dorsal lip with a digitiform process. Two long grooved palps. First setiger with elongated notosetae and neurosetae. Postsetal lobes elongated but vary in shape. Filiform branchiae behind middle and posterior parapodia. Setae are mainly capillaries which are smooth anteriorly and plumose posteriorly. Barbed setae from middle segments onward. Acicular hooks in the neuropodia of setigers 2, 3 and sometimes 4 and in the notopodia of posterior segments.

Type species : *Poecilochaetus fulgoris* Ehlers, 1874

KEY TO SPECIES

1 Neuropodial hooks in setigers 2–4. Anterior dorsum with tubercles . . . . . ***P. fulgoris****
– Neuropodial hooks in setigers 2–3. Anterior dorsum smooth 2
2 Three tentaculiform lobes behind the prostomium. Filamentous gills on posterior face of posterior parapodia . . . . . ***P. serpens***
One tentaculiform lobe behind prostomium. No gills on middle or posterior parapodia ***P. johnsoni****

Poecilochaetus serpens Allen, 1904
(fig. 21.1.a–j)

Poecilochaetus serpens Allen, 1904: 79, pls. 7–12 text-fig. 1; Fauvel, 1927: 67, fig. 23 a–m; Day, 1961: 407.

Body (fig. 21.1.b) slender, up to 55 mm. long with 110 segments. Prostomium (fig. 21.1.a) rounded with four eyes. Palps long, grooved and caducous. A digitiform process arising from the dorsal lip. Three long nuchal processes arising from the occipital region. First setiger often with a vestigial notopodial postsetal lobe and a long cirriform postsetal neuropodial lobe. From setiger 2 to setiger 6 both

FIG. 21.1. *Poecilochaetus serpens*. A Head. B Entire worm (twice natural size). C Fourth foot. D Anterior hook. E Posterior view of posterior foot showing branchiae. F Middle foot (10th). G Smooth capillary. H Feathered capillary. I Posterior spine (after Fauvel). J Posterior serrated spine (after Fauvel).

notopodia and neuropodial lobes are tapered (fig. 21.1.c), from setiger 7–13 they are club-shaped with swollen bases, slender shafts and knobbed tips (fig. 21.1.f) but from setiger 14 onwards they are again tapered (fig. 21.1.e) with two to four filamentous gills behind middle and posterior parapodia. Long capillaries of setiger 1 directed forwards to form a cephalic cage. Two to four curved spines (fig. 21.1.d) in the neuropodia of setigers 2 and 3. The rest of the anterior setae are all smooth capillaries (fig. 21.1.g) plus a few feathered setae (fig. 21.1.h) in middle segments; these persist in posterior parapodia. On the last 16 or 17 setigers the notosetae are replaced by simple or serrate spines (fig. 21.1.i and j).

Type locality: Plymouth, England.

Records: Cape (from 32/17/d, 34/17/vd and 34°18/s to 34/26/d); Natal (29/31/s, d).

Distribution: N. Atlantic from Scotland (s), Ireland and the English Channel (i) to Morocco (s); Mediterranean.

Family **APISTOBRANCHIDAE** Mesnil and Caullery, 1898

Small elongate worms with numerous segments. Prostomium without appendages but with well developed nuchal organs. Pharynx soft and unarmed. Peristome with parapodia and a pair of long grooved palps. Notopodium reduced to a postsetal cirriform lobe with an internal aciculum. An inter-ramal cirrus sometimes present. No branchiae. Neuropodium with a lamellar postsetal lobe and a fascicle of simple capillary setae. Pygidium with anal cirri.

Note: No representative has been recorded from South Africa. A single genus *Apistobranchus* is know from northern seas. A review will be found in Orrhage (1962).

Family **CHAETOPTERIDAE** Malmgren, 1867

Very soft mucilaginous worms always protected in a tube. Body elongate and composed of numerous segments always divided into three regions. Prostomium inconspicuous and enfolded by a broad, collar-like buccal segment. Head appendages include a pair of long grooved palps and sometimes a pair of inconspicuous tentacular cirri. Anterior region of nine to fifteen uniramous, dorsally flattened segments with stout acicular setae in setiger 1 and elongate simple setae elsewhere. Middle region of biramous segments with fine internal notosetae and minute serpuliform uncini in the neuropodia; the notopodia are often bilobed and one or more pairs produce mucus bags which are caught by cup-shaped organs and carried forward to the mouth. Posterior region of biramous segments always with simple notopodia which do not produce mucus bags.

Records from southern Africa

Chaetopterus variopedatus (Renier) .	13Ci, 26Ais, 27Mi, 32Ps, 33As, 36Ci, 40Pi, 44Ci, 45PiNi, 51Cs
as *Chaetopterus capensis* Stimpson .	2Ci
as *Chaetopterus hamatus* Schmarda .	4Ci
Mesochaetopterus capensis (McIntosh) .	
as *Ranzania capensis* McIntosh .	10Cs
as *Ranzanides capensis* (McIntosh) .	51Cs
Mesochaetopterus minutus Potts . .	38Ni, 40Ni, 45PiNi, 48CsWs
Phyllochaetopterus elioti Crossland .	45Pi, 51Ci
Phyllochaetopterus herdmani Crossland .	45Pi
Phyllochaetopterus socialis Claparède .	32Cd, 33As, 40Ni, 44Ci, 45Pi, 51Cs
as *Phyllochaetopterus pictus* Crossland	15Cs, 21Ci
Spiochaetopterus costarum (Claparède) .	
as *Telepsavus costarum* Claparède .	27Mi, 51Cs
Spiochaetopterus typicus Sars . .	?Cs
Spiochaetopterus vitrarius (Ehlers) .	– Ns
as *Telepsavus vitrarius* Ehlers .	15Ai

THE MAIN DIAGNOSTIC CHARACTERS

Useful accounts of the family Chaetopteridae will be found in Potts (1914), Fauvel (1927) and Barnes (1964).

All genera are tubicolous with an extremely fragile epithelium which produces abundant mucus. When the worm is preserved in its tube, the mucus hardens around it and it is very difficult to remove the worm from its tube without damaging the fragile parapodia upon which identification depends. The most important characters include the nature of the head appendages, the number and shape of the enlarged setae of the fourth setiger, the shape of the notopodia of the middle region and the nature of the tube.

The head is truncate with a small ovoid prostomium enfolded by a broad glandular

buccal segment. The latter is always provided with a large funnel-shaped lower lip and a pair of grooved palps similar to those of the family Spionidae. These palps often show a characteristic pigment pattern which is worth noting. In *Phyllochaetopterus* alone there is a pair of minute tentacular cirri with fine internal acicula. They arise from the dorsal surface of the first setiger and lie on either side of the prostomium. In well preserved specimens they are easy to see but when the specimen has been fixed inside the tube the head is usually covered with congealed mucus and the tentacular cirri are difficult to distinguish. Since the possession of these tentacular cirri is the main character which distinguishes *Phyllochaetopterus* from *Spiochaetopterus* the two are often confused.

The regions of the body. The number of uniramous segments which forms the anterior region is probably constant but allowance must be made for autonomy and subsequent regeneration. The fourth setiger however is always recognisable by its enlarged and modified setae which are used to cut the partitions between the annuli of the tube or even the tube wall itself when a side branch is formed. The number and shape of these specialised setae is a useful character.

All the segments of the middle and posterior regions are biramous but the foliaceous, bilobed notopodia are limited to the middle region since Barnes (in press) has shown that even *Telepsavus* has a short posterior region of simple conical notopodia; it thus becomes a synonym of *Spiochaetopterus*. In *Spiochaetopterus* and *Phyllochaetopterus* the change from the middle region with its bilobed notopodia to the posterior region with its simple knobbed notopodia is well marked; in *Chaetopterus* the last three segments of the middle region have fused notopodia but in *Mesochaetopterus* where the notopodia of the middle region are simple, the change from middle to the posterior region is gradual and depends on the relative length of the segments.

The nature of the tube. In *Chaetopterus* the tube is broad, papery and opens on the the surface at both ends. In *Mesochaetopterus* it is fragile and covered with sand or foraminifera shells and one end is buried. In *Phyllochaetopterus* and *Spiochaetopterus* the tube is horny and ringed with one end buried or attached to the substrate. Barnes has shown that the rings correspond with internal partitions pierced by minute pores.

Feeding mechanisms. It has long been known that *Chaetopterus* is a ciliary feeder and Barnes (1964) has shown that all the other genera feed in essentially the same way. They produce a feeding current either by the pumping action of the fused notopodia (in *Chaetopterus*) or by the beating of cilia on the smaller non-fused notopodia of the middle region in other genera. The food current passes down the dorsal surface of the body and the enlarged notopodia of the second segment of the middle region secrete a mucus bag in which food particles are trapped. In some species more than one mucus bag is formed. Posterior to the mucus bags there are cup-shaped organs or *cupules* which roll up the food bags and these are then passed forwards along a ciliated mid-dorsal groove to the mouth. Faecal pellets are carried forwards in the same way but on the head these are transferred to the palps and voided from the tube. The palps eliminate not only egested material but also large inedible

particles which enter the tube and their primitive function of detritus gathering organs appears to be of minor importance in some cases.

Key to Genera

1 Middle region with bilobed notopodia. Tube often horny and ringed 2
– Middle region with the notopodia never bilobed. Tube not horny or ringed 3
2 A pair of minute tentacular cirri as well as large grooved palps ***PHYLLOCHAETOPTERUS*** (p. 524)
– No tentacular cirri, only a pair of large grooved palps . ***SPIOCHAETOPTERUS*** (p. 527)
3 Body large. Palps short. Some notopodia of middle region fused to form paddles ***CHAETOPTERUS*** (p. 529)
– Body usually small. Palps large. Notopodia of middle region never fused ***MESOCHAETOPTERUS*** (p. 531)

PHYLLOCHAETOPTERUS Grube, 1863

Body with three well defined body regions. A pair of long grooved palps and a pair of minute tentacular cirri arising from the dorsal surface of setiger 1 on either side of the prostomium. Anterior region uniramous with enlarged setae on setiger 1 and paddle-shaped setae elsewhere. Middle region biramous with bilobed foliaceous notopodia, lateral branchial lobes and bilobed neuropodia. Posterior region biramous without branchial lobes but with cylindrical notopodia and neuropodia as uncigerous ridges.

Type species: *Phyllochaetopterus gracilis* Grube, 1863

Key to Species

1 Middle region of two segments. A solitary species with a sand-encrusted tube ***P. herdmani***
– Middle region with seven or more segments 2
2 A large solitary species with a fragile, sand-encrusted tube. Two or more spines on setiger 4 ***P. elioti***
– A small gregarious species with a tough, horny ringed tube. A single spine on setiger 4 ***P. socialis***

Phyllochaetopterus herdmani Willey, 1905

(fig. 22.1.a–e)

Phyllochaetopterus herdmani Willey, 1905: 292, p. 5 fig. 127–132; Fauvel, 1953: 342, fig. 177 i–m; Day, 1957: 100, fig. 6 m.

A large species reaching 80 mm. Prostomium without eyes. Tentacular cirri (fig. 22.1.a) long, tapered and supported by fine internal setae. Buccal segment large, truncate and curving upwards. Palps barred. Anterior region of nine to ten segments. Segment 1 with six to eight stout setae obliquely truncate at the ends (fig. 22.1.c). Middle region with two segments with elongate bilobed notopodia (fig. 22.1.b), flattened branchiae and large expanded wing-like neuropodia with uncini along the whole external margin. Posterior region of numerous segments bearing digitiform notopodia with knobbed tips. Neuropodia are inferior square

projecting pinnules. Uncini (fig. 22.1.d) with twelve to fourteen teeth. Tube (fig. 22.1.e) fragile and thickly encrusted with sand-grains and shell fragments.

TYPE LOCALITY: Galle, Ceylon.

RECORDS: Natal (30/30/i); Mocambique (26/31/i).

DISTRIBUTION: Ceylon.

Phyllochaeopterus elioti Crossland, 1903
(fig. 22.1.f–g)

Phyllochaetopterus elioti Crossland, 1903: 172, pl. 16 figs. 1–3, 8, pl. 17 figs. 10–13; Day, 1957: 100.

A large species 50–100 mm. long by 2–3 mm. broad. Buccal segment truncate, palps barred with brown. Tentacular cirri which are well developed and digitiform, arise at the sides of the prostomium which bears one pair of eyes. Anterior region of fifteen segments. Fourth segment with two to three enlarged and truncate setae (fig. 22.1.g). Middle region of more than twenty short segments with bilobed notopodia (fig. 22.1.f) containing six slender setae. Triangular lateral branchiae are continuous with the ventro-lateral neuropodia which bear numerous minute uncini with about thirty teeth. Posterior region with slender knobbed notopodia each supported by a single spear-headed seta. Tube horny, not ringed and densely encrusted with sand.

TYPE LOCALITY: Zanzibar.

RECORDS: Cape (34/22/s); Mocambique (26/32/i).

DISTRIBUTION: Zanzibar (i); Ceylon and the Gulf of Manaar.

Phyllochatopterus socialis Claparède, 1870
(fig. 22.1.h–r)

Phyllochaetopterus socialis Claparède 1870: 345, p. 21 fig. 1; Fauvel, 1927: 84, fig. 30 a–l.

A small worm (fig. 22.1.i) seldom exceeding 30 mm. in length and dark green posteriorly. Prostomium (fig. 22.1.j) ovoid with two lateral eyes often hidden by the small tentacular cirri. Buccal segment truncate in front but curving up laterally on the sides of the prostomium. Two long stout grooved palps. Anterior region of ten to eighteen segments. Fourth setiger with one stout brown specialised seta (fig. 22.1.n) having an irregularly truncate end. Middle region of seven to twenty-four segments bearing bilobed notopodia dorsally and triangular gills laterally (fig. 22.1.l). Uncigerous portion of neuropodium ventro-lateral. Uncini (fig. 22.1.r with about twenty-four teeth. Posterior region of numerous segments with digitiform

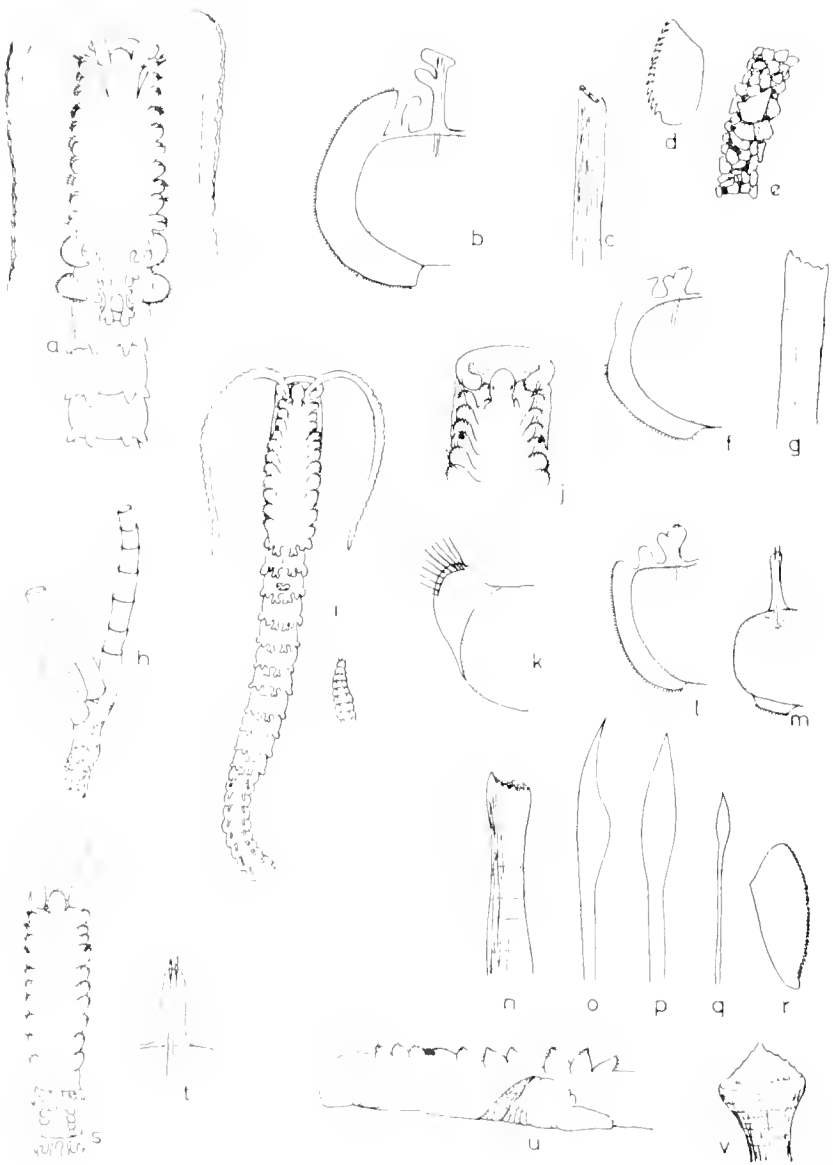


FIG. 22.1. *Phyllochaetopterus herdmani.* (A) Anterior end. (B) Foot from middle region. (C) Enlarged seta from fourth foot. (D) Uncinus. (E) Part of sandy tube. *Phyllochaetopterus elioti.* (F) Foot from mid-region. (G) Enlarged seta from fourth foot. *Phyllochaetopterus socialis.* (H) Part of branching group of tubes. (I) Entire worm (four times natural size).

[*Contd. at foot of page 527*]

notopodia bearing one to two spear-headed setae (fig. 22.1.q). Tube (fig. 22.1.h) horny and ringed distally, often aggregated into branching colonies.

TYPE LOCALITY: Italy.

RECORDS: South West Africa (22/14/s and 26/15/i, s); Cape (from 29/16/i and 34/18 i, s, d to 33/28/s); Natal (29/31/i, s); Mocambique (26/32 i, 24/34/s, 24/35/d).

DISTRIBUTION: Atlantic from the U.S.A. and the English Channel south to the Falkland Islands and South Africa; Mediterranean; tropical Indian Ocean (i, s, d, vd); Australia.

SPIOCHAETOPTERUS Sars, 1853
(including *TELEPSAVUS* Costa, 1861)

Fairly large but very soft worms in ringed horny tubes. Three distinct body regions. Prostomium small and enfolded by the truncate buccal segment which bears long grooved palps but no tentacular cirri. Fourth setiger with one to two stout spines. Middle region with a variable number of segments bearing bilobed notopodia. A short posterior region bearing conical notopodia.

TYPE SPECIES: *Spiochaetopterus typicus* Sars, 1853.

KEY TO SPECIES

1	Middle region of two to ten segments	***S. typicus***
–	Middle region of about 20 segments	***S. vitrarius***
–	Middle region of over 30 segments	***S. costarum***

Spiochaetopterus typicus Sars, 1853
(fig. 22.1.s–t)

Spiochaetopterus typicus Sars, 1853: 390; Fauvel, 1927: 82, fig. 29 a–i.

A fairly large species measuring 50–60 mm. with a horny, ringed tube. Anterior region (fig. 22.1.s) of nine to ten segments. Fourth setiger with a single giant seta obliquely truncate at the end. A brown patch on the ventrum of setigers 5–6. Middle region of two to ten segments bearing large biolobed notopodia with fine setae embedded in the larger inner lobe. A triangular lateral gill on the side of each segment. Neuropodia ventro-lateral. Uncini with about thirty teeth. Posterior

(J) Anterior end (palps omitted). (K) Foot from anterior region. (L) Foot from mid-region. (M) Foot from posterior region. (N) Enlarged seta from fourth foot. (O and P) Notosetae from anterior region. (Q) Notosetae from posterior region. (R) Uncinus. *Spiochaetopterus typicus*. (S) Anterior end. (T) Notopodium from posterior foot. *Spiochaetopterus vitrarius* (after Ehlers, 1908). (U) Lateral view of anterior region. (V) End of enlarged seta of fourth foot.

region with finger-like notopodia supported by two spear-tipped setae (fig. 22.1.t). No lateral gills. Uncini with minute teeth.

TYPE LOCALITY: Northern Norway.

RECORDS: ? Cape (34 18 s).

DISTRIBUTION: Arctic (s.); North Sea; North Carolina (d).

Spiochaetopterus vitrarius (Ehlers, 1908)
(fig. 22.1.u–v)

Telepsavus vitrarius Ehlers, 1908: 114, pl 15 figs. 1–8.

A slender species over 35 mm. long, consisting of an anterior region of nine uniramous segments, a middle region of about twenty segments of decreasing length and a posterior region of numerous short segments. Prostomium ovoid with a pair of lateral eye-spots. Buccal segment broad, truncate and curving upwards laterally. Palps long and barred distally. No tentacular cirri. Segment 7 with a sharply defined arc of black pigment on the ventrum (fig. 22.1.u) preceding a white glandular patch on segments 8 and 9. Segment 4 with a fan of hastate setae and a single enlarged seta with a swollen and conical tip (fig. 22.1.v). Notopodia of middle region large, flattened and bilobed. Lateral branchiae present. Posterior region with short blunt notopodia supported by one to two long hastate setae. No posterior branchiae. Neuropodia of middle and posterior regions bear undivided rows of serpuliform uncini with (?) teeth. Tube clear, horny and closely ringed.

TYPE LOCALITY: Great Fish Bay, Angola.

RECORDS: Natal (30 30 s, 29 31 s).

DISTRIBUTION: Tropical western Africa from Senegal (s) to Angola (s).

Spiochaetopterus costarum (Claparède, 1870)

Telepsavus costarum Claparede, 1870: 330, pl. 20 fig. 1; Fauvel, 1927: 82, fig. 28 a–h.
Spiochaetopterus costarum: Barnes (in press).

Body 50–60 mm. long, slender and fragile. Tube horny, ringed and transparent. Palps long and speckled with brown. Anterior region of nine to ten setigers with a large white glandular patch on the ventrum of setiger 7. One enlarged seta in the fourth setiger with the end swollen and truncate and the cutting edge serrate. Middle region with very numerous segments, each bearing bilobed notopodia lateral triangular branchiae and neuropodia with numerous uncini with 25–30 small teeth. A cupule on middle segment 2. Posterior region short with crowded segments bearing digitiform notopodia and reduced neuropodia.

Type locality: Naples.

Records: Cape (34/18/s).

Distribution: Atlantic coast of France (i, s); Mediterranean (s); Madagascar (i); Japan and W. Canada to Southern California.

CHAETOPTERUS Cuvier, 1827

A large flabby worm inhabiting a broad parchment-like tube opening onto the surface at both ends. Body divided into three distinct regions, an anterior region of uniramous segments, a middle region which has the posterior notopodia fused across the dorsum to form paddles and a posterior region with digitiform notopodia. Buccal segment with short tapered palps but no tentacular cirri. Fourth setiger with several stout spines.

Type species: *Tricoelia varieopedatus* Renier, 1804.

Chaetopterus varieopedatus Renier, 1804
(fig. 22.2.a–g)

Tricoelia varieopedatus Renier 1804: xviii.
Chaetopterus varieopedatus: Fauvel, 1927: 77, fig. 26 a–n.

Body about 100–150 mm. long by 10 mm. broad with 70 segments (fig. 22.2.a). Head truncate with a very small prostomium and a very large buccal segment which forms the glandular lower lip. A pair of short tapered palps and a pair of small eyes. Anterior region with eight to twelve segments bearing triangular notopodia. Notosetae with flattened knife-like blades except in setiger 4 where there are several stout, obliquely truncate setae (fig. 22.2.g) in addition to a few capillaries. Middle region with five biramous segments, the first short with small notopodia, the second long with large wing-like notopodia anteriorly and a cupule posteriorly and the third, fourth and fifth with large notopodia fused across the dorsum to form paddles. Neuropodial uncini (fig. 22.2.c) with six to eight teeth. Posterior region with over 20 segments bearing digitiform notopodia with knobbed ends and bilobed neuropodia (fig. 22.2.b).

Type locality: Mediterranean Sea.

Records: Cape (from 33 18/i, s and 34 23 e, i to 32 28 i); Natal (29 31 i, s); Mocambique (26 32 i, s).

Distribution: Cosmopolitan apart from the Arctic and Antarctic.

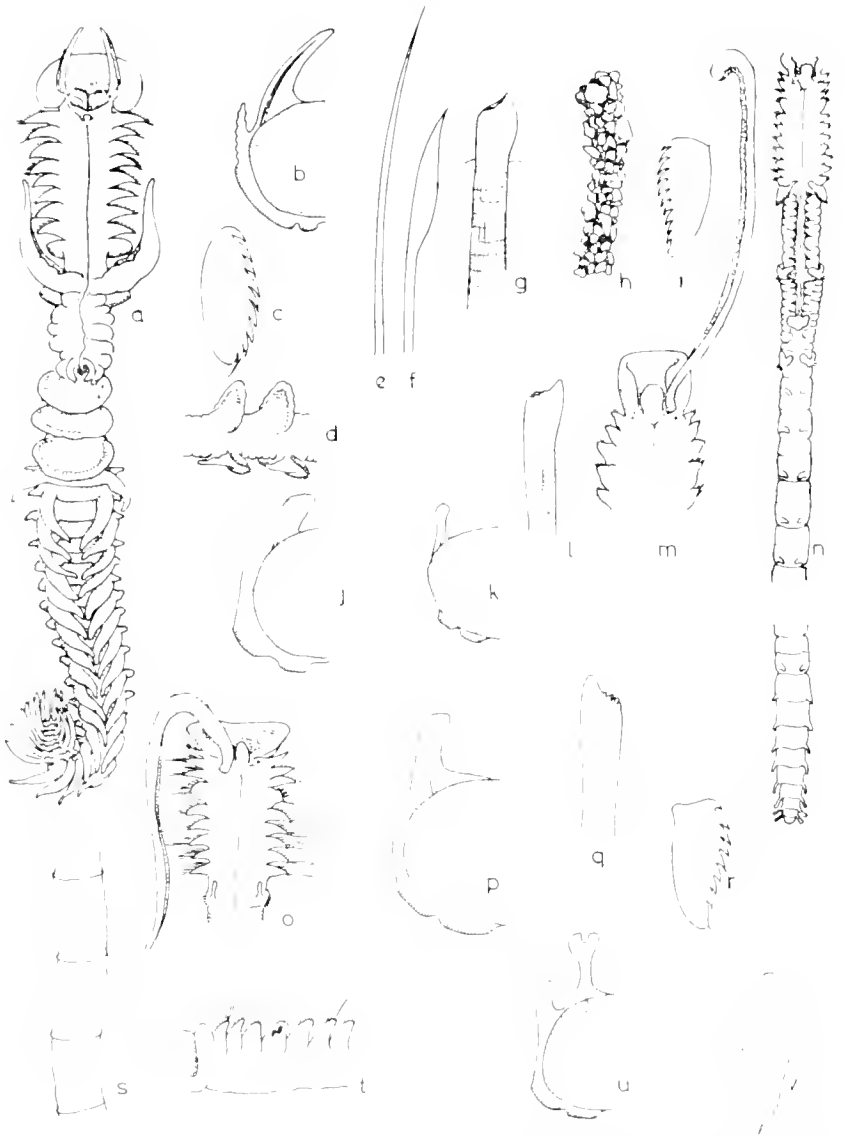


FIG. 22.2. *Chaetopterus anteopelatus*. (A) Entire worm (natural size). (B) Foot from the posterior region. (C) Uncinus. (D) Lateral view of fourth and fifth segments of mid-region. (E) Anterior capillary seta. (F) Anterior oar-shaped seta. (G) Enlarged seta of setiger 4. *Mesochaetopterus minutus*. (H) Part of sandy tube. (I) Uncinus. (J) Second foot of mid-region. (K) Foot from tail region. (L) Enlarged seta of setiger 4. (M) Head end. (N) Entire worm (four times life size). *Mesochaetopterus capensis*. (O) Anterior end. (P) Second uncinigerous foot. (Q) Enlarged seta of setiger 4. (R) Uncinus. *Spiochaetopterus costarum*. (S) Part of tube. (T) Lateral view of head end. (U) Posterior foot. (V) Uncinus.

MESOCHAETOPTERUS Potts, 1914
(including *RANZANIA* Claparède, 1870 (preoccupied) and *RANZANIDES* Chamberlin, 1919)

Body with three regions. Buccal segment with long grooved palps but no tentacular cirri. Anterior region with uniramous segments. Fourth setiger with several specialised setae. Middle region with a few long segments bearing simple notopodia and neuropodia with divided rows of uncini. Posterior region not sharply marked off from the middle region but the segments are short, the notopodia digitiform and there are no cupules. Tube fragile and encrusted with sand or shell fragments.

Type species: *Mesochaetopterus minutus* Potts, 1914.

Key to Species

1 Middle region of three segments of which the second and third bear cupules. A large solitary species measuring 100 mm. or more . . . . . ***M. taylori****
– Middle region of two segments of which the second bears a cupule. Small species measuring less than 35 mm. 2
2 Anterior region of 10–13 segments with four to seven modified setae in setiger 4. Posterior notopodia each with a single seta. Animals gregarious . . . ***M. minutus***
– Anterior region of 12 segments with "several" modified setae in setiger 4. Posterior notopodia each with (?) notosetae. Animals not gregarious . . . ***M. sagittaria****
– Anterior region of nine segments with eight modified setae in setiger 4. Animals not gregarious . . . . . ***M. capensis***

Mesochaetopterus minutus Potts, 1914
(fig. 22.2.h–n)

Mesochaetopterus minutus Potts, 1914: 963, pl. 2 fig. 4, pl. 3 figs. 7–8; text-figs. 4 and 5.

A small species about 15 mm. long living gregariously in dense masses of fragile sandy tubes (fig. 22.2.h). Body (fig. 22.2.n) not pigmented. Prostomium relatively large and ovoid with a pair of eyes. Buccal segment broad and truncate with a pair of long grooved palps. Anterior region of ten to thirteen segments. Setiger 4 with four to seven modified setae (fig. 22.j). Middle region of two long segments with simple flattened notopodia supported by two to three setae. One cupule in the middle of the second segment. Branchiae absent. Neuropodia notched and uncigerous row divided. Uncini with seven to nine teeth (fig. 22.2.l). Posterior region of numerous segments decreasing in length each bearing short conical notopodia supported by a single seta and finally a few segments with knobbed notopodia (fig. 22.2.k).

Type locality: Torres Strait.

Records: Natal (30 30 i and 29 31 i); Mocambique (26 32 i).

Distribution: Tropical Indo-west-Pacific (i) to Japan.

Mesochaetopterus capensis (McIntosh, 1885)
(fig. 22.2.o r)

Ranzania capensis McIntosh, 1885: 378, pl. 23A figs. 19–20.
Ranzanides capensis: Day, 1961: 498.

Body about 15 mm. long with more than 20 segments. Anterior region of nine uniramous segments (fig. 22.2.o). Prostomium ovoid. Palps long, faintly barred distally and with a pair of eyes at their bases. Fourth setiger with eight modified setae having obliquely truncate and serrated tips (fig. 22.2.q). Middle region of two long segments of which the first has a pair of short notopodia close to the last anterior segment. The second has a pair of longer strap-like notopodia (fig. 22.2.p) and a cupule posteriorly. Neuropodia as bilobed ridges with a divided series of uncini. Individual uncini (fig. 22.2.r) with six to nine teeth. Posterior region with short segments bearing simple conical notopodia supported by two setae with flattened, tapering blades. Tube fragile and encrusted with sand or foraminifera shells. Animal solitary.

Type locality: Dredged off the Cape of Good Hope.

Records: Cape (from 34 18 s, d and 36 21 d to 34 23 s); Natal (30 30 s).

Distribution: Endemic.

Family **ORBINIIDAE** Hartman, 1942

Body vermiform and divided into an anterior thoracic region of rather flattened segments and a posterior abdominal region of numerous rounded segments. Prostomium conical without sensory appendages or palps. Proboscis unarmed. Buccal segment achaetous and sometimes also the next. Cirriform branchiae are inserted on the dorsal surface between the notopodia and usually extend over most of the body. Notopodia consist of finger-like postsetal lobes each with a bundle of crenulate capillaries and often a few forked setae. An interramal cirrus may be present on abdominal segments. Neuropodia are in the form of vertical ridges on the sides of the thorax and may be accompanied by a postsetal row of foot-papillae which extend onto the ventral surface as stomach papillae. Thoracic neurosetae include crenulate capillaries and usually acicular hooks as well. Abdominal neuropodia are dorso-lateral projections usually bilobed. A ventral cirrus is usually present. Abdominal neurosetae are crenulate capillaries.

Records from southern Africa

Haploscoloplos cf. *fragilis* Verrill	56Cs
Haploscoloplos kerguelensis (McIntosh)	51Csd
as ? *Theostoma oersetedi* Kirkegaard (non Claparède)	48Cs
Naineris laevigata (Grube)	36Ci, 40Ni, 44Ci, Ni, 51Cs
as *Anthostoma hexaphyllum* Schmarda	4Ci
as *Theodisca hexaphyllum* (Schmarda)	13Ci
as *Scoloplos* (*Naidonereis*) *hexaphyllum* (Schmarda)	26Wis
as *Nainereis hexaphyllum* (Schmarda)	33Ci
as *Scoloplos armiger* Monro (non Müller)	33Ci
Orbinia angrapequensis (Augener)	44Ci, 51Cs
as *Aricia angrapequensis* Augener	26Ws
Orbinia bioreti (Fauvel)	45Ni, ? 51Cis
as *Aricia bioreti* Fauvel	27Mi
Orbinia cuvieri (Aud. & M. Edw.)	—Ns
Phylo foetida australis (Fauvel)	
as *Aricia foetida* var. *australis* Fauvel	27Mi, 45Pi
Phylo foetidia ligustica (Orlandi)	
as *Orbinia foetida* (Claparède) var. *ligustica* (Orlandi)	44Ci, 51Csd
Phylo capensis Day	51Csd
Orbinia monroi Day	44Ci, 45Pi
Proscoloplos cyngochactus Day	51Ci
Schroederella pauliani Laubier	51Wi
Scolaricia capensis Day	51Cs
Scolaricia dubia (Day)	51Cs
as *Orbinia dubia* Day	44Ci

Scoloplella capensis Day	56Cd
Scoloplos armiger Muller	? 51Csd
Scoloplos (*Leodamas*) *jonstonei* Day . . .	36Ci, 44Ci, 45PiNi, 51Cs
Scoloplos (*Leodamas*) *madagascariensis* Fauvel .	27Mi, 40Pi, 45Pi, 48Cs, —s
Scoloplos marsupialis Southern	45Pi
Scoloplos sp.	44Ci
Scoloplos (*Leodamas*) *uniramus* Day . . .	51Csd, —Ns

REMARKS

A recent review of the family Orbiniidae will be found in Hartman (1957). Most of the orbiniids burrow in banks of sandy mud and do not make permanent tubes. They ingest particulate organic matter but do not appear to be selective as the gut is often packed with large sand grains. The pointed prostomium and the flattened, muscular anterior region appear to do most of the burrowing work while the posterior region, where the whole parapodium is dorsal to protect the gills, is respiratory and digestive. Forms with more rounded prostomia such as *Naineris* and *Proscoloplos* are found on rocky shores among the holdfasts of algae.

The important taxonomic characters include the shape of the prostomium, the number of segments which form the anterior region, the position of the first gill, the shape of both the anterior and posterior neuropodia and finally the character of the setae.

The head. As noted, the prostomium may be either a sharply pointed cone or a rounded lobe above the mouth. The eversible proboscis is soft and often lobed but it is usually retracted and not important. The buccal segment is always achaetous and in the subfamily Protoariciinae it is followed by a second achaetous segment.

The anterior region or thorax. This part of the body is flattened to varying degrees and the neuropodia are mere lateral ridges bearing vertical rows of neurosetae. Behind the neurosetae however, there are one or more conical postsetal lobes or *foot-papillae* whose position (superior, median or inferior) is important if there are only one to three. In the abdomen the superior one becomes the postsetal lobe of the neuropodium and the other one or two persist for several segments as ventral cirri. In *Orbinia* and *Phylo* there are numerous foot papillae and, on the transitional segments between the thorax and abdomen, a ventral row of *stomach papillae* is developed. The presence or absence of such papillae is important but their exact number and segmental disposition is too variable to be of value.

The segment on which the first pair of branchiae arises is constant to within two segments if branchiae start on setiger 5–7 but varies up to four segments if the first branchia appears between the 15th and 25th setiger. This ability of the worm to "count more accurately" nearer its head is fairly common among polychaetes.

The thoracic notosetae are all *crenulate* (laddered) capillaries. The neurosetae are arranged in vertical rows. In the genus *Haploscoloplos* they are all crenulate capillaries but in other genera the anterior rows of neurosetae are short, stout hooks (sometimes

called *crochets*). These often have serrated ends protected by delicate bivalve guards. Setae which are intermediate between hooks and capillaries are termed *subuluncini* and have stout shafts which abruptly taper to delicate crenulated tips. Finally in the genus *Phylo* one or more stout spines much larger than any of the other setae arise from the superior edges of the neuropodia of the last few thoracic setigers.

The posterior region or abdomen. The change from thorax to abdomen is marked by the loss of neuropodial hooks and the movement of the whole neuropodium to the dorsal surface of the segment. The postsetal lobe enlarges and between it and the neuropodium a short *interramal cirrus* may develop. The neuropodium itself elongates and becomes bilobed. The relative size or the presetal and postsetal lobe is of specific importance and also the character of the whole lateral margin of the neuropodium. Usually the basal part is flanged and may even form a broad lamella which divides into two lamellae on posterior segments. In other cases a small ventral cirrus persists over the first half of the abdomen.

Abdominal notosetae are mainly crenulate capillaries but these are often accompanied by a few forked setae. The latter are short and difficult to see unless the whole notopodial bundle is frayed out on a slide. The neuropodium is strengthened by one or two acicula which usually have tapering tips but in some species of *Scoloplos* the ends are stout and project through the surface. The neurosetae are usually long crenulate capillaries but in *Scolaricia* the blades taper very abruptly to whip-like tips and are aptly known as *flail setae*.

As will be seen the characters change along the length of the abdomen and the segmental position of a parapodium should be noted before it is removed for microscopic examination.

Key to Genera

1 Both the buccal segment and the next is achaetous (fig. 23.1.a) (subfamily Protoariciinae) 2
– Only the buccal segment is achaetous (fig. 23.2.g) (subfamily Orbiniinae) 6
2 Branchiae present on abdominal segments 3
– Branchiae completely absent . . . . . *ORBINIELLA**
3 Only crenulate capillaries present . . . . . *SCOLOPLELLA* (p. 536)
– More than one type of seta present 4
4 Abdominal neurosetae include swan-shaped hooks (fig. 23.1.g). Prostomium rounded *PROSCOLOPLOS* (p. 536)
– Swan-shaped hooks absent. Prostomium rounded or pointed 5
5 Abdominal neurosetae are all crenulate capillaries. Prostomium rounded *PROTOARICIA**
– Abdominal neurosetae include acicular hooks (fig. 23.1.k) as well as crenulate capillaries. Prostomium pointed . . . . . *SCHROEDERELLA* (p. 538)
6 Prostomium rounded or square. Thoracic neurosetae include subuluncini *NAINERIS* (p. 539)
– Prostomium pointed. No subuluncini 7
7 Thoracic neuropodia with numerous foot papillae (fig. 23.2.h). Stomach papillae often numerous 8
– Thoracic neuropodia without foot papillae or only one to three. Few if any stomach papillae 9
8 One or more enlarged spines in the superior part of last few thoracic neuropodia (fig. 23.2.m) . . . . . *PHYLO* (p. 540)
– No enlarged spines in thoracic neuropodia . . . . . *ORBINIA* (p. 543)

9 Thoracic neuropodia with crenulate capillaries only; no hooks ***HAPLOSCOLOPLOS*** (p. 546)
– Thoracic neuropodia with both hooks and crenulate capillaries 10
10 Flail-tipped neurosetae (fig. 23.4.f) in abdominal segments. Abdominal neuropodia with an inferior lamella . . . . . ***SCOLARICIA*** p. 547
– – No flail-tipped neurosetae. Abdominal neuropodia without a distinct inferior lamella ***SCOLOPLOS*** (p. 549)

Sub-family **PROTOARICIINAE** Hartman, 1957

Small Orbiniidae with the first two segments apodous and achaetous. Branchiae sometimes absent.

SCOLOPLELLA Day, 1963

Prostomium conical. Both the buccal segment and the next achaetous. Thorax of few segments and not obviously flattened. Parapodia biramous but reduced to small papillae, each ramus bearing crenulate capillaries only. No specialised setae. Branchiae absent from the thorax. No intermediate cirrus; no ventral cirrus nor stomach papillae.

Type species: *Scoloplella capensis* Day, 1963.

Scoloplella capensis Day, 1963
fig. 23.1.a–d

Scoloplella capensis Day, 1963: 415, fig. 8 m–q.

Body small and thread-like, an incomplete specimen measuring 6 mm. for 25 segments. Prostomium (fig. 23.1.a) bluntly conical and without eyes. Peristome and the next segment achaetous. Thorax almost rounded, sharply marked off from the abdomen and consists of seven short setigerous segments. Parapodial rami (fig. 23.1.b) close together and each reduced to a small papilla plus a bundle of crenulate capillaries. Abdominal segments longer than broad, each with a short blunt postsetal lobe in the notopodium and a stout bilobed neuropodium (fig. 23.1.c). No intermediate cirrus nor ventral cirrus. Branchiae do not appear before setiger 24 and are thus absent from the thorax. Neurosetae are short broad-bladed crenulate capillaries (fig. 23.1.d) similar to those of the thorax. No specialised setae.

Type locality: W. of Cape Town in 183 metres.

Records: Cape (33 17 d and 34 23 d).

Distribution: No other specimens known.

PROSCOLOPLOS Day, 1954

Minute worms with a rounded prostomium and the first two segments achaetous. No sharp division between thorax and abdomen, the parapodia being poorly developed and essentially similar. Setae include crenulate capillaries plus swan-shaped hooks in posterior neuropodia.

Type species: *Proscoloplos cygnochaetus* Day, 1954.

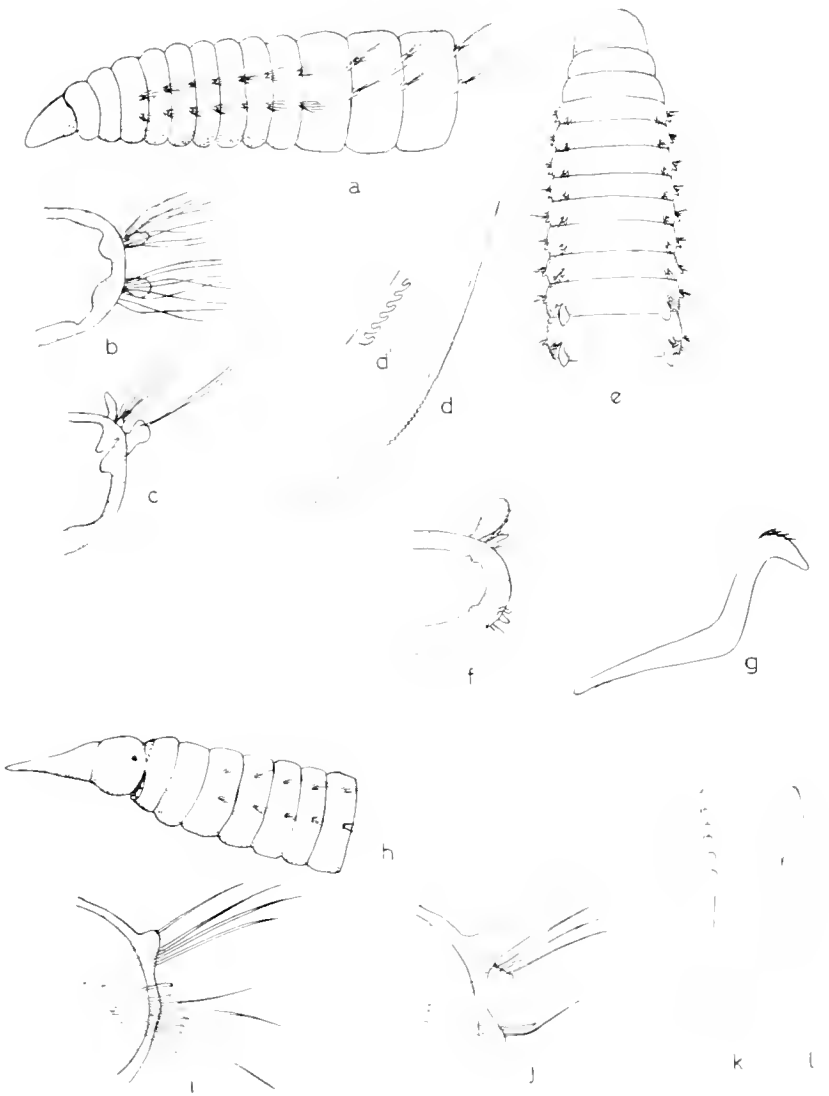


FIG. 23.1. *Scoloplella capensis*. (A) Lateral view of anterior end. (B) Thoracic segment. (C) Abdominal segment. (D, D1) Crenulate capillary. *Proscoloplos cygnochaetus*. (E) Dorsal view of anterior end. (F) Branchiate foot. (G) Swan-shaped hook. *Schroederella pauliani* (after Laublier, 1962). (H) Lateral view of anterior end. (I) Thoracic foot. (J) Abdominal foot. (K) Thoracic uncinus. (L) Abdominal neuroaciculum.

Proscoloplos cygnochaetus Day, 1954
(fig. 23.1.e–g)

Proscoloplos cygnochaetus Day, 1954: 21, fig. 3 a–f.

Body 3–5 mm. long. Prostomium (fig. 23.1.e) rounded; first two segments achaetous. Parapodia essentially similar throughout. Each notopodium consists of a digitiform postsetal lobe with a few crenulate capillaries arising from its base. Stout fusiform branchiae (fig. 23.1.f) from setiger 8. Neuropodia similar to notopodia throughout but lateral in position and smaller. Neurosetae include a few crenulate capillaries and, in posterior segments, one to two swan-shaped hooks (fig. 23.1.g) with a row of four to five denticles above the rostrum.

Type locality: Tristan da Cunha.

Records: Cape (34/18/i).

Distribution: Tristan da Cunha (i).

SCHROEDERELLA Laubier, 1962

Minute worms with a very pointed prostomium consisting of two annuli. Eyes present. Buccal segment and the next both achaetous. Body divided into an anterior thoracic region without branchiae and a posterior abdominal region with branchiae. Parapodia poorly developed and foot papillae absent. Notosetae are crenulate capillaries with the addition of a pointed aciculum in the abdomen. Neurosetae include both crenulate capillaries and acicular hooks.

Type species: *Schroederella pauliani* Laubier, 1962.

Schroederella pauliani Laubier, 1962
(fig. 23.1.h–l)

Schroederella pauliani Laubier, 1962: 231, figs. 1–2.

Body minute, 3–4 mm. long for 40 segments. Prostomium (fig. 23.1.h) a long pointed cone divided into two annuli. One pair of eyes. Thorax of about eight to twenty segments without branchiae. Postsetal lobe of notopodium small and appears on setiger 7–9. Thoracic neuropodia (fig. 23.1.i) as slight lateral swellings without foot papillae. A short intermediate region of four to five segments between thorax and abdomen. Abdomen of 16–20 segments with digitiform dorsal branchiae (fig. 23.1.j) and small postsetal notopodial lobes. Neuropodia better marked than those on the thorax but essentially similar and lack ventral cirri. Notosetae are crenulate capillaries throughout with the addition of a sharp pointed aciculum in the abdomen. Thoracic neurosetae include a few crenulate capillaries and several serrated acicular

uncini (fig. 23.1.k). Abdominal neurosetae include one to two crenulate capillaries and a single blunt "acicular seta" (or ? projecting aciculum fig. 23.1.l).

TYPE LOCALITY: Sandwich Bay, South West Africa.

RECORDS: South West Africa (23/14/i).

DISTRIBUTION: No further records.

Subfamily **ORBINIINAE** Hartman, 1957

Orbiniidae with only the first or buccal segment achaetous and apodous. Branchiae always present.

NAINERIS Blainville, 1828

Prostomium rounded to square in front, depressed. Two subdermal eyes. Pharynx with a frilled or lobed margin. Only the buccal segment achaetous. Branchiae on most of the anterior segments. Thoracic notosetae may include a few forked setae as well as crenulate capillaries. Thoracic neuropodia with a posterior foot-papilla. No stomach papillae. Thoracic neurosetae include rows of hooks (uncini), crenulate capillaries and often intermediate forms (subuluncini). Abdominal notosetae may include a few forked setae with the crenulate capillaries. Abdominal neuropodia bilobed with three to five acicula and a sheaf of crenulate capillaries. No ventral cirri.

TYPE SPECIES: *Nais quadricuspida* Fabricius, 1780.

KEY TO SPECIES

1	Thoracic neuropodia with subuluncini and a median foot-papilla .	***N. quadricuspida****
–	Thoracic neuropodia with subuluncini and a superior foot-papilla . .	***N. laevigata***

Naineris laevigata (Grube, 1855)
(fig. 23.2.a–f)

Aricia laevigata Grube, 1855: 112, pl. 4 figs. 6–8.
Naineris laevigata: Fauvel, 1927: 22, fig. 7 a–l; Hartman, 1957: 297, pl. 35 figs. 1–8.

Body about 40 mm. long by 2 mm. across the thorax. Prostomium depressed and smoothly rounded in front. Subdermal eyes not obvious. Pharynx eversible with numerous marginal lobes (fig. 23.2.a). Thorax flattened with 15–30 setigers. Tapering branchiae start on the fifth to eighth foot. Thoracic notopodium (fig. 23.2.b) with a sheaf of crenulate capillaries and a stout postsetal lobe. Thoracic neuropodia as stout lateral ridges each with a superior postsetal lobe or foot papilla. Abdominal notopodia (fig. 23.2.c) more slender and elongated than those on the thorax. No intermediate cirrus. Abdominal neuropodia bilobed, each with a short blunt presetal lobe and a slightly longer and more pointed postsetal lobe. No ventral cirrus. Thoracic notosetae include many stout, well tapered crenulate capillaries and one to two forked setae with distally serrated shafts and unequal forks spinulose on their inner margins. Thoracic neurosetae in four to five vertical rows; most are

subuluncini (fig. 23.2.e) with stout bent shafts abruptly tapering to weakly serrated tips; inferiorly there is also a group of hooks (uncini) (fig. 23.2.d) which are bent and faintly barred with guards near the blunt tips and numerous crenulate capillaries (fig. 23.2.f) like those in the notopodia. Abdominal notosetae are fine crenulate capillaries and two to three forked setae similar to those of the thorax. Neurosetae include three to five acicula with projecting tips which are quite smooth and faintly curved as well as numerous crenulate capillaries.

Type locality: Mediterranean Sea.

Records: South West Africa (22,14 i – 26,15 i, s); Cape (30,17 i and 34,18 i, s to 33,26 s); Natal (29,31 i); Mocambique (26,32 i).

Distribution: Bay of Biscay, warm and tropical Atlantic from North Carolina (i) to Gulf of Mexico (i) and Brazil; Gold Coast (i); Mediterranean; Persian Gulf; Ceylon; Japan.

PHYLO Kinberg, 1866

Prostomium conical, proboscis lobed. Only the buccal segment achaetous. Notosetae are crenulate capillaries sometimes accompanied by a few forked setae in the abdomen. Branchiae start on setiger 6–9. Thoracic neuropodia with numerous foot-papillae. Stomach papillae usually present at the junction of the thorax and abdomen. Thoracic neurosetae include two to four rows of hooks, a few crenulate capillaries and towards the end of the thorax, one or more giant superior spines arising from a glandular organ. Abdominal neuropodia bilobed. An interramal cirrus may be present.

Type species: *Phylo felix* Kinberg, 1866.

Key to Species

1	Numerous stomach papillae	2
–	No stomach papillae or only two to three	***P. capensis***
2	Twenty to twenty-three thoracic segments	***P. foetida ligustica***
–	Thirty-six to thirty-nine thoracic segments	***P. foetida australis***

Phylo capensis Day, 1961
(fig. 23.2.g–l)

Phylo capensis Day, 1961: 476, fig. 1 a–f.

Length up to 50 mm. Seventeen to twenty-four thoracic segments (fig. 23.2.g) with branchiae from the sixth. Postsetal lobe of the notopodia well developed from the first foot onwards but not expanded and chopper-shaped in the abdomen. Thoracic neuropodia (fig. 23.2.h) with up to nine foot papillae. Stomach papillae either absent or limited to two to three at the junction of thorax and abdomen. Abdominal neuropodia (fig. 23.2.k) bilobed and the ventral cirri well developed. Intermediate cirrus either absent or very small. Notosetae include the usual crenulate capillaries plus a few forked setae (fig. 23.2.f) in the abdomen. Thoracic

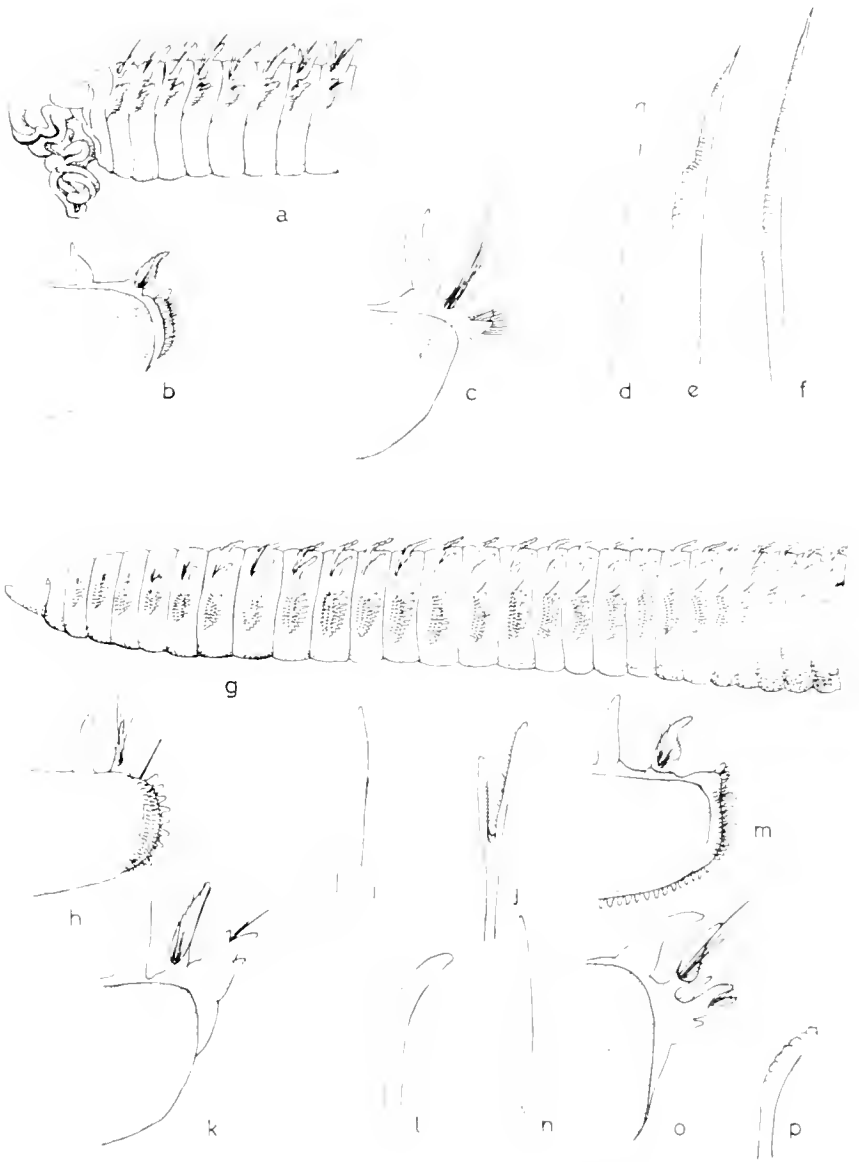


FIG. 23.2. *Naineris laevigata*. (A) Lateral view of anterior end. (B) Tenth thoracic foot. (C) Abdominal foot. (D) Thoracic hook. (E) Subuluncinus. (F) Crenulate capillary from thoracic neuropodium. *Phyllo capensis*. (G) Lateral view of anterior end. (H) Fifteenth foot. (I) Superior spine. (J) Forked seta. (K) Abdominal foot. (L) Thoracic hook. *Phyllo foetida ligustica*. (M) Fifteenth foot. (N) Superior spine. (O) Abdominal foot. (P) Thoracic hook.

neurosetae include three to four rows of blunt, lightly serrated hooks which lack guards (fig. 23.2.l), a few capillaries and, from setiger 14 to the end of the thorax, a single enlarged superior spine with a smooth shaft (fig. 23.2.i).

TYPE LOCALITY: Saldanha Bay, South Africa.

RECORDS: Cape (33 17 s, 34 18 s, 34 22 d).

DISTRIBUTION: Endemic.

Phylo foetida foetida (Claparède, 1870)
(fig. 23.2.m–p)

Aricia foetida Claparède, 1870: 306.
Aricia foetida: Fauvel, 1927: 14, fig. 4 a–e.

A large reddish brown species reaching 105 mm. and with a characteristic foetid odour. Twenty to thirty-nine thoracic segments with branchiae from setiger 6–9 onwards. Postsetal lobe of notopodium well developed throughout. Thoracic neuropodia (fig. 23.2.m) with ten to fifteen foot papillae and, at the junction of thorax and abdomen, the segments have continuous rows of stomach papillae. Thoracic neurosetae include three to four rows of flanged and serrated hooks (fig. 23.2.p), a row of crenulate capillaries and, from setiger 12 onwards, a large, dark, superior hastate spine (fig. 23.2.n). Abdominal notopodia with cultriform postsetal lobes and a few forked setae among the crenulate capillaries. A well developed interramal cirrus. Neuropodia with unequal lobes and a well marked ventral cirrus.

TYPE LOCALITY: Naples.

Phylo foetida ligustica (Orlandi, 1896)

Aricia foetida var. *ligustica* Orlandi, 1896: 12, pl. 2 figs. 3–12; Fauvel, 1927: 14, fig. 4 a–l.

Length up to 80 mm. A total of 20–23 thoracic segments with branchiae from the sixth or seventh.

TYPE LOCALITY: Mediterranean.

RECORDS: Cape (from 32/18 s to 34 22 d); Mocambique (26/32 i and 23/35 e).

DISTRIBUTION: Mediterranean (i); tropical western Africa (s).

Phylo foetida australis (Fauvel, 1919)

Aricia foetida var. *australis* Fauvel, 1919: 429.

Length about 100 mm. A total of 36–39 thoracic segments with branchiae from the sixth or seventh.

TYPE LOCALITY: Madagascar.

RECORDS: Mocambique (23, 35 e).

DISTRIBUTION: Madagascar (i).

ORBINIA Quatrefages, 1865

Prostomium conical and pointed. Proboscis lobed. Buccal segment achaetous. Notosetae are crenulate capillaries on the thorax but a few forked setae may also be present on the abdomen. Branchiae start between segments 4 and 10. Thoracic neuropodia with numerous foot papillae. Segmental rows of stomach papillae at the junction of the thorax and abdomen. Thoracic neurosetae include two to four rows of hooks plus a variable number of crenulate capillaries but no superior enlarged spines. Abdominal neuropodia bilobed. An interramal cirrus may be present or merely a ciliated button. Ventral cirrus present or absent.

Type species: *Aricia cuvieri* Audouin and Milne Edwards, 1833.

Key to species

1	Interramal cirrus between abdominal notopodia and neuropodia absent. (18–24 thoracic setigers)	**O. angrapequensis**
–	Interramal cirrus present	2
2	22–26 thoracic setigers	**O. cuvieri**
–	32–39 thoracic setigers	**O. bioreti**
–	About 50 thoracic setigers	**O. monroi**

Orbinia angrapequensis (Augener, 1918)
(fig. 23.3.a–d)

Aricia angrapequensis Augener, 1918: 413, pl. 6 fig. 146, pl. 7 fig. 225, text-fig. 56.
Orbinia angrapequensis: Day, 1955: 408.

Length up to 30 mm. for 90 segments. Eighteen to twenty-four thoracic setigers with branchiae from the sixth (fig. 23.3.a). Postsetal lobe of notopodium obvious from the first foot. About 12 foot papillae per neuropodium and continuous rows of stomach papillae on segments near the junction of thorax and abdomen (fig. 23.3.b). Thoracic neurosetae include three to four rows of flanged, bent, serrated hooks (fig. 23.3.d) and a row of crenulate capillaries. Abdominal notopodia with only a few forked setae among the capillaries. Abdominal neuropodia (fig. 23.3.c) bilobed with the inner ramus longer than the outer. No interramal cirrus but a ciliated cushion is present. Ventral cirri present on all abdominal neuropodia.

Type locality: Luderitz, South West Africa.

Records: South West Africa (22/14/s and 26/15/i, s); Cape (from 32/18/s to 34/26/d).

Distribution: Endemic.

Orbinia cuvieri (Audouin & Milne-Edwards, 1834)

Aricia Cuvieri Audouin and Milne-Edwards, 1834: 258, pl. 7 figs. 5–13: Fauvel, 1927: 12 fig. 3 e–l; Fauvel, 1953: 301, figs. 155, 156.

Body up to 300 mm. long with 400 segments. Twenty-two to twenty-six thoracic setigers with branchiae from setiger 5. Postsetal lobe of notopodium obvious from the first foot. Thoracic neuropodia with 10–15 foot papillae and continuous rows

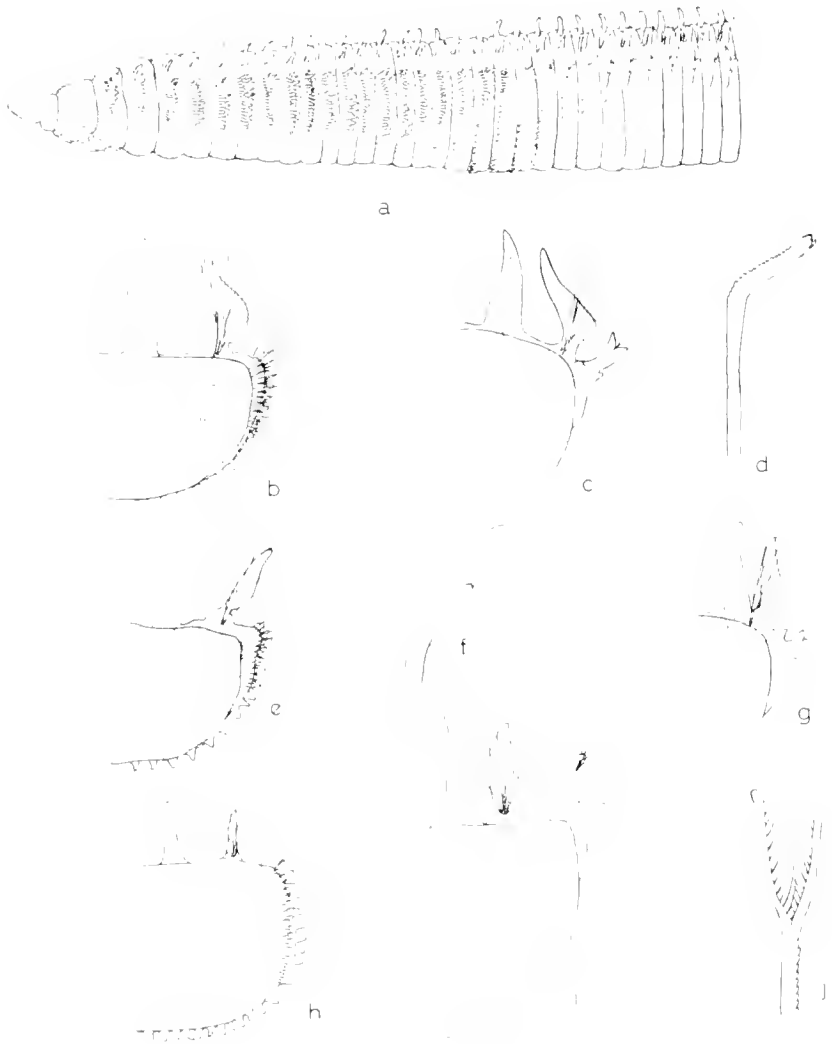


FIG. 2.5.5. *Orbinia angrapequensis*. (A) Lateral view of anterior end. (B) Eighteenth thoracic foot. (C) Abdominal foot. (D) Thoracic neuropodial hook. *Orbinia hiarti*. (E) Twenty-fifth thoracic foot. (F) Thoracic neuropodial hook. (G) Anterior abdominal foot. *Orbinia mamiri*. (H) Forty-fifth thoracic foot. (I) Abdominal foot. (J) Forked seta.

of stomach papillae on segments at the junction of thorax and abdomen. Thoracic neurosetae include three to five rows of flanged, bent and serrated hooks and a few crenulate capillaries, but no enlarged superior spines. Abdominal notopodia with chopper-shaped postsetal lobes and larger tapered gills. A well developed interramal cirrus. Abdominal neuropodia bilobed and with a small conical ventral cirrus. Abdominal notosetae are mainly crenulate capillaries plus a few forked setae with unequal prongs; neurosetae are a few short crenulate capillaries.

TYPE LOCALITY: France.

RECORDS: Natal (29/31/s).

DISTRIBUTION: North Atlantic from Greenland (s), Sweden (s), North Sea (s), English Channel (s); Mediterranean (s).

Orbinia bioreti (Fauvel, 1919)
(fig. 23.3.e–g)

Aricia bioreti Fauvel, 1919: 430, pl. 16 figs. 52–56; Fauvel, 1927: 13, fig. 3 a–d.

Length up to 130 mm. with more than 120 segments. Thirty-one to thirty-nine thoracic setigers with branchiae from the fifth or sixth. Postsetal lobe of notopodium obvious from the first foot. About 12 foot papillae per neuropodium (fig. 23.3.e) and continuous rows of stomach papillae on segments at the junction of thorax and abdomen. Thoracic neurosetae include four to five rows of flanged and bent but smooth hooks (fig. 23.3.f) and a very few crenulate capillaries. Abdominal notopodia without forked setae. Interramal cirrus rudimentary in anterior abdominal segments but well marked posteriorly. Abdominal neuropodia (fig. 23.3.g) with small unequal lobes. Abdominal neurosetae (fig. 23.3.g) with small unequal lobes. Abdominal neurosetae include two acicula with blunt, bent tips and two to three crenulate capillaries some of which have abruptly tapered tips.

TYPE LOCALITY: Madagascar.

RECORDS: Natal (27/32/i).

DISTRIBUTION: Bay of Biscay (i); Madagascar (i).

Orbinia monroi Day, 1955
(fig. 23.3.h–j)

Orbinia monroi Day, 1955: 409, fig. 1 e–h.

Length up to 100 mm. for 200 segments. About 50 thoracic setigers with branchiae from the fifth. A row of about 11 foot papillae on posterior thoracic neuropodia and about 30 stomach papillae over setigers 40–45 (fig. 23.3.h). Thoracic neurosetae include four to five rows of flanged, bent but smooth hooks and a few crenulate

capillaries. Interramal cirrus (fig. 23.3.i) well developed. Postsetal lobe of abdominal notopodia with a chopper-shaped blade. Forked setae (fig. 23.3.j) with weakly serrated shafts.

TYPE LOCALITY: Knysna Lagoon, South Africa.

RECORDS: Cape (24/23/e); Mocambique (26/32/i).

DISTRIBUTION: Endemic.

HAPLOSCOLOPLOS Monro, 1933

Prostomium conical and pointed. Proboscis lobed. Buccal segment achaetous. Branchiae on all except a few anterior segments. Thoracic segments not markedly flattened. Notopodia with a cirriform postsetal lobe bearing a bundle of crenulate capillaries at its base. Thoracic neuropodia with not more than two foot papillae. No stomach papillae. Only crenulate capillaries in the thoracic neuropodia, there being no hooks. Abdominal neuropodia bilobed and bear a bundle of crenulate capillaries. An interramal cirrus may be present.

TYPE SPECIES: *Scoloplos cylindrifer* Ehlers, 1905.

KEY TO SPECIES

1 An interramal cirrus present on anterior abdominal segments (fig. 23.4.f) . . . ***H. fragilis***
– No interramal cirrus . . . . . ***H. kerguelensis***

Haploscoloplos cf. ***fragilis*** (Verrill, 1873)
(fig. 23.4.e–f)

? *Anthostoma fragile* Verrill, 1873: 598.
? *Haploscoloplos fragilis*: Hartman, 1957: 271, pl. 25 figs. 1–3.
Haploscoloplos cf. *fragilis*: Day, 1963: 416.

Length up to 20 mm. Thorax with 15–16 setigers. Setae are crenulate capillaries in both rami throughout the body. Thoracic notopodia with a well marked postsetal lobe from the first foot onwards; abdominal notopodia slender. Branchiae from setiger 14–15; they are larger than the notopodia. An interramal cirrus appears at the junction of the thorax and abdomen but decreases in size posteriorly. Anterior thoracic neuropodia with a single postsetal lobe; the last two thoracic neuropodia (fig. 23.4.e) with two to three postsetal lobes. In the abdomen the neuropodia are bilobed (fig. 23.4.f) with at first two and later one ventral cirrus.

RECORDS: Cape (34/26 d).

DISTRIBUTION: Doubtful – *H. fragilis* is recorded from the Atlantic coast of U.S.A. between Massachusetts and the Gulf of Mexico on sandy shores and from dredgings, but the South African specimens may be distinct.

Haploscoloplos kerguelensis (McIntosh, 1885)
(fig. 23.4.a–d)

Scoloplos kerguelensis McIntosh, 1885: 355, pl. 43 figs. 6–8, pl. 22A fig. 19.
Haploscoloplos kerguelensis: Monro, 1936: 160; Hartman, 1957: 275, pl. 27 figs. 1–3; Day, 1961: 477.

Length up to 20 mm. Thorax (fig. 23.4.a) with 10–14 slightly flattened segments with branchiae from the ninth to fifteenth onwards, at first small but much larger than the notopodia in the posterior abdomen. Notopodial postsetal lobes obvious from the first foot. Thoracic neuropodia (fig. 23.4.b) with a single long median foot papilla. No stomach papillae. Abdominal notopodia (fig. 23.4.c) small and tapered. No interramal cirrus. Abdominal neuropodia with unequal lobes. No ventral cirrus. Thoracic and abdominal neurosetae are crenulate capillaries (fig. 23.4.d).

Type locality: Kerguelen Island.

Records: Cape (from 32/16/d to 34/18/s and 34/22/d).

Distribution: Kerguelen (s, d); Magellan area (s); South Georgia (s); Antarctica (s, d); Western Australia (e); ? ? India.

SCOLARICIA Eisig, 1914

Prostomium conical and pointed. No eyes. Only the buccal segment achaetous. Branchiae from the middle of the thorax onwards. Notopodia with a cirriform postsetal lobe bearing a bundle of crenulate capillaries and sometimes a few forked setae in the abdomen. Thoracic neuropodia as lateral ridges or lamellae which may be notched and may bear a posterior foot papilla. Abdominal neuropodia bilobed with a lamellar expansion at the base. Stomach papillae few or absent. Thoracic neurosetae include rows of hooks and crenulate capillaries. Abdominal neurosetae are crenulate capillaries and flail setae (capillaries with abruptly tapered tips).

Type species: *Scolaricia typica* Eisig, 1914.

Key to Species

1 Six to twelve stomach papillae. Each posterior abdominal neuropodium with a notched inferior lamella . . . . . ***S. dubia***
– Stomach papillae absent. Inferior lamellae of abdominal neuropodia not notched ***S. capensis***

Scolaricia dubia (Day, 1955)
(fig. 23.4.g–l)

Orbinia dubia Day, 1955: 409, fig. 1 a–d.
Scolaricia dubia: Day, 1961: 481.

Length up to 35 mm. for 100 segments. Nineteen thoracic setigers with branchiae from the thirteenth (fig. 23.4.g). A single median foot papilla increasing to three at the end of the thorax (fig. 23.4.h). Six to twelve stomach papillae at the junction

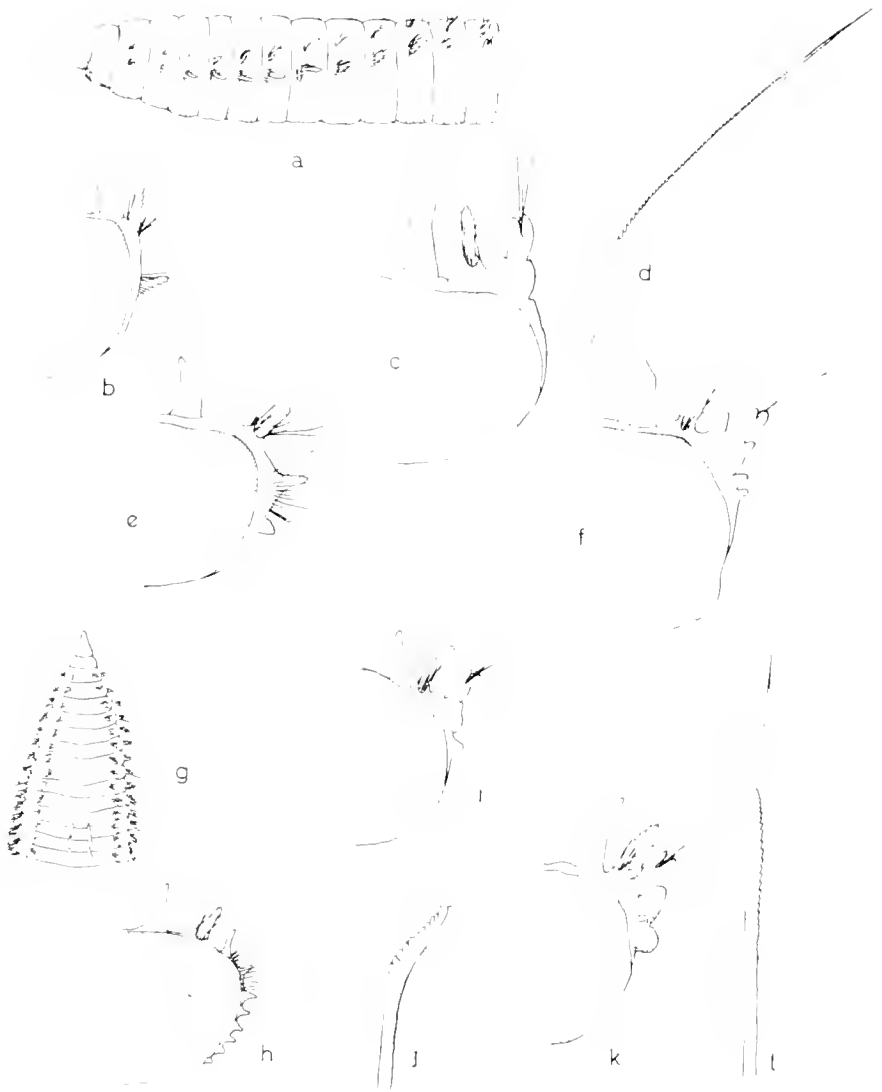


FIG. 234. *Haploscoloplos longidentis*. (A) Lateral view of anterior end. (B) Tenth foot. (C) Abdominal foot. (D) Crenulate capillary. *Haploscoloplos* cf. *fragilis*. (E) Fourteenth foot. (F) First abdominal foot. *Scolaricia dubia*. (G) Dorsal view of anterior end. (H) Last thoracic foot. (I) Anterior abdominal foot. (J) Thoracic hook. (K) Posterior abdominal foot. (L) Hair seta.

of thorax and abdomen. A large interramal cirrus (fig. 23.4.i). Abdominal neuropodia with equal lobes but with no ventral cirrus. A blunt glandular lamella appears below the neuropodium at the beginning of the abdomen, later becomes notched and may separate into two lamellae at the end (fig. 23.4.k). Notosetae as crenulate capillaries throughout, and forked setae absent. Thoracic neurosetae include three rows of flanged, bent and serrated hooks (fig. 23.4.j) plus a posterior row of crenulate capillaries. Abdominal neurosetae few, including crenulate capillaries and longer flail setae with abruptly tapered tips and serrated shafts (fig. 23.4.l).

TYPE LOCALITY: Langebaan Lagoon, South Africa.

RECORDS: Cape (from 33/17/s to 34/23/s, d).

DISTRIBUTION: Endemic.

Scolaricia capensis Day, 1961
(fig. 23.5.a–d)

Scolaricia capensis Day, 1961: 480, fig. 1 p–s.

Length up to 45 mm. for 112 segments. Seventeen thoracic setigers with branchiae from the fifteenth onwards. Thoracic neuropodia (fig. 23.5.a) faintly bilobed with a median foot papilla. No stomach papillae. No interramal cirrus. Abdominal neuropodia (fig. 23.5.b) bilobed with a single inferior lamellar expansion. No ventral cirrus. Thoracic neurosetae are blunt hooks (fig. 23.5.c) having a few coarse serrations and a posterior row of crenulate capillaries. Abdominal notosetae do not include forked setae. Abdominal neurosetae include one to two crenulate capillaries and one to two flail setae (fig. 23.5.d).

TYPE LOCALITY: Agulhas Bank, South Africa.

RECORDS: Cape (34/17/d, 34/18/s, 34/21/s, 34/25/s).

DISTRIBUTION: Endemic.

SCOLOPLOS Blainville, 1828

Prostomium conical and pointed, with or without eyes. Proboscis lobed. Only the buccal segment achaetous. Branchiae on all except a few anterior segments. Notopodia with a cirriform postsetal lobe bearing a bundle of crenulate capillaries and sometimes a few forked setae in the abdomen. Thoracic neuropodia with nought to three postsetal foot papillae. Stomach papillae usually absent. Thoracic neurosetae include rows of hooks plus a few crenulate capillaries. Interramal cirrus usually absent. Abdominal neuropodia bilobed. A ventral cirrus may be present.

TYPE SPECIES: *Lumbricus armiger* Müller, 1776.

KEY TO SPECIES

1 Membraneous pockets between the abdominal neuropodia (fig. 23.5.i). 18 thoracic setigers . . . . . *S. marsupialis*
– No membraneous pockets 2

2 Branchiae start on setiger 6 3
– Branchiae start on setiger 12 or later 4
3 Abdominal neuropodia bilobed (fig. 23.5.m); abdominal neurosetae all with tapered tips ***S. johnstonei***
– Abdominal neuropodia unilobed (fig. 23.6.c); many abdominal neurosetae with abruptly pointed tips . . . . . ***S. uniramus***
4 Less than 22 thoracic setigers. Thoracic neuropodial hooks serrated . . . ***S. armiger***
– Between 24 and 29 thoracic setigers. Neuropodial hooks not serrated . ***S. madagascariensis***

Scoloplos marsupialis Southern, 1921
(fig. 23.5.e–j)

Scoloplos marsupialis Southern, 1921: 632, pl. 27 fig. 19 a–g, text-fig. 18; Day, 1957: 96.

Length up to 50 mm. with 210 segments. About 18 thoracic setigers (fig. 23.5.e) with branchiae from the ninth to thirteenth onward. Thoracic neuropodia with a single foot papilla (fig. 23.5.f) starting on setiger 4 to 12. No stomach papillae. Neurosetae are mainly crenulate capillaries and the few hooks may be limited to the first 10 feet or be entirely absent in juveniles. When present the hooks (fig. 23.5.j) are serrated, flanged and faintly recurved. Abdominal segments (fig. 23.5.h) have membranous pockets between adjacent neuropodia. Forked setae very few. Interramal cirrus absent.

TYPE LOCALITY: Chilka Lake, India.

RECORDS: Mocambique (26°32'i).

DISTRIBUTION: India (e, i); Gulf of Manaar.

Scoloplos* (*Leodamas*) *johnstonei Day, 1934
(fig. 23.5.k–o)

Scoloplos johnstonei Day, 1934: 58, fig. 11 a–e.

Length up to 35 mm. for 180 segments. Between 21 and 24 thoracic setigers with branchiae from the sixth (fig. 23.5.l). Thoracic neuropodia (fig. 23.5.o) either lack foot papillae entirely or have only one to two on the last two to three thoracic segments. Abdominal neuropodia (fig. 23.5.m) bilobed with the outer ramus larger than the inner; inferior lamella absent. Interramal cirrus absent. Thoracic neuropodia with three to five rows of hooks plus a few capillaries. Each hook (fig. 23.5.n) is slightly bent near the tip, lightly serrated and flanged. Abdominal notosetae are crenulate capillaries plus a few forked setae with equal prongs (fig. 23.5.k). Abdominal neurosetae are crenulate capillaries with normally tapered tips. The aciculum has a blunt tip.

TYPE LOCALITY: False Bay, South Africa.

RECORDS: Cape (from 32°18'i, s to 34°18'i); Natal (29°31'i); Mocambique (26°32'i).

DISTRIBUTION: Endemic.

FIG. 23.5. *Scolaricia capensis*. (A) Fifteenth (thoracic) foot. (B) Posterior abdominal foot. (C) Thoracic hook. (D) Flail seta. *Scoloplos marsupialis* (after Southern, 1921). (E) Lateral view of anterior end. (F) Fifth foot. (G) Sixteenth foot. (H) Abdominal foot. (I) Three abdominal segments showing membraneous pockets between neuropodia. (J) Thoracic hook. *Scoloplos johnstonei*. (K) Forked seta. (L) Lateral view of anterior end. (M) Abdominal foot. (N) Thoracic hook. (O) Tenth (thoracic) foot.

Scoloplos (*Leodamas*) *uniramus* Day, 1961
(fig. 23.6.a–f)

Scoloplos (*L.*) *uniramus* Day, 1961: 477, fig. 1 g–o; Day, 1963: 647.

Length up to 35 mm. for 100 segments. Twenty-one to twenty-two thoracic setigers with branchiae from the sixth. Postsetal lobe of the notopodium always with a filamentous tip even on the abdomen. Thoracic neuropodia with a single long median foot papilla and a long ventral cirrus from setiger 18 onwards (fig. 23.6.a). No interramal cirrus. Abdominal neuropodia each with a stout base and a single (outer) ramus (fig. 23.6.c). Juveniles with ventral cirri on first few abdominal segments (fig. 23.6.b). No expanded lamellae. Notosetae as crenulate capillaries (fig. 23.6.e) plus a few forked setae in the abdomen of juvenile specimens but not adults. Thoracic neurosetae include three to four rows of blunt, bent hooks lightly serrated near the end (fig. 23.6.d) plus a few fine capillaries on the last few segments. Abdominal neurosetae include one to two fine crenulate capillaries, two to four long stout setae with poorly marked serrations and abruptly pointed tips (fig. 23.6.f) and one to two stout, projecting acicula.

Type locality: Agulhas Bank, South Africa.

Records: Cape (from 34 18/s and 34/22/d to 31/25/s; Natal (29/31/s).

Distribution: Endemic.

Scoloplos madagascariensis Fauvel, 1919
(fig. 23.6.g–j)

Scoloplos madagascariensis Fauvel, 1919: 433, pl. 17 figs. 81–86.

Length up to 120 mm. with over 250 segments. Between 24 and 30 thoracic setigers (fig. 23.6.g) with branchiae from about the 22nd. Postsetal lobe of notopodium minute on anterior segments but obvious from the tenth. Thoracic neuropodia (fig. 23.6.h) without foot papillae except sometimes on the last one to three. Neuropodial hooks in two rows accompanied by a very few capillaries; they are quite smooth and almost straight without serrations or a trace of a flange (fig. 23.6.j). Forked setae present with unequal rami. No interramal cirrus. No ventral cirri on abdominal neuropodia (fig. 23.6.i).

Type locality: Tulear, Madagascar.

Records: Cape (33/18/s and 31/18/s); Natal (29/31/i, s); Mocambique (26/32/i and 23/35/e).

Distribution: Madagascar (i) and tropical West Africa; Mauretania (s) Gulf; of Guinea (s); Angola (s).

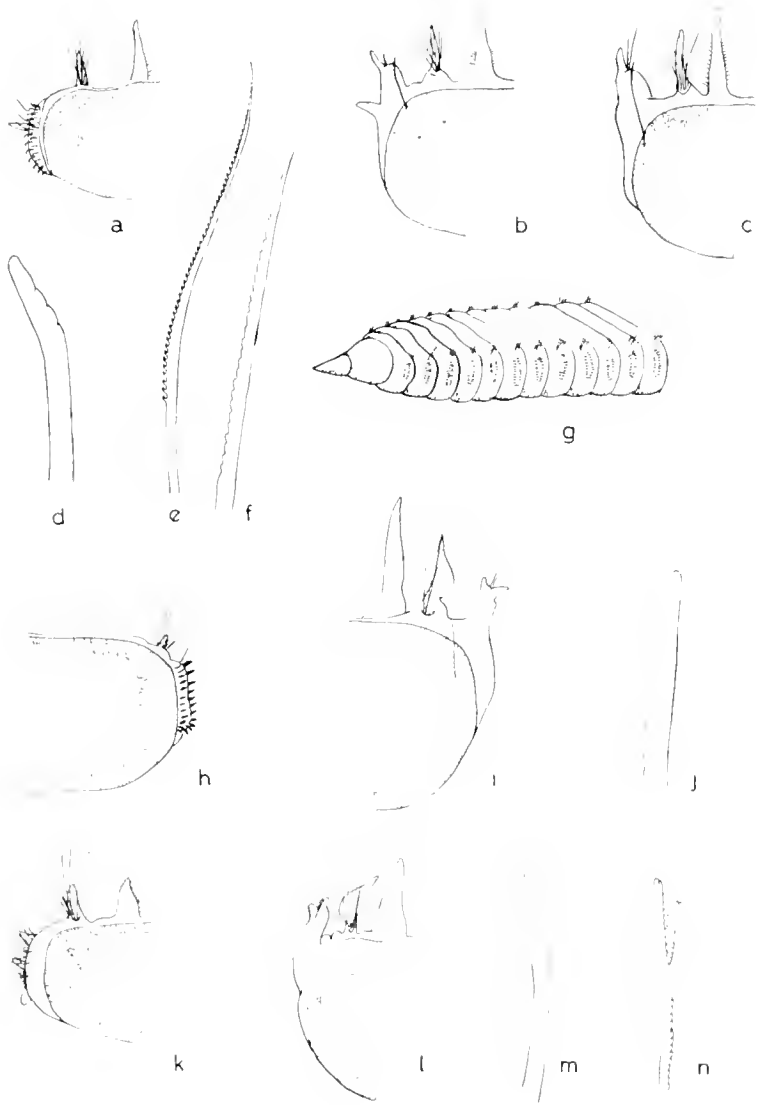


FIG. 23.6. *Scoloplos uniramus*. (A) Eighteenth (thoracic) foot. (B) Anterior abdominal foot. (C) Posterior abdominal foot. (D) Thoracic hook. (E) Notopodial capillary. (F) Neuropodial capillary from the abdomen. *Scoloplos madagascariensis*. (G) Anterior end. (H) Thoracic foot. (I) Abdominal foot. (J) Thoracic hook. *Scoloplos armiger* (modified from Fauvel, 1927). (K) Thoracic foot. (L) Abdominal foot. (M) Thoracic hook. (N) Forked seta.

Scoloplos armiger (Müller, 1776)
(fig. 23.6.k–n)

Lumbricus armiger Muller, 1776: 215.
Scoloplos armiger: Fauvel, 1927: 20, fig. 6 k–q.

Length up to 120 mm. for 200 segments. Prostomium pointed with subdermal eyes. Sixteen to eighteen thoracic setigers with branchiae starting on the 12th–15th. Thoracic neuropodia (fig. 23.6.k) with at least one foot papilla but two on the last three to four segments. One to two stomach papillae at the junction of the thorax and abdomen. Abdominal neuropodia (fig. 23.6.l) bilobed with the inner lobe longer. No interramal cirrus or ventral cirrus. Notosetae as crenulate capillaries plus one to two forked setae (fig. 23.6.n) on the abdomen. Thoracic neurosetae include five rows of setae among which crenulate capillaries and short blunt "hooks" are mixed.

Type locality: Southern Norway.

Records: ? Cape (34/18/s and ? 34/22/d).

Distribution: Arctic (s, d, vd, abyssal); North and South Atlantic (i, s); North Pacific from Japan to California (s); ? Indian Ocean.

Family **PARAONIDAE** Cerruti, 1909

Small thread-like worms up to 40 mm. long with numerous segments, somewhat flattened anteriorly but rounded posteriorly. Prostomium conical with well developed nuchal slits and sometimes a median dorsal antenna and eye-spots. Palps absent. Pharynx soft and unarmed. Buccal segment reduced and fused to the lower surface of the prostomium; it is seldom visible dorsally. All subsequent segments with small biramous parapodia reduced to a postsetal notopodial lobe and a lateral ridge-shaped neuropodium. Cirriform dorsal branchiae start on setigers 4 to 18 and continue over a variable number of anterior segments but are absent posteriorly. Acicula absent. Setae are mainly smooth capillaries in both rami but specialised setae may be present in either ramus posteriorly.

Records from southern Africa

Aedicira belgicae (Fauvel)	56Cd
Aricidea capensis Day	51Cs
Aricidea curviseta Day	56Cs, —Nd
Aricidea fauveli Hartman	48Cd
Aricidea jeffreysi (McIntosh) sensu Cerruti	56Cs
Aricidea longobranchiata Day	51Cs
Aricidea succica simplex Day	55Ca
Cirrophorus branchiatus Ehlers	15Cs, 56Cd, —Nd
Paraonis gracilis gracilis (Tauber)	56Cd
as *Aonides gracilis* Tauber	21Ci
Paraonis gracilis oculata Hartman	55Ca
Paraonides lyra capensis Day	
as *Paraonis lyra* var. *capensis* Day	44Ci
Paraonides lyra lyra Southern	56Cd
? *Paraonides* sp.	56Cs

REMARKS

Useful reviews of the family will be found in Cerruti (1909) and Hartman (1957). The paraonids are tiny thread-like worms which burrow just below the surface of sandy mud. They are non-selective deposit feeders and the gut is full of sand grains ingested together with the detritus. For systematic purposes one of the most important characters is the presence of a median antenna on the prostomium and it should be noted that this is often broken off.

At the generic level the possession of a median antenna and the disposition of specialised setae are the most important characters. At the specific level the shape of the prostomium, the length of the antenna, the segmental position and number of gills, the size of the postsetal lobe of the notopodium and the exact shapes of the setae are useful.

Head structures. The median antenna varies in length but is easily broken off leading to generic confusion. The eye-spots are never deeply pigmented and probably fade in alcohol. The shape of the head is reasonably constant but there has

been some uncertainty as to whether the head consists of a prostomium alone and whether the buccal segment possesses setae or not. According to Hartman "the first or second visible segment has biramous parapodia provided with setae". After careful examination of several species the view adopted here is that the first or buccal segment is usually reduced and not visible dorsally. According to this view the buccal segment lacks setae and is fused to the ventral surface of the prostomium so that the head consists of a fused prostomium plus peristomium. This appears to be the case in *Aricidea* but in *Cirrophorus* the posterior dorsal margin of the peristome is visible between the prostomium and the first setiger while the ventral part is outlined by a shallow groove. In *Paraonis* the mouth is further back with the ventral surface of the first setiger forming the posterior lip.

Parapodia and branchiae. The notopodium is reduced to a bundle of setae and a postsetal lobe. The latter is usually best developed in the anterior region and the comparative length of the postsetal lobe and branchia is worth noting. In the posterior region the postsetal lobe usually becomes a slender filament which may be elongated on the last few segments. The neuropodium is seldom more than a lateral ridge from which the setae arise but a minute postsetal papilla is occasionally present in the anterior region.

The branchiae usually appear on setiger 4 or occasionally on setiger 5 but in *Paraonis gracilis* they do not appear before setiger 7 and sometimes not before setiger 9. The branchiae are cylindo-conical projections which overlap in the mid-dorsal line. The last few tend to have swollen bases and occasionally they have elongated filiform tips. The number of branchiae varies from three to over 60 and this number is somewhat variable within a single species, e.g. 3–14, 9–14, 18–24, 34–50.

Setae. The majority of the setae in both rami are smooth capillaries. They are curved and may have flattened blades in the anterior region but are straight and much finer in the posterior region. The specialised setae may be present in either ramus, sometimes as early as the last few branchiae and sometimes not until the last third of the body. They vary from setae with thick shafts and slender tips (and thus very similar to the capillaries) to hooded hooks with a rounded guard or delicate tapering arista extending beyond the apex. Forked setae also occur.

Hartman (1957) recognises two genera *Aricidea* and *Paraonis* based on the presence or absence of the median antenna. In each genus there are subgenera depending on whether the specialised setae occur in the notopodia or neuropodia. These distinctions are clear cut and easy to observe and as some 30 species of *Aricidea* have been described it is suggested that the subgenera be raised to full generic rank. The following generic key is adapted from Hartman (1957 p. 314).

Key to Genera

1 Prostomium with a median dorsal antenna (fig. 24.1.j) 2
– Prostomium without an antenna 3
2 Specialised setae among the capillaries of posterior neuropodia . . ***ARICIDEA*** (p. 557)
– Specialised setae among the capillaries of posterior notopodia . ***CIRROPHORUS*** (p. 562)
– No specialised setae among the capillaries either in the notopodia or neuropodia
AEDICIRA (p. 563)

3 Specialised setae among the capillaries of posterior notopodia . ***PARAONIDES*** (p. 566)
– Specialised setae among the capillaries of posterior neuropodia . . ***PARAONIS*** (p. 565)

ARICIDEA Webster, 1879

Prostomium with a median antenna. Peristome reduced, achaetous and fused to the ventral surface of the prostomium. All subsequent segments with two bundles of setae. Branchiae from setiger 4 and number 10 to 60 or more pairs; they are absent from posterior segments. Smooth capillaries present in both rami of all feet. In addition the neuropodia of posterior segments have specialised setae which may be pseudo-articulate, acicular or abruptly tapered, their distal ends often being provided with a hood or delicate tapered arista.

TYPE SPECIES: *Aricidea fragilis* Webster, 1879.

KEY TO SPECIES

1 Specialised posterior neurosetae numerous, each with stout shaft abruptly tapered to a slender blade 2
– Specialised posterior neurosetae as a few (eight or less) sigmoid hooks often with a hood or arista 3
2 Specialised neurosetae with an incomplete joint at the junction of shaft and slender tip ***A. fragilis****
– Specialised neurosetae with a kink but no joint at the junction of shaft and blade (fig. 24.1.e) ***A. curviseta*** (p. 557)
3 Specialised neurosetae are sigmoid acicular hooks sometimes with a terminal filament but no hood 4
– Specialised neurosetae are hooks with a short or tapering hood or arista 5
4 Acicular hooks with a terminal filament in middle segments but plain posteriorly ***A. suecica suecica****
– Acicular hooks without a terminal filament even in middle segments (fig. 24.1.i) ***A. suecica simplex*** (p. 558)
5 Specialised neurosetae with a rounded spioniform hood covering the blunt apex (fig. 24.1.m) . . . . . ***A. jeffreysi*** (p. 558)
– Specialised neurosetae with a delicate pointed hood or arista near the apex 6
6 Pointed hood or arista on the convex side of the apex (fig. 24.2.d). Posterior branchiae longer and stouter than middle ones . . . . . ***A. fauveli*** (p. 560)
– Pointed hood or arista on the concave side of the apex (fig. 24.2.k) 7
7 Last few branchiae with swollen bases and greatly elongated tips (fig. 24.2.i) ***A. longobranchiata*** (p. 560)
– Last few branchiae decrease in size . . . . . ***A. capensis*** (p. 562)

Aricidea curviseta Day, 1963
(fig. 24.1.a–e)

Aricidea curviseta Day, 1963a: 422, fig. 9 e–k.

Length up to 20 mm. for 100 segments. Prostomium (fig. 24.1.a) bluntly conical, slightly longer than broad. Antenna short, not reaching tip of prostomium. Anterior segments six times broader than long, posterior ones about as broad as long. Thirty-four to forty-four pairs of branchiae starting on setiger 4; anterior ones equal to half the segmental width, posterior ones smaller. Postsetal lobes of notopodia (fig. 24.1.c) tapered and equal to one-third the length of the gill anteriorly but become

very slender posteriorly. No visible postsetal lobes in the neuropodia. Anterior notosetae and neurosetae are curved capillaries with stout shafts and tapering blades. Posterior notosetae are a few slender capillaries (fig. 24.1.d). Posterior neurosetae are all capillaries; superior ones taper normally while inferior ones are numerous rather short setae (fig. 24.1.e) having stout shafts and abruptly tapered blades with a kink at the junction of the shaft with the blade. No articulation at the junction.

TYPE LOCALITY: Agulhas Bank, South Africa.

RECORDS: Cape (34/23/s, d); Natal (29/31/d).

DISTRIBUTION: ? Endemic.

Aricidea suecica simplex Day, 1963
(fig. 24.1.f–i)

Aricidea suecica simplex Day, 1963: 364, fig. 3 a–b.

Body slender, about 12 mm. long for 80 segments. Prostomium (fig. 24.1.f) slightly longer than broad. Antenna short and club-shaped and does not reach the tip of the prostomium. No eyes. Anterior segments six times as broad as long, posterior ones a little longer. Branchiae from setiger 4 to about setiger 15; anterior ones (fig. 24.1.g) overlap their fellows in the mid-dorsal line but posterior ones are smaller. Postsetal lobe of the notopodium slender and two-thirds the length of the branchia in the anterior region; posterior ones the same length. Anterior notosetae and neurosetae are curved capillaries with tapered blades; posterior capillaries are straight and much finer. From setiger 24 the neurosetae include six to ten stout, blunt, sigmoid, aciculae setae (fig. 24.1.i) without any sign of a terminal filament.

TYPE LOCALITY: West of Cape Town in 1240 metres.

RECORDS: Cape (34/17/abyssal).

DISTRIBUTION: No other records.

Aricidea jeffreysi McIntosh 1879 (*sensu* Cerruti, 1909)*
(fig. 24.1.j–m)

Scolecolepis (?) *jeffreysi* McIntosh, 1879: 506, pl. 45 figs. 13–14.
Aricidea jeffreysii: Cerruti, 1909: 409, pl. 18 figs. 1–6, 9–18, 22–26, pl 19 figs. 28–42. Fauvel, 1927: 75, fig. 25 a–e. Day, 1963a: 423.

Body about 15 mm. long by 0·4 mm. for 100 segments. Prostomium (fig. 24.1.j) bluntly triangular or rounded anteriorly. Median antenna just projects beyond anterior margin of prostomium. Eyes not seen. Anterior segments four times as broad as long; posterior segments a little longer. Branchiae from setiger 4 and extend over about 14–18 segments; anterior ones (fig. 24.1.k) overlap their fellows in the mid-dorsal line and are bluntly cylindrical; posterior ones slightly shorter. Postsetal lobes of notopodia well developed and tapered anteriorly, about half as

* There is some doubt whether Cerruti's specimen from the Mediterranean is conspecific with McIntosh's type.

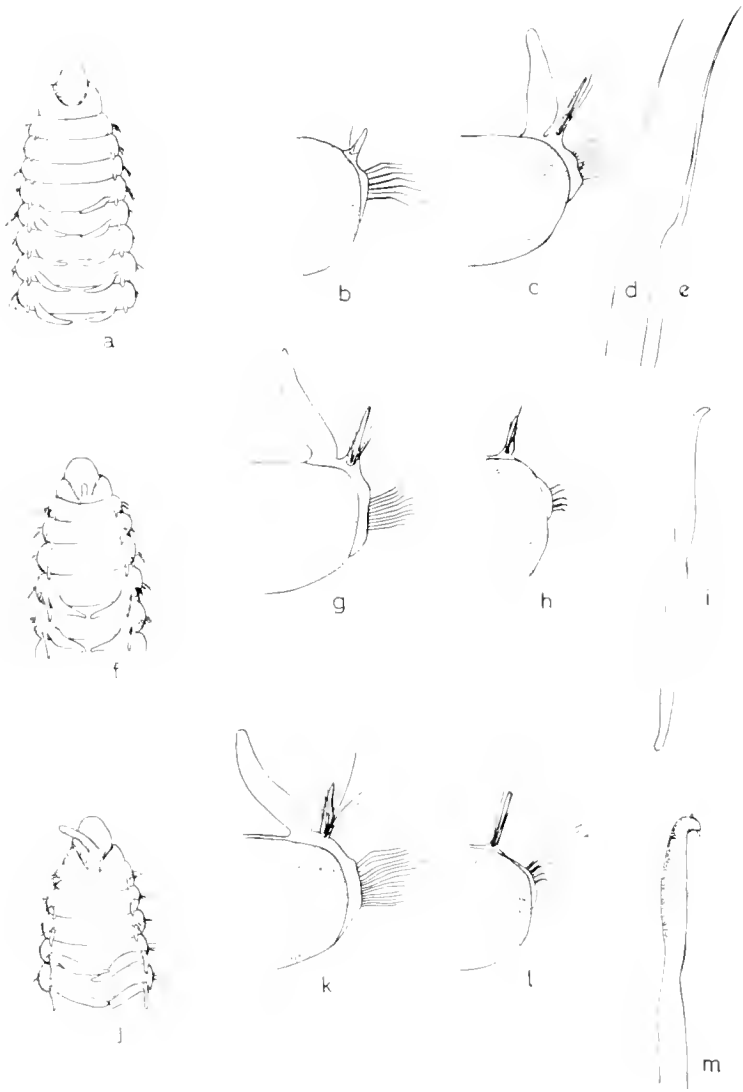


FIG. 24.1. *Aricidea curviseta*. (A) Anterior end. (B) Far posterior foot. (C) Branchiferous foot. (D) Posterior notoseta. (E) Posterior neuroseta. *Aricidea suecica simplex*. (F) Anterior end. (G) Branchiferous foot. (H) Posterior foot. (I) Specialised posterior neuroseta. *Aricidea jeffreysi*. (J) Anterior end. (K) Branchiferous foot. (L) Posterior foot. (M) Specialised posterior neuroseta.

long as the branchiae; posteriorly (fig. 24.1.l) they become very slender but remain the same length. Minute postsetal papillae present on anterior neuropodia. Anterior setae are curved, tapering capillaries in both rami; posteriorly they become straight and slender and four to five hooks (fig. 24.1.m) appear in the neuropodia. Each curves to a blunt apex which has a rounded spioniform guard.

TYPE LOCALITY: Greenland.

RECORDS: Cape (34/18/s).

DISTRIBUTION: ? Davis Straits (Greenland); ? North Carolina (s); ? Ireland; Mediterranean.*

Aricidea fauveli Hartman, 1957
(fig. 24.2.a–d)

Aricidea fauveli Hartman, 1957: 318.
Aricidea fragilis (non Webster) Fauvel, 1936: 65, figs. 6–7.

Body about 20 mm. long by 0·4 mm. for 100 segments. Prostomium (fig. 24.2.a) bluntly triangular, about as broad as long with indistinct eyes and a small median antenna. Anterior region flattened with segments almost eight times as broad as long; posterior region rounded with slightly longer segments. Branchiae from setiger 4 and extend over 20–24 segments. An average gill (fig. 24.2.b) is equal to two-thirds the segmental breadth but the posterior ones are stouter basally and as long as the segment is broad. Postsetal lobes of anterior notopodia are well developed and half as long as the gill but they become slender posteriorly (fig. 24.2.c). Anterior setae are curved and tapered capillaries in both rami. Posterior setae are reduced in number; the notosetae consist of a few fine capillaries a little longer than the notopodial lobes; neurosetae include a few capillaries similar to those in the notopodia and about four curved unidentate hooks (fig. 24.2.d) with a delicate pointed hood or arista covering the convex side of the apex.

TYPE LOCALITY: Morocco.

RECORDS: Cape (34/18/d).

DISTRIBUTION: Morocco (s, d); Tropical western Africa (s); Angola (s, d).

Aricidea longobranchiata Day, 1961
(fig. 24.2.e–k)

Aricidea longobranchiata Day, 1961: 482, fig. 2 g–n.

Body (fig. 24.2.e) vermiform and tapering. Length up to 20 mm. by 0·8 mm. for 120 segments. Prostomium (fig. 24.2.f) bluntly triangular, as broad as long. No eyes. Median antenna very elongated, reaching setiger 5. Anterior region flattened with segments six to eight times as broad as long; posterior segments only slightly

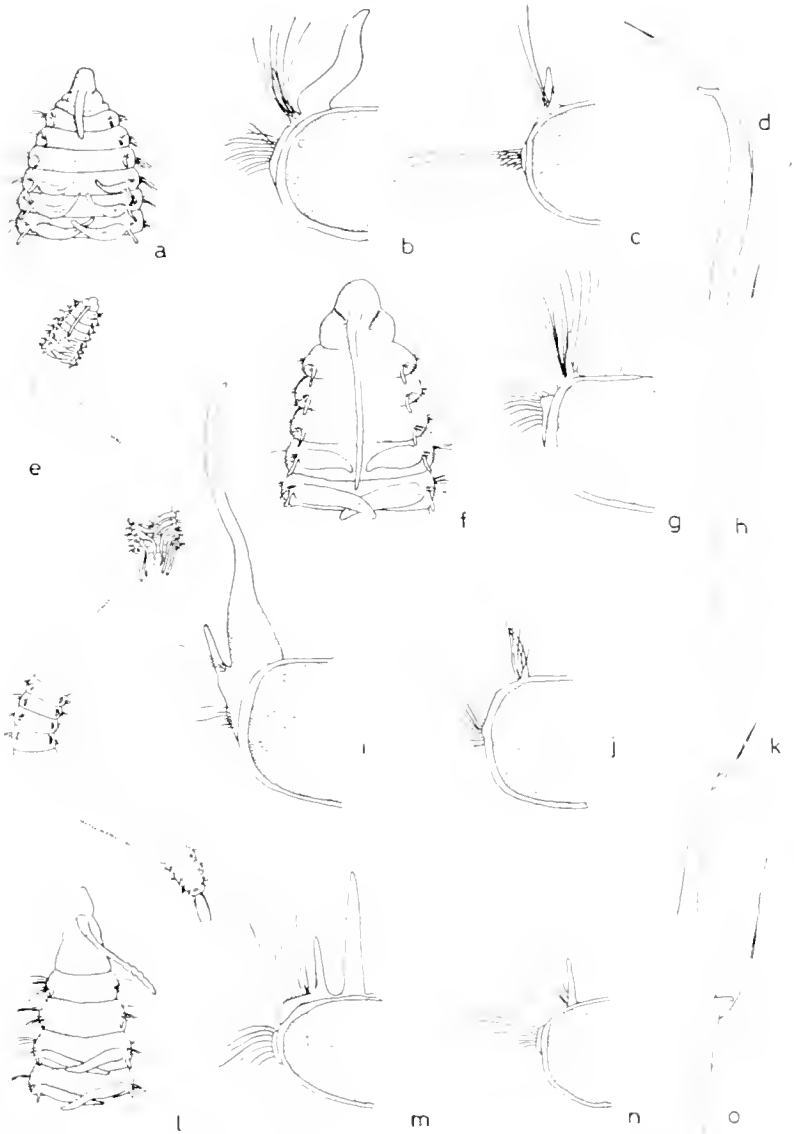


FIG. 24.2. *Africidea fauveli*. (A) Anterior end. (B) Branchiferous foot. (C) Posterior foot. (D) Specialised posterior neuroseta. *Aricidea longobranchiata*. (E) Entire worm (six times natural size). (F) Anterior end. (G) Anterior branchiferous foot (tenth). (H) Notopodial capillary. (I) Posterior branchiferous foot (24th). (J) Far posterior foot. (K) Specialised posterior neuroseta. *Aricidea capensis*. (L) Anterior end. (M) Branchiferous foot. (N) Far posterior foot. (O) Specialised posterior neuroseta.

broader than long. Branchiae from setiger 4 and extend over 18–22 segments. Anterior ones (fig. 24.2.g) are uniformly tapered and just overlap in the mid-dorsal line but the last three pairs (fig. 24.2.i) have swollen bases and long slender tips longer than the width of the segment. Postsetal lobes of anterior segments well developed but posterior ones (fig. 24.2.j) very slender. Anterior setae are curved capillaries with rather broad blades in both rami. Posteriorly the capillaries (fig. 24.2.h) became fine and straight and four to five hooks (fig. 24.2.k) appear in the neuropodia. Each has a unidentate curved apex with a fine tapered guard or arista arising from the concave side of the shaft.

TYPE LOCALITY: Off Saldanha Bay, southern Africa.

RECORDS: South West Africa (26 14 d and 26 15 s); Cape (from 32 18 s and 33 17 s, d to 36 21 d and 34 25 s).

DISTRIBUTION: Southern African endemic.

Aricidea capensis Day, 1961
(fig. 24.2.l–o)

Aricidea capensis Day, 1961: 481, fig. 2 a–f.

A thread-like species measuring 10 mm. by 0·2 mm. for more than 75 segments. Prostomium (fig. 24.2.l) conical, 1·5 times longer than broad. No eyes. Antenna slightly longer than the prostomium and obscurely annulated near the tips. Anterior segments three times as broad as long; posterior ones hardly broader than long. Branchiae (fig. 24.2.m) from setiger 4 and extend over 14 segments; most of them are equal to two-thirds the segmental breadth but the last two to three pairs are smaller. Postsetal lobes of anterior notopodia are one-third the length of the gills but posterior ones (fig. 24.2.n) are smaller. Anterior setae are curved, broad-bladed capillaries in both rami. Posterior capillaries are fine and straight. About four curved hooks (fig. 24.2.o) appear in the posterior neuropodia; each is bidentate with a minute secondary tooth above the main terminal one and has a long tapering arista arising from the concave side of the shaft just below the apex.

TYPE LOCALITY: Mossel Bay, South Africa.

RECORDS: Cape (34 22 s); Natal (30 30 s).

DISTRIBUTION: Only two records.

CIRROPHORUS Ehlers, 1908

Prostomium with a median antenna. Peristome reduced, fused to the ventral surface of the prostomium but occasionally visible dorsally as a fillet between the prostomium and the first setiger. All subsequent segments biramous. Notopodium reduced to a cirriform postsetal lobe. Neuropodium as a low lateral ridge. Branchiae from setiger 4 or 5 and extend over 15–33 segments. Smooth capillaries present in both rami of all feet; in addition the middle and posterior notopodia bear acicular or forked setae. No specialised neurosetae.

TYPE SPECIES: *Cirrophorus branchiatus* Ehlers, 1908.

Cirrophorus branchiatus Ehlers, 1908
(fig. 24.3.a–e)

Cirrophorus branchiatus Ehler, 1908: 124, pl. 17 figs. 5–9; Day, 1963a: 423, fig. 9 l–o.

Body about 25 mm. long by 0·4 mm. for 120 segments. Prostomium (fig. 24.3.a) bluntly conical, slightly longer than broad. Eyes absent. Median antenna short and stout, less than half the prostomial length. Peristome reduced; it is just visible dorsally between the prostomium and the first setiger but the main part is fused to the ventral surface of the prostomium. Anterior segments somewhat flattened, each three to four times as broad as long. Posterior region with segments slightly broader than long and separated by marked intersegmental constrictions (fig. 24.3.c). Branchiae from setiger 5 and extend over 20–25 segments; each is a cylindro-conical lobe (fig. 24.3.b) equal to two-thirds the segmental breadth. The last two to three pairs are shorter. Postsetal lobes of the notopodia well developed anteriorly, very small in the middle of the body but longer posteriorly. Four pairs of cirriform projections at the posterior end (fig. 24.3.c) some of which may be the notopodial lobes of rudimentary segments.

Anterior setae up to segment 12 are fine capillaries in both rami. From setiger 13, one to two heavy spines appear in the notopodia and the number of capillaries is reduced. Each spine (fig. 24.3.d) is straight and bluntly pointed with a very fine curved filament arising some distance below the apex. No specialised setae appear in posterior neuropodia but the capillaries are twice as long as those in the notopodia.

Type locality: Agulhas Bank, South Africa.

Records: Cape (32/17/d and 35/20/d); Natal (29/31/d).

Distribution: ? California; North Carolina (s).

AEDICIRA Hartman, 1957

Prostomium broadly rounded or flattened anteriorly with a median dorsal antenna which is usually simple but may be branched. Peristome fused to the prostomium. All subsequent segments biramous with two bundles of setae. Notopodia reduced to small postsetal lobes; neuropodia are mere lateral ridges. Cirriform branchiae appear on setiger 4 and extend over 12 to 60 segments. The setae are simple capillaries in both rami throughout the body and specialised setae are absent.

Type species: *Aricidea* (*Aedicira*) *pacifica* Hartman, 1944.

Aedicira belgicae (Fauvel, 1936)
(fig. 24.3.f–j)

Paraonis belgicae Fauvel, 1963a: 29.
Aricidea belgicae: Monro, 1939: 127, fig. 16 a–b.
Aricidea (*Aedicira*) *belgicae*: Hartman, 1957: 327.
Aedicira belgicae: Day, 1936a: 424.

Body about 20 mm. long and 1 mm. broad for 100 segments. Prostomium fig. 24.3.f) broadly rounded anteriorly, about as broad as long with pale indistinct eyes, well marked nuchal slits and a short stout median antenna which does not reach

FIG. 24.3. *Ceraphonus branchiatus*. (A) Anterior end. (B) Branchiferous foot. (C) Lateral view of four posterior segments. (D) Notopodial spine. (E) Posterior end and pygidium. *Aedicira belgica*. (I) Anterior end. (G) Branchiferous foot. (H) Posterior neuroseta. (I) Posterior notoseta. (J) Posterior foot. *Paradoris gracilis ocellata*. (K) Branchiferous foot. (L) Entire worm (seven times natural size). (M) Head. (N) Specialised posterior neuroseta. (O) Posterior foot.

the prostomial margin. Peristome reduced and fused to the ventral surface of the prostomium and not visible dorsally. Anterior region somewhat flattened with the segments six times broader than long; posterior region rounded with the segments about twice as broad as long. Branchiae appear on setiger 4 and extend over 13–24 segments. An average gill (fig. 24.3.g) is a stout, cylindro-conical organ as long as two-thirds the segmental width but the last few are shorter with swollen bases and short filamentous tips. In the anterior region the postsetal lobe of the notopodium is well developed, tapered and half the length of the gill. Posteriorly (fig. 24.3.j) it remains the same length but becomes very slender and filamentous. Anterior setae are numerous curved and tapered capillaries in both rami. Posteriorly the number of setae decreases but no specialised setae appear. The notopodial capillaries are very fine; the neuropodial ones are considerably longer, and most of them are equal to the segmental breadth.

Type locality: Antarctic regions.

Records: Cape (32/17/d and 34/18/s).

Distribution: Subantarctic; North Carolina (d).

PARAONIS Grube, 1878

Prostomium conical. No median antenna. Eyes present or absent. Peristome usually reduced and fused to the ventral surface of the prostomium. All subsequent segments biramous but the parapodia are poorly developed; notopodia are represented by a small cirriform postsetal lobe, and neuropodia by mere lateral ridges from which the setae arise. Dorsal branchiae start on the fourth to nineteenth setiger and number three to 36 pairs but are absent posteriorly. Notosetae are smooth capillaries throughout. Neurosetae include capillaries plus specialised setae in posterior segments.

Type species: *Paraonis tenera* Grube, 1878 (? = *Aonides gracilis* Tauber, 1879).

Key to Species

1 Specialised neurosetae have a blunt, curved apex with a ventral guard. Branchiae foliaceous . . . . . ***P. fulgens****

– Specialised neurosetae are unidentate acicular hooks without hoods. Branchiae cirriform . 2

2 Prostomium with eyes (fig. 24.3.m) . . . . . ***P. gracilis oculata***

– Prostomium without eyes . . . . . ***P. gracilis gracilis***

Paraonis gracilis oculata Hartman, 1957
(fig. 24.3.k–o)

Paraonis gracilis oculata Hartman, 1957: 331, pl. 44 figs. 1–3; Day, 1963: 363.

Body (fig. 24.3.l) up to 17 mm. long by 0·3 mm. for more than 80 segments. Prostomium (fig. 24.3.m) broader than long with a pair of pale eyes. Anterior segments about three to four times as broad as long; posterior segments more rounded, not more than three times as broad as long. Branchiae start on setiger 6–12

and number about 10 to 20 pairs. An average gill (fig. 24.3.k) is cirriform and just overlaps its fellow in the mid-dorsal line; the last few are slightly smaller. Postsetal lobes of anterior notopodia inconspicuous, posterior ones (fig. 24.3.o) small. Both rami of all parapodia have slender capillaries whose length is about half the segmental breadth. In addition the posterior neuropodia bear about four sigmoid acicular setae (fig. 24.3.n) with curved tips but lack a guard or arista.

TYPE LOCALITY: Dredged off California.

RECORDS: Cape (34/17/abyssal).

DISTRIBUTION: California (d).

Paraonis gracilis gracilis (Tauber 1879)
(fig. 24.4.a–b)

Aonides gracilis Tauber, 1879: 115.
Paraonis gracilis gracilis: Hartman, 1957: 330, pl. 44 figs. 4–5; Day, 1963a: 425.

Body thread-like, about 20 mm. long by 0·3 mm. broad for 100 segments. Prostomium (fig. 24.4.a) twice as long as broad. No eyes. Anterior segments slightly flattened and three times broader than long; posterior region rounded with segments as broad as long. Branchiae from setiger 6–11 onwards and number 3–14 pairs (usually 11). Each is a cirriform organ equal to two-thirds the segmental breadth; the last few are a little smaller. Postsetal lobes of the notopodia are inconspicuous and less than a quarter the length of the gill. Both rami of all parapodia have slender capillaries equal to half the segmental breadth. In addition the posterior neuropodia bear two to four sigmoid acicular hooks (fig. 24.4.b) with a narrow guard (in South African specimens at least).

TYPE LOCALITY: North Sea.

RECORDS: Cape (32/17/d, 35/20/d, 34/26/d).

DISTRIBUTION: Cosmopolitan (s, d).

PARAONIDES Cerruti, 1909
(including *PARADONEIS* Hartman, 1965)

Prostomium conical. No median antenna. Eyes present or absent. Peristome greatly reduced and fused to the ventral surface of the prostomium. All subsequent segments bear biramous but greatly reduced parapodia. Notopodium represented by a small cirriform postsetal lobe. Neuropodium as an indistinct lateral ridge from which the setae arise. Cirriform dorsal branchiae start on setiger 4 and extend over about 10–20 segments. Notosetae are fine capillaries with the addition of a few specialised setae from the branchial region onwards. Neurosetae are slender capillaries and there are no specialised neurosetae.

TYPE SPECIES: *Paraonis* (*Paraonides*) *neapolitana* Cerruti, 1909.

FIG. 244. *Paraonis gracilis gracilis.* (A) Head. (B) Posterior neuropodial hook. *Paraonides lyra lyra.* (C) Anterior end. (D) Notopodial forked seta. (E) Notopodial capillary. (F) Branchiferous foot. (G) Posterior foot. *Paraonides lyra capensis.* (H) Anterior end. (I) Branchiferous foot. (J) Notopodial forked seta. (K) Posterior foot.

KEY TO SPECIES

1 Modified notosetae are short, stout, broad-winged capillaries . . . . ***P. neapolitana****
– Modified setae are forked setae 2
2 Postsetal lobe of anterior notopodia one-third the length of the branchia. Prostomium as broad as long . . . . . ***P. lyra lyra***
– Postsetal lobe of anterior notopodia are minute, inconspicuous papillae. Prostomium longer than broad . . . . . ***P. lyra capensis***

Paraonides lyra lyra (Southern, 1914)
(fig. 24.4.c–g)

Paraonis (Paraonides) lyra Southern, 1914: 94, fig. 22 a–g; Fauvel, 1927: 72, fig. 21 a–f.
Paraonides lyra lyra: Day, 1963a: 425.

Body thread-like, up to 20 mm. long by 0·2 mm. broad for 100 segments. Prostomium (fig. 24.4.c) broadly triangular, about as broad as long. No eyes. Anterior segments twice as broad as long, posterior ones about as long as broad. Branchiae from setiger 4 and number 8–14 pairs. Each is a digitiform lobe which overlaps its fellow in the mid-dorsal line. Postsetal lobe of the notopodium (fig. 24.4.f) well developed in the anterior region and about one-quarter the length of the gill; posteriorly (fig. 24.4.g) they become inconspicuous. Both rami of all parapodia contain fine capillary setae (fig. 24.4.e). In addition the notopodia from the last few branchiferous segments onward contain one to two short forked setae (fig. 24.4.d) with the longer limb spinulose on the inner margin. No specialised setae in the neuropodia and the capillaries usually exceed the segmental width.

TYPE LOCALITY: Western Ireland.

RECORDS: Cape (33/17,d).

DISTRIBUTION: Sweden; Ireland (s).

Paraonides lyra capensis (Day, 1955)
(fig. 24.4.h–k)

Paraonis lyra var. *capensis* Day, 1955: 417.

Body thread-like, about 10 mm. long by 0·1 mm. broad for 80 segments. Prostomium (fig. 24.4.h) conical, longer than broad. No eyes. Anterior segments twice as broad as long, posterior ones as long as broad. Branchiae from setiger 4 and extend over 10–13 segments. Each is a digitiform lobe whose length equals two-thirds the segmental breadth. Postsetal lobe of the notopodium (fig. 24.4.i) minute and not visible before setiger 8 and sometimes only found in the posterior region. Fine capillary setae present in both rami of the parapodia throughout the body. In addition there are two to three short forked setae (fig. 24.4.j) with the

longer limb spinulose on the inner margin. These appear in the notopodia of the last few branchiferous segments and persist in later segments (fig. 24.4.h). No specialised setae in the neuropodia and the neuropodial capillaries are shorter than the segmental width.

TYPE LOCALITY: Knysna estuary, South Africa.

RECORDS: Cape (36/21/d, 34/23/e, 34/26/d).

DISTRIBUTION: South African endemic.

Family **OPHELIIDAE** Malmgren, 1867

Body fusiform in shape with relatively few segments and often grooved ventrally and laterally. Prostomium a tapered cone without appendages but with a pair of evaginable nuchal organs and a pair of subdermal eyes. Proboscis unarmed. Mouth a transverse slit at the level of setiger 1. Parapodia biramous but not well developed; they have minute setigerous lobes and lack dorsal cirri and often ventral ones as well. Cirriform branchiae may be present above the notopodia and lateral eyes may be present between the parapodia. Setae are simple capillaries throughout. Pygidium often prolonged and tubular and usually provided with numerous anal cirri.

Records from southern Africa

Armandia intermedia Fauvel	26Ai, 45Ni, 51Cs
Armandia leptocirris Grube	40Ni, 44Ci, 51Cs
Armandia longicaudata (Caullery)	40Ni
Ophelia africana Tebble	42Cs, 51Cs
Ophelia agulhana Day	51Cs
Ophelia anomala Day	51Cs
Ophelia capensis Kirkegaard	48Cs, 51Cs
Ophelia peresi Bellan and Picard	57Ms
Ophelia roscoffensis Augener	? 56Cs
Ophelina acuminata Oersted	? 51Csd, —Nsd
as *Ammotrypane aulogaster* Rathke	32NdCd
Polyophthalmus pictus (Dujardin)	40Ni, —Ms
as *Polyophthalmus papillatus* Treadwell	38Ai
Travisia concinna (Kinberg)	
as *Dindymene concinna* Kinberg	3Cs
Travisia forbesii Johnston	15Csd, 51Cs

REMARKS

The opheliids are fusiform worms which burrow head downwards in sand or mud. The ventrum is grooved and the respiratory current is brought don by peristaltic action and escapes along the lateral grooves in which the gills are situated. The gut is often full of sand grains ingested along with the organic matter in the substrate.

Polyophthalmus is found on muddy shores in all warm seas; *Ophelia* and *Armandia* are more common in dredging on fairly clean sand while *Travisia* lives on muddy bottoms in deep water.

A brief review of the family will be found in Fauvel (1927). Stop-Bowitz (1945a) gives a key to the several Norwegian species including five species of *Ophelina*. Tebble (1953) gives a useful review of the known species of the genus *Ophelia*.

The whole family is well defined. The different genera are easily recognised by the development of the ventral groove, the nature of the pygidium and the presence or absence of branchiae and lateral eye-spots. Specific differences are based on

further details of the same structures plus the number of segments and the disposition of the gills.

The ventral groove. In all genera except *Travisia* the longitudinal ventral muscles are very strongly developed so that they form ventro-lateral ridges. In consequence the ventrum between these ridges forms a *ventral groove* which may extend the whole length of the body or be restricted to the posterior half. Often a pair of *lateral grooves* develop just above the longitudinal muscles in which the parapodia and branchiae are protected as the worm burrows through the sand.

Segmentation, parapodia and branchiae. The whole body is fusiform and intersegmental constrictions are poorly marked. Moreover each segment is annulated so that the easiest way of counting the segments is by noting the number of bundles of setae. It should be noted that the setae of the first segment are small and easily overlooked and the several species possess a few achaetous posterior segments in front of the pygidium. The total number of segments varies between 30 and 60 and is surprisingly constant for each species, at least in the genera *Armandia* and *Ophelia*.

The parapodia though biramous, are small and the shapes of the parapodial lobes seldom provide characters of importance. The setae too, are surprisingly uniform though their development on the last few segments may be of systematic value.

The branchiae with few exceptions are cylindrical tapering projections which arise postero-dorsal to the notosetae. They are absent in *Polyophthalmus*, *Tachytrypane* and in a few species of *Ophelia* and *Ophelina* but in most species they are well developed and their segmental distribution is very constant. As shown by Tebble (1953) the various species of *Ophelia* may be classified on the arrangement of the branchiae and the total number of segments.

Lateral eye-spots occur in both *Armandia* and *Polyophthalmus*. They are restricted to a certain number of segments in the middle of the body and occur at segmental intervals between the parapodia.

Key to Genera

1 Ventral groove at least in the posterior part of the body. No segmental swellings above and below the parapodia (fig. 25.1.c) 2
– Ventral groove absent throughout. Body stout with segmental swellings above and below the posterior parapodia (fig. 25.1.j) . . . . . ***TRAVISIA*** (p. 575)
2 A ventral groove along the whole body. Gills present from setiger 2 or entirely absent . 3
– A ventral groove posteriorly from setiger 7. Gills absent before setiger 8 ***OPHELIA*** (p. 571)
3 Gills present from setiger 2 onwards 4
– Gills entirely absent 5
4 Eye-spots present between the parapodia of middle segments . . ***ARMANDIA*** (p. 576)
– Eye-spots absent from body . . . . . ***OPHELINA*** (p. 579)
5 Eye-spots present between the parapodia of middle segments. Surface normal ***POLYOPHTHALMUS*** (p. 579)
– Eye-spots absent from body. Surface tough and cartilaginous . ***TACHYTRYPANE**** (p. 580)

OPHELIA Savigny, 1818

Body fusiform with an anterior swollen region without grooves and a posterior tapered one with a ventral groove. Prostomium a tapered cone. Segments with

superficial annulations and often microscopic pits in the lateral walls of the branchial region. Branchiae may be entirely absent or present over most of the segments from setiger 8 or 10 onwards. Both rami of the parapodia reduced to inconspicuous lobes bearing a bundle of simple capillaries. A papilla between the parapodial rami. Pygidium with two stout ventral lobes and several small anal papillae dorsally.

Type species: *Ophelia bicornis* Savigny, 1818.

Key to Species

1	Branchiae absent. Body with 26 setigers (fig. 25.1.a)	***O. anomala*** (p. 572)
–	Branchiae present. Body with more than 26 setigers	2
2	Eight anterior abranchiate segments. A total of 32 setigers	***O. roscoffensis*** (p. 572)
–	Nine anterior abranchiate setigers. More than 32 setigers	3
–	Ten anterior abranchiate setigers	4
3	Thirty-six setigers	***O. agulhana*** (p. 573)
–	Thirty-nine setigers	***O. africana*** (p. 575)
4	A total of 29 setigers including 14–15 branchiferous	***O. peresi*** (p. 573)
–	A total of 32 setigers including 17–19 branchiferous	***O capensis*** (p. 573)

Ophelia anomala Day, 1961
(fig. 25.1.a–b)

Ophelia anomala Day, 1961: 515, fig. 10b.

Length up to 40 mm. Body (fig. 25.1.a) of 26 setigers with a doubtful achaetous preanal. No branchiae at all. A constriction behind setiger 2. Notosetae short and not obviously longer than neurosetae. Ventral groove well marked from setiger 7. Nephridiopores from setiger 11 to 14. No pits on lateral body wall. Crimped dorso-lateral ridges (fig. 25.1.b) from setiger 24 to pygidium which has two stout ventral cirri and a dorsal arc of 16–18 small ones.

Type locality: False Bay, South Africa.

Records: Cape (32, 18's, 34, 18.s, 33 25.s').

Distribution: Endemic.

Ophelia roscoffensis Augener, 1910
(fig. 25.1.i)

Ophelia roscoffensis Augener, 1910: 237; Tebble, 1952: 365, fig. 5.

Body cigar-shaped, up to 51 mm. long with a total of 32 setigers of which the first eight are abranchiate, 23 bear slender branchiae and the last setiger is again abranchiate. One doubtful achaetous preanal. Branchial fenestrations absent. Setigers 12 to 20 with nephridiopores. Setigers 29 to 32 abruptly tapered with crimped dorso-lateral ridges (fig. 25.1.i). Pygidium with an arc of 12 small anal cirri and two stout ventral ones. Notosetae twice as long as neurosetae or even more on the last few setigers. (South African specimens are doubtfully assigned to

this species as they have only 20–21 pairs of branchiae and three to four posterior abranchiate setigers.)

TYPE LOCALITY: Roscoff, France.

RECORDS: ? Cape (34.22.s).

DISTRIBUTION: English Channel.

Ophelia peresi Bellan & Picard, 1965

Ophelia peresi Bellan and Picard, 1965: 295, figs. 1–2.

Length 10–12 mm. Body of 29 setigers and 3 indistinct and doubtful achaetous preanals. The first 10 or 11 are abranchiate, the next 14–15 bear short branchiae and the last four setigers are again abranchiate. Branchial fenestrations absent. Nephridiopores not seen. Prominent dorso-lateral ridges extend from setiger 20 to unite on the 27th setiger (2nd posterior abranchiate setiger) and continue to the base of the pygidium. Pygidium with a dorsal arc of 12 small anal papillae and two large elongated ventral ones. Differs from *O. bicornis* by the possession of the dorso-lateral ridges on the last few segments and in having 4 *not* 7 posterior abranchiate setigers.

TYPE LOCALITY: Tulear, Madagascar.

RECORDS: Madagascar (s).

Ophelia capensis Kirkegaard, 1959
(fig. 25.1.e–f)

Ophelia capensis Kirkegaard, 1959: 45, fig. 8; Day, 1961: 514.

Length up to 50 mm. Body of 36–37 setigers including 9 (or occasionally 10) abranchiate setigers, 17–19 branchiferous segments, three to four posterior abranchiate setigers and one to two achaetous preanals. Branchiae with a flattened sac-like basal projection (fig. 25.1.e). Nephridiopores on setigers 12–17. Notosetae (fig. 25.1.f) in middle of body three times as long as neurosetae. Lateral swellings start on setiger 26 and continue to the anus which has a dorsal arc of 12 small papillae and two long stout ventral ones (fig. 25.1.d).

TYPE LOCALITY: In 50 metres off Table Bay, South Africa.

RECORDS: Cape (33 18 s, 34 18 s, 34 23 s, and 33 27 s).

DISTRIBUTION: Endemic.

Ophelia agulhana Day, 1961
(fig. 25.1.g)

Ophelia agulhana Day, 1961: 513, fig. 10 a.

Length up to 50 mm. Body of 36–37 setigers including nine (or occasionally 10) anterior abranchiate segments, 23–26 branchiferous segments, one to three posterior abranchiate setigers and a doubtful achaetous preanal segment in front of the

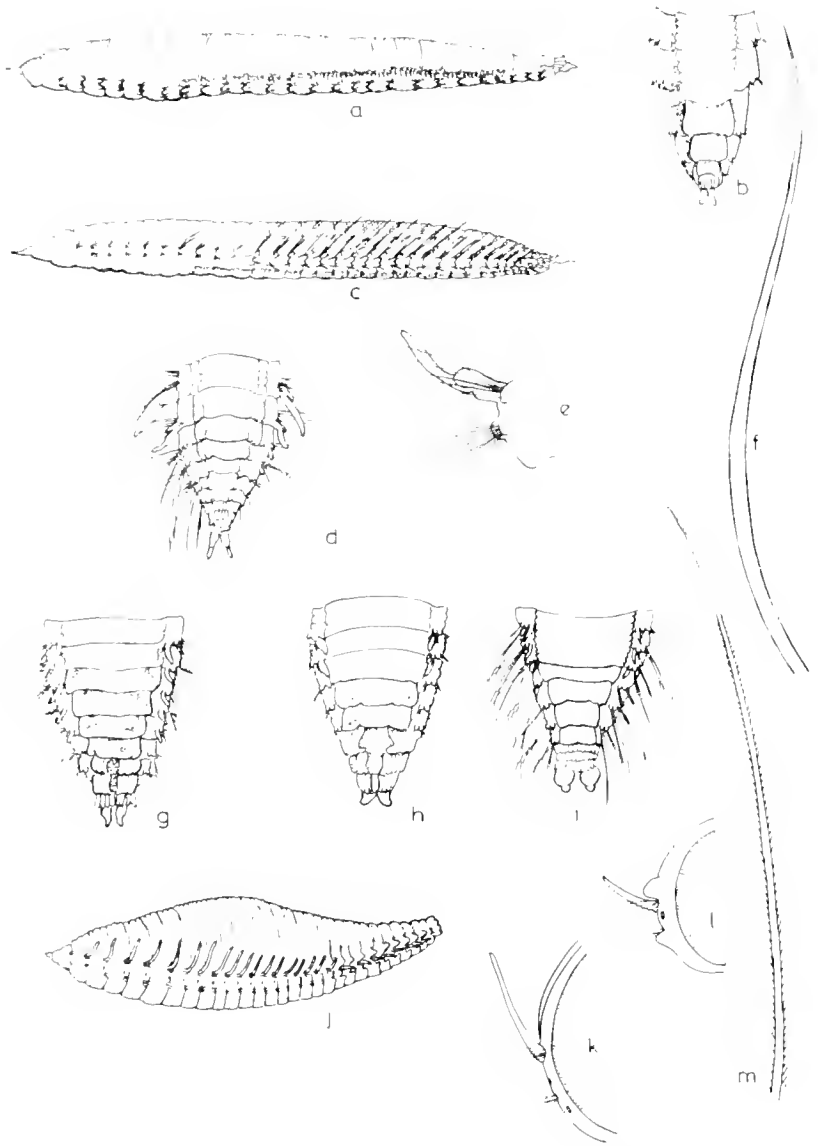


FIG. 25.1. *Ophelia anomala.* (A) Entire worm (twice life size). (B) Dorsal view of posterior end. *Ophelia capensis.* (C) Entire worm (four times life size). (D) Posterior end. (E) Parapodium. (F) Capillary seta. *Ophelia agulhana.* (G) Posterior end. *Ophelia africana.* (H) Posterior end. *Ophelia* cf. *roscoffensis.* (I) Posterior end. *Travisia forbesii.* (J) Entire worm (twice life size). (K) Anterior parapodium. (L) Posterior parapodium. (M) Capillary seta.

pygidium. Branchiferous segments with rows of pits in the lateral body wall. Branchiae irregularly annulated. Notosetae twice as long as neurosetae in the branchiferous region. Nephridial pores on setigers 12–17. Crimped dorso-lateral ridges from setiger 33 to pygidium which has two stout ventral cirri and a dorsal arc of 15 small ones (fig. 25.1.g).

TYPE LOCALITY: False Bay, South Africa.

RECORDS: Cape (32/17/d, 32/18/s, 33/17/d and 34/18/s).

DISTRIBUTION: Endemic.

Ophelia africana Tebble, 1953
(fig. 25.1.h)

Ophelia africana Tebble, 1953: 365, fig. 1; Day, 1961: 513.

Length up to 70 mm. Body of 39–40 setigers including nine anterior abranchiate setigers, 27–28 branchiferous segments, two to three posterior abranchiate setigers and one to two achaetous preanals. Adults with rows of pits in body wall of branchiferous segments. Branchiae irregularly annulated. Posterior setae short. Nephridiopores on setigers 11–16. Lateral swellings on setigers 36–39. Preanals and dorsal part of pygidium crimped (fig. 25.1.h). Two short, stout ovoid papillae below the anus and an arc of 10–12 small papillae above it.

TYPE LOCALITY: Table Bay, South Africa.

RECORDS: Cape (33/18/s).

DISTRIBUTION: A single record.

TRAVISIA Johnston, 1840

Body fusiform without a ventral groove. Prostomium conical. Cirriform branchiae from setiger 2 to the last few. Dorsal and ventral rami of parapodia both reduced to a bundle of simple capillaries. Posterior setigers with cushion-like swellings above and below the setigerous bundles. No ventral cirri. A lateral organ (pit) between the parapodial rami. Anus encircled by blunt lobes.

TYPE SPECIES: *Travisia forbesii* Johnston, 1840.

KEY TO SPECIES

1	Twenty-three to twenty-nine setigers. Surface reticulate and sandy . .	***T. forbesii***
–	Thirty-five setigers. Surface granular with papillae	***T. concinna***

Travisia forbesii Johnston, 1840
(fig. 25.1.j–m)

Travisia Forbesii Johnston, 1840: 273; Fauvel, 1927: 138, fig. 48 g–k.

Length up to 30 mm. Body (fig. 25.1.j) short and fusiform with 23–29 setigers, the anterior ones rounded and triannulate, the more posterior ones more rectangular and rather telescoped with the ventral surface flat or faintly grooved. Branchiae

from setiger 2 to the last two. Nephridiopores from setiger 3 to 14. Anterior parapodia (fig. 25.1.k) without projections. Posterior parapodia (fig. 25.1.l) with swellings representing dorsal and ventral cirri. Setae are fine hispid capillaries (fig. 25.1.m) throughout. Anus encircled by about eight stout papillae.

Type locality: Firth of Clyde, Scotland.

Records: Cape (34°18 s and 33°25 s).

Distribution: Arctic; northern Atlantic from Norway (i, s) and Greenland (i, s, d, abyssal) to the English Channel; Behring Sea; N.W. Japan and Okhotsk Sea.

Travisia concinna (Kinberg, 1866)

Dindymene concinna Kinberg, 1866: 66, pl. 23 fig. 3.
Travisia concinna: Hartman, 1948: 113.

A total of 35 setigers. Surface of body granular with fine papillae. Branchiae from setiger 2 to the last (33 in all). Anus lobed. Fleshy lobes above the notopodia from setiger 17 and below the neurosetae from setiger 18. They increase in size posteriorly.

Type locality: Algoa Bay, South Africa.

Records: Cape (33°25 s).

Distribution: Known only from the original record.

ARMANDIA Filippi, 1861

Body elongated, pointed anteriorly and not divided into regions. A deep ventral groove and a pair of lateral grooves along the whole length. Prostomium conical with two subdermal eyes and two evaginable nuchal organs. Proboscis more or less lobed. Segments annulated and lateral eyes present from about setiger 2 onwards. Parapodia with a presetal lobe, a short ventral cirrus and two bundles of capillary setae. Pygidium tubular with a long internal ventral cirrus and a semi-circle of short dorsal cirri.

Type species: *Armandia cirrhosa* Filippi, 1861.

Key to Species

1 Presetal lobe of parapodia very long (fig. 25.2.a). Thirty to thirty-two setigers with gills to the last . . . . . ***A. longicaudata***
– Presetal lobe of parapodia always short (fig. 25.2.e) 2
2 Twenty-seven to twenty-nine setigers. Two or more posterior abranchiate setigers . . . 3
Thirty-three to thirty-seven setigers. Gills extend to the last setiger . . . ***A. leptocirris***
3 Three to four posterior abranchiate setigers. Pygidial funnel pale with 12–20 anal cirri ***A. intermedia***
– Two posterior abranchiate setigers. Pygidial funnel brown with six anal cirri ***A. melanura****

Armandia longicaudata (Caullery, 1944)
(fig. 25.2.a–c)

Ammotrypane longicaudata Caullery, 1944: 44, fig. 35.
Armandia longicaudata: Day, 1951: 50.

Body up to 30 mm. long with 30–32 setigers which bear gills from the second to the last. Presetal lobe of parapodium prolonged especially on the anterior 6–10 segments (fig. 25.2.a, b). Lateral eyes between setiger 6 and 23. Anal funnel (fig. 25.2.c) obliquely truncate so that the anus opens downward. It is provided with a very long ventral cirrus and an arc of about 12 tapered dorsal papillae.

Type locality: East Indies.

Records: Natal (30/30/s); Mocambique (26/32/i and 23/35/e, s).

Distribution: Madagascar (i), East Indies.

Armandia intermedia Fauvel, 1902
(fig. 25.2.d–g)

Armandia intermedia Fauvel, 1902: 86, figs. 29, 30; Day, 1957: 104.

Body (fig. 25.2.d) about 12 mm. long and rounded at both ends. Twenty-seven to twenty-nine setigers with gills extending over 24–25 segments from setiger 2 to the last two or three. Lateral eye-spots (fig. 25.2.e) on setigers 7 to about 18. Presetal lip of parapodium not prolonged. Setae (fig. 25.2.f) of last few segments not obviously longer than those on preceding ones. Anal funnel (fig. 25.2.g) short with a long internal ventral cirrus and 10–20 clavate dorsal papillae.

Type locality: Senegal.

Records: Cape (34/18/s and 34/22/i, s); Natal (29/31/i).

Distribution: Senegal (s), Ghana (s), Angola; Indo-west-Pacific from the Red Sea (i), Persian Gulf and Ceylon to N.W. Australia, Japan and New Caledonia.

Armandia leptocirrus Grube, 1878
(fig. 25.2.h)

Armandia leptocirrus Grube, 1878: 194; Fauvel, 1919: 435; Day, 1951: 50.

Body about 20 mm. long; 31–35 setigers with gills from setiger 2 to the last or last but one. Lateral eye-spots on setigers 7 to about 18. Presetal lip of parapodia not prolonged. Setae of last few segments longer than those of preceding segments. Anal funnel (fig. 25.2.h) long, and obliquely truncate so that the anus opens upward. It has a long ventral cirrus and 12–18 fine dorsal papillae.

Type locality: Philippine Islands.

Records: Cape (33/27/s); Mocambique (26/32 i and 23/35 e, s).

Distribution: Tropical Indo-west Pacific from the Red Sea and Persian Gulf (s) to the Andaman Is. (i) and New Caledonia.

FIG. 25.2. *Armandia longicaudata.* (A) Anterior foot. (B) Posterior foot. (C) Lateral view of posterior end. *Armandia intermedia.* (D) Entire worm (four times life size). (E) Three segments from middle of body. (F) Capillary seta. (G) Posterior end. *Armandia leptocirrus.* (H) Posterior end. *Ophelina acuminata.* (I) Entire worm (three times life size). (J) Posterior end. *Polyophthalmus pictus.* (K) Entire worm (four times life size). (L) Lateral view of head end. (M) Posterior end.

OPHELINA Oersted, 1843
(including *AMMOTRYPANE* Rathke, 1843)

Body vermiform, not divided into distinct regions. A deep ventral groove and a pair of lateral ones along the whole body. Prostomium conical with subdermal eyes. Segments annulated, lateral eye-spots absent. Cirriform gills, if present, start on setiger 2 and continue to near the end of the body. Each parapodium with a conical setigerous lobe, two bundles of simple capillaries and a small ventral cirrus. Anal funnel with a long internal ventral cirrus and an arc of dorsal papillae.

Type species: *Ophelina acuminata* Oersted, 1843.

Ophelina acuminata Oersted, 1843
(fig. 25.2.i–j)

Ophelina acuminata Oersted, 1843: 46.
Ammotrypane aulogaster Rathke, 1843: 188, 10 figs. 1–3; Fauvel, 1927: 133, fig. 47 a–e.

Body (fig. 25.2.i) vermiform with 48–50 segments and up to 50 mm. long. Prostomium conical with a filiform tip. About 46 pairs of gills from setiger 2 to the last two to three. Setigerous lobe elongate, conical. Ventral cirrus small. Anal funnel (fig. 25.2.j) scoop-shaped and slit ventrally. The posterior end is fringed by many small marginal papillae and two much stouter ones arise at the anterior end of the slit and flank a long median internal cirrus.

Type locality: Danish seas.

Records: Cape (34/18/d to 33/27/s); Natal (30/31/d, 29/31/s, d).

Distribution: Arctic; N. Atlantic from Norway (s) and Greenland (s, d) to the English Channel (s); N. Pacific from the Behring Sea to Japan; tropical Indian Ocean (i, s).

POLYOPHTHALMUS Quatrefages, 1850

Body short, without distinct regions. A ventral groove along the whole length. Prostomium short, proboscis small. No branchiae. Lateral eyes present. Parapodia biramous with simple setae but no ventral cirri. Anal tube short with small papillae.

Type species: *Nais picta* Dujardin, 1839.

Polyophthalmus pictus (Dujardin, 1839)
(fig. 25.2.k–m)

Nais picta Dujardin, 1839: 293.
Polyophthalmus pictus: Fauvel, 1927: 137, fig. 48 l–n.

Body (fig. 25.2.k) slender, up to 25 mm. long and consists of 27–28 biannulate segments with a pattern of brown marks dorsally. Prostomium (fig. 25.2.l) a rounded hood with subdermal eye-spots. A single bundle of very small capillaries

per foot except on the last few. Lateral eye-spots present on setigers 7–21 but difficult to see. Anal tube (fig. 25.2.m) rudimentary with small marginal papillae.

TYPE LOCALITY: France.

RECORDS: Natal (30°30'i and 29°31'i); Mocambique (26°32'i and 23°35'e).

DISTRIBUTION: All warm and tropical seas – Atlantic from the English Channel (i) to the Gulf of Mexico (i) and tropical West Africa (i, s); Mediterranean (i) Red Sea (s) and Indo Pacific to Japan; western Canada and Southern California (i, s); Madagascar (i).

TACHYTRYPANE McIntosh, 1879

Body elongate and vermiform with a smooth, tough, cartilaginous surface. A ventral groove along the whole length. No branchiae. No lateral eye-spots. Parapodia biramous but without ventral cirri. Pygidium marked off from the posterior segments and curved down so as to open ventrally.

TYPE SPECIES: *Tachytrypane jeffreysi* McIntosh, 1879.

RECORDS: Not recorded from southern Africa.

Family **COSSURIDAE** Day, 1963

Small thread-like worms with numerous similar segments. Prostomium conical and without appendages or eyes. Pharynx eversible, soft and unarmed. Peristome achaetous and without appendages. The second segment sometimes achaetous as well. All subsequent segments without parapodial lobes but with one or two bundles of simple pointed setae with rather flattened spinulose blades. A single very long cylindrical dorsal gill (or ? tentacle) on setiger 2 or 3. Pygidium with anal cirri.

Records from southern Africa

Cossura coasta Kitamori 56Cd

COSSURA Webster and Benedict, 1887

The only recorded genus has the characters of the family.

Type species: *Cossura longocirrata* Webster and Benedict, 1887.

REMARKS

Cossura is a small thread-like worm which lives in sandy mud in fairly deep water and appears to be a deposit feeder. A key to the known species will be found in Laubier (1963). It is suspected that several of the specific names that have been erected are really synonyms for there are few useful taxonomic characters. The shape of the anal cirri seems to be distinctive but unfortunately the posterior end is often missing.

Cossura coasta Kitamori, 1960
(fig. 26.1.a–d)

Cossura coasta Kitamori, 1960: 1082, fig. 1 a-f; Day, 1963: 427.

Body thread-like, rounded in section and up to 15 mm. long with 107 segments. Prostomium (fig. 26.1.a) a blunt depressed cone without eyes or appendages but with a pair of nuchal slits. Pharynx eversible and lobed. Peristome and segment 2 partly fused, apodous, and achaetous. Subsequent segments broader than long with poorly marked intersegmental constrictions. Parapodial lobes absent and the setae arise directly from the sides of the body. Segment 3 (the first setiger) has a single bundle of setae but all subsequent segments have two bundles which arise close together (fig. 26.1.b). The setae are all simple capillaries (fig. 26.1. d) with longer and shorter blades which are somewhat flattened and finely spinulose on one margin. A single very long cylindrical gill arises from the dorsal surface of setiger 3. It is about three-quarters the length of the body. The last few segments

fig. 26.1.c lack setae and the pygidium bears three long filiform anal cirri. In Japanese specimens these are forked at the ends but not in South African specimens.

Type locality: Seto Inland Sea, Japan.

Records: South-west Africa (26/14 d); Cape (from 33 17/d to 36/21/d); Natal (29 30 s, 29 31 d).

Distribution: Japan.

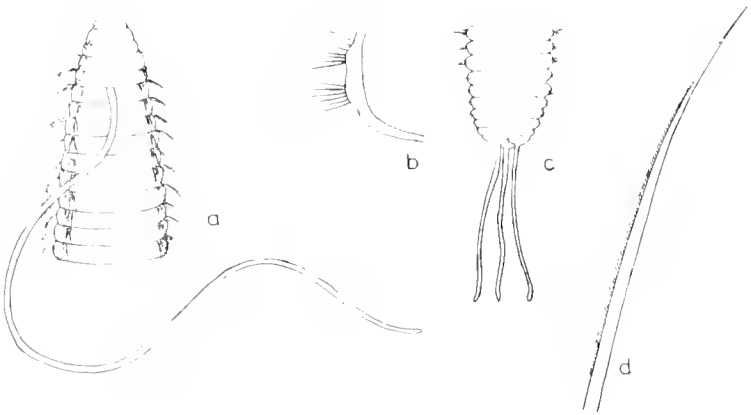


Fig. 26.1. *Cossura consta*. (A) Anterior end. (B) Foot from mid-region. (C) Posterior end. (D) Blade of capillary seta.

Family **SCALIBREGMIDAE** Malmgren, 1867

Body either short and stout or longer and arenicoliform but never with more than 30–60 segments. Prostomium either bilobed or with two divergent frontal horns. Eyes present or absent. Nuchal slits present. Proboscis eversible, but soft and unarmed. Buccal segment achaetous. Parapodia biramous but poorly developed with or without dorsal and ventral cirri on the posterior part of the body. Setae all simple and consist mainly of capillaries accompanied by a few forked setae; in addition there may be acicular setae in the first one to four segments. Branchiae if present are branched and restricted to the first few segments. Pygidium with or without anal cirri.

Records from southern Africa

Asclerocheilus capensis Day	56Cd
Hyboscolex longiseta Schmarda . . .	4Ci, 26Wi, 40Ni, 44Ci, 45Pi, 51Csd
as *Lipobranchius capensis* Willey . . .	12Ci
as *Lipobranchius longisetus* (Schmarda) . .	36Ci
Parasclerocheilus capensis Day	51Cis, 56Ws
Polyphysia crassa (Oersted)	51Cd
Scalibregma inflatum Rathke	48Cd, 51Csd

REMARKS

Scalibregmids are rare worms and not well known. They are found in muddy situations and in all of them the gut contains mostly mud. On the other hand, they do not burrow deep in the mud and presumably live in the surface layer of silt feeding on detritus. *Hyboscolex* lives in muddy rock crevices and is often found in old tubes formed by other animals. *Parasclerocheilus* lives among loose muddy stones and *Scalibregma* is dredged from similar habitats. *Polyphysia* is a deep water species living on mud or foraminifera.

THE MAIN DIAGNOSTIC CHARACTERS

Useful discussions of the family will be found in Ashworth (1901), Chamberlin (1919) and Furreg (1925). Both Chamberlin (1919) and Fauvel (1927) provide keys.

The most important taxonomic characters are the shape of the whole body, details of the prostomium, the presence of branchiae and acicular setae in the first few segments and the nature of the posterior parapodia.

The body. In most genera the body is either arenicoliform with a swollen anterior region and a narrowed tail or short and maggot-shaped. In *Parasclerocheilus* however, the body is elongate and fusiform. In some species the segments in the middle of the body are divided into three annuli, in others there are four.

The prostomium and eye-spots. The prostomium is bilobed to varying degrees. In *Polyphysia* there are merely two stout lobes divided by a deep median V-shaped

notch; in other genera such as *Scalibregma* these lateral lobes are better developed so that the whole prostomium is broadly T-shaped. The exact shape in any single specimen is greatly affected by the degree of contraction and only major differences are important. The presence or absence of eye-spots is useful at the species level but it should be noted that when the prostomium is partly retracted into the peristomial collar the eyes may be hidden.

Branchiae. Branching gills may arise behind the notopodia of three to six segments from setiger 2 onwards. It is important to note, however, that the number of gills increases with the size of the worm and that small juveniles may even lack gills entirely.

The setae. The typical setae in both rami of the parapodia are capillaries accompanied by a few forked setae but a few genera have acicular setae in the first one to four feet. The capillaries may be either smooth and cylindrical or minutely spinulose. The forked setae usually have unequal prongs with spinules on their inner margins. The acicular setae are stouter than the other setae and typically have abruptly pointed tips but they may have blunt or tapered tips; in the latter case they are not very different from the capillaries. When acicular setae occur they replace the forked setae in a few anterior segments.

Parapodia. The parapodia are never well developed in anterior segments. The parapodial projections may even be entirely absent and the two bundles of setae then project directly from the sides of the body with a small ciliated button or "*lateral organ*" between them. In many genera however, the anterior setae arise from small conical setigerous lobes. These tend to become longer in the posterior part of the body and may be accompanied by both dorsal and ventral cirri or by ventral cirri alone. When both cirri are well developed they tend to be conical and as long as the setigerous lobes but when only the ventral cirrus is present it tends to be filamentous and may arise posterior to the neuropodium.

The synonymy of the genera is confused. Schmarda (1861) described two genera, *Hyboscolex* (type *H. longiseta*) and *Oncoscolex* (type *O. dicranochaetus*). As Augner (1918) has shown after an examination of Schmarda's material, the two genera are synonymous although *Oncoscolex bipartitus* Schmarda is a fragment of *Dasybranchus* sp. *Oncoscolex dicranochaetus* thus becomes *Hyboscolex dicranochaetus* (Schmarda). As shown by Day 1961 *Eumenia reticulata* McIntosh 1885 must be transferred to *Hyboscolex*. It differs from *H. longiseta* in lacking eyes and in having parapodial projections in posterior segments but like *H. longiseta* it lacks dorsal and ventral cirri. *Eumenia oculata* Ehlers 1901 which was transferred to the genus *Oncoscolex* by Ehlers (1913) also becomes a species of *Hyboscolex*. *Eumenia glabra* Ehlers 1887 was used by Chamberlin (1919) as the type species of his new genus *Kebuita*. I have not seen Ehlers' original description but judged from the remarks of Chamberlin and Furreg it is essentially similar to *Hyboscolex* apart from an abruptly narrowed anal tube.

Furreg has shown that the genus *Eumenia* is preoccupied in the Lepidoptera so that Oersted's *E. crassa* becomes *Polyphysia crassa*. *Eumenia jeffreysii* McIntosh 1869 was made the type of a new genus *Lipobranchius* by Cunningham and Ramage (1888).

It differs from *Polyphysia* in the absence of gills but according to Støp-Bowitz (1945) it is no more than a juvenile *P. crassa* in which the gills are undeveloped.

KEY TO GENERA

1 Acicular setae present in one or more of the first few parapodia 2
– Acicular setae absent 4
2 Branched gills present on the first few segments. No dorsal or ventral cirri ***PARASCLEROCHEILUS*** (p. 585)
– Branched gills absent 3
3 Ventral cirri present on posterior segments . . . . . ***SCLEROCHEILUS****
– Ventral cirri absent . . . . . ***ASCLEROCHEILUS*** (p. 586)
4 Body short and maggot-shaped (fig. 27.1 k). Prostomium broadly V-shaped. Branched gills present . . . . . ***POLYPHYSIA*** (p. 586)
– Body arenicoliform (fig. 27.2.a). Prostomium broadly T-shaped with lateral projections. Gills present or absent 5
5 Posterior parapodia with both dorsal and ventral cirri 6
– Posterior parapodia if developed lack dorsal and ventral cirri. (No gills) ***HYBOSCOLEX*** (p. 588)
6 Branched gills present . . . . . ***SCALIBREGMA*** (p. 589)
– Gills absent . . . . . ***PSEUDOSCALIBREGMA***

PARASCLEROCHEILUS Fauvel, 1928

Body elongate and fusiform. Prostomium T-shaped with a pair of frontal lobes. Eyes present. Buccal segment achaetous. Branched gills on setigers 2 to 6–7. Segments with four annuli after the first few. Parapodia biramous but poorly developed and dorsal cirri absent. A ventral cirrus behind the neurosetae of posterior segments. Acicular notosetae present in the first one to four anterior segments and fine capillaries plus a few forked setae in subsequent ones.

TYPE SPECIES: *Parasclerocheilus branchiatus* Fauvel, 1928.

Parasclerocheilus capensis Day, 1961
(fig. 27.1.a–f)

Parasclerocheilus capensis Day, 1961: 517, fig. 10 c–f.

Body (fig. 27.1.a) arenicoliform, up to 30 mm. long with 60 segments and blood-red when alive. Prostomium (fig. 27.1.b) T-shaped with divergent frontal lobes and a pair of large reniform eyes. Buccal segment incomplete ventrally and the lower lip formed by setiger 1. The first four segments biannulate and subsequent ones quadriannulate. Parapodia biramous with swollen setigerous lobes and a ciliated lateral organ between them. A small ventral cirrus (fig. 27.1.c) below the neurosetae on the last third of the body. Bushy gills behind the notopodia of setigers 2–7. Setiger 1 with five to six acicular setae (fig. 27.1.d) in the notopodium. Subsequent setae are mainly fine capillaries (fig. 27.1.f) plus a few short forked setae in

both rami. Forked setae (fig. 27.1.e) with unequal prongs both feathered on their inner margins.

TYPE LOCALITY: Langebaan Lagoon, South Africa.

RECORDS: South West Africa (28/16/s); Cape (33/18/i and 34/18/s to 33/25/s).

DISTRIBUTION: Endemic.

ASCLEROCHEILUS Ashworth, 1901

Body arenicoliform. Prostomium T-shaped with divergent frontal horns. No eyes. Buccal segment achaetous. No gills. Segments with four annuli after the first few. Parapodia biramous but poorly developed anteriorly and never have dorsal or ventral cirri. Curved acicular setae accompany the capillaries in the first one to three setigers. Subsequent segments with fine capillaries and forked setae. Anal cirri digitiform.

TYPE SPECIES: *Lipobranchius intermedius* Saint-Joseph, 1894.

Asclerocheilus capensis Day, 1963
(fig. 27.1.g–j)

Asclerocheilus capensis Day, 1963a: 428, fig. 10 a–f.

Body arenicoliform, about 10 mm. long with about 30 segments. Prostomium (fig. 27.1.h) with stout, divergent frontal lobes but no eyes. Peristome short and achaetous. The first seven segments vaguely biannulate, later ones clearly quadriannulate and tessellated. No gills. Parapodia (fig. 27.1.g) biramous but poorly developed. Setigers 1 and 2 with acicular setae plus long capillaries in both rami. Acicular setae (fig. 27.1.i) with stout shafts and curved, tapered tips. Setiger 3 and all subsequent segments have fine capillaries of varying lengths plus a few forked setae (fig. 27.1.j) with unequal prongs.

TYPE LOCALITY: Agulhas Bank, South Africa.

RECORDS: Cape (34.23.d).

DISTRIBUTION: Only one record.

POLYPHYSIA Quatrefages, 1865
[*EUMENIA* Oersted – preoccupied] including *LIPOBRANCHIUS* Cunningham and Ramage, 1888.)

Body short and swollen with about 30 segments. Prostomium bilobed. No eyes. Buccal segment achaetous. Setigerous segments with three annuli and the surface tessellated. Parapodia biramous but poorly developed, consisting of two cushion-shaped setigerous lobes with a lateral organ between them. Branching gills present on anterior segments. Setae include slender capillaries and forked setae but no acicular setae. No anal cirri.

TYPE SPECIES: *Eumenia crassa* Oersted, 1843.

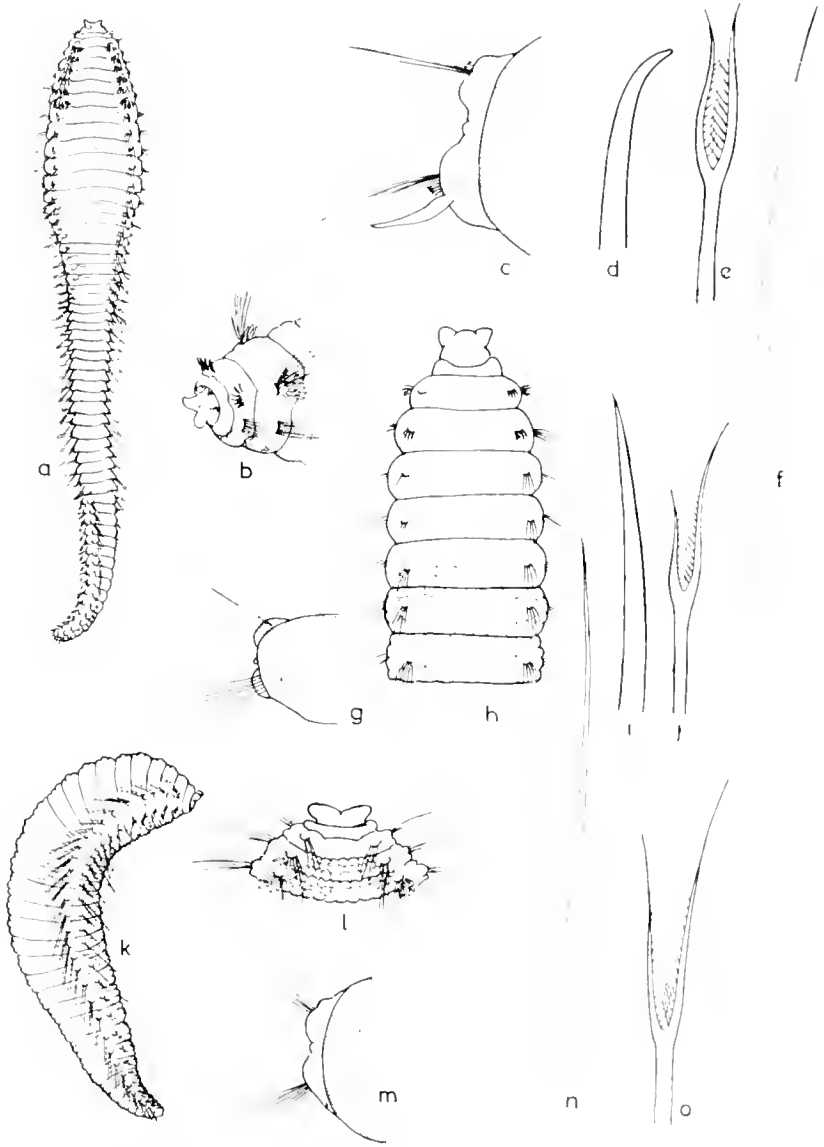


FIG. 27.1. *Parasclerocheilus capensis*. (A) Entire worm in dorsal view (four times life size). (B) Head. (C) Posterior foot. (D) Acicular seta. (E) Forked seta. (F) Capillary seta. *Asclerocheilus capensis*. (G) Twelfth foot. (H) Dorsal view of anterior end. (I) Acicular seta. (J) Forked seta. *Polyphysia crassa*. (K) Lateral view of entire worm (three times life size). (L) Head. (M) Foot from mid-region. (N) Capillary seta. (O) Forked seta.

Polyphysia crassa (Oersted, 1843)
(fig. 27.1.k–o)

Eumenia crassa Oersted, 1843: 47; Fauvel, 1927: 127, fig. 45 i–k.
Polyphysia crassa: Stop-Bowitz, 1947: 75, figs. 4–6; Day, 1961: 516.

Body (fig. 27.1.k) maggot-like, up to 30 mm. long with about 33 segments. Segments triannulate and surface tessellated. Prostomium (fig. 27.1.l) deeply bilobed and without eyes. Buccal segment achaetous. Parapodia (fig. 27.1.m) biramous with two indistinct setigerous lobes each bearing long capillaries plus a few forked setae. Dorsal and ventral cirri absent. About five pairs of branched gills behind the notopodia starting from setigers 2 but not developed in juveniles. Capillary setae (fig. 27.1.n) very long and smooth; forked setae (fig. 27.1.o) with very long prongs feathered on their inner margins.

Type locality: Denmark.

Records: Cape (31, 16 d).

Distribution: Atlantic from Greenland (s, a) and Norway (s, d) to the North Sea; ? Mediterranean.

HYBOSCOLEX Schmarda, 1861
(including *OXOSCOLEX* Schmarda, 1861, and ? *KEBUITA* Chamberlin, 1919.)

Body small, swollen anteriorly, arenicoliform. Prostomium T-shaped. Eyes present or absent. Buccal segment achaetous and fused to the first setiger ventrally. Anterior segments with three annuli. Parapodia biramous but may lack setigerous lobes and never possess dorsal or ventral cirri. Numerous simple capillaries and a few forked setae but no acicular setae.

Type species: *Hyboscolex longiseta* Schmarda, 1861.

Hyboscolex longiseta Schmarda, 1861
(fig. 27.2.a–d)

Hyboscolex longiseta Schmarda, 1861: 54, pl. 27 fig. 211.
Lipobranchius capensis Willey, 1904: 266, pl. 14 fig. 14, pl. 15 figs. 23, 24.

Body (fig. 27.2.a) about 15 mm. long with 50 segments and often dark brown in colour. Prostomium (fig. 27.2.b) with a pair of stout lateral projections so that the whole is T-shaped. Two fused pairs of large eyes often hidden by the peristomial fold. Peristome short, achaetous, obvious dorsally and laterally but not visible ventrally so that the posterior lip is formed by setiger 1. Anterior segments inflated and triannulate, but posterior ones not annulated. No branchiae or parapodial projections of any sort in any part of the body, the setae arising directly from the body wall (fig. 27.2.c). Both notopodial and neuropodial bundles of setae contain

numerous smooth capillaries and a few forked setae (fig. 27.2.d) with unequal limbs. Five small anal cirri.

TYPE LOCALITY: Cape of Good Hope.

RECORDS: South-west Africa (22/14 i); Cape (from 29/16 i to 35/20 s and 33/25 s); Natal (30/30 i); Mocambique (26/32 i).

DISTRIBUTION: Auckland Is. (New Zealand) (i).

SCALIBREGMA Rathke, 1843

Body arenicoliform. Prostomium T-shaped with a pair of latero-frontal lobes. Eyes absent. Buccal segment achaetous. Segments with four annuli after the first few. Branched gills present on some anterior segments. Parapodia biramous with

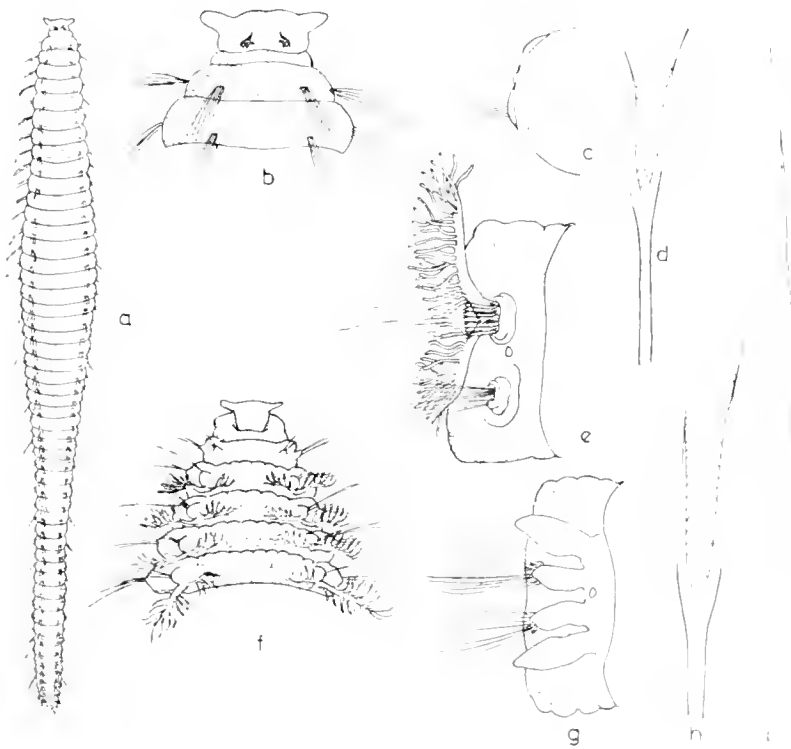


FIG. 27.2. *Hyboscolex longiseta*. (A) Dorsal view of entire worm (four times life size). (B) Head. (C) Foot from mid-region. (D) Forked seta. *Scalibregma inflatum*. (I) Branchiferous foot. (F) Head end. (G) Posterior foot. (H) Forked seta. (I) Capillary seta.

lateral organs between the short setigerous lobes. Dorsal and ventral cirri present on posterior segments. The setae are mainly capillaries plus a few forked setae but large acicular setae are absent. Anal cirri digitiform.

TYPE SPECIES: *Scalibregma inflatum* Rathke, 1843.

Scalibregma inflatum Rathke, 1843
(fig. 27.2.e–i)

Scalibregma inflatum Rathke, 1843: 184, pl. 9 figs. 15–21; Fauvel, 1927: 123, fig. 44 a–f.

Body rusty brown, swollen anteriorly but narrowed posteriorly. Length up to 60 mm. with 60 segments. Skin tessellated. The first few segments triannulate, the remainder quadriannulate. Prostomium (fig. 27.2.f) pale with divergent processes forming a stout T. No eyes. Buccal segment achaetous. Four pairs of bushy gills (fig. 27.2.e) behind the notopodia of setigers 2–5. In anterior segments both the notopodia and the neuropodia are truncate cones with a lateral organ in the form of an evaginable pit between them. Conical dorsal and ventral cirri from setiger 16 or 18. In the posterior region the setigerous lobes (fig. 27.2.g) are more prominent and compressed. The setae are mainly capillaries (fig. 27.2.i) but a few forked setae (fig. 27.2.h) are also present with the inner sides of the unequal prongs minutely feathered. Five slender anal cirri.

TYPE LOCALITY: Molde, Norway.

RECORDS: Cape (from 32/17/d and 33/17 s, d to 36 21 d and 34 26/d).

DISTRIBUTION: Cosmopolitan from the Arctic to Antarctic; in depths of 100–1000 metres in the tropics but at all depths from a few metres down in cold seas. Habitat muddy sands.

Family **CAPITELLIDAE** Grube, 1862

Body elongated, reddish, rounded in section and without obvious parapodia so as to appear like oligochaetes. Prostomium voluminous, evaginable but unarmed. Body divided into an anterior, rather short and swollen thoracic region and a longer abdominal region which often bears inconspicuous gills. Lateral sense organs commonly present on many segents as small eversible, ciliated pits between the notopodia and the neuropodia. Parapodia biramous but poorly marked, being reduced to two bundles of setae on the thorax and two setigerous ridges on the abdomen. Genital pores on some segments become visible in sexually mature adults. Branchiae if present, are either branched and retractile organs on some abdominal segments or are represented by vascular enlargements of the notopodia and/or neuropodia. Setae include capillaries and hooded hooks. Special genital setae may be present.

Records from southern Africa

Capitella capitata (Fabricius) . . .	15As, 21Ci, 26Wi, 44Ci, 45Pi, 51Cs
Dasybranchus bipartitus (Schmarda) . .	44Ci, 51Cs
as *Oncoscolex bipartitus* Schmarda . .	4Ci
as *Branchoscolex craspidochaetus* Schmarda	4Ci
as *Branchoscolex sphaerochaetus* Schmarda .	4Ci
as *Branchoscolex oligobranchus* Schmarda .	4Ci
as *Dasybranchus caducus* (non Grube) .	13Ci, 32Ci, 36Ci, 48Cs
Dasybranchus caducus (Grube) . . .	27Mi, 40Pi, Ni, 45Pi
Heteromastus filiformis (Claparède) . .	40Ni, 44Ci, 48Cd
Leiochrides africanus Augener . . .	26Ai, 35Ci, 44Ci, Ns
Mediomastus capensis Day . . .	51Csd, Nsd
Notomastus aberans Day	45PiNi, 51Ci
Notomastus fauveli Day	44Ci
Notomastus latericeus Sars . . .	32Cd, 38Csd, 51Csd, —Nd
Parheteromastus tenuis Monro . . .	45Pi
Pulliella armata Fauvel	45Pi
Scyphoproctus djiboutiensis Gravier . .	—Ps

BIOLOGICAL NOTES

Capitellids have a superificial resemblance to earthworms and seem to have similar habits. They burrow in various grades of sandy mud, their guts are filled with mud suggesting that they ingest a good deal of inorganic matter along with the organic particles on which they subsist. The only burrowing organ is the eversible proboscis which is used in the same way as that of *Arenicola*. The thorax is stout and muscular and is highly extensible. The abdominal segments with their long rows of hooks grip the substrate as the thorax is extended.

Capitella lives in black mud and is often found in estuaries. It is capable of tolerating very low oxygen tensions for enormous numbers may occur in polluted areas

such as harbour basins. *Notomastus latericeus* and *Heteromastus filiformis* live in cleaner sandbanks and are common in sheltered bays and in dredgings. *Notomastus fauvelii* which has well developed gills makes deep burrows in sandy mud and *Dasybranchus caducus* has similar habits. The latter is widespread in many parts of the world and harbours a number of commensals in its tube, in particular the scale worms *Harmothoe lunulata* and *Lepidasthenia maculata*.

THE MAIN DIAGNOSTIC CHARACTERS

The most important works are those of Eisig (1887) who gave a detailed account of the anatomy, Fauvel (1927) who gave a key to the European species and Hartman (1947) whose review covers all genera erected up to 1944. Her chart showing the distribution of the various types of setae is particularly valuable.

The most useful taxonomic characters are the number of thoracic segments, the distribution of the setae, the detailed structure of the hooded hooks and the presence or absence of branchiae. Several other specialised features are useful in individual genera.

The head consists of a conical prostomium followed by a well developed peristomium. The prostomium always possesses a pair of evaginable nuchal slits and often a pair of eyes though the latter are rather indefinite pigmented areas. The proboscis is soft and eversible, often voluminous. The peristomium is biannulated and may be either achaetous or bear a few capillary setae in both rami. It may be noted in passing that these setae are not always easy to find.

The thorax and its setae. The anterior region of the body or thorax includes the peristomium and 8–18 setigerous segments. Although these segments are often rather shorter and stouter than the abdominal segments which follow, the thorax is not always well defined. Changes in the nature of the parapodia and setae are the best criteria for determining the junction of the thorax and abdomen. The parapodia are never well developed and in the thorax they are mere grooves from which the short series of notopodial and neuropodial setae arise. In the abdomen the parapodia form raised ridges and the setal rows are considerably longer than those of the thorax. Moreover capillary setae are usually (though not always) restricted to the thorax and the thoracic hooks, when such occur, project further from the surface than do those of the abdomen.

The presence of setae on the peristomium, the number of thoracic segments and the distribution of different types of setae, e.g. winged capillaries, hooded hooks and genital setae, are all characters of generic importance.

The abdomen and its setae. The abdominal segments are much more numerous than those of the thorax and the segments are longer and usually better marked, occasionally becoming moniliform or campanulate towards the posterior end. The neuropodial rows of setae are longer than those of the notopodium though the proportions change from the anterior to the posterior segments. The two notopodial rows may fuse in certain species and the distance across the ventrum between the two neuropodial rows seem to be of specific importance so long as similar parts of the abdomen are compared.

The last few segments of the abdomen develop stout acicular setae in both *Pulliella* and *Scyphoproctus* and in the latter genus the pygidium is flattened and saucer-like. In some genera there is one short ventral anal cirrus and in others there may be two but as the body fragments readily, these are often missing.

Branchiae. A closed circulatory system is absent and the ventral part of the coelome acts as a haemocoele. The blood is red and when the worm is alive it is easy to see that certain thin walled projections or branchiae connected with the abdominal parapodia have a respiratory function. When the worm is preserved however, the branchiae are seldom obvious. In many genera (e.g. *Capitella*) branchiae are entirely absent. In others (e.g. *Notomastus*) the branchiae are rather indefinite projections of the notopodia and the superior edges of the neuropodia. In *Branchiocapitella* the branchiae are digitiform projections from the medial margins of the notopodia and in *Dasybranchus* they are branched filaments which may be retracted into a small pocket immediately above the superior end of the neuropodium. In brief the branchiae may be absent, indefinite or retractile and in preserved material they are seldom easy characters to use for identification.

Lateral sense organs, nephridiopores and genital pores. The lateral sense organs are small ciliated papillae between the notopodia and neuropodia. They are seldom easy to see and may be limited to certain parts of the body or be entirely absent.

Nephridiopores are also difficult to see in sexually immature specimens but in ripe males and females where the nephridiopores act as genital pores they may be very conspicuous with prominent glandular lips. They are situated on the same horizontal level as the lateral sense organs but slightly posterior to them. They are not found on all segments but usually occur on segments near the junction of the thorax and abdomen. Their exact segmental arrangement is said to be of specific importance.

Structure of the hooded hooks. The detailed structure of these setae is surprisingly constant along the length of the body and Hartman (1947) has shown that they are of great systematic importance at the species level. Unfortunately they are very small and it is necessary to examine them under oil immersion both in profile and in frontal view to see all the details. According to Hartman's terminology (p. 396) each hook has the following parts :

"The long embedded stem is the *shaft* with the *node* near its middle length. It extends distally often forming a thickened *shoulder* and a slender *neck* and terminates distally in a hooked *beak* provided with a larger *fang* (= *main fang*) surmounted by a *crescent* composed of smaller *teeth* or *denticles*. The beak is more or less loosely vested with a hyaline *hood* or sheath (rarely absent in *Protocapitella**) ; this is capelike, with an oval *aperture* distally to allow for protrusion of the teeth ; the aperture is continued basally as a *cleft* that extends nearly to the basal end of the hood."

The most important characters are the proportions of the hood, the number of teeth above the main fang, their arrangements and relative size. These latter characters can only be seen under oil immersion in frontal view.

**Protocapitella* is now known to be a synonym of *Branchiomaldane* a genus of the family Arenicolidae.

Key to Genera

1 Setae present on the peristomial segment. Only nine thoracic setigers 2
– Setae absent from the peristomial segment. Nine or more thoracic setigers . . 3
2 Posterior abdominal segments with cirriform dorsal branchiae . ***BRANCHIOCAPITELLA****
– Abdominal segments without branchiae. (Genital setae in the male, fig. 28.2.j) ***CAPITELLA*** (p. 594)
3 Nine thoracic setigers. Genital setae may be present 4
– Ten or more thoracic setigers. Genital setae absent 5
4 No stout spines on the last few abdominal segments. Genital setae present in the notopodia of setigers 7 and 8 . . . . . ***CAPITOMASTUS****
– Stout spines present on the last few abdominal segments (fig. 28.1.c). Genital setae absent ***PULLIELLA*** (p. 595)
5 Ten thoracic setigers (with capillaries in setigers 1–4 and hooks in setigers 5–10) ***MEDIOMASTUS*** (p. 600)
– More than ten thoracic setigers 6
6 Eleven thoracic setigers 7
– More than 11 thoracic setigers 9
7 Capillary setae in both rami of thoracic setigers . . . ***NOTOMASTUS*** (p. 597)
– Capillary setae restricted to anterior thoracic setigers and hooks in posterior ones . . 8
8 Hooks start on setiger 5. Branchiae absent . . . . ***PARHETEROMASTUS*** (p. 605)
– Hooks start on setiger 6. Neuropodial branchiae present . . ***HETEROMASTUS*** (p. 601)
– Hooks start on setiger 7. Notopodial branchiae present . . . ***BARANTOLLA****
9 Twelve or thirteen thoracic setigers 10
– Fourteen or more thoracic setigers 13
10 Capillary setae in both rami of all thoracic setigers 11
— Both capillary setae and hooks on the thorax. (Posterior end expanded to form an anal plate) . . . . . ***HETEROMASTIDES****
11 Twelve thoracic setigers 12
— Thirteen thoracic setigers. (Retractile branchiae above the neuropodia of posterior abdominal segments (fig. 28.3.k) . . . . . ***DASYBRANCHUS*** (p. 603)
12 Abdomen ends in an anal plate armed with spines. Branchiae absent ***SCYPHOPROCTUS*** (p. 604)
— Abdomen ends with normal segments. Retractile branchiae sometimes present ***LEIOCHRIDES*** (p. 600)
13 Branchiae absent. Fourteen to seventeen setigers . . . ***PSEUDOCAPITELLA****
— Branchiae compound, notopodial. Sixteen to seventeen thoracic setigers ***ANOTOMASTUS****
— Branchiae compound, neuropodial. Eighteen to twenty thoracic setigers ***CAPITOBRANCHUS****

CAPITELLA Blainville, 1828

Thorax of nine segments. Peristomium and the next six segments with winged capillaries. Hooded hooks present in posterior thoracic segments, starting from segment 5 so that segments 5, 6 and 7 may have both hooks and capillaries. Segments 8 and 9 with copulatory setae in the notopodia of the male but hooks only in the female. Lateral organs absent and genital apertures limited to the last few thoracic segments. Abdominal segments with hooded hooks in both rami. No branchiae.

Type species: *Lumbricus capitatus* Fabricius, 1780.

Capitella capitata (Fabricius, 1780)
(fig. 28.2.i–m)

Lumbricus capitatus Fabricius, 1780: 279.
Capitella capitata: Fauvel, 1927: 154, fig. 55 a–h; Hartman, 1947: 404, pl. 43 figs. 1–2.

Body (fig. 28.2.i) thread-like, 30–40 mm. long by 1·0 mm. and dark red when alive. Prostomium conical with a pair of ventro-lateral eyes. Thoracic segments all biannulate with capillaries in both rami from the first or peristomial segment to the sixth. Seventh segment variable and may have capillaries only or hooks only or both. In the female the eighth and ninth segments have hooks in both rami but in the male (fig. 28.2.j) there are enlarged genital hooks dorsally slanting inwards towards the genital opening and normal hooks ventrally. Abdominal segments (fig. 28.2.k) smooth in section with long-shafted hooks in both rami. Each hook (fig. 28.2.l, m) with an arc of three to four teeth above the main fang.

Type locality: Greenland.

Records: South West Africa (22/14/i); Cape (from 32/18/ea nd 34/18/s to 32/28/e).

Distribution: Arctic; North Atlantic from Greenland (i, s) and Scotland (i) to North Carolina (i) and Senegal (s); Mediterranean; Black Sea; cold North Pacific from Behring Sea to N.W. Japan; Southern California (s); subantarctic (i, s, d).

PULLIELLA Fauvel, 1929

Thorax with an achaetous peristomium followed by nine setigerous segments bearing winged capillaries in both rami. No specialised copulatory setae. Anterior abdominal segments with hooded hooks in both rami, but the last 8–11 with acicular spines in the notopodia and hooded hooks in the neuropodia. Branchiae absent. Pygidium with a pair of anal cirri.

Type species: *Pulliella armata* Fauvel, 1929.

Pulliella armata Fauvel, 1929
(fig. 28.1.a–f)

Pulliella armata Fauvel, 1929: 184, fig. 3; Fauvel, 1930: 48, fig. 13 a–h.

Body about 20 mm. long for 70 segments. Prostomium (fig. 28.1.b) broad and blunt with indistinct eyes. Peristomial segment biannulate, achaetous. Nine thoracic setigers with bundles of winged capillaries in both rami (fig. 28.1.a). Anterior abdominal segments (fig. 28.1.d) with rows of hooded hooks in both rami, but no parapodial ridges; later segments have better marked tori. Most of the abdominal segments are short and close to one another but the last 8–11 (fig. 28.1.c) are enlarged, have deep intersegmental grooves and bear stout, straight, blunt, acicular spines in the notopodia (fig. 28.1.f) and normal hooded hooks (fig. 28.1.e)

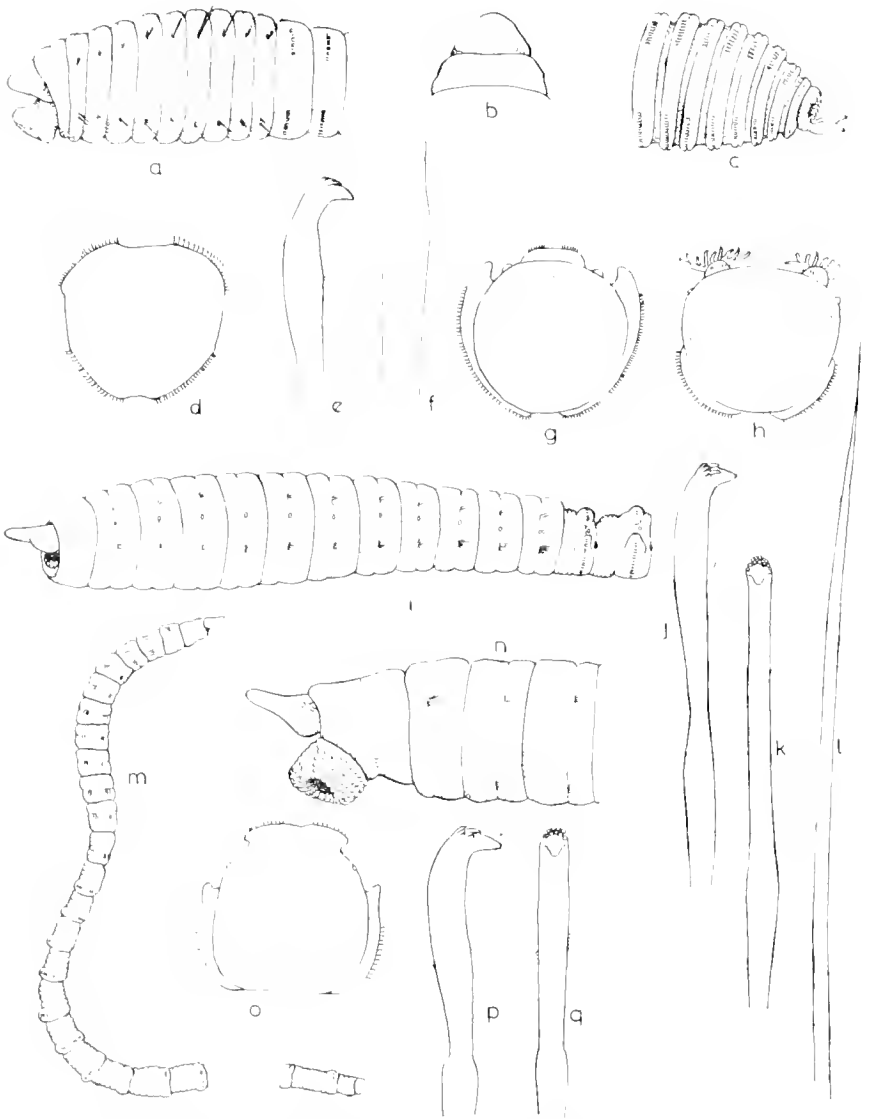


FIG. 28.1. *Pullilla armata*. (A) Lateral view of anterior end. (B) Dorsal view of head. (C) Lateral view of posterior end. (D) Diagrammatic T.S. of anterior abdominal segment. (E) Hooded hook. (F) Posterior notopodial spine. *Notomastus fauveli*. (G) T/S anterior abdominal segment. (H) T.S. branchiferous abdominal segment. (I) Lateral view of anterior end. (J, K) Profile and face view of hooded hook. (L) Capillary seta. *Notomastus aberanus*. (M) Entire worm (twice natural size). (N) Anterior end. (O) T.S. anterior abdominal segment. (P, Q) Profile and face view of hooded hook.

with two arcs of denticles in the neuropodia. Pygidium (fig. 28.1.c) with two stout diverging ventral cirri. No branchiae.

TYPE LOCALITY: Pulli Island, Gulf of Manaar.

RECORDS: Mocambique (26/32/i).

DISTRIBUTION: Tropical Indo-west-Pacific (Ceylon, Indo-China, New Caledonia).

NOTOMASTUS Sars, 1851

Thorax with an achaetous peristomium followed by 11 setigerous segments. The first setiger has notopodial capillaries and usually neuropodial capillaries as well, and the remaining 10 always bear capillaries in both notopodia and neuropodia. Abdomen with hooded hooks in both notopodia and neuropodia. Branchiae are triangular vascular projections from both parapodial ridges or occasionally as branched filaments from the notopodia.

TYPE SPECIES: *Notomastus latericeus* Sars, 1851.

KEY TO SPECIES

1 Gills as branched filaments arising from the abdominal notopodia (fig. 28.1.h) . ***N. fauveli***
– Gills as simple projections from the abdominal parapodia (fig. 28.2.d) 2
2 Neurosetae absent from first thoracic setiger. Abdominal gills minute, often indistinguishable . . . . . ***N. aberans***
– Neuropodial capillaries present on first thoracic setiger. Gills well developed ***N. latericeus***

Notomastus fauveli Day, 1955
(fig. 28.1.g–l)

Notomastus fauvelii Day, 1955: 422, fig. 2 h–l.
Notomastus giganteus (non Moore) Fauvel, 1932: 194.

Body up to 90 mm. long by 3 mm. with 80 segments. Prostomium (fig. 28.1.i) small and conical. Peristome achaetous. First thoracic setiger with both notopodial and neuropodial capillaries. Anterior abdominal notopodia (fig. 28.1.g) united to form a continuous dorsal ridge with short rows of hooks on either side of the mid-dorsal line. From the 15th abdominal segment they separate to become well marked papillae in front of branching gills (fig. 28.1.h). Posteriorly the gills develop up to 20 filaments. Nephridial pores not conspicuous but present on the first six abdominal segments. Abdominal neuropodia with a small superior branchial projection anteriorly, but shorter and without projections posteriorly. Hooded hooks (fig. 28.1.j, k) with two transverse rows of denticles above the main fang, the first row with 8–10, the second with three to four denticles. Capillary setae (fig. 28.1.l) with fairly narrow blades.

TYPE LOCALITY: Knysna Estuary, South Africa.

RECORDS: Cape (from 34 18 i to 33 26 e).

DISTRIBUTION: Ceyon (d, vd), India (s).

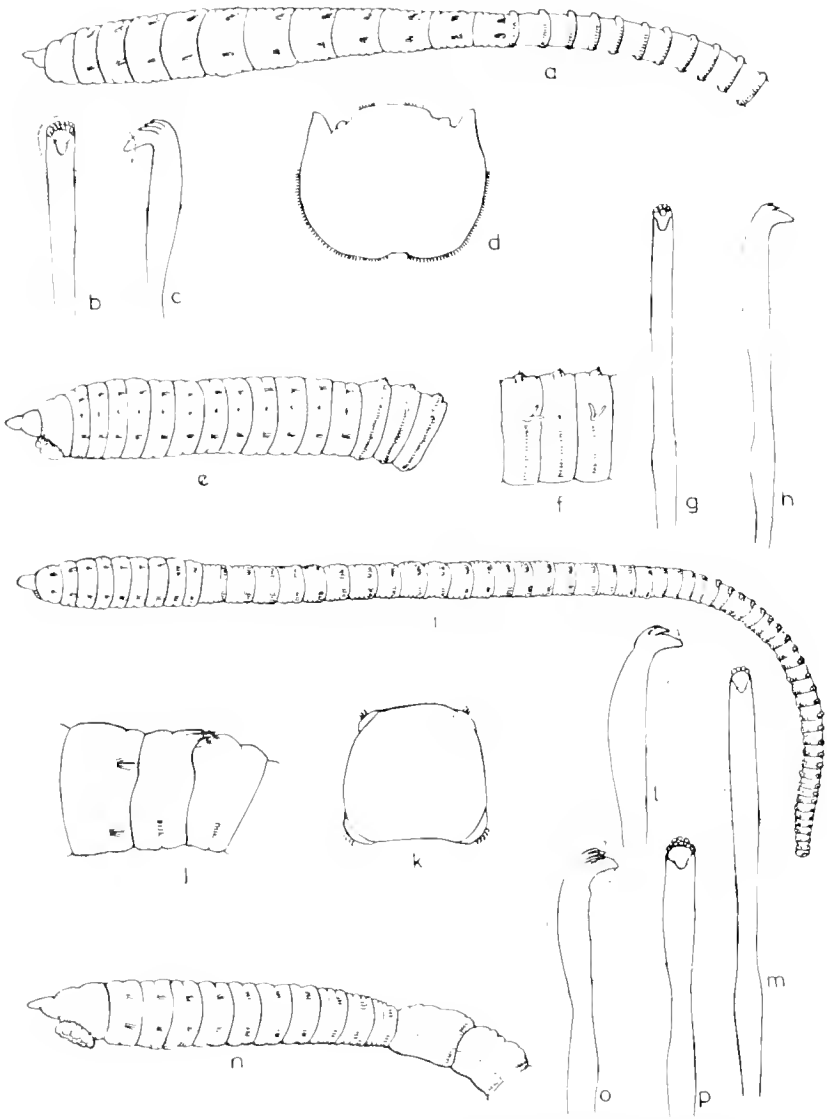


FIG. 28.2. *Notomastus latericeus*. (A) Lateral view of anterior end. (B) and (C) Face view and profile of hooded hook. (D) T/S anterior abdominal segment (diagrammatic). *Leiochrides africanus*. (E) Anterior end. (F) Lateral view of three branchiferous segments. (G, H) Face view and profile of hooded hook. *Capitella capitata*. (I) Entire worm (♀ four times life size). (J) Lateral view of setigers 7–9 of ♂. (K) T/S abdominal segment (diagrammatic). (L, M) Profile and face view of hooded hook. *Mediomastus capensis*. (N) Lateral view of anterior end. (O, P) Profile and face view of hooded hook.

Notomastus aberans Day, 1957*
(fig. 28.1.m–q)

Notomastus aberans Day, 1957 : 105, fig. 7 a–b.

Body about 60 mm. long with 120 segments (fig. 28.1.m). Prostomium (fig. 28.1.n) an elongate cone with indefinite eyes. Peristome achaetous. First thoracic setiger with notopodial capillaries but without neurosetae. Abdominal segments (fig. 28.1.o) with short rows of hooks in both notopodia and neuropodia. Gills as minute papillae (often indistinguishable) on the outer edges of the abdominal notopodia and the superior edges of the neuropodia. Abdominal neuropodia with short rows of hooks well separated ventrally. Hooks (fig. 28.1.p, q) with hoods twice as long as broad and with at least two rows of denticles above the main fang, the first row with four to five equal teeth, the second with five to seven minute teeth. Posterior abdominal segments often campanulate when contracted.

Type locality : Kosi Bay, South Africa.

Records : Cape (34/18/i) ; Natal (27/32/e) ; Mocambique (26/32/i and 23/35/e).

Distribution : Madagascar (i).

Notomastus latericeus Sars, 1851
(fig. 28.2.a–d)

Notomastus latericeus Sars, 1851 : 199; Fauvel, 1927 : 143, fig. 49 a–h.

Length up to 300 mm. with more than 150 segments. Prostomium a blunt, biannular cone with ocular specks. Peristomium achaetous (fig. 28.2.a). The succeeding 11 thoracic setigers with at first three and later five annuli and capillaries in both rami from the first onwards. Gills rudimentary and represented by small swellings of the abdominal notopodia and slightly larger triangular projections of the superior edge of the neuropodia (fig. 28.2.d.) A lateral organ between notopodia and neuropodia. Genital pores present behind the lateral organs in mature individuals on 7–20 segments starting on the second abdominal. Abdominal neuropodia have long rows of hooks which almost meet in the mid-ventral line. Hooks (fig. 28.2.b, e) with short hoods less than twice as long as broad and arcs of about five denticles above the main fang.

Type locality : Norway.

Records : South West Africa (28/16/s) ; Cape (from 32/17/d, 33/17/vd to 34/20/e and 33/25/s ; Natal (29/31/d) ; Mocambique (24/34/s).

Distribution : Cosmopolitan from the Arctic to the Antarctic. At all depths (intertidal to abyssal) in cold seas but usually below 50 metres in tropical seas. Habitat sand, mud.

* Differs from *N. hemipodus* Hartman 1945 in the structure of the hooks.

LEIOCHRIDES Augener, 1914

Thorax with an achaetous peristomium followed by 12 setigers with capillary setae in both rami. Abdomen with long-shafted hooded hooks in both rami. Retractile branchiae with a few filaments arise from the superior ends of the posterior neuropodia.

Type species: *Leiochrides australis* Augener, 1914.

Leiochrides africanus Augener, 1918
(fig. 28.2.e–h)

Leiochrides africanus Augener, 1918: 472, pl. 7 figs. 199–200; text-fig. 74; Day, 1955: 423.

Body about 60 mm. long for 200 segments. Prostomium (fig. 28.2.e) conical, two-ringed. Abdominal hooks (fig. 28.2.g, h) with long hoods and two arcs of one to two large and then three to four smaller denticles above the rostrum. Retractile gills arise between the notopodia and neuropodia of posterior abdominal segments and have two to four lobes (fig. 28.2.f). In posterior abdominal segments the rows of notosetae are broadly separated dorsally.

Type locality: Setté Cama, Brazzaville Congo.

Records: Cape (34 18'i); Natal (29 31's).

Distribution: Tropical western Africa from Ghana (s) to Angola (i).

MEDIOMASTUS Hartman, 1944

Body thread-like. Thorax with an achaetous peristomium followed by 10 setigerous segments. The first four setigers bear winged capillaries in both rami and the last six bear long-shafted hooded hooks. No genital setae. Abdominal segments with hooded hooks in both rami. Gills entirely absent.

Type species: *Mediomastus californiensis* Hartman, 1944.

Mediomastus capensis Day, 1961
(fig. 28.2.n–p)

Mediomastus capensis Day, 1961: 518, fig. 11 a–d.

A thread-like worm about 11 mm. long with 60 segments. Prostomium (fig. 28.2.n) biannulate, conical, without eyes. Buccal segment achaetous. Segments two to five biannulate with capillaries in both rami. Segments 6–11 narrowed, biannulate to multiannulate with long hooded hooks in both rami. First abdominal segment stouter than last thoracic. Abdominal segments flattened ventrally and thin-walled dorsally so that the large brown faecal pellets are visible giving a beaded effect. No gills. Parapodia poorly marked with short notopodial and neuropodial rows of hooks equally spaced around the segments. Hooks (fig. 28.2.o, p)

with two arcs of equal teeth above the main fang, the first with eight and the second with three to four teeth.

TYPE LOCALITY: Saldanha Bay, South Africa.

RECORDS: South West Africa (26/15/s and 28/16/s); Cape (from 32/17/s, d to 35 20/d and 33/27/s); Natal (30/30/s, 29/31/s, d).

DISTRIBUTION: Endemic.

HETEROMASTUS Eisig, 1887

Body filiform. Thorax with an achaetous peristomium followed by 11 setigerous segments. The second to sixth bear capillaries in both rami and the seventh to twelfth bear long-shafted hooded hooks in both rami. Abdomen with hooded hooks in both rami throughout. In the abdomen the gills are indistinct extensions of the superior ends of the neuropodia and the posterior segments are campanulate or strobiliform. Pygidium with a median ventral cirrus.

TYPE SPECIES: *Capitella filiformis* Claparède, 1864.

Heteromastus filiformis (Claparède, 1864)
(fig. 28.3.a–d)

Capitella filiformis Claparède, 1864: 509, pl. 4, fig. 10.
Heteromastus filiformis: Fauvel, 1927: 150, fig. 53 a–l; Hartman, 1947: 427, pl. 52 figs. 1–4.

Body filiform, up to 100 mm. long but only 1 mm. in diameter. No marked distinction between thorax and abdomen (fig. 28.3.a). Prostomium conical. Thorax biannulate and tesselate. Anterior abdominal segments long and cylindrical, later ones shorter and posterior ones campanulate or strobiliform with short uncigerous rows on projecting lobes (fig. 28.3.b). Branchiae as indistinct superior projections of the neuropodia from the 80th segment onwards. Genital pores from the ninth to twelfth thoracic segment. Thoracic hooks (fig. 28.3.c and d) with long hoods and an arc of about six denticles above the main fang; abdominal hooks with short hoods and only three to four denticles above the main fang.

TYPE LOCALITY: Mediterranean Sea.

RECORDS: Cape (31/23/e); Natal (29 31 i); Mocambique (23 35/s).

DISTRIBUTION: North Atlantic from Greenland (s) and Sweden (d, vd) south to New England, North Carolina (i) and the Gulf of Mexico (i); Morocco (s, d); Mediterranean (s); Persian Gulf (s); North Pacific from the Behring Sea to N.W. Japan and Southern California.

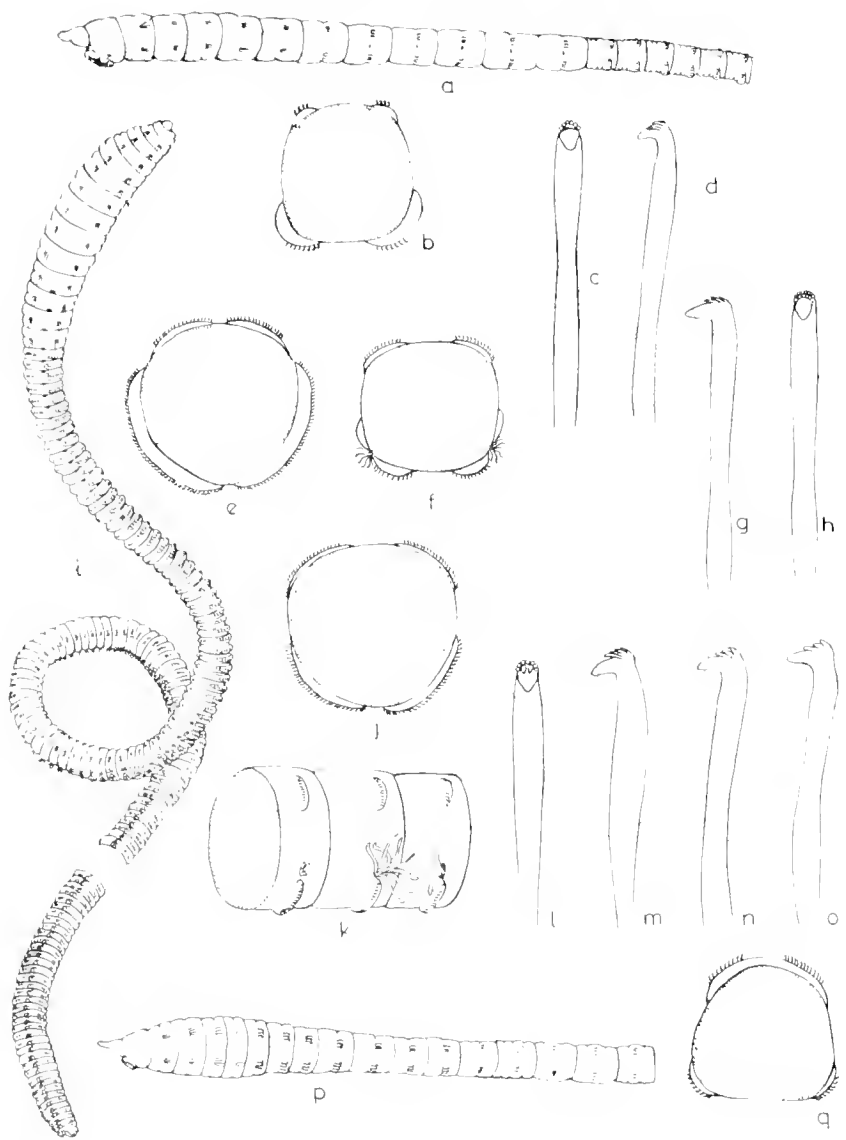


FIG. 28.3. *Heteromastus filiformis*. (A) Lateral view of thorax and anterior abdomen. (B) T.S posterior abdominal segment. (C) Face view of thoracic hook. (D) Profile of same. *Dasybranchus caducus*. (E) T.S anterior abdominal segment. (F) T.S posterior abdominal segment. (G) and (H) Profile and face view of hooded hook. *Dasybranchus bipartitus*. (I) Entire worm, natural size. (J) T.S anterior abdominal segment. (K) Posterior abdominal segment, bearing gills. (L) and (M) Face and profile views of hooded hooks. *Parheteromastus tenuis*. (N) Profile of thoracic hook. (O) Profile of abdominal hook (from Monro). (P) Lateral view of anterior end. (Q) T.S of abdominal segment.

DASYBRANCHUS Grube, 1850

Thorax with an achaetous peristomium followed by 13 setigers bearing winged capillaries in both rami. Abdominal segments with hooks only in both rami. Retractile branchiae in the form of branched filaments arising from the superior edges of the neuropodia of posterior abdominal segments.

Type species: *Dasymallus caducus* Grube, 1846.

Key to Species

1 Hoods of hooks less than twice as long as broad. Denticles above the main fang small and equal (fig. 28.3. g, h). Branchiae from 20th abdominal segment . . . ***D. caducus***

– Hoods of hooks about three times as long as broad. Denticles above main fang unequal, the first row consisting of one to four large ones (fig. 28.3. l, m). Branchiae from abdominal segment 40 . . . . . ***D. bipartitus***

Dasybranchus caducus (Grube, 1846)
(fig. 28.3.e–h)

Dasymallus caducus Grube, 1846: 166.
Dasybranchus caducus: Eisig, 1887: 823, pl. 16 figs. 1–6, 8–12, pl. 32 figs. 1–4.

A large worm reaching 300 mm. in length and 10 mm. in diameter. Prostomium short and conical. Thoracic segments biannulate and tesselate. Genital pores start in the intersegmental constriction of setigers 12 and 13 (i.e. before last thoracic segment) of sexually mature specimens. Abdominal parapodia as low ridges bearing rows of hooks. A narrow mid-dorsal gap between anterior abdominal notopodial rows of hooks (fig. 28.3.e). Retractile gills (fig. 28.3.f) above the neuropodia from abdominal segment 20 onwards and reach a maximum of 20 branches. Hooks (fig. 28.3. g, h) with hoods not more than twice as long as broad and with three to four rows each with about eight equal denticles above the main fang.

Type locality: Mediterranean.

Records: Natal (29/31 i and 27/32 i); Mocambique (26/32 i and 23/35 e).

Distribution: Records confused – certainly present in Mediterranean (i), Red Sea (i) and tropical Indian Ocean south to Madagascar (i, s).

Dasybranchus bipartitus (Schmarda, 1861)
(fig. 28.3.i–m)

Oncoscolex bipartitus Schmarda, 1861: 55, pl. 26 fig. 205.
Dasybranchus bipartitus: Day, 1955: 424, fig. 3 f and g.

Body (fig. 28.3.i) up to 300 mm. long by 6 mm. with more than 200 segments. Prostomium short and conical. Thoracic segments biannulate and tesselate. Nephridial pores from setiger 9–10. Abdominal parapodia as low ridges bearing rows of hooks. A broad dorsal gap between right and left notopodial rows of hooks and a small mid-ventral gap between the long rows of neuropodial hooks on anterior abdominal segments (fig. 28.3.j). Nephridial pores continue to the 14th and 15th

abdominal segment. Posterior segments with short rows of hooks in both rami and wide gaps between them. Retractile gills from abdominal segment 40, each with a maximum of 13 branches in large specimens (fig. 28.3.k). Hooks with hoods three to five times as long as broad and three arcs of teeth decreasing in size above the main fang with one to four in the first row and four to eight in the second row (fig. 28.3.l, m).

Type locality: Cape of Good Hope.

Records: Cape (from 29°16 i to 34°18 i, s and 33°25 s).

Distribution: Records confused – certainly present in English Channel (s) and probably Sweden (d).

SCYPHOPROCTUS Gravier, 1906 (emend. Day, 1962)

Thorax with 14–16 segments of which the peristome and the next segment are achaetous and the following 12–14 bear capillary setae in both rami though hooks may replace capillaries in the neuropodium of the last thoracic setiger. Abdomen with hooded hooks in both rami. No branchiae. Terminal segments of abdomen fused to pygidium to form a slanting plate on which the anus opens above a pair of anal cirri. Notosetae of last few segments modified to form stout spines without hoods.

Type species: *Scyphoproctus djiboutiensis* Gravier, 1906.

Key to species

1 Fourteen thoracic setigers. Anal plate with two rows of notopodial spines . **S. steinitzi***
– Twelve thoracic setigers. Anal plate with ten to twelve groups of notopodial spines **S. djiboutiensis**

Scyphoproctus djiboutiensis Gravier, 1906

Scyphoproctus djiboutiensis Gravier, 1906: 181, pl. 3 figs. 200–204, text figs. 345–348; Fauvel, 1953: 373, fig. 194 a–b.

Body slender, cylindrical, 23–30 mm. long. Prostomium a blunt cone without eyes. Peristome and the next segment achaetous. Twelve biannulate thoracic setigers with capillary setae in both rami, though the capillaries in the neuropodium of the last thoracic segment may be partly or completely replaced by hooks. Abdomen of 70 or more thin walled segments without parapodial projections or any sign of gills. The rows of hooks are equal in length and evenly spaced in anterior segments, but the notopodial rows approach one another dorsally and almost fuse just before the anal plate. At the same time the hooks, which are normally hooded and denticulate over most of the abdomen, lose their hoods and denticles and are enlarged to form stout spines. The anal plate is formed of a doubtful number of segments fused to the pygidium. It slants posteriorly and is flattened dorsally with the anus just above a pair of large terminal anal cirri. The margin of the plate is beset with 10–12 groups of spines. The number of spines in each group decreases posteriorly. The anterior margin has a continuous palisade of about 20 spines

formed by the fusion of right and left groups but thereafter the groups decrease from four or five to only one or two just before the origin of the anal cirri. There is only one row of neuropodial hooks on the anal plate obviously corresponding to the palisade of dorsal spines on its anterior margin. The capillary setae are quite plain with narrow wings. Each hook has a short hood, almost as broad as long, a well marked rostrum or main fang bent at right angles to the shaft and surmounted by a crest of four rows of subequal denticles.

TYPE LOCALITY: Djibouti in 20 metres.

RECORDS: Mocambique (24'34's).

DISTRIBUTION: Tropical Indian Ocean from the Gulf of Aden (s) to Ceylon (s).

PARHETEROMASTUS Monro, 1937

Thorax of 12 segments of which the peristomium or first segment is achaetous, the second to fifth segments bear capillaries only and the last seven have only long-hooded hooks. Abdominal hooks with shorter hoods than those of the thorax. Abdominal tori poorly developed and branchiae lacking. Pygidium with a single short cirrus.

TYPE SPECIES: *Parheteromastus tenuis* Monro, 1937.

Parheteromastus tenuis Monro, 1937
(fig. 28.3.n–q)

Parheteromastus tenuis Monro, 1937a: 536, fig. 2 a–e.

Body slender, up to 50 mm. long by 0·5 mm. broad for 140 segments. Prostomium conical and lacks eyes. Thorax (fig. 28.3.p) slightly swollen with an achaetous peristomial segment followed by 11 setigerous segments of which the first four bear capillary setae in both rami and the last seven bear hooded hooks in both rami. Change from thorax to abdomen not well marked, the main difference being the hooks which have shorter hoods in the abdomen (fig. 28.3.o) than in the thorax (fig. 28.3.n). Parapodial ridges (fig. 28.3.q) poorly developed. Branchiae absent. Pygidium with a single short anal cirrus.

TYPE LOCALITY: Maungmagan, Burma.

RECORDS: Mocambique (26'32, i).

DISTRIBUTION: Burma (i).

Family **ARENICOLIDAE** Johnston, 1835

Body elongate with numerous annulated segments. The head consists of a small prostomium without appendages, a peristome with a large eversible proboscis which is unarmed and then another achaetous segment. Behind this is a trunk of numerous setigerous segments of which the first few lack branchiae and the remainder bear branching gills behind the notopodia. A posterior tail region of achaetous segments is sometimes present. Oesophagus with one or more pairs of glandular caeca. A single pair of hearts. The first septum often bears a pair of septal pouches. Parapodia small but biramous; notosetae are simple capillaries and neurosetae are acicular hooks without hoods.

Records from southern Africa

Abarenicola affinis africana Wells	
as *Arenicola assimilis* var. *affinis* Ashworth	19Wi
Abarenicola gilchristi Wells	
as *Arenicola assimilis* var. *affinis* Ashworth *partim*	19Ci, 44Ci
as *Arenicola marina* (non Linnaeus)	11Wi
as *Arenicola claparedii* (non Levinsen) Ashworth, 1910	Wi
Arenicola loveni Kinberg	3Ni, 18Ci, 19NiCi, 36Ci, 44Ci
Branchiomaldane vincenti Langerhans	
as *Protocapitella simplex* Berkeley	44Ci

BIOLOGICAL NOTES

The arenicolids are particle feeders and apart from the small and primitive form *Branchiomaldane* which lives in muddy rock crevices, they live in muddy sand in the intertidal zone. Their physiology has been described by Professor G. P. Wells in a long series of papers. *Arenicola* and the related genus *Abarenicola* both construct U-shaped burrows by means of an eversible proboscis. Power for pumping water through the burrow is supplied by the contraction of the circular muscles of the body and for burrowing it is transmitted to the proboscis cavity by the hydrostatic pressure of the coelomic fluid. The intervening septa have pouches which bulge in consequence. Three variations on this theme are illustrated in the accompanying diagrams.

The usual indication of an *Arenicola* burrow is a funnel-like depression which marks the head end of the tube and earthworm type castings at the tail end. But this is not always the case. *Arenicola loveni* which is one of the largest species and may reach a length of one metre, burrows in estuarine sandbanks where the subsurface layers are semi-liquid. The head end of the burrow is marked by the usual depression but the tail end lacks castings. Material voided by the worm is in a semi-liquid state and is squirted out a considerable distance. *Abarenicola gilchristi* which is seldom more than 250 mm. long lives on more exposed shores. It ejects fairly solid castings but these are carried away by wave action. Only the dwarf form

Abarenicola affinis africana makes typical castings on South African shores. It lives in the black mud of salt marsh pools high up on the shore where there are no waves.

THE MAIN DIAGNOSTIC CHARACTERS

Important revisions of the family will be found in Ashworth (1912) and Wells (1958). Wells recognised four genera, namely *Abarenicola*, *Arenicola*, *Branchiomaldane* and *Arenicolides*, the last of which does not occur in southern African seas.

Head and internal organs. The prostomium varies in shape and statocysts may be present or absent. If present they may be closed sacs or have ducts leading to the exterior. The first double septum or "diaphragm" may be muscular and have a pair of large, backwardly directed septal pouches; alternatively the third septum may have baggy projections extending forward. The number of glandular caeca on the oesophagus is a most useful character; there may be only one pair or as many as 20. The number of nephridia varies from two to thirteen pairs and the first may appear as early as setiger 4 or as late as setiger 15.

Body regions, number of segments and number of annuli. The presence or absence of a posterior achaetous tail region is of generic importance. The number of segments in the trunk region is very constant in *Arenicola* and *Abarenicola* but not in *Branchiomaldane* and *Arenicolides*. Apart from *Branchiomaldane* which has two annuli per segment, all genera have five annuli per segment in the branchiferous region but a reduced number immediately behind the head.

Parapodia, branchiae and setae. The notopodia are erect and uniform in structure and the neuropodia are ventro-lateral ridges which vary in length. The short neuropodia of *Abarenicola* provide an easy means of separating this genus from *Arenicola* and *Arenicolides* which have long neuropodial ridges in the branchiferous region. The branchiae are essentially similar in structure but the segmental position of the first gill is important at the specific level. The notosetae are capillaries with smooth blades in *Branchiomaldane* and spinulose blades in other genera. The neuropodial hooks have poorly marked denticles on the crest except in *Branchiomaldane* where well marked teeth are present. The absence of a hood distinguishes the hooks of the *Arenicolidae* from those of the *Capitellidae*.

KEY TO GENERA

1 Branchiferous segments with two annuli (fig. 29.1.a). Animal small, not exceeding 40 mm. ***BRANCHIOMALDANE*** (p. 608)

– Branchiferous segments with five annuli (fig. 29.1.f). Animal large, exceeding 40 mm. . 2

2 No achaetous tail region. Gills never start before setier 12 (neuropodia long and approach the mid-ventral line) . . . . . ***ARENICOLIDES****

– Achaetous tail region present. Gills start on setiger 7 or 8 3

3 Neuropodia long and approach the mid-ventral line in the branchial region (fig. 29.1.i). One pair of oesophageal caeca . . . . . ***ARENICOLA*** p. 608)

– Neuropodia short and are always widely separated ventrally (fig. 29.1.n). Five or more pairs of oesophageal caeca . . . . . ***ABARENICOLA*** p. 610)

BRANCHIOMALDANE Langerhans, 1881

Small thread-like worms 20–30 mm. long with numerous biannulated segments. Prostomium a simple cone with eyes but without otocysts. One pair of oesophageal caeca. Body divided into an anterior region of about 14–20 abranchiate segments and a posterior region of numerous segments most of which bear a few branchial filaments behind the notopodium. No achaetous tail region. Notosetae are narrow-bladed capillaries throughout. Neurosetae are long-shafted dentate hooks without hoods.

Type species: *Branchiomaldane vincenti* Langerhans, 1881.

Branchiomaldane vincenti Langerhans, 1881
(fig. 29.1.a–e)

Branchiomaldane vincenti Langerhans, 1881: 116, pl. 5 fig. 21; Fauvel, 1927: 166, fig. 58 m, p.
Protocapitella simplex Berkeley & Berkeley, 1932: 669; Hartman, 1947: 440, pl. 57 figs. 3–4.

Body (fig. 29.1.a) small and thread-like, about 10 mm. long with 30–50 biannulate segments. Prostomium (fig. 29.1.b) an ovoid cone with two groups of ocelli. No otocysts. Proboscis globular. One pair of oesophageal caeca. Peristome and the next segment achaetous. Anterior region of 14–20 abranchiate segments each with the anterior setigerous annulus more prominent than the second one. Posterior region with 15–30 biannulate segments (fig. 29.1.c) all of which bear parapodia and most of them notopodial branchiae which arise as three to five simple filaments behind the notosetae. Notosetae (fig. 29.1.e) are capillaries throughout with flattened blades and minutely spinulose tips. Neurosetae are hooks (fig. 29.1.d) with three to four teeth above the rostrum but without hoods. Two pairs of nephridia open on setigers 5 and 6. Hermaphrodite.

Type locality: Canary Islands.

Records: Cape (33 18 i and 34 18 i).

Distribution: North Atlantic from the English Channel (i) to the Canary Is.; N.E. Pacific to S. California.

ARENICOLA Lamarck, 1801

Body large (100–400 mm.) and divided into a trunk region of about 20 setigerous segments and a tail region of numerous achaetous and apodous segments. Prostomium small and retractile. Statocysts present. Proboscis large, papillose and eversible. Diaphragm muscular with a pair of backwardly directed septal pouches. Oesophagus with one pair of glandular caeca. Five to seven pairs of nephridia the first opening on setiger 4 or 5. Sexes separate. Setigerous segments after the first two to three divided into five annuli. Branched gills arise behind the notopodia from setiger 7 to the end of the trunk. Notosetae erect and bear bundles of capillaries with serrated and spinulose blades. Neuropodia as low vertical ridges which are elongated in the branchiferous region and almost meet on the mid-ventral line; each bears a row of long-shafted hooks with poorly marked denticles on the crest.

Type species: *Lumbricus marinus* Linnaeus, 1758.

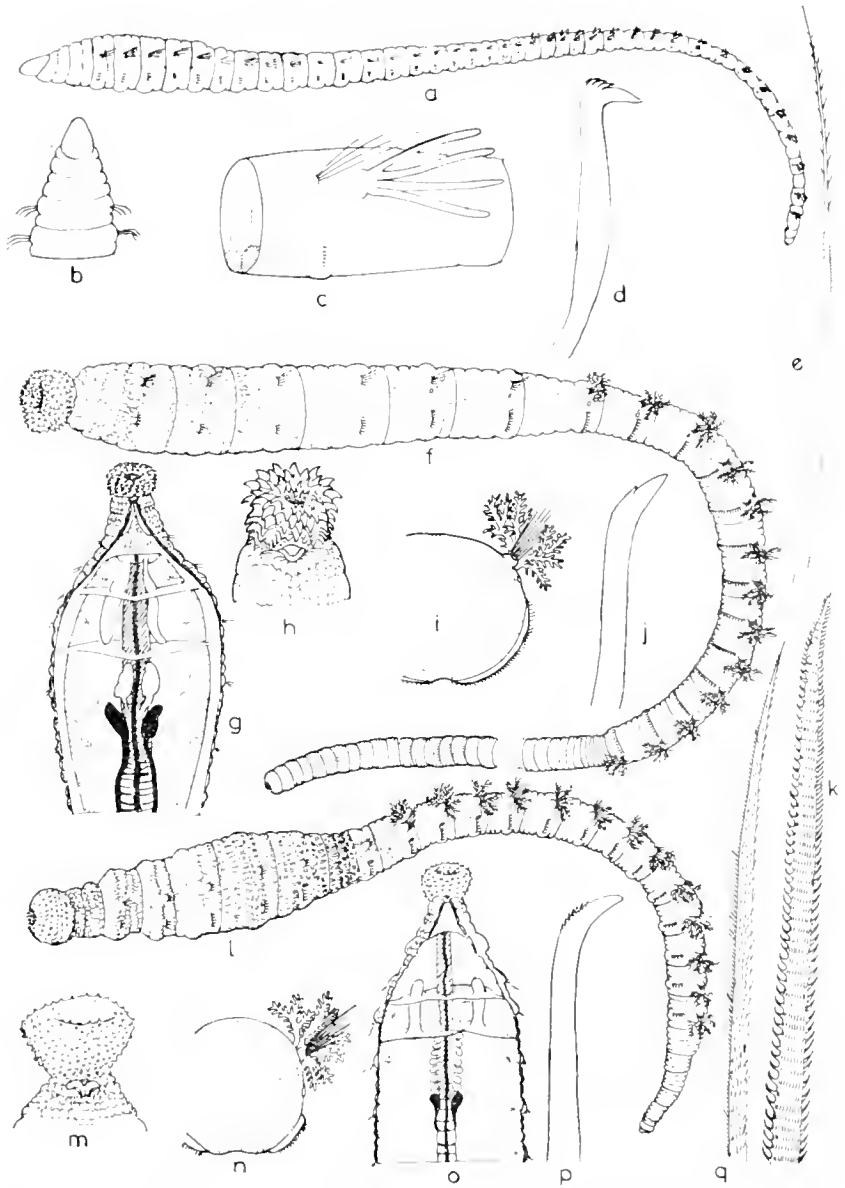


FIG. 29.1. *Branchiomaldane vincenti.* (A) Entire worm (four times natural size). (B) Dorsal view of head region. (C) Lateral view of a branchiferous segment. (D) Neuropodial hook. (E) Notopodial capillary. *Arenicola loveni.* (F) Entire worm (half natural size). (G) Dissection of anterior end. (H) Dorsal view of head and extruded proboscis. (I) T S branchiferous segment. (J) Neuropodial hook. (K) Notopodial capillary. *Abarenicola affinis africana.* (L) Entire worm (half natural size). (M) Dorsal view of head and proboscis. (N) T S branchiferous segment. (O) Dissection of anterior end. (P) Neuropodial hook. (Q) Notopodial capillary.

Key to Species

1 Seventeen setigerous segments and 11 pairs of gills . . . . . ***A. bombayensis****
Nineteen setigerous segments and 13 pairs of gills 2
2 Six pairs of nephridia on setigers 4 to 9. Septal pouches small. Statocyst open ***A. marina****
– Five pairs of nephridia on setigers 5 to 9. Septal pouches enormous. Statocyst closed . 3
3 No preventricular dilatations of the dorsal vessel . . . . . ***A. loveni loveni***
– A pair of preventricular dilatations to the dorsal vessel . . ***A. loveni sudaustraliensis****

Arenicola loveni loveni Kinberg, 1867

(fig. 29.1.f–k)

Arenicola loveni Kinberg, 1867: 375; Kinberg, 1857–1910: 73, pl. 29 fig. 1; Ashworth, 1910: 1, pl. 1 figs. 1–8; Wells, 1962: 348, pls. 2 and 4.

A very large species (fig. 29.1.f) with a long achaetous tail region reaching a length of 800 mm. Prostomium (fig. 29.1.h) trilobed with the median triangular lobe broader than the V-shaped pair of lateral lobes which support it. A pair of closed statocysts each containing one secreted statolith. The tips of the enormous septal pouches (fig. 29.1.g) reach back to the third diaphragm or further. Oesophagus with one pair of glandular caeca. Five pairs of nephridia opening on segments 5 to 9. Inner end of dorsal septal vessel moves from subintestinal to dorsal vessel in setiger 12. Thirteen pairs of branchiae starting on setiger 7. Notosetae (fig. 29.1.k) with lateral toothed-crests and a narrow, finely spinulose lamina. Neuropodial hooks (fig. 29.1.j) with a faint indication of a denticle or none. Neuropodial ridges in the branchial region long and almost meet on the mid-ventral line (fig. 29.1.i). The nominate form, *A. loveni loveni*, lacks preventricular dilations of the dorsal vessel.

Type locality: Durban, South Africa.

Records: Cape (from 33 18 i to 32 26 e); Natal (29 31 i, s); habitat: muddy sand of protected bays and estuaries; L.W.N. to L.W.S.

Distribution: *A. l. loveni* is endemic; *A. l. sudaustraliensis* is known from South Australia.

ABARENICOLA Wells 1958

Body with a trunk region of 19–20 setigers and an achaetous tail region. Prostomium non-retractile, in the form of a triangle with lateral extensions of its (anterior) base. Statocysts either present with external openings or absent. Proboscis large, eversible and papillose. First septum weak and lacks septal pouches; third septum with a pair of large, forwardly directed baggy projections. Five or more pairs of oesophageal caeca of which the first is the largest. Five to six pairs of nephridia starting on setigers 4 or 5. Sexes separate. Setigerous segments after the first two to three divided into five annuli. Branched gills arise behind the notopodia from setiger 7 or 8 to the end of the trunk. Notosetae with spinulose

blades. Neuropodia as lateral ridges which are well separated ventrally in the branchiferous region. Neurosetae are long-shafted hooks with poorly marked denticles near the apices.

TYPE SPECIES: *Arenicola claparedii* Levinsen, 1883.

KEY TO SPECIES

1 Thirteen pairs of gills starting on setiger 7. Eight to ten pairs of oesophageal caeca (fig. 29.1.o). (The first three setigerous annuli very prominent) . . . ***A. affinis africana***
– Twelve pairs of gills starting on setiger 8. Fifteen to twenty-one pairs of oseophageal caeca (fig. 29.2.b) . . . . . ***A. gilchristi***

Abarenicola affinis africana Wells, 1963
(fig. 29.1.l–q)

Abarenicola affinis africana Wells, 1963: 142, fig. 6 a–b, pl. 1 and 5.
Arenicola assimilis var. *affinis* Ashworth, 1911: 18, text-figs. 4–5 (partim).

Body (fig. 29.1.l) small, less than 100 mm. long. Trunk region of 19 setigers with 13 pairs of well branched gills starting on setiger 7. Caudal region short with prominent papillae. The first three setigerous annuli powerful and prominent, intervening annuli small. Statocysts with ducts to the exterior and contain numerous foreign statoliths as well as secreted ones. Posterior region of oesophagus (fig. 29.1.o) with one pair of long delicate caeca followed by six to nine short ones in front of the hearts. Five pairs of nephridia opening on setigers 5–9. Inner end of dorsal septal vessel moves from subintestinal to dorsal vessel in setiger 13. Hooks (fig. 29.1.p) with several poorly marked denticles. Notosetae (fig. 29.1.q) with finely spinulose blades.

TYPE LOCALITY: Luderitzbucht, South West Africa.

RECORDS: South West Africa (26/15/i); Cape (33/18/i). Habitat: mud above M.S.L. in protected bays.

DISTRIBUTION: Endemic.

Abarenicola gilchristi Wells, 1963
(fig. 29.2.a–c)

Abarenicola gilchristi Wells, 1963: 147, fig. 6c, pl. 2 and 5.
Arenicola assimilis var. *affinis* Ashworth, 1911: 18, text-figs. 4–5 (partim); Day, 1955: 427.
Arenicola claparedii: (non Levinsen) Ashworth, 1910: 351.

Body 150–250 mm. long. Trunk region with 19 setigerous segments and 12 pairs of lightly branched gills on setigers 8–19. Caudal region fairly long with low papillae. The first three setigerous annuli (fig. 29.2.a) prominent. Statocysts with ducts to the exterior and contain a few (five to six) foreign and secreted statoliths. Oesophagus (fig. 29.2.b) with one large pair of caeca followed by 14–20 short pairs arranged in double rows in front of the hearts. Five pairs of nephridia opening on

setigers 5 9. Inner end of dorsal septal vessel moves from sub-intestinal to dorsal vessel in setiger 12. Hooks (fig. 29.2c) with several poorly marked denticles.

TYPE LOCALITY: Cape Peninsula, South Africa.

RECORDS: South West Africa (26 15 i); Cape (32 18 i to 34 19 i) – habitat: intertidal sands below M.S.L. on sheltered shores.

DISTRIBUTION: Endemic.

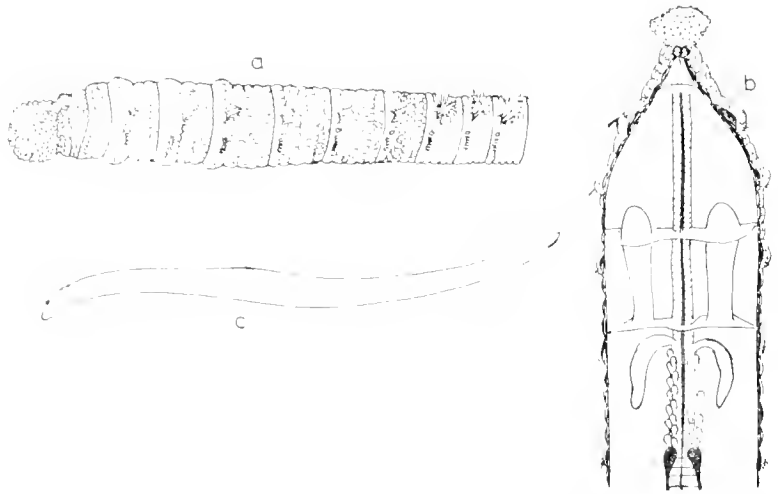


FIG. 29.2. *Abarenicola gilchristi*. (A) Lateral view of anterior end. (B) Dissection of anterior end. (C) Neuropodial hook.

Family **MALDANIDAE** Malmgren, 1867

Body cylindrical with a relatively small number of greatly elongated segments. Body regions not marked. Prostomium poorly defined and fused to the buccal segment. Prostomial appendages entirely absent but nuchal slits well marked and numerous eye-spots may be present. The prostomium may be followed by a crest or surrounded by a flattened cephalic plate with a raised rim on the dorsum of the buccal segment. Mouth ventral with an unarmed but papillose proboscis. Parapodia biramous but poorly developed with a tuft of capillaries in the notopodium and a vertical series of hooks in the neuropodium. Parapodia are situated near the anterior margins of the first few setigers, in the middle of setiger 8 and near the posterior margins of all succeeding segments. Up to 10 achaetous preanal segments may precede the pygidium which may be conical, truncate, funnel-shaped or petaloid. The anus may be dorsal, terminal or sunk in the funnel. In the first three setigers the neurosetae may be modified to form simple spines or may be absent. Tube of cemented mud or sand grains.

Records from southern Africa

Asychis capensis Day 51Ci
Axiothella jarli Kirkegaard . . . 48As, ?Cs
Axiothella quadrimaculata Augener . . 45Pi, ?51Cis
Clymenura tenuis (Day) . . . .
as *Leiochone tenuis* Day . . . 45NiPi
Euclymene glandularis (Day) . . . 51Cs
as *Clymene glandularis* Day . . . 44Ci
as *Praxillella praetermissa* var. *capensis* (non auctorum) . . . 13Ci, 35Ci
as *Clymene praetermissa* var. *capensis* (non auctorum) . . . 36Ci
Euclymene lombricoides (Quatrefages) . 51Cs
as *Clymene lombricoides* Quatrefages . 35Ci, 36Ci, 44CiWi, 45Pi
Euclymene luderitziana Augener . . 26Ws, 44Ci, 51Cs
Euclymene lyrocephala (Schmarda) . . 11Wi, 16Wi
as *Clymene lyrocephala* Schmarda . . 4Ci
Euclymene mossambica (Day) . . .
as *Clymene mossambica* Day . . . 45Pi
Euclymene natalensis (Day) . . . 51Cd
as *Clymene natalensis* Day . . . 45PiNi
as *Clymene* sp. 40Ni
Euclymene oerstedi (Claparède) . . 48Cd
Euclymene cf. *quadrilobata* (Sars) . . 56Cd
Euclymene sp. 56Cs
Gravierella multiannulata Fauvel . . 27Mi, 45Pi
as *?Gravierella* sp. 40Pi
Johnstonia clymenoides Quatrefages . . 48Wd

Johnstonia kurysa Day 44Ci, 51Cs
Lumbriclymene cylindricauda Sars . . 56Cd
Lumbriclymene minor Arwidsson . . 55Ca
Macroclymene monilis Fauvel . . . 34As
Macroclymene saldanha (Day) . . .
as *Clymene saldanha* Day . . . 44Ci
Maldane sarsi Malmgren . . . 32NdCs, 51Nd, Nsd, Ps
Maldanella capensis Day . . . 51Cs
Maldanella fibrillata Chamberlin . . 55Ca
Micromaldane (forma *juvenis*) . . . 44Ci
Nicomache lumbricalis (Fabricius) . . 33Ci, 36Ci, 44Ci, 50Cs
as *Nicomache capensis* McIntosh . . 10Ci
as *Nicomache lumbricalis* var. *capensis* McIntosh 13Ci, 35Ci
? as *Clymene microcephala* Schmarda . 4Ci
Nicomache mossambica Day . . . 40Pi
Petaloproctus terricola Quatrefages . . 44Ci, 48Ws
as *Nicomache macintoshi* Marenzeller . 11Wi, 13Ci
as *Petaloproctus macintoshi* Marenzeller) 26Ws
Praxillella cf. *affinis* (Sars) . . . 56Cd
Praxillella capensis (McIntosh) . . 41Cs
as *Praxilla capensis* McIntosh . . 10Cs
Praxillella praetermissa Malmgren . . ?32Cd
Rhodine gracilior Arwidsson . . . 51Csd, 56Cd

Incertae sedis

Maldanid gen. et sp.? 51Cd

BIOLOGICAL NOTES

The maldanids are highly specialised burrowers feeding on organic particles buried in the mud. Those whose habits have been investigated appear to burrow head downward cementing the surrounding materials together to form a fairly compact tube. The pygidium plugs the entrance of the tube and the anal cirri are probably sensory.

Nicomache and *Petaloproctus* burrow along the sides of boulders half buried in sand or gravel so that the tube is attached to the stone. *Euclymene*, *Clymenella* and *Praxillella* burrow in open sandbanks and their tubes are relatively fragile. *Maldane* and *Asychis* are found in softer muds and their tubes are often bulky. *Rhodine* which is dredged on the same type of substrate has a thin horny tube.

Irrigation of the burrow is brought about by peristaltic action of the elongated and highly contractile segments. According to Dr. Charlotte Mangum's observations, the water current is forced down from the tail towards the head and assists in feeding. It is not surprising that in *Johnstonia* where branchial filaments occur, they are found near the tail end.

The eggs are incubated in mucus cocoons attached to the entrance of the burrow and the larvae escape at a fairly late stage of development.

THE MAIN DIAGNOSTIC CHARACTERS

Useful reviews of the family will be found in Arwidsson (1906) and Fauvel (1927).

In general the genera and species are well defined but complete specimens are essential for accurate diagnosis. Several very dubious species have been founded on fragments.

The head. The prostomium is contractile and its shape is of limited value; the presence of *ocelli* is however, worth noting. The prostomium may extend back as a median ridge or *cephalic keel* which is well marked and arched in genera such as *Maldane* or undeveloped in *Euclymene* and its allies. On either side of the keel there is a pair of *nuchal slits* which may be straight and parallel or curved and divergent anteriorly particularly if the prostomium is broad. The whole dorsal surface of the head may form a flattened *cephalic plate* enclosed by a raised margin or *cephalic rim*. The development of the cephalic rim is a useful character. In some species it is rudimentary, in others it is high with a scalloped, notched or lobed posterior margin; but often there is only a pair of lateral notches and a single posterior one. Arwidsson (1906) has also used the distribution of the papillae on the margin of the eversible proboscis but as these are seldom visible other workers have not followed his example.

The body and number of segments. In most genera there are 18–24 setigerous segments followed by 1–10 achaetous preanals and then the pygidium. In these genera the number of setigers and preanals is surprisingly constant but there are other genera such as *Macroclymene* and *Gravierella* with 30–70 setigers and in these the number of segments is not constant and in the latter genus a group of achaetous segments may precede the last few setigers. The anterior segments up to about the eighth are usually short, the middle ones long and the last few again shorter. The exact proportions vary with the state of contraction but the numbers and relative sizes of achaetous preanals are useful. The parapodia are usually near the anterior margins of the first few segments, then move back towards the middle of setigers 5–8 and from the ninth onwards they are at the posterior margin. The junction of setigers 8 and 9 is very indistinct. The epithelium around the parapodia is usually glandular. The *glands* spread to form thickened circular bands or rings around the anterior margins of the first few setigers or even over the whole surface setigers 3–7. In the posterior region, however, the glands are limited to the swollen neuropodia. In many species a ventral *glandular streak* extends from setiger 9 to the pygidium and in some species it can be traced forwards to setiger 1. Occasionally a dorsal glandular streak is present on middle segments. In genera such as *Rhodine* the anterior margins of some anterior segments extend forward as *membraneous collars* surrounding the posterior margin of the preceding segment. Posterior segments may have posterior collars.

Pygidium and anus. The shape of the pygidium and the position of the anus provide valuable characters. In its simplest form found in *Clymenura*, the pygidium is bluntly conical with a terminal anus sometimes closed by a swollen lobe or *ventral valve*. Three lines of development occur. In the first *anal cirri* appear; when these become numerous a circle of cirri is formed from which the anal cone protrudes.

This is the condition in *Praxillella*. Further development results in the formation of an *anal funnel* rimmed with cirri into which the anal cone sinks and the ventral valve is then reduced or lost. This ultimate stage occurs in *Euclymene* and several other genera. A second line of development seen in *Lumbriclymene* is the formation of a flattened shield below the anus; in *Nicomache* the posterior end becomes obliquely truncate and the anus is dorsal. The third line of development is seen in *Petaloproctus*. Here the pygidium forms a petaloid plate around the central anus.

Setae. The notosetae are various forms of capillaries and seldom provide useful characters. In juveniles, hastate setae are often present. In adults the tips may be cylindrical or flattened to form marginal wings and these may become incised to form fine spinules, the whole tip then resembling a very slender feather. Such feathered setae are more common in posterior segments. With the exception of *Rhodine* the neurosetae are arranged in single rows. In juveniles the neurosetae first appear as S-shaped hooks with a crest of denticles and a swelling in the shaft. In the adult the basic form has a long shaft, a toothed crest and a tuft of tendons below the main fang. In most genera the denticles or teeth above the main fang are in a vertical series but in *Maldane* and *Asychis* the denticles are arranged in transverse arcs. Neurosetae may be absent on setigers 1–4 but are usually present and reduced to acicular setae either with a few vestigial denticles or none at all. In this case the neurosetae may be represented by a single, smooth, curved spine.

Arwidsson (1906) has divided the Maldanidae into five subfamilies whose main characters are summarised below.

LUMBRICLYMENINAE Arwidsson, 1906.

Nuchal grooves curved. Cephalic ridge present but poorly defined. No cephalic plate. Pygidium either conical with a ventral valve below the terminal anus or shield-shaped with a dorsal anus. Segments without collars. Neuropodial hooks from setiger 1 onwards and always in single rows. The first few neurosetae may be reduced to acicular spines but later hooks have a vertical series of denticles above the main fang.

Genera ***LUMBRICLYMENE, CLYMENURA, NOTOPROCTUS, LUMBRICLYMENELLA, PRAXILLURA.***

RHODININAE Arwidsson, 1906.

Nuchal grooves slightly curved. Cephalic keel present. No cephalic plate. Pygidium conical with a terminal anus and a ventral valve. Some anterior segments with anterior collars and some posterior ones with posterior collars. Neuropodial hooks absent from the first few setigers but thereafter arranged in double rows. Individual hooks with transverse arcs of denticles above the main fang.

A single genus ***RHODINE.***

NICOMACHINAE Arwidsson, 1906.

Nuchal grooves straight or curved. Cephalic keel well developed and arched. No cephalic plate. Pygidium with the anus on a foliaceous plate or sunken in a funnel rimmed with cirri. Segments without collars. Neuropodial hooks always in a single row; they are present in reduced numbers from setiger 1 and are usually simplified to form acicular spines on the first three or four setigers. Later hooks with a vertical series of teeth above the main fang.

Genera ***NICOMACHE, MICROMALDANE, PETALOPROCTUS.***

EUCLYMENINAE Arwidsson, 1906.

Nuchal grooves usually straight and parallel. Cephalic plate present, usually with a well developed rim. Pygidium either with the anus sunken in a funnel ringed with cirri or with the anus on a cone projecting from a ring of cirri and provided with a ventral valve. Segments without collars except rarely on setiger 4. Neuropodial hooks always in a single row. Neuropodial hooks occasionally absent from setiger 1 but usually present in reduced numbers on the first three or four setigers. First few hooks often somplified to form acicular spines. Later hooks with a vertical series of teeth above the main fang.

Genera ***AXIOTHELLA, CLYMALDANE, CLYMENELLA, EUCLYMENE, GRAVIERELLA, JOHNSTONIA, MACROCLYMENE, MACROCLYMENELLA, MALDANELLA, MICROCYLMENE, PROCLYMENE, PRAXILLELLA.***

MALDANINAE Arwidsson, 1906.

Nuchal grooves curved and divergent anteriorly. Cephalic keel low and broad or high and arched. Cephalic plate present with a well developed rim. Pygidium a slanting plate with the dorsal anus above it. No anal cirri. Segments without collars. Neuropodial hooks always in a single row and absent from setiger 1. Later hooks all similar and have transverse arcs of denticles above the main fang.

Genera ***MALDANE, ASYCHIS, BRANCHIOASYCHIS.***

Key to Subfamilies and Genera

1	Neurosetae start on setiger 5 and are arranged in double rows. (Setigers 2 and 3 with collars s.–f. Rhodininae fig. 30.1.a) . . . . . ***RHODINE*** (p. 618)	
–	Neurosetae start on setiger 1 or 2 and are arranged in single rows	2
2	Cephalic plate present though it may be poorly marked. Cephalic ridge low . .	3
–	Cephalic plate absent. Cephalic ridge well marked. (s.–f. Nicomachinae) (fig. 30.1.j) .	5
3	Cephalic plate well defined and surrounded by a raised margin. Pygidium variable .	4
–	Cephalic plate poorly defined. Pygidium conical, sometimes flattened ventrally. (s.–f. Lumbriclymeninae)	7
4	Pygidium encircled by anal cirri with the anus on a projecting cone or sunken in a funnel. Neurosetae often present on setiger 1. (s.–f. Euclymeninae)	9
–	Pygidium as a slanting plate with a dorsal anus above it. No anal cirri. No neurosetae on setiger 1. (s.–f. Maldaninae)	17

5 Neurosetae of setigers 1–3 acicular; later ones as hooks with long, almost straight shafts 6
– Neurosetae of all setigers S-shaped with a swelling at the inflection. (Body small, possibly juveniles of other genera) . . . . . ***MICROMALDANE*** (p. 619)
6 Pygidium funnel-shaped with marginal cirri (fig. 30.1.k) . . ***NICOMACHE*** (p. 621)
– Pygidium petaloid with a central anus; no anal cirri (fig. 30.2.b) ***PETALOPROCTUS*** (p. 622)
7 Neuropodial hooks of setigers 1–4 generally similar to those of succeeding segments but have fewer teeth . . . . . ***CLYMENURA*** (p. 623)
– Neurosetae of setigers 1–3 or 1–4 acicular and markedly different from the hooks of succeeding segments. 8
8 Pygidium conical with a well marked ventral valve (fig. 30.2.k). Setigers 1–3 with acicular neurosetae . . . . . ***LUMBRICLYMENE*** (p. 625)
– Pygidium a slanting plate with a dorsal anus. Setigers 1–4 with acicular neurosetae ***NOTOPROCTUS*** (p. 647)
9 Neurosetae absent from setiger 1 . . . . . ***MALDANELLA*** (p. 626)
– Neurosetae present on setiger 1 10
10 Neurosetae of the first three to four segments are dentate crested hooks essentially similar to those of later segments 11
— Neurosetae of the first three to four segments are acicular and differ from those of later segments 12
11 Segments not very numerous (14–24); posterior ones not campanulate ***AXIOTHELLA*** (p. 629)
— Segments very numerous (30+); posterior ones short and campanulate (fig. 30.4.b) ***GRAVIERELLA*** (p. 630)
12 Neurosetae of the first three setigers are acicular. Nuchal grooves straight . . . 13
— Neurosetae of the first four setigers are acicular. Nuchal grooves curved ***PROCLYMENE****
13 A collar on the anterior margin of setiger 4 . . . . . ***CLYMENELLA****
— Segments without collars 14
14 Rows of vascular cirri on the last few segments (fig. 30.4.j) . ***JOHNSTONIA*** (p. 630)
— No vascular cirri on the last few segments 15
15 Thirty setigerous segments or more . . . . . ***MACROCLYMENE*** (p. 633)
— Twenty-five setigerous segments or less 16
16 Anus sunk in a pygidial funnel rimmed with cirri; no enlarged ventral valve (fig. 30.7.f) ***EUCLYMENE*** (p. 634)
— Anus on a cone projecting from a circle of cirri; a large ventral valve (fig. 30.7.n) ***PRAXILLELLA*** (p. 642)
17 Cephalic keel well marked. Rim of cephalic plate notched laterally (fig. 30.8.a) ***MALDANE*** (p. 645)
— Cephalic ridge low and broad. Rim of cephalic plate very deeply incised laterally (fig. 30.8.g) 18
18 Middle segments with numerous gill filaments . . . ***BRANCHIONASYCHIS****
Middle segments without gill filaments . . . . . ***ASYCHIS*** (p. 645)

RHODINE Malmgren, 1866

Head with a cephalic keel but no cephalic plate or raised rim. Nuchal grooves curved. Anterior segments long with anterior collars on setigers 2 and 3. Glandular bands well developed. Posterior segments with posterior collars. Rudimentary achaetous precanals present. Pygidium conical with a terminal anus and a well developed ventral valve but no anal cirri. Notosetae are winged capillaries and forms with flattened blades. Neurosetae absent on setigers 1–4 but present on

setiger 5 and are arranged in double rows. Hooks with transverse arcs of denticles above the main fang.

TYPE SPECIES: *Rhodine loveni* Malmgren, 1866.

Rhodine gracilior Tauber, 1879
(fig. 30.1.a–d)

Rhodine gracilior Tauber, 1879: 123; Arwidsson, 1906: 74, pl. 2 figs. 53–58; pl. 7 figs. 237–241 and pl. 8 figs. 242–243; Day, 1963a: 433, fig. 10 m–p.

Tube fragile. Body up to 50 mm. long by 1.0 mm. with a minimum of 23 setigers and 5–10 achaetous preanals. Colour pale apart from a red or purple fourth setiger (fig. 30.1.a). Prostomium (fig. 30.1.b) forming an oval hood over the mouth with a smoothly arched cephalic ridge and n-shaped nuchal grooves. No eye spots. Head three times as long as broad with only a dorsal crest to mark the junction with setiger 1 which is five times as long as broad. Setigers 2–5 progressively shorter, setigers 5–8 subequal and only twice as long as broad. Setigers 9 and 10 fused and setigers 11–16 about three to five times as long as broad. All subsequent segments decrease in length and the achaetous preanals are much broader than long. Pygidium (fig. 30.1.c) a short blunt cone with a terminal anus and a well developed ventral valve.

Setigers 2 and 3 with smooth-edged anterior collars. Setigers 3 and 4 completely glandular, setigers 5–9 with the anterior half glandular but subsequent setigers with glands restricted to a small area around the posteriorly situated parapodia. From the 17th setiger onwards all segments have posterior collars, even the achaetous preanals. Notosetae include narrow-winged capillaries and others with flattened, sword-like blades. Neuropodial hooks appear in setiger 5 as double rows of hooks arranged face to face. Each hook (fig. 30.1.d) with an expanded head bent back at an angle to the shaft. A close-set cap of 15–20 denticles above the rostrum. Tendons rudimentary and below them is a boss before the hook tapers to the shaft.

TYPE LOCALITY: North Sea.

RECORDS: Cape (34/18's and 34/22/d).

DISTRIBUTION: Sweden (d); Nigeria (s); Angola (d).

MICROMALDANE Mesnil, 1897

Small worms with few segments having the head bent downwards and without a cephalic plate. Cephalic crest poorly defined. Nuchal grooves curved. Pygidium with a shallow funnel whose margin is crenulate. No ventral valve. Notosetae include hastate-bladed capillaries and fine geniculate forms. Neurosetae are similar in all parapodia, all avicular with a vertical crest of teeth above the main fang and a swelling at the inflection of the S-shaped shaft. This genus probably represents a juvenile stage of *Nicomache*.

TYPE SPECIES: *Micromaldane ornithochaeta* Mesnil, 1897.

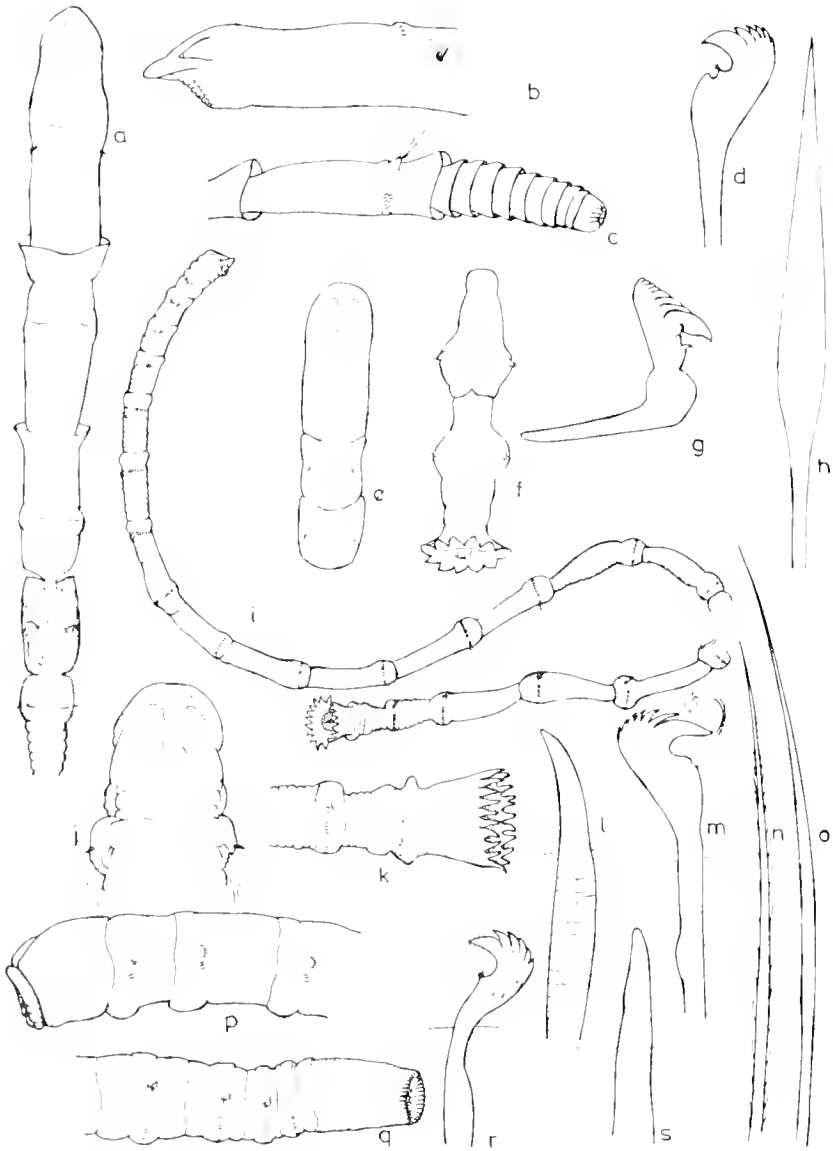


FIG. 30.1. *Rhodine gracilior*. (A) Anterior end. (B) Lateral view of head. (C) Posterior end. (D) Hook. *Micromaldane* sp. (E) Head. (F) Posterior end. (G) Hook. (H) Hastate notoseta. *Nicomache lumbricalis*. (I) Entire worm (natural size). (J) Dorsal view of head. (K) Posterior end. (L) Acicular spine from setiger 2. (M) Normal hook. (N) Feathered capillary. (O) Winged capillary. *Nicomache mossambica*. (P) Anterior end. (Q) Posterior end. (R) Normal hook. (S) Acicular spine from setiger 2.

Micromaldane sp.
(fig. 30.1.e–h)

Micromaldane sp. Day, 1955: 531.

Body small with 22–23 setigers and one achaetous preanal. Head rounded in front with a well defined cephalic ridge (fig. 30.1.e). Notosetae (fig. 30.1.h) hastate with striated blades. Neuropodial hooks (fig. 30.1.g) S-shaped and swollen. Pygidium (fig. 30.1.f) funnel-shaped with 10–12 triangular marginal cirri.

NICOMACHE Malmgren, 1866

Head with an arched keel but no cephalic plate. Nuchal grooves S-shaped. Segments 1–7 short with glandular rings, posterior ones longer. One or two achaetous preanals in front of the pygidium which is funnel-shaped and rimmed with cirri. Anus central and sunk in the funnel. Notosetae include winged capillaries and finely spinulose forms. Neurosetae of the first three setigers are acicular spines and succeeding ones are numerous hooks with a vertical series of teeth above the main fang.

Type species: *Sabella lumbricalis* Fabricius, 1780.

Key to Species

1 Twenty-two setigers: one achaetous preanal. Pygidium short and funnel-shaped ***N. lumbricalis***

– Thirty-seven setigers: one achaetous preanal. Pygidium long and cylindrical ***N. mossambica***

Nicomache lumbricalis (Fabricius, 1780)
(fig. 30.1.i–o)

Sabella lumbricalis Fabricius, 1780: 189.
Nicomache lumbricalis: Fauvel, 1927: 190, fig. 66 a–i.

Body (fig. 30.1.i) up to 160 mm. long. Prostomium (fig. 30.1.j) ill-defined, short and broad merging into an arched cephalic keel. Ocelli present in juveniles. Nuchal grooves short and S-shaped. Twenty-two to twenty-three setigers plus one very short achaetous preanal followed by the pygidial ring and funnel which is short and rimmed with 15–25 equal anal cirri (fig. 30.1.k). Anus sunken, no ventral valve. A single smooth acicular spine (fig. 30.1.l) in each of the first three neuropodia. Subsequent neurosetae as numerous hooks each with a vertical series of four to five teeth above the main fang and tendons below (fig. 30.1.m). Notosetae include normal winged capillaries (fig. 30.1.o) and fine feathered forms (fig. 30.1.n).

Type locality: Greenland.

Records: Cape (from 30 17 i and 33 18 i, s to 34 21 i).

Distribution: Arctic; North Atlantic from Greenland (s, d, vd) to the English Channel (c); North Pacific from the Behring Sea to N.W. Japan and W. Canada to Southern California (d, vd); Bouvet Is. (d).

Nicomache mossambica Day, 1951
(fig. 30.1.p–s)

Nicomache mossambica Day, 1951 : 52, fig. 7 a–f.

Body up to 240 mm. long by 5 mm. Head (fig. 30.1.p) bent forward with a short, arched cephalic keel dorsally. Nuchal grooves almost parallel. Thirty-seven setigers, one minute achaetous preanal and a long cylindrical pygidium rimmed with numerous short cirri (fig. 30.1.q). First three segments short and glandular ventrally, succeeding ones longer. Notosetae are narrow-winged capillaries plus a few fine spinulose forms. Neurosetae of setigers 1–3 are two to four straight acicular spines (fig. 30.1.s) ; succeeding neurosetae are rows of hooks with a vertical series of five teeth above the main fang (fig. 30.1.r).

Type locality : Delagoa Bay.

Records : Mocambique (26/32/i).

Distribution : A single record.

PETALOPROCTUS Quatrefages, 1865

Head with an arched keel but no cephalic plate or raised margin. Nuchal grooves short, divergent. Anterior segments short with anterior glandular rings, middle segments longer and the posterior ones again short. Small achaetous preanal segments may precede the pygidium which is a foliaceous plate with a central anus. Setigers 1–3 with acicular neurosetae, the succeeding ones with neuropodial hooks having a vertical series of teeth above the main fang. Notosetae include winged capillaries and finely spinulose forms.

Type species : *Petaloproctus terricola* Quatrefages, 1865.

Petaloproctus terricola Quatrefages, 1865
(fig. 30.2.a–d)

Petaloproctus terricola Quatrefages, 1856 II : 247 ; Fauvel, 1927 : 194, fig. 68 a–l.

Body up to 200 mm. long. Head (fig. 30.2.a) with a broad, semicircular prostomium overhanging the mouth followed by a marked keel with short divergent nuchal grooves on either side. Eye-spots present. Body of 22 setigers plus the pygidium (fig. 30.2.b). No achaetous preanal but two annuli below the pygidium. Anterior segments short with glandular rings. In large specimens the last five to seven segments develop fleshy dorsal lobes which project backwards. Notosetae include winged capillaries, fine capillaries with denticulate tips and spinulose forms with spiral blades. Neurosetae of setigers 1–3 are smooth, bluntly pointed acicula

(fig. 30.2.d). Posterior neurosetae have a vertical crest of four to five teeth above the main fang (fig. 30.2.e).

TYPE LOCALITY: France.

RECORDS: South West Africa (23/14/s, 26/14/d and 26/15/i, s); Cape (31/17/i, 33/18/i and 34/18/i).

DISTRIBUTION: Atlantic from the English Channel (i, s) to Morocco (i, d), Ghana (s) and Angola (s).

CLYMENURA Verrill, 1900

Prostomium well developed and followed by long parallel nuchal grooves. Cephalic plate rudimentary or absent. Anterior segments with glandular rings, the eighth with a ventral glandular patch. Achaetous preanals present. Anus on a cone with an enlarged ventral valve, anal cirri few and elongate or absent. Notosetae include both winged capillaries and feathered forms. The first few neurosetae essentially similar to the hooks of succeeding segments though the denticles on the rostrum are poorly developed. Later hooks with a vertical series of teeth above the main fang and tendons below.

TYPE SPECIES: *Clymene cirrata* Ehlers, 1887.

Clymenura tenuis (Day, 1957)
(fig. 30.2.e–i)

Leiochone tenuis Day, 1957: 110, fig. 7 g–l.

Body up to 120 mm. long by 1.5 mm. broad. Prostomium (fig. 30.2.e) bluntly triangular in front and continuous with a faint cephalic ridge behind. Ocelli numerous and well marked. Nuchal grooves long and straight. Twenty-three to twenty-five setigers plus 0–1 preanals followed by three to five annuli without parapodial ridges. Pygidium (fig. 30.2.f) with three slender anal cirri and a well marked ventral valve which may protrude as a cone (fig. 30.2.g). Glandular rings on the peristome and setigers 2–7. A glandular patch on the ventrum of setiger 8. Notosetae include broad-winged capillaries and feathered forms. Neurosetae either absent from setiger 1 or represented by two to three hooks (fig. 30.2.i) with two to four denticles above the rostrum and poorly marked tendons. Posterior neurosetae numerous with a vertical series of about six teeth above the rostrum and strong tendons below (fig. 30.2.h).

TYPE LOCALITY: Durban Bay.

RECORDS: Natal (29/31/i); Mocambique (26/32/i).

DISTRIBUTION: Only two records.

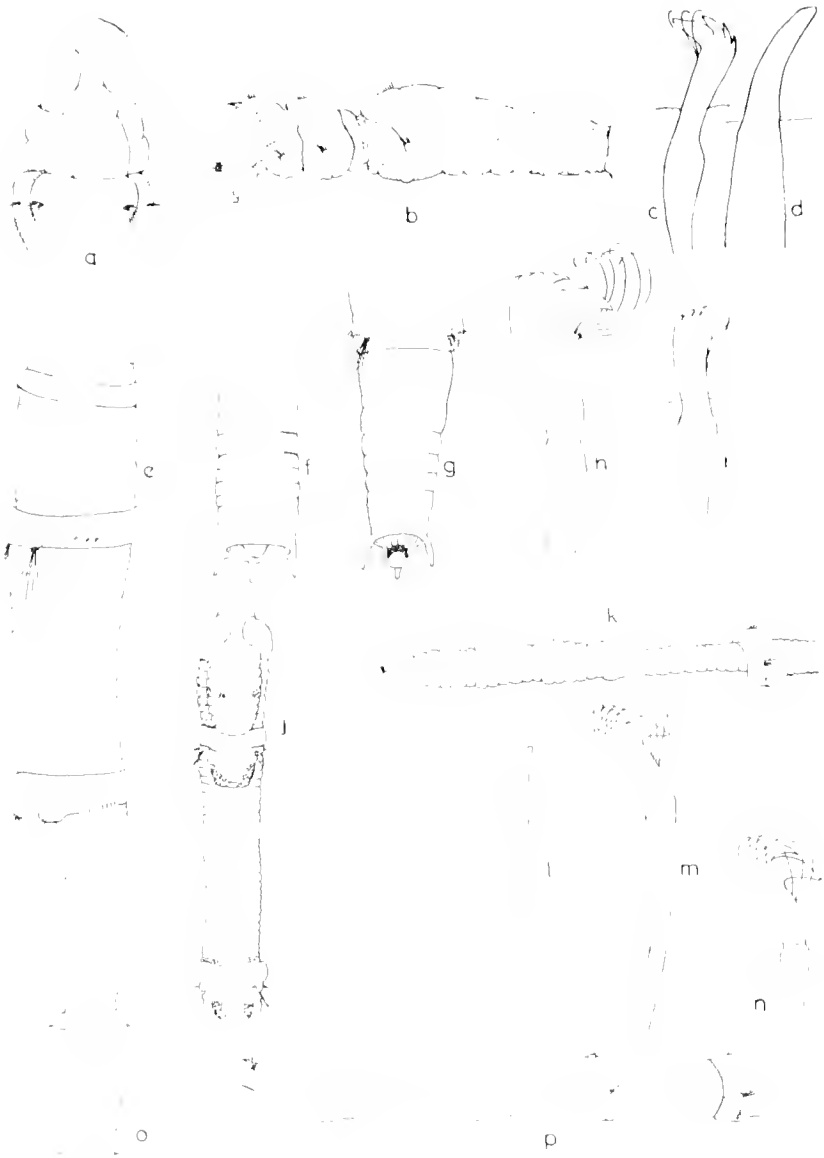


FIG. 30.2. *Petaloproctus terricola*. (A) Head. (B) Posterior end. (C) Normal hook. (D) Acicular spine of setiger 2. *Clymenura tenuis*. (E) Anterior end. (F) and (G) Contracted and expanded appearance of posterior end. (H) Normal hook. (I) Acicular spine of setiger 1. *Lumbriclymene cylindricaudata*. (J) Anterior end in dorsal view. (K) Posterior end. (L) Acicular spine. (M) Normal hook. *Lumbriclymene minor*. (N) Normal hook. (O) Dorsal view of anterior end. (P) Posterior end.

LUMBRICLYMENE Sars, 1872

Head without a cephalic plate or raised margin but with a broad prostomium followed by a median dorsal ridge. Nuchal grooves markedly curved. Setigerous segments elongated, the anterior ones without collars but with glandular rings. Acicular neurosetae present in the first few (usually 4) setigers but each of the later setigers has a row of hooks with a vertical series of denticles above the main fang. Posterior end of the body tapered with a few achaetous preanal segments preceding the conical pygidium. No anal funnel. Anus with a marked ventral valve.

Type species: *Lumbriclymene cylindricauda* Sars, 1872.

Key to Species

1 Pygidium cylindrical and anus terminal . . . . . ***L. cylindricauda***
– Pygidium flattened ventrally and anus dorsal . . . . . ***L. minor***

Lumbriclymene cylindricauda Sars, 1872
(fig. 30.2.j-m)

Lubriclymene cylindricauda Sars, 1872: 413; Arwidsson, 1906: 40, pl. 1 figs. 15–25, pl. 7 figs. 219–221; Day, 1963a: 432.

Body long and slender, up to 120 mm. long with 19 setigers and four to six achaetous preanals of which only the first three are well marked. A brown bar across the buccal segment and at each end of the first three setigers. Head (fig. 30.2.j) steeply arched with a median ridge above the broad prostomium. No eyespots. Nuchal grooves markedly curved, almost semicircular. Setiger 1 four times as long as broad and succeeding ones even longer, an average segment in the middle of the body being about seven times as long as broad. The last few setigers are shorter and the achaetous preanals decrease progressively in length so that the last is broader than long (fig. 30.2.k). Pygidium bluntly conical with a marked ventral valve below the anus. No anal cirri. The first six setigers have anterior glandular rings which become progressively broader. In posterior segments glandular swellings are limited to the area around the setae but from setiger 11–14 there is a mid-ventral glandular streak. Notosetae are smooth-winged capillaries throughout. Neurosetae of setigers 1–4 are stout, blunt, acicular spines (fig. 30.2.l), one per parapodium. Neurosetae of all subsequent setigers are dentate-crested hooks. Setiger 5 bears a row of about seven but later setigers have more. Hooks on setiger 5 with only two to three teeth above the main fang, but each hook of later segments has a vertical series of about four to six teeth above the main fang (fig. 30.2.m).

Type locality: Norway.

Records: Cape (34°23′d).

Distribution: Norway.

Lumbriclymene minor Ardwidsson, 1906
(fig. 30.2.n–p)

Lumbriclymene minor Arwidsson, 1906: 46, pl. 1 figs. 26–29, pl. 7 figs. 223–226; Fauvel, 1927: 196, fig. 68 k–q; Day, 1963: 366.

Body 25–30 mm. long and about 1.0 mm. broad. Head (fig. 30.2.o) rounded anteriorly without a well defined prostomium and dorsal crest. Nuchal grooves poorly marked, curved, almost semicircular. No ocelli. Body of 19 setigerous segments, three poorly marked achaetous preanals and a blunt, ventrally flattened pygidium with a dorsal anus (fig. 30.2.p). No anal cirri. The setigerous segments do not differ greatly in length, each being three to four times as long as broad. Intersegmental constrictions poorly marked and glandular bands though present on the first six segments are not well defined. Notosetae are all winged capillaries mostly with smooth margins but some are striated distally. Neurosetae of setiger 1–4, are represented by a single, stout, smoothly pointed acicular seta per segment. Subsequent neurosetae are rows of five to seven hooks, each with four to five teeth in a vertical series above the main fang and a few lateral denticles (fig. 30.2.n). The neck is short and there is a well defined swelling preceding the smoothly tapered shaft.

Type locality: Sweden.

Records: Cape (31.17′ abyssal).

Distribution: Greenland (s, d); Sweden (d).

MALDANELLA McIntosh, 1885

Prostomium well developed, with or without eye-spots. A well marked cephalic plate with a raised margin. Nuchal grooves straight and parallel. Pygidium funnel-shaped with marginal cirri. Anus sunk in the funnel. Achaetous preanal segments present. Setiger 1 without neurosetae and setigers 2 and 3 with a reduced number of simplified hooks; later segments with a single row of hooks bearing a vertical series of teeth above the main fang. Notosetae are winged capillaries and often include feathered forms.

Type species: *Maldanella antarctica* McIntosh, 1885.

Key to Species

1 Two to three neuropodial hooks on setiger 2. Four short achaetous preanal segments
M. capensis

– Twelve or more neuropodial hooks on setiger 2. Three achaetous preanal segments
M. fibrillata

Maldanella fibrillata Chamberlin, 1919
(fig. 30.3.f–k)

Maldanella fibrillata Chamberlin, 1919: 413, pl. 72 figs. 1–6, pl. 73 figs. 1–2; Day, 1963: 365.

Body up to 70 mm. long. Prostomium (fig. 30.3.f) small and without eye-spots. Cephalic plate (fig. 30.3.j) oval and slanting with a high, unnotched rim. Nuchal grooves straight, half the length of the cephalic plate, their anterior ends continuous with a sharply bent streak which curves back around the inside of the rim. Body with 19 setigers and three achaetous preanals the last of which is united to the pygidial funnel (fig. 30.3.k). Anterior segments short with glandular rims, middle ones long, posterior ones decreasing, the last few sausage-shaped. Funnel with about 50 subequal cirri; anus sunk in the funnel and lacks a ventral valve. Notosetae of two lengths but all are narrow-winged capillaries. No neurosetae on setiger 1. Setiger 2 with 12–20 hooks each with two to three teeth above the main fang (fig. 30.3.g). Setiger 3 and later ones with a row of about 30 hooks having a vertical series of three to four teeth above the main fang (fig. 30.3.h).

Type locality: 1,471 fathoms off Pacific coast of Panama.

Records: Cape (33/16/abyssal).

Distribution: Pacific off Panama (abyssal).

Maldanella capensis Day, 1961
(fig. 30.3.a–e)

Maldanella capensis Day, 1961: 523, fig. 11 h–k.

Body up to 45 mm. long by 2 mm. Prostomium (fig. 30.3.a) broad with a curved anterior margin and numerous eye-spots. Cephalic plate (fig. 30.3.b) broadly oval with a very low rim having deep lateral notches. Nuchal grooves short and straight. Body with 19 short setigers, four very short achaetous preanals followed by the pygidial ring and funnel (fig. 30.3.c). Anterior segments hardly longer than broad, later ones twice as long as broad. The four preanals together are shorter than the last two setigers. Thirty short anal cirri. Anus sunk in the funnel and without a marked ventral valve. Notosetae include narrow-winged capillaries and fairly broad feathered forms. Setiger 1 without neurosetae. Setiger 2 with only two hooks each having only three to four teeth (fig. 30.3.d); setiger 3 with three to five hooks and later segments with numerous hooks. Normal hooks (fig. 30.3.e) with an acutely curved main fang surmounted by a vertical series of about five teeth.

Type locality: Agulhas Bank, South Africa.

Records: Cape (32/28/s).

Distribution: A single record.

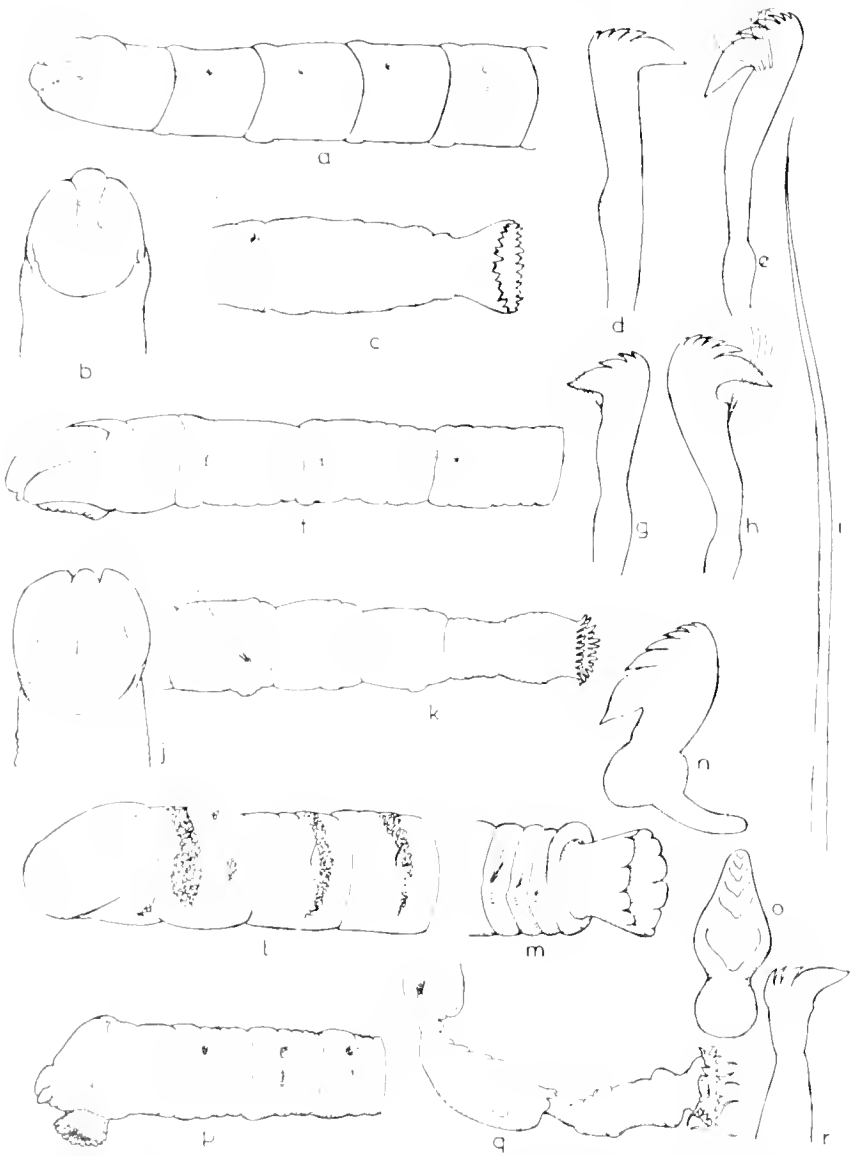


Fig. 303. *Maldanella capensis*. (A) Anterior end. (B) Dorsal view of head. (C) Posterior end. (D) Hook from setiger 2. (E) Normal hook. *Maldanella filifillata*. (F) Anterior end. (G) Hook from setiger 2. (H) Normal hook. (I) Notopodial capillary. (J) Head. (K) Posterior end. *Axiothella quadrimaculata*. (L) Anterior end. (M) Posterior end. (N) Hook in profile. (O) Hook in face view. *Axiothella parli*. (P) Anterior end. (Q) Posterior end. (R) Hook (after Kirkegaard 1959).

AXIOTHELLA Verrill, 1900

Head with a flattened cephalic plate with a raised rim. Nuchal grooves straight and parallel. Anus sunk in a funnel rimmed with cirri or mere crenulations. No ventral valve. Achaetous preanals sometimes present. Notosetae of two types. Neurosetae essentially similar throughout from the first setiger onwards, sometimes avicular, always with a vertical series of teeth above the main fang.

TYPE SPECIES: *Axiothea catenata* Malmgren, 1865.

KEY TO SPECIES

1 A small species with avicular hooks having a swelling in the S-shaped shaft. No achaetous preanals . . . . . ***A. quadrimaculata***
– A large species with fairly straight hooks. Two achaetous preanals . . . ***A. jarli***

Axiothella quadrimaculata Augener, 1914
(fig. 30.3.l–o)

Axiothella quadrimaculata Augener, 1914: 70, pl. 1 fig. 10, text-fig. 10; Day, 1957: 111, fig. 8 a–d.

A minute cylindrical worm about 5 mm. long with 19–20 setigers, no preanals and a pygidial ring and scalloped funnel (fig. 30.3.m). Prostomium (fig. 30.3.l) broadly curved in front and continuous with a cephalic ridge behind. Nuchal grooves slightly curved. Cephalic rim low and poorly marked. Anterior segments barred and brown marks on head. Notosetae include hastate-bladed capillaries and a few feathered forms. Neuropodial hooks avicular with five teeth in a vertical series above the main fang and a swelling in the S-shaped shaft (fig. 30.3.n).

TYPE LOCALITY: South-west Australia.

RECORDS: ? Cape (33/17/s and 34/18/s); Mocambique Island (i).

DISTRIBUTION: South-west Australia, New Zealand and subantarctic islands (i, s).

Axiothella jarli Kirkegaard, 1959
(fig. 30.3.p–r)

Axiothella jarli Kirkegaard, 1959: 56, figs. 11–13.

Body up to 35 mm. long. Prostomium (fig. 30.3.p) rounded in front with numerous ocelli. Nuchal grooves straight and half the length of the cephalic plate. Cephalic rim at first high, then notched and behind the notch is a low semicircular part notched in the mid-dorsal line. The first eight setigers are short and the seventh has a marked glandular ring. Number of setigers unknown. Two long achaetous preanals precede the pygidial ring and funnel which is rimmed with 18 alternately long and short cirri (fig. 30.3.q). Neuropodial hooks of the first three setigers (fig. 30.3.r) with three to four teeth above the main fang and subsequent ones with a vertical series of six to seven teeth. First three setigers with three, six and seven

hooks respectively, and subsequent ones with numerous hooks in a single row. Notosetae include broad-winged capillaries and spinulose forms.

TYPE LOCALITY: In 50 m. off Angola.

RECORDS: Cape (33, 18 s).

DISTRIBUTION: Angola (s, d).

GRAVIERELLA Fauvel, 1919

Cephalic plate with a raised rim. Nuchal grooves straight and parallel. Body with very numerous segments, the posterior ones being campanulate. No achaetous preanals, the region of regeneration being in front of the last few setigers. Pygidium funnel-shaped with marginal cirri. Anus sunken and lacks a ventral valve. Neurosetae of the first three setigers reduced in number but essentially similar to all succeeding ones. Hooks with a vertical series of teeth above the main fang.

TYPE SPECIES: *Gravierella multiannulata* Fauvel, 1919.

Gravierella multiannulata Fauvel, 1919
(fig. 30.4.a–e)

Gravierella multiannulata Fauvel, 1919: 438, pl. 17 figs. 58–69.

Body up to 80 mm. long by 1–2 mm. Tube sandy, very fragile. Prostomium (fig. 30.4.a) well developed and conical with numerous ocelli. Cephalic rim high with lateral and posterior identations. Nuchal grooves very long and parallel. Body slender and elongate with 60–70 segments. No achaetous preanals but with a region of regeneration towards the posterior end. Pygidium (fig. 30.4.b) with about 20 anal cirri which increase in length ventrally. First seven segments slightly longer than broad; segments 8–12 longer. From setiger 13 onwards the segments are very short and campanulate with backwardly directed collars. Neurosetae of setigers 1–3 are three to five dentate hooks very similar to the more numerous ones of succeeding segments which have a vertical series of five to seven teeth above the main fang (fig. 30.4.c). Notosetae are winged capillaries (fig. 30.4.e) and fine feathered forms (fig. 30.4.d).

TYPE LOCALITY: Madagascar (Tulear).

RECORDS: Mocambique (26–32 i).

DISTRIBUTION: Madagascar.

JOHNSTONIA Quatrefages, 1865

Head with a cephalic plate bordered by a raised rim. Nuchal grooves straight and parallel. Anterior segments short, posterior ones long, the last few bearing rows of vascular cirri. Sometimes an achaetous preanal segment. Pygidium funnel-shaped with marginal cirri and a central anus sunk in the funnel. No ventral valve. Setigers

1–3 with acicular neurosetae, subsequent ones with hooks with a vertical series of numerous denticles above the main fang. Notosetae of two kinds including winged capillaries and feathered forms. Anterior segments with glandular rings and posterior ones with longitudinal belts.

TYPE SPECIES: *Johnstonia clymenoides* Quatrefages, 1865.

KEY TO SPECIES

1 Acicular neurosetae of setigers 1–3 with dentate apices. Vascular cirri simple (fig. 30.4.f) ***J. clymenoides***

– Acicular neurosetae of setigers 1–3 with smooth tips. Vascular cirri branched (fig. 30.4.j) ***J. knysna***

Johnstonia clymenoides Quatrefages, 1865
(fig. 30.4.f–h)

Johnstonia clymenoides Quatrefages, 1865 II: 245, pl. 11 figs. 10–15; Fauvel, 1927: 184, fig. 64 a–h.

Body elongate, up to 200 mm. long, with 22 setigers and one preanal in front of the pygidial funnel. Cephalic plate bordered with a lightly scalloped rim. Prostomium broad; ocelli present. Nuchal grooves straight and two-thirds the length of the cephalic plate. Glandular rings on setigers 1 to 7 and four longitudinal belts on setigers 9–15 situated on the dorsum, ventrum and the two sides. The last five to six setigers with four rows of vascular cirri which are usually unbranched (fig. 30.4.f). Achaetous preanal short, poorly marked. Pygidial funnel rimmed with 20–30 anal cirri of which the ventral one is the largest. No ventral valve. Notosetae include broadly winged and feathered capillaries. Neurosetae of setigers 1–3 have one to two vestigial denticles above the apex (fig. 30.4.g); subsequent hooks with numerous denticles in a vertical series (fig. 30.4.h).

TYPE LOCALITY: France.

RECORDS: South West Africa (23/14/d).

DISTRIBUTION: Atlantic from the English Channel (i) and Morocco (i) to tropical West Africa (s); Mediterranean (i).

Johnstonia knysna Day, 1955
(fig. 30.4.i–m)

Johnstonia knysna Day, 1955: 429, fig. 4 e–j.

Body up to 180 mm. long by 4 mm., brownish in alcohol. Prostomium (fig. 30.4.i) bluntly conical, with eye-spots. Nuchal grooves straight and extend over two-thirds of the cephalic plate. Cephalic rim crenulate posteriorly. Body with 19 setigers, and one to two achaetous preanals followed by the pygidial funnel (fig. 30.4.j). Setigers 1–3 fairly short, setigers 4–7 successively longer, setiger 8 short, setigers 9–19 about twice as long as setiger 8, the 19th being four times as long as broad. The first preanal is well developed and not much shorter than setiger 19; the second preanal

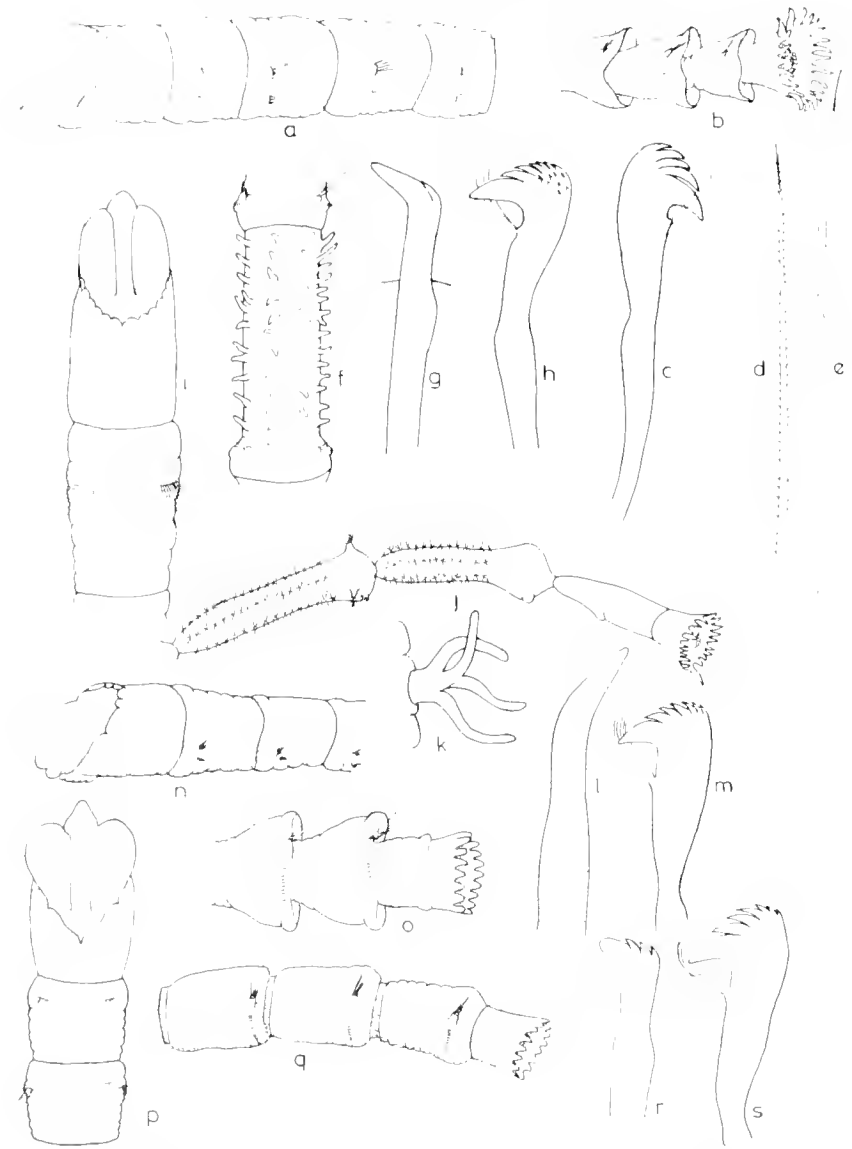


FIG. 30.1. *Gracieella multiannulata*. (A) Anterior end. (B) Posterior end. (C) Normal hook. (D) Tip of feathered capillary. (E) Winged capillary. *Johnstonia clymenoides* (after Fauvel). (F) Segment with vascular cirri. (G) Acicular neuroseta of setiger 2. (H) Normal hook. *Johnstonia knysna*. (I) Head. (J) Posterior end. (K) Branching vascular cirrus. (L) Acicular neuroseta of setiger 2. (M) Normal hook. *Macroclymene monilis* (after Fauvel). (N) Anterior end. (O) Posterior end. *Macroclymene saldanha*. (P) Anterior end. (Q) Posterior end. (R) Acicular neuroseta of setiger 2. (S) Normal hook.

is either poorly marked or absent. Pygidium elongate, ending in a funnel encircled by 20 cirri and a sunken anus with a small ventral valve. Glandular bands extensive on setigers 3–8. A narrow ventral glandular streak from setiger 9 onwards and a dorsal glandular streak from setiger 9 to 14. Vascular caeca (fig. 30.4.k) branched and arranged in four rows from setiger 14 to the first preanal. Notosetae include broad-winged capillaries and fine spinulose forms. Neurosetae of setigers 1–3 as a single smooth, bent acicular spine per neuropodium (fig. 30.4.l). Later setigers with numerous hooks, each with a vertical series of five to six teeth above the main fang and well marked tendons below (fig. 30.4.m).

Type locality: Knysna Estuary, South Africa.

Records: South West Africa (26/14/d); Cape (32/18/s, 34/23/e and 33/25/s).

Distribution: Endemic.

MACROCLYMENE Verrill, 1900

Head with a slanting cephalic plate with a raised rim. Nuchal grooves straight and parallel. Body with more than 30 setigers and sometimes an indistinct achaetous preanal. First three setigers with one to three acicular neurosetae which may have smooth or faintly dentate tips. Subsequent hooks each with a vertical series of five to seven teeth above the main fang and chitinous tendons below. Anterior segments with glandular bands. Posterior segments short, often campanulate. Pygidium with the anus sunk in a poorly developed funnel whose margin is rimmed with cirri.

Type species: *Clymene producta* Lewis, 1899.

Key to Species

1 Acicular neurosetae of setigers 1–3 with smooth tips . . . . . ***M. monilis***
– Acicular neurosetae of setigers 1–3 with vestigial teeth (fig. 30.4.r) . . ***M. saldanha***

Macroclymene monilis (Fauvel, 1902)
(fig. 30.4.n–o)

Clymene monilis Fauvel, 1902: 89, figs. 31–38.

Body up to 120 mm. long by 2 mm. Prostomium (fig. 30.4.n) ovoid. Nuchal grooves two-thirds of cephalic plate. Cephalic rim with a marked lateral notch and five to eight triangular lobes posteriorly. Thirty-one or more setigers followed by the pygidial ring and funnel (fig. 30.4.o) which is encircled by 16–20 unequal anal cirri. No achaetous preanal segments. Setigers 1–3 each with a single neuropodial spine. Setigers 4–7 with anterior glandular rings. Middle segments twice as long as broad, posterior ones campanulate. Notosetae include many broad-winged capillaries, a few fine-winged capillaries and slender feathered forms in posterior segments.

Acicular neurosetae of setigers 1–3 stout and abruptly bent near their smooth pointed tips. Posterior hooks with a vertical series of six to seven teeth above the main fang.

TYPE LOCALITY: Senegal, western Africa.

RECORDS: Not recorded from southern Africa.

DISTRIBUTION: Senegal (i), Nigeria (i).

Macroclymene saldanha (Day, 1955)
(fig. 30.4.p–s)

Clymene (Praxillella) saldanha Day, 1955: 428, fig. 4 a–d.

Body about 55 mm. long by 1.3 mm. and creamy yellow in spirit. Prostomium (fig. 30.4.p) triangular, pointed and without eye-spots. Nuchal grooves straight and extend over four-fifths of the cephalic plate. Cephalic rim well developed and high anteriorly, notched laterally and again posteriorly. Body with 35–40 setigers, a doubtful achaetous preanal or possibly none and a small pygidium (fig. 30.4.q). Setigers 1–3 short, setigers 4–8 longer, and subsequent ones progressively shorter again until the last is only twice as long as broad. Pygidium shorter than the last setiger, and lacks a funnel-shaped expansion, having merely a ring of 10–20 short cirri around the sunken anus. Glandular bands faint on setigers 2–3, well marked on setigers 4–7 and faint on setiger 8. A narrow ventral streak from the first setiger to the pygidium. Notosetae include (a) stout broad-winged capillaries; (b) slender spinulose capillaries; and (c) slender smooth capillaries. Neuropodial hooks of setigers 1–3 are straight with three obscolescent teeth above the blunt rostrum (fig. 30.4.r). Later hooks are well developed with a vertical series of 5–7 teeth above the main fang and well marked tendons below (fig. 30.4.s).

TYPE LOCALITY: Langebaan Lagoon, South Africa.

RECORDS: Cape (33/18/i).

DISTRIBUTION: A single record.

EUCLYMENE Verrill, 1900

Head with a slanting cephalic plate with a raised rim. Nuchal grooves straight and parallel. Up to 25 setigerous segments and four achaetous preanals. The first three setigers with one to three acicular neurosetae which usually have smooth tips or occasionally vestigial denticles; subsequent neurosetae are numerous hooks with a vertical series of five to seven denticles above the main fang and chitinous tendons below. Pygidial funnel rimmed with cirri. Anus sunk in the funnel and has no enlarged ventral valve. Glandular rings on anterior segments and sometimes glandular streaks on posterior ones.

TYPE SPECIES: *Clymene oerstedii* Claparède, 1863.

Key to Species

1 Acicular neurosetae of setigers 1–3 with vestigial teeth on the convex side of the apex. (Cephalic rim not crenulate posteriorly) 2
– Acicular neurosetae of setigers 1–3 with smooth apices 3
2 Two achaetous preanals and a circular ridge (fig. 30.5.b). Ocelli present ***E. oerstedi*** (p. 635)
– Only two achaetous preanals. Ocelli absent . . . . . ***E. sp.*** (p. 636)
3 Four achaetous preanals 4
– Three achaetous preanals. (Nineteen setigers. Cephalic rim crenulate posteriorly (fig. 30.5.e)) . . . . . ***E. lombricoides*** (p. 636)
– Two achaetous preanals 5
4 Cephalic rim high and crenulate posteriorly. Nineteen setigers . ***E. lyrocephala*** (p. 638)
– Cephalic rim low and a single notch posteriorly. Number of setigers unknown ***E.* cf. *quadrilobata*** (p. 638)
5 Nineteen setigers 6
– Twenty-one or more setigers 8
6 Cephalic rim crenulate posteriorly 7
– Cephalic rim with a pair of lateral notches and one posterior one . ***E. natalensis*** (p. 638)
7 A dorsal glandular streak from setiger 9 to 14 (fig. 30.6.i). Ocelli present ***E. glandularis*** (p. 639)
– No dorsal glandular streak. No ocelli . . . . . ***E. mossambica*** (p. 639)
8 Twenty-one setigers. Cephalic rim crenulate posteriorly. A dorsal glandular streak from setiger 9 . . . . . ***E. annandalei*** (p. 641)
– Twenty-four setigers. Cephalic rim with a pair of lateral notches and one posterior one. No dorsal glandular streak . . . . . ***E. luderitziana*** (p. 641)

Euclymene oerstedi (Claparède, 1863)
(fig. 30.5.o–q)

Clymene oerstedii Claparède, 1863: 28, pl. 13 figs. 8–13.
Clymene (*Euclymene*) *oerstedii*: Fauvel, 1927: 173, fig. 60 a–i.

Body up to 100 mm. long. Prostomium (fig. 30.5.o) small. Ocelli present. Nuchal grooves two-thirds of cephalic plate. Cephalic rim low with a single notch on each side. Body slender with 19 setigers, two obvious achaetous preanals and circular ridge preceding the pygidial ring and funnel (fig. 30.5.q). First preanal two-thirds the length of the last setiger, the second much shorter, the last small and poorly marked. Anus with numerous short anal cirri and 7–10 alternating long ones. Anus sunken with a small ventral valve. Setigers 1–7 short with broad, white glandular bands contrasting with the red posterior part of the segment. A broad mid-ventral glandular streak on setigers 7 to 14. The first three setigers with one to two acicular neurosetae each having two to three vestigial teeth on the blunt apex (fig. 30.5.p); later neurosetae are numerous hooks with a vertical series of five teeth above the main fang and well developed tendons below.

Type locality: Naples.

Records: ? Cape (32/17/d and 33/18/d).

Distribution: North Sea (i) and English Channel (i) and ? tropical western Africa; Mediterranean (i).

Euclymene cf. *oerstedi*
(fig. 30.5.a–d)

Euclymene cf. *oerstedii* Day, 1963a: 429, fig. 10 g.

Number of setigerous segments unknown. Prostomium (fig. 30.5.a) bluntly triangular and lacks ocelli. Nuchal grooves long and straight, equal to four-fifths the length of the cephalic plate. Cephalic margin high, smooth laterally but with a single median posterior notch. Segments increase in length after the fifth. Glandular bands strongly marked on setigers 3–6. A faint mid-ventral streak from setiger 1 onwards. Posterior end (fig. 30.5.b) with two achaetous preanals preceding the pygidial ring and funnel. First preanal twice as long as the second, the two together shorter than the last setiger. Anal funnel with 18–24 cirri alternating in length and a much longer ventral one. Anus sunken, no ventral valve. Notosetae include winged capillaries and fine, feathered forms. Setigers 1–3 with two to three acicular spines (fig. 30.5.c) with abruptly bent tips bearing three to four small denticles. Later hooks (fig. 30.5.d) with six to seven teeth above the main fang and strong tendons below.

Records: Cape (34/23/s).

Euclymene lombricoides (Quatrefages, 1865)
(fig. 30.5.e–k)

Clymene lombricoides Quatrefages, 1865 II: 236.
Clymene (*Euclymene*) *lombricoides*: Fauvel, 1927: 172, fig. 59 a–i.

Body (fig. 30.5.e) up to 150 mm. long by 9 mm. broad. Prostomium (fig. 30.5.f) broadly rounded in front with indistinct ocelli. Nuchal grooves straight and half the length of the cephalic plate. Cephalic rim with the posterior part divided into about 10 lobes. Body with 19 setigers, three preanals decreasing in length followed by the pygidial ring and funnel. Anterior segments a little longer than broad, posterior ones two to four times as long as broad. The three preanals together slightly longer than the length of the last setiger (fig. 30.5.g). Funnel with very numerous cirri alternately long and short. Anal funnel sunken without a ventral valve. Setigers 2–8 with anterior glandular rings. Setigers 8 to 12 sometimes with a dorsal glandular streak. Notosetae include winged capillaries (fig. 30.5.j) and feathered forms (fig. 30.5.h). Setigers 1–3 each with one to two smooth acicular neurosetae (fig. 30.5.i). Later neurosetae are numerous hooks (fig. 30.5.h) each with a vertical series of five to six teeth above the main fang and well marked tendons below.

Type locality: France.

Records: South West Africa (26 15 i and 28 16 s); Cape (from 33 18 i, s to 34 21 i); Moscambique (26 32 i).

Distribution: North Atlantic from Scotland (s) and the English Channel (i) to Morocco (i); Mediterranean (i).

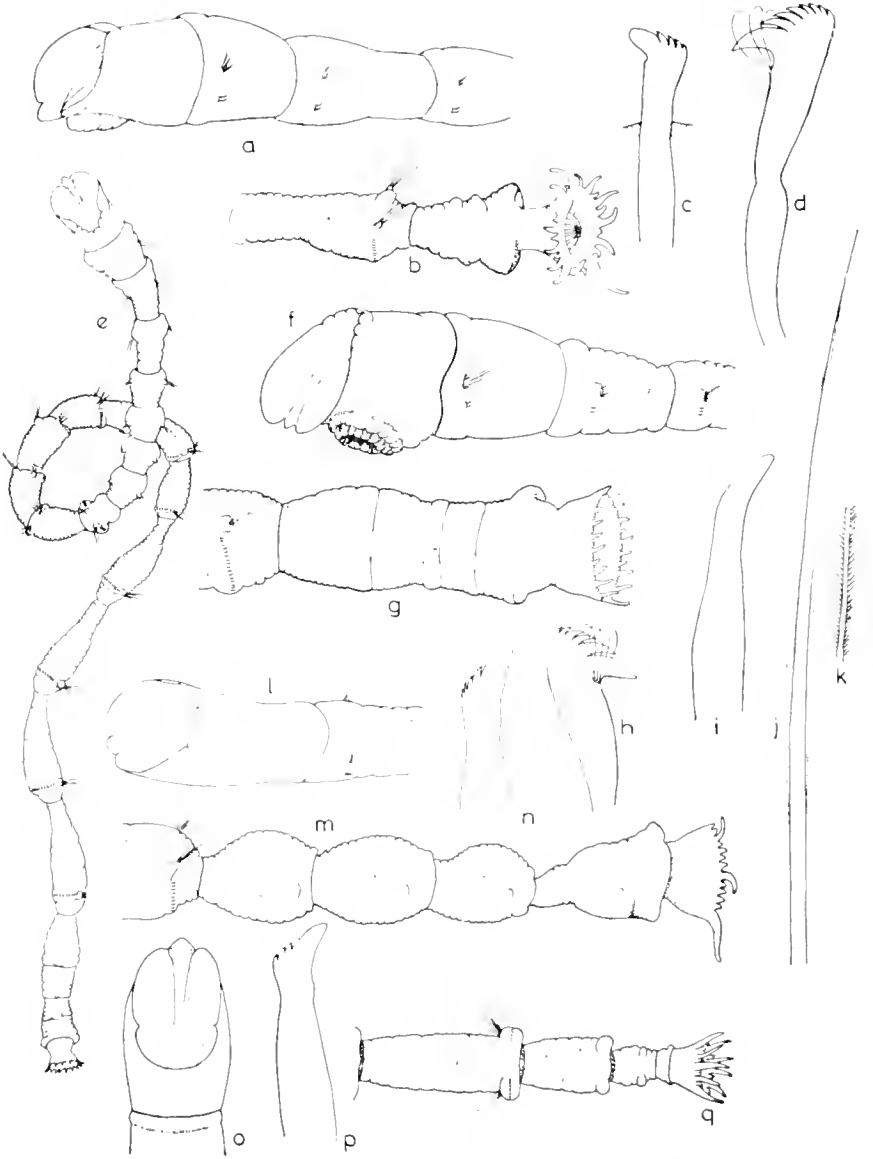


FIG. 30.5. *Euclymene* cf. *oerstedii*. (A) Anterior end. (B) Posterior end. (C) Acicular neuroseta of setiger 1. (D) Normal hook. *Euclymene oerstedii* (after Fauvel). (O) Head. (P) Acicular neuroseta. (Q) Ventral view of posterior end. *Euclymene lombricoides*. (E) Entire worm (twice life size). (F) Anterior end. (G) Posterior end. (H) Normal hook. (I) Acicular neuroseta of setiger 2. (J) Winged capillary. (K) Part of feathered capillary. *Euclymene* cf. *quadrilobata*. (L) Head. (M) Posterior end. (N) Acicular spine of setiger 2.

Euclymene lyrocephala (Schmarda, 1861)

Clymene lyrocephala Schmarda, 1861: 15; Augener, 1918: 483.

Body 80 mm. long. Prostomium ?. Nuchal grooves?. Cephalic rim high, crenulate posteriorly. Nineteen setigers, four short preanals plus the pygidium. Funnel with 28 subequal anal cirri. Acicular neurosetae of first three setigers probably smooth and acicular.

Type locality: False Bay, South Africa.

Records: South West Africa (26/15/i); Cape (33/18/i).

Distribution: No other records of this doubtful species.

Euclymene cf. *quadrilobata* (Sars, 1856)
(fig. 30.5.l–n)

Euclymene cf. *quadrilobata* Day, 1963a: 430, fig. 10 h–j.

No complete specimen known but generally similar to *Pseudoclymene quadrilobata* (Sars) as described by Arwidsson, 1906. Prostomium (fig. 30.5.l) small and rounded. Cephalic plate almost circular with a very low rim with a pair of lateral notches and one posterior median one. Nuchal grooves short and straight, less than half the length of the cephalic plate. Number of setigers unknown. Glandular bands well marked on setigers 4–7. Four achaetous preanals each half as long as the last setiger. Pygidial ring and funnel (fig. 30.5.m) well developed with the anus sunken in the funnel which is rimmed with 24 unequal cirri. No anal valve. Neurosetae of setigers 1–3 represented by a single stout spine with vestigial denticles (fig. 30.5.n). Later neurosetae numerous, each with four to five well marked teeth above the main fang.

Records: Cape (34/26/d).

Distribution: ?

Euclymene natalensis (Day, 1957)
(fig. 30.6.j–m)

Clymene natalensis Day, 1957: 107, fig. 7 c–d.

Body up to 120 mm. long by 3.5 mm. Prostomium (fig. 30.6.l) rounded and with a few ocelli. Nuchal grooves long. Cephalic rim high laterally and separated by a notch or step from the lower posterior portion which is smooth apart from a median posterior notch. Body with 19 setigers, two preanals and the pygidial ring and funnel which has 20 subequal anal cirri plus a longer ventral one (fig. 30.6.m). First preanal almost as long as the last setiger, second only half its length. Anus without a ventral valve. Glandular rings on setigers 2–7 and a median ventral streak from setiger 9 onwards. No dorsal glandular streak. The first three setigers each with a single smooth, acicular spine with a bent tip (fig. 30.6.j). Later neurosetae are well

developed with six teeth above the main fang and stout tendons below (fig. 30.6.k). Notosetae include numerous winged capillaries and a few fine feathered forms.

TYPE LOCALITY: Inhaca Is., Delagoa Bay.

RECORDS: Cape (34/22/d); Natal (30/30/i); Mocambique (26/32/i).

DISTRIBUTION: No other records.

Euclymene glandularis (Day, 1955)
(fig. 30.6.e–i)

Clymene glandularis Day, 1955: 427, fig. 3 a–e.

Body brown, up to 138 mm. long by 3.5 mm. Prostomium (fig. 30.6.e) rounded with numerous eye-spots. Nuchal grooves straight and three-quarter the length of the cephalic plate. Cephalic rim with 8–10 crenulations posteriorly. Body with 19 setigers and two long achaetous preanals followed by the pygidial ring and funnel (fig. 30.6.f). Setigers 1–7 increase in length, setiger 8 short, setiger 9 twice as long and subsequent setigers progressively shorter until setiger 19 is less than twice as long as broad. The first achaetous preanal is twice as long as the second, the two together are about as long as setiger 19. Pygidial funnel with 25–30 subequal cirri. Anus sunken and without a ventral valve. Setigers 2–8 with glandular rings. Setigers 9 to 14 with a broad dorsal glandular streak (fig. 30.6.i). A faint mid-ventral glandular streak from setiger 9 onwards. Notosetae include stout, winged capillaries and fine spinulose forms. Neurosetae of the first three setigers are one to three stout acicular setae with smooth curved tips (fig. 30.6.j); later neurosetae are numerous hooks with a vertical series of five to six teeth above the main fang and well marked tendon below (fig. 30.6.k).

TYPE LOCALITY: Zwartkops Estuary, South Africa.

RECORDS: Cape (from 34/18/i and 34/22/s to 33/25/e and 33/26/i); Natal (30/30/i).

DISTRIBUTION: Endemic.

Euclymene mossambica (Day, 1957)
(fig. 30.6.a–b)

Clymene mossambica Day, 1957: 109, fig. 7 e–f.

Body up to 70 mm. long by 1.6 mm. and pale brown in alcohol. Prostomium (fig. 30.6.a) rounded in front. No ocelli. Cephalic plate almost rounded and concave with a thick rim with 8–10 well marked crenulations posteriorly. Nuchal grooves straight and three-quarter the length of the cephalic plate. Body with 19 setigers, two long achaetous preanals followed by the pygidial ring and funnel (fig. 30.6.b). Anterior setigers short, sixth and seventh longer, eighth short, ninth and succeeding ones long but the last few decrease again until the 19th is twice as long as broad. First preanal two-third the length of setiger 19, second preanal much shorter and

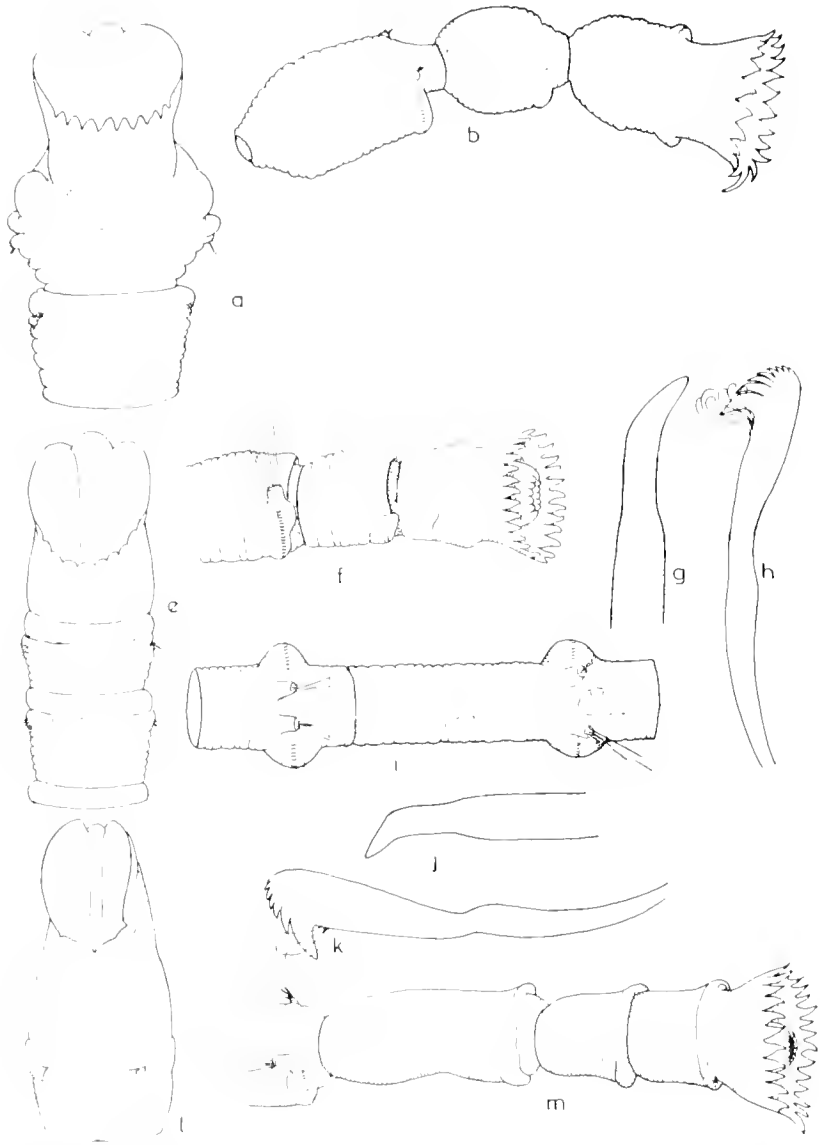


FIG. 30.6. *Euclymene mossambica*. (A) Anterior end. (B) Posterior end. *Euclymene glandularis*. (E) Anterior end. (F) Posterior end. (G) Acicular spine of setiger 2. (H) Normal hook. (I) Dorsal view of setigers 8–9. *Euclymene natalensis*. (J) Neuropodial spine of setiger 2. (K) Normal hook. (L) Anterior end. (M) Posterior end.

poorly defined. Pygidial ring well marked, funnel with 20 short cirri and a longer ventral one. Anus sunken and lacks a ventral valve. A stout glandular band at the anterior margin of setiger 1. Glandular bands also present on setigers 2–7. A narrow glandular ventral streak from setiger 9 onwards. Notosetae include stout capillaries with flattened blades and slender forms with feathered tips. A single neuropodial acicular seta with a smooth bent tip in each of the first three setigers. Later neurosetae are well developed hooks each with a vertical series of six teeth above the main fang and well developed tendons below.

Type locality: Mocambique Island.

Records: Not recorded from southern Africa.

Distribution: Mocambique Island (i).

Euclymene annandalei Southern, 1921
(fig. 30.7.a–d)

Euclymene annandalei Southern, 1921: 648, pl. 28 fig. 22 A–G, pl. 29 fig. 22 H–K.

Body up to 80 mm. long, pale in alcohol. Prostomium (fig. 30.7.a) bluntly triangular with numerous ocelli. Nuchal grooves straight and two-third the length of the cephalic plate. Cephalic rim high anteriorly but lower and divided into about eight crenulations posteriorly. Body with 21 setigers, two achaetous preanals followed by the pygidial ring and funnel (fig. 30.7.b). Anterior segments rather short, setigers 3–8 being little longer than broad; later segments longer but decrease over the last few. First preanal well developed and about two-third the length of the last setiger. Second preanal much shorter, and poorly developed. Funnel with 14 short equal cirri and a longer ventral one. Anus sunken in the funnel and without a ventral valve. Faint glandular rings on setigers 1–3; broad bands on setigers 4–8. A mid-dorsal glandular streak from setiger 9 and a narrow mid-ventral streak from setiger 7 to the pygidium. Notosetae are mainly narrow-winged capillaries anteriorly but include feathered forms posteriorly. Setigers 1–3 with a single acicular spine with a smooth bent tip (fig. 30.7.c). Subsequent neurosetae are numerous hooks each with a vertical series of five to six teeth above the main fang and well marked tendons below (fig. 30.7.d).

Type locality: Chilka Lake, India.

Records: Not recorded from southern Africa.

Distribution: Tropical Indian Ocean (e).

Euclymene luderitziana Augener, 1918
(fig. 30.7.e–h)

Euclymene luderitziana Augener, 1918: 481, pl. 6 figs. 144–145, pl. 7 figs. 186, 215, text-fig. 77.
Clymene luderitziana: Day, 1955: 427.

Body about 40 mm. long by 0.6 mm. Prostomium (fig. 30.7.e) as a broad blunt triangle with numerous eye-spots. Cephalic rim low with a pair of shallow lateral notches and one median posterior one. Nuchal grooves convergent and three-quarter

the length of the cephalic plate. Body with 23–24 setigers, two short achaetous preanals followed by the pygidial ring and funnel (fig. 30.7.f). Setigers 1–7 increase in length, setiger 8 shorter than 7, setigers 9–19 subequal, setigers 20–24 shorter. Second preanal much shorter and less distinct than the first, the two together shorter than the last setiger. Pygidial funnel with 15–20 subequal cirri and a longer ventral one. Anus sunk in the funnel and without a ventral valve. Notosetae include stout, broadly-winged capillaries and fine ones with spinulose blades. Neurosetae of setigers 1–3 (fig. 30.7.g) as a single smooth, boldly bent acicular spine per neuropodium. Later neurosetae are numerous hooks (fig. 30.7.h) each with a vertical series of six to seven denticles above the main fang.

Type locality: Luderitzbucht, South West Africa.

Records: South West Africa (26/15 i, s); Cape (32/18 i, s and 33 18/i, s, also ?34 18/s).

Distribution: Endemic.

PRAXILLELLA Verrill, 1881

Head with a slanting cephalic plate with a raised margin. Nuchal grooves straight and parallel. Up to 25 setigerous segments and four achaetous preanals. Setigers 1–3 with two to four stout neurosetae often with vestigial teeth; posterior hooks numerous with a vertical series of five to seven denticles above the main fang and chitinous tendons below. Pygidium with a ring of cirri of which the ventral one is enlarged. Anus on a protuberent cone and provided with an enlarged ventral valve. Glandular rings on anterior segments.

Typl. species: *Praxilla praetermissa* Malmgren, 1866.

Key to Species

1 Setigers 1–3 with two to four acicular neurosetae which have vestigial teeth 2
– Setigers 1–3 with one acicular neuroseta which has a smooth tip. . . . ***P. capensis***
2 Nineteen setigers and four achaetous preanals . . . . . ***P. praetermissa***
– Eighteen setigers and three achaetous preanals . . . . . ***P. affinis***

Praxillella praetermissa (Malmgren, 1866)
(fig. 30.7.i–l)

Praxilla praetermissa Malmgren, 1866: 191.
Praxillella praetermissa: Arwidsson, 1906: 192, pl. 4 figs. 136–143, pl. 9 figs. 294–296, pl. 12 figs. 361–365.
Clymene (*Praxillella*) *praetermissa*: Fauvel, 1927: 179, fig. 62 a–c.

Body up to 100 mm. long. Prostomium (fig. 30.7.i) triangular and blunt, without ocelli. Nuchal grooves two-third cephalic plate. Cephalic rim low with a pair of small lateral incisions and a posterior notch. Nineteen setigers, four long achaetous preanals plus an indistinct pygidial ring and a short funnel which has a protruding anal cone with a large ventral valve (fig. 30.7.j). Anal funnel encircled by 20–30

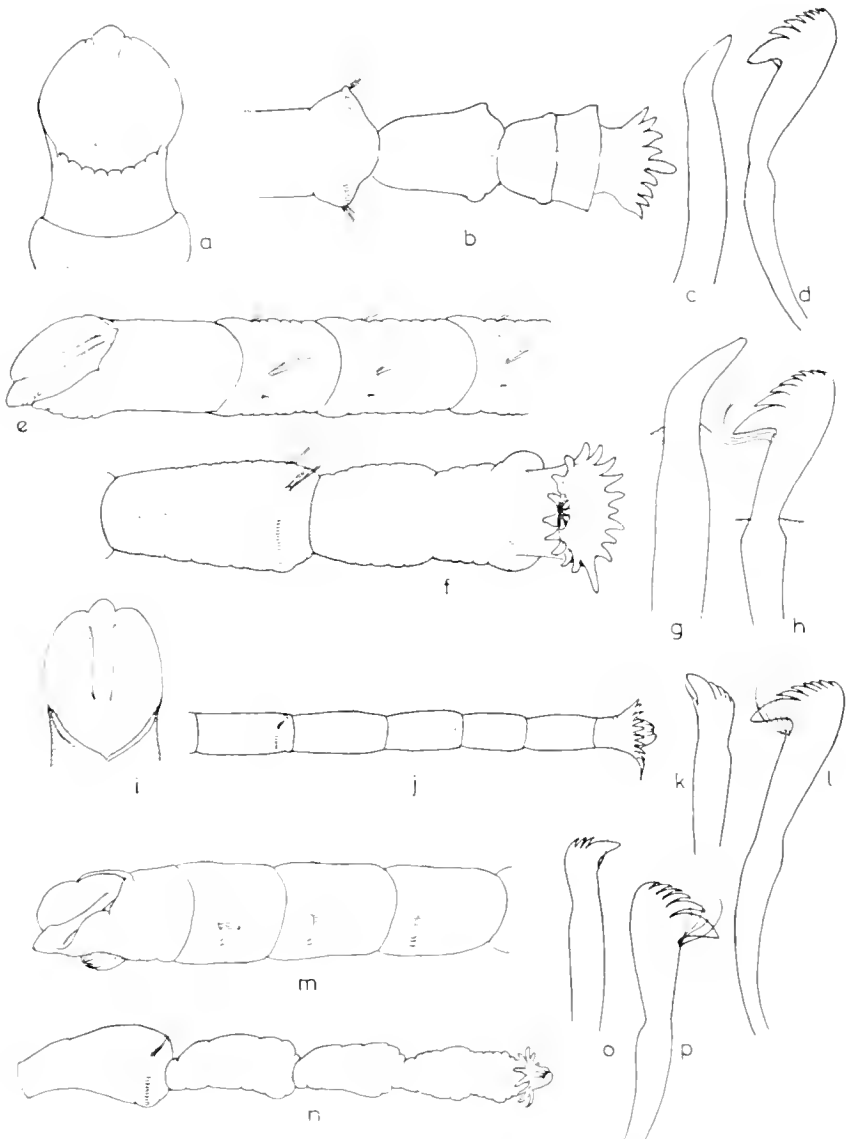


FIG. 30.7. *Euclymene annandalei* (after Southern). (A) Head. (B) Ventral view of posterior end. (C) Acicular spine of setiger 2. (D) Normal hook. *Euclymene luderitziana*. (E) Anterior end. (F) Posterior end. (G) Acicular spine of setiger 2. (H) Normal hook. *Praxillella praetermissa* (after Fauvel). (I) Head. (J) Posterior end. (K) Acicular spine of setiger 2. (L) Normal hook. *Praxillella* cf. *affinis*. (M) Anterior end. (N) Posterior end. (O) Acicular spine of setiger 2. (P) Normal hook.

cirri of which the ventral one is the largest. Two to five acicular neurosetae in the first three setigers each with a blunt rostrum surmounted by three to five vestigial teeth and a vestigial tendon below (fig. 30.7.k). Later neurosetae numerous, each with six to seven teeth above the main fang in a vertical series and fine tendons below (fig. 30.7.l).

TYPE LOCALITY: Bahusia, Norway.

RECORDS: No certain southern African record.

DISTRIBUTION: Arctic; North Atlantic from Norway to Spain; Mediterranean.

? ***Praxillella capensis*** (McIntosh, 1885)

Praxilla capensis McIntosh, 1885: 405, pl. 25 A fig. 8.
? Praxillella capensis: Day, 1955: 428.

Prostomium prominent but without eyes. Cephalic rim with a pair of lateral notches and one posterior one. Nuchal grooves straight and two-third the length of the cephalic plate. Number of setigers unknown. Anal segments and pygidium missing. Glandular bands on setigers 5–8. One pair of neuropodial acicular hooks on the first three setigers. Each with a smooth slightly curved tip. Posterior neuropodial hooks with a single vertical series of six to seven teeth above the main fang. Posterior notosetae include broad winged capillaries and narrow-bladed forms with spinulose tips. This is a doubtful species.

TYPE LOCALITY: 180 m. off Cape Town.

RECORDS: Cape (34 18 d).

DISTRIBUTION: Doubtful records from tropical western Africa (s).

Praxillella cf. ***affinis*** (Sars, 1872)
(fig. 30.7.m–p)

? Clymene affinis Sars, 1872: 412.
? Clymene (Praxillella) affinis: Fauvel, 1927: 180, fig. 62 f–l.
Praxillella cf. *affinis*: Day, 1963a: 430, fig. 10 k–l.

Body up to 23 mm. long without colour markings. Prostomium (fig. 30.7.m) bluntly triangular without eye-spots. Nuchal grooves four-fifths of cephalic plate. Cephalic rim with a pair of faint lateral notches and a single posterior notch. Rim high anteriorly in front of the lateral notches. Body with 18 setigers and three achaetous preanals preceding the pygidium which bears a circle of 12 subequal cirri and ends in a protuberant anus with a marked ventral valve (fig. 30.7.n). Setigers 1–8 two to three times as long as broad, setigers 9–15 about four times as long as broad, later segments successively shorter, the three preanals being equal in length to the last two setigers. Setigers 4–8 markedly glandular. A mid-ventral glandular line from setiger 8 onwards. Setigers 1–3 each with two to three hooks per neuropodium with three well marked teeth above the rostrum and a faint tendon below (fig. 30.7.o). Later neurosetae are well developed hooks with a vertical series

of five teeth above the main fang and obvious tendons below (fig. 30.7.p). Notosetae include a few winged capillaries and a few fine capillaries without obvious blades.

TYPE LOCALITY: Off Cape Columbine, South Africa.

RECORDS: Cape (33/17/d).

DISTRIBUTION: *P. affinis* is known from the North Atlantic (Norway (s) to southern Ireland (i)); Japan.

MALDANE Grube, 1860

Head with a well marked cephalic keel surrounded by a slanting cephalic plate with a raised margin. Nuchal grooves short, straight or slightly curved. Anterior segments without collars but with glandular rings. Pygidium with a dorsal anus below which is a flat anal plate with a low rim which is notched laterally. Neurosetae absent from the first setiger but present on all later setigers. Hooks with a transverse arc of denticles above the main fang. Notosetae include broad and slender-winged capillaries and finely feathered forms.

TYPE SPECIES: *Maldane glebifex* Grube, 1860.

Maldane sarsi Malmgren, 1866
(fig. 30.8.a–e)

Maldane sarsi Malmgren, 1866: 188; Arwidsson, 1906: 251, pl. 6 figs. 192–199, pl. 10 figs. 333–338; Fauvel, 1927: 197, fig. 69 a–i.

Body up to 100 mm. long and encased in a sausage-like mud tube. Cephalic keel (fig. 30.8.a) strongly arched and well defined in European forms, broader and more indefinite in S. African forms. Nuchal grooves (fig. 30.8.b) short, almost straight. Cephalic rim low, deeply notched laterally but smooth posteriorly. Nineteen setigers, two short, indistinct achaetous preanals plus the pygidium (fig. 30.8.c). Anal plate oval and slanting, rim chitinised and notched laterally but otherwise smooth. Notosetae include winged capillaries with markedly tapered blades anteriorly and winged capillaries plus a few spinulose forms which are slender and faintly twisted posteriorly. Neuropodial hooks (fig. 30.8.d, e) have the main fang surmounted by a transverse arc of 12 large teeth above which is a cap of very numerous small denticles.

TYPE LOCALITY: Sweden and Iceland.

RECORDS: Cape (33/25 s); Natal (29/31 's, d, vd); Mocambique (24 34 s).

DISTRIBUTION: Cosmopolitan from the Arctic to Antarctic mainly from deep dredgings; habitat mud.

ASYCHIS Kinberg, 1867

Cephalic keel low, broad and poorly marked. Nuchal grooves well developed and curved. Cephalic plate with the rim deeply incised laterally to form two lateral lobes and a curved posterior portion. Anterior segments short and without collars

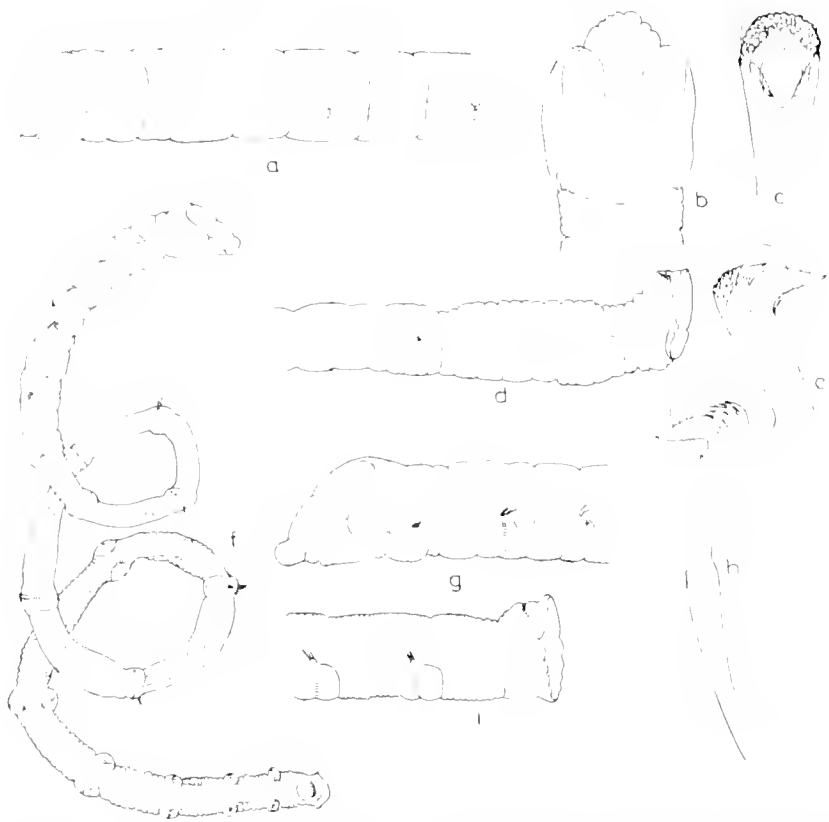


FIG. 308. *Maldane sarsi*. (A) Anterior end. (B) Dorsal view of head. (C) Face view of hook. (D) Posterior end. (E) Profile of hook. *Aychis capensis*. (F) Entire worm (twice life size). (G) Anterior end. (H) Profile of hook. (I) Posterior end.

but may have marked glandular rings. Rudimentary preanal segments present. Pygidium with a dorsal anus, below which is a slanting oval plate with a low rim which is either entire or notched laterally. Notosetae include winged and spinulose capillaries. Neurosetae absent from setiger 1 but present on all posterior setigers. Hooks with a transverse arc of denticles above the main fang.

TYPE SPECIES: *Aychis atlanticus* Kinberg, 1867

KEY TO SPECIES

1 Cephalic rim deep, forming a pocket with a smooth margin and deep lateral incisions. Dorsal papillae absent . . . . . ***A. capensis***

– Cephalic rim low with lateral notches. Two rows of dorsal papillae from setiger 6 onwards ***A. dorsofilis****

* Probably *Aychis dorsofilis* should be referred to the genus *Branchiaxychis*

Asychis capensis Day, 1961
(fig. 30.8.f–i)

Asychis capensis Day, 1961 : 521, fig. 11 e–g.

Body (fig. 30.8.f) up to 100 mm. long and encased in a toughened mud tube. Prostomium (fig. 30.8.g) broadly semi-circular in front and without ocelli. Nuchal slits strongly curved. Cephalic plate a long oval without an obvious cephalic keel. Cephalic rim deep and divided into three sections by deep lateral incisions; the paired lateral flaps are smooth and the median posterior section forms a deep, smoothly edged pocket covering half of the cephalic plate. Head and cephalic plate speckled with brown when fresh. Body with 19 setigers, one to two poorly marked achaetous preanals and the pygidial plate (fig. 30.8.i) which is vertical with the margin strongly notched laterally and scalloped ventrally. Setigers 1–8 short, 9–13 long and 14–19 again short. Setigers 1–5 diffusely glandular and setiger 6 with an anterior glandular band. From setiger 7 onwards there are lateral glandular ridges. Setiger 1 without neurosetae; subsequent setigers with a row of hooks (fig. 30.8.h) each with two transverse arcs of teeth above the main fang, the first arc with five large teeth and the second with about 20 fine denticles.

Type locality: Saldanha Bay, South Africa.

Records: Cape (from 32/18/s to 34/18/s and 32/28/s). Habitat mud.

Distribution: Endemic.

NOTOPROCTUS Arwidsson, 1906

Head with a slanting plate without a raised rim. Prostomium broad and nuchal grooves strongly curved. Up to 21 setigerous segments and four achaetous preanals. No collar on setiger 4. Setigers 1-4 with 1-3 stout acicular neurosetae usually without any sign of denticles or chitinous tendons; later setigers with a single row of numerous hooks each with a single vertical series of teeth above the main fang and chitinous tendons below. Pygidium with a dorsal anus below which is an inclined oval plate with a smooth margin.

Type species: *Notoproctus oculatus* Arwidsson, 1906.

Family **STERNASPIDAE** Carus, 1863

Body short, swollen and often ovoid or dumb-bell-shaped. It consists of few segments. Anterior end invaginable with a small prostomium and the first three segments provided with rows of acicular setae. Segment 7 with genital papillae. The next eight segments not visibly setose and the final segments with a ventral plate surrounded with setae. A terminal tuft of branchial filaments.

Records from southern Africa

Sternaspis scutata (Renier)	51Cs, —Xd
as *Sternaspis scutata* var. *africana* Augener .	33As

REMARKS

The single genus *Sternaspis* feeds on buried organic matter and burrows head downwards in stiff mud. The digging organs are short, stout spines on the first three segments. The hard anal plates cover the entrance of the burrow and the filamentous gills can be extended into the water above.

STERNASPIS Otto, 1821

Body sausage-shaped, often constricted in the middle. Few segments. Anterior segments forming an introvert and bearing stout setae. Posterior end with a pair of ventral horny shields with radiating bundles of setae at their edges. Filiform branchiae arise from two posterior dorsal plaques. Anus terminal.

Type species: *Echinorhynchus scutatus* Renier, 1807.

Sternaspis scutata (Renier, 1807)
(fig. 31.1.a–d)

Echinorhynchus scutatus Renier, 1807: 34.
Sternaspis scutata: Fauvel, 1927: 216, fig. 76 a–g.

Body (fig. 31.1.a) swollen, about 20–30 mm. long with 20–22 segments of which the first seven form an introvert. Surface velvety due to a dense covering of fine papillae. Prostomium small, papillose and normally retracted into the introvert. The first three segments each have lateral rows of about 12 acicular spines (fig. 31.1.b). A pair of genital papillae on segment 7. The next eight segments have two bundles of microscopic setae embedded in the body wall. Striated rhomboidal shields on the ventrum of the posterior end each with 15–17 bundles of capillary setae arising on its outer edges. Capillaries either fine and smooth (fig. 31.1.d) or stouter and pilose (fig. 31.1.c). Branchial filaments numerous, often rolled into spirals.

Type locality: Mediterranean Sea.

Records: Cape (33 25 s); Natal (31 29 s, d) – habitat mud.

Distribution: Cosmopolitan from the Arctic to the Antarctic in shallow to very deep dredgings on mud.

Family **OWENIIDAE** Rioja, 1917

Tubicolous worms encased in sandy tubes. Body elongate and cylindrical and composed of relatively few segments. Head formed of a fused prostomium and peristomium. It lacks antennae but is usually provided with a frilled food-gathering membrane. Mouth terminal. Parapodia poorly developed. Notosetae are spinulose capillaries and neurosetae are numerous long-shafted but minute hooks arranged in transverse bands. No anal cirri.

Records from southern Africa

Owenia fusiformis Delle Chiaje . 26AiWs, 27Mi, 28Mi, 32PiCs, 33Cs, 34As, 45PiNi, 48WsdCs, 51Csd

REMARKS

Owenia is a suspension feeder which gathers floating particles on a frilly membrane around its head. There are no palps and the particles are carried along ciliated grooves to the lips which presumably act as sorting organs although the details have not been worked out. The surface of the body is glandular and probably supplies the tough, almost cartilaginous matrix of the sandy tube. The tube itself projects well above the surface of the sand in which it is embedded.

KEY TO GENERA

1 Head rounded and without a feeding membrane or palps . . . . . *MYRIOCHELE**
– Head provided with a frilly feeding membrane (fig. 31.1.g . . . . . *OWENIA*
– Head with a pair of grooved palps . . . . . *MYRIOWENIA**

OWENIA Delle Chiaje, 1844

Whole worm encased in a tough tube encrusted with imbricating sandgrains or shell fragments. Prostomium fused to the achaetous buccal segment and provided with a frilly food-gathering membrane which surrounds the terminal trilobed mouth. The first three body segments short with capillary setae only, the rest elongated with notopodial capillaries and neuropodial rows of minute long-shafted hooks.

TYPE SPECIES: *Owenia fusiformis* Delle Chiaje, 1844

Owenia fusiformis Delle Chiaje, 1844
(fig. 31.1.e–j)

Owenia fusiformis Delle Chiaje, 1844: 31; Fauvel, 1927: 203, fig. 71 a–f.

Whole worm encased in a tough cartilaginous tube strengthened by imbricating shell fragments or sand grains (fig. 31.1.e). Body (fig. 31.1.f) diffusely glandular and greenish brown; up to 100 mm. long with 20–30 segments. Feeding membrane (fig. 31.1.g) mounted on a trilobed base and incised to form six main divisions surrounding the terminal mouth which has bilobed dorsal and ventral lips. Two

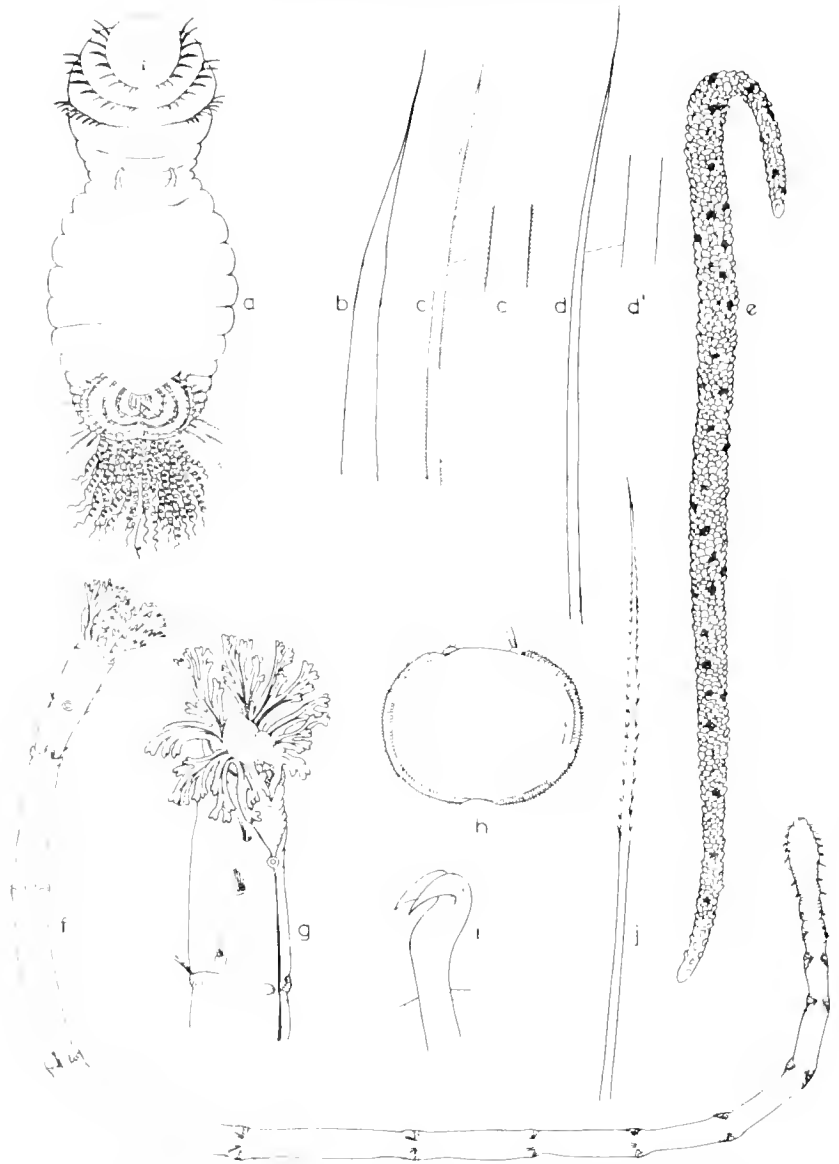


FIG. 311. *Sternaspis cutata*. (A) Ventral view of entire worm (three times life size). (B) Anterior acicular seta. (C) Posterior pilose capillary. (D) Posterior smooth capillary. *Oweniu fusiformis*. (E) Sandy tube (twice natural size). (F) Dorsal view of entire worm (three times life size). (G) Ventrol-lateral view of anterior end. (H) T.S. middle segment. (I) Hook. (J) Spinulose capillary.

ocular marks at the base of the membrane. Thoracic region of three short setigers bearing capillary setae. The first five abdominal segments much longer (fig. 31.1.h) and succeeding ones decreasing progressively in length. Notopodial capillaries with spinulose blades (fig. 31.1.j). Neuropodial hooks minute but long-shafted with two recurved teeth at the apex (fig. 31.1.i).

TYPE LOCALITY: Naples.

RECORDS: South West Africa (22/34/s, 23/14/s, d and 26/14/s, d); Cape (from 32/18/s, d to 34/25/s); Natal (29/31/i, s); Mocambique (26/32/i and 23/35/c).

DISTRIBUTION: Atlantic from Greenland (s, d) and Sweden (d) to North Carolina (i, s, d and the Gulf of Mexico (i); the English Channel (i, s) then south along the African coast to Angola (i, s, d); Mediterranean and the Red Sea (s); Indian Ocean (i, s, d); northern Pacific from the Behring Sea to Japan; Chile (s).

Family **FLABELLIGERIDAE** Saint Joseph, 1891

Body with relatively few segments, sometimes markedly tapered posteriorly. Segments essentially similar, surface often papillose. Prostomium indistinct and both it and the buccal segment are normally retracted into a membraneous sheath. When everted eight or more branchial filaments borne on a dorsal semi-circular membrane and two large grooved palps become visible. Setae of the first 1–4 segments are often elongated and directed forwards to form a cephalic cage protecting the buccal apparatus. Parapodia biramous but usually reduced to two bundles of setae arising directly from the body wall. Notosetae are simple annulated capillaries. Neurosetae may be similar to the notosetae or modified to form simple or compound hooks. Blood green. Anus terminal.

Records from southern Africa

Brada villosa (Rathke) 34Wi
Brada villosa capensis Day 51Csd
Diplocirrus capensis Day 51Csd
Flabelligera affinis Sars 35Ci, 44Ci, 51Cs
as *Trotonella luctator* Stimpson . . . 2Ci
as *Pherusa tetragona* Schmarda . . . 4Ci
as *Chloraema tetragona* Schmarda . . . 3Ci
as *Flabelligera affinis* var. *marenzelleri* McIntosh 13Ci
as *Flabelligera affinis* var. *luctator* (Stimpson) . 36Ci
as *Flabelligera luctator* Stimpson . . . 11Wi, 12Ci, 13Ci, 16Wi, 21Ci, 26Ws, 33Cs
Pherusa laevis Stimpson 51Cs
as *Stylarioides laevis* (Stimpson) . . . 44Ci
as *Siphonostomum laeve* Stimpson . . . 2Ci
as *Trophonia vanthotricha* Schmarda . . 4Ci
as *Flabelligera vanthotricha* (Schmarda) . . 16Wi
as *Stylarioides vanthotricha* (Schmarda) . . 15Cd, (pp.), 26Wi
Pherusa monoi Day 51Cs
as *Stylarioides monoi* Day 45NiCs
Pherusa parmata Grube . . . . . – Ns
as *Stylarioides parmatus* Grube . . . 27Mi, 40Ni
Pherusa saldanha Day 51Cs
Pherusa scalopiana Augener 51Cs
as *Stylarioides scalopianus* Augener . . 26Wis, 48CdWs
as *Stylarioides vanthotricha* (non Schmarda) . 15Cd, (pp.)
Pherusa topica Augener . . . . .
as *Stylarioides topicus* Augener . . . 26Ai
Promis arenosa Kinberg 3Ni, 51Cs
as *Trophonia capensis* McIntosh . . . 10Ci, 13Ci
as *Stylarioides capensis* McIntosh . . . 35Ci, 36Ci

as *Stylarioides arenosus* (Kinberg) . . . 40Ni, 44Ci
Piromis sp. 51Cs
Pycnoderma congoense Grube 33As

BIOLOGICAL NOTES

The flabelligerids are deposit feeders and use their large frilly palps to collect food particles from the surface. Possibly the dorsal semi-circle of branchial filaments may assist in feeding in certain genera such as *Diplocirrus* where they are usually stout. Some of the genera are tubicolous while others creep about under stones or burrow just below the surface of the sand. *Flabelligera affinis*, for example, is found under loose stones in rock pools and creeps around like a caterpillar by means of its hooked neurosetae. *Piromis* lives in sandy pools on rocky shores and its sandy crust provides good protection from small predators as it burrows through the surface layers. The various species of *Pherusa* are more sedentary. *P. laevis* lives in mud-filled crevices or the abandoned burrows of rock-boring bivalves. Its head, protected by the cephalic cage of long setae is at the mouth of the tube and its tail is often folded back against the body so that the faecal pellets can be expelled from the mouth of the tube. *P. swakopiana* which is dredged from muddy bottoms also has a slender tail folded forwards and it is presumed that it too lives in burrows in the mud.

THE MAIN DIAGNOSTIC CHARACTERS

Reviews of the family will be found in Haase (1915), Fauvel (1927) and Stop-Bowitz (1948a).

The main diagnostic characters include the number and arrangement of branchial filaments, the development of the cephalic cage, the structure of the neurosetae and finally the nature of the skin papillae and body covering.

The branchial filaments and the structure of the head region. The prostomium is ill-defined and fused with the peristomial segment to form the head or buccal apparatus. In preserved specimens this is usually surrounded by a membraneous *sheath* and retracted into the first few setigerous segments. When fully expanded however the head is seen to include a pair of stout *grooved palps* on either side of the mouth and a tongue-shaped or semi-circular *cephalic hood* which bears a number of *branchial filaments*. Inside the cephalic hood and immediately above the mouth is a poorly defined *prostomial swelling* which often bears two pairs of eye-spots.

The arrangement of the branchial filaments on the cephalic hood has rarely been described since the whole buccal apparatus is seldom extended sufficiently for the details to be clearly apparent. Nevertheless it is of considerable systematic importance and in doubtful cases dissection will provide additional evidence. In the genus *Piromis* the cephalic hood is short and semicircular. In *Brada* and *Flabelligera* the thickened margin of the hood bears numerous irregular rows of branchial filaments. In *Pherua* the margin is narrow and there is only a single row of filaments though the inrolled lateral margins often give the impression of two lateral bunches of filaments joined by a single dorsal row. In *Diplocirrus* there are relatively few

branchiae (10 or less) and these are arranged in an outer group of stouter cirriform projections and two to four inner ones which are usually but not always more slender and filamentous.

The cephalic cage is formed of the elongated setae of the first few setigerous segments. In most species of the genus *Brada* and in some species of *Diplocirrus* these setae are not obviously elongated and no cage is formed but in most species of *Pherusa*, *Flabelligera* and *Piromis* the cage is well developed and protects the delicate branchial filaments. The number of setigerous segments which take part in the formation of the cage is a most useful systematic character and varies from one in *Flabelligera affinis* to as many as six in *Pherusa parmata*. The cage setae are distinguished from those of the body segments by the fact that they form a compact group of long, forwardly directed setae and that they are all capillaries whether they are derived from the notopodial or neuropodial bundle. In contrast, the setae of the normal body segments are arranged at segmental intervals, they may be directed laterally or dorsally and the neurosetae are often modified to form hooks. On this basis the number of segments which contribute to the cephalic cage is most easily determined by an examination of the neurosetae. It may be added that the number of individual setae which form the cage is constant within broad limits.

The neurosetae of the body segments. The notosetae are all annulated capillaries which are of little systematic value. The neurosetae however are much more diverse. In *Brada*, *Pycnoderma* and *Diplocirrus* the neurosetae are slightly stouter than the notosetae but not very different in structure. In *Pherusa* the neurosetae are simple hooks, in *Piromis* they are pseudo-compound hooks often with bidentate apices and in *Flabelligera* they are stout compound hooks with simple apices. It should be noted that not only the shape but also the number of hooks per parapodium is important.

The skin papillae and body covering. The surface of the body is usually glandular and may be covered by debris, a crust of sand grains or by a translucent mucilaginous coat which may even be toughened to a cartilaginous consistency. Projecting into this body covering are skin papillae whose shape and distribution is of systematic importance. They may be small, wart-like and arranged in a series of annular rings or may be elongated and club-shaped. Those on the ventrum are usually the shortest, those on the dorsum longer and those around the setae and the cage longer still.

Key to Genera

1 Body covered with a clear cartilaginous cuticle. Neurosetae are annulated capillaries ***PYCNODERMA*** (p. 655)

No clear cartilaginous cuticle. Neurosetae either annulated capillaries or hooks . . . 2

2 Neurosetae are simple hooks. Branchiae filamentous and arise in a single marginal row from the cephalic hood (fig. 32.3f). . . . . ***PHERUSA*** (p. 658)

– Neurosetae are not simple hooks. Branchiae filamentous or cirriform and arise in two or several rows (fig. 32.1b). 3

3 A few stout branchiae in two distinct groups (fig. 32.3f). (Neurosetae annulated with bent or minutely hooked tips) . . . . . ***DIPLOCIRRUS*** (p. 664)

Numerous fine branchiae in several irregular rows 4

4 Body covered with a mucilaginous sheath (fig. 32.1.a). Neurosetae are stout compound hooks . . . . . ***FLABELLIGERA*** (p. 655)
– Body covered with adhesive papillae (fig. 32.1.k). Neurosetae with annulated shafts and smooth tips. (Prominent nephridial papillae) . . . . . ***BRADA*** (p. 656)
– Body encrusted with sand or debris (fig. 32.4.a). Neurosetae are pseudocompound hooks and often bidentate . . . . . ***PIROMIS*** (p. 663)

FLABELLIGERA Sars, 1829

Body flabby, translucent and covered with a thick mucilaginous sheath supported by long pedunculate papillae. Branchiae filamentous and all similar; the filaments arise in several irregular rows from the thickened margin of the triangular cephalic hood. Cephalic cage well developed and formed of the elongated notopodial and neuropodial capillaries of setiger 1. Subsequent notosetae are all annulated capillaries. Neurosetae of setiger 2 and subsequent segments are one or more stout jointed hooks.

Type species: *Flabelligera affinis* Sars, 1829

Flabelligera affinis Sars, 1829
(fig. 32.1.a–f)

Flabelligera affinis Sars, 1829: 31, pl. 3 fig. 16; Fauvel, 1927: 113, fig. 40 a–f; Day, 1961: 505, fig. 8 a.

Body (fig. 32.1.a) up to 60 mm. long with about 50 segments entirely covered with a thick mucilaginous sheath supported by long pedunculate papillae (fig. 32.1.d). Cephalic cage rather short and formed by 50 + 50 capillaries of setiger 1. Notosetae of setiger 2 and subsequent segments are about six annulated capillaries (fig. 32.1.f) supported by elongate club-shaped papillae. Neurosetae are one to two stout compound hooks per segment (fig. 32.1.c) with transversely striated shafts and a jointed brown apex (fig. 32.1.e). Two groups of 30 or more fine branchial filaments arise from the thickened margin of the triangular cephalic hood in several irregular rows (fig. 32.1.b). Two short frilly palps. A median cephalic ridge on the inner side of the cephalic hood with a pair of conical papillae at its base. Two pairs of large indistinct eyes almost fused. Puckered lips around the mouth.

Type locality: Bergen.

Records: South West Africa (26 15 i, s); Cape (from 29 16 i and 34 18 i, s to 34 23 e. i and 32 28 i).

Distribution: Arctic; Atlantic from Norway (s, d) and Greenland (s, d) to the English Channel (i, s), Canary Is. (i), Senegal (i, s); Falkland Is. (s, d) and South Georgia (d); far northern Pacific (Behring Sea to N.W. Japan).

PYCNODERMA Grube, 1877

Body long, slender and covered with a tough cartilaginous sheath in which a few elongate papillae are embedded. Cephalic cage formed by the setae of setiger 1 although the setae of the next few segments are also elongate and directed forwards. Two groups of fine branchial filaments. Notosetae are simple annulated capillaries.

Neurosetae are annulated capillaries stouter than the notosetae. Cephalic hood with numerous slender branchial filaments. A pair of short grooved palps.

TYPE SPECIES: *Pycnoderma congoense* Grube, 1877.

Pycnoderma congoense Grube, 1877
(fig. 32.1.g–j)

Pycnoderma congoense Grube, 1877a: 540; Monro, 1930: 162, fig. 65 a–d.

Body (fig. 32.1.g) about 50 mm. long, and 2 mm. broad with about 70 segments; it is not swollen anteriorly or markedly tapered posteriorly. Surface covered with a cartilaginous cuticle from which long, fine, knobbed papillae (fig. 32.1.j) project here and there. Cephalic hood with numerous slender branchial filaments in two groups. A pair of short grooved palps and three well developed lips, one dorsal and two ventro-lateral. Cephalic cage poorly developed and composed of the notosetae and neurosetae of setiger 1 plus the notosetae of setiger 2 but not the neurosetae, though these like the setae of the next few segments are directed forwards. Notosetae of normal body segments are slender annulated capillaries with flagelliform tips (fig. 32.1.i). Neurosetae are similar but stouter (fig. 32.1.h).

TYPE LOCALITY: Congo coast.

RECORDS: Not recorded from southern Africa.

DISTRIBUTION: Tropical western Africa from Liberia (s) to Angola (s).

BRADA Stimpson, 1854

Body more or less fusiform and maggot-like with few segments. Surface papillose and often covered with sand or debris. Cephalic hood poorly developed. Numerous similar branchial filaments in three to four irregular rows. A pair of palps. Anterior setae do not form a cephalic cage. Notosetae are feeble annulated capillaries. Neurosetae stouter, with more closely annulated shafts and non-annulated tips. A pair of prominent nephridial papillae on setiger 4 or 5 of the adult.

TYPE SPECIES: *Siphonostoma villosum* Rathke, 1843.

Brada villosa capensis Day, 1961
(fig. 32.1.k–q)

Brada villosa capensis Day, 1961: 510, fig. 9 g–m.

Body (fig. 32.1.k) maggot-like, about 15 mm. long for 36 segments; shape broadly cylindrical with truncate ends. Dorsal surface with long cylindrical papillae about eight times as long as broad (fig. 32.1.o). Papillae on parapodia even longer but ventral papillae small, cylindrical, about three to four times as long as broad (fig. 32.1.n). Whole surface sandy, especially the dorsum (fig. 32.1.m). Setae of first segment elongated but not forming a cage, about eight in the notopodium and four in the neuropodium. Later parapodia with about six long slender notopodial capillaries

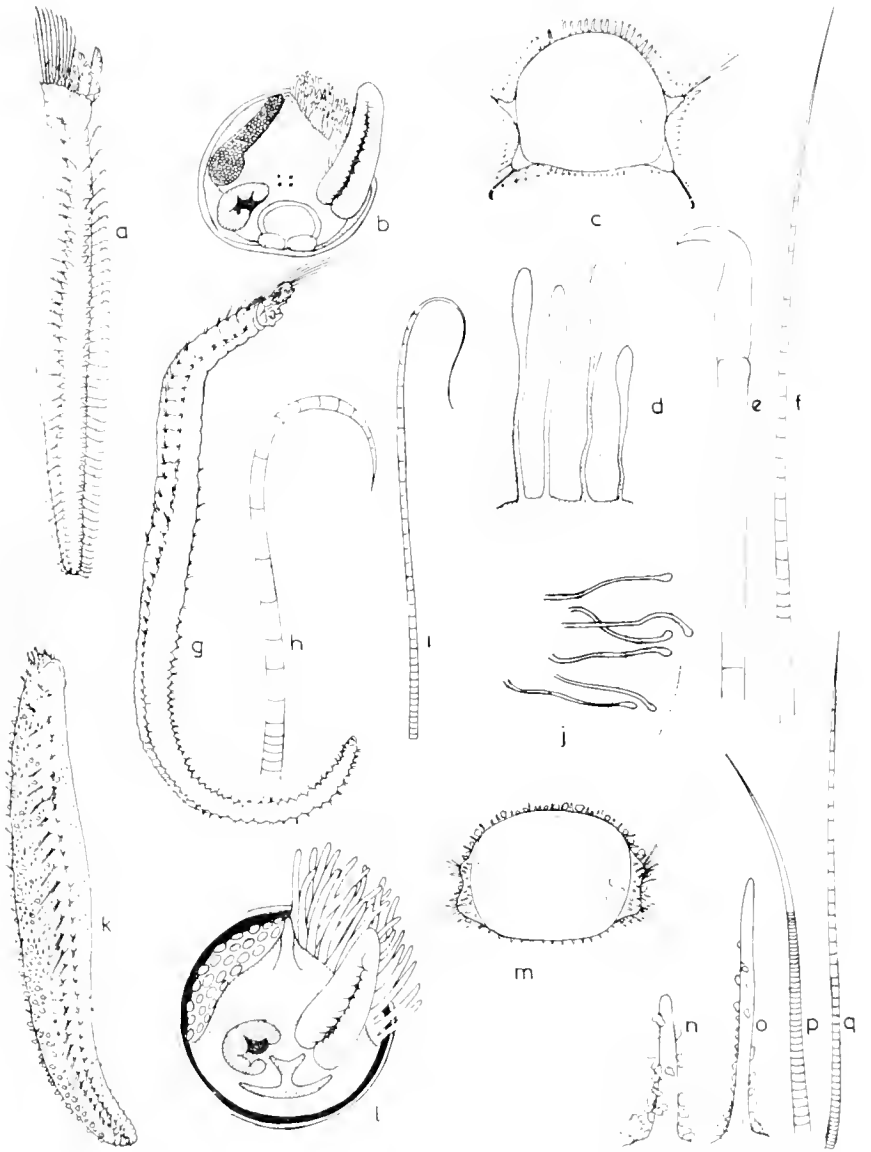


FIG. 32.1. *Flabelligera affinis*. (A) Entire worm (twice life size). (B) Anterior view of head. (C) T.S body segment. (D) Details of elongate papillae embedded in the gelatinous coat. (E) Hook. (F) Capillary seta. *Pycnoderma congoense* (from Monro, 1930). (G) Entire worm (twice natural size) (cartilaginous sheath omitted). (H) Neuroseta. (I) Notopodial capillary. (J) Papillae embedded in sheath. *Brada villosa capensis*. (K) Entire worm (three times natural size). (L) Anterior view of head. (M) T.S body segment. (N) Ventral papilla. (O) Dorsal papillae. (P) Neuroseta. (Q) Notopodial capillary.

annulated to their fine tips (fig. 32.1.q) and about four to five shorter, stouter neuropodial capillaries with the proximal half closely annulated and the distal half not annulated (fig. 32.1.p). Setiger 5 with a stout nephridial papilla antero-ventral to the neuropodium. Buccal apparatus (fig. 32.1.l) with a poorly developed cephalic hood bearing about 30 to 40 short branchial filaments arranged in a dorsal arc three to four deep, a pair of short, stout, grooved palps, an indistinct prostomial swelling without eyes and a ventral mouth with two lateral lips and one ventral lip none of which are swollen.

Type locality: Agulhas Bank, South Africa.

Records: South West Africa (22 14 s, d); Cape from 32 17 d to 35 20 d and 34 22 s.

Distribution: The subspecies *B.c. capensis* is probably endemic.

PHERUSA Oken, 1807

Body cylindrical anteriorly but often narrowed to a well marked tail posteriorly. Surface papillose and often covered with sand and debris. Introvert with a pair of grooved palps, two or three cushion-shaped lips and a dorsal cephalic hood bearing numerous similar branchial filaments along its edge. A well developed cephalic cage formed by the elongated setae of the first two or three segments. Notosetae are annulated capillaries. Neurosetae of the head region are annulated capillaries but in the body region they are simple hooks.

Type species: *Amphitrite plumosa* Muller, 1776.

Key to Species

1 Simple hooks replace the annulated capillaries in neuropodium 3 2
– Simple hooks replace the annulated capillaries in neuropodium 4 3
– Simple hooks replace the annulated capillaries in neuropodium 6 or 7. (A hard sandy shield on the head) (fig. 32.2.a) . . . . . ***P. parmata*** (p. 658)
2 Neuropodium 3 with a slender elongated hook (fig. 32.2.g); stout hooks from setiger 4. Skin with a few small wart-like papillae in two rows . . . . ***P. monroi*** (p. 660)
– Neuropodium 3 with a short stout hook. Skin with numerous long papillae giving a shaggy appearance . . . . . ***P. swakopiana*** (p. 661)
3 Body with numerous papillae covering the surface 4
– Body with two irregular rows of wart-like papillae per segment . . ***P. laevis*** (p. 661)
– Body without skin papillae; branchial filaments few and stout . . ***P.*** sp. (NAD 30B)
4 Papillae long, giving a shaggy appearance. Cage setae numerous. Many branchial filaments . . . . . ***P. tropica*** (p. 663)
– Papillae short giving a velvety appearance. Cage setae few. Few branchial filaments ***P. saldanha*** (p. 663)

Pherusa parmata (Grube, 1878)

(fig. 32.2.a–e)

Sylaminobis parmatus Grube, 1878: 199, pl. 11 fig. 1; Fauvel, 1953: 346, fig. 179 b.

Body cylindrical, about 30 mm. long for 60 segments but tapered posteriorly from about the 25th to form a narrow tail. Setiger 1 with a median bifid process on the anterior margin. A well marked sandy shield on the head (fig. 32.2.a) extending

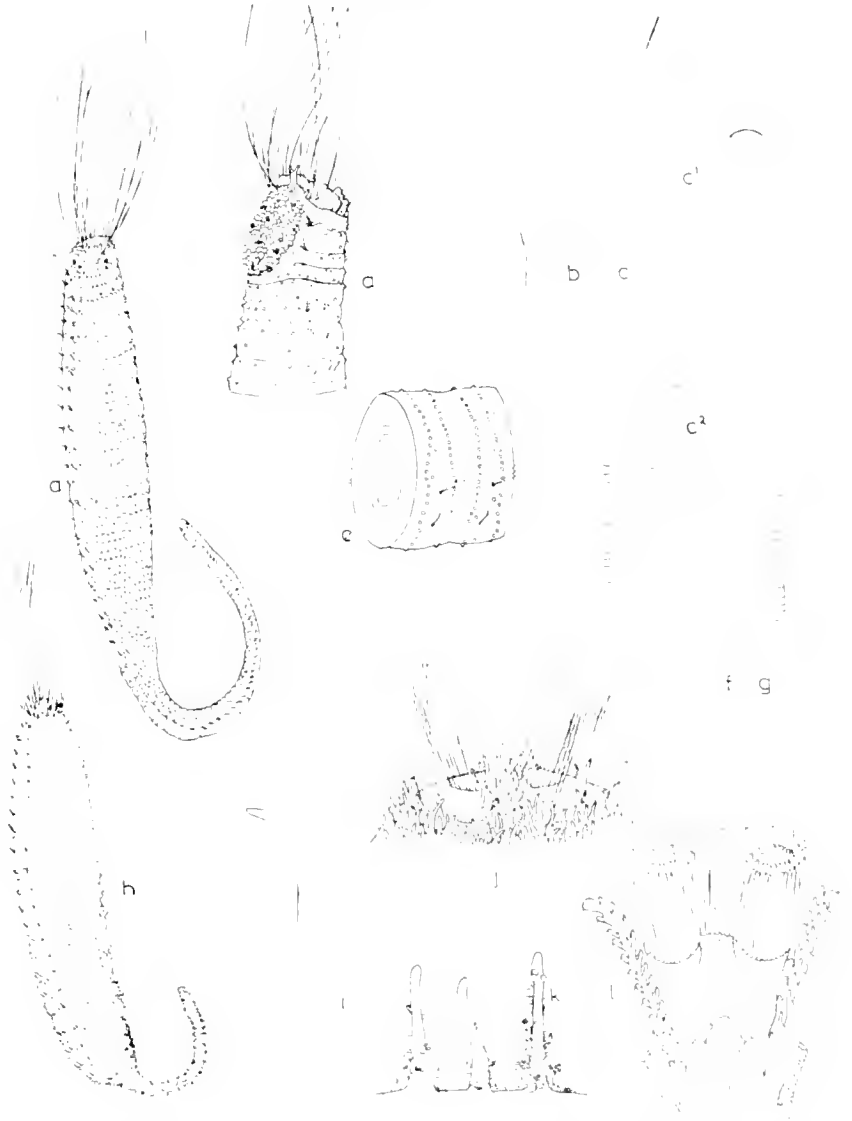


FIG. 32.2. *Pherusa parmata*. (A) Dorso-lateral view of anterior end. (B) Hook from middle neuropodium. (C, C^1, C^2) Capillary seta. *Pherusa monroi*. (D) Entire worm four times natural size. (E) Two body segments to show skin papillae. (F) Hook from middle of body. (G) Elongate hook from neuropodium of setiger 3. *Pherusa swakopiana*. (H) Entire worm (twice natural size). (I) Hook. (J) Details of anterior end. (K) Skin papillae. (L) Ventral view of buccal apparatus (dissected).

from setiger 2 to 4. Body otherwise naked apart from two sparse rows of wart-like papillae per segment. Cephalic cage well marked and formed of 38 + 38 very fine long setae of the first two segments. Setigers 3–6 do not form part of the cage but each has three to five fine capillaries (fig. 32.3.c) in both rami. A single stout simple hook (fig. 32.2.b) appears in the neuropodium of setiger 6 or 7. Behind this the number of hooks slowly increases to four at the end of the tail but most segments have two. The buccal apparatus includes two long grooved palps, a cephalic hood rolled in at each side and bearing a single row of 15 + 15 branchial filaments on either side of the cephalic ridge. Eyes not seen. One dorsal and two ventro-lateral flattened lips around the mouth.

Type locality: Philippine Is.

Records: Natal (29–31 i, s).

Distribution: Indo-west-Pacific from Madagascar and Madras to Philippine Is., and New Zealand.

Pherusa monroi (Day, 1957)
(fig. 32.2.d–g)

Stylarioides monroi Day, 1957: 103, fig. 6 n–p.
Pherusa monroi: Day, 1961: 505.

Body (fig. 32.2.d) small, seldom exceeding 20 mm. for 60 segments. It is cylindrical and tapered evenly to a distinct tail. Adherent sand grains on the first two segments but thereafter the body is naked apart from two irregular rows of small wart-like papillae per segment (fig. 32.2.e). Cephalic cage well marked and formed by 33 + 33 setae of the first two setigers. Notosetae of body segments are two to three small capillaries per segment. The neuroseta of segment 3 is a single long slender hook (fig. 32.2.g); a stout simple hook appears on setiger 4 (fig. 32.2.f) and there is one (or occasionally two) on all succeeding neuropodia. A bifid process at the dorsal entrance to the introvert. The buccal apparatus consists of a pair of stout frilled palps, three short lips around the mouth and a dorsal cephalic hood rolled in on either side and bearing a single continuous series of 14–16 branchial filaments. Four eyes on the cephalic ridge on the inner side of the hood.

Type locality: Imbotje, southern Natal coast.

Records: South West Africa (26/15 i, s); Cape (from 32/18/s and 31/19/s to 32/28 s); Natal (31/29 i).

Distribution: Southern Arabia (s).

Pherusa swakopiana (Augener, 1918)
(fig. 32.2.h–l)

Stylarioides swakopianus Augener, 1918: 433, pl. 7 fig. 234, text-figs. 61–62.
Pherusa swakopiana: Day, 1961: 506.

Body (fig. 32.2.h) up to 40 mm. long for 50 segments of which the anterior 20–25 form the stout, sausage-shaped body and the last 30 measuring 10 mm. form the slender tail. Body covered with elongate papillae (fig. 32.2.k) giving a shaggy appearance. Cephalic cage (fig. 32.2.j) formed of the long setae of setigers 1 and 2, each of the four rami contributing about six to eight to the total of 28 on each side. Cage setae supported by very long papillae. Buccal apparatus (fig. 32.2.l) includes a dorsal cephalic hood rolled in on each side and bearing a single continuous row of about 100 flattened branchial filaments. No eyes. A pair of long grooved frilly palps. Mouth with a long tongue-shaped dorsal lip above and two rather shorter ventro-lateral lips below. The whole buccal apparatus is often retracted into a long introvert.

Body segments with three to four fine notopodial capillaries. Neuropodial hooks start on setiger 3 as one per segment until setiger 17 or 18 and up to four thereafter. Each is stout and has a curved, pointed tip; shaft finely striated (fig. 32.2.i).

Type locality: Swakopmund, South West Africa.

Records: South West Africa (22 14 i, s to 26 15 i); Cape (from 32 18 s and 33 18 s, d to 33 25 s); Natal (31 29 s).

Distribution: Morocco (s); Tristan da Cunha (s); Falkland Is. (s); South Georgia (s).

Pherusa laevis (Stimpson, 1856)
(fig. 32.3.a–c)

Siphonostomum laeve Stimpson, 1856: 391.
Trophonia xanthotricha Schmarda, 1861: 16, pl. 19 fig. 165.
Stylarioides xanthotricha: Augener, 1918: 430, fig. 40.
Stylarioides laevis: Day, 1955: 421.

Body rather small, seldom exceeding 30 mm. for 65 segments; it is stout anteriorly but tapers evenly to form a well marked trail. Adherent sand grains on the anterior end but the rest of the body is naked apart from two irregular rows of rounded papillae per segment (fig. 32.3.b). Cephalic cage (fig. 32.3.a) well marked and formed of 44 + 44 setae of the first two segments. Setiger 3 with three to four fine capillaries dorsally and two to three ventrally but these are separate from the cephalic cage. A tentaculiform sensory appendage ending in three to four short processes above the introvert. Buccal apparatus consisting of a cephalic hood rolled in on each side and bearing a continuous row of about 35–40 branchial filaments. Two pairs of eyes. A pair of long grooved palps. Three cushion-like lips, one above and two below the mouth.

Notosetae of the fourth and subsequent segments are three to four small capillaries.

Neuropodial hooks start on setiger 4. There is one per segment throughout the body and each is a stout simple hook with faint transverse striations (fig. 32.3.c).

TYPE LOCALITY: False Bay, South Africa.

RECORDS: South West Africa (22 14 i to 28 16 i, s); Cape (from 29 16 i to 34 18 i, s and 34 24 i).

DISTRIBUTION: Endemic.

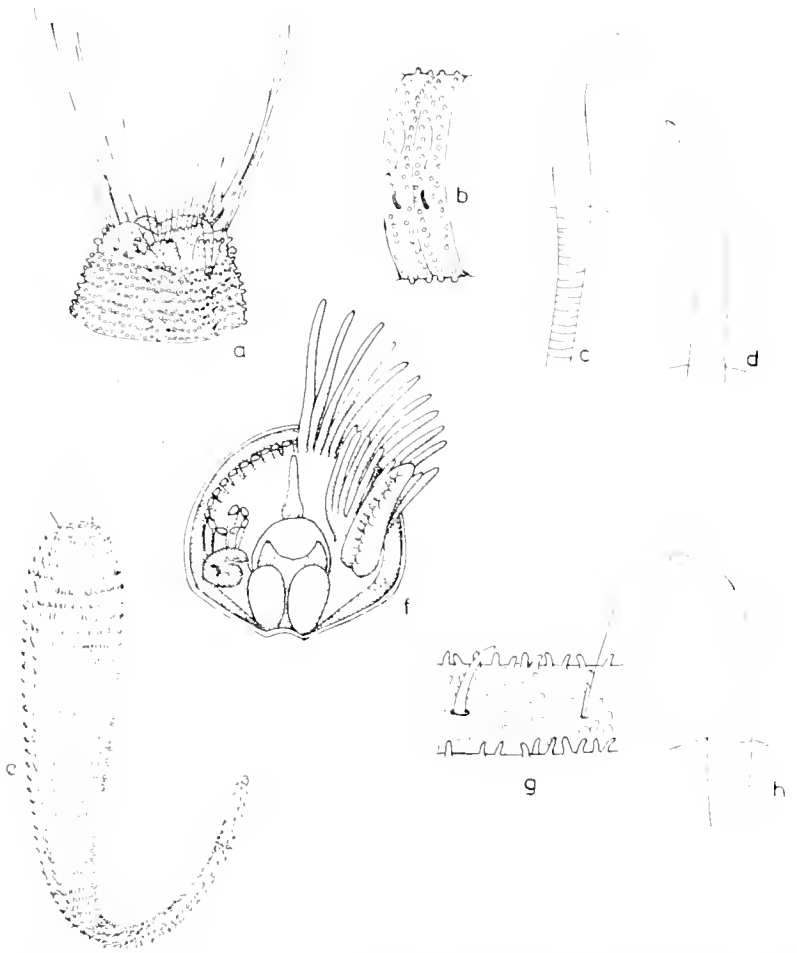


FIG. 32.3. *Pherusa bucera*. A Lateral view of head. B Lateral view of two segments showing papillae. C Hook. *Pherusa tropica*. D Hook after Augener, 1918b. *Pherusa saldanha*. E Entire worm (three times life size). F Anterior view of buccal apparatus (dissected). G Setae and skin papillae. H Hook.

Pherusa tropica (Augener, 1918)
(fig. 32.3.d)

Stylarioides tropicus Augener, 1918 : 437, pl. 6 fig. 147 ; pl. 7 figs. 220–221, text-fig. 63.

Body about 25 mm. long with 30 segments. It is sausage-shaped anteriorly with a narrow tail. Surface shaggy due to a dense covering of long papillae. Cephalic cage formed by 24–31 long capillaries of the first two setigers. Cephalic hood with 50–60 branchial filaments. Notosetae of body segments are five to eight capillaries per bundle. Neurosetae of setiger 3 are capillaries. Stout neuropodial hooks start on setiger 4, at first one to two, posteriorly three to four per segment. Each hook has a slightly curved and pointed tip (fig. 32.3.d).

Type locality : Landana, Congo coast.

Records : Not recorded from southern Africa.

Distribution : Tropical western Africa from Liberia (i) to Angola (i).

Pherusa saldanha Day, 1961
(fig. 32.3.e–h)

Pherusa saldanha Day, 1961 : 508, fig. 8 b–d.

Body (fig. 32.3.e) up to 30 mm. long for 65 segments. It is stout anteriorly and tapers evenly to a slender tail. Surface velvety with very numerous, small papillae (fig. 32.3.g) and rings of slightly longer ones marking the segments. Cephalic cage formed by a few stout setae of the first two setigers, and total about 17 on each side. Cephalic hood (fig. 32.3.f) with 32 branchial filaments in a single marginal row. Three well-marked cushion-like lips. Two palps. Setiger 3 with one to two small capillaries in each ramus. Succeeding segments with a single capillary in the notopodium and a single simple hook (fig. 32.3.h) in the neuropodium.

Type locality : Saldanha Bay, South Africa.

Records : Cape (33/18/s and 34/22/s).

Distribution : No other records.

PIROMIS Kinberg, 1867

Body elongate and tapered posteriorly. Surface papillose with a sandy crust. Buccal introvert with a pair of grooved palps and a cephalic hood bearing two groups of numerous similar branchial filaments arranged in several irregular rows. Prostomial lobe with four eyes. Cephalic cage well developed but poorly defined and formed by the long setae of the first few segments. Notosetae are crenulate capillaries. Neurosetae of the cage are similar but later ones are pseudocompound hooks ending in unidentate or bidentate apices.

Type species : *Piromis arenosus* Kinberg, 1867.

Piromis arenosus Kinberg, 1867
fig. 32.4a–d

Piromis arenosus Kinberg, 1867: 338; Hartman, 1948: 117, pl. 15 figs. 7–9; Day, 1961: 509, fig. 8 e.
Euphrosine capensis McIntosh, 1885: 303, pl. 44 figs. 7–8, pl. 23A figs. 1–3.
Stylarioides capensis: Monro, 1933: 502; Day, 1934: 63.

A large species reaching 90 mm. with about 60 segments. Body (fig. 32.4a) evenly tapered posteriorly and without a distinct tail. The whole surface is encrusted with sand and when this is peeled off each segment is seen to have a few cylindrical papillae. There are four dorsally, four ventrally (fig. 32.4b) and two on each side between the rami of the parapodia. Cephalic cage poorly defined and may be said to consist of the setae of the first two or three setigers although the setae of the fourth are not much shorter and are also directed forwards. Setiger 1 has nine dorsal and seven ventral capillaries, setiger 2 has seven dorsal and five ventral, setiger 3 has about six dorsal and five long stout setae ventrally, some of which may end in minute bidentate hooks. Thereafter all notopodia have four to six capillaries and all neuropodia have four to eight multiarticulate hooks (fig. 32.4d, d^1) which end in either unidentate or bidentate tips. The buccal apparatus (fig. 32.4c) is retractile and there is a dorsal tentaculiform process ending in two to six papillae on setiger 1 over the introvert. Buccal sheath low and membranous. Cephalic hood tongue-shaped and bears on its ventral surface two elongate groups of about 100 tentacular filaments. Individual filaments cylindrical and ringed with cilia. Palps long and grooved. Prostomial lobe with four eyes. A semicircular dorsal lip overhanging the mouth and two ventro-lateral ones.

Type locality: Port Natal [Durban], South Africa.

Records: Cape from 33 18 i, s to 32 28 i, s; Natal from 31 29 i to 29 31 i.

Distribution: Red Sea; ? Uruguay s.

Piromis sp.

Piromis sp. Day, 1961: 509.

A damaged specimen with an incomplete head but no sign of a cephalic cage. A thin film of mud and mucus forms a delicate coat which covers the body. Below this a scattering of conical papillae, longer laterally and more numerous ventrally. Notosetae are four to five stout capillaries with long internodes between annulations and fine flagelliform tips. Neurosetae are four to five pseudocompound hooks ending in falcate unidentate blades.

DIPLOCIRRUS Haase, 1915 (emend.)

Body elongate and gently tapered. Posterior segments well defined. Surface papillose and with adherent sand or debris. Buccal apparatus with a pair of grooved palps, three lips and a cephalic hood bearing a few stout tentacels along its edge and a second and inner group which are usually more slender. Prostomial lobe with four

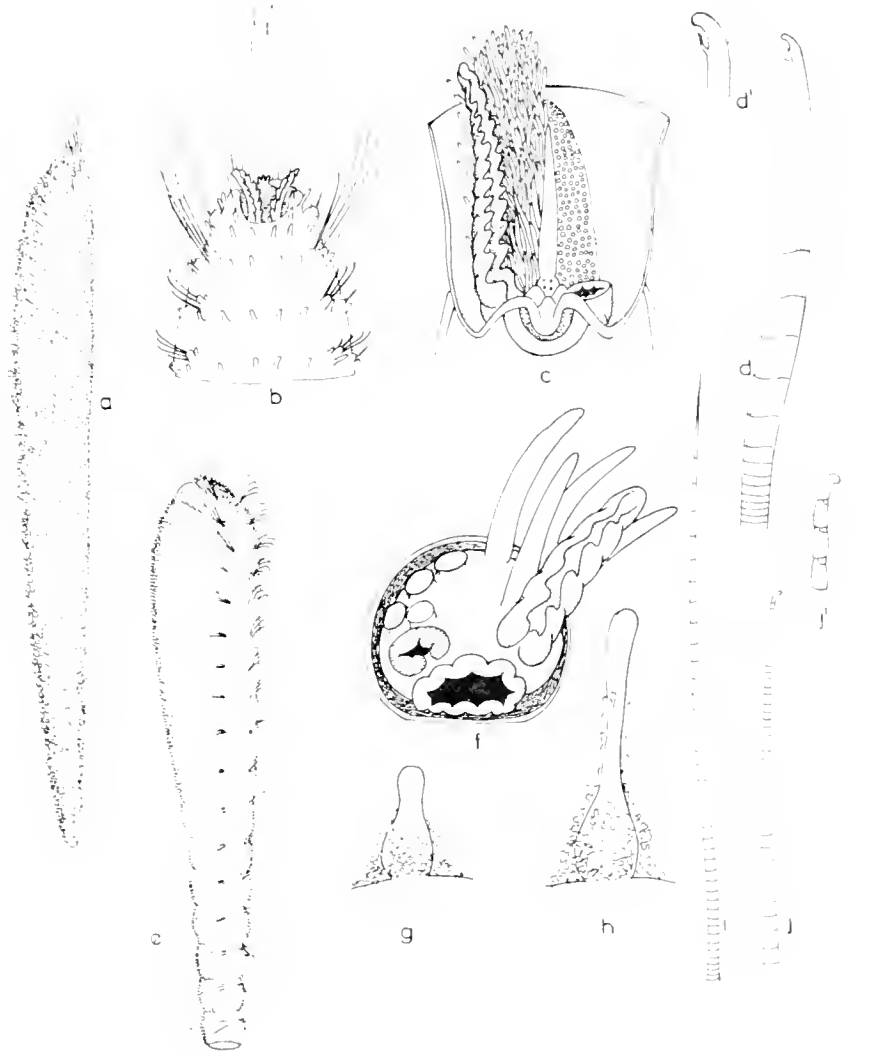


FIG. 32.4. *Piromis arenosus*. (A) Entire worm twice life size. (B) Ventral view of head end with the sandy coat removed. (C) Ventral view of the dissected buccal apparatus. (D, D¹) Neuropodial hook. *Diplocirrus capensis*. (E) Worm with posterior end missing four times life size). (F) Anterior view of dissected buccal apparatus. (G) Papilla from the ventral surface. (H) Papilla from the dorsal surface. I Notoseta. J, J¹ Neuroseta.

eyes. Cephalic cage variable, sometimes absent. Both notosetae and neurosetae are boldly annulated, the notosetae having fine hair-like tips and the neurosetae stouter with bent or minutely hooked tips. Nephridial papillae sometimes seen on setiger 5.

Type species: *Trophonia glauca* Malmgren, 1867.

Diplocirrus capensis Day, 1961
(fig. 32.4.e–j)

Diplocirrus capensis Day, 1961 : 509, fig. 9 a–f.

Body (fig. 32.4.e) arenicoliform, about 12 mm. long, with well defined posterior segments and the whole surface covered with flask-shaped papillae which are longer dorsally (fig. 32.4.h) than ventrally (fig. 32.4.g). No cephalic cage. No visible nephridial papillae. Cephalic lobe (fig. 32.4.f) semicircular with a median ridge bearing eyes at its base. Eight stout branchial cirri of which six arise from the margin of the tentacular lobe and two of the same size or slightly stouter arise from its inner surface. A pair of grooved palps twice as stout as the tentacles. Mouth ventral with poorly defined lips. Both notosetae (fig. 32.4.i) and neurosetae (fig. 32.4.j) are annulated but the neurosetae are stouter than the notopodial capillaries and end in minutely hooked tips.

Type locality: Off Port Elizabeth, South Africa.

Records: Cape (from 34° 23′ S, d to 34°25′S, d).

Distribution: Endemic.

Family **SABELLARIIDAE** Johnston, 1865

Tubicolous worms living in dense sandy tubes. Head crowned with an operculum of golden paleae. Prostomium indistinct and hidden between the opercular lobes which may be completely fused dorsally but always remain separate ventrally and bear numerous buccal cirri on either side of the mouth. A cirriform lobe and a pair of grooved palps hidden in the opercular cleft in front of the mouth. Body divided into four regions: First region of two short uniramous segments with ventral capillaries only. Second (parathoracic) region of three to four biramous segments with dorsal cirriform gills, stout oar-shaped notosetae and capillary neurosetae. Third (abdominal) region of numerous biramous segments with dorsal cirriform gills, notopodial serpuliform uncini and neuropodial capillaries. Fourth (caudal) region of rudimentary achaetous segments reflected forwards under the abdomen.

Records from southern Africa

Gunnarea capensis (Schmarda)	33Ci, 35Ci, 36Ci, 40Ni, 44Ci, 48Ci, 51Cs
as *Hermella capensis* Schmarda	4Ci
as *Sabellaria capensis* (Schmarda)	10Ci, 11Wi, 13Ci, 16Wi, 26Wi
as *Pallasia capensis* (Schmarda)	39Wi
Idanthyrsus pennatus (Peters)	40NiPi, 44Ci, 45Pi
as *Pallasia pennata* Peters	1Pi, 45Mi
as *Cryptopomatus geayi* Gravier	17Mi
Lygdamis indicus Kinberg	—Ps
as *Lygdamis indicus* var. *gilchristi* Day (non McIntosh)	40Ni
Lygdamis murata var. *gilchristi* (McIntosh)	
as *Tetreres murata* var. *gilchristi* McIntosh	32Cd
Phalacrostemma elegans Fauvel	55Ca
Sabellaria intoshi Fauvel	—Ns
as *Sabellaria spinulosa* var. *intoshi* Fauvel	27Mi, 28Mi, 40NiPi, 45Pi
as *Sabellaria guinensis* Augener	26Ai
as *Sabellaria spinulosa* var. *gilchristi* McIntosh	32Pi
Sabellaria pectinata Fauvel	—Ns
Sabellaria spinulosa alcocki Gravier	36Cs, 40Ni, 44Ci, 48Ws, 51Csd, —Nsd
Sabellaria spinulosa eupomatoides Augener	
as *Sabellaria eupomatoides* Augener	26Ai, 48Ws
Sabellaria spinulosa fucicola Augener	
as *Sabellaria fucicola* Augener	26Ws

BIOLOGICAL NOTES

The sabellariids are suspension feeders and live in strong sandy tubes attached to various objects. Most of them grow on rocks but the smaller species may be

found on the shells of living molluscs or on the fronds of algae. Although single specimens are often found, most species are gregarious and *Gunnarea capensis* forms sandy reefs covering hundreds of square metres on the shores of the western Cape. The tropical *Idanthyrsus pennatus* is less prolific but still encrusts many rocks on the Natal coast.

Gunnarea reefs seem to be best developed at the level of low water neaps and the surface of the reef is quite dry at low water of springs. At this time individual tubes are plugged with a crown of golden paleae or flattened setae which cover the surface of the head and serve both to protect the worm from predators and prevent dessication. When the tide rises and the tubes are submerged, the head is pushed out and arched back so that the two opercular lobes are distended to reveal numerous buccal cirri around the mouth. These bear rings of cilia and catch suspended food particles which are conveyed along grooves to the mouth. The mechanism whereby the heavier silt particles are eliminated is not known but the grooved palps seem to be mainly concerned in tube building. Each tube is lined with a black secretion and closed at the posterior end. The slender tail end of the worm is bent forwards against the body so that the faecal pellets are voided from the mouth of the tube.

THE MAIN DIAGNOSTIC CHARACTERS

Revisions of the morphology and systematics of the family Hermellidae (= Sabellariidae) are given by Johansson (1927) and Hartman (1944b). While the most important systematic features are found on the head, the number of parathoracic segments bearing oar-shaped setae is of generic importance and the number of teeth on the uncini differs slightly. Though the prostomium is indistinguishable and hidden in the cleft between the opercular peduncles, it may have a free cirriform projection or this may be absent. A pair of grooved palps is always present in front of the mouth but the number of lobes bearing the buccal cirri differs from species to species and is constant within limits. The opercular lobes may be quite separate dorsally or fused to varying degrees and their ends which bear the paleae may be long, fleshy and sloping or vertically truncate and entirely covered by the paleae. There may be a pair of stout dorsal hooks at the base of the opercular cleft or only small acicular setae immediately behind the external row of paleae or none at all. The operculum itself consists of one to three rows of paleae (external, middle and inner rows) and the shape of the individual paleae is constant apart from wear and the degree of development of the median tooth in the external row; thus the dorsal ones are often better developed than the lateral ones.

Key to Genera

1 One row of paleae (fig. 33.1.b) . . . . . ***PHALACROSTEMMA*** (p. 669)
– Two or three rows of paleae 2
2 Three rows of paleae. (Three parathoracic segments) 3
– Two rows of paleae 4
3 Middle row of paleae forming a cone which conceals the inner row ***PHRAGMATOPOMA****
– Middle row of paleae not concealing the inner row (fig. 33.1.i) . ***SABELLARIA*** (p. 671)
4 Opercular peduncles completely fused dorsally and lack hooks or acicular setae ***GUNNAREA*** (p. 673)
– Opercular peduncles not fused and have a pair of stout hooks basally (fig. 33.2.j) . . 5

5 Three parathoracic segments. Outer paleae bipinnate or serrated (fig. 33.2.k)
IDANTHYRSUS (p. 675)
– Four parathoracic segments. Outer paleae smooth . . . . *LYGDAMIS* (p. 675)

PHALACROSTEMMA Marenzeller, 1895

Opercular peduncles elongated. Opercular crown formed by a single circular row of long palaea and a few short acicular setae. A pair of stout hooks at the dorsal junction of the opercular lobes and one to three cirri at the ventral junction. A pair of grooved palps. Few buccal cirri.* The first two segments with fine neuropodial capillaries, then four biramous parathoracic segments followed by about 12 abdominal segments with uncini in the notopodial pinnules and capillaries in the neuropodia. Caudal region smooth and achaetous. Cirriform branchiae from the second setiger to the middle of the abdomen but may be lacking on parathoracic segments.

Type species: *Phalocrostemma cidariophilum* Marenzeller, 1895.

Key to Species

1 Opercular peduncles very long. A single large median cirrus between the opercular peduncles (fig. 33.1.b) . . . . . *P. elegans*
– Opercular peduncles short. Two to three short cirri between the opercular peduncles
*P. cidariophilum**

Phalacrostemma elegans Fauvel, 1911
(fig. 33.1.a–g)

Phalacrostemma elegans Fauvel, 1911a: 3, fig. 3; Fauvel, 1914a: 270, pl. 24, figs. 1–16; Day, 1963: 367.

A small abyssal species (fig. 33.1.a) about 17 mm. long, living in a tube of foraminiferan shells. Opercular peduncles (fig. 33.1.b) very long and separate, each bearing a single circular row of very long, spirally serrated paleae (fig. 33.1.g) and one to two much shorter stouter paleae (fig. 33.1.d). A pair of short stout hooks (fig. 33.1.c) at the dorsal origin of the opercular peduncles. A single large median cirrus between the opercular lobes and a pair of grooved palps. No true buccal cirri but four cirriform papillae on the ventral surface of each opercular lobe. The first two setigers bear capillary neurosetae only, the next four parathoracic segments bear notopodial oar-shaped setae (fig. 33.1.c) and neuropodial capillaries and the final 10–11 abdominal segments bear six-toothed uncini (fig. 33.1.f) in the notopodial pinnules and capillaries in the neuropodia. Cirriform branchiae from setiger 2 to about the sixth abdominal segment. Tail achaetous and reflected forwards.

Type locality: 1,968 metres off Madeira.

Records: Cape (34/17/a).

Distribution: Madeira (a).

*Fauvel (1927, p. 212) stated in his definition of the genus: "Pas de paquets de tentacles filiformes autour de la bouche". There are certainly no large *groups* of buccal cirri but there are a few homologous buccal cirri in *P. elegans*. It is difficult to understand how *P. cidariophyllum*, the type species of the genus, can feed without them.

FIG. 43.1. *Phalacrostemma elegans* (after Fauvel, 1914). (A) Lateral view of body (four times life size). (B) Ventral view of anterior end. (C) Oar-shaped seta. (D) Short, stout palea from opercular crown. (E) Hook from opercular peduncle. (F) Uncinus. (G) Serrated palea from opercular crown. *Sabellaria intoshi*. (H) Head end protruding from tube. (I) Operculum. (J) Outer palea in plan. (K) Middle palea in plan. (L) Middle palea in profile. (M) Inner palea in profile. *Sabellaria spinulosa cuponatoides* (from Augener). (N) End of outer palea. (O) Middle palea.

SABELLARIA Savigny, 1818

Opercular peduncles mainly fused. Operculum almost at right angles to body. Opercular crown formed of three rows of golden paleae, the external row flattened with toothed ends, the middle and inner rows both geniculate. No stout hooks at the base of the peduncles but acicular setae may be present dorsally behind the external row of paleae. A median cirrus may be present in front of the mouth. Three parathoracic segments with oar-shaped setae.

Type species: *Sabella alveolata* Linnaeus, 1767.

Key to Species

1 Inner paleae with serrated margins. (Outer paleae with tapered, denticulate ends) ***S. pectinata***
– Inner paleae with smooth margins 2
2 Middle paleae short and boat-shaped, never with a long spike. External paleae seldom with a barbed central tooth in adults . . . . . ***S. intoshi***
– Middle paleae with a long spike projecting from one end. External paleae always with a long barbed central tooth (*S. spinulosa* subspp.) 3
3 Spike of middle paleae hooked and claw-like (fig. 33.1.o) . . ***S. spinulosa eupomatoides***
– Spike of middle paleae straight or only slightly curved (fig. 33.2.b) 4
4 Inner paleae spoon-shaped. Acicular setae serrate . . . . . ***S. s. fucicola***
– Inner paleae produced at one end (fig. 33.2.c). Acicular setae smooth . ***S. s. alcocki***

Sabellaria pectinata Fauvel, 1928
(fig. 33.3.i–k)

Sabellaria pectinata Fauvel 1928: 163, fig. 3a–g; Fauvel, 1932: 210; Fauvel, 1953: 396, fig. 206 a–g.

Body up to 8 mm. long, pale in alcohol. Tube fragile. Outer paleae (fig. 33.3.i) number about 15–20. They are elongate with a series of about 12 teeth which increase in size from small denticles midway along the blade to long sharp spines at the distal end. Central spine nor markedly longer than the rest. Middle paleae (fig. 33.3.j) much smaller than the outer ones, asymmetrically spoon-shaped with the tips produced. The surface is covered with a series of scaly ridges which form cusps at the edges except on the asymmetrical flange which overlaps the next palea in the row. Innermost paleae (fig. 33.3.k) essentially similar to the middle row but the tips are longer, sharper and directed inwards. In this case the ridges form spinules towards the tip. Two to three smooth spines in the dorsal groove between the opercular peduncles. A median cirriform lobe. Buccal tentacles remarkably long and stiff.

Type locality: Gulf of Mannar, India.

Records: Natal (29°31′S).

Distribution: Tropical Indian Ocean.

Sabellaria intoshi Fauvel, 1914
(fig. 33.1.h–m)

Sabellaria spinulosa var. *intoshi* Fauvel, 1914: 139, pl. 8 figs. 50–53.
Sabellaria guinensis Augener, 1918: 498, text-fig. 82.

A large species reaching 60 mm. Tubes very hard, often forming gregarious masses. Outer paleae (fig. 33.1.j) end in five unequal teeth of which the median is longer, usually smooth but in a few dorsal palae it may be barbed in juveniles. Middle paleae (fig. 33.1.k, l) short, broad and asymmetrically boat-shaped, overlapping one another laterally. Inner paleae (fig. 33.1.m) longer and tapered but essentially similar to the middle ones. Two to three smooth acicular setae in the dorsal groove between the peduncles. A short median cirriform lobe ventrally between the opercular lobes followed by a ridge and a pair of slender grooved palps in front of the mouth. About 12 rows of numerous buccal cirri (fig. 33.1.i). Abdominal uncini with two rows of seven teeth.

Type locality: Sao-Thomé, Gulf of Guinea.

Records: Natal (29°31′ i, s); Mocambique (26°32′ i).

Distribution: Eastern Atlantic from the English Channel to tropical western Africa, Angola (i).

Sabellaria spinulosa fucicola (Augener, 1918)
(fig. 33.2.a)

Sabellaria fucicola Augener, 1918: 496, pl. 6 fig. 158, text-fig. 81.
Sabellaria spinulosa fucicola: Day, 1961: 525.

A small gregarious species about 5 mm. long with the tubes attached to algae. Outer paleae broad and end in five to eight teeth of which the median is long and barbed. Middle paleae (fig. 33.2.a) with the base produced on one side as a long erect spike which is almost straight. Inner paleae pointed with spoon-shaped ends. Three to four fine spinulose setae in the shallow dorsal cleft between the opercular peduncles.

Type locality: South West Africa.

Records: South West Africa (26°15′ i, s).

Distribution: No other record.

Sabellaria spinulosa alcocki Gravier, 1906*
(fig. 33.2.b–c)

Sabellaria alcocki Gravier, 1906d: 298, pl. 8 figs. 11–23.

A small gregarious species up to 20 mm. long with about thirty setigerous segments. Opercular crown almost at right angles to body with a deep dorsal notch between the opercular lobes. About fifteen external paleae to each lobe, each broad

* According to Hartman (1944), Gravier's species is close to, if not identical with *S. bella* Grube 1870.

and ending in five to seven teeth of which the median is always elongated and barbed. Middle paleae (fig. 33.2.b) about twelve teeth on each side, each with a cup-shaped base with the outer edge produced into a long, erect, almost straight spine. Inner row of about twelve paleae (fig. 33.2.c) generally similar to those of the middle row but with much shorter spines directed towards the centre. Numerous buccal cirri arranged in about eight rows. A median cirrus and a pair of grooved palps only slightly larger than the buccal cirri are situated on the roof of the opercular cleft in front of the mouth.

TYPE LOCALITY : Indian Ocean, 8°23N/76°28E, 186 metres.

RECORDS : South West Africa (26/15/s); Cape (?32/18/s and 34/22/s, 34/24/i to 33/27/s); Natal (30/30/i, s and 29/31/s, d).

DISTRIBUTION : Eastern Atlantic from the English Channel (i) to Africa (Senegal (s)); Persian Gulf and tropical Indian Ocean (i, s, d); Indo-China; California.

GUNNAREA Johansson, 1927

Opercular peduncles completely fused dorsally and anteriorly. Opercular crown formed of two rows of paleae set at right angles to body. No dorsal hooks or aciculars setae between opercular peduncles. A pair of grooved palps but no free median cirrus, only a ridge on the roof of the opercular cleft. Buccal cirri arranged in numerous rows. Three parathoracic segments bearing large, oar-shaped setae.

TYPE SPECIES : *Hermella capensis* Schmarda, 1861.

Gunnarea capensis (Schmarda, 1861)
(fig. 33.2.d-i)

Hermella capensis Schmarda, 1861 : 23, pl. 23 fig. 171.
Sabellaria capensis : McIntosh, 1885 : 418, pl. 25A figs. 24–25, pl. 26A figs. 11–12.

A large gregarious species forming massive reefs (fig. 33.2.d) between tide marks. Operculum (fig. 33.2.f) with an external row of twenty to twenty-five golden paleae on each side, each palea (fig. 33.2.h) with a broad blade set at right angles to the shaft; the edges are smooth and the distal end of the dorsal series are rounded and formed of two broad flattened incurving teeth; the ventral series has simple tips. Inner row with fifteen to twenty wedge-shaped paleae (fig. 33.2.g) completely covering the truncate ends of the united opercular peduncles. Ventral cleft between opercular peduncles (fig. 33.2.e) with fifteen to twenty rows of buccal cirri and a pair of small grooved palps on the roof of the cleft immediately in front of the mouth. Median cirrus reduced to a ridge. Abdomen of 45 segments. Abdominal uncini with six teeth per row (fig. 33.2.i).

TYPE LOCALITY: Table Bay, South Africa.

RECORDS: South West Africa (from 22/14/i to 26/15/i); Cape (from 29/16/i to 32/28/i); Natal (from 31/29/i to 28/32/i) – Abundant.

DISTRIBUTION: Endemic.

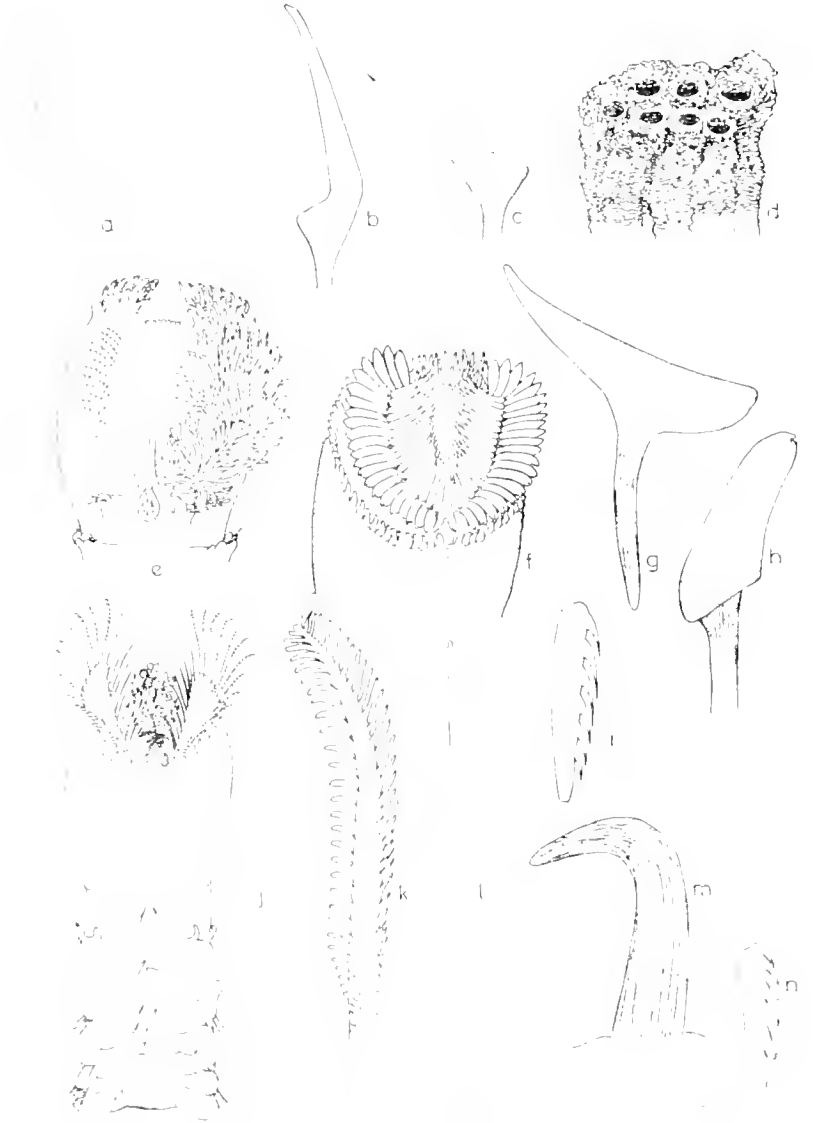


FIG. 332. *Sabellaria spinulosa fuscicola*. A Middle palea. *Sabellaria spinulosa alcocki*. (B) Middle palea. (C) Inner palea. *Gunnarea capensis*. D A few sand tubes from reef. E Ventral view of head with buccal cirri cut short on one side. (F) Dorsal view of operculum. G Lateral view of inner palea. H Plan view of outer palea. I Uncinus. *Idanthyrsus armatus*. J Dorsal view of anterior end. (K) Outer palea. L Inner palea. (M) Opercular hook. N Uncinus.

IDANTHYRSUS Kinberg, 1867
(including *CRYPTOPOMATUS* Gravier, 1909)

Opercular peduncles elongated but not completely fused; opercular crown oval and often slanting in relation to the body. A pair of stout hooks at the dorsal junction of the peduncles. Opercular crown consisting of two rows of golden paleae which do not cover the ends of the peduncles. External row of paleae long and bear lateral teeth. Opercular cleft with numerous rows of buccal cirri on the sides and a pair of grooved palps plus a median cirrus on the roof in front of the mouth. Three parathoracic segments bearing large, oar-shaped setae.

Type species: *Idanthyrsus armatus* Kinberg, 1967.

Key to Species

1 External paleae plumose with curved shafts and slender lateral denticles . ***I. pennatus***
– External paleae as serrated spikes with straight shafts and tapered denticles . ***I. armatus****

Idanthyrsus pennatus (Peters, 1855)
(fig. 33.2.j–n)

Sabellaria (Pallasia) pennata Peters, 1855: 613.
Idanthyrsus pennatus: Johansson, 1927: 88.

Opercular crown (fig. 33.2.j) with two clearly separated rows of long paleae. External paleae (fig. 33.2.k) with curved shafts and slender denticles giving the general impression of a feather or a palm leaf. Inner paleae (fig. 33.2.l) smooth with tapering tips. One to two pairs of stout dorsal hooks (fig. 33.2.m) at the bases of the opercular peduncles. About 15 rows of buccal cirri on the sides of the opercular cleft. A pair of grooved palps and a small median cirrus continued as a ridge on the roof of the opercular cleft. Three parathoracic segments with narrow oar-like setae with frayed tips. Uncini (fig. 33.2.n) with seven teeth. A large species reaching 50 mm. which makes solitary tubes or small reefs between tide marks.

Type locality: Mocambique Is.

Records: Natal from 30/30/ to 27/32 i); Mocambique (26 32 i), Mocambique Is. (i).

Distribution: Ascension Is. (i); Tropical Indo-west-Pacific from India (i) and Madagascar (i) to New Caledonia (i) and Japan (i).

LYGDAMIS Kinberg, 1867

Opercular peduncles elongate and not fused. Opercular crown long and slanting with respect to the body; it is formed of two rows of paleae which are rather small so that the fleshy ends of the opercular peduncles are exposed. A pair of stout dorsal hooks at the base of the opercular peduncles. Inner margins of opercular peduncles with several rows of buccal cirri. A median cirrus and two large grooved palps in front of mouth. Four parathoracic segments bearing oar-shaped setae.

Type species: *Lygdamis indicus* Kinberg, 1867.

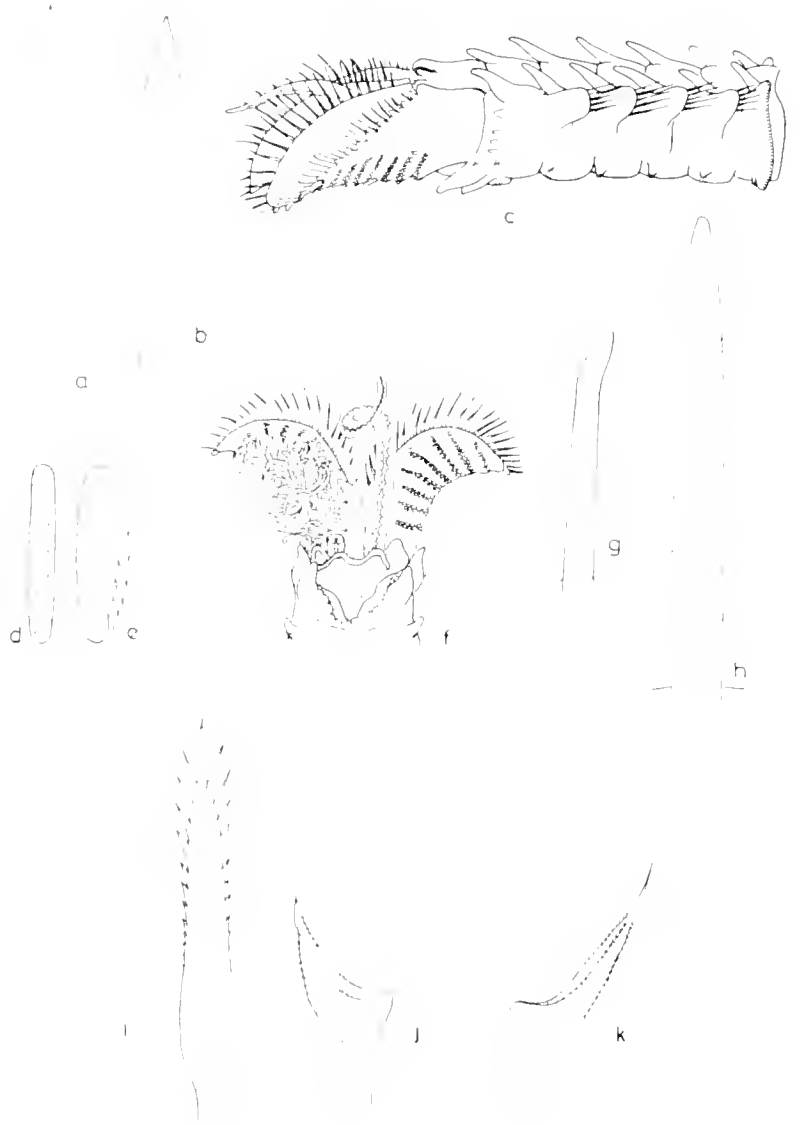


Fig. 333. *Lygdamis murata var. gilchristi* (after McIntosh, 1924). (A) Outer palea. (B) Inner palea. *Lygdamis indicus*. (C) Lateral view of anterior end. (D, E) Edge-on view and profile of uncinus. (F) Ventral view of head with the palp and buccal cirri removed from the left side. (G) Outer palea. (H) Inner palea. *Sabellaria pectinata*. (I) Outer palea. (J) Middle palea. (K) Inner palea.

KEY TO SPECIES

1 Inner paleae ending in pointed tips (fig. 33.3.b) . . . . . ***L. murata gilchristi***
– Inner paleae stout with blunt tips (fig. 33.3.h) . . . . . ***L. indicus***

Lygdamis murata gilchristi (McIntosh, 1925)
(fig. 33.3.a–b)

Tetreres murata var. *gilchristi* McIntosh, 1925: 76, pl. 10 figs. 10–12.

Operculum a long oval formed of outer and inner rows of paleae mainly imbedded in the flesh. Outer paleae (fig. 33.3.a) slightly tapered and end in blunt tips. Inner row (fig. 33.3.b) shorter, swollen in the middle and end abruptly in pointed tips. Four parathoracic segments with oar-shaped setae. Abdominal uncini with eight teeth. Tube broad and composed of sand grains and foraminiferan shells. A deep water species.

TYPE LOCALITY: South Africa, 33°25S/17°24E in 476 metres.

RECORDS: Cape (33/17/d).

DISTRIBUTION: A single record only.

Lygdamis indicus Kinberg, 1867
(fig. 33.3.c–h)

Lygdamis indicus Kinberg, 1867: 350; Johansson, 1925: 8, fig. 2, 2–7.

Operculum (fig. 33.3.c) oval and slanting. External paleae (fig. 33.3.g) about 25 on each side; each smooth, straight and tapered to the recurved tip; margins finely striate in juveniles. Inner paleae (fig. 33.3.h) about 16 on each side; each much stouter with a blunt end. A tapered median cirrus and a pair of large grooved palps in front of the mouth (fig. 33.3 f). About 8–10 rows of slender buccal cirri on the inner sides of the opercular peduncles. Abdominal uncini (fig. 33.3.d, e) with two rows of eight to nine teeth each.

TYPE LOCALITY: Bangka Straits, East Indies.

RECORDS: Natal (30/30/i, s).

DISTRIBUTION: Tropical Indo-west-Pacific.

Family **PECTINARIIDAE** Quatrefages, 1865

Tubicolous worms encased in free, tapered, sandy tubes open at both ends. Body short with an anterior operculum and three distinct regions. Prostomium indistinct. The buccal segment forms a broad opercular plate on the dorsal surface of the head and bears a fan of stout paleae anteriorly. A cephalic veil derived from the prostomium forms a hood in front of the mouth which is surrounded by numerous buccal tentacles. Two pairs of tentacular cirri, the first on the buccal segment and the second on segment 2 which is very short. Segments 3 and 4 usually bear lamellated gills. Segments 5–7 short and uniramous with notopodial capillaries only. The next 12–13 segments are biramous with geniculate notosetae dorsally and rows of uncini ventrally. The last few (? 5) segments form a flattened plate or scaphe with hooks at its base.

Records from southern Africa

Pectinaria (*Amphictene*) *capensis* (Pallas) . .	6Ci, 13Ci, 44Ci, 51Cs, 56Ws
as *Nereis cylindraria capensis* Pallas, 1778 .	
as *Sabella capensis* Linnaeus, 1788 . .	
as *Sabella chrysodon* Linnaeus, 1788 . .	
as *Sabella indica* Linnaeus, 1788 . .	
Pectinaria (*Pectinaria*) *papillosa* Caullery . .	40Pi
Pectinaria (*Lagis*) *koreni* Malmgren . .	48Wsd
Pectinaria (*Lagis*) *koreni cirrata* Day . .	56Ns
Pectinaria (*Lagis*) *neapolitana* Claparède . .	51Cs
as *Pectinaria pseudokoreni* Day . . .	44Ci, 45Ni

BIOLOGICAL NOTES

Pectinaria is a deposit feeder and constructs a chimney-shaped tube most of which is buried in the sand. The tube is quite free and may be constructed of sand grains, sponge spicules, foraminiferan shells or even shell fragments. It is cylindrical and often faintly curved like a hollow tusk. Only the open tip of the tube projects above the surface of the sand and the respiratory current is drawn down the tube, over the tail of the worm and along the body to the gills. The head is provided with a thick fleshy operculum and a row of flattened setae (paleae) which are used for burrowing. Behind these is the mouth surrounded by numerous grooved buccal tentacles which gather food particles buried in the sand and help in the construction of the tube.

THE MAIN DIAGNOSTIC CHARACTERS

Reviews of the family will be found in Hessle (1917), Fauvel (1927), Nilsson (1928) and Hartman (1941).

As noted by Fauvel, the fusion of the anterior segments makes it difficult to determine their homologies and the first uncigerous segment has been reckoned as the 7th, 8th or 9th by different workers. The view adopted here is that the

first uncigerous segment is the 8th but luckily the exact number of anterior segments is not significant from a taxonomic point of view. The most useful characters are the opercular margin, the cephalic veil, the number of uncigerous abdominal segments, the number of tooth rows on the uncini, the separation of the scaphe from the rest of the body, and, on the species level, the nature of the tube.

The *operculum* is a stout muscular plate which forms the antero-dorsal surface of the head. It is surrounded dorsally and laterally by a raised *opercular margin* or rim which may be smoothly continuous or divided into a number of triangular lappets or "teeth". Ventro-laterally the operculum bears the first pair of *tentacular cirri* and ventrally it gives rise to a series of 20–30 golden *paleae* by means of which the worm burrows in the sand. The paleae are uniform in shape and their number varies with the size of the worm. They are of little taxonomic importance.

The *cephalic veil* (= *antennular membrane* of Hartman) is a curved membrane which bears eyes in juveniles and lies immediately behind the paleae and protects and encloses the grooved *buccal tentacles*. In the genus *Petta* the cephalic veil has a smooth margin but in *Pectinaria* the margin bears numerous long papillae and the veil is said to be *fringed*. The relations between the veil and the operculum are well shown by Hessle. In *Pectinaria auricoma* the veil is completely free from the operculum and forms a ventral semicircle around the front and sides of the numerous buccal tentacles. In *Pectinaria koreni* the veil is merely an anterior arch whose ends are fused to the operculum at the bases of the tentacular cirri. In *Pectinaria neapolitana* there is an intermediate condition; the veil is a semicircle extending around the sides of the buccal tentacles as in *P. auricoma* but there are low bridges attaching the veil to the bases of the tentacular cirri. Such a veil is said to be partially fused to the operculum.

A low ventral ridge unites the first pair of tentacular cirri behind the mouth. The second pair of tentacular cirri are united by a more distinct ventral ridge usually incised to form glandular lobes but occasionally produced to form triangular papillae. Two achaetous segments follow with lamellate branchiae laterally and glandular pads ventrally, then the first three setigers with capillary notosetae and glandular ventral pads but no neurosetae. This marks the end of the thorax.

The *abdomen* consists of 12 or 13 segments provided with *notopodial capillaries* and *neuropodial uncini* and behind these, 0–2 segments which lack uncini but may possess small bundles of notopodial capillaries. The capillaries are winged, some are said to have smooth tips and others spinulose tips, but probably all are spinulose under high magnification; they are not of systematic importance. The uncini on the other hand provide valuable characters. They are provided with both major and minor teeth above a horseshoe-shaped gouge. The major teeth may be arranged in one, two or even three to four vertical rows and Hartman has separated *Cistenides* with one row of teeth from *Pectinaria* with two or more rows of teeth. These are regarded here as subgenera. Unfortunately the number of teeth is difficult to determine unless the uncini are viewed edge-on.

The *scaphe* is a short foliaceous caudal region which is large and well defined in *Pectinaria* but small and poorly defined in *Petta*. It bears a number of short, acicular *scaphal hooks* where it joins the abdomen and an *anal ligule* with an *anal cirrus* terminally. The number of scaphal hooks is somewhat variable within an individual species, e.g. 3–4; 6–10; 13–15 on each side but the shape and ornamentation of the scaphe is of some value.

The *tube* is always conical and open at both ends. In some species it is almost straight and in others it is obviously curved. Some species use irregular sized sand grains, others small uniform sand grains and some even select short fragments of sponge-spicules which are arranged like bonded bricks in the construction of the tube.

Key to Genera

1 Margin of cephalic veil smooth. Scaphe indistinctly separated from the abdomen. ***PETTA****
– Margin of cephalic veil with cirriform projections. Scaphe distinctly separated from abdomen . . . . . ***PECTINARIA***

PECTINARIA Savigny, 1818

Head with an opercular plate having a smooth or dentate margin and a row of paleae ventrally. Cephalic veil with marginal cirri and may be free from or united to the opercular plate. Two pairs of tentacular cirri and numerous buccal tentacles. Usually two pairs of lamellate gills. Neuropodial uncini on 12–13 segments starting from setiger 4. Notosetae are winged capillaries with denticulate tips. Uncini serpuliform with a gouge and numerous teeth. Scaphe separate from the abdomen and lacks eyes.

Type species: *Nereis cylindraria belgica* Pallas, 1766.

Key to Subgenera and Species

1 Cephalic veil partly or entirely fused to the operculum. (Opercular rim smooth. Twelve segments with uncini. (Subgenus ***LAGIS***) 2
– Cephalic veil free from the operculum (fig. 34.2.e) 4
2 Cephalic veil partly fused to the operculum (fig. 34.1.c) . . . . ***P.*** (***L.***) ***neapolitana***
– Cephalic veil entirely fused to the operculum (fig. 34.1.b) 3
3 Ventral flange joining second pair of tentacular cirri with 8–10 blunt lobes ***P.*** (***L. koreni koreni***
– Ventral flange joining second pair of tentacular cirri with 15–20 long papillae ***P.*** (***L. koreni cirrata***
4 Opercular rim dentate (Subgenus ***AMPHICTENE***). Thirteen segments with uncini. (Tube made of sponge spicules (fig. 34.2.b[1]) . . . . . ***P.*** (***A.***) ***capensis***
– Opercular rim smooth 5
– Uncini with major teeth in a single row (Subgenus ***CISTENIDES***) . (No South African spp.)
Uncini with major teeth in two or more rows (Subgenus ***PECTINARIA***). (Thirteen segments with uncini. Scaphe papillose) . . . . . ***P.*** (***P.***) ***papillosa***

Pectinaria (*Lagis*) *neapolitana* Claparède, 1870
(fig. 34.1.a–f)

Pectinaria neapolitana Claparède, 1870: 123.
Pectinaria pseudokoreni Day, 1955: 432, fig. 5 a–c.

Body (fig. 34.1.a) tapered and up to 25 mm. long. Cephalic rim smooth. Veil (fig. 34.1.c) partly fused to operculum being attached by a low fold to the base of the first tentacular cirrus and also continuing posteriorly along the sides of the buccal cirri. About 12 velar cirri. Posterior to the mouth the ventral surface of the second tentacular segment forms a transverse ridge with about 10 blunt triangular lobes. Three anterior segments bearing notosetae only. Twelve abdominal segments with both notosetae and uncini followed by two achaetous prescaphal segments. Five scaphal hooks. Scaphe (fig. 34.1.e) oval with a lobed margin. Anal ligule with a small anal papilla. Uncini (fig. 34.1.f) with two to three rows each with about eight major teeth and three to four minor teeth preceding the basal gouge. Notosetae mainly with denticulate tips (fig. 34.1.d). Tube composed of coarse sand grains irregularly arranged (fig. 34.1.b).

Type locality: Naples.

Records: South West Africa (26/14/d and 26/15/s); Cape (from 33/18/s to 34/23/i, s and 33/25/e, s).

Distribution: Mediterranean.

Pectinaria (*Lagis*) *koreni koreni* Malmgren, 1865
(fig. 34.1.g–h)

Lagis koreni Malmgren, 1865: 360.
Pectinaria (*Lagis*) *koreni*: Fauvel, 1927: 221, fig. 77 a–i.

Cephalic rim smooth. Ten to fifteen golden paleae on each side. Cephalic veil (fig. 34.1.h) completely fused to the operculum and does not continue beyond the point where its edges are fused to the bases of the first tentacular cirri. About 20 velar cirri. Posterior to the mouth the ventrum of the segment with the second pair of tentacular cirri bears eight to ten blunt triangular lobes. Three anterior segments with notosetae only. Twelve abdominal segments with notopodial capillaries and uncini followed by two achaetous prescaphal segments. Notosetae include smooth-winged capillaries and others with saw-edged tips. Uncini (fig. 34.1.g) pectiniform with three to four rows each with six to eight major teeth and four indistinct minor ones preceding the basal gouge. Three pairs of scaphal hooks. Scaphe oval with five lateral scallops on each side of which the first three bear papillae. Anal ligule broader than long with a small anal cirrus. Tube almost straight and composed of sand grains of varying size.

Type locality: Stavanger, Norway.

Records: South West Africa (23/14/d).

Distribution: Eastern Atlantic from Scotland (s) and Norway to Morocco (s) and tropical western Africa (s); Mediterranean.

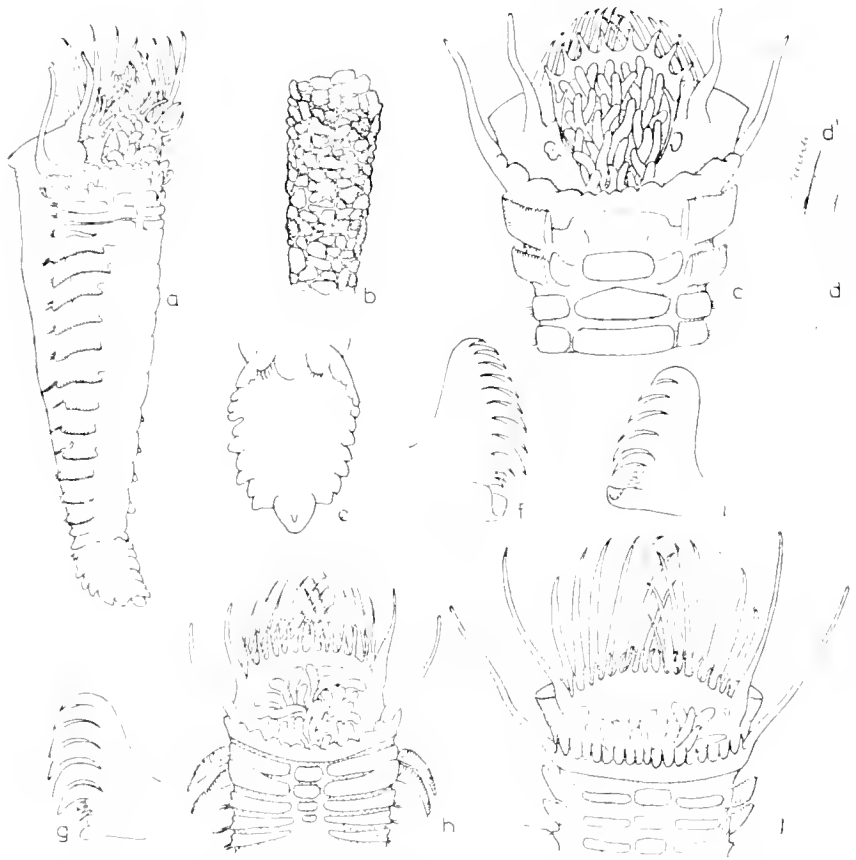


Fig. 34.1. *Pectinaria* (*Lagis*) *neapolitana*. (A) Entire worm (three times natural size). (B) Part of tube. (C) Ventral view of head. (D, D1) Notopodial capillary and details of tip. (E) Scaphe. (F) Uncinus. *Pectinaria* (*Lagis*) *koreni koreni* (after Fauvel). (G) Uncinus. (H) Ventral view of head. *Pectinaria* (*Lagis*) *koreni cirrata*. (I) Uncinus. (J) Ventral view of head.

Pectinaria (*Lagis*) *koreni cirrata* Day, 1963
(fig. 34.1.i–j)

Pectinaria (*Lagis*) *koreni cirrata* Day, 1963a: 434, fig. 11 a.

A small species about 10 mm. long, 10 + 10 paleae. Operecular rim high and smooth. Veil completely fused to the operculum and ending where its sides are fused to the bases of the first pair tentacular cirri. Fourteen velar cirri. First pair of tentacular cirri slender and longer than the paleae; second pair shorter. Three

small lobes inside the veil and just mediad to tentacular cirrus 1. Posterior to the mouth the ventrum of the segment bearing the second pair of tentacular cirri forms a ridge bearing 15–20 slender cirri (fig. 34.1.j). Second pair of gills smaller than the first. Three anterior segments with notosetae only. Twelve abdominal segments with both notosetae and uncini followed by two achaetous prescaphal segments. Uncini (fig. 34.1.i) with two rows each with six to seven major teeth and several minor ones above the gouge. Scaphal hooks four to six on each side. Scaphe oval with a flanged margin incised to form a median and five to six lateral lappets. Anal ligule tongue-shaped with a small anal cirrus. Tube composed of coarse sand grains.

Type locality: Dredged off Natal, South Africa.

Records: Natal (29/32/s).

Distribution: A single record.

Pectinaria (*Amphictene*) *capensis* (Pallas, 1776)
(fig. 34.2.a–d)

Nereis cylindraria capensis Pallas, 1776: 118, pl. 9 figs. 1–2.
Pectinaria (*Amphictene*) *capensis* McIntosh, 1904: 76, pl. 7 figs. 35–36; Day, 1955: 432; Day, 1963a: 433.

A large species reaching 90 mm. (fig. 34.2.a). Cephalic rim (fig. 34.2.c) with about 20 serrations. Eleven to fifteen golden paleae on each side. Cephalic veil joined to the operculum medially but quite free from the bases of the first pair of tentacular cirri. Two clavate papillae and a conical lobe between the sides of the veil and the base of the first tentacular cirrus. Twenty to thirty velar cirri. Both pairs of tentacular cirri shorter than the paleae. Ventrum of the segment bearing the second pair of tentacular cirri incised to form about 12 square lappets. Lateral swellings dorsal to the origin of the second tentacular cirrus and first pair of gills. Three anterior segments with notosetae only. Thirteen abdominal segments with both notosetae and uncini followed by one achaetous prescaphal segment. Seven to eight scaphal hooks on each side. Scaphe oval with two pairs of marginal cirri proximally and one pair distally. Anal ligule shield-shaped with a slender anal cirrus often detached. Notosetae include a row of broad, smooth-winged capillaries and a row of capillaries with a basal spur and a spinulose blade. Uncini (fig. 34.2.d) with two rows of six to eight major teeth and a crowded group of four rows of about eight minor teeth preceeding the basal gouge. Gouge large and horseshoe-shaped in plan. Tube (fig. 34.2.b, b^1) straight and composed of short lengths of sponge spicules arranged like rows of bricks or occasionally of small, even-sized sand grains regularly arranged in rows.

Type locality: Cape of Good Hope.

Records: South-West Africa (26 15 s and 28 16 s); Cape (from 32 18 s and 33 18 i, s to 34 18 s).

Distribution: ? Red Sea.

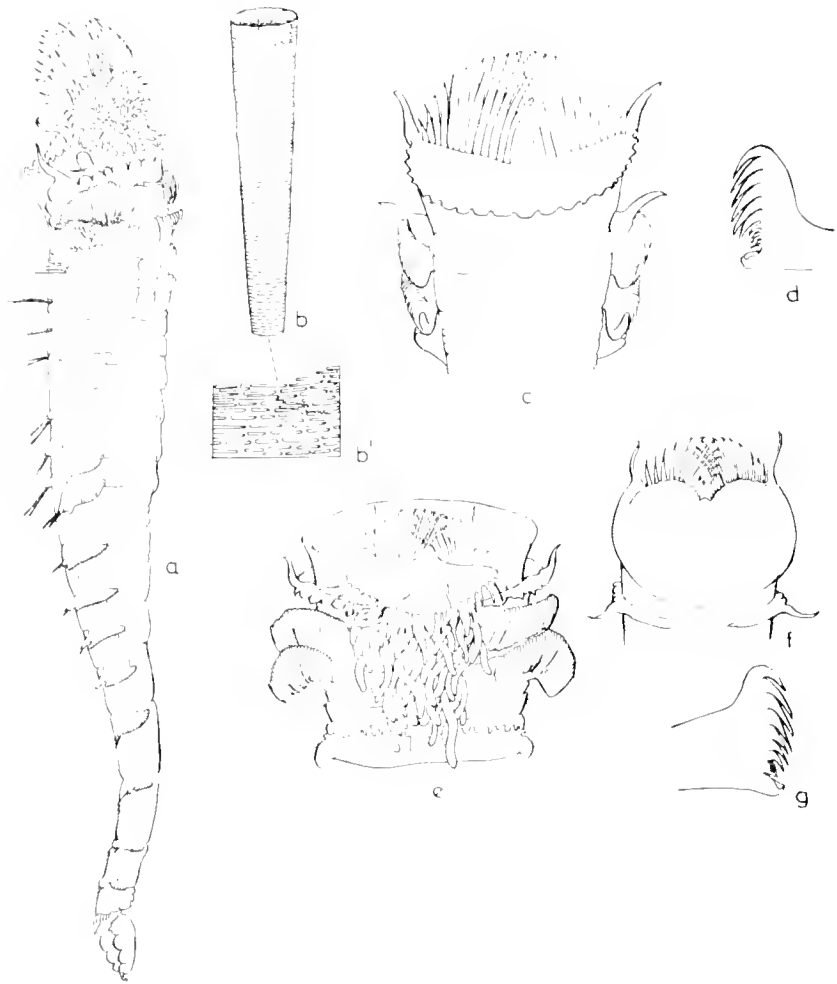


Fig. 54.2. *Pectinaria* (*Amphictene*) *capensis*. (A) Entire worm (twice life size). (B, B1) Tube with part magnified to show details. (C) Dorsal view of head. (D) Uncinus. *Pectinaria* (*Pectinaria*) *papillata*. (E) Ventral view of head with the veil folded down over the mouth. (F) Dorsal view of head. (G) Uncinus.

Pectinaria (*Pectinaria*) *papillosa* Caullery, 1944*
(fig. 34.2.c–g)

Pectinaria papillosa Caullery, 1944: 71; Day, 1951: 55, fig. 8 a.

A large stout species reaching a length of 60 mm. and 16 mm. across the operculum. Rim of cephalic plate smooth (fig. 34.2.f); 13 + 13 golden paleae. Cephalic veil (fig. 34.2.e) joined to the operculum medially but quite free from the bases of the tentacular cirri laterally. About 46 velar cirri. Both pairs of tentacular cirri small, the second pair being lateral in origin and mounted on a flange which extends from the dorso-lateral surface across the ventrum immediately behind the mouth. The ventral part of the flange has a smooth margin. The second setiger also has a prominent ventral ridge. Three anterior segments with notosetae only. Thirteen abdominal segments with both notosetae and uncini followed by one prescaphal segment with only a small bundle of notosetae. Three to four strongly curved scaphal hooks on each side. Scaphe oval, edges scalloped, surface papillose. Anal ligule cordate. No anal cirrus (? lost). Notosetae stout with narrow hispid wings and spinulose tips. Uncini (fig. 34.2.g) with two rows of about seven major teeth followed by two to three rows each with three minor teeth preceding the basal gouge. Tube composed of coarse, irregularly arranged sand grains.

Type locality: East Indies.

Records: Mocambique (26/32/i).

Distribution: East Indies.

*Very close to *P. antipoda* Schmarda.

Family **AMPHARETIDAE** Malmgren, 1867

Tubicolous worms living in fragile tubes of sandy mud. Body tapered and divided into two regions. Prostomium well developed, often with eyes but without sensory appendages. Mouth with numerous buccal tentacles for deposit feeding. Peristomium and the next segment achaetous and often partly fused. Segments III–VI primitively bear segmentally arranged dorsal branchiae but these are often reduced in number and concentrated in a transverse row across segment III. Similarly one or more bundles of setae may be reduced or absent from segments III–VI. Segment VII and 10–13 succeeding thoracic segments bear both notopodial capillaries and neuropodial uncini. Abdominal segments without notosetae but with uncini. Pygidium often with anal cirri.

BIOLOGICAL NOTES

The ampharetids are deposit feeders which gather food particles from the surface of the sand or mud by means of buccal tentacles which can be extruded from the mouth. They construct fragile tubes of mud or sometimes sand grains and attach them to sponges, compound ascidians or the shells of living molluscs. They are seldom found on stones and very few ampharetids live in shallow water but they become common with increasing depth.

THE MAIN DIAGNOSTIC CHARACTERS

Reviews of the family and keys to the genera will be found in Hessle (1917), Chamberlin (1919), Fauvel (1927), Uschakov (1957) and Day (1964). It is important to note that Hessle and Uschakov regard the paleal (or first branchiferous) segment as segment II whereas the other workers quoted regard the paleal segment as segment III. This is also the view adopted in the present work.

The important taxonomic characters include the structure of the prostomium, the nature of the buccal tentacles, the branchiae, the setation of segments III to VI, the number of uncigerous thoracic segments, the number of abdominal segments and the structure of their parapodia, the shape of the uncini and the development of the anal cirri.

The head and buccal tentacles. The *prostomium* (or tentacular membrane of Hessle) is a flattened hood over the mouth and bears eyes, nuchal slits and sometimes a pair of *glandular ridges* which diverge outwards towards the antero-lateral margins. The buccal *tentacles* arise from the upper lip and may be retracted into a special cavity above the true mouth. The tentacles themselves are papillose or smooth with a groove along one side as in the Terebellidae. In a few species the tentacles are borne by an eversible probosciform lobe or tongue (fig. 35.2.a').

The branchiae, nephridia and setation of segments III–VI. The four branchial segments are often telescoped or partially fused and some of the branchiae and bundles of setae may be missing. Primitively there are four pairs of segmentally arranged gills as is shown by the blood vessels but in many genera the gills are concentrated to form a transverse row mounted on a *branchial ridge* across segment III. Further the number

of paired gills may be reduced from four to three or even two. The individual gills are usually smooth and tapering but in certain species they may bear rows of small lamellae or papillae. The number of nephridia may be reduced in the same way as the gills, and in *Sabellides* the enlarged anterior pair of nephridia open on a pair of prominent *nephridial papillae* mounted on the branchial ridge between the right and left groups of gills. In *Anobothrus* the two nephridia open on a single median papilla.

In the subfamily Melinninae the neurosetae of the branchial segments take the form of minute *acicular setae* deeply embedded in a lateral fold which slants upwards and backwards from below the mouth to the sides of segment VI. The two folds are united by a *dorsal crest* across segment VI. In the subfamily Ampharetinae neurosetae are entirely lacking from the branchial segments and even the notosetae may be reduced or lacking from some segments. Segment IV very often lacks notosetae and is fused to segment III. Segment III itself may lack notosetae and even segment V. On the other hand segment III may develop enlarged notosetae called *paleae* which project forwards on either side of the gills.

The uncigerous thoracic segments. Segment VII always bears both notopodial capillaries and neuropodial uncini so that it is the most reliable landmark on the body. The number of uncigerous thoracic segments is constant for each genus and thus a most useful taxonomic character. The notopodia are usually simple conical projections bearing bundles of winged capillaries, but in *Amphicteis* and certain other genera each notopodium has a small terminal papilla or *notopodial cirrus* which is quite distinctive. The neuropodia are small square uncigerous pinnules below the notopodia. Like the notopodia they may also bear superior papillae though these are seldom so obvious as those on the notopodia.

The abdomen and the anal cirri. Abdominal segments may be distinguished from thoracic ones by the lack of notosetae. In most species the entire notopodium is lacking but in some it persists in a rudimentary form for a few segments or on all segments to the pygidium. Occasionally the notopodial cirrus persists even though the notopodium itself is lacking. The neuropodium is present as an *uncigerous pinnule* on every abdominal segment; in fact it tends to elongate so that the last few uncigerous pinnules are the longest of the whole body. The same is true of the superior papilla of the neuropodium which is usually minute on the thorax but may become a long cirriform organ after the third abdominal segment. This is well shown by *Sabellides octocirrata*. It is important to distinguish this *neuropodial cirrus* from the *rudimentary notopodium* above it by examining the parapodia at the junction of the thorax and abdomen.

The number of abdominal segments varies from over 50 in many species of the subfamily Melinninae to as few as 10 in some of the Ampharetinae. The approximate number is of systematic value in the Ampharetinae. The pygidium may be quite simple with only a few indistinct papillae around the anus or it may develop long *anal cirri*. Commonly there is only one pair of these but two, three or even four pairs may be present.

The setae. As noted, the notosetae of segment III may be enlarged to form conspicuous paleae or they may remain small or may be absent. With few exceptions

the notosetae of subsequent thoracic segments are winged capillaries which are so uniform in structure that they are of little systematic value. In several genera of the Melinninae however, the notosetae of segment IV are modified to form a pair of stout *postbranchial hooks*. Again in a few genera of the Ampharetinae one or more of the posterior notopodia is elevated above the rest and the notosetae are modified – usually the blades develop spinules.

The neurosetae of the branchial segments of the Melinninae are minute and acicular and deeply embedded in the flesh. In the Ampharetinae, neurosetae are entirely absent from segments III to VI. Subsequent thoracic segments all bear uncini. These are toothed plates which are quadrangular to triangular in outline with one, two or more series of teeth above the small *rostral point* and *basal prow*. In many species the rostral point is like a small tooth and may be mistaken for the lowermost of the series but in species of *Melinna* it is obviously an attachment organ and in species with two or more series of teeth the rostral point is always single and median. The basal prow may project forwards as a continuation of the base or may be short and curve upwards so that its blunt apex almost meets the rostral point. The number of teeth above the rostral point is very constant in the thorax but usually increases in the abdomen. There is a single vertical series of teeth in the Melinninae and in several genera of the Ampharetinae. Other genera have two or three series but rarely more.

Key to Subfamilies

1 Segments III–VI (or III–V) with fine acicular neurosetae. Post-branchial hooks may be present. No paleae . . . . . Melinninae (p. 689)
– Segments III–VI without neurosetae. No post-branchial hooks. Paleae may be present Ampharetinae (p. 693)

Subfamily **MELINNINAE** Chamberlin, 1919

Buccal tentacles never papillose, usually smooth with a groove along one side. Paleae absent. One or two pairs of stout notopodial hooks may be present behind the gills. Small acicular neurosetae embedded in segments III–V and sometimes VI. Uncini always with a single series of teeth. Numerous (20–90) abdominal segments.

Records from southern Africa

Isolda pulchella Müller 56Cs
Isolda whydahensis Augener 26Ai
Melinna cristata (Sars) 48Cd
Melinnopsides capensis (Day) . . . . . as *Melinnopsis capensis* Day 44Ci

Key to Genera

1 Stout notopodial hooks behind the gills (fig. 35.1.i) 2
– Notopodial hooks absent 4
2 Four pairs of gills 3
– Three pairs of gills (one smooth, two pennate) . . . . . ***IRANA****

3 All gills smooth . . . . . ***MELINNA*** (p. 689)
– Some gills smooth, some pennate (fig. 35.1.k) . . . . . ***ISOLDA*** (p. 691)
4 Four pairs of smooth gills . . . . . ***MELINNOPIS****
– Three pairs of smooth gills . . . . . ***MELINNOPSIDES*** (p. 692)

MELINNA Malmgren, 1866

Buccal tentacles smooth with a groove along one side. Four pairs of smooth gills. A dorsal crest across segment VI. Segments III–VI with notopodial hooks on segment IV and notopodial capillaries on segments V and VI. Fine acicular neurosetae on segments III–V and sometimes on VI as well. Fourteen uncigerous thoracic segments and 30–50 abdominal ones. Thoracic uncini with a single series of teeth.

Type species: *Sabellides cristata* Sars, 1851.

Key to Species

1 Numerous buccal tentacles (fig. 35.1.i). Membrane across segment VI crenate . . 2
– One large buccal tentacle (fig. 35.1.a). Membrane across segment VI smooth ***M. monoceroides***
2 Neurosetae present on segment VI. Branchial filaments united for less than half their length . . . . . ***M. cristata***
– Neurosetae absent from segment VI. Branchial filaments united for more than half their length . . . . . ***M. palmata****

Melinna monoceroides Fauvel, 1936
(fig. 35.1.a–b)

Melinna monoceroides Fauvel, 1936: 93, fig. 12 a–d.

Body up to 17 mm. long. Prostomium (fig. 35.1.a) trilobed, without eyes or glandular ridges. A single greatly enlarged tentacle arising from the upper lip. Branchiae in two groups of four, three of which are united for half their length and arranged in a semicircle around the fourth. Individual gills long and smooth, projecting far beyond the prostomium. Segments III–V (and possibly VI) with fine neuropodial acicula. Segment IV with stout notopodial hooks; segments V and VI with fine notopodial capillaries. Transverse dorsal ridge across segment VI forming a deep pocket with a smooth margin. A total of 14 uncigerous thoracic segments starting from segment VII. Thoracic uncini (fig. 35.1.b) with a single series of five to six teeth above the very small rostral point and basal prow. Number of abdominal segments unknown. Abdominal neuropodia without superior cirri. Pygidium unknown.

Type locality: Dredged in 224 m. off Morocco.

Records: Not recorded from southern Africa.

Distribution: Morocco (d); Angola (s).

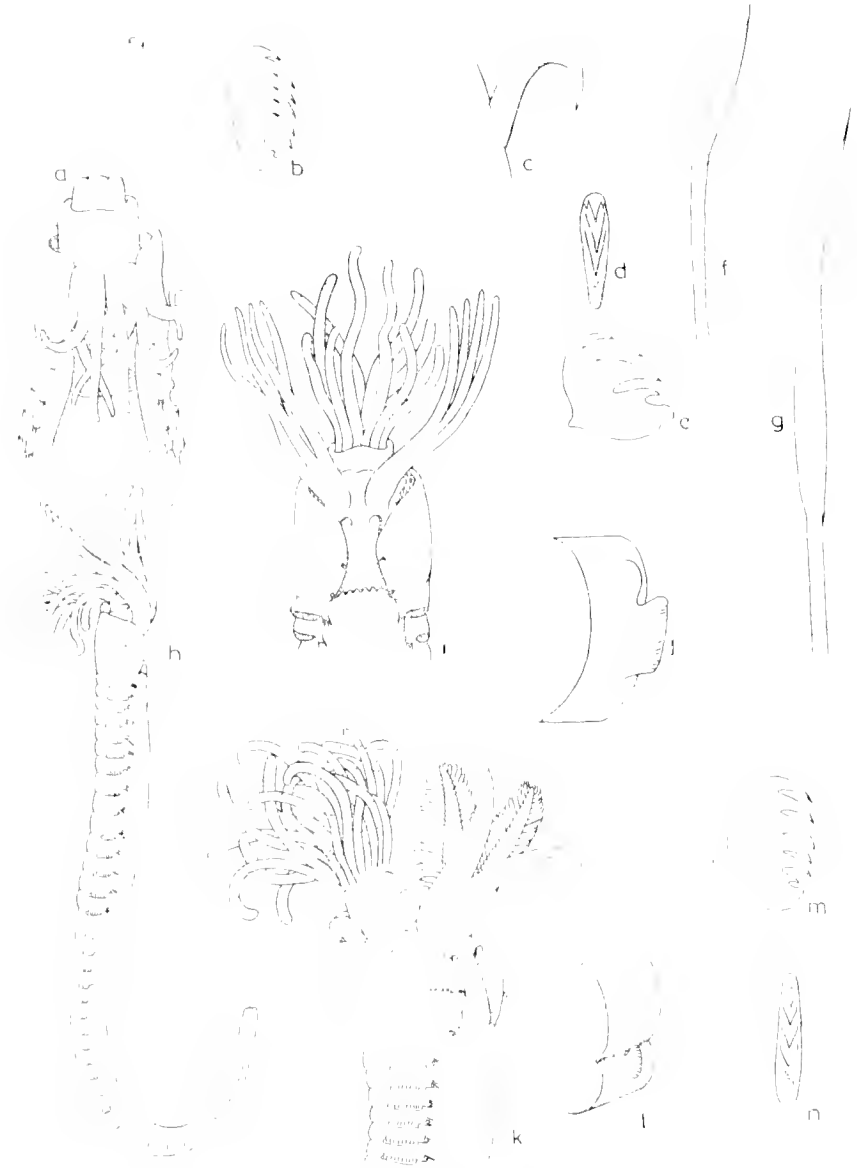


FIG. 35.1. *Melinna tomacroides*, modified from Fauvel, 1936). (A) Anterior end. (B) Thoracic uncinus. *Melinna cristata*. (C) Post-branchial hook. (D, E) Edge-on and profile of thoracic uncinus. (F) Neuropodial acicular seta. (G) Winged notopodial capillary. (H) Entire worm (three times life size). (I) Anterior end. (J) Abdominal parapodium. *Isolda pulchella*. (K) Anterior end with tentacles fully extruded (gills on right side omitted). (L) Abdominal segment showing parapodium. (M, N) Profile and edge-on view of thoracic uncinus.

Melinna cristata (Sars, 1851)
(fig. 35.1.c–j)

Sabellides cristata Sars, 1851: 205.
Melinna cristata: Hessle, 1917: 92; Fauvel, 1927: 237, fig. 83 i–n.

Body (fig. 35.1.h) tapered, up to 50 mm. long. Prostomium with eye-spots. Buccal tentacles smooth with a groove along one side (fig. 35.1.i). Branchiae in two separate groups of four each, united by a web for less than half their length. Segments III–VI all with fine neuropodial acicula (fig. 35.1.f) embedded in the flesh. Segment IV with stout notopodial hooks (fig. 35.1.c); both segments V and VI with notopodial capillaries (fig. 35.1.g). A total of 14 uncigerous thoracic segments starting from segment VII. Transverse dorsal ridge across segment VI with a dentate margin. Thoracic uncini (fig. 35.1.d) with a single series of three to four teeth above the small rostral point and a basal prow and sometimes with a crest of three to five teeth (fig. 35.1.d). Thirty to fifty abdominal segments with uncigerous pinnules and small rudimentary notopodia (fig. 35.1.j). No anal cirri.

Type locality: 550 metres off Norway.

Records: Cape (32/17/d).

Distribution: Arctic; North Atlantic from Greenland (s, d, vd) and Norway (vd) to the English Channel (e, s) and North Carolina (s); boreal North Pacific from Alaska to N.W. Japan; subantarctic (d).

ISOLDA Muller, 1858

Buccal tentacles smooth with a groove along one side. Four pairs of gills of which two are smooth and two are pennate. A dorsal crest across segment VI. Segments III–VI with notopodial hooks on segment IV and notopodial capillaries on segments V and VI. Fine acicular neurosetae on segments III–V and sometimes on VI as well. Twelve to thirteen uncigerous thoracic segments and 25–36 abdominal ones. Thoracic uncini with a single series of teeth.

Type species: *Isolda pulchella* Müller, 1858.

Key to Species

1 Thirteen uncigerous thoracic segments. Inner two pairs of gills with two rows of long lamellae (fig. 35.1.k) . . . . . ***I. pulchella***
– Twelve uncigerous thoracic segments. Inner two pairs of gills with many minute lamellae (fig. 35.2.a) . . . . . ***I. whydahaensis***

Isolda pulchella Müller, 1858
(fig. 35.1.k–n)

Isolda pulchella Müller, 1858: 219; Augener, 1918: 517, pl. 7 fig. 229, text-fig. 68; Day, 1963a: 434.

Body up to 45 mm. long, brown in alcohol with barred tentacles. Prostomium snout-like. Eye-spots minute. Buccal tentacles smooth with a groove along one side (fig. 35.1.k). They arise from a horizontal shelf in the roof of the mouth. Stout

lateral folds embrace the branchiferous region. Transverse ridge across segment VI with a smooth margin. Branchiae in two groups of four, each united basally; inner two pairs of gills with two rows of long lateral lamellae. Fine acicular neurosetae on segments III–V but not VI. Stout notopodial hooks on segment IV. Small notopodial capillaries on segments V and VI. A total of 13 uncigerous thoracic segments starting from segment VII. Thoracic uncini (fig. 35.1.m, n) with a single series of five to six teeth above the small rostral point and projecting basal prow. Abdomen with 32 or more segments each with a square uncigerous pinnule above which is a small papilla (fig. 35.1.l).

Type locality: St. Catherine Is., Brazil.

Records: Cape (34 23/s).

Distribution: North Carolina (s); Brazil; S.W. Australia (s); Burma.

Isolda whydahaensis Augener, 1918
(fig. 35.2.a–d)

Isolda whydahaensis Augener, 1918: 514, pl. 7 fig. 216, text-fig. 87.

A small species about 7 mm. long. Head (fig. 35.2.a) snout-like with a triangular prostomium. Eyes not seen. Tentacles short, grooved and mounted on a protrusible "tongue" arising from the roof of the mouth. A pair of lateral folds embrace the branchiferous region. Dorsal ridge across segment VI with a smooth margin. Branchiae long and slender, arranged in two groups of four which are united basally. Inner two pairs of branchiae stouter than the two outer and beset with numerous minute lamellae (fig. 35.2.c). Fine acicular neurosetae embedded in segments III–V but not VI. Segment IV with stout notopodial hooks, segments V and VI with notopodial capillaries. A total of 12 uncigerous thoracic segments starting from segment VII. Thoracic uncini (fig. 35.2.b) with a single series of five to six equal teeth above the small rostral point and projecting prow. Abdominal uncini usually with two rows of teeth. Abdominal segments numerous and bear square uncigerous pinnules (fig. 35.2.d).

Type locality: Whyda, tropical western Africa.

Records: Not recorded from South Africa.

Distribution: Western Africa from Morocco (s) to Angola (i, s, d).

MELINNOPSIDES Day, 1964

Buccal tentacles smooth with a groove along one side. Three pairs of smooth gills. No dorsal crest on segment VI. Segments III–VI without notopodial hooks on segment IV but with notopodial capillaries on segments V and VI. Fine acicular neurosetae on segments III–V but not VI. Ten uncigerous thoracic segments and about 30 abdominal ones. Thoracic uncini with a single series of teeth.

Type species: *Melinnopsis capensis* Day, 1955.

Melinnopsides capensis (Day, 1955)
(fig. 35.2.e–f)

Melinnopsis capensis Day, 1955: 433, fig. 5 d–g.

A small species about 6 mm. long. The worms are gregarious and live in sandy tubes attached to corallines. Prostomium (fig. 35.2.f) arched with a rounded anterior margin. Two to three pairs of eyes. Three pairs of smooth cirriform gills all united basally to form a continuous row of six across segment III. Segments III–V (but not VI) with fine neuropodial acicula embedded in the flesh. Segments V and VI with notopodial capillaries. No notopodial hooks on segment IV. No dorsal crest on segment VI. Ten uncigerous thoracic segments starting from segment VII. Thoracic uncini (fig. 35.2.e) with a single vertical series of five teeth above the small rostral point and basal prow. Twenty-eight abdominal segments with square uncigerous pinnules. No rudimentary notopodia.

Type locality: Plettenberg Bay, South Africa.

Records: Cape (34/23/i).

Distribution: Endemic.

Subfamily **AMPHARETINAE** Chamberlin, 1919 (emend. Day, 1964)

Buccal tentacles either smooth with a groove along one side or papillose. Paleae present or absent. No notopodial hooks behind the gills. Neurosetae absent from segments III–VI. Neuropodial uncini start on segment VII and may have one or more series of teeth. Few (8) to many (60) abdominal segments.

Records from southern Africa

Ampharete acutifrons (Grube)	51Cs
as *Ampharete kerguelensis* (non McIntosh)	48Wsd
Ampharete agulhasensis (Day)	
as *Lysippe agulhasensis* Day	51Cs
Ampharete capensis (Day)	
as *Lysippe capensis* Day	51Cs
Amphicteis gunneri (Sars)	33Cs, 48Cs, 51Csd
Glyphanostomum abyssalis Day	
as *Neosabellides* cf. *elongatus*	55Ca
Phyllocomus hiltoni (Chamberlin)	
as *Schistocomus hiltoni* Chamberlin	45Pi
Sabellides capensis Day	51Cis
as *Sabellides* sp.	44Ci
Sabellides (*Pterampharete*) *luderitzi* (Augener)	
as *Pterampharete luderitzi* Augener	26Wis, 48Ws, 51Cs
Sabellides octocirrata (Sars)	51Cs
Samythella affinis Day	56Cd

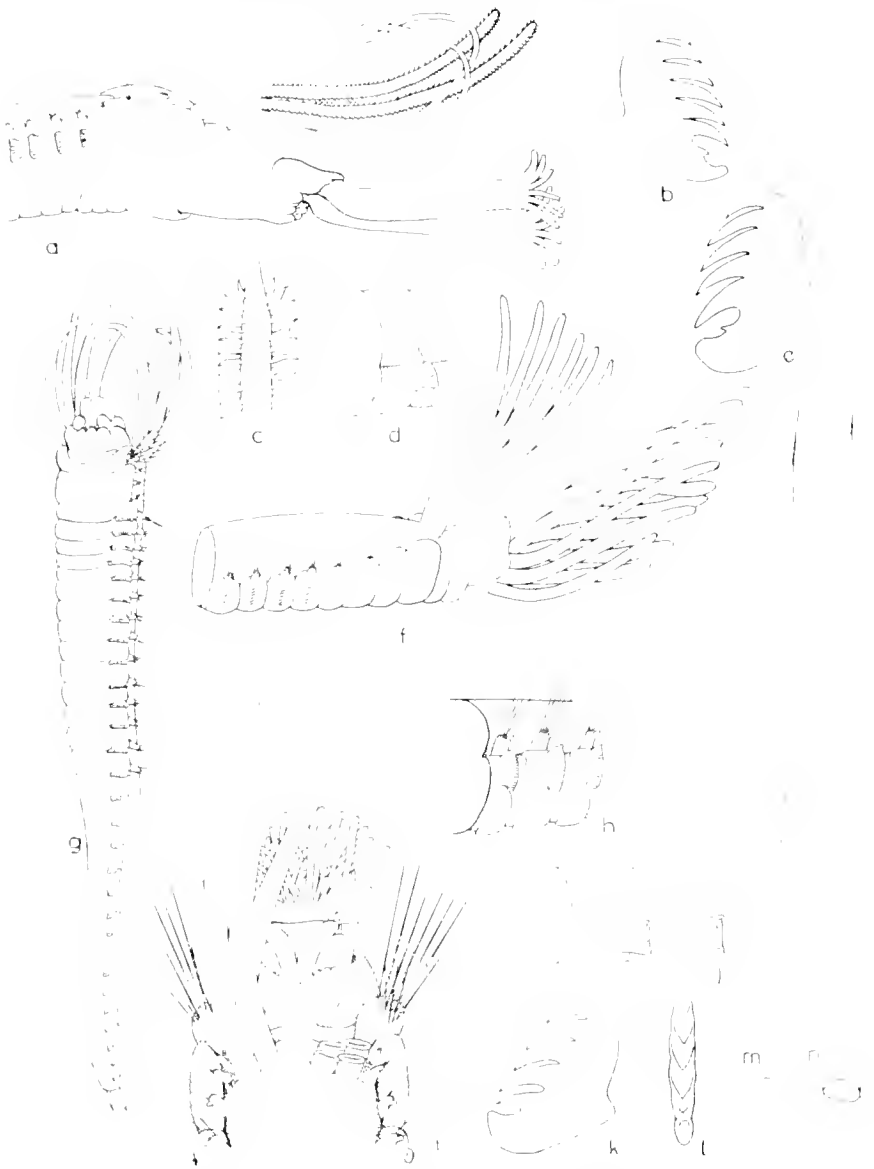


FIG. 45.2. *Lolda tchydahensis.* (A) Anterior end with "tongue" extruded (gills on left side omitted). (B) Thoracic uncinus. (C) Tip of bipennate branchia. (D) Abdominal segment and parapodium. *Melinnopsides capensis.* (E) Thoracic uncinus. (F) Anterior end. *Amphicteis gunneri.* (G) Entire worm (three times life size). (H) Thoracic segments showing notopodial cirri. (I) Anterior end. (J) Abdominal segments and parapodia. (K, L) Profile and edge-on view of thoracic uncinus. (M) Winged capillary. (N) Palea.

KEY TO GENERA

1 Four pairs of gills 2
– Three pairs of gills 8
– Two pairs of gills (first row of uncini very long) . . . . . *AUCHENOPLAX**
2 Glandular ridges on prostomium (fig. 35.2.i). (Notopodial cirri present (fig. 35.2.h)) . 3
– No glandular ridges 4
3 Fourteen uncigerous thoracic segments . . . . . *AMPHICTEIS* (p. 695)
– Eleven uncigerous thoracic segments . . . . . *AMAGE**
4 Fourteen uncigerous thoracic segments 5
– Thirteen uncigerous thoracic segments . . . . . *LYSIPPE**
– Twelve uncigerous thoracic segments 6
– Eleven uncigerous thoracic segments. (Two nephridial papillae on the branchial ridge (fig. 35.3.a)) . . . . . *SABELLIDES* (p. 696)
5 Notopodial cirri present . . . . . *PHYLLAMPHICTEIS**
– Notopodial cirri absent . . . . . *LYSIPPIDES**
6 Tentacles papillose. Thoracic uncini with two vertical series of teeth (fig. 35.4.c) *AMPHARETE* (p. 699)
– Tentacles smooth with a groove along one side. Thoracic uncini with a single vertical series of teeth 7
7 One median papilla on the branchial ridge. Specialised notosetae in some posterior notopodia . . . . . *SOSANE**
– No nephridial papillae on the branchial ridge. No specialised posterior notosetae *PHYLLOCOMUS* (p. 702)
8 Fourteen uncigerous thoracic segments. (Abdominal notopodia present. No glandular ridges on prostomium) . . . . . *SAMYTHA**
– Thirteen uncigerous thoracic segments . . . . . *MICROSAMYTHA**
– Twelve uncigerous thoracic segments 9
– Eleven uncigerous thoracic segments . . . . . *GLYPHANOSTOMUM* (p. 703)
9 Tentacles papillose. (No dorsal ridge on segment VI) . . . . . *NEOSABELLIDES**
– Tentacles smooth. (Thoracic uncini with a single vertical series of teeth) *SAMYTHELLA* (p. 704)

AMPHICTEIS Grube, 1851

Prostomium with a pair of divergent glandular ridges. Buccal tentacles smooth with a groove along one side. Four pairs of gills. Segments III–IV without neurosetae. Segment III often with paleae, segments IV–VI with notopodial capillaries. Fourteen uncigerous thoracic segments. Notopodial cirri present. Thoracic uncini with a single vertical series of teeth. Thirteen to nineteen abdominal segments, sometimes with rudimentary notopodia as well as uncigerous pinnules.

TYPE SPECIES: *Amphicteis gunneri* Sars, 1835.

Amphicteis gunneri (Sars, 1835)
(fig. 35.2.g–n)

Amphitrite gunneri Sars, 1835: 50, pl. 9 fig. 30.
Amphicteis gunneri: Fauvel, 1927: 231, fig. 80 a–k; Day, 1961: 527.

Body (fig. 35.2.g) up to 60 mm. long. Prostomium (fig. 35.2.i) quadrangular with prominent glandular ridges. Buccal tentacles rather short, smooth and grooved along one side; they arise from a horizontal shelf in the mouth which is occasionally

protruded. Two groups of four to five ocelli. Four pairs of smooth tapered gills arranged two in front and two behind on the branchial ridge with a median gap between right and left groups. Notosetae of segment III as large wingless paleae with smoothly tapered tips (fig. 35.2.n). Segments IV–VI with notopodial capillaries (fig. 35.2.m). Fourteen uncigerous thoracic segments starting from segment VII. Papilliform dorsal cirri on both notopodia and neuropodia (fig. 35.2.h). Thoracic uncini (fig. 35.2.k, l) with a single vertical series of four teeth above the tooth-like rostral point and basal prow. Fifteen abdominal segments with square uncigerous pinnules (fig. 35.2.j) bearing a superior papilla. Rudimentary notopodia on all segments in the form of pedunculate lobes. They originate progressively further and further above the uncigerous pinnules (fig. 35.2.g). Pygidium with a pair of long anal cirri.

Type locality: Dredged off Norway.

Records: South-west Africa (26 15 s); Cape (from 32 17 d to 34 18 s and 34 25 s); Natal (31 29 s and 30 30 s).

Distribution: Atlantic from Greenland (s, d, vd, a) and Norway (s, d) south to North Carolina (s, d), Morocco (s, d) and Ghana (s, d); Mediterranean; tropical Indian Ocean (d, vd); Kerguelen (s).

SABELLIDES Milne-Edwards, 1838
(including *PTERAMPHARETE* Augener, 1918)

Prostomium without glandular ridges. Buccal tentacles papillose. Four pairs of gills, arranged three in line and one behind on the branchial ridge. A pair of nephridial papillae on the branchial ridge between the two groups of gills. Segments III–VI without neurosetae. Segments V and VI with notopodial capillaries, segment IV usually fused to segment III and without notosetae, but notosetae often present on segment III. Eleven uncigerous thoracic segments. No specialised posterior notosetae. Notopodial cirri absent. Thoracic uncini with one or two series of teeth. Between 11 and 18 abdominal sgements with uncigerous pinnules but without rudimentary notopodia.

Type species: ? *Sabella octocirrata* Sars, 1835.

Key to Species

1 Gills papillose (fig. 35.3.a and g). Thoracic uncini with two series of five teeth (subgenus ***Pterampharete*** . . . . . ***S. P. luderitzi***
– Gills smooth. Thoracic uncini with a single vertical series of teeth (fig. 35.h and k) . . 2
2 Posterior abdominal neuropodia with a long superior cirrus (fig. 35.3.f). Nephridial papillae on branchial ridge minute . . . . . ***S. octocirrata***
– Posterior abdominal neuropodia with only a minute superior papilla. Nephridial papillae on branchial ridge large (fig. 35.3.l) . . . . . ***S. capensis***

Sabellides (*Pterampharete*) *luderitzi* (Augener, 1918)
(fig. 35.3.a–g)

Pterampharete luderitzi Augener, 1918: 505, pl. 7 figs. 222–224, text-fig. 84; Day, 1961: 527.

Body about 20 mm. long. Prostomium (fig. 35.3.a) spade-shaped. One pair of eyes. Numerous tentacles beset with capitate papillae (fig. 35.3.e). Four pairs of papillose gills (or three inner pairs papillose and the outer pair smooth) arranged in a line on the branchial ridge with a pair of small nephridial papillae between them. Notosetae of segment III as eight to nine well developed paleae with finely tapered tips. Segment IV achaetous and fused to segment III. Segments V and VI with notopodial capillaries. Eleven uncigerous thoracic segments (fig. 35.3.c). Thoracic uncini (fig. 35.3.f, g) with two vertical series of five teeth each above the small rostral point and recurved basal prow. Abdomen with 11 segments bearing uncini on pinnules which become triangular after the first two (fig. 35.3.d). A minute superior papilla above the uncini. Pygidium with a pair of long anal cirri.

Type locality: Luderitz, South West Africa.

Records: South West Africa (23/14's, d to28/16/s); Cape (from 32/17/d to 34 18's and 34/23/s).

Distribution: Endemic.

Sabellides octocirrata (Sars, 1835)
(fig. 35.3.h–k)

?*Sabella octocirrata* Sars, 1835: 51.
Sabellides octocirrata: Hessle, 1917: 101; Fauvel, 1927: 232, fig. 81 a–g.

Length up to 10 mm. Prostomium (fig. 35.3.h) a triangular hood over the mouth pinched in at the sides. One pair of eyes. Buccal tentacles pennate. Four pairs of long smooth gills arranged obliquely on the branchial ridge with a minute pair of nephridial papillae in the narrow median gap between them. Segment III with four to five notopodial capillaries which are much smaller than those which follow. Segment IV achaetous and fused to segment III. Segments V and VI with notopodial capillaries. Eleven uncigerous thoracic segments starting from segment VII. Thoracic uncini (fig. 35.3.j, k) with a single series of three to four teeth above the rostral point and recurved basal prow. Abdomen with 14–17 segments which bear long neuropodial cirri (fig. 35.3.i) above the rows of uncini after the first two segments. Abdominal uncini with eight teeth arranged in two to three series. One pair of anal cirri.

Type locality: Norway.

Records: South West Africa (26 15's); Cape (from 32 18's to 34 18's and 32 28's).

Distribution: North Atlantic from Greenland (s) and Sweden (d) south to the Canary Islands (s); Mediterranean; ? Alaska.

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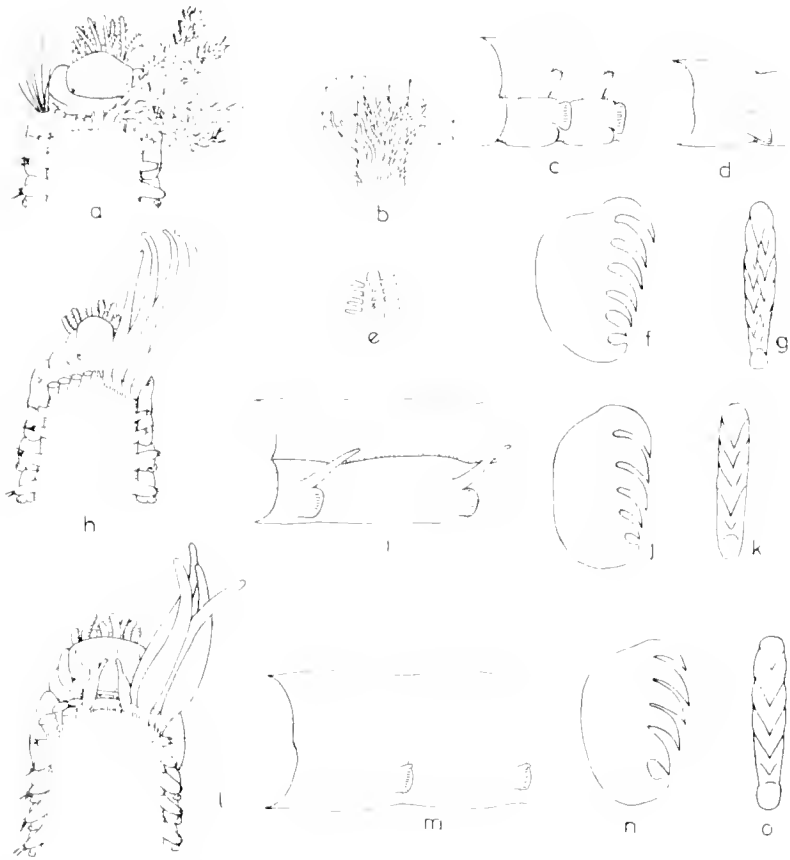

FIG. 35.3. *Sabellides (Pteramphanete) luderitzi*. (A) Anterior end. (B) Part of papillose gill. (C) Thoracic parapodia. (D) Fifth abdominal parapodium. (E) Tip of buccal tentacle. (F, G) Profile and edge-on view of thoracic uncinus. *Sabellides octocirrata*. (H) Anterior end. (I) Fourth and fifth abdominal parapodia. (J, K) Profile and edge-on view of thoracic uncinus. *Sabellides capensis*. (L) Anterior end. (M) Fourth and fifth abdominal parapodia. (N, O) Profile and edge-on view of thoracic uncinus.

Sabellides capensis Day, 1961
(fig. 35.3.L–O)

Sabellides capensis Day, 1961 : 528, fig. 12 a–h.

Length up to 12 mm. Prostomium (fig. 35.3.L) a speckled, flattened hood over the mouth. One pair of eyes. Buccal tentacles papillose. Four pairs of smooth gills arranged three in front and one behind on the branchial ridge with a wide median gap between them in which there is a pair of very long nephridial papillae. Segment

III without setae. Segment IV achaetous and fused to segment III. Segment V and VI with small bundles of notopodial capillaries. Eleven uncigerous thoracic segments starting from segment VII. Glandular ventral pads continue to the ninth uncigerous segment. Thoracic uncini (fig. 35.3.n, o) with a single vertical series of three to four teeth above the shorter rostral point and recurved basal prow. Eleven to fourteen abdominal segments with square uncigerous pinnules each bearing a minute papilla above the uncini. One pair of anal cirri.

TYPE LOCALITY: Dredged off Cape Town, South Africa.

RECORDS: South West Africa (26/15/s); Cape (from 29/16/i to 34/17/d and 34/25/s).

DISTRIBUTION: Endemic.

AMPHARETE Malmgren, 1866

Prostomium without glandular ridges. Buccal tentacles papillose. Four pairs of gills. No nephridial papillae on the branchial ridge. Segments III–VI without neurosetae. Notosetae of segment III usually enlarged to form paleae, notosetae of segment IV usually absent, notosetae of segments V and VI always present. Twelve uncigerous thoracic segments. Notopodial cirri absent. Thoracic uncini usually with two series of teeth. About 12–15 abdominal segments which have uncigerous pinnules but usually lack rudimentary notopodia.

TYPE SPECIES: *Amphicteis acutifrons* Grube, 1860.

KEY TO SPECIES

1 Paleae markedly larger than the capillaries of uncigerous thoracic segments (fig. 35.4.a) . . 2
– Paleae not larger than the capillaries of uncigerous thoracic segments 3
2 Abdominal segments with long superior cirri on the neuropodia (fig. 35.4.d). Paleae have smoothly tapered tips (fig. 35.4.e) . . . . . ***A. acutifrons***
– Abdominal segments without superior cirri on the neuropodia. Paleae have abruptly tapered tips (fig. 35.4.l) . . . . . ***A. kerguelensis***
3 Conspicuous notopodial lobes above the first four uncigerous pinnules of the abdomen (fig. 35.4.p, q). Gills extend well beyond the prostomium . . . ***A. agulhasensis***
– No notopodial lobes above the uncigerous pinnules (fig. 35.4.j) on the abdomen. Gills do not extend beyond the prostomium . . . . . ***A. capensis***

Ampharete acutifrons (Grube, 1860)
(fig. 35.4.a–f)

Amphicteis acutifrons Grube, 1860: 109.
Ampharete acutifrons: Hessle, 1917: 96.
Ampharete grubei Fauvel, 1927: 227, fig. 79 a–p.

Body up to 80 mm. long. Prostomium (fig. 35.4.a) a triangular hood over the mouth, and pinched in at the sides. One pair of eyes. Tentacles clearly pennate. Gills smooth and extend well beyond the prostomium. They are arranged two in front and two behind on the fused third and fourth segments. Segment III with

10–15 large paleae which taper evenly to fine tips (fig. 35.4.e). Segment IV without setae but may have an achaetous notopodium. Segments V and VI with small capillaries. Twelve uncigerous thoracic segments starting from segment VII. Thoracic notosetae (fig. 35.4.f) are winged capillaries. Thoracic uncini (fig. 35.4.b, c) with two vertical series of five teeth above the poorly developed rostral point and basal prow. Twelve abdominal segments bearing dorsal cirri on the uncigerous pinnules (fig. 35.4.d). Rudimentary notopodia absent. Pygidium with several anal cirri, including one long pair.

Type locality: Greenland.

Records: Cape (31 17 d and 34 25 s).

Distribution: Arctic; North Atlantic from Greenland (s, d) and Sweden (d) south to North Carolina (s) and Morocco (s, d); Mediterranean; North Pacific from the Behring Sea to N.W. Japan and southern California.

Ampharete kerguelensis McIntosh, 1885
(fig. 35.4.k–l)

Ampharete kerguelensis McIntosh, 1885: 426, pl. 47 fig. 10, pl. 26A figs. 22–24; Hessle, 1917: 100.

Body up to 18 mm. long. Prostomium a triangular hood over the mouth. One pair of eyes. Tentacles pennate. Gills long and smooth, extending well beyond the prostomium. Segment III with seven to eight large paleae which end in blunt tips with minute filiform processes (fig. 35.4.l). Segment IV with an achaetous notopodium. Segments V and VI with normal capillaries. Twelve uncigerous thoracic segments starting from segment VII. Thoracic uncini (fig. 35.4.k) with two vertical series of six teeth above the short rostral point and recurved basal prow. Twelve abdominal segments. No dorsal cirri on the neuropodia and no rudimentary notopodia. Pygidium encircled by numerous small papillae.

Type locality: Kerguelen.

Records: ?South West Africa (23 14 s, d).

Distribution: Antarctica; South Georgia; Kerguelen (d); New Zealand; ? tropical western Africa.

Ampharete agulhasensis (Day, 1961)
(fig. 35.4.m–r)

Isolippe agulhasensis Day, 1961: 529, fig. 12 e–k.

Body slender, up to 15 mm. long. Prostomium (fig. 35.4.m) curved in front and pinched in at the sides. One pair of eyes. Buccal tentacles long with two rows of capitate papillae. Four pairs of gills with a wide median gap between them. Gills long, extending well beyond the prostomium. "Paleae" on segment III of the same size as the normal capillaries of later thoracic segments. Segment IV achaetous and fused to segment III. Segment V with a small bundle of capillaries and segment VI

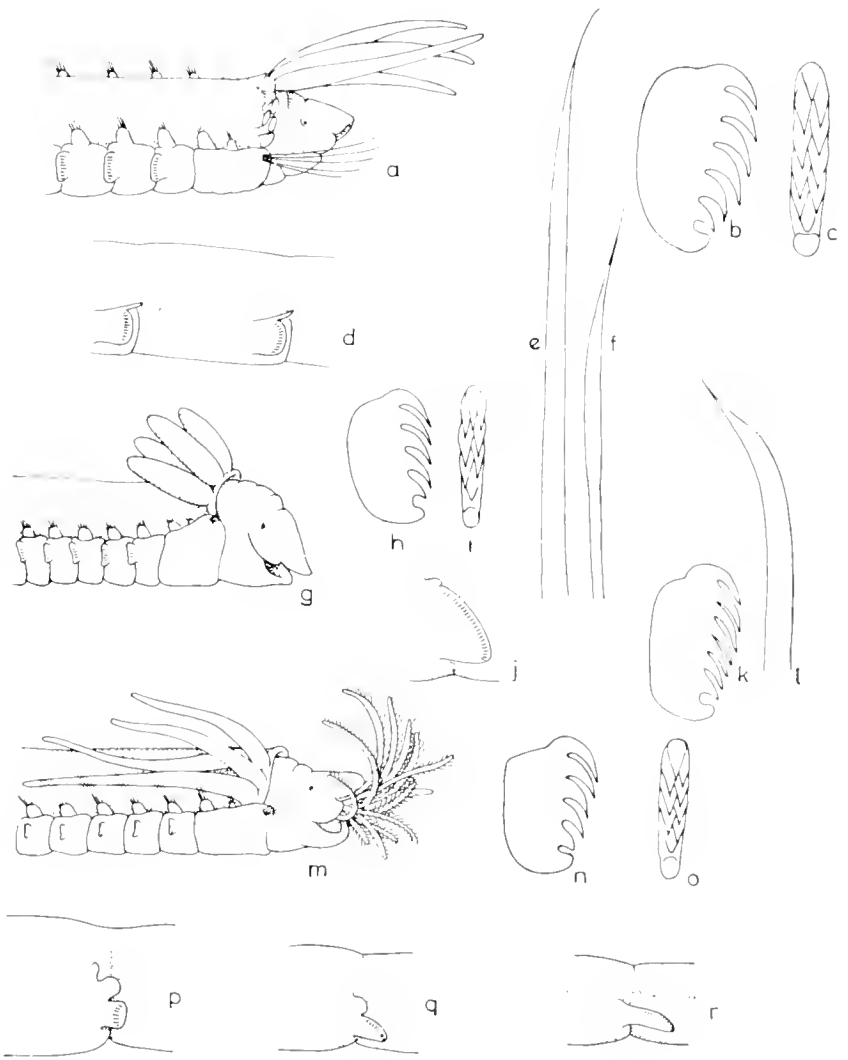

Fig. 35.4. *Ampharete acutifrons*. (A) Anterior end. (B, C) Profile and edge-on view of thoracic uncinus. (D) Fourth and fifth abdominal parapodia. (E) Palea. (F) Winged capillary. *Ampharete capensis*. (G) Anterior end. (H, I) Profile and edge-on view of thoracic uncinus. (J) Fifth abdominal parapodium. *Ampharete kerguelensis* (after McIntosh). (K) Profile of thoracic uncinus. (L) Tip of palea. *Ampharete agulhasensis*. (M) Anterior end. (N, O) Profile and edge-on view of thoracic uncinus. (P, Q, R) First, fourth and eighth abdominal parapodia.

with normal ones. Twelve uncigerous thoracic segments starting from segment VII. Thoracic uncini (fig. 35.4.n, o) with two vertical series of four teeth above the small rostral point and recurved basal prow. Twelve abdominal segments; the first four (fig. 35.4.p, q) having large notopodial lobes above the square uncigerous pinnules and the last eight (fig. 35.4.r) without notopodia but with paddle-shaped uncigerous pinnules. Pygidium with a pair of long anal cirri and 10 low papillae around the anus.

Type locality: Agulhas Bank, South Africa.

Records: Cape (34 22 s, d and ? 31 23 s).

Distribution: Endemic.

Ampharete capensis (Day, 1961)
(fig. 35.4.g, j)

Lysippe capensis Day, 1961: 530, fig. 12 h–o.

Body tapered, up to 20 mm. long. Prostomium (fig. 35.4.g) pointed and arched down over the mouth. One pair of eyes. Buccal tentacles beset with long papillae. Four pairs of gills on the branchial ridge with only a narrow gap between them. Gills short and do not extend beyond the tip of the prostomium. "Paleae" on segment III rather smaller than the normal capillaries of later segments. Segment IV achaetous and fused to segment III. Segment V with weak capillaries and segment VI with normal ones. Twelve uncigerous thoracic segments starting from segment VII. Thoracic uncini (fig. 35.4.h, i) with two vertical series of four teeth above the small rostral point and recurved basal prow. Twelve abdominal segments without any rudimentary notopodia. Uncigerous pinnules (fig. 35.4.j) roughly triangular throughout with only a minute dorsal papilla above the uncini. Pygidium with a pair of anal cirri.

Type locality: Saldanha Bay, South Africa.

Records: South West Africa (26 14 d); Cape (from 32 17 d to 34 18 s).

Distribution: Endemic.

PHYLLOCOMUS Grube, 1878
(including *SCHISTOCOMUS* Chamberlin)

Prostomium without glandular ridges. Buccal tentacles smooth with a groove along one side. Four pairs of gills. Segments III–VI without neurosetae. Notopodial capillaries present on segments IV, V and VI. Twelve uncigerous thoracic segments without specialised notosetae. Notopodial cirri present or absent. Thoracic uncini with a single series of teeth. Numerous (over 30) abdominal segments.

Type species: *Phyllocomus crocea* Grube, 1878a.

Phyllocomus hiltoni (Chamberlin, 1919)
(fig. 35.5. a–h)

Schistocomus hiltoni Chamberlin, 1919a: 17; Fauvel, 1932: 219, pl. 8 figs. 15–19; Fauvel, 1953: 411, fig. 216 a–e; Day, 1957: 112.

Body (fig. 35.5.a) up to 50 mm. long, speckled with brown dorsally. Prostomium (fig. 35.5.b) a flattened lobe over the mouth with a rounded anterior margin. No glandular ridges. Eyes absent. Numerous buccal tentacles which are smooth with a groove along one side; they arise from a hood-shaped membrane which is retractile into a pocket-shaped cavity below the prostomium and above the true mouth. Branchiferous ridge well developed. Four pairs of gills of which the first and outermost is smooth, the second and medial is unilamellate (fig. 35.5.c) and the third and fourth lateral pairs are bilamellate. The first and second are on the branchial ridge and the third and fourth arise above segments V and VI. Segment III without setae of any sort. Segments IV–VI with notopodial capillaries but no neurosetae. Twelve uncigerous thoracic segments starting from segment VII. Notosetae (fig. 35.5.h) are all normal winged capillaries. Uncigerous pinnules on the thorax (fig. 35.5.d) with a superior papilla. Thoracic uncini (fig. 35.5.e, f) with a single vertical series of five to six teeth above the small rostral point and recurved basal prow. Abdomen with about 50 segments, each with a rudimentary notopodial lobe and an uncigerous pinnule with a superior cirrus; in addition, the anterior abdominal segments have an intermediate triangular projection between the minute rudimentary notopodium and the uncigerous pinnule (fig. 35.5.g). Pygidium with a circle of short cirri around the anus.

Type locality: California.

Records: Natal (30'30/s); Mocambique (23/35'e).

Distribution: India (s); Southern California.

GLYPHANOSTOMUM Levinsen, 1883

Prostomium without glandular ridges. Buccal tentacles (?) smooth. Three pairs of gills. Segments III–VI without neurosetae. Segment III sometimes with paleae and segments IV–VI always with notopodial capillaries. Eleven uncigerous thoracic segments. Notopodial cirri absent. Thoracic uncini with two or more series of teeth. Twelve to twenty-five abdominal segments without rudimentary notopodia but with uncigerous pinnules.

Type species: *Samytha pallescens* Theel, 1878.

Glyphanostomum abyssale sp. nov.
(fig. 35.5.i–m)

Neosabellides cf. *elongatus*: Day, 1963: 367.

Body slender, up to 30 mm. long and encased in a narrow, closely ringed mud tube (fig. 35.5.m). Prostomium (fig. 35.5.i) as a flattened hood over the mouth. One pair of eyes. Buchal tentacles weakly papillose. Two groups of three gills each, in a

transverse row across segment III with a median gap between them. Individual gills long and smooth extending well beyond the tip of the prostomium. Segment III without setae. Segment IV with a small bundle of capillaries and larger bundles on V and VI. Eleven uncigerous thoracic segments starting on segment VII. The first few segments are short but later ones are three times longer than broad. Fourteen ventral pads. Thoracic uncini (fig. 35.5.k, l) with two vertical series of four teeth above the small rostral point and recurved basal prow. Thirty-two abdominal segments, each with an oval uncigerous pinnule bearing a minute superior papilla above the row of uncini (fig. 35.5.j). No rudimentary notopodia. Pygidium with six to eight tapered anal cirri and a larger pair of ventral lobes.

Type locality: 2,269 metres west of Cape Town.

Records: Cape (34 16 abyssal).

Distribution: No other record.

SAMYTHELLA Verrill, 1873

Prostomium without glandular ridges. Buccal tentacles smooth and not borne on an elongate tentacular lobe. Three pairs of gills. Segments III–VI without neurosetae. Notopodial capillaries present on segments IV–VI and sometimes on III as well. Twelve uncigerous thoracic segments. Notopodial cirri may be present on the last few thoracic segments. Thoracic uncini with one or two series of teeth. Up to 36 abdominal segments.

Type species: *Samythella elongata* Verrill, 1873.

Samythella affinis Day, 1963
(fig. 35.5.n–r)

Samythella affinis Day, 1963a: 435, fig. 11 b–e.

Length up to 10 mm. Prostomium (fig. 35.5.p) a flattened hood over the mouth. No eyes nor glandular ridges. Buccal tentacles smooth. Three pairs of smooth gills in a continuous transverse row across segment III without a median gap between them. Individual gills tapered and project far in front of the prostomium. Segment III with paleae hardly larger than the normal capillaries of uncigerous segments. Segments IV and V with small capillaries and segment VI with normal ones. Twelve uncigerous thoracic segments starting from segment VII. All notosetae are normal winged capillaries (fig. 35.5.r) and there are no specialised posterior notosetae. Thirteen glandular ventral pads. Thoracic uncini (fig. 35.5.n, o) with a single vertical series of five teeth above the rostral point and recurved basal prow. Abdomen of 11 segments of which the first few bear small square uncigerous tori and later ones have longer pinnules which are expanded distally (fig. 35.5.q). No rudimentary notopodia nor neuropodial cirri.

Type locality: Off Port Elizabeth, South Africa.

Records: Cape (34 23 d).

Distribution: A single record.

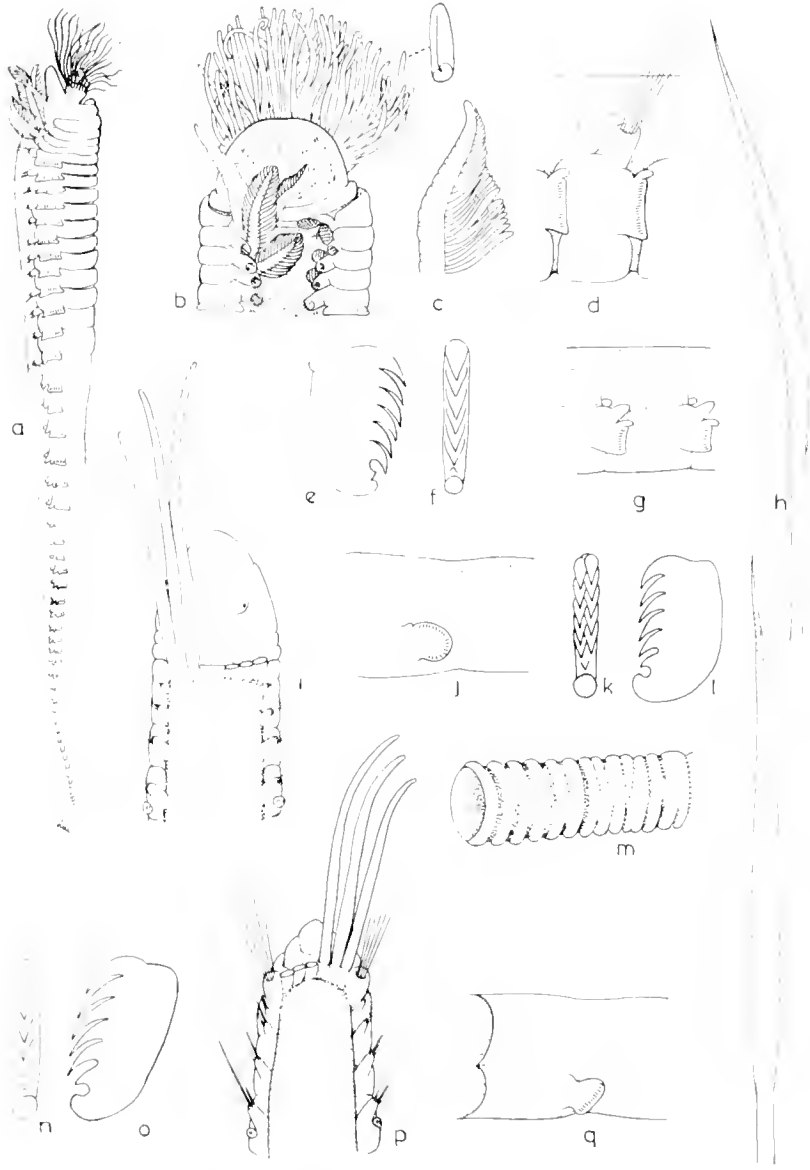

Fig. 35.5. *Phyllocomus hultoni*. (A) Entire worm (three times life size). (B) Head with details of tentacles. (C) Lamellate gill. (D) Thoracic parapodium. (E, F) Profile and edge-on view of uncinus. (G) Parapodium from middle of abdomen. (H) Winged capillary seta. *Glyphanostomum abyssalis*. (I) Anterior end. (J) Abdominal parapodium. (K, L) Edge-on and profile of uncinus. (M) Part of mud-tube. *Samythella affinis*. (N, O) Edge-on views and profile of thoracic uncinus. (P) Anterior end. (Q) Abdominal parapodium. (R) Winged capillary seta.

Family **TEREBELLIDAE** Grube, 1851

Tubicolous worms with soft tapered bodies divided into two regions and encased in mucous tubes encrusted with sand or mud. Head with numerous grooved food-gathering tentacles which are not papillose nor retractile into the mouth. Thorax with biramous segments and often gills and lateral lobes on segments 2–4 and glandular pads ventrally. Notosetae are winged capillaries. Neurosetae either as long-shafted hooks or uncini which may be avicular with arcs of denticles above the main fang or pectinate with a single vertical series of teeth. Abdomen with numerous segments which lack notopodia and notosetae but have neuropodia and neuropodial uncini. Pygidium without anal cirri.

BIOLOGICAL NOTES

Terebellids are highly adapted deposit feeders. They all have grooved buccal tentacles and many of them can extend these out over the substratum for a distance equal to the length of the body. They usually live in quiet areas such as lagoons, rock pools or crevices where the organic particles settle and these are picked up by the sticky tentacles and conveyed along the groove either by ciliary action if the particle is small, or by muscular contraction of the whole tentacle if the particle is large. Details have been worked out by Dr. R. Phillips Dales and he has shown that the food-laden tentacle is wiped on the upper lip which acts as a sorting device.

Apart from a few exceptions to be noted later, the terebellids are all tubicolous and some of the larvae build tubes of diatom frustules while floating in the plankton. The adult tube is usually attached to the side of a rock and extends back into a crevice or down below the level of the sand. The building materials are not carefully selected and the result is an untidy and rather fragile tube composed of sand, mud, fragments of shell or sponge spicules. At deep levels foraminiferan shells are commonly used. Only a few genera such as *Lanice* and *Loimia* commonly build tubes away from rocks. *Lanice* often builds a stout tube which projects well above the surface of the mud and decorates the flattened end with projecting fingers of sand grains. *Loimia* occasionally builds its tube on open sandy beaches and the whole tube is then shaped like a cork-screw so that it breaks before it pulls out of the sand.

Polycirrus and a few other genera such as *Amaeana* do not make tubes at all and creep about naked. *Polycirrus* lives among branching organisms such as algae, hydroids and bryozoa and pulls its body around with its tentacles. It is noteworthy that the Polycirrinae are the only group which lack gills. The one exception is the American genus *Enoplobranchus* which lives on black mud. Its branchiae are quite different from those of other terebellids and are vascular outgrowths of the notopodia. Another unusual terebellid is *Artacama* which burrows through the silt by means of a papillose proboscis below the mouth.

THE MAIN DIAGNOSTIC CHARACTERS

The family Terebellidae, originally defined by Grube, was revised by Malmgren (1865) and his system of classification has been accepted with minor modifications by all later workers. Useful discussions will be found in Saint Joseph 1894, Hessle

1917, Chamberlin 1919 and Fauvel 1927. The most important revision is that of Hessle who describes the anatomy and discusses the relation of the Terebellidae to the Trichobranchidae [*sic*], Amphictenidae (= Pectinariidae) and Ampharetidae. Recent work on feeding habits and the structure of the mouth and buccal tentacles will be found in Dales 1955.

The most useful taxonomic characters include the structure of the head, the number and the type of branching of the gills, the development of lateral lobes on the first few segments, the distribution and nature of the setae, the development of the glandular ventral pads and the number of nephridia.

The structure of the head. Since the prostomium is not distinct in adult Terebellids there has been considerable doubt as to the segmental homologies of anterior structures. Hessle (1917) draws comparisons between the Terebellidae and Ampharetidae. He notes that the buccal tentacles were originally arranged in two arcs on either side of the mouth opening as shown by their innervation, but states that in modern forms they are arranged in a continuous semicircle above the mouth. Above the tentacles again there is, in the Amphectenidae and the Ampharetidae, a flattened projecting lobe which Hessle terms the "Tentakelmembran" and between the tentacles and the mouth there is a curved "Oberlippe". Below the mouth Hessle states that: "Ein frei vorstehender Hautsaum des Buccalsegments dient auf der Ventralseite als Unterlippe". Actually, as Dales (1955a) has shown, the Terebellids have not one lower lip but four, all derived from the buccal segment or the projecting surface of the stomadaeum. Dales also says, however, that there is one upper lip and that the tentacles arise from the prostomium.

The homologies of the Tentakelmembran in the Ampharetidae have been discussed by me (Day, 1964), and it was concluded that this flattened lobe which contains the brain and cephalic eyes is the prostomium. The buccal tentacles of the Ampharetidae arise from the roof of the mouth and may be retracted into it. In some species (e.g. *Amphicteis gunneri* (fig. 35.2.i)) it may be seen that they arise from the margin of a horizontal septum which divides the mouth into a tentacular pocket above and a food passage below. In *Isolda whydahensis* (fig. 35.2.a) the same septum is greatly elongated and clearly issues from the mouth. It bears short grooved tentacles at its end so that these organs are not prostomial in origin but are derived from the stomadoeum.

The buccal tentacles of the Terebellidae are obviously homologous with those of the Ampharetidae but neither the tentacles nor the upper lip which bears them is retractile into the mouth. In *Trichobranchus glacialis* (fig. 36.1.a) which belongs to the primitive subfamily Trichobranchinae linking the Ampharetidae to the Terebellidae, the prostomial fold which bears the eyes is separated from the long, frilly upper lip which bears the tentacles. In the subfamily Polycirrinae the upper lip is similar to that of *Trichobranchus* but in the more advanced subfamilies *Thelepinae* and *Amphitritinae* the tentacular lobe is short and fused to the prostomium. The combined structure is like a stout collar which bears tentacles on its antero-ventral surface and eye-spots on its postero-dorsal surface. Below this collar-like *tentacular lobe* is a second upper lip in the shape of a glandular hood overhanging the mouth opening. We may summarise by saying that in distinction to the Ampharetids where the roof of the

buccal cavity and tentacles may be everted at will, the terebellids have the lining of the buccal cavity permanently everted to form two upper lips and four lower ones.

The branchiae. Typically there are three pairs of gills on segments 2, 3 and 4. In different genera or even different species of the same genus these may be reduced to two pairs or even one. In the subfamily Polycirrinae there are no gills at all though this is not surprising since they are not tubicolous. It may be added that as gills are often lost and readily regenerated, the gills are often very unequal in size.

The gills may branch dichotomously or the gill filaments may be arranged in whorls to form a terminal tuft or "pom-pom" on a single main stem. This is a useful taxonomic character in the genus *Pista* but the relative lengths of the filaments is not, since the whole gill is contractile. In the subfamily Thelepinae the gills are not branched but arise as simple filaments directly from the body wall. Somewhat the same condition occurs in species of *Amphitrite* where the branchial trunk is extremely short and the filaments are elongated.

Lateral lobes. The buccal segment may develop a prominent shelf-like lower lip, a conical proboscis (e.g. *Artacama*), or wing-like *lateral lobes*. Similar lateral lobes are developed from segments 2, 3 and 4 by several genera and are important taxonomic characters. In species of *Pista* and some other genera, the large lateral lobes on the buccal segment may meet and fuse ventrally and then project forward as a sort of basal sheath to the tentacles. All lateral lobes are extremely glandular and function mainly in the construction of the tube.

The distribution and nature of the setae. As shown by Wilson (1928) the setae first appear on segment 2 during development but these and others may be lost later so that in the adult the first setigerous segment may be the second, third or fourth and in *Hauchiella* there are no setae at all. Usually the neurosetae appear on a later segment than the notosetae and the distribution of both types of setae is of generic importance. Typically there are about 17 bundles of notosetae and their presence distinguishes the anterior or *thoracic region* from the posterior or *abdominal region*, although in some genera, e.g. *Thelepus* and *Terebella* the notosetae extend onto the abdominal segments. It is of interest to note that many genera of the family Ampharetidae also have 17 bundles of notosetae. The identification of the first setigerous segment is easy in genera that bear gills for the first gill is always on segment 2, but where gills are absent as in *Polycirrus* and its allies the numbering of this segment is more difficult. In this connection it may be remembered that the tentacles arise from the stomadaeum and not from the prostomium. Some early descriptions are confusing for this reason.

With few exceptions the notosetae are *winged capillaries* consisting of a basal *shaft* and a terminal *blade* with lateral flanges or *wings* on either side of a central *axis*. Occasionally the wings are incised or *serrated* as in certain species of *Polycirrus* but usually the wings are smooth. The tip of the axis may be smooth and in this case the whole seta is referred to as a "*smooth tipped capillary*" or the distal part of the axis may develop a saw-edged median ridge in which case the seta is said to have a *denticulate tip*. In *Terebella* the wings of the posterior notosetae are reduced or even absent and the denticulate tip is enlarged until the entire blade is denticulate.

The neurosetae are usually arranged in a single vertical row on the *uncigerous ridges* or *tori* of the subfamilies Polycirrinae and Thelepinae. In the Amphitritinae however the posterior thoracic segments have their neurosetae (*uncini*) arranged in *alternating rows* with one uncinus facing one way and the next the opposite way or in two rows either face to face or back to back. On abdominal segments the uncigerous ridges become more prominent and often project as *uncigerous pinnules*. Only very marked differences in shape are of systematic importance.

The most primitive form of neuroseta is the *acicular hook* found in the thorax of the Trichobranchinae. These have long shafts and a curved rostrum surmounted by a crest of obscure denticles. In most terebellids, however, the neurosetae are *uncini*, or flattened S-shaped tooth-plates with a main fang or rostrum arising from a broad flattened base and surmounted by a series of small teeth or denticles. These denticles may be arranged in a single vertical series (*pectinate* uncini) or in a series of transverse arcs (*avicular* uncini). In the latter case the number and arrangement of the denticles may be expressed by a *dental formula* in which the number of teeth in each arc is stated e.g. MF : 3–5 : 7–12 where the first arc above the main fang has three to five teeth and the second seven to twelve. In the genus *Thelepus* the identification of species depends on the shape of the basal part of the uncinus. This projects forward as a *basal prow* upon which the *attachment button* is mounted in different ways. To see the full details, the uncinus should be examined in edge-on-view and in profile after treating with 5% KOH.

Glandular ventral pads. Scattered glandular cells may be found all over the body but specialised concentrations of giant glandular cells are limited to certain areas. These are known as *ventral pads* or cushions and occur on the ventrum of most of the thoracic segments. The outline of the pad changes as the worm extends and contracts but the number is reasonably constant. They are found in the Amphitritinae and Thelepinae but are absent in the Trichobranchinae and in greatly reduced numbers in the Polycirrinae. In the latter family the pads are small and limited to a midventral groove of the first few segments but the lateral body wall of the first 10–15 segments forms glandular swellings below the notopodia and this makes it difficult to find the rows of uncini.

Nephridia. Hessle (1917) described these structures in detail and uses them in his system of classification. This has not found favour with later workers because it demands dissection and the *nephridial papillae* on which the nephridiopores open vary in size according to the sexual state of the animal. None the less in the difficult genus *Polycirrus* the number of nephridia is an important character. The most satisfactory method is to remove the dorsal body wall from the anterior thorax, take out the gut and then count the nephridia which show as opaque white sacs.

GENERIC GROUPINGS

As mentioned earlier, most workers have adopted Malmgren's system of classification with minor modification. Saint Joseph (1894) stressed the importance of the uncini and Hessle (1917) the importance of the nephridia. The importance of

these structures is not disputed but they do not provide a practical means of identifying large collections. In Fauvel (1927) a wide variety of external characters are used and the nephridia only become important in distinguishing the species of *Polycirrus*.

In the present work the subfamilies Trichobranchinae, Polycirrinae, Thelepinae and Terebellinae are recognised. I agree with Fauvel in reducing Hessle's Trichobranchidae to the status of a subfamily and I agree with Hessle that *Artacama* with its very striking proboscis is no more than a specialised member of the Terebellinae *olim* Amphitritinae. The main difference from earlier works is that all genera which lack gills are included in the sub-family Polycirrinae. Fauvel following Hessle has grouped the abranchiate genera *Leaena*, *Lanassa*, *Laphania*, *Phisidia*, *Proclea* and *Spinosphaera* in the Terebellinae and thus separates them from the abranchiate genera *Polycirrus*, *Amacana*, *Lysilla* and *Hauchiella*. Detailed discussions concerning all these genera will be found in Hessle but I do not find his arguments sufficiently convincing. The inclusion of all abranchiate genera in one subfamily certainly makes the task of identification much simpler and I have broadened Malmgren's definition of the Polycirrinae to allow for this.

Key to Subfamilies

1 Thoracic neurosetae as long-shafted hooks (fig. 36.1.d). Branchiae always present
Trichobranchinae (p. 710)
– Thoracic neurosetae as uncini (fig. 36.5.c, d). Branchiae sometimes absent 2
2 Branchiae absent. Tentacular lobe often large and frilled . . Polycirrinae (p. 713)
– Branchiae present as simple filaments. Tentacular lobe usually small and collar-like
Thelepinae (p. 722)
– Branchiae present and usually blanched. Tentacular lobe small and collar-like
Terebellinae (p. 731)

Subfamily **TRICHOBRANCHINAE** Malmgren, 1866
(Trichobranchidae, Hessle 1917, includes *CAPEPHORIDEA* and *TRICHOBRANCHIDEA* Malmgren)

Tentacular lobe expanded with the frilly margin on the dorsal surface of which is a ridge bearing grooved tentacles. Branchiae either filamentous or united into a single branchial trunk with four lamellate lobes. Glandular ventral pads not developed. Thoracic neurosetae as long acicular hooks with dentate crests; abdominal neurosetae as avicular uncini. Large nephridia present in front of the diaphragm.

Records from southern Africa

Terebellides stroemi Sars	32Ps, 34Cd, 48Cd, 51Csd, 55Ca, – Ms
Trichobranchus glacialis Malmgren . .	44Ci, 48Cs, 51Csd

Key to Genera

1 A single branchial trunk distally divided into four lamellate lobes (fig. 36.1.g)
TEREBELLIDES
– Two to three pairs of simple filamentous gills (fig. 36.1.a) . *TRICHOBRANCHUS*
– Four pairs of simple gills . . . . . *OCTOBRANCHUS**

TRICHOBRANCHUS Malmgren, 1866

Tentacular lobe large and frilly with numerous grooved tentacles arising from the dorsal surface. First segment with a pair of lateral lobes. Two to three pairs of gills on segments 2–4, each a cylindrical tapered filament. Notosetae as smooth-tipped capillaries on about 15 segments starting from the sixth. Neurosetae start on setiger 1, the thoracic ones being long acicular hooks with toothed crests and the abdominal ones being avicular uncini. Five pairs of nephridia of which the first three in segments 3–5 are the largest.

Type species: *Trichobranchus glacialis* Malmgren, 1866.

Trichobranchus glacialis Malmgren, 1866
(fig. 36.1.a–e)

Trichobranchus glacialis Malmgren, 1866: 395, pl. 24 fig. 65; Hessle, 1917: 131; Fauvel, 1927: 288, fig. 100 a–h.

Length up to 40 mm. Tentacular lobe (fig. 36.1.a) large with a frilly margin overhanging the true mouth and numerous tentacles arising from its outer surface. Prostomium with eye spots and fused to the buccal segment, which bears a pair of horizontal wing-like lateral lobes and a ventral keel. Six gill filaments on segments 2, 3 and 4 arranged as three pairs with the dorsal gap between right and left filaments decreasing from the first to the third. Notosetae on 15 segments starting from segment 6 and long-shafted neurosetae on the same segments. Notosetae (fig. 36.1.e) with very narrow wings and smooth tips. Shafts of neurosetae (fig. 36.1.d) constricted below the head which bears an arc of about 12 long denticles above the rostrum or main fang. Abdominal uncini (fig. 36.1.b, c) avicular and appear to have three to four denticles above the main fang when seen in lateral view but one to three arcs of denticles may be distinguished in face view giving the formula MF: ca 10: 0–20. Nephridia in segments 3–7.

Type locality: Spitzbergen.

Records: Cape (34/18′s and 34/20′i).

Distribution: Arctic (s, d); Atlantic (from North Sea (s) to Senegal (s) and N. Carolina (d); Magellan and Antarctic (d); Mediterranean; N.W. Pacific.

TEREBELLIDES Sars, 1835

Tentacular lobe large and deeply grooved with a frilly margin bearing numerous tentacles on its dorsal surface but no eye-spots. Mouth hidden in the groove of the tentacular lobe. A prominent lower lip. A single gill with a stout trunk bearing

FIG. 36.1. *Trichobranchus glacialis*. (A) Anterior end. (B, C) Edge-on view and profile of abdominal uncinus. (D) Thoracic hook. (E) Winged capillary. *Terebellides stroemi*. (F) Entire worm (three times life size). (G) Anterior end. (H) Thoracic hook. (I, J) Edge-on view and profile of abdominal uncinus.

four lamellate lobes. About 13 thoracic setigers bearing winged capillary notosetae, the first of which starts on segment 3. Neurosetae from segment 8 (setiger 6), the thoracic ones being long-shafted hooks and the abdominal ones avicular uncini.

TYPE SPECIES: *Terebellides stroemi* Sars, 1835.

Terebellides stroemi Sars, 1835
(fig. 36.1.f–j)

Terebellides stroemi Sars, 1835: 48; Hessle, 1917: 137; Fauvel, 1927: 291, fig. 100 i–q.

Length up to 70 mm. Body (fig. 36.1.f) uniformly tapered. Tentacular lobe erect and frilly bearing numerous short tentacles on its upper surface. No eyes. A large shelf-like lower lip. The gill arises from segments 2–4 as a stout trunk bearing four lamellate lobes which are partially fused (fig. 36.1.g). The two outer lobes are larger than the inner pair. Anterior ventral margins of the third and succeeding segments prominent. Eighteen segments with smooth-tipped notopodial capillaries starting on segment 3. Neurosetae start on setiger 6 (segment 8); the first row of uncini are stout, unidentate and acicular with a right angle bend below the rostrum; uncini of subsequent rows (fig. 36.1.h) are more slender with a small rostrum surmounted by a series of minute denticles. Abdominal uncini are borne on long projecting pinnules and each is avicular with one to two arcs of denticles above the main fang; formula MF: 0–3: ca 10. (fig. 36.1.i, j).

Type locality: Norway.

Records: Cape (28/14/d to 34/17/a and 33/27/s); Natal (29/31/d); Madagascar (s).

Distribution: Cosmopolitan from the Arctic to the subantarctic (s, d, vd, a).

Subfamily **POLYCIRRINAE** Malmgren, 1865 (emend.)

Tentacular lobe typically enlarged and frilly with numerous tentacles but occasionally short and collar-like. Gills entirely absent. Glandular ventral pads small and restricted to the first few segments but the area around the thoracic neuropodia is often swollen and glandular. Neurosetae are avicular uncini which may appear on segment 5 but often further back or may even be entirely absent. Notosetae from segment 3 or 4 but occasionally absent. Nephridia often enlarged.

Records from southern Africa

Amaeana accraensis (Augener)	
as *Amaea accraensis* Augener	?48Cd
Amaeana trilobata (Sars)	51Cs, – Ns
Hauchiella tribullata (McIntosh)	
Lanassa capensis Day	44Ci, 51Cs
Leaena sp.	51Cs
Lysilla ubianensis Caullery	45PiNi
Polycirrus aurantiacus Grube	31Ai
Polycirrus cf. *haematodes* (Claparède)	51Cis
Polycirrus plumosus (Wollebaek)	51Cd
Polycirrus tenuisetosus Langerhans	51Cs
Polycirrus swakopianus Augener	26Wis

Key to Genera

1 Tentacular lobe expanded with a frilly margin (fig. 36.3.e) (Polycirrinae *sensu stricto*) . 2
– Tentacular lobe small and collar-like (fig. 36.4.a) 4
2 Both notosetae and neurosetae entirely absent . . . . ***HAUCHIELLA*** (p. 714)
– Notosetae present; neurosetae entirely absent 3
– Notosetae present; neurosetae present from setiger 7 or later . ***POLYCIRRUS*** (p. 715)
3 Abdomen with acicular notosetae (fig. 36.3.g) . . . . . ***AMAEANA*** (p. 718)
– Abdomen without notosetae . . . . . ***LYSILLA*** (p. 720)
4 Neurosetae start on setiger 2 5
– Neurosetae start on setiger 3–7 8
5 Notosetae with smooth tips. Lateral lobes on segment 3 united by a dorsal ridge ***LEAENA*** (p. 721)
– Notosetae with denticulate tips. Lateral lobes if present, not united dorsally . . 6
6 Longer notosetae with a hispid swelling before the spinulose tip. Nephridia behind the diaphragm large and united . . . . . ***SPINOSPHAERA****
– Longer notosetae not swollen nor hispid. Nephridia not united 7
7 Both long and short notosetae with similar spinulose tips. Lateral lobes sometimes present on segments 2–4 . . . . . ***LANASSA*** (p. 721)
– Only the long notosetae with spinulose tips, the short forms with comb-like teeth. No lateral lobes . . . . . ***PHISIDIA****
8 Neurosetae start on setiger 3 . . . . . ***PROCLEA****
– Neurosetae start on setiger 7 . . . . . ***LAPHANIA****

HAUCHIELLA Levinsen, 1893

Tentacular lobe large and expanded with a frilly margin. No eye spots. Branchiae absent. Both notosetae and neurosetae entirely absent though notopodial papillae are visible. Body of about 70 segments. Thorax of approximately 10 segments, then a constriction followed by the swollen abdomen with annulated segments. Thorax diffusely glandular. Glandular ventral pads small but distinct in both thorax and abdomen.

Type species: *Polycirrus tribullata* McIntosh, 1869.

Hauchiella tribullata (McIntosh, 1869)

Polycirrus tribullata McIntosh, 1869: 351.
Hauchiella tribullata: Hessle, 1917: 233; Monro, 1930: 197; Monro, 1936: 184.

Body up to 46 mm. long, soft, diffusely glandular and swollen but often constricted between thorax and abdomen. Tentacular lobe large and frilly, roughly trefoil-shaped with rather numerous grooved tentacles. Mouth ventral with two posterior lips. No eye spots. Thorax not well-defined but appears to consist of 10 segments with notopodial papillae conspicuous after the first three. A mid-ventral groove with small rectangular ventral pads. The groove and ventral pads are continued on the swollen abdomen which consists of about 60–70 biannulate segments. No setae at all. Hessle reported four pairs of nephridia on the third, fourth, fifth and seventh segments.

Records: Cape (34 18/s).

Distribution: Norway (d); British Isles (d); subantarctic (s); Antarctic (s).

POLYCIRRUS Grube, 1850

Tentacular lobe large and expanded with a frilly margin bearing numerous tentacles but no eye-spots. Branchiae absent. Notosetae start from segment 3 and continue for a variable number of segments. Notosetae are capillaries with smooth, serrated or feathered wings. Neurosetae aviculars with a crest of long denticles above the main fang; base often produced forwards. Neurosetae appear on the 7th–18th segment and continue to the end of the abdomen. Only two to four well developed ventral pads behind the lower lip followed by a glandular streak in a mid-ventral groove. Glandular swellings on the ventro-lateral sides of the thoracic segments. Large nephridia in the first three to six setigers.

TYPE SPECIES: *Polycirrus medusa* Grube, 1850.

KEY TO SPECIES

1	Three pairs of nephridia. Uncini start on setigers 7–12	2
–	Six pairs of nephridia (fig. 36.2.h). Uncini start on setigers 13–18	3
2	Twelve to twenty segments with smooth-bladed notosetae	***P. tenuisetis***
–	Thirty to forty segments with smooth or hispid-bladed notosetae	***P. aurantiacus***
3	Notosetae with smooth wings (fig.36.2.i)	***P.*** cf. ***haematodes***
–	Notosetae with narrow, denticulate wings (fig. 36.2.l)	***P. swakopianus***
–	Notosetae include some with smooth wings and others with broad plumose blades (fig. 36.3.d)	***P. plumosus***

Polycirrus tenuisetis Langerhans, 1880
(fig. 36.2.a–c)

Polycirrus tenuisetis Langerhans, 1880: 110, pl. 5 fig. 25; Fauvel, 1927: 283, fig. 98 m–n; Day, 1961: 535.

Body evenly tapered and about 15 mm. long. Tentacular lobe longer than broad with a frilly margin bearing rather short tentacles. Twelve to nineteen segments bearing notosetae. Glandular swellings on the sides of nine thoracic setigers. Three pairs of very large nephridia in setigers 1–3. Uncini commence between setigers 7 and 10. Notosetae (fig. 36.2.c) with smooth wings. Uncini (fig. 36.2.a, b) with one to three large teeth above the main fang and then an arc of 10–12 slender denticles giving the formula MF: 1–3; 10–12.

TYPE LOCALITY: Madeira Island.

RECORDS: Cape (34/22/s).

DISTRIBUTION: English Channel (s); Madeira.

Polycirrus aurantiacus Grube, 1860
(fig. 36.2.d–f)

Polycirrus aurantiacus Grube, 1860: 110; Fauvel, 1927: 280, fig. 97 e–k.

Body up to 100 mm. long with 120 segments. Tentacular lobe (fig. 36.2.d) large and divided into basal and distal parts with two types of tentacles. No eye-spots. Thirty to forty segments with notosetae. Glandular swellings on the sides of eight to

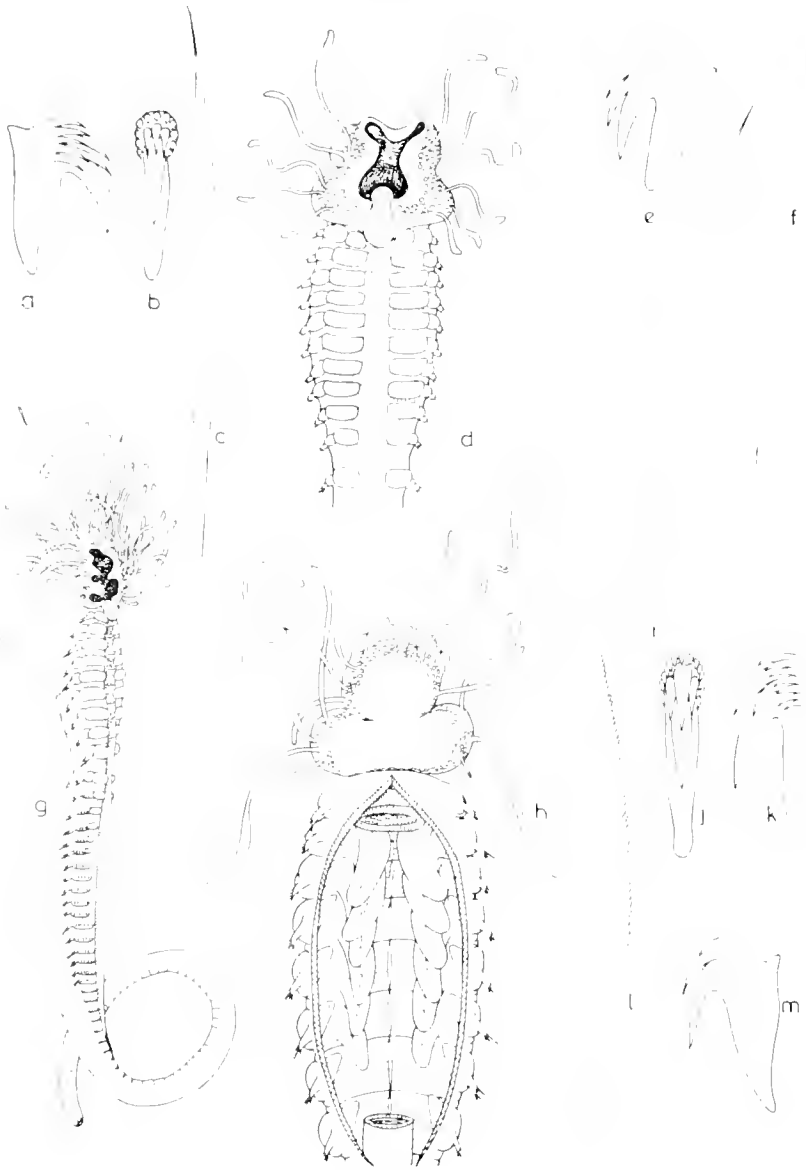

FIG. 36.2. *Polycirrus tenuisetis*. (A, B) Profile and edge-on view of uncinus. (C) Notoseta. *Polycirrus aurantiacus* (after Fauvel, 1927). (D) Ventral view of anterior end. (H) Juvenile uncinus. (E) Notoseta. *Polycirrus* cf. *haematodes*. (G) Entire worm (1·5 times life size). (I) Dissection to show nephridia. (F) Notoseta. (J, K) Edge-on view and profile of uncinus. *Polycirrus scalopianus* (after Augener). (L) Notoseta. (M) Profile of uncinus.

eleven thoracic setigers. Three pairs of nephridia of which the third in segment 6 is the largest. Notosetae (fig. 36.2.f) with smooth or hispid wings. Uncini start on setiger 8 to 12 and the posterior ones are borne on pinnules. Each uncinus (fig. 36.2.e) with numerous denticles above the main fang in the adult.

TYPE LOCALITY: France.

RECORDS: Not recorded from southern Africa.

DISTRIBUTION: English Channel (i); Madeira (i); Mediterranean (i); Angola (i).

Polycirrus cf. ***haematodes*** (Claparède, 1864)
(fig. 36.2.g–k)

? *Aphlebina haematodes* Claparède, 1864: 483, pl. 2 fig. 1.
Polycirrus cf. *haematodes*: Day, 1961: 535.

Body (fig. 36.2.g) about 15 mm. long. Tentacular lobe large and trefoil-shaped with pleated margins. Fourteen to twenty-seven segments bearing smooth-winged notopodial capillaries (fig. 36.2.i). Uncini (fig. 36.2.j, k) from setiger 12–13 onwards each with one to three large teeth above the main fang and the crest encircled by about 12 long denticles giving the formula MF: 1–3: ca 12. Six pairs of nephridia (fig. 36.2.h) decreasing in size from the first to the sixth. Paired ventro-lateral glandular swellings corresponding to the first 10–16 setigers; they are separated by the mid-ventral groove.

RECORDS: Cape (from 33/17/s and 34/18/i, s to 35/21/d and 34/25/s).

DISTRIBUTION: (of *S. haematodes*) Scotland (s); English Channel (i, s); Mediterranean.

Polycirrus swakopianus Augener, 1918
(fig. 36.2.l–m)

Polycirrus swakopianus Augener, 1918: 563, pl. 7 fig. 228, text-fig. 99.

Length about 16 mm. for 75 segments. Tentacular lobe trefoil-shaped. Sixteen to twenty-five segments with notosetae. Notosetae (fig. 36.2.l) with markedly denticulate wings. Fourteen to fifteen segments with paired ventro-lateral cushions. Uncini start about setiger 14 or 15 and the posterior ones are on swollen pinnules. Six pairs of nephridia with small nephridial papillae opening below the notopodia of setigers 1–6. Uncini (fig. 36.2.m) with two denticles above the main fang when seen in profile but probably more when seen in face view; dental formula MF: 3: ?.

TYPE LOCALITY: Swakopmund, South West Africa.

RECORDS: South West Africa (22 14 i and 26 15 s).

DISTRIBUTION: No other records.

Polycirrus plumosus (Wollebaek, 1912)
(fig. 36.3.a–d)

Ereutho plumosa Wollebaek, 1912: 82, pl. 21, figs. 1-4.
Polycirrus plumosus: Hessle, 1917: 224; Day, 1961: 535, fig. 13 a–d.

A large species reaching 36 mm. for about 60 segments. Tentacular lobe large and pleated. Seventeen segments with notosetae of two types: (a) with smooth narrow wings (fig. 36.3.c) and (b) broad with "plumose" blades formed by a series of transparent cones along a slender shaft (fig. 36.3.d). Uncini start on setiger 18 (the first abdominal); they are minute with few teeth, the formula being MF: 1: 1-3 (fig. 36.3.a, b). Behind the ventral lip the ventral surface is covered with minute glandular papillae up to setiger 15.

Type locality: Norway

Records: Cape (32, 17/d and 34, 18/d).

Distribution: Norway. (s).

AMAEANA Hartman, 1959
(= *AMAEA* Malmgren, 1866, pre-occupied)

Tentacular lobe expanded and trefoil-shaped with an anterior tongue-like lobe and a posterior frilled portion with numerous short tentacles. No eye-spots. No branchiae. Ten to thirteen thoracic segments with notosetae starting on segment 3. No thoracic neuropodia or neurosetae. About five achaetous segments at the end of the thorax. Abdomen of numerous uniramous segments with conical notopodial pinnules bearing acicular setae. No neuropodia or neurosetae. Anterior nephridia rather larger than posterior ones and all open on small papillae just below the notopodia. Sides of body swollen and glandular below the thoracic notopodia. Small ventral pads in a groove.

Type species: *Polycirrus trilobata* Sars, 1863.

Key to Species

1 The first ten setigers bearing smooth-winged notosetae . . . . . ***A. trilobata***
– The first 11–13 setigers bearing barbed notosetae . . . . . ***A. accraensis***

Amaeana trilobata (Sars, 1863)
(fig. 36.3.e–h)

Polycirrus trilobata Sars, 1863: 53.
Amaea trilobata: Fauvel, 1927: 285, fig. 99 a–e.
Amaeana trilobata: Day, 1961: 533.

Body (fig. 36.3.h) about 20 mm. long for about 40 segments. It is swollen anteriorly and cylindrical posteriorly. The first 10 setigers with long, slender notopodia bearing fine, smooth-winged capillaries (fig. 36.3.f) which are completely retractile. Thorax arched dorsally, swollen and glandular laterally and with a

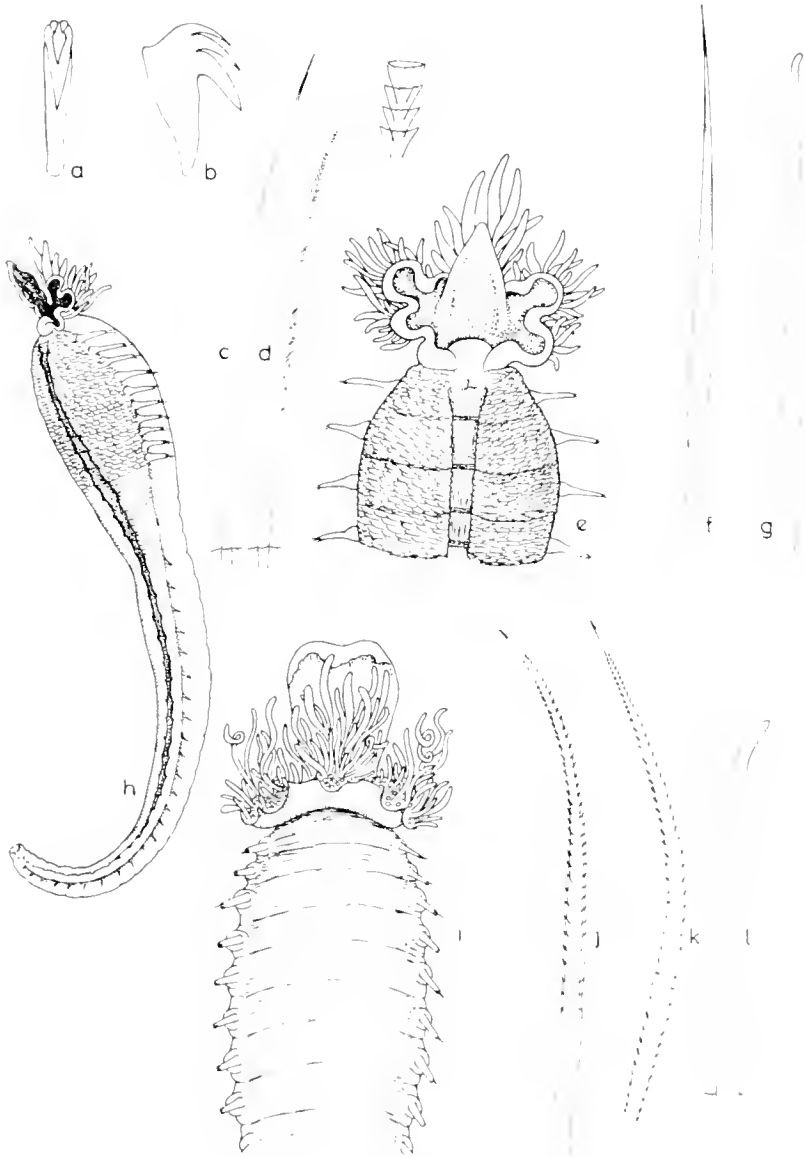

FIG. 36.3. *Polycirrus plumosus*. (A, B) Edge-on view and profile of uncinus. (C, D) Smooth and plumose notosetae. *Amaeana trilobata*. (E) Ventral view of head. (F) Thoracic winged capillary. (G) Abdominal acicular seta. (H) Entire worm (five times life size). *Lysilla ubianensis*. (I) Dorsal view of anterior end. (J) Barbed notoseta. *Amaeana accraensis* (after Augener). (K) Barbed notoseta. (L) Abdominal acicular seta.

median groove ventrally in which a series of narrow ventral pads are concealed. A small but distinct nephridial papilla at the base of each notopodium. Five to eight elongate ventral pads. Five to six achaetous segments between thorax and abdomen. Abdomen with about 30 uniramous segments which are arched dorsally, ridged ventro-laterally and grooved in the mid-ventral line. Each bears a small conical notopodium from which projects five to six straight acicular setae with blunt tips (fig. 36.3.g). Colour purple in life.

TYPE LOCALITY: Norway.

RECORDS: Cape (33 17 d and 34 18 s); Natal (31 29 s, 29 31 s and 30 30 s).

DISTRIBUTION: Arctic; Norway; North Carolina (d); Mediterranean (i, s); Japan.

Amaeana accraensis (Augener, 1918)
(fig. 36.3.k–l)

Amaea accraensis Augener, 1918: 561, pl. 7 fig. 246, text-fig. 98; Kirkegaard, 1959: 89, fig. 22.

Body 10–20 mm. long. Tentacular lobe trefoil-shaped with short broad tentacles. Thorax with 11–13 segments bearing coarsely barbed notosetae. Notopodia long and slender each with a nephridial papilla at its base. Thorax swollen and glandular laterally and grooved ventrally with seven long ventral pads concealed in the groove. Five achaetous segments follow the thorax. Abdomen of about 26 segments each with a conical notopodium bearing five acicular setae with straight shafts and bent tips. (See also *Polycirrus plumosus*.)

TYPE LOCALITY: Accra, Ghana.

RECORDS: ? Cape (32 17 d, 34 18 s, d).

DISTRIBUTION: Ghana (i); North Carolina (d).

LYSILLA Malmgren, 1866

Tentacular lobe expanded and frilly with numerous tentacles restricted to the basal margins. No gills. No lateral lobes on anterior segments. A small number of thoracic segments (about six to twelve) with notosetae starting on segment 3. Neuropodia and neurosetae entirely absent both from the thorax and the abdomen. Ventral pads narrow and restricted to a groove. Nephridia of decreasing size present in all segments with notosetae.

TYPE SPECIES: *Lysilla loveni* Malmgren, 1866.

KEY TO SPECIES

1 Six thoracic segments with notosetae . . . . . ***L. loveni****
– Ten to twelve thoracic segments with notosetae . . . . . ***L. ubianensis***

Lysilla ubianensis Caullery, 1944
(fig. 36.3.i–j)

Lysilla ubianensis Caullery, 1944: 197, fig. 156; Day, 1957: 114.

Body swollen, about 30 mm. long. Head (fig. 36.3.i) with an anterior tongue-like upper lip above which is a broad frilly tentacular lobe bearing numerous grooved tentacles. Thorax with 10–12 segments bearing notosetae. Notosetae (fig. 36.3.j) with barbed wings. Nephridial papillae on all segments bearing notosetae and sometimes swollen from the fourth onwards. Thorax with a mid-ventral groove and broad glandular ventro-lateral ridges. Ventral pads in the groove narrow and not segmentally defined. Abdomen with about 30 segments. It is grooved laterally and ventrally and segmental boundaries are indistinct. No notopodia or neuropodia and no setae at all.

Type locality: Malay Seas.

Records: Natal (29/31/i); Mocambique (26/32/i).

Distribution: East Indies.

LEAENA Malmgren, 1866

Tentacular lobe small and collar-shaped. Branchiae absent. Anterior segments with lateral lobes, those on segment 3 being united by a transverse ridge across the dorsum. Notosetae from segment 4. Notosetae are all smooth-winged capillaries. Avicular uncini from segment 5 (second setiger). Nephridia fairly large, not united and present on segments 3, 6, 7, 8 and 9.

Type species: *Leaena abranchiata* Malmgren, 1866.

Leaena sp.

Leaena sp. Day, 1961: 537.

Only a juvenile of 7 mm. is known. Lower lip swollen. Lateral lobe on segment 2 continuous across the ventrum. Lateral lobe on segment 3 continuous across the dorsum. Seventeen segments with smooth, broad-winged notosetae starting on segment 4. Uncini from segment 5 (setiger 2) and arranged in an alternating row towards the end of the thorax. Uncini avicular with a close-set crest of denticles above the main fang.

LANASSA Malmgren, 1866

Tentacular lobe small and collar-shaped. Anterior segments with or without lateral lobes. Notosetae from segment 4. All notosetae with small wings and denticulate tips. Neurosetae avicular and present from segment 5 (setiger 2) onwards; they are arranged in double rows on some segments. Large nephridia in segment 3, none in 4 and 5 but present again in segments 6, 7 and 8.

Type species: *Lanassa nordenskioldi* Malmgren, 1866.

Lanassa capensis Day, 1955
(fig. 36.4.a–c)

Lanassa capensis Day, 1955 : 441, fig. 7 e–f.

Body about 20 mm. long, slender, and pale in colour. Tentacular lobe (fig. 36.4.a) small and has few tentacles. A few eye-spots. No gills. No lateral lobes on anterior segments. Thirteen well marked ventral pads followed by a glandular streak reaching setiger 20. Notosetae present on 27 segments starting from segment 4. Both long and short forms of notosetae with a short winged portion followed by a well developed denticulate tip. Uncini from setiger 2 to the end of the body. No uncigerous pinnules. Each uncinus (fig. 36.4.b, c) is avicular with a short base and four to five denticles above the main fang when seen in lateral view but an edge-on view shows four arcs of denticles giving the formula MF : 2–3 : 4–1 : ca 6 : ca 16.

Type locality : Still Bay, South Africa.

Records : Cape (34/18 i, s and 34/21 i).

Distribution : No other records.

Subfamily **THELEPINAE** Malmgren, 1866

Tentacular lobe either short and collar-shaped or prolonged and frilled. Numerous grooved tentacles and sometimes eye-spots. Branchiae usually present as simple cylindrical filaments on segments 2, 3 and often 4. Lateral lobes sometimes present. Glandular ventral pads present or absent. Smooth tipped notosetae* start on segment 2 or 3 and sometimes extend to within a few segments of the pygidium. Avicular uncini with forwardly projecting bases bearing an attachment button, are present in single or occasionally double rows; they start between segments 4 and 9 but may be entirely absent.

Records from southern Africa

Euthelepus kinsemboensis Augener* . . .	26Ai
Streblosoma abranchiata Day	55Ca
Streblosoma chilensis (McIntosh) . . .	55Ca
Streblosoma hesslei Day	44Ci, ? – Ms
Streblosoma persica (Fauvel)	45Pi, – Nd
as *Pseudothelepus nyanganus* Augener . .	26Ai
Telothelepus capensis Day	44Ci, 51Cs
Thelepus comatus (Grube)	44Ci
Thelepus pequenianus Augener . . .	26Wis, 44Ci, 51Cs
as *Thelepus* sp.	13Ci
Thelepus plagiostoma Schmarda . . .	27Mi, 35Ci, 36Ci, 44Ci, 45PiNi, 51Cs
as *Thelepus setosus* var. *africanus* Day . .	40PiNi
Thelepus setosus (Quatrefages) . . .	45 Pi, – Ps
Thelepus triserialis (Grube)	40Ni, 44Ci, 51Cs – Ms

**Euthelepus kinsemboensis* Augener, 1918 has denticulate notosetae, possibly it should be referred to the genus *Amphitrite*.

Key to Genera

1	Notosetae start on segment 2 (first branchiferous) . . .	***STREBLOSOMA*** (p. 723)
–	Notosetae start on segment 3 (second branchiferous)	2
2	Lateral lobes present on segments 2–4. (fig. 36.5.c) . . .	***EUTHELEPUS*** (p. 726)
–	No lateral lobes	3
3	Uncini from setiger 3. Tentacular lobe short and collar-like . .	***THELEPUS*** (p. 727)
–	Uncini from setiger 9. Tentacular lobe short and collar-like . .	***PARATHELEPUS****
–	Uncini absent from the thorax but present on the abdomen. Tentacular lobe elongated with a frilled margin (fig. 36.6.b)	***TELOTHELEPUS*** (p. 731)

STREBLOSOMA Sars, 1872

Tentacular lobe small and collar-like bearing numerous tentacles. No lateral lobes on anterior segments. Nil to three pairs of filiform gills on segments 2–4. Smooth-tipped notopodial capillaries start on segment 2 (first branchiferous). Uncini start on segment 5 (setiger 4) and extend over a variable number of segments. Nephridia increase in size from segment 3 to 8 and are present on segment 5.

Type species: *Grymaea bairdi* Malmgren, 1866.

Key to Species

1	Gills entirely absent (fig. 36.4.d)	***S. abranchiata***
–	Two pairs of gills, each as a single filament (fig. 36.4.h)	***S. chilensis***
–	Three pairs of gills, each consisting of many filaments	2
2	Posterior uncini arranged in loops. Thirty-three segments with notosetae . .	***S. hesslei***
–	Posterior uncini in single rows. Thirty-eight or more segments with notosetae .	***S. persica***

Streblosoma abranchiata Day, 1963
(fig. 36.4.d–g)

Streblosoma abranchiata Day, 1963: 369, fig. 3 c–f.

Tubes fragile and covered with foraminiferan shells. Body uniformly slender, about 30 mm. long by 1.5 mm. wide for 60–70 segments. Tentacular lobe (fig. 36.4. d) short and collar-like with six to ten long tentacles. No eye-spots. Upper lip overhanging the ventral mouth. Lower lip small. No lateral lobes on anterior segments. No gills. Notosetae from segment 2 and continue for at least 19 segments, the first three being smaller than the rest. All notosetae are smooth-tipped capillaries (fig. 36.4.g). Uncini appear on segment 5 (setiger 4), are arranged in single rows throughout and are borne on low uncigerous ridges on the abdomen. Each uncinus (fig. 36.4. e, f) has a close-set cap of long denticles above the main fang. They are irregularly arranged but approximate to the dental formula MF: 4–5: ca 8: ca 12. Basal prow well marked and has a dorsal button.

Type locality: In 2269 metres off Cape Town.

Records: Cape (33/16 a, 34/16 a, 34/17 a).

Distribution: No other records.

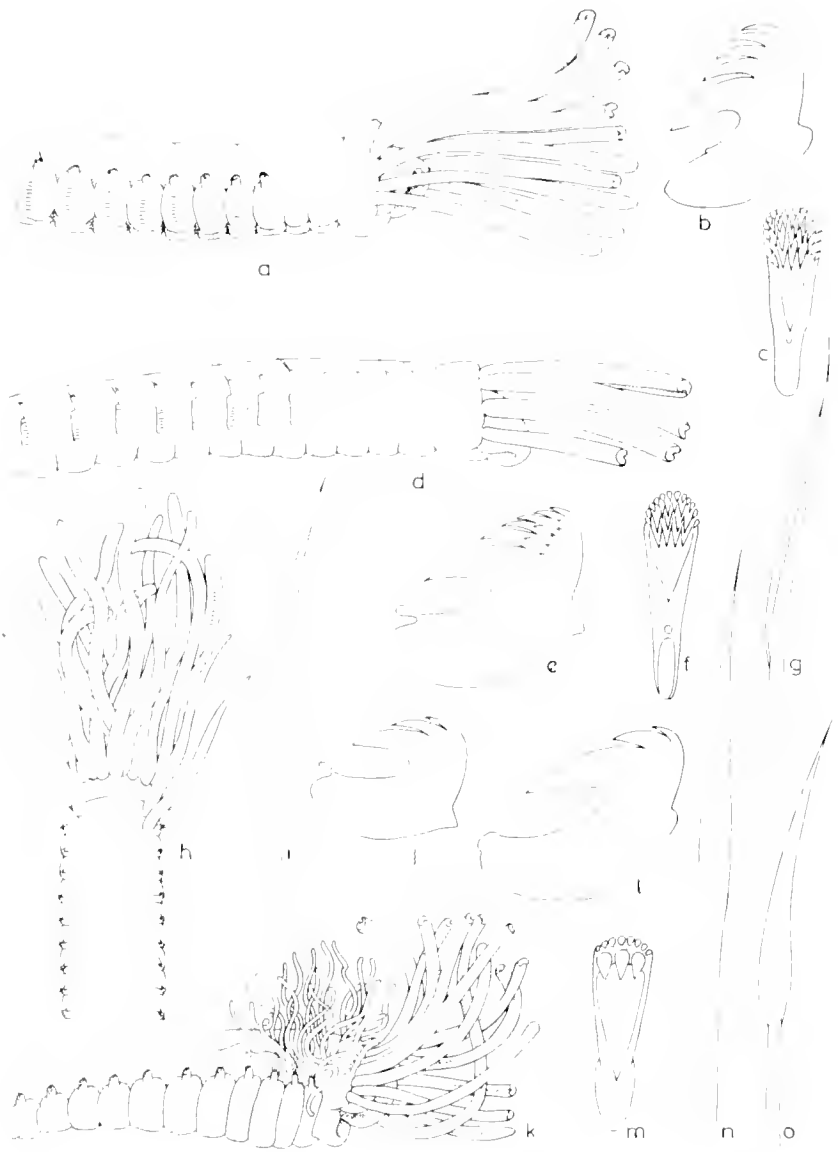

FIG. 36.4. *Lanassa capensis.* (A) Anterior end. (B, C) Profile and edge-on view of uncinus. *Streblosoma alaunchiata.* (D) Anterior end. (E, F) Profile and edge-on view of uncinus. (G) Notoseta. *Streblosoma chilensis* modified from McIntosh, 1885). (H) Anterior end. (I) Notoseta. (J) Uncinus. *Streblosoma hesslei.* (K) Anterior end. (L, M) Profile and edge-on view of uncinus. (N, O) Long and short types of notosetae.

Streblosoma chilensis (McIntosh, 1885)
(fig. 36.4.h–j)

Euthelepus chilensis McIntosh, 1885: 467, pl. 51 figs. 4–5; pl. 28A figs. 14–15.
Streblosoma chilensis: Day, 1963: 370.

Body about 50 mm. long by 2.5 mm. broad. Tentacular lobe (fig. 36.4.h) short and collar-like with 12 or more long tentacles. A well developed upper lip and a small lower lip. No eye-spots. Two pairs of gills on segments 2 and 3, each consisting of a single long filament. No lateral lobes on anterior segments. Notosetae from segment 2 (first branchiferous) and continue for at least 20 segments. Notosetae (fig. 36.4.i) have slender wings and smooth tips. Uncini from segment 5 (setiger 4) and are arranged in single rows throughout. In lateral view (fig. 36.4.j) each uncinus appears to have two teeth above the main fang, the first large and the second very small; dental formula MF: 1: 1–3. The prow of the uncinus is well developed and has a dorsal button. About nine ventral pads. Tube massive and made of mud.

Type locality: In 2610 fathoms, off Valparaiso.

Records: Cape (34/18/a).

Distribution: Chile (a).

Streblosoma hesslei Day, 1955
(fig. 36.4.k–o)

Streblosoma hesslei Day, 1955: 439, fig. g–l.

Body about 25 mm. long with 73 segments. Tentacular lobe (fig. 36.4.k) short with numerous eye-spots. Three branchiferous segments each bearing several filaments. Thirty-three segments with notosetae. Notosetae include long and short smooth-winged capillaries (fig. 36.4.n, o). No lateral lobes on anterior segments. Fifteen ventral pads. The first seven rows of uncini are in single rows but thereafter the rows become looped and eventually double rows are formed. Abdominal uncini on well marked pinnules. Uncini with two rows of denticles above the main fang and a large base with a broad attachment button at its end (fig. 36.4.l, m). Dental formula of uncinus MF: 2–5: 5–9.

Type locality: Robberg, South Africa.

Records: Cape (34/23/i); ? Madagascar (s).

Distribution: ? Endemic.

Streblosoma persica (Fauvel, 1908)
(fig. 36.5.a–d)

Grymaea persica Fauvel, 1908: 386; Fauvel, 1911: 419, pl. 20 figs. 35–43.
Streblosoma persica: Fauvel, 1953: 432, fig. 229 and 230 c–m.

Body (fig. 36.5.a) slender, evenly tapered, up to 60 mm. long. Upper lip hood-shaped, lower lip well defined. Tentacular lobe small and collar-like with short tentacles. No eye-spots. Three pairs of branchiae in the form of about six slender

filaments on segments 2–4 with a median gap between lateral groups. Notosetae from the first branchiferous segment to the end of the abdomen. Notosetae are short, broad-winged capillaries with smooth tips. Uncini from setiger 4, arranged in single rows throughout (fig. 36.4.b), and are borne on low pinnules in the abdomen. Dental formula of uncinus MF: 2–3: 1–5 (fig. 36.5.d). Prow of uncinus (fig. 36.5.c) well developed and rounded with the dorsal button slanting forwards. Thirteen well marked ventral pads which are not separated from the uncigerous tori. Nephridial papillae not seen.

TYPE LOCALITY: Persian Gulf.

RECORDS: Natal (29/32 d); Mocambique (26/32 i).

DISTRIBUTION: Persian Gulf; Gulf of Manaar; Krusadai Is.; tropical western Africa from Senegal (s) and Sao Thomé (i) to Angola (i).

EUTHELEPUS McIntosh, 1885

Tentacular lobe small and collar-like. Anterior segments with lateral lobes. Filamentous gills on segments 2–4 sometimes reduced to a single pair of filaments per segment. Smooth tipped notopodial capillaries start on segment 3 (second branchiferous) and extend over about 20 segments. Uncini which have short bases start on segment 5 (setiger 3). Distinct ventral pads present.

TYPE SPECIES: *Euthelepus setabulensis* McIntosh, 1885.

Euthelepus kinsemboensis Augener, 1918*
(fig. 36.5.e–i)

Euthelepus kinsemboensis Augener, 1918: 548, pl. 6 fig. 161, pl. 7 fig. 250, text-fig. 93.

Tentacular lobe (fig. 36.5.e) broad and hood-shaped. Eyes not seen. Ventral lip stout and well defined. Small lateral lobes on segments 2–4. Simple filamentous gills in right and left groups as follows: segment 2 with 3 and 3; segment 3 with 2 and 2; segment 4 with 1 and 1. Notosetae start on segment 3 (second branchiferous) and continue for 20 segments (posterior segments missing). Ventral pads not clearly defined after the first few. Notosetae of two types – broad-winged capillaries (fig. 36.5.h) and others with fine tapered blades with the blade serrate (fig. 36.5.i). Uncini from segment 5 (third setiger) onwards and are arranged in single rows. In profile (fig. 36.5.f) the base is short with an anterior prow and button and three to four teeth above the main fang; face view (fig. 36.5.g) shows the formula as MF: 2: 3–4.

TYPE LOCALITY: Tropical western Africa.

RECORDS: Not recorded from southern Africa.

DISTRIBUTION: Angola (i); New Caledonia (i).

*Possibly this species should be referred to *Amphitrite* though notosetae are said to start on segment 3.

THELEPUS Leuckart, 1849

Tentacular lobe short and collar-like, usually with numerous eye-spots. Branchiae as numerous simple filaments forming transverse rows across segments 2, 3 and sometimes 4. No lateral lobes on anterior segments. Notosetae as smooth-tipped capillaries starting on segment 3 (second branchiferous) and extending over at least half the body. Uncini with the base prolonged forwards like the prow of a ship on the upper surface of which is an attachment button. Uncini start on setiger 3 and continue to the posterior end. Ventral pads present. Nephridia in segments 4–7.

Type species: *Amphitrite cincinnata* Fabricius, 1780.

Key to Species

1 Two branchiferous segments . . . . . ***T. cincinnatus****
– Three branchiferous segments 2
2 Uncini always in a single row 3
– Uncini of middle and later segments in incomplete double rows (fig. 36.5.l, m). (Base of uncinus with both prow and button well developed) . . . . . ***T. comatus***
3 Prow of uncinus poorly developed 4
– Prow of uncinus well developed with a smaller button above 5
4 Button of uncinus superior and separated by a notch from the small prow (fig. 36.6.a). Notosetae stop halfway along abdomen . . . . . ***T. setosus***
– Button of uncinus terminal and in line with the tapered prow (fig. 36.6.o). Notosetae to near end of abdomen . . . . . ***T. plagiostoma***
5 Prow of uncinus broadly rounded and the button directed upward (fig. 36.5.p). Notosetae stop halfway along abdomen . . . . . ***T. triserialis***
– Prow of uncinus and button equally developed with a deep notch between them (fig. 36.5.q). Notosetae continue to near pygidium . . . . . ***T. pequenianus***

Thelepus cincinnatus (Fabricius, 1780)

Amphitrite cincinnata Fabricius, 1780: 286.
Thelepus cincinnatus: Fauvel, 1927: 271, fig. 95 i–m.

Body up to 200 mm. long with 100 segments. Tentacular lobe with eye-spots. Two branchiferous segments bearing numerous branchial filaments. Glandular ventral pads indistinct. Notosetae on 30–40 segments. Uncini always in a single row and in the abdomen they are borne on rectangular pinnules. Prow of uncinus broad, and much larger than the button which is directed upwards. Dental formula of uncinus MF: 2: 1–3.

Type locality: Greenland.

Records: No valid record from southern Africa.

Distribution: Arctic; North Atlantic; Mediterranean (s).

FIG. 36.5. *Stubbsoma persica*. (A) Entire worm (three times life size). (B) Parapodia of middle segments. (C, D) Profile and edge-on view of uncinus. *Euthelepus kinsembonsis* (modified from Augener, 1918). (E) Anterior end. (F, G) Profile and edge-on view of uncinus. (H, I) Two types of notosetae. *Thelepus cincinnatus*. (J) Entire worm (three times life size). (K, L, M) Uncigerous tori from the 5th, 7th and 12th setigers, showing the development of double rows of uncini. (N) Uncinus. *Thelepus plagiostoma*. (O) Uncinus. *Thelepus tricolor*. (P) Uncinus. *Thelepus pequenianus*. (Q) Uncinus.

Thelepus comatus (Grube, 1859)
(fig. 36.5.j–n)

Terebella comata Grube, 1859: 109.
Thelepus comatus: Day, 1955: 439, fig. 6 d.

Body (fig. 36.5.j) up to 60 mm. long with 100 segments. Tentacular lobe without eye-spots. Three branchiferous segments each bearing numerous gill filaments. Notosetae start on segment 3 and continue almost to the pygidium. Uncini of the first five to seven setigers in single rows (fig. 36.5.k); thereafter the rows become loops (fig. 36.5.l) and finally double rows are formed (fig. 36.5.m). Abdominal uncini borne on short ventro-lateral ridges. Prow and button of uncinus equally developed with a deep notch between them (fig. 36.5.n). Dental formula of uncinus MF: 2: 11–15.

Type locality: Chile.

Records: Cape (32/18/i).

Distribution: Chile (i); Tristan da Cunha (i); S. Arabia (s).

Thelepus plagiostoma (Schmarda, 1861)
(fig. 36.5.o)

Terebella plagiostoma Schmarda, 1861: 41, pl. 24 fig. 196.
Thelepus plagiostoma: Fauvel, 1953: 430, fig. 228 a–f; Day, 1955: 437, fig. 6 c.

Body up to 100 mm. long with 200 segments. Tentacular lobe with eye-spots. Three branchiferous segments with numerous gill filaments. Notosetae continue almost to the pygidium. Uncini always in single rows; uncigerous tori poorly developed and abdominal segments short and crowded. Uncini with the prow absent and the button terminal and directed forwards (fig. 36.5.o). Dental formula of uncinus MF: 2: 1–3.

Type locality: New Zealand.

Records: Cape (from 34/18/i and 34/22/i, s to 32/38/i); Natal (from 31/29/i to 27/32/i); Mocambique (26/32/i and 23/35/s); Madagascar (s).

Distribution: Chile; subantarctic (Falkland Is. (s), Magellan Area (d), New Zealand (d)); Indo-west-Pacific (Red Sea (i) and Madagascar (i) to Japan and Australia).

Thelepus setosus (Quatrefages, 1865)
(fig. 36.6.a)

Phenacia setosa Quatrefages, 1865: 376.
Thelepus setosus: Fauvel, 1927: 273, fig. 95 a–h.

Body up to 150 mm. long with 80–120 segments. Tentacular lobe with eye-spots. Three branchiferous segments bearing numerous gill filaments. About 15 ventral pads. Notosetae continue two-thirds the way along the abdomen. Uncini

always in a single row. Uncigerous tori well developed and form conspicuous pinnules along the abdomen. Uncini (fig. 36.6.a) with the prow smaller than the button above it and a slight notch between the two. Dental formula of uncinus MF : 2–3 : 0–2.

Type locality : France.

Records : Mocambique Island (i), (24 34′s).

Distribution : North Atlantic from Scotland (s) and the English Channel (i, s), Ireland to Senegal (i, s) ; Argentina (s), Falklands (i, s, d), North Carolina (i) and South Georgia (i, s) ; Mediterranean (s) ; Pacific (W. Canada and Japan to S. California and New Caledonia) ; Red Sea and Indian Ocean.

Thelepus triserialis (Grube, 1855)
(fig. 36.5.p)

Terebella triserialis Grube, 1855 : 118, pl. 4 fig. 16.
Thelepus triserialis : Fauvel, 1927 : 274, fig. 95 n–r ; Day, 1955 : 439, fig. 6 a.

Body up to 100 mm. long, swollen anteriorly, with 100–150 segments. Tentacular lobe with eye-spots. Three branchiferous segments bearing numerous gill filaments. Notosetae stop halfway along abdomen. Uncini always in a single row. Abdominal uncini borne on projecting pinnules. Prow of uncinus (fig. 36.5.p) broad and rounded and much larger than the dorsal button which is directed upwards. Dental formula of uncinus MF : 1–3 : 0–5.

Type locality : Sicily.

Records : Cape (34′20,i) ; Natal (30′30/i) ; Madagascar (s).

Distribution : Mediterranean (i, s).

Thelepus pequenianus Augener, 1918
(fig. 36.5.q)

Thelepus pequenianus Augener, 1918 : 545 ; Day, 1955 : 439, fig. 6 b.

Body up to 70 mm. long with 150 segments. Tentacular lobe with eye-spots. Three branchiferous segments. Notosetae continue almost to pygidium. Uncini always in a single row. Uncigerous pinnules well developed on abdomen. Uncini (fig. 36.5.q) with the prow and button subequal and with a deep notch between them. Dental formula of uncinus MF : 2 : 0–5.

Type locality : Luderitzbucht, South West Africa.

Records : South West Africa (26, 15 i, s) ; Cape (from 29, 16′i and 34 18 i, s to 33, 26 s).

Distribution : Endemic.

TELOTHELEPUS Day, 1955

Tentacular lobe large and elongate bearing numerous fine tentacles and a large and expanded frilly margin. Branchiae as numerous simple filaments arising from prominent bosses on two or three segments starting from segment 2. No lateral lobes on anterior segments. Notosetae as smooth-winged capillaries starting on segment 3 (second branchiferous) and restricted to the thorax. No neurosetae on the thorax but present as avicular uncini on the abdomen.

Type species: *Telothelepus capensis* Day, 1955.

Telothelepus capensis Day, 1955
(fig. 36.6.b–c)

Telothelepus capensis Day, 1955: 440, fig. 6 e–f.

Body about 50 mm. long with 100 segments. Tentacular lobe (fig. 36.6.b) long and bent back dorsally. Numerous short fine tentacles and an expanded frilly margin. No eye-spots. Numerous simple gill filaments borne on a pair of bosses on segments 2 and 3. No lateral lobes on anterior segments. Notosetae are smooth-winged capillaries and start on the second branchiferous segment and total 15 bundles. Conspicuous nephridial papilla on segments 5–7. Ventral pads absent. No uncini on the thorax but present on the abdomen and borne on square pinnules. Each uncinus (fig. 36.6.c) with a short base, a deep prow with a dorsal button and a dental formula of MF: 5–6: 8–10. No permanent tube.

Type locality: Langebaan Lagoon, South Africa.

Records: Cape (33/18/i, s, 34/23/e, 33/27/e) – locally common on sheltered sandbanks.

Distribution: Endemic.

Subfamily **TEREBELLINAE** Grube, 1850
(including AMPHITRICACEA and ARTACAMACEA Malmgren, 1865)

Tentacular lobe short and collar-like with numerous grooved tentacles. Buccal segment usually smooth, rarely with a papillose proboscis. Gills usually present on segments 2–4, often branched, rarely filamentous. Lateral lobes sometimes present on segments 2–4. Glandular ventral pads present. Notosetae start on segment 3 or 4 and are smooth-winged capillaries sometimes with denticulate tips. Neurosetae are always present as avicular or pectiniform uncini and start on segment 5; in later thoracic segments they are in double or alternating rows.

Records from southern Africa

Amphitrite pauciseta Day	56Cd
Amphitrite cirrata (Müller)	55Ca
Artacama proboscidea Malmgren . . .	56Cd
? *Colymmatops granulatus* Peters . . .	1Pi

Eupolymnia nebulosa (Montagu) . . . 51Csd, – Ms
as *Polymnia nebulosa* (Montagu) . . 27Mi, 44Ci, 45Pi
as *Polymnia capensis* McIntosh . . . 32Nd
Lanice conchilega (Pallas) . . . . 26Ai, 48WsCs, – NsPs
as *Lanice wollebaeki* (Caullery) . . . 40NiPi, 45Pi, 51Cs
Loimia medusa (Savigny) . . . . 26Ai, 27Mi, 40NiPi, 45PiNi, 51Cs, – NdMs
as *Terebella medusa* Savigny . . . 1Pi
as *Lanice fauveli* Day 36Cs
Nicolea macrobranchia (Schmarda) . . . 26Wis, 33Cs, 35Ci, 44Ci, 51Cs
as *Nicolea claparedii* (Grube) . . . 21Ci
as *Terebella macrobranchia* Schmarda . . 4Ci
Nicolea venustula (Montagu) . . . . 16Wi, 21Ci, 51 Csd, – NsMs
Nicolea venustula var. *africana* Augener . . 26Ais
Pista brevibranchia Caullery 40Pi, 45Pi
Pista cristata (Muller) . . . . . 48Csd, – Ns
? *Pista cristata* var. *capensis* McIntosh . . 32Pi
Pista fasciata (Grube) . . . . .
as *Terebella fasciata* Grube . . . 15Cs
Pista folliigera Caullery . . . . 27Mi, 40Ni, 44Ci, 51Cs, – Ms
Pista grubei Augener 34Wsd
Pista macrolobata Hessle . . . . 45Pi, – PsdMs
Pista quadrilobata (Augener) . . . 51Wi
as *Nicolea quadrilobata* Augener . . . 26AiWi
as *Pista qolora* Day 44Ci, 51Cs
Pista unibranchia Day 56Cs
Terebella ehrenbergi Grube . . . . 45Pi, – Pd
Terebella pterochaeta Schmarda (partim) . 4Ci, 36Ci, 40Ni, 44Ci, 51Cs
as *Leprea pterochaeta* (Schmarda) . . 11Wi, 15Cs, 16Wi, 26Wis
as *Schmardanella pterochaeta* (Schmarda) . 10Ci, 13Ci
Terebella schmardai Day 36Ci, 44Ci, 51Cs
as *Terebella pterochaeta* Schmarda (partim) . 4Ci
as *Terebella lapidaria* Augener (non Kahler) 26Wis
Terebellobranchia natalensis Day . . . 40Ni

Key to Genera

1 A papillose proboscis below the mouth (fig. 36.6.d). (Notosetae with smooth tips) ***ARTACAMA*** (p. 733)
– No papillose proboscis 2
2 Notosetae with smooth tips 3

–	Notosetae with denticulate tips (fig. 36.10.e)	8
3	No lateral lobes on segments 2–4. (Two pairs of gills) . . .	***NICOLEA*** (p. 735)
–	Lateral lobes present	4
4	Uncini of the first row or first few rows differ from those of later segments, having the base produced backwards as a long shaft (fig. 36.7.i). Not more than two pairs of gills .	5
–	Uncini of the first row short and similar to those of later segments. Three pairs of gills	6
5	Lateral lobes present on segments 2 and 4 at least (fig. 36.7.a). Posterior nephridia separate	***PISTA*** (p. 736)
–	Lateral lobes present on segment 3 only. Posterior nephridia united . .	***LANICIDES****
6	Uncini normal and avicular with close-set arcs of denticles above the main fang . .	7
–	Uncini pectiniform with a single vertical series on teeth (fig. 36.9.c, d)	***LOIMIA*** (p. 742)
7	Mouth of tube fringed and flattened (fig. 36.8.n). Uncini set back to back on posterior thorax	***LANICE*** (p. 743)
–	Mouth of tube not fringed or flattened. Uncini not set back to back	***EUPOLYMNIA*** (p. 744)
8	Lateral lobes present on segments 2, 3 and often 4 . . .	***AMPHITRITE*** (p. 746)
–	Lateral lobes absent	9
9	Notosetae start on segment 3 (second branchiferous)	***NEOLEPREA****
–	Notosetae start on segment 4	10
10	Two to three pairs of gills on segments 2–4	***TEREBELLA*** (p. 747)
—	Three pairs of gills at intervals along thorax (fig. 36.10.o)	***TEREBELLOBRANCHIA*** (p. 750)

ARTACAMA Malmgren, 1866

Tentacular lobe short and folded. A swollen papillose proboscis arising from the buccal segment below the mouth. Three pairs of filamentous gills, each gill consisting of several filaments arising from a common base. No lateral lobes on segments 2–4. Nephridia separate, the anterior one on segment 3 large and the posterior ones on segments 6, 7, 8 and 9 smaller. Smooth-tipped notosetae start on segment 4 and continue for 17 segments. Uncini start on segment 5 and are avicular with numerous denticles above the main fang. Glandular ventral pads present on the thorax. Uncigerous pinnules in abdomen expanded dorsally.

Type species: *Artacama proboscidea* Malmgren, 1866.

Artacama proboscidea Malmgren, 1866
(fig. 36.6.d–g)

Artacama proboscidea Malmgren, 1866: 394; Hessle, 1917: 191, pl 2 fig. 13; Day, 1963a: 437.

Tentacular lobe (fig. 36.6.d) small and horseshoe-shaped with a dorsal indentation. Tentacles very short. No eye-spots. A large conical proboscis formed by the projecting lower lip and covered with numerous conical papillae. Segments 2 and 3 flanged but without real lateral lobes. Three pairs of short filiform branchiae on segments 2–4, each in the form of a tuft of simple filaments arising from a basal stump. A well developed nephridial papilla on segment 3 below the gill and smaller ones on segments 6, 7, 8 and 9 postero-ventral to the notopodia. Seventeen bundles of notosetae starting on segment 4. Uncini start on segment 5 and are arranged in double rows on the posterior thorax. Eleven glandular ventral pads. Abdomen with numerous segments bearing expanded and pedunculate uncigerous pinnules with uncini restricted to part of the ventral margin.

Notosetae (fig. 36.6.g) are winged capillaries of two lengths and end in fine,

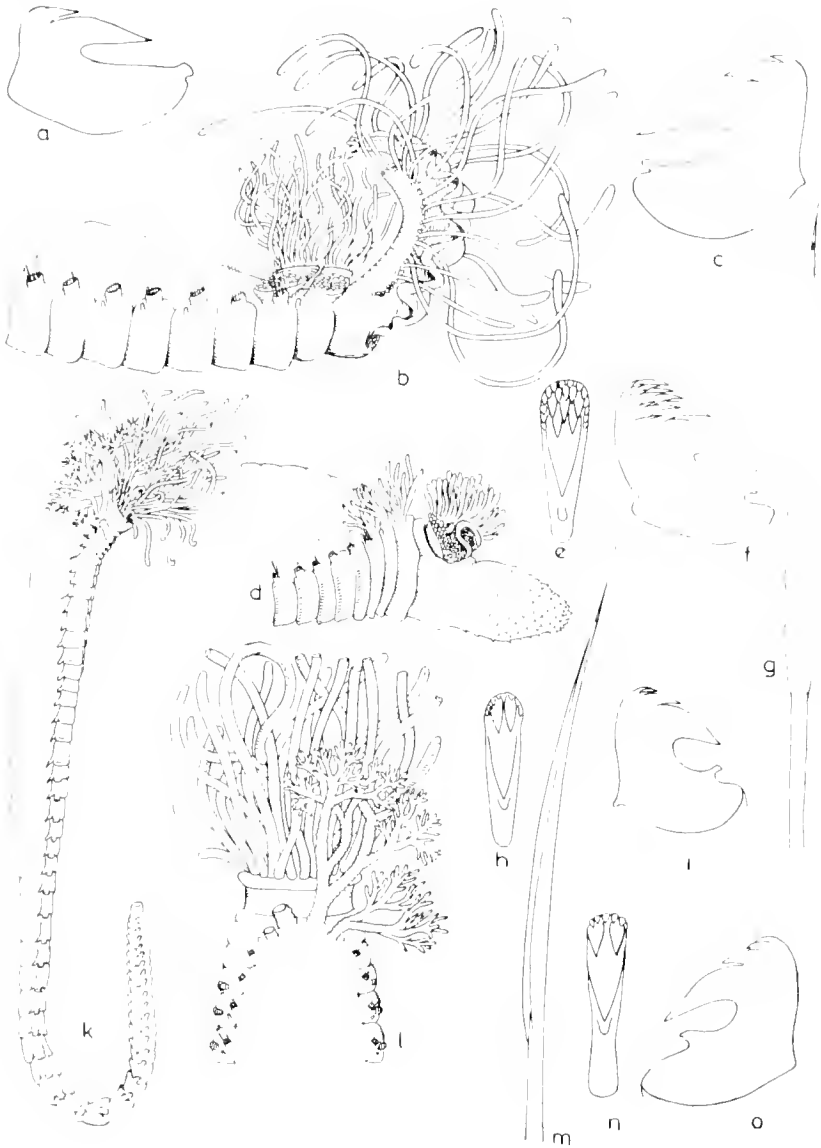

FIG. 36.6. *Thelepus setosus*. (A) Uncinus. *Telothelepus capensis*. (B) Anterior end. (C) Uncinus. *Artacama proboscidea*. (D) Anterior end. (E, F) Edge-on and profile of uncinus. (G) Short type of notoseta. *Nicolea venustula*. (I, J) Edge-on and profile of uncinus. *Nicolea macrobranchia*. (K) Entire worm (twice life size). (L) Anterior end. (M) Notoseta. (N, O) Edge-on and profile of uncinus.

smooth tops. Uncini (fig. 36.6.e, f) are small and avicular with a short base and a cap of about 20 denticles above the main fang arranged in four alternating rows. The attachment button is relatively large.

TYPE LOCALITY: Spitzbergen.

RECORDS: Cape (32/17/d).

DISTRIBUTION: Arctic (s, d); boreal North Atlantic (s); Bering Sea (s); N.W. Japan (s); subantarctic (s, d).

NICOLEA Malmgren, 1866

Tentacular lobe short and collar-shaped with numerous long tentacles and many eye-spots. Two pairs of branched gills on segments 2 and 3. No lateral lobes on segments 2–4. Notosetae are winged capillaries with smooth tips which start on segment 4 and extend over 15 to 40 segments. Uncini avicular with a close-set cap of denticles above the main fang. They start on segment 5 and are set in alternate rows back to back on a number of thoracic segments. Nephridia separate and subequal on either side of diaphragm.

TYPE SPECIES: *Terebella venustula* Montagu, 1818.

KEY TO SPECIES

1 Seventeen segments with notosetae . . . . . ***N. venustula***
– Twenty-five to forty segments with notosetae . . . . . ***N. macrobranchia***

Nicolea venustula venustula (Montagu, 1818)
(fig. 36.6 i–j)

Terebella venustula Montagu, 1818: 344, pl. 13 fig. 2.
Nicolea venustula: Fauvel, 1927: 260, fig. 90 a–f.

Body up to 50 mm. long. Tentacular lobe with numerous ocelli. Seventeen segments with notosetae. Two pairs of long, branched gills. Thirteen to seventeen ventral pads. Nephridial papillae on segments 3, 6 and 7. Uncini (fig. 36.6.i, j) with two irregular arcs of denticles above the main fang according to the formula MF: 2–4: 3–5. Rows of uncini on the abdomen abruptly shorter than those on the thorax and are borne on pinnules which have small superior papillae. Colour brick red spotted with white.

TYPE LOCALITY: South coast of Devon, England.

RECORDS: South West Africa (26/15/i); Cape (from 31/16/d and 34/18/s, d to 33/27/s); Natal (30/30/s); Mocambique (24/34/s); Madagascar (s).

DISTRIBUTION: Atlantic from Greenland (s, d) and Scotland (s) south to the Canary Is. (i) and Senegal (s, d); Mediterranean; Red Sea; Behring Sea to north Japan.

Nicolea venustula africana Augener, 1918

Nicolea venustula var. *africana* Augener, 1918: 524, pl. 7 fig. 242.

Generally similar to the stem form but the uncigerous pinnules on the abdomen have a cirriform dorsal appendage replacing the superior papillae.

Type locality: Ivory Coast, western Africa.

Distribution: Ivory Coast, Angola (s).

Nicolea macrobranchia (Schmarda, 1861)
(fig. 36.6.k–o)

Terebella macrobranchia Schmarda, 1861: 42, pl. 24 fig. 198.
Nicolea macrobranchia: Augener, 1918: 527, pl 7 fig. 232–3, text-fig. 89.

A large species reaching 100 mm. (fig. 36.6.k). Tentacular lobe (fig. 36.6.l) with numerous long tentacles and many eye-spots. The first gill much larger than the second. Twenty-five to forty segments with smooth-tipped notopodial capillaries (fig. 36.6.m). Eighteen ventral pads to setiger 17, some with transverse incisions. Long rows of uncini on the thorax and short ones on the abdomen with an abrupt change at setiger 18. Individual uncini (fig. 36.6.n, o) with few teeth according to the formula MF: 2–4 : 3–5.

Type locality: Cape of Good Hope.

Records: South West Africa (22/14 i and 26/15 i, s); Cape (from 29/16 i to 34/18 i, s, 34/23 c, i and 32/28 i); Natal (30/30 i).

Distribution: Endemic.

PISTA Malmgren, 1866

Tentacular lobe short, swollen and collar-like with numerous long tentacles. Eye-spot present or absent. Lateral lobes on segments 2–4. One to two pairs of branched gills on segments 2–3. Notosetae start on segment 4 and continue for 15 to 24 segments. They have well developed wings and, in most cases, smooth tips. Uncini start on segment 5 and the first one or two rows usually have posteriorly elongated bases but subsequent ones are avicular and arranged in two rows face to face. Distinct ventral pads. Nephridium on segment 3 small or absent but large separate ones are present in segments 6 and 7 behind the diaphragm.

Type species: *Amphitrite cristata* Muller, 1776.

Key to Species

1 Branchiae with filaments in closely packed whorls at the end of a naked trunk (fig. 36.7.e) 2
– Branchiae with filaments which are dichotomously branched (fig. 36.8.b). (Two pairs of branchiae) 4
2 Uncini of the first row without basal shafts (fig. 36.7.c). A single pair of branchiae ***P. unibranchia*** (p. 737)
– Uncini of the first row with basal shafts (fig. 36.7.d). Two pairs of branchiae . . 3

3 Branchial trunks shorter than the terminal bunch of filaments (fig. 36.7.e)
P. brevibranchia (p. 737)
– Branchial trunks longer than the terminal bunch of filaments (fig. 36.7.h) ***P. cristata*** (p. 738)
4 Uncini of the first row without basal shafts (fig. 36.7.n) . . ***P. macrolobata*** (p. 738)
– Uncini of the first row with basal shafts 5
5 Seventeen segments with notosetae. Neck of uncinus bears no striated lobe . . . 6
– Eighteen to twenty-four segments with notosetae. Neck of uncinus short and bears a striated lobe . . . . . ***P. foliigera*** (p. 740)
6 Neck of uncinus from first row obviously elongated and shaft tapered (fig. 36.8.c)
P. quadrilobata (p. 740)
– Neck of uncinus from first row not elongated and shaft slender not tapered (fig. 36.8.k)
P. fasciata (p. 742)

N.B. A doubtful species has been omitted – *P. cristata* var. *capensis* with two pairs of gills and a single tooth above the main fang.

Pista unibranchia Day, 1963
(fig. 36.7.a–c)

Pista unibranchia Day, 1963a: 438, fig. 11 f–h.

A small species about 10 mm. long. Tentacular lobe (fig. 36.7.a) collar-shaped with few eye-spots or none. Segments 2 and 3 with swollen, glandular lateral lobes which almost encircle the anterior end. Small lateral lobes on segment 4. A single median dorsal gill on segment 2 with a naked trunk and a pom-pom of short filaments arranged in six to eight whorls. Seventeen segments with notosetae starting on segment 4. Fifteen segments with ventral pads. Uncini start on segment 5 and are arranged in alternating rows on the posterior thorax. About 26 long abdominal segments with small uncigerous pinnules. Notosetae are broad-winged capillaries with smooth tips. Uncini (fig. 36.7.b, c) with rounded bases which lack shafts even in the first row. Main fang stout and surmounted with four irregular ares of close set denticles giving the approximate formula MF: 4 : 5 : 7 : 10.

TYPE LOCALITY: False Bay, South Africa.

RECORDS: Cape (34/18/s).

DISTRIBUTION: Endemic.

Pista brevibranchia Caullery, 1915*
(fig. 36.7.d–g)

Pista brevibranchia Caullery, 1915: 76. Caullery, 1944: 152, fig. 121.

Body about 30 mm. long. Buccal segment (fig. 36.7.e) with fairly small lateral ridges and a stout curved ventral lip. Segment 4 with small dorso-lateral lobes, segment 3 with large lateral lobes which cover most of segment 2, so that only small ventro-lateral lobes of segment 2 are visible. Two pairs of branchiae of which one is often missing and the other enlarged. Each gill consists of a stout trunk and a slightly longer bunch of spirally arranged filaments. Seventeen segments with

*Close to *P. cristata* and *P. typha*.

notosetae. First row of uncini with long shafts (fig. 36.7.d); succeeding uncini with shorter shafts (fig. 36.7.g) and four to five denticles above the main fang when seen in profile. An edge-on view (fig. 36.7.f) shows four to five arcs of denticles above the main fang giving a dental formula of MF : 3–4 ; 4–5 : 4–5 : ca. 12.

Type locality: Malay seas.

Records: Mocambique (26/32/i).

Distribution: Indonesia (d, vd, a).

Pista cristata (Müller, 1776)
(fig. 36.7.h–j)

Amphitrite cristata Muller, 1776: 216.
Pista cristata: Fauvel, 1–27: 266, fig. 93 a–g. Day, 1963: 369.

Body up to 60 mm. long. Tentacular lobe (fig. 36.7.h) short and collar-shaped with many tentacles but no eye-spots. A hood-shaped upper lip. Buccal segment with a straight lower lip notched in the middle and a pair of distinct, rectangular, lateral lobes. Segment 4 with rudimentary dorso-lateral lobes. Segment 3 with large wing-like lateral lobes which cover the sides of segment 2; below this segment 2 gives rise to a small but prominent pair of ventro-lateral lobes. Two pairs of branchiae each with a long naked trunk and a shorter terminal bunch of filaments arranged in whorls. Body of 70–100 segments of which 17 bear smooth-tipped notosetae. Nchpridial papillae on segments 6 and 7. Seventeen to twenty ventral pads. Uncini (fig. 36.7.j) avicular with rounded bases and numerous denticles above the main fang (according to the formula MF : 5–6 : 4–5 : 12–14). Uncini of the first six to ten rows with long shafts (fig. 36.7.i). Abdominal uncini without shafts and borne on well marked pinnules.

Type locality: Norway.

Records: Cape (32/17/d, 33/16/a, 34/16/a, 34/18/s); Natal (29/31/s).

Distribution: Arctic; Atlantic from Sweden (d), North Carolina (s) to Gulf of Mexico (s), English Channel (i, s), Senegal (s), Angola (s), Magellan area (i); Mediterranean; North Pacific from Japan to Behring Sea.

Pista macrolobata Hessle, 1917
(fig. 36.7.k–n)

Pista macrolobata Hessle, 1917: 157, pl. 2 fig. 4, text-fig. 36; Fauvel, 1932: 229, text-fig. 39.

Length about 25 mm. Tentacular lobe without eye-spots. Buccal segment with a pair of very large square lateral lobes extending forwards as a sheath to the tentacles (fig. 36.7.k). Second segment with a small pair of ventro-lateral lobes which are absent in juveniles; third segment with a pair of thick lateralll obes often reflected back; fourth segment with a pair of rudimentary lateral lobes or none at all. Two pairs of dichotomously branched gills. Small nephridia on segment 3

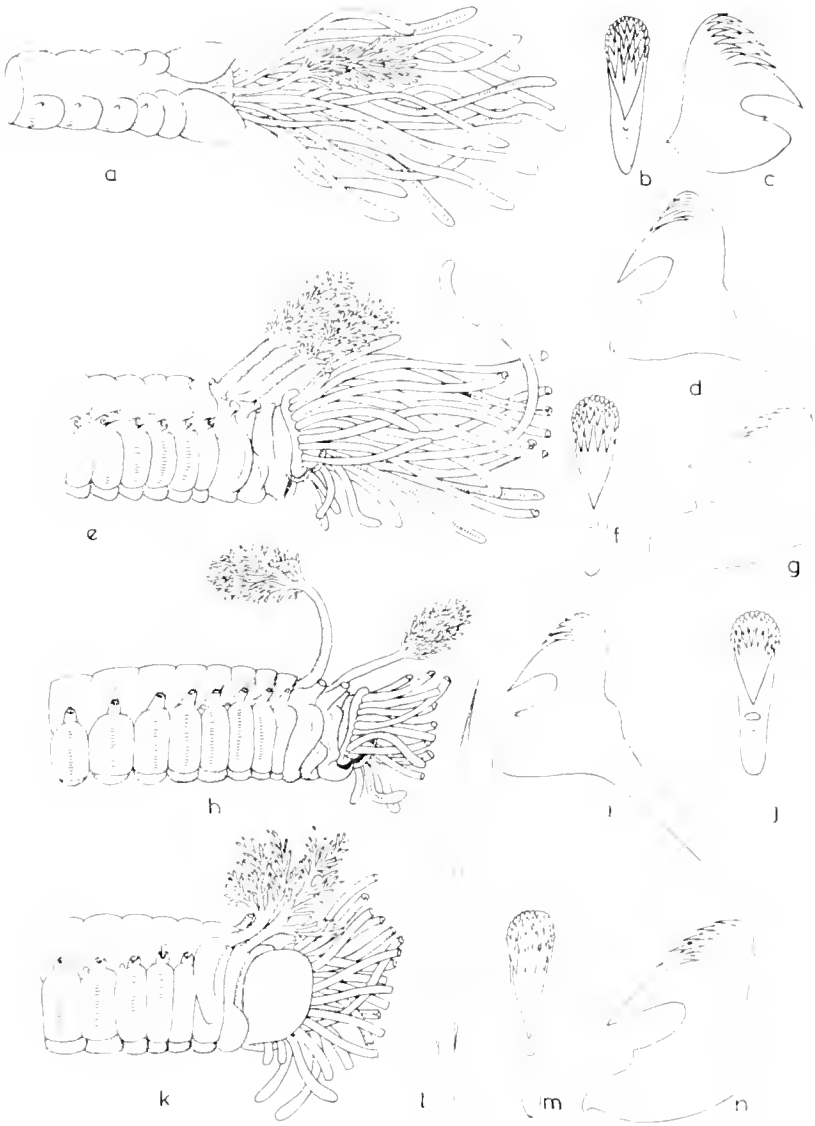

FIG. 36.7. *Pista unibranchia.* (A) Dorso-lateral view of anterior end. (B, C) Edge-on and profile of uncinus of first row. *Pista brevibranchia.* (D) Profile of uncinus of first row. (E) Anterior end. (F, G) Edge-on and profile of uncinus from 12th setiger. *Pista cristata.* (H) Anterior end. (I, J) Profile and edge-on view of uncinus from sixth setiger. *Pista macrolobata.* (K) Anterior end. (L) Winged capillary seta. (M, N) Edge-on and profile of uncinus from first row.

and large ones on segments 6 and 7. About 12 ventral pads. Seventeen segments bear smooth-tipped notopodial capillaries (fig. 36.7.l). Uncini (fig. 36.7.m) with a close-set cap of long denticles above the main fang according to the formula MF : 4 6 : 4–9 : ca 5 : ca 12. Uncini of the first row (fig. 36.7.n) lack shafts and are similar to those of succeeding segments. Abdominal uncini on square pinnules.

Type locality: Bonin Is., Pacific.

Records: Mocambique (26 32 i, s, d); Madagascar (s).

Distribution: Japan; Red Sea.

Pista foliigera Caullery, 1915
(fig. 36.8.f–j)

Pista foliigera Caullery, 1915: 72; Fauvel, 1919: 451, pl. 17 fig. 80, text-fig. 9.

Body about 50 mm. long for 120 segments. Tentacular lobe (fig. 36.8.f) with reddish-brown tentacles and numerous eye-spots. Buccal segment with ventro-lateral lobes and a well-developed lower lip. Second segment telescoped and with small lobes or none at all. Third segment with large, wing-like lateral lobes. Fourth segment without obvious lateral lobes. Two pairs of dichotomously branched gills with relatively few, stout, terminal branches. Fourteen ventral pads. Nephridial papillae on segments 3–8. Eighteen to twenty-four segments with notosetae of two types. The longer forms are normal winged capillaries with smooth tips and the shorter forms (fig. 36.8.j) have finely spinulose tips; these are better marked on posterior segments. Uncini of the first two rows (fig. 36.8.g) large with short broad heads, a fibrillar attachment lobe below the main fang which disappears in KOH and three arcs of teeth above the main fang giving the formula MF : 2 : 5 : 6–8; shafts very long and broad. Subsequent uncini avicular (fig. 36.8. h, i); abdominal uncini on short ventro-lateral pinnules.

Type locality: Celebes.

Records: Cape (from 33 18 i and 34 18 i, s to 34 23 s, d and 32 28 i); Natal 31 29 i; Madagascar (s).

Distribution: Madagascar (i); East Indies; tropical western Africa (i, s).

Pista quadrilobata (Augener, 1918)
(fig. 36.8.a–e)

Nicolea quadrilobata Augener, 1918: 532, pl. 6 fig. 183, pl. 7 figs. 226–227, text-fig. 90.
Pista golora Day, 1955: 436, fig. 5 g, k.
Pista quadrilobata: Day, 1961: 532, fig. 13 e.

Body (fig. 36.8.a) slender, gently tapering and about 35 mm. long. Tentacular lobe collar-shaped with short orange tentacles and eye-spots. Buccal segment (fig. 36.8.b) with large lateral lobes united ventrally and extending forward as a sheath for the tentacles. Second segment (first branchiferous) telescoped and with small ventro-lateral lobes or none at all. Third segment with large, wing-like lateral

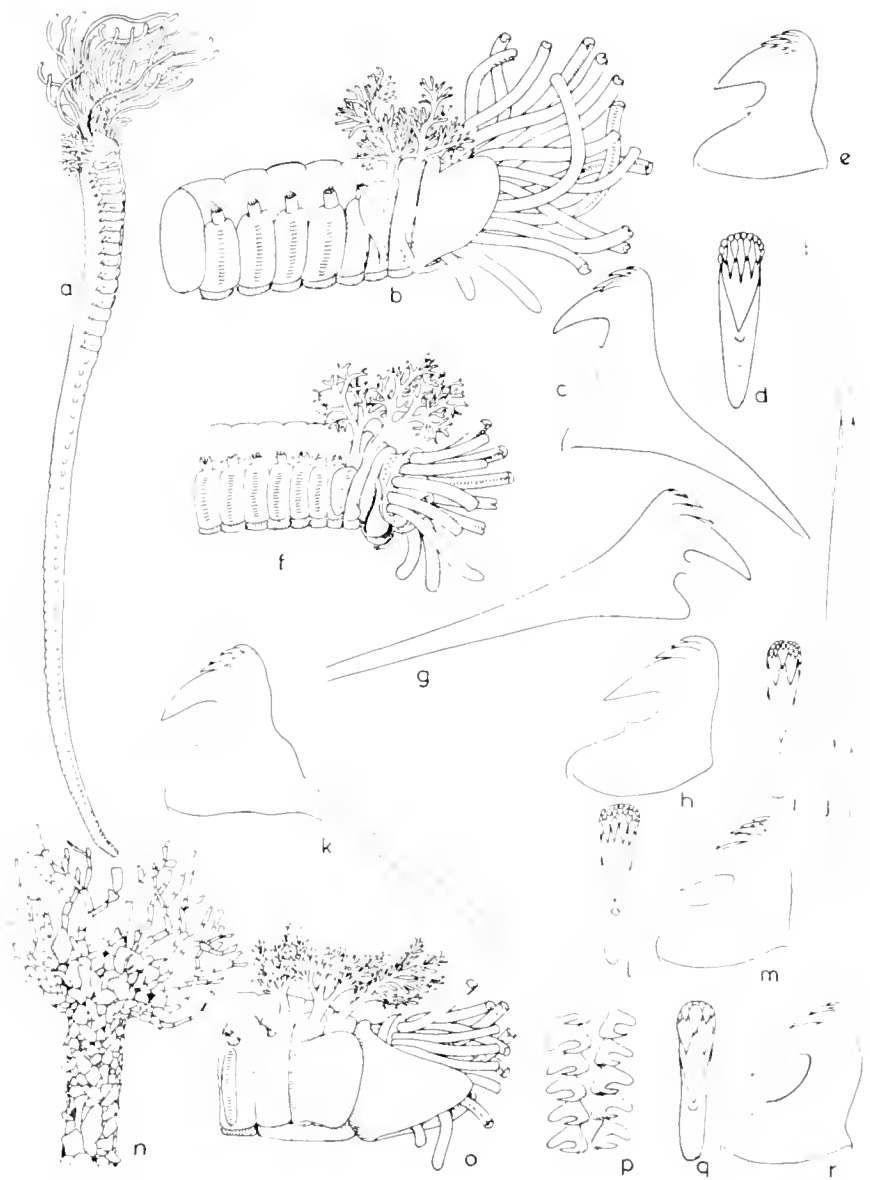

Fig. 36.8. *Pista quadrilobata*. (A) Entire worm (twice life size). (B) Anterior end. (C) Uncinus from first row. (D, E) Edge-on view and profile of uncinus from 10th setiger. *Pista foliigera*. (F) Anterior end. (G) Uncinus from first row. (H, I) Profile and edge-on view of uncinus from 16th setiger. (J) Short form of notoseta with spinulose tip from 16th setiger. *Pista fasciata*. (K) Uncinus from second row (after Fauvel, 1932). (L, M) Edge-on and profile of uncinus from abdomen (after Marenzeller, 1885). *Lanice conchilega*. (N) Top of tube. (O) Anterior end. (P) Arrangement of uncini on posterior thoracic segment. (Q, R) Edge-on view and profile of thoracic uncinus.

lobes. Two pairs of dichotomously branched gills. Seventeen segments with smooth-tipped notopodial capillaries. Eighteen ventral pads starting from the first branchiferous. Nephridial papillae not evident. Uncini avicular, those of the first two rows (fig. 36.8.c) having long straight necks, relatively few teeth according to the formula MF: 2–3: 4–7, and long, markedly tapered shafts. Later uncini (fig. 36.8.d, e) with more teeth (formula MF: 2–3: 10–12) but no shafts. Abdominal uncini borne on square pinnules.

Type locality: Swakopmund, South West Africa.

Records: South West Africa (22/14/i, 26/15/s and 28/16/s); Cape (from 32/18/s and 34/18/s to 32/28/i, s).

Distribution: Endemic.

Pista fasciata (Grube, 1869)
(fig. 36.8.k–m)

Terebella (Phyzelia) fasciata Grube, 1869: 513; Ehlers, 1908: 148.
Pista fasciata: Marenzeller, 1884: 6, pl. 1 fig. 4; Fauvel, 1932: 228, text-fig. 38.

Length 58 mm. for 131 segments. Tentacles short and stout. Buccal segment with large lateral lobes; second segment with small ventro-lateral lobes or none at all; third segment with lateral lobes one-third the size of those on the buccal segment. Two pairs of stout, dichotomously branched gills one of which is often lost. Seventeen segments with smooth-tipped winged capillaries. Fifteen ventral pads starting on the first branchiferous segment. Uncini of all thoracic segments (fig. 36.8.k) have slender but straight and well marked shafts; abdominal uncini (fig. 36.8.l, m) without shafts. Crest of uncinus with a close set cap of denticles giving the approximate formula MF: 4: 7: ca 12.

Type locality: Red Sea.

Records: Cape (33/25/s).

Distribution: Indo-Pacific (from Red Sea and Zanzibar (d); Bay of Bengal (d), Japan (s) to Alaska and S. California.

LOIMIA Malmgren, 1866

Tentacular lobe short and collar-like with eye-spots. Three pairs of branched gills on segments 2–4. First few segments with lateral lobes. Notosetae with smooth tips start on segment 4 and extend over 17 segments. Uncini start on segment 5 and are in double rows back to back on the posterior part of the thorax. Each uncinus is pectinate with a single vertical series of teeth above the main fang. Ventral pads present. Nephridial papillae on segments 6–8. Nephridia small anterior to diaphragm, large and united behind it.

Type species: *Terebella medusa* Savigny, 1820.

Loimia medusa (Savigny, 1820)
(fig. 36.9. a–e)

Terebella medusa Savigny, 1820: 95. 8
Loimia medusa: Fauvel, 1953: 416, fig. 218 a–f.

Length up to 250 mm. for 200 segments. Tentacular lobe short and collar-like (fig. 36.9.a). Eye-spots present. Tentacles long, often banded with purple. First branchia often larger than the other two. Buccal segment with a large membraneous lower lip. Segments 2 and 3 fused with a horizontal membraneous lateral lobe and a large united ventral pad below. Well marked ventral pads up to setiger 15. Seventeen segments bear narrow-winged capillaries with smooth tips (fig. 36.9.c). Uncini pectiniform with a single vertical series of about five to six teeth (fig. 36.9. c, d). The uncini are in double rows back to back on the posterior thorax (fig. 36.9.b) and the rows are abruptly shortened at the end of the thorax and on the posterior abdomen they are borne on square pinnules.

Type locality: Gulf of Suez.

Records: Cape (34/18/s, 34/22/s, 34/23/d); Natal (30/30/i and 29/32/d to 27/32/i); Mocambique (26/32/i and 23/35/e, i, s); Madagascar (s).

Distribution: English Channel (e, i, s); North Carolina, U.S.A. (s); West Indies (s); tropical Indian Ocean (i, s, d); Red Sea (i); Pacific (Japan and S. California).

LANICE Malmgren, 1866

Tentacular lobe short and collar-shaped with numerous long tentacles and eye-spots. Three pairs of branched gills on segments 2–4. Lateral lobes on the first three segments. Smooth-tipped notopodial capillaries start on segment 4 and are present on a total of 17 segments. Uncini start on segment 5. They are avicular with irregular transverse arcs of denticles above the main fang, and are set in two rows back to back on the posterior thorax (fig. 36.8.p). Ventral pads more or less continuous. Nephridia small in front of diaphragm, large and united behind it. Tube with the mouth flattened and fringed with stringy projections (fig. 36.8.n).

Type species: *Nereis conchilega* Pallas, 1766.

Lanice conchilega (Pallas, 1766)*
(fig. 36.8.n–r)

Nereis conchilega Pallas, 1766: 131, pl. 9 figs. 14–22.
Lanice conchilega: Fauvel, 1927: 255, fig. 88 a–h.
Lanice wollebaeki Caullery, 1944: 125, fig. 99; Day, 1951: 59.

Body large and soft with a swollen thorax and slender abdomen. Length up to 30 cm. Tentacular lobe with eyes sometimes present. Upper lip pronounced. Buccal segment (fig. 36.8.o) with very large ventro-lateral lobes sometimes continuous ventrally forming a sheath for the tentacles. No lobes on segment 2. Large

*Although the bodies and the setae of specimens from southern Africa agree in detail with those from Europe, the tube is not muddy but is composed of large shell fragments and is attached to rocks.

square lateral lobes on segment 3 which cover segment 2. Three pairs of equal gills with short trunks on segments 2–4. Fourteen to twenty ventral pads which are not distinct from one another and taper to a glandular streak. Nephridial papillae on segments 3 and 6–9. Uncini (fig. 36.8.q, r) avicular with three teeth when seen in profile but with three arcs of teeth when seen in face view according to the formula MF: 2:3–7. Abdominal uncini borne on long pinnules. Tube composed of mud and sand or shell fragments and has a fringed mouth (fig. 36.8.n).

Type locality: Holland.

Records: Cape (from 34 18 s to 33 28 s); Natal (31 29 i and 30 30 i, s to 29 31 i,s); Mocambique (26 32 i and 23 35 s).

Distribution: Atlantic (from Sweden (d) to the English Channel (i, s) and tropical west Africa (i, s, d); Mediterranean; Persian Gulf (s); Southern California.

EUPOLYMNIA Verrill, 1900

Tentacular lobe short and collar-shaped with numerous tentacles. Eye-spots present. Three pairs of branched gills on segments 2–4. Lateral lobes on segments 2–4. Smooth-tipped notopodial capillaries start on segment 4 and extend over 17 segments. Uncini with anteriorly produced bases start on segment 5 and are set in alternating or double rows on the posterior thorax. Well marked ventral pads. Nephridia separate and not missing from segment 7.

Type species: *Amphitrite nesidensis* Delle Chiaje, 1825.

Eupolymnia nebulosa (Montagu, 1818)
(fig. 36.9.f–h)

Terebella nebulosa Montagu, 1818: 343, pl. 12 fig. 1.
Polymnia nebulosa: Fauvel, 1927: 257, fig. 89 a–g; Fauvel, 1953: 419, fig. 219 a–g.

Tentacular lobe (fig. 36.9.h) with numerous ocelli. Small lateral lobes on segments 2, 3 and often 4. Fourteen to fifteen ventral pads extending to setiger 13 and a narrow glandular streak after that. Winged notosetae with smooth tips start on segment 4 and extend over 17 segments. Uncini from segment 5, each with two large teeth and one to five denticles above the main fang in a close-set group according to the formula MF: 2:1–5 (fig. 36.9.f, g). Abdominal uncini borne on pinnules, which are abruptly shorter than the thoracic ones. Obvious nephridial papillae on segments 3, 4 and 5 posterior and dorsal to the notopodia. Body soft, skin thin with numerous white dots which disappear in alcohol.

Type locality: British seas.

Records: South West Africa (28 16 s; Cape (from 31 16 d and 34 1 8 i, s to 32 28 i; Natal (30 30 s and 30 31 vd); Mocambique (26 32 i); Madagascar (s).

Distribution: Atlantic (from Scotland (s) and the English Channel (i, s) to tropical western Africa (s, d) and the Falkland Is. (d); Mediterranean (i, s); Red Sea (i); Persian Gulf (s); tropical Indian Ocean (i); Pacific (Japan).

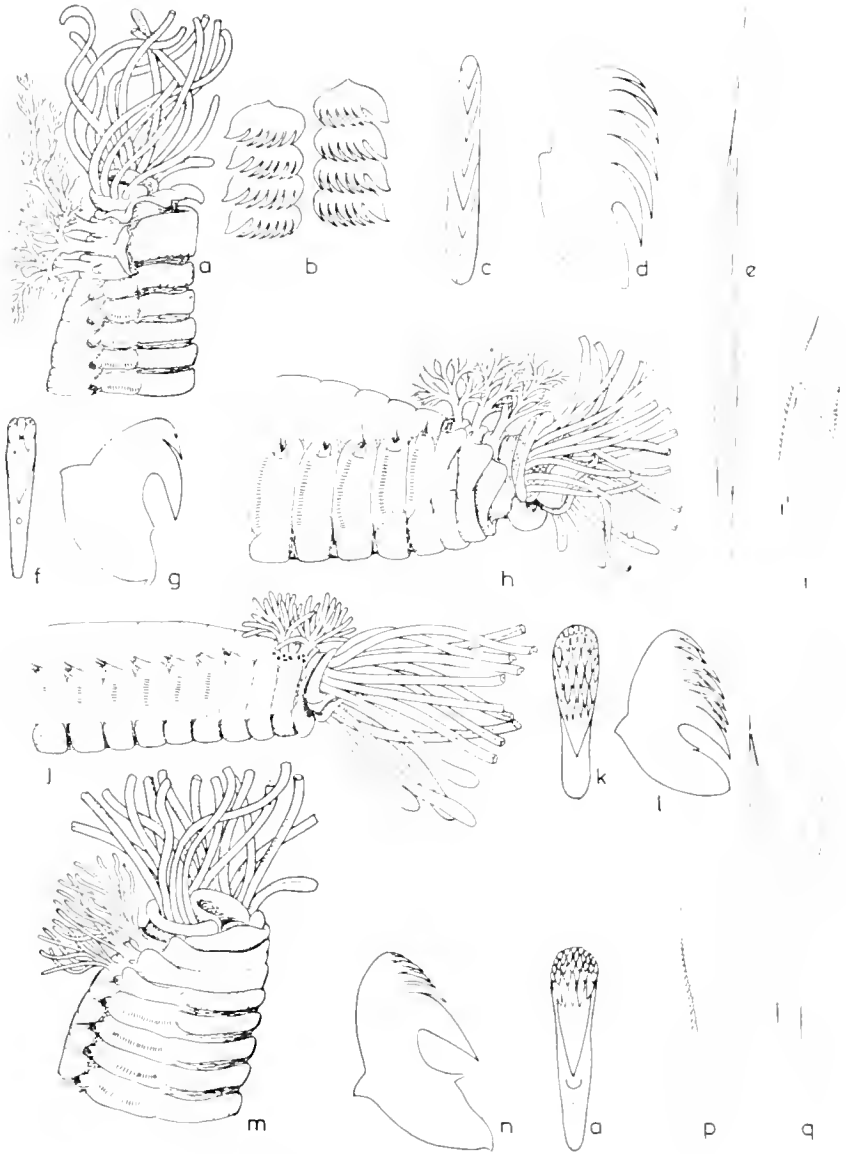

FIG. 36.9. *Loimia medusa*. (A) Anterior end. (B) Uncigerous double row from setiger 12. (C, D) Edge-on view and profile of thoracic uncinus. (E) Winged capillary seta. *Eupolymnia nebulosa*. (F, G) Edge-on view and profile of thoracic uncinus. (H) Anterior end. *Amphitrite pauciseta*. (I) Winged capillary seta and side view of tip. (J) Anterior end. (K, L) Edge-on view and profile of uncinus. *Amphitrite cirrata*. (M) Anterior end. (N, O) Profile and edge-on view of thoracic uncinus. (P) Tip of notoseta. (Q) Notoseta.

W

AMPHITRITE Muller, 1771

Tentacular lobe short and collar-like with numerous tentacles. Eye-spots seldom present. Two to three pairs of gills starting on segment 2. Gills either branched or as simple filaments arising from a basal stump. Lateral lobes present on segments 2–4. Notosetae are winged capillaries with finely serrated tips. They start on segment 4 (third branchiferous) and extend over 13–25 thoracic segments. Avicular uncini appear on segment 5 (setiger 2) and are arranged in alternating or double rows on posterior thoracic segments. Ventral pads well developed. Abdominal segments numerous and bear uncigerous pinnules.

Type species: *Amphitrite cirrata* Müller, 1771.

Key to Species

1 Thirteen segments with notosetae. Branchial filaments arise from a main stem ***A. pauciseta***
– Seventeen segments with notosetae. Branchial filaments arise from a basal stump ***A. cirrata***

Amphitrite pauciseta Day, 1963
(fig. 36.9.i–l)

Amphitrite pauciseta Day, 1963a: 439, fig. 11 j–m.

Body up to 20 mm. long for 70 segments. Tube fragile. Tentacular lobe (fig. 36.9.j) with long tentacles. Eye-spots minute or absent. Obscure lateral lobes on segments 2, 3 and 4. Two pairs of gills on segments 2 and 3. Each gill as a tuft of digitiform filaments arising from a basal stump. A group of subdermal reddish spots visible in fresh specimens at the base of each gill. Thirteen segments with notosetae starting on segment 4. Uncini from segment 5 (setiger 2) and arranged in double rows on the posterior thorax. A large nephridial papilla on segment 3 lateral to the gill base. Ten glandular ventral pads.

Abdomen smoothly tapered with 40 or more segments bearing uncigerous tori anteriorly and small uncigerous pinnules near the end. Notosetae (fig. 36.9.i) with narrow blades and minutely denticulated tips. Uncini with short bases; in profile (fig. 36.9.l) they appear to have five teeth above the main fang but an edge-on view (fig. 36.9.k) shows irregular arcs approximating to the formula MF: ca 5: ca 7: ca 9: ca 12.

Type locality: 160 metres off Saldanha Bay, South Africa.

Records: Cape (33 17/d).

Distribution: Endemic.

Amphitrite cirrata Muller, 1771
(fig. 36.9.m–q)

Amphitrite cirrata Muller, 1771 in 1776: 216; Fauvel, 1927: 251, fig. 86 i–o; Day, 1963: 368.

Body up to 100 mm. long for 85 segments. Tentacular lobe (fig. 36.9.m) without eye-spots. A prominent shelf-like lower lip. Three pairs of gills, each composed

of numerous simple filaments arising from a basal stump. Small lateral lobes on segments 2–4. Ten to twelve ventral pads. Seven pairs of nephridial papillae on segments 3, and 6–11. Notopodial capillaries on 17 segments from segment 4 onwards. Thoracic uncini from segment 5 and arranged in two rows from setiger 7 to 16. Abdominal uncini borne on projecting pinnules. Thoracic notosetae (fig. 36.9.p, q) are winged capillaries with minutely denticulate tips. Thoracic uncini (fig. 36.9.n, o) avicular with irregularly arranged cap of denticles above the main fang approximating to the formula MF : 4–5 : 5–6 : 8–10 10–15.

Type locality : Iceland.

Records : Cape (34/16/a).

Distribution : Arctic ; North Atlantic from Greenland (i, s, d, vd, a) and Sweden (d) ; Azores (a), Senegal (s) ; Mediterranean ; Behring Sea and North Pacific to Japan ; Western Canada to central California.

TEREBELLA Linnaeus, 1767

Tentacular lobe short and collar-shaped. Eye-spots present. Two or three pairs of branched gills on segments 2–4. No lateral lobes on the first few segments. Notosetae start on segment 4 (third branchiferous) and continue for a variable number of segments. Notosetae have serrated tips. Uncini are avicular ; they start on segment 5 (setiger 2) and are set in double or alternate rows face to face on the posterior thorax. The uncigerous tori are poorly marked on the abdomen and are ventral in position. Ventral pads well marked on the thorax. Posterior nephridia united by a pair of lateral canals.

Type species : *Terebella lapidaria* Linnaeus, 1767.

Key to Species

1 Two pairs of gills . . . . . ***T. pterochaeta***
– Three pairs of gills. (No spur at the base of the denticulate blade of the notosetae) . 2
2 Notosetae stop 20–40 segments from the pygidium . . . . . ***T. ehrenbergi***
– Notosetae continue almost to pygidium . . . . . ***T. schmardai***

Terebella pterochaeta Schmarda, 1861
(fig. 36.10.a–f)

Terebella pterochaeta Schmarda, 1861 : 43, text-figs. a–d.
Schmardanella pterochaeta : McIntosh, 1885 : 449, pl. 53 fig. 1, pl. 27A.

Body (fig. 36.10.a) slender, evenly tapered, up to 100 mm. long. Head (fig. 36.10.b) with well marked upper and lower lips. Two pairs of gills with short, close-set branches. Twenty-eight to thirty-three segments with notosetae. About 16 ventral pads followed by a narrow streak of glandular tissue in a ventral groove along the abdomen. Uncini on low tori which decrease evenly in size after the first three and originate from ventral ridges on the abdomen. Notosetae of two lengths ; anterior ones (fig. 36.10.e) with characteristic winged shafts and denticulate

tips which become proportionately larger on posterior segments until they form most of the blade (fig. 36. 10.f). No spur at the base of the denticulate blade. Uncini seen in profile (fig. 36.10.d) appear to have three to four teeth above the main fang but in face view (fig. 36.10.e) they show three to four irregular arcs of teeth; dental formula: MF: 2–4: 5–7: 8–10. Attachment button well developed.

Type locality: Cape of Good Hope.

Records: South West Africa (22 14 i and 26 15 i, s); Cape (from 29 16 i and 34 18 i, s to 32 28 i); Natal (31 29 i to 29 31 i).

Distribution: Senegal (?d); tropical Indo-west-Pacific from the Red Sea (i) to Indo-China and New Caledonia.

Terebella ehrenbergi Grube, 1870
(fig. 36.10.g–i)

Terebella Ehrenbergi Grube, 1870: 511; Gravier, 1905b: 213, pl. 4 figs. 224–225; Hessle, 1917: 188.

Three pairs of branched gills. Notosetae from segment 4 to within 20–40 segments from the pygidium. A large nephridial papilla on segment 3 between the bases of the first and second branchiae and small nephridiopores on segments 6–12. Thirteen ventral pads followed by a narrow mid-ventral glandular streak. Anterior notosetae (fig.36.10.i) have long, uniformly narrow wings and denticulate tips. Posterior ones lack the wings but the denticulate tip is then enlarged to form a spiral blade without a basal spur. Shorter notosetae with coarse teeth at the base of the blade. Uncini (fig. 36.10. g, h) with two to three arcs of denticles above the main fang giving the formula MF: 2–3: 5–7. Attachment button obscure.

Type locality: Red Sea.

Records: Mocambique (26 32 i and 26 33 d).

Distribution: Tropical Indo-west-Pacific from the Red Sea (s) to Burma, Japan and New Caledonia (i).

Terebella schmardai Day, 1934
(fig. 36.10.j–n)

Terebella schmardai Day, 1934: 69, fig. 13 a–e.

Body up to 50 mm. in length. Tentacular lobe (fig. 36.10.l) with well developed lips and eye-spots. Three pairs of short, branched gills. Notosetae from segment 4 almost to the pygidium. Inconspicuous nephridial papillae on segments 3, 6, 7, 8, 9. Ventral pads distinct on ten segments and then a narrow streak. Notosetae have well marked wings and serrated blades (fig. 36.10.j, k) which become fairly broad and markedly spiral but never have a spur at the base. Uncini (fig. 36.10.m, n)

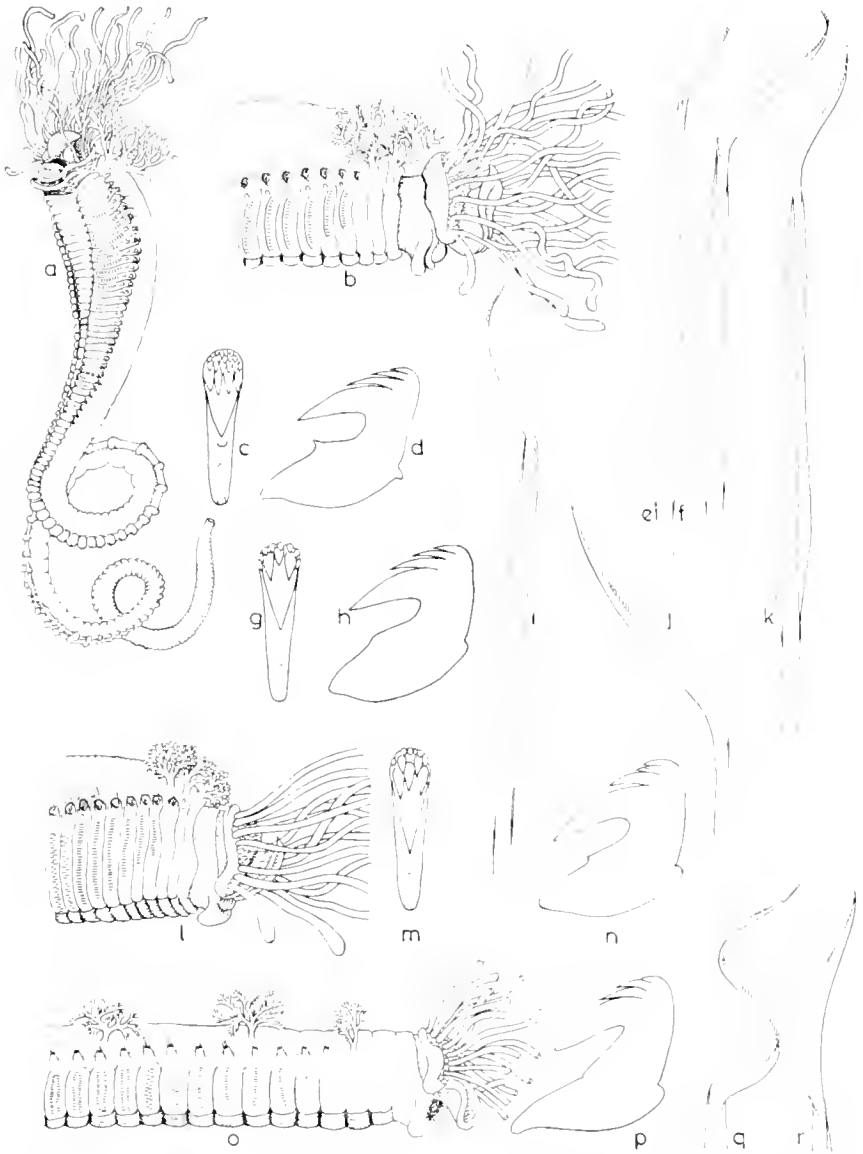

Fig. 36.10. *Terebella pterochaeta*. (A) Entire worm (three times life size). (B) Anterior end. (C, D) Edge-on view and profile of thoracic uncinus. (E) Anterior notoseta. (F) Posterior notoseta. *Terebella ehrenbergi*. (G, H) Edge on view and profile of thoracic uncinus. (I) Anterior notoseta. *Terebella schmardai*. (J) Blade of posterior notoseta. (K) Anterior notoseta. (L) Anterior end. (M, N) Edge-on view and profile of thoracic uncinus. *Terebellobranchia natalensis*. (O) Anterior end. (P) Thoracic uncinus. (Q) Tip of posterior notoseta. (R) Tip of anterior notoseta.

with about 12 denticles above the main fang arranged according to the formula: MF: 2–3; 8–10. Attachment button poorly developed.

TYPE LOCALITY: False Bay, South Africa.

RECORDS: South West Africa (22/14/i to 28/16/i, s); Cape (from 29/16/i to 34.18.i, s and 34.24 d to 33 28.s).

DISTRIBUTION: Endemic.

TEREBELLOBRANCHIA Day, 1951

Generally similar to *Terebella* except for the arrangement of the branchiae; there are three pairs of branched gills at intervals along the thorax.

TYPE SPECIES: *Terebellobranchia natalensis* Day, 1951.

Terebellobranchia natalensis Day, 1951
(fig. 36.10.o–r)

Terebellobranchia natalensis Day, 1951: 58, fig. 8 b–e.

A small species less than 20 mm. long. No eye-spots. No lateral lobes on anterior segments (fig. 36.10.o). Thirteen ventral pads on segments 2–15, followed by a glandular ventral streak. Three pairs of branched gills on segments 3, 7 and 13. Notosetae from segment 4 and total 19 or more. Each has a denticulate tip (fig. 36.10.r) and in posterior segments the denticulate portion becomes long and spirally twisted (fig. 36.10.q). Uncini from segment 5, at first in a single row and later in two rows. Each uncinus (fig. 36.10.p) with a series of three denticles above the main fang when seen in profile but three to four arcs when seen in edge-on view. Attachment button not developed.

TYPE LOCALITY: Durban, South Africa.

RECORDS: Natal (30/30/i and 29/31/i).

DISTRIBUTION: No other records.

Family **SABELLIDAE** Malmgren, 1867

Tubicolous, filter-feeding worms living in tough tubes reinforced with mud or sand. Prostomium indistinct. The food-gathering apparatus consists of two terminal branchial lobes which project forward from either side of the mouth and bear numerous bipinnate radioles which are sometimes united by a web. No operculum. Two grooved palps and often a pair of membraneous lips. The peristome often develops a collar which ensheaths the base of the branchial lobes and in addition there may be both eyes and otocysts internally. Body sharply divided into an anterior thorax of about eight setigers bearing winged capillaries dorsally plus avicular or long-shafted hooks ventrally and a posterior abdomen of few or many segments with the setal types inverted.

Records from southern Africa

Amphiglena mediterranea (Leydig)	51Cs
Branchiomma capensis (McIntosh)	
as *Dasychone capensis* McIntosh	10Cd, 51Csd
as *Dasychone argus* var. *capensis* McIntosh	32Cs
Branchiomma natalensis (Kinberg)	
as *Sabella natalensis* Kinberg	3?Ni
as *Dasychone natalensis* (Kinberg)	33Ci, 44Ci, 51Cs
as *Dasychone violacea* McIntosh (non Schmarda)	10Ci
as *Dystilia violacea* Quatrefages (non Schmarda)	6Ci
Branchiomma nigromaculata (Baird)	–Ms
as *Dasychone nigromaculata* Baird	36Ci, 40Ni, 44Ci, 45NiPi, 51Cs
as *Dasychone corollifera* Ehlers	21Ci
as *Dasychone cingulata* Grube	27Mi, 28Mi
as *Dasychone argus* var. *chefinae* McIntosh	32Ps
as *Dasychone bairdi* McIntosh	29Ai
Branchiomma nigromaculata loandensis Treadwell	
as *Dasychone loandensis* Treadwell	39Ai
Branchiomma serratibranchus (Grube)	
as *Dasychone serratibranchis* Grube	40Ni, 45Ni
as *Dasychone* near *orientalis* McIntosh	32Pis
Branchiymma violacea (Schmarda)	–Ms
as *Sabella violacea* Schmarda	4Ci
as *Sabella foliifera* Kinberg	7Ci
as *Dasychone violacea* (Schmarda)	10Ci (pp.), 11Wi, 16Wi, 20Ci, 33Cs, 26Wis, 35Ci, 36Ci, 44Ci, 51Cs
as *Dasychone violacea* var. *capensis* Day (non McIntosh)	36Ci
Chone collaris Langerhans	45Pi
Chone filicaudata Southern	48Cs, 51Cs, –Ns

Chone letterstedti (Kinberg)	
as *Parachonia letterstedti* Kinberg	3Ci
Desdemona ornata Banse	47Ci
as *Oridia parvula* Day (non Ehlers)	44Ci, 45Ne
Euchone capensis Day	51Csd
Euchone rosea Langerhans	48Cs
Fabricia bansei Day	51Cis
Fabricia capensis (Monro)	44Ci, 51Cs
as *Oridia capensis* Monro	38Ci
Fabricia filamentosa Day	56Cd
Fabriciola mossambica (Day)	56Cd
as *Fabricia mossambica* Day	45Pi
Hypsicomus capensis Day	51Cd
Hypsicomus phaeotaenia (Schmarda)	28Mi
Jasmineira caudata Langerhans	—Ms
Jasmineira elegans St. Joseph	48Cs, 51Csd,—Ns
Jasmineira (? = *Fabricia*) *analis* Ehlers	16Wi
Megalomma quadrioculatum (Willey)	—Ps
as *Branchiomma quadrioculatum* Willey	35Ci, 36Ci, 40PiNi, 44Ci, 45PiNi, 51Cs
?as *Branchiomma vesiculosum* Ehlers (non Montagu)	21Ci
as *Branchiomma mushaensis* Gravier	28Mi
Megalomma bioculatum (Ehlers)	
as *Branchiomma bioculatum* Ehlers	26As
Megalomma vesiculosum (Montagu)	
as *Branchiomma vesiculosum* (Montagu)	45Pi
Myxicola infundibulum (Renier)	36Ci, 44Ci, 51Cs
as *Myxicola michaelseni* Augener	26Wi
Oriopsis bansei Day	51Wi
as *Oria parvula* Augener (non Ehlers)	26Wis
as *Oriopsis parvula* Banse (non Ehlers)	47Wis
Oriopsis ehlersi Day	51Cs
Oriopsis eimeri Langerhans	51Cl
Oriopsis neglecta Banse	47Wis, 51Cis
Oriopsis parvula (Ehlers)	51Cs
as *Oria parvula* Ehlers	21Ci
Potamilla reniformis (Leuckart)	13Ci, 32Cs, 36Ci, 40Ni, 44Ci, 51Cs, –NsPd
as *Potamilla ehlersi* Monro (? Gravier)	38Ni
Potamilla linguicollaris Day	51Csd
Potamilla torelli Malmgren	15Cs, 44Ci, 45PiNi, 51Cs
Sabella fusca Grube	45Pi
? as *Sabella mossambica* Peters	1Pi

Sabella penicillus Linnaeus	51Csd
as *Sabella pavonina* Savigny	33Cs
Sabellastarte longa (Kinberg)	35Ci, 36NiCi, 40NiPi, 44Ci, 51Cs
as *Sabella longa* Kinberg	7Ni
as *Bispira volutacornis* McIntosh (non Montagu)	13Ci
as *Dasychone odhneri* Fauvel	28Mi
Sabellastarte sanctijosephi (Gravier)	
as *Sabella indica* Savigny (non Linnaeus)	32Pi
as *Sabellastarte indica* (Savigny)	40NiPi

BIOLOGICAL NOTES

The most primitive group of sabellids is the subfamily Fabriciinae, the members of which make temporary mucus tubes and creep about quite actively. They move either backwards or forwards and it is not surprising that many of them have two pairs of eyes, one on the head and the other on the pygidium. When feeding they either spread out their branchial crowns to trap suspended particles or sweep the surface with long mobile palps to pick up deposited material.

Typical sabellids are, however, tubicolous and rely entirely on suspended food particles. They are common on the sides of pylons and on rock ledges where there is considerable water movement. They make tough tubes lined with muco-protein and covered with mud, sand or general debris. The base of the tube is usually lodged in a crevice and some actually bore holes in soft coral. The mouth of the tube often collapses when the worm retracts and *Potamilla* is even better protected from predators for the end of the tube rolls up like a scroll.

When feeding, a sabellid pushes its head out of the mouth of its tube and distends its trumpet-shaped branchial crown. The whole crown is formed of two branchial lobes each of which bears a semi-circle of bipinnate radioles. These are ciliated and the food current is drawn down into the funnel where the food particles are trapped in mucus on the pinnules. From the pinnules the food strings pass down grooves on the inner sides of the radioles and collect in basal gutters which lead them to the palps where the particles are sorted. The lighter particles are carried to the mouth while the heavier silt and sand particles are either ejected or used to build the tube.

The posterior end of the tube is closed and there is a special method for the removal of faecal pellets. From the anus they are carried forward along a midventral groove called the *copragogue*. At the junction of the thorax and abdomen the pellets move onto the dorsal surface and eventually fall out of the mouth of the tube.

THE MAIN DIAGNOSTIC CHARACTERS

General discussions of the family Sabellidae are given by Rioja (1923) and Fauvel (1927). A more detailed account of the subfamily Sabellinae is given by Johansson (1927) and recent discussions of the subfamily Fabriciinae will be found in Hartman (1951a) and Banse (1956 and 1957).

The family Sabellidae is well defined and easily distinguished from the Serpulidae

by the lack of a calcareous tube and an operculum. The most important taxonomic characters include structures associated with the branchial crown (Siebapparat), the collar and the nature of the setae.

The branchial crown. The Sabellids are suspension feeders. The suspended particles are collected by a pair of *branchial lobes* which bear a number of bipinnate *radioles*. The particles entangled in mucus are conveyed down an inner groove of each radiole to a ciliated sorting groove from which the food particles are led via the ciliated *palps* to the mouth which is guarded by a dorsal lip and two ventro-lateral ones.

In certain genera (e.g. *Fabricia*, *Manayunkia* and *Oriopsis*) there are only three or four pairs of radioles but in the great majority of Sabellids the radioles are numerous and the exact number of radioles varies so much with the size of the worm that it loses systematic value. The colour too is of little importance. The radioles are usually arranged in a semicircle on each branchial lobe but in some species the radioles are arranged in a series of *whorls* around a central axis provided with a spiral groove to convey the mucus strings to the palps and mouth. With rare exceptions (*Manayunkia*) each radiole has a central "cartilagenous" axis of clear cylindrical cells and a series of paired side branches or *pinnules* so that the whole radiole is said to be *bipinnate* with the naked *tip* projecting distally. In *Chone* some of the smaller ventral radioles lack pinnules and appear to act as filamentous palps. A pair of filamentous palps is well defined in *Fabriciola* but normally all the radioles possess lateral pinnules and the palps are flattened tapering organs on either side of the mouth.

In *Myxicola* the radioles of each branchial lobe are united to one another by a membraneous *web* so that when the whole branchial crown is expanded, it forms a funnel leading down to the mouth. In other genera however, the web between the radioles is split to varying degrees and when the splitting is complete the radioles are said to be *free* or united only at the base. The remains of the web form a pair of *lateral flanges* on the side of the individual radioles. These flanges may be incised at intervals to form a series of lappets or external *stylodes* and in the genus *Branchiomma* (*olim Dasychone*) the shape and distribution of the stylodes is a useful specific character. In many genera the lateral flanges are lost entirely.

In several genera some of the radioles bear *eye spots* or ocelli. These may be regularly arranged in pairs on the side of the radioles or irregularly scattered over the outer surface of the dorsal radioles. In *Megalomma* (*olim Branchiomma*), well developed *sub-terminal eyes* occur near the tips of the radioles. The number of radioles which bear such eyes seems to be a function of the size of the worm.

The radioles have a respiratory as well as a nutritive function and in a few genera there is a pulsatile *branchial heart* in each branchial lobe. This is not easy to see unless it is dilated with blood. In *Manayunkia* however, the branchial hearts are contained in prominent palp-like organs.

The Collar. The base of each branchial lobe is usually surrounded by an elevated fold or half *collar*. The two halves of the collar always remain separate dorsally but may be united ventrally. Further, each half collar is often incised or notched back

dorso-laterally so that the whole collar then consists of two small dorsal lobes and two large ventro-lateral lobes. These main differences are important but variations in the shape of the lobes are of doubtful systematic value. In some genera (e.g. *Oriopsis*) the collar segment may lack flanges and a true collar is thus absent; in this case the ventral lips may be enlarged and thickened to form a triangular projection below the mouth. This has sometimes been mistaken for a triangular ventral collar.

Otocysts or statocysts. These are embedded in the collar segment and are open or closed. They are seldom easy to see and are thus of little value in classification.

Eye-spots or ocelli. Apart from the radiolar eyes mentioned earlier, ocelli may occur in the tissues of the collar segment, on the surface of the setigerous segments between the notosetae and neurosetae or on the pygidium. They are not of great systematic value as those of the first segment are hidden deep inside the collar and those on the parapodia tend to fade in alcohol.

The setae. Thoracic notosetae include *winged capillaries*, *paleae* with very short broad blades and sometimes intermediate forms with hastate or spatulate blades. The winged capillaries vary in detail and their exact structure is of little specific value but the shape of the paleae is more important. Thoracic uncini may be in two rows or only one. When there are two rows the first row always consists of *pick-axe setae* with broad pointed blades set at right angles on top of a slender shaft. The second row always consists of Z-shaped *avicular uncini* with a pointed *rostrum*, a dentate crest, a broad neck, an angular prow and a short tail. When there is only one row of thoracic uncini these may be avicular uncini or *long-shafted hooks* with a stout rostrum and dentate crest mounted on a long curved shaft.

In the abdomen the setal types are inverted. The notosetae are uncini usually similar to those in the thoracic neuropodia, but where long-shafted hooks occur in the thorax the abdominal uncini are either square uncini or long-handled hooks with numerous teeth. These abdominal uncini are arranged in a close-set row and in order to obtain a clear profile view of a single uncinus it is necessary to excise the parapodium and masserate it with 5% KOH for a few minutes before making a temporary mount in glycerine.

Subfamilies

The family Sabellidae was divided by Rioja (1923) into three subfamilies: *Sabellinae*, *Fabriciinae* and *Myxicolinae*. This subdivision is followed by Fauvel (1927) but Johansson (1927) has included *Myxicola* in the Fabriciinae so reducing the number of subfamilies to two. This subdivision is adopted here and the two subfamilies are defined below:

Subfamily **SABELLINAE** Rioja, 1923

Sabellidae with avicular uncini in the thorax and abdomen. Longitudinal body muscles not nematoid. Branchial crown innervated by a single pair of nerves.

Sub-family **FABRICIINAE** Rioja, 1923 (including Myxicolinae Rioja, 1923).

Sabellidae with long-shafted hooks in the thorax. Longitudinal muscles nematoid. Branchial crown innervated by two pairs of nerves.

Key to Genera

1	Thoracic neurosetae are a row of avicular uncini (fig. 37.5.c) and sometimes a row of pick-axe setae as well (subfamily Sabellinae)	2
–	Thoracic neurosetae are a single row of long-shafted hooks (fig. 37.5.m) (subfamily Fabriciinae)	11
2	Thoracic neurosetae include a row of avicular uncini and a row of pick-axe setae (fig. 37.2.a, v)	3
–	Thoracic neurosetae are a single row of avicular uncini only	9
3	Collar well developed, at least ventrally	4
–	Collar replaced by a triangular ventral projection (fig. 37.1.b)	***AMPHIGLENA*** (p. 757)
4	Large sub-terminal eyes on some branchial radioles (fig. 37.1.h)	***MEGALOMMA*** (p. 757)
–	No terminal eyes but lateral eye-spots sometimes present on the dorsal radioles (fig. 37.4.b)	5
5	Notosetae of first row very short and set in a row (fig. 37.2.a). Base of branchial lobes elongated. Lateral eye-spots always present on radioles	***HYPSICOMUS*** (p. 760)
–	Notosetae of first row in a compact tuft. Base of branchial lobes not elongated. Radioles with or without eye-spots	6
6	Thoracic notosetae are all winged capillaries of varying length	7
–	Thoracic notosetae include winged capillaries and either paleae or spatulate setae (fig. 37.1.d)	8
7	Branchial lobes symmetrical, semicircular (fig. 37.2.o)	***SABELLA*** (p. 763)
–	Branchial lobes asymmetrical, spirally coiled	***SPIROGRAPHIS****
8	Branchial lobes spiral with three to four whorls of radioles. Posterior thoracic notosetae include striated sabre-setae	***BISPIRA****
–	Branchial lobes flat, semicircular. Thoracic notosetae include winged capillaries plus paleae	***POTAMILLA*** (p. 764)
9	Thoracic notosetae include winged capillaries and subspathulate setae with abruptly pointed tips	***LAONOME****
–	Only winged capillaries in thorax	10
10	Branchial radioles with external lappets or *stylodes* (fig. 37.4.b)	***BRANCHIOMMA*** (p. 767)
—	Branchial radioles without stylodes (fig. 37.5.b)	***SABELLASTARTE*** (p. 770)
11	Abdominal uncini minute and arranged in long rows almost encircling the segments. Radioles completely united by a web (fig. 37.5.j)	***MYXICOLA*** (p. 773)
—	Abdominal uncini in short rows. Radioles either separate or united by a web	12
12	Radioles united for most of their length	13
—	Radioles either free or united only at the base	14
13	The last few abdominal segments flanged to form a ventral spoon-shaped hollow (fig. 37.6.a, d)	***EUCHONE*** (p. 774)
—	No spoon-shaped hollow	***CHONE*** (p. 776)
14	Abdominal uncini avicular (fig. 37.7.p, q). Thoracic notosetae include both winged capillaries and spathulate forms	***JASMINEIRA*** (p. 779)
–	Abdominal uncini either long-shafted hooks or serpuliform uncini. Thoracic notosetae are all winged capillaries	15
15	No branchial radioles with lateral pinnules	***MANAYUNKIA****
	Most branchial radioles with lateral pinnules	16
16	Abdominal uncini with long shafts (fig. 37.8.k). Three abdominal segments. Branchial hearts present	17
—	Abdominal uncini with short bases (fig. 37.10.f). More than three abdominal segments. No branchial hearts	18

17 A pair of ventral, elongated palps which do not contain blood vessels (fig. 37.8.a) ***FABRICIOLA*** (p. 781)
— No elongated, filamentous palps . . . . . ***FABRICIA*** (p. 782)
18 Branchial radioles with marginal flanges (fig. 37.10.a) . . . ***ORIOPSIS*** (p. 785)
— Branchial radioles without flanges or only minute ones (fig. 37.10.i) ***DESDEMONA*** (p. 788)

AMPHIGLENA Claparède, 1864

Body small, 5–15 mm. long. Branchial lobes not spiral and radioles without eyes or external stylodes and not united by a web. A pair of long tapered palps. Mouth between the branchial lobes which arise from a triangular ventral projection of the peristomial segment. No collar. A pair of otocysts embedded in the peristome. First setiger with winged capillaries only. Notosetae of setigers 2–8 include both winged capillaries and paleae. Thoracic neurosetae are avicular uncini plus pick-axe setae. Abdominal notosetae are avicular uncini and the neurosetae are broad-winged capillaries.

Type species: *Amphicora mediterranea* Leydig, 1851.

Amphiglena mediterranea (Leydig, 1851)
(fig. 37.1.a–g)

Amphicora mediterranea Leydig, 1951: 328, pl. 9 figs. 6–7.
Amphiglena mediterranea: Fauvel, 1927: 324, fig. 112 k–r.

Body (fig. 37.1.a) 6–15 mm. long with 35–40 segments. Branchial lobes each with seven radioles not united by a web. Distal pinnules short and beyond these there is a long naked tip. No collar but the peristomial segment forms a triangular ventral lobe fused to the base of the branchial lobes (fig. 37.1.b). Eight thoracic and 24–30 abdominal segments. Setiger 1 with winged capillaries only. Notosetae of setigers 2–8 are winged capillaries (fig. 37.1.c) and paleae with long tips (fig. 37.1.d). Thoracic neurosetae include pick-axe setae with heart-shaped blades ending in long tips (fig. 37.1,e, f) and avicular uncini with striated crests (fig. 37.1.g). Abdominal notosetae are avicular uncini similar to those on the thorax and the neurosetae are broad-bladed capillaries. Animal hermaphrodite.

Type locality: Mediterranean Sea.

Records: Cape (34/18/s).

Distribution: North Atlantic from the English Channel (i, s) to Madeira and Morocco (i); ? Antarctica (d); Mediterranean (i, s); Persian Gulf.

MEGALOMMA Johansson, 1927
(= *BRANCHIOMMA* Claparede, 1870, non Kolliker, 1858)

Branchial lobes equal; radioles without external stylodes but with subterminal eyes at least on a few dorsal radioles. A pair of grooved palps. A two- or four-lobed collar. Collar setae in a compact bundle. Thoracic notosetae are winged capillaries

(plus paleae in *B. quadrioculatum*). Thoracic neurosetae are avicular uncini plus pick-axe setae. Abdominal uncini are avicular uncini.

TYPE SPECIES: *Amphitrite vesiculosum* Montagu, 1815.

KEY TO SPECIES

1 Only winged capillaries in thoracic notopodia 2
– Winged capillaries plus paleae in thoracic notopodia (fig. 37.1.k, l) . ***M. quadrioculatum***
2 Collar widely gaping dorsally with very small dorsal lobes. Lateral lobes slant forward ventrally. Two terminal eyes . . . . . . ***M. bioculatum****
– Collar narrowly divided dorsally with large dorsal lobes (fig. 37.1.s). Numerous subterminal eyes . . . . . ***M. vesiculosum***

Megalomma quadrioculatum (Willey, 1905)
(fig. 37.1.h–o)

Branchiomma quadrioculatum Willey, 1905: 307.
Branchiomma Mushaensis Gravier, 1908: 94, pl. 7 figs. 267–270, text-figs. 447–453.

Body (fig. 37.1.m) slightly tapered. Length up to 50 mm. Two or more radioles of each branchial lobe bear large subterminal eyes (fig. 37.1.h). Collar notched back dorsally to form two small dorsal and two large lateral lobes. Palps short. Thoracic notosetae of setigers 2–8 include two types of setae: (a) long slender-winged capillaries (fig. 37.1.l) and (b) paleae with short tips (fig. 37.1.k). Thoracic neurosetae include a row of pick-axe setae with symmetrical blades (fig. 37.1.i, j) and a row of avicular uncini with fairly long shafts (fig. 37.1.n, o).

TYPE LOCALITY: Ceylon.

RECORDS: South West Africa (26/15/i and 28/16/s); Cape (from 33/17/s, d and 34/18/i, s to 32/28 i); Natal (31/29 i to 29/31 i(; Mocambique (26/32/i, 24/34/s).

DISTRIBUTION: Red Sea; S. Arabia (s); Madagascar (i); Ceylon.

Megalomma vesiculosum (Montagu, 1815)
(fig. 37.1.p–u)

Amphitrite vesiculosa Montagu, 1815: 19, pl. 5 fig. 1.
Branchiomma vesiculosum: Fauvel, 1927: 315, fig. 109 a–q.

Body up to 100 mm. or more, encased in a horny tube reinforced with sand. Twenty to thirty branchial radioles with the tips coiled inwards, each bearing a subterminal eye. The dorsal radiole of each lobe is stouter than the rest. Palps stout and triangular. Two acuminate ventral lips with pockets. Collar (fig. 37.1.s) divided dorsally and notched back on each side to form large rectangular dorsal lobes and large lateral lobes which broaden to form large lappets on either side of the mid-ventral line. Thoracic notosetae are winged capillaries of two lengths; the shorter forms (fig. 37.1.r) have slightly broader wings than the longer ones. Thoracic neurosetae include avicular uncini with long tails and striated crests (g. 37.1.t, u),

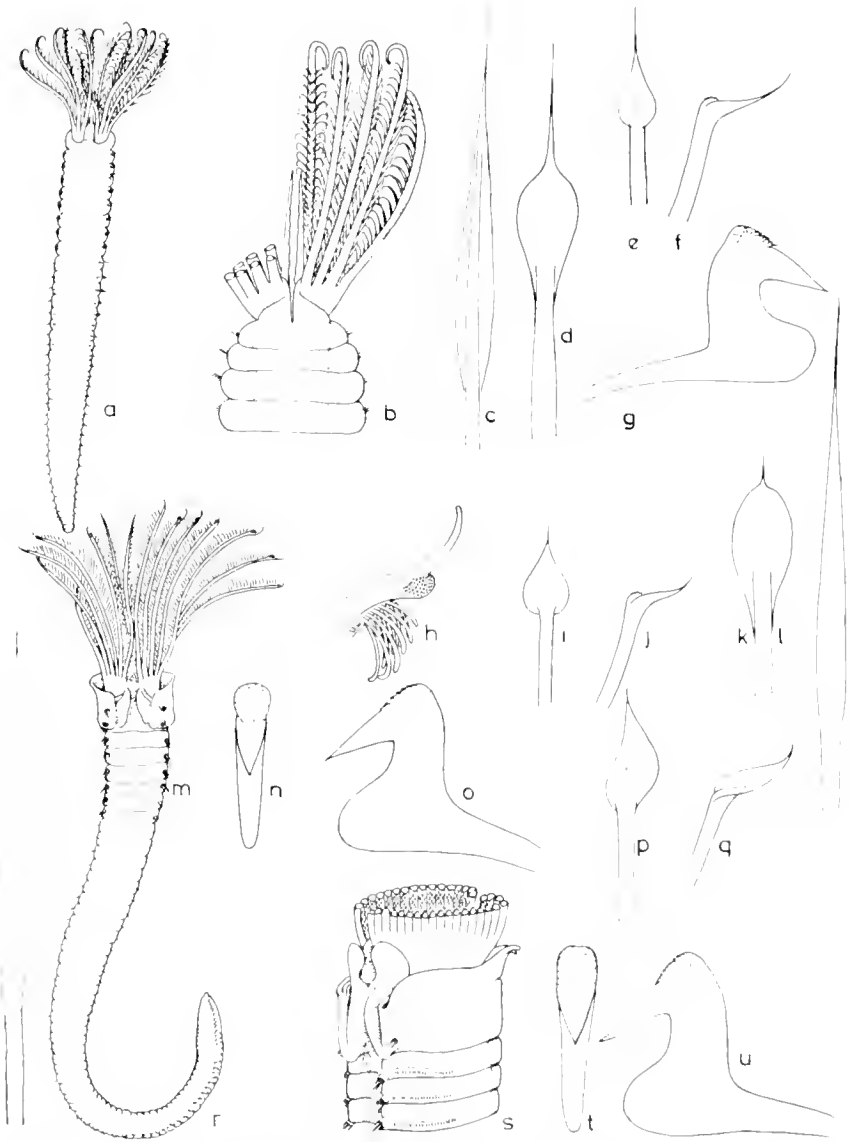

FIG. 37.1. *Amphiglena mediterranea.* (A) Entire worm (10 times life size). (B) Ventral view of head end. (C) Thoracic winged capillary. (D) Palea. (E, F) Plan and profile of pick-axe seta. (G) Thoracic uncinus. *Megalomma quadrioculatum.* (H) Tip of radiole with subterminal eye. (I, J) Pick-axe seta in plan and profile. (K) Palea. (L) Thoracic wing capillary. (M) Entire worm (2.5 times life size). (N, O) Edge-on and profile of thoracic uncinus. (P, Q) Pick-axe seta in plan and profile. *Megalomma vesiculosum.* (R) Shorter form of thoracic notoseta. (S) Lateral view of collar. (T, U) Edge-on view and profile of thoracic uncinus.

plus a row of pick-axe setae with asymmetrical blades and tapering tips (fig. 37.1 p, q). Abdominal uncini are essentially similar but have shorter shafts than those on the thorax while the capillaries are similar to the thoracic ones.

TYPE LOCALITY: Devon, England.

RECORDS: Mocambique (26 32 i and 23 35 s).

DISTRIBUTION: North Atlantic from the English Channel (c, i, s) to Cape Verde Is. (s) and Senegal (i, s); Mediterranean (s); West Indies (s); Indian Ocean.

Megalomma bioculatum (Ehlers, 1887)

Branchiomma bioculatum Ehlers, 1887: 260, pl. 53 figs. 1–9.

A small species up to 20 mm. long. Branchial lobes with 10–20 radioles. The dorsal radiole on each side has a subterminal eye. Palps broadly flanged. Collar narrowly divided dorsally and each half notched back to form a small dorsal lobe with a rounded end and a large lateral lobe which slants forward ventrally to end in a pointed triangular lappet. (Ehlers saw no dorsal lobes at all.) Thoracic notosetae with wings broad at the base. Uncini include a row of pick-axe setae with symmetrical blades tapering to long points and avicular uncini with long shafts.

TYPE LOCALITY: Southern Florida, U.S.A.

RECORDS: Not recorded from southern Africa.

DISTRIBUTION: North Carolina (s), Florida and tropical western Africa (i, s).

HYPSICOMUS Grube, 1870

Branchial lobes borne on a long stalk, each lobe bearing numerous radioles without external stylodes but with eye-spots in rows. A collar present. First setiger with the setae short and set in a slanting row, not a compact bundle. Subsequent thoracic notosetae include both winged capillaries and paleae. Thoracic neurosetae include both pick-axe setae and avicular uncini. Abdominal notosetae are avicular uncini and the notosetae are winged capillaries and paleae.

TYPE SPECIES: *Sabella phaeotaenia* Schmarda, 1861.

KEY TO SPECIES

1 Collar high and slanting. Collar setae are stout smooth-winged capillaries (fig. 37.2.d). Thoracic paleae with short tips . . . . . ***H. capensis***
Collar low and straight. Collar setae with very short broad blades (fig. 37.2.i, j). Thoracic paleae without tips . . . . . ***H. phaeotaenia***

Hypsicomus capensis Day, 1961
(fig. 37.2.a–h)

Hypsicomus capensis Day, 1961: 537, fig. 13.f.–m.

A long slender worm with a tough brown translucent tube. Branchial lobes (fig. 37.2.a) borne on a long stalk; each lobe with 12 radioles united by a web for one quarter of their length. Each radiole with about 10 pairs of eye-spots about half way along and a blunt tip. Collar divided dorsally and split ventrally, each half notched back dorsally to form a small rounded dorsal lobe and a large lateral lobe which slants forward ventrally to form a triangular lappet Collar setae (fig. 37.2.d) are stout smooth-winged capillaries arranged in a line. Notosetae of setigers 2–8 include two to three smooth-winged capillaries (fig. 37.2.e) and numerous paleae with rounded blades ending in pointed tips (fig. 37.2.b). Neurosetae of setigers 2–8 include a row of pick-axe setae with transparent tapered blades (fig. 37.2.c) and a row of avicular uncini with fairly broad tails and striated crests (fig. 37.2.f). Abdominal notosetae are avicular uncini similar to the thoracic ones and the neurosetae are slender-winged capillaries (fig. 37.2.h) and paleae with much longer blades than those on the thorax (fig. 37.2.g).

Type locality: Agulhas Bank, South Africa.

Records: Cape (34/23/d).

Distribution: No other records.

Hypsicomus phaeotaenia (Schmarda, 1861)
(fig. 37.2.i–n)

Sabella phaeotaenia Schmarda, 1861: 35, pl. 22 figs. 188.
Hypsicomus phaeotaenia: Fauvel, 1953: 447, fig. 236 a–l.
Hypsicomus pigmentatus Gravier, 1908: 81, pl. 6 figs. 252–254, text-figs. 424–431.

Body slender, up to 50 mm. long, commonly boring in old coral. Branchial lobes borne on a common stalk. A pair of tapering palps. Each branchial lobe with about 15–20 radioles which are united for a third their length. Distally the free radioles have small irregularly arranged lateral eye-spots and fairly long naked tips. Collar (fig. 37.2.k) very low with a smooth straight margin which is quite continuous, there being only a shallow depression dorsally and a prominence ventrally. Collar setae (fig. 37.2.i, j) very short and stout and set in a slanting double row. The two lines of setae are difficult to distinguish as they are closely packed but the blades differ slightly, one row having rather longer blades about two times as long as broad. Notosetae of setigers 2–8 include (a) winged capillaries with normal tapered blades (b) paleae with rounded blades and no tip at all (fig. 37.2.l). Thoracic neurosetae include a row of pick-axe setae with smooth symmetrical blades (fig. 37.2.m) and a row of avicular uncini (fig. 37.2.n) with finely striated crests and very broad tails. Abdominal notosetae similar to the avicular uncini of the thorax. Abdominal neurosetae of two types: (a) very slender winged capillaries

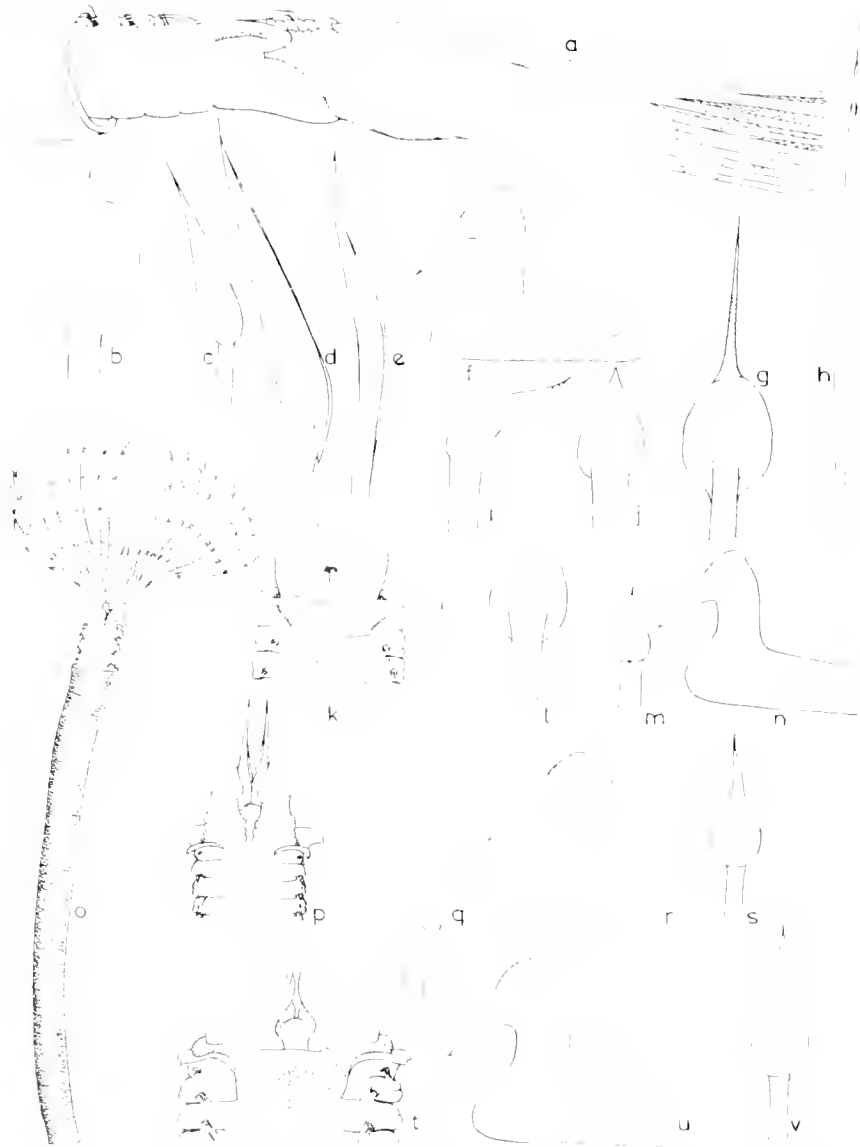

FIG. 37.2. *Hypsicomus capensis*. (A) Anterior end. (B) Thoracic palea. (C) Pick-axe seta. (D) Collar seta. (E) Notoseta of setiger 3. (F) Thoracic uncinus. (G) Abdominal palae. (H) Abdominal capillary. *Hypsicomus phaeotaenia*. (I, J) Profile and face view of collar seta. (K) Dorsal view of collar. (L) Thoracic palea. (M) Pick-axe seta. (N) Thoracic uncinus. *Sabella penicillus*. (O) Anterior end and part of mud tube. (P) Dorsal view of gill base and collar. (Q) Thoracic capillary. (R) Thoracic uncinus. (S) Pick-axe seta. *Sabella fusca*. (T) Dorsal view of collar region. (U) Thoracic uncinus. (V) Pick-axe seta.

with long narrow blades (b) stout paleae with oval blades from the rounded end of which a slender tip arises very abruptly.

TYPE LOCALITY: Ceylon.

RECORDS: Madagascar (i).

DISTRIBUTION: Western Africa (Senegal (s) and São Thomé (s)); Mediterranean, Red Sea (s); tropical Indo-west-Pacific from the Persian Gulf (s) and Madagascar (i) to W. Australia, New Caledonia (i) and Japan.

SABELLA Linnaeus, 1767

Body elongate, branchial lobes not spiral. Radioles not united by a web and without external stylodes or subterminal eyes but may have rows of eye-spots externally. Collar widely separated dorsally, each half notched back to form a dorsal lobe and a larger lateral one. Collar setae are winged capillaries in a compact bundle. Notosetae of setigers 2–8 include winged capillaries of two lengths but no spatulate setae or paleae. Thoracic neurosetae include a row of pick-axe setae and a row of avicular uncini. Abdomen of numerous segments bearing avicular uncini dorsally and winged capillaries ventrally.

TYPE SPECIES: *Sabella penicillus* Linnaeus, 1767.

KEY TO SPECIES

1 Base of gills swollen but setigers 1–4 not glandular dorsally . . . . *S. penicillus*
– Base of gills and setigers 1–4 swollen and glandular dorsally . . . . . *S. fusca*

Sabella penicillus Linnaeus, 1767
(fig. 37.2.o–s)

Sabella penicillus Linnaeus, 1767: 1269.
Sabella pavonina Savigny, 1818: 79; Fauvel, 1927: 298, fig. 102 a–l.

Body encased in a slender mud tube, up to 250 mm. long and pale apart from the gills which are banded with purple (fig. 37.2.o). Branchial lobes each with 10–40 radioles which are long and slender with short tips. Branchial base (fig. 37.2.p) without glandular cushions but with annular rings when contracted. Collar widely separated dorsally and reflected back dorso-laterally to form four lobes of which the larger lateral pair end in thickened lappets ventrally. Thoracic notosetae are winged capillaries of two lengths, either longer and narrower or shorter and broader (fig. 37.2.q). Thoracic neurosetae include a row of pick-axe setae with broad symmetrical blades ending in pointed tips (fig. 37.2.s) and a row of avicular uncini (fig. 37.2.r) each with a cap formed of 30 or more minutely denticulate ridges above the rostrum and a short tail.

TYPE LOCALITY: Southern Europe.

RECORDS: Cape (from 30/15/d to 34/18/s and 33/27/s).

DISTRIBUTION: N. Atlantic from Scotland (i, s, d) to Morocco (s, d) and Senegal (s); Mediterranean (s).

Sabella fusca Grube, 1870
(fig. 37.2.t–v)

Sabella fusca Grube, 1870: 516; Gravier, 1908: 71, figs. 243-245, text-fig. 410.
Sabella pavifera Grube, 1878: 252, pl. 14 fig. 3; Fauvel, 1930: 260; Fauvel, 1953: 439, fig. 323 a–f.

A large stout species with the gills often banded in yellow and brown. Radioles united by a web for about a quarter of their length. Collar (fig. 37.2.t) low, widely separated dorsally and attached back to setiger 2, notched laterally with a pair of stout lappets ventrally. A dorsal glandular area extends from the base of the gills to the third or fourth setiger; it is often divided medially or transversely and is continuous with bands on the inside of the collar which curves round to the ventral surface. This ventral area may be separate according to some workers. Thoracic notosetae are the usual winged capillaries. Thoracic neurosetae include a row of pick-axe setae with long symmetrical blades (fig. 37.2.v) and a row of avicular uncini with 20 oblique rows of striations on the crest and long broad shafts (fig. 37.2.u).

Type locality: Red Sea.

Records: Mocambique (23°35′i).

Distribution: Red Sea (s); Zanzibar (i); Andaman Is.; Ceylon; N. Australia.

POTAMILLA Malmgren, 1866

Branchial lobes not spiral, dorsal radioles usually with rows of external eye-spots but none of the radioles bear external stylodes. A pair of palps. Collar well developed, each half notched dorsally and not fused ventrally. Notosetae of setiger 1 grouped in a compact bundle. Notosetae of setigers 2–8 of two kinds, (a) winged capillaries and (b) palaea. Thoracic neurosetae include a row of pick-axe setae and a row of avicular uncini. Abdomen with avicular uncini in the notopodia and winged capillaries in the neuropodia.

Type species: *Sabella neglecta* Sars, 1851.

Key to Species

1 Dorsal radioles with rows of eye-spots. Pick-axe setae with broad, unstriated blades) ***P. reniformis***
– No external eye-spots on branchial radioles 2
2 Collar slanting forward like a scoop below the radioles. Pick-axe setae with plain blades ***P. linguicollaris***
– Collar straight. Pick-axe setae with small striated blades . . . . ***P. torelli***

Potamilla reniformis (Muller, 1771)
(fig. 37.3.a–f)

Amphitrite reniformis O. F. Muller, 1771: 194.
Sabella reniformis: Leuckart, 1849: 183, pl. 3 fig. 8.
Potamilla reniformis: Fauvel, 1927: 309, fig. 107 a–l.

Tube (fig. 37.3.a) horny with the free end flattened, sandy and partly rolled up. Body (fig. 37.3.b) rather slender, up to 50 mm. long. Some dorsal radioles have one

to four external eye-spots about half way along. A pair of large tapered palps. Collar (fig. 37.3.d) divided dorsally and each half notched back to form smaller dorsal and larger lateral lobes with a straight edge. Setiger 1 with winged capillaries only; setigers 2–8 with both winged capillaries and paleae (fig. 37.3.c) with broad wings and short pointed tips. Thoracic neurosetae include a row of pick-axe setae (fig. 37.3.f) with smooth, asymmetrically pear-shaped blades having long tapered tips and posteriorly, a row of avicular uncini (fig. 37.3.e) with fairly broad shafts and finely striated crests.

TYPE LOCALITY: Iceland.

RECORDS: South West Africa (28/16/s); Cape (from 31/17/d and 34/18/i, s to 32/28/i, s); Natal (30/30/s and 29/31 i); Mocambique (26/32 i, 24/35/d).

DISTRIBUTION: Arctic; N. Atlantic from New England to North Carolina (s); Scotland (s) and the English Channel (i) to the Cape Verde Islands (i); Morocco (s, d) and Senegal (s); Mediterranean; N. Pacific from Japan to Behring Sea.

Potamilla linguicollaris Day, 1961
(fig. 37.3.g–k)

Potamilla linguicollaris Day, 1961: 539, fig. 14 d-l.

A slender species up to 15 mm. long with a fragile tube. Branchial lobes each with six radioles which lack eye-spots and have fairly long tips. Palps slender. Collar (fig. 37.3.g) widely gaping dorsally; each half is notched back to form a small rounded dorso-lateral lobe and a large lateral lobe which slants forward below the gills to meet its fellow, the whole collar resembling a long scoop supporting the bases of the gills. Body with up to 12 thoracic and numerous abdominal segments. Pygidium with a pair of small oval lobes without eye-spots. Collar setae are small winged capillaries. Notosetae of setigers 2–8 include six winged capillaries and six spear-shaped paleae (fig. 37.3.k). Neurosetae include a row of pick-axe setae (fig. 37.3.h, i) with plain, symmetrical pear-shaped blades ending in fine tips and a row of long-shafted avicular uncini (fig. 37.3.j) with coarsely serrated crests. Abdominal uncini are similar to those on the thorax and the neurosetae are three broad-bladed paleae. All setae are symmetrical.

TYPE LOCALITY: Agulhas Bank, South Africa.

RECORDS: Cape (33/17/s, 34/21/s, 34/24/d).

DISTRIBUTION: Endemic.

FIG. 37.3. *Potamilla reniformis*. (A) Tubes. (B) Entire worm (three times life size). (C) Thoracic palea. (D) Dorsal view of collar. (E) Thoracic uncinus. (F) Pick-axe seta. *Potamilla linguicollaris*. (G) Collar region. (H, I) Pick-axe seta. (J) Thoracic uncinus. (K) Thoracic palea. *Potamilla torelli*. (L) Hastate thoracic palea. (M) Thoracic uncinus. (N, O) Pick-axe seta. (P) Collar region.

Potamilla torelli Malmgren, 1866
(fig. 37.3.l–p)

Sabella (Potamilla) torelli Malmgren, 1866: 402.
Potamilla torelli: Fauvel, 1927: 310, fig. 107 m–s; Day, 1955: 447, fig. 8 d-f.

Tuby horny with the free end encrusted with sand, flattened and partly rolled up. Body up to 60 mm. long with well marked glandular pads ventrally. Branchial lobes each with 10–15 radioles which lack eye-spots but have long flanged tips. A

pair of large tapered palps. Collar (fig. 37.3.p) divided dorsally and each half notched back to form a narrow dorsal lobe and a large lateral lobe which ends in a rounded lappet overlapping its fellow in the mid-ventral line. Collar setae are normal winged capillaries. Notosetae of setigers 2–8 include winged capillaries and hastate paleae (fig. 37.3.l). Thoracic neurosetae include a row of pick-axe setae (fig. 37.3.n, o) with small striate blades on which a long blade-like tip is set edgeways and a row of avicular uncini (fig. 37.3.m) with coarsely serrated crests and long shafts.

TYPE LOCALITY: Iceland.

RECORDS: Cape (from 34/18/s and 34/19/i, s to 34/25/s); Natal (29/31/i); Mocambique (23/35/s).

DISTRIBUTION: North Atlantic from Iceland and the English Channel (s) to Madeira and Morocco (s, d); Mediterranean (s); Japan.

BRANCHIOMMA Kolliker, 1858
(= *DASYCHONE* Sars, 1862)

Body usually stout. Branchial lobes sometimes spiral. Radioles mainly free from one another and possess external processes (stylodes) and double rows of eye-spots. A well developed collar widely separated dorsally. Thoracic notosetae are winged capillaries of two lengths but paleae are absent. Thoracic neurosetae are avicular uncini and pick-axe setae are absent. Abdominal segments numerous, with avicular uncini dorsally and winged capillaries ventrally.

TYPE SPECIES: *Amphitrite bombyx* Dalyell, 1853.

KEY TO SPECIES

1 Stylodes broad (fig. 37.3.b, g). Uncini with very numerous (over 40) poorly marked denticles surmounting the rostrum (fig. 37.3.d, f) 2
– Stylodes slender or minute (fig. 37.3.j, p). Uncini with less than 40 denticles above the rostrum (fig. 37.3.k, n, q) 3
2 Branchial lobes spiral with about five whorls of radioles (fig. 37.3.a) . . ***B. natalensis***
– Branchial lobes not spiral . . . . . ***B. violacea***
3 Stylodes separate and slender (fig. 37.3.p) 4
– Stylodes reduced to notches on the sides of the radiolar flange (37.3.j) . ***B. serratibranchis***
4 Uncini with few teeth arranged in two arcs above the rostrum. Abdomen flecked with dark pigment (37.3.m) . . . . . ***B. nigromaculata***
– Uncini with numerous denticles arranged in five to six rows above the rostrum. Colour uniform . . . . . ***B. capensis***

Branchiomma natalensis (Kinberg, 1867)
(fig. 37.4.a–d)

Sabella natalensis Kinberg, 1867: 353.
Dasychone natalensis: Day, 1955: 444, fig. 7 g–j.

Body stout and brownish shading to purple anteriorly. Collar (fig. 37.4.a) widely separated dorsally, notched laterally and ending in rounded lappets ventrally.

Branchial lobes spiral with four to six whorls of radioles of decreasing length. Radiolar eye-spots present. Stylodes (fig. 37.4.b) broad and extend back as flanges on the sides of the radioles; they increase in size distally. Thoracic uncini (fig. 37.4.c, d) have straight tails and 20 or more minute denticular ridges above the rostrum.

Type locality: Cape of Good Hope.

Records: South West Africa (26 15/i); Cape (from 29 16/i to 33/18/i, s and 34 18 i).

Distribution: Endemic.

Branchiomma violacea (Schmarda, 1861)
(fig. 37.4.e–i)

Sabella violacea Schmarda, 1861: 34, pl. 22 fig. 187.
Dasychone violacea: Day, 1955: 443, fig. 7 k–m.

Body (fig. 37.4.h) up to 100 mm. long; colour brownish shading to purple anteriorly. Branchial lobes not spiral and bear not more than one whorl of radioles. Stylodes (fig. 37.4.g) broad and truncate and increase in size distally. Radiolar eye-spots present. Collar widely separated dorsally, notched laterally and ending in rounded lappets ventrally (fig. 37.4.i). Thoracic uncini (fig. 37.4.e, f) have short broad tails and 12–14 rows of indistinct denticles above the rostrum.

Type locality: Cape of Good Hope.

Records: South West Africa (22 14 i, s and 26/15/i, s); Cape (from 29/16/i to 34 18 i, s and 34 23 e, i to 32/28/i); Natal (30/30/i).

Distribution: Endemic.

Branchiomma serratibranchis (Grube, 1878)
(fig. 37.4.j–l)

Sabella (Dasychone) serratibranchis Grube, 1878: 262, pl. 14 fig. 7.
Dasychone serratibranchis: Day, 1951: 64.

Body uniformly pale or brownish and up to 70 mm. long. Branchial lobes semicircular, not spiral. No radiolar eye-spots seen. Stylodes (fig. 37.4.j) short and appear as small triangular serrations or steps on the sides of the radiolar flange. Collar low, the two sides well separated dorsally and reflected back dorso-laterally with smooth lateral lobes and small ventral lappets. Thoracic uncini (fig. 37.4. k, l) with narrow necks, four to five arcs of rather coarse teeth above the rostrum and broad tapered tails.

Type locality: Philippine Islands.

Records: Natal (29 31 i); Mocambique (26/32 i, s).

Distribution: Indo-west-Pacific (from India to the Philippine Islands, Japan and Australia to New Zealand).

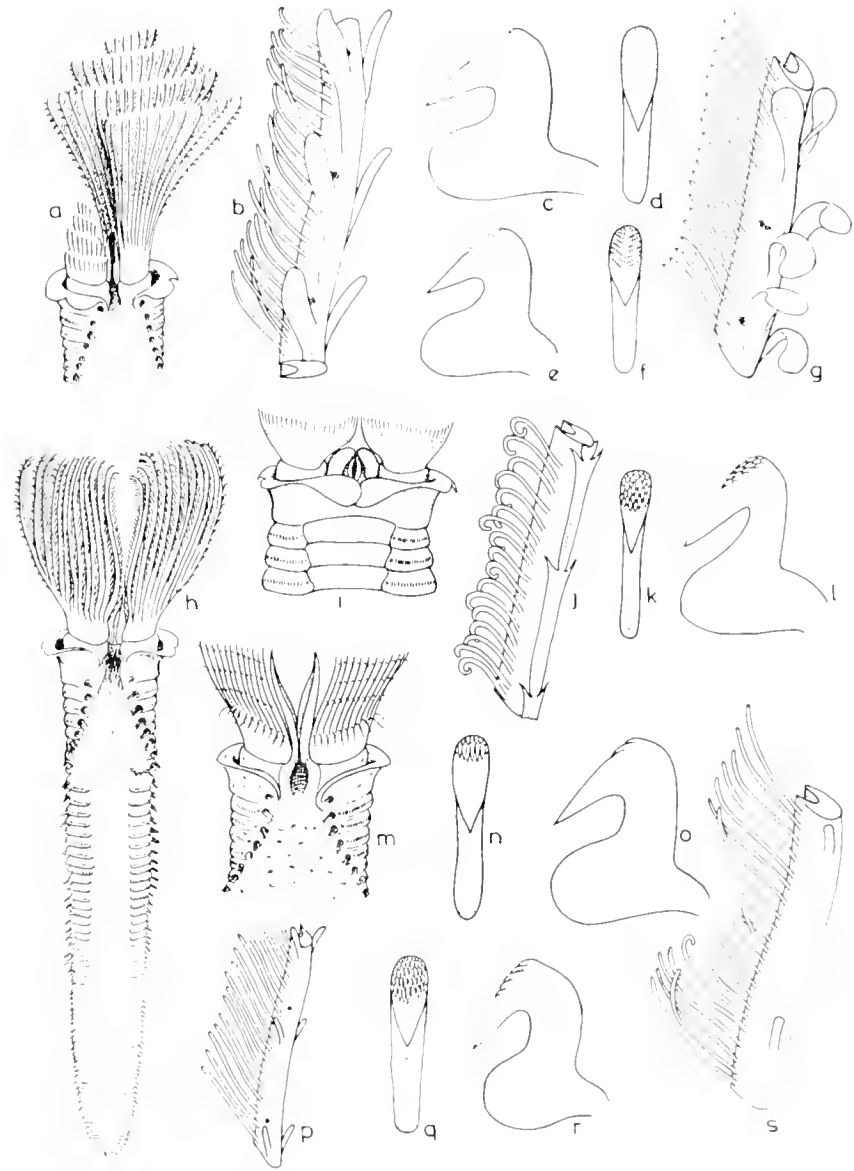

FIG. 37.4. *Branchiomma natalensis*. (A) Anterior end with the gills cut short on one side to show the spiral axis. (B) Stylodes on distal part of radiole. (C, D) Thoracic uncinus. *Branchiomma violacea*. (E, F) Thoracic uncinus. (G) Stylodes on distal part of radiole. (H) Entire worm (twice life size). (I) Ventral view of collar. *Branchiomma serratibranchis*. (J) Stylodes on distal part of radiole. (K, L) Thoracic uncinus. *Branchiomma nigromaculata*. (M) Dorsal view of thorax showing collar and pigmentation. (N, O) Thoracic uncinus. (P) Stylodes on distal part of radiole. *Branchiomma capensis*. (Q, R) Thoracic uncinus. (S) Stylodes on distal part of radiole.

Branchiomma nigromaculata (Baird, 1865)
(fig. 37.4.m–p)

Sabella nigromaculata Baird, 1865a: 159.
Dasychone nigromaculata: Day, 1955: 445, fig. 7 n–r.

Length up to 70 mm. Body irregularly flecked with dark pigment (fig. 37.3.m). Branchial lobes semi-circular, not spiral and radioles arranged in a single whorl. A row of long stylodes at the base of the radioles, later stylodes (fig. 37.4.p) slender and as long as the radiole is broad. Radioles without marginal flanges. Collar broadly separated dorsally, reflected back dorso-laterally and with smooth lateral lobes which end in well marked ventral lappets. Thoracic uncini (fig. 37.4.n, o) avicular with short tails bent downwards and with two arcs of teeth above the rostrum, the first with four to six and the second with six to eight teeth.

Type locality: St. Vincent, West Indies.

Records: Cape (from 34/18/i, s to 33/25/s); Natal (30/30/i and 29/31/i); Mocambique (26/32/i, s); Madagascar (s).

Distribution: Tropical and sub-tropical Atlantic (from North Carolina (s), the Gulf of Mexico (i) and West Indies to Cape Verde Is.); Red Sea (i); tropical Indian Ocean (i, s); Pacific (Gambier and Japan).

Branchiomma capensis (McIntosh, 1885)
(fig. 37.4.q–s)

Dasychone capensis McIntosh, 1885: 506, pl. 54 fig. 1, pl. 31A figs. 9–11, pl. 39 fig. 8; Day, 1961: 538, fig. 14 a–c.

Body slender, up to 50 mm. long and uniformly pale apart from interramal eye-spots. Branchial lobes semi-circular, not spiral and bear not more than one flattened whorl of radioles. Collar widely separated dorsally, low and without lateral notches. Stylodes (fig. 37.4.s) small, strap-like and one to two times as long as the width of the radiole. Radioles without marginal flanges. Collar divided dorsally, reflected back dorso-laterally, and forming small lappets ventrally. Thoracic uncini (fig. 37.4.q, r) have six to eight rows of denticles above the rostrum.

Type locality: 98 fathoms off Cape of Good Hope.

Records: Cape (from 31/16/d to 34/18/s and 35/18/d to 34/25/s).

Distribution: Endemic.

SABELLASTARTE Kröyer, 1856

Body stout, often large. Branchial lobes sometimes spiral, with more than one whorl of radioles. Radioles with or without a double row of eye-spots but never with stylodes. Collar widely separated dorsally. Thoracic notosetae are winged capillaries of two lengths but spatulate setae are absent. Thoracic neurosetae are a

single row of avicular uncini, there being no pick-axe setae. Abdominal segments numerous with dorsal avicular uncini and ventral winged capillaries.

TYPE SPECIES: *Eurato sanctijosephi* Gravier, 1906 (= *Sabella indica* Savigny, 1818, non Linnaeus, 1788).

KEY TO SPECIES

1 Branchial lobes spiral with about five whorls of radioles (fig. 37.4.a). Outer radioles with eye-spots and marginal flanges. Body uniform in colour . . . . . ***S. longa***
– Branchial lobes not spiral. Eye-spots absent. Body flecked with dark pigment ***S. sanctijosephi***

Sabellastarte longa (Kinberg, 1867)
(fig. 37.5.a–e)

Sabella longa Kinberg, 1867: 352.
Sabellastarte longa: Johansson, 1925: 10, figs. 3, 5, 6, 7; Day, 1951: 62.
Dasychone odhneri Fauvel, 1919: 24, pl. 1 figs. 10–14.

A large species reaching 150 mm. by 15 mm. Body (fig. 37.4.a) shading from brown to purplish anteriorly, and the gills uniformly orange brown or barred. Branchial lobes each with a central axis bearing four to six whorls of radioles. Outer whorl of radioles (fig. 37.5.b) with double rows of eye-spots and lateral flanges formed by a continuation of the basal web. No stylodes. Collar widely separated dorsally, not notched laterally and forming a pair of stout triangular lappets ventrally (fig. 37.5.c). Thoracic capillaries of two lengths, the shorter ones having broader wings than the longer ones. Thoracic uncini (fig. 37.5.d, e) with finely denticulate crests, rather narrow necks and fairly long tails.

TYPE LOCALITY: Durban, South Africa.

RECORDS: Cape (from 34/18/i to 34/22/i, s and 32/28/i); Natal (31/29/i to 27/32/i); Mocambique 26/32/i.

DISTRIBUTION: Madagascar (i).

Sabellastarte sanctijosephi (Gravier, 1906)
(fig. 37.5.f–i)

Eurato sancti-josephi Gravier, 1906: 105, pl. 7 figs. 281–283.
Sabella indica Savigny, 1820: 77 (non *S. indica* Linnaeus, 1788).
Sabellastarte indica: Day, 1951: 63.

Length up to 80 mm. by 11 mm. Body irregularly flecked with purple and gills banded. Branchial lobes not spiral. Individual radioles (fig. 37.5.f) without any trace of external stylodes or eye-spots and the lateral flanges are reduced to faint ridges with a median groove between them. Long palps. Collar (fig. 37.5.g) divided dorsally, and reflected back dorso-laterally to form a pair of small forwardly projecting dorsal lobes and a pair of large lateral lobes which terminate as triangular

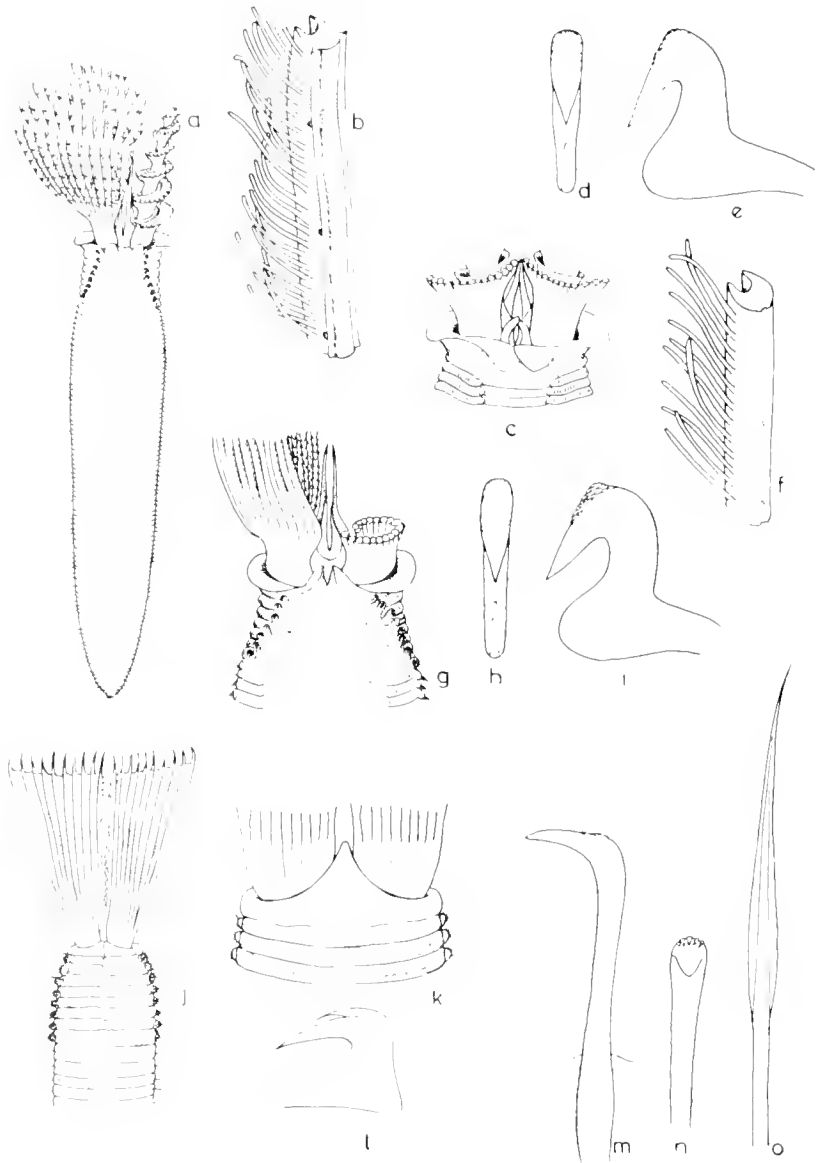

FIG. 375. *Sabellastarte longa*. (A) Entire worm with radioles removed from axis on the right side, life size. (B) Part of radiole. (C) Ventral view of collar. (D, E) Thoracic uncinus. *Sabellastarte sanctijosephi*. (F) Part of radiole. (G) Dorsal view of collar. (H, I) Thoracic uncinus. *Myxicola infundibulum*. (J) Dorsal view of anterior end. (K) Ventral view of collar region. (L) Abdominal uncinus. (M, N) Thoracic uncinus. (O) Thoracic winged capillary.

lappets ventrally. Thoracic notosetae are winged capillaries of two lengths. Thoracic neurosetae are a single row of avicular uncini each with an arched neck and the rostrum surmounted by a prominent striated crest (fig. 37.5.h, i).

TYPE LOCALITY: Red Sea.

RECORDS: Natal (29/31 i and 28/32/i); Mocambique (26/32/i).

DISTRIBUTION: Western Africa (Mauritania (i), Senegal (i, s)); Red Sea (i); tropical Indo-west-Pacific from India (i, s) to Japan and New Caledonia.

MYXICOLA Koch (in) Renier, 1847

Branchial lobes equal, not spiral. Radioles lack external stylodes and eye-spots and are united for most of their length by a web. Collar indistinct. Thoracic notosetae are winged capillaries and the neurosetae are minute, long-shafted hooks. Abdominal segments numerous with capillaries ventrally and an almost complete semi-circle of avicular hooks dorsally. Tube mucilaginous.

TYPE SPECIES: *Terebella infundibulum* Renier, 1804.

Myxicola infundibulum (Renier, 1804)
(fig. 37.5.j–o)

Terebella infundibulum Renier, 1804: p. xiii.
Myxicola infundibulum: Fauvel, 1927: 342, fig. 119 a–i.

Body markedly tapered with a pair of large branchial lobes each bearing 20–40 radioles which are united by a web almost to their bare tips (fig. 37.5.j). Collar without a flanged margin but forming two low, closely apposed dorsal lobes, a stout lateral ridge with a notch in front of the notosetae and widening ventrally to form a median triangular projection between the branchial lobes (fig. 37.5.k). An otocyst in the first segment. Thoracic notosetae are numerous winged capillaries (fig. 37.5.o). Thoracic neurosetae are long-shafted hooks each with a minute denticle above the rostrum (fig. 37.5.m, n). On the abdomen the tiny uncini form an almost continuous arc across the dorsum. They are avicular with a single tooth above the rostrum (fig. 37.4.l). Abdominal neurosetae are winged capillaries like the thoracic notosetae. Pygidium with ocular specks. Tube mucilaginous.

TYPE LOCALITY: Adriatic.

RECORDS: South West Africa (22/14 i and 26/15 i); Cape (34 18 i, s and 33 25 c).

DISTRIBUTION: Arctic; N. Atlantic from Greenland (s, d) to Scotland (s) and the English Channel (i, s) to Mauretania (s); Mediterranean; N. Pacific from the Behring Sea to Japan and Alaska to California.

EUCHONE Malmgren, 1866

Small Sabellids with eight thoracic and numerous abdominal segments. Each branchial lobe has several radioles which are united for most of their length by a web. A few ventral filaments lack pinnules. A pair of palps. Otocysts present in the collar segment. Collar well developed and usually continuous ventrally. Thoracic notosetae include both winged capillaries and paleae. Thoracic neurosetae as long-shafted hooks. The last few abdominal segments are flanged laterally to form a spoon-shaped cavity. Abdominal notosetae are avicular uncini without tails. Abdominal neurosetae are narrow-winged capillaries. Pygidial eye-spots sometimes present.

Type species: *Sabella analis* Kröyer, 1856.

Key to Species

1 Collar shallowly notched ventrally. Anal concavity extending over about five setigers ***E. rosea***
– Collar split ventrally. Anal concavity extending over about eight setigers . . ***E. capensis***

Euchone rosea Langerhans, 1884
(fig. 37.6.a–i)

Euchone rosea Langerhorns, 1884: 271, pl. 16 fig. 35; Fauvel, 1927: 340, fig. 118 a–l.

Body (fig. 37.6.a) up to 12 mm. long, slightly tapered, with 20–26 segments. Branchial lobes each with five radioles united by a web for more than half their length and ending in long naked tips. About two pairs of ventral filaments which are small, rolled inwards and lack pinnules. Two long palps. Collar widely divided dorsally, well developed laterally and shallowly notched ventrally where it is attached to the lips (fig. 37.6.b). A pair of otocysts and a pair of internal eyes in the collar segment. Thoracic notosetae include winged capillaries (fig. 37.6.h) and spear-shaped paleae (fig. 37.6.g). Thoracic neurosetae are long-shafted hooks (fig. 37.6.c) with numerous denticles above the main fang. Abdomen with 12–18 segments and a ventral concavity at the posterior end (fig. 37.6.d) with lateral flanges for about five to six setigers. Abdominal notosetae are quadrangular uncini with several rows of denticles above the main fang (fig. 37.6.e, f). Abdominal neurosetae are narrow-winged capillaries (fig. 37.6.i). Pygidium with two eyes but without a posterior prolongation.

Type locality: Madeira Island.

Records: Cape (from 32/17/d to 34/18/s).

Distribution: S.W. Ireland (s); Madeira (i); Ivory Coast (s).

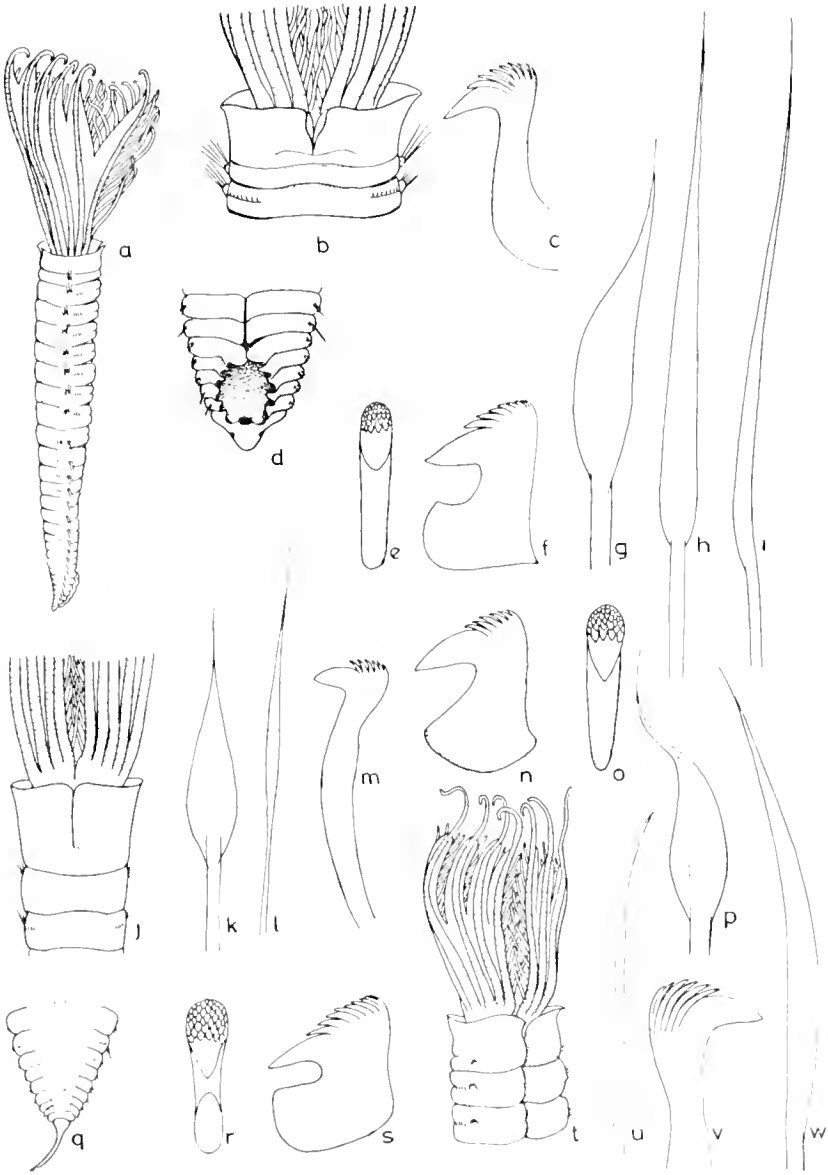

FIG. 37.6. *Euchone rosea*. (A) Entire worm (ten times life size). (B) Ventral view of collar. (C) Thoracic hook. (D) Ventral view of posterior end. (E, F) Abdominal uncinus. (G) Thoracic palea. (H) Thoracic winged capillary. (I) Abdominal capillary. *Euchone capensis*. (J) Ventral view of collar. (K) Thoracic palea. (L) Minute thoracic seta. (M) Thoracic hook. (N, O) Abdominal uncinus. *Chone filicaudata*. (P) Thoracic palea. (Q) Dorsal view of posterior end. (R, S) Abdominal uncinus. (T) Anterior end. (U) Minute thoracic seta. (V) Head of thoracic hook. (W) Thoracic winged capillary.

Euchone capensis Day, 1961
(fig. 37.6.j–o)

Euchone capensis Day, 1961 : 540, fig. 14 m–t.

Length up to 20 mm. for 40 segments. Branchial lobes each with nine radioles bearing pinnules and two to three elongated pinnules ventrally. Radioles all united by a web for two-thirds their length. Collar divided dorsally and notched to form a pair of small dorsal lobes and a pair of large lateral lobes ; the latter are slit ventrally and soldered onto the ventral lips (fig. 37.6.j). A pair of eyes and a pair of otocysts inside the collar segment. Thorax with eight setigers. Notosetae of setigers two to eight of three types : (a) four winged capillaries ; (b) five paleae with broad blades and long tips (fig. 37.6.k) and (c) three setae with minute blades which just project from the surface (fig. 37.6.l). Thoracic neurosetae are long-shafted hooks (fig. 37.6.m) with arcs of numerous small denticles above the main fang. Abdomen with 32 setigers. Abdominal neurosetae are slender capillaries. The notosetae are quadrangular uncini (fig. 37.6.n, o) with five to six close-set rows of teeth above the main fang. The last eight segments are short and flanged to form a spoon-shaped concavity. Pygidium conical and without eyes.

Type locality : Agulhas Bank, South Africa.

Records : Cape (32/16/d and 34/21/s).

Distribution : Only two records.

CHONE Kröyer, 1856

Rather small Sabellids with eight thoracic and numerous abdominal segments. Branchial lobes each with several radioles of which a few ventral ones lack pinnules. The rest are united by a web for most of their length. Two palps. A well developed collar. Thoracic notosetae include winged capillaries and paleae. Thoracic neurosetae are long-shafted hooks. Pygidium sometimes with eye-spots or a terminal appendage. Abdominal notosetae are quadrangular uncini with numerous denticles while the neurosetae are winged capillaries.

Type species : *Chone infundibuliformis* Kröyer, 1856.

Key to Species

1	Pygidium with a terminal appendage (fig. 37.6.q)	***C. filicaudata***
–	No pygidial appendage	2
2	Collar with a scalloped margin (fig. 37.7.a)	***C. collaris***
–	Collar with a smooth margin	***C. letterstedti***

Chone filicaudata Southern, 1914
(fig. 37.6.p–w)

Chone filicaudata Southern, 1914 : 141, pl. 14–15 fig. 32 ; Fauvel, 1927 : 337, fig. 117 a–k.

Body short and rather stout, 5–11 mm. long with 26–30 segments. Each branchial lobe with six to ten radioles plus two elongated ventral filaments. All radioles united for half their length and thereafter flanged. Two short palps and a bifid ventral lip.

Collar (fig. 37.6.t) well developed with small apposed dorsal lobes, smooth lateral lobes which are not notched ventrally. Eyes and otocysts doubtful. Thoracic notosetae of three types: (a) winged capillaries (fig. 37.6.w) (b) paleae with tapered blades (fig. 37.6.p) and (c) short fine setae with tapered tips but no blades (fig. 37.6.u). Thoracic neurosetae are long-shafted hooks with the main fang surmounted by two teeth, numerous denticles and "une limbe etroite" (fig. 37.6.v). Abdominal notosetae are quadrangular uncini (fig. 37.6.r, s) with six close-set rows each with five to six teeth above the main fang and basal prow. Neurosetae are fine-bladed capillaries. Pygidium with a tapered terminal appendage (fig. 37.5.q).

TYPE LOCALITY: Ireland.

RECORDS: Cape (33/17/s, 34/18/s, 34/21/s); Natal (30/30/s).

DISTRIBUTION: Ireland (s); North Carolina (s, d).

Chone collaris Langerhans, 1880
(fig. 37.7.a–f)

Chone collaris Langerhans, 1880: 116, pl. 5 fig. 29; Fauvel, 1927: 337, fig. 116 p–x.

Body small with about 30–40 segments. Branchial lobes each with four to eight radioles united by a web for two-thirds their length, and thereafter flanged. A pair of small ventral radioles lack pinnules. A pair of long slender palps. Collar (fig. 37.7.a) narrowly divided dorsally, straight laterally and united ventrally; its margin is scalloped. Eyes and otocysts inside the collar segment. First setiger with winged capillaries only. Setigers 2–8 with winged capillaries (fig. 37.7.b) and paleae (fig. 37.7.c) in the notopodia and long-shafted hooks in the neuropodia. Individual hooks (fig. 37.7.d) with numerous small teeth above the main fang when seen in lateral view. Abdominal segments numerous. Abdominal uncini (fig. 37.7.e, f) are square with three to four arcs each of six teeth above the large main fang. Neurosetae are winged capillaries. The pygidium may have eye-spots.

TYPE LOCALITY: Madeira Island.

RECORDS: Mocambique (23/35/i).

DISTRIBUTION: Madeira (i); Mediterranean (s); ? Persian Gulf (s).

Chone letterstedti (Kinberg, 1867)
(fig. 37.7.g–k)

Parachonia letterstedti Kinberg, 1867: 73, pl. 28 fig. 6; Johansson, 1925: 27, figs. 9–11.

Body about 25 mm. long with numerous segments. Branchial lobes each with eight long radioles united by a web for half their length, and with long slender flattened tips. Number of ventral radioles lacking pinnules unknown. Collar low, widely divided dorsally and reflected back dorso-laterally to form pocket-like dorsal lobes which reach back to setiger 3; on the sides there are straight lateral lobes which are (?) united ventrally (fig. 37.6.g). First setiger with winged capillaries only.

FIG. 37.7. *Chone collaris*. (A) Anterior end. (B) Thoracic winged capillary. (C) Thoracic hastate seta. (D) Thoracic hook. (E, F) Abdominal uncinus. *Chone letterstedti*. (G) Ventral view of anterior end (from Kinberg). (H) Winged thoracic capillary. (I) Thoracic palea. (J) Thoracic hook. (K) Abdominal uncinus (all from Johansson). *Jasmineira elegans*. (L) Entire worm (four times life size). (M) Ventral view of collar. (N) Ventral view of posterior end. (O) Thoracic hooks. (P, Q) Abdominal uncinus. (R) Thoracic palea. (S) Abdominal capillary.

Setigers 2–8 with (a) winged capillaries (fig. 37.7.h), (b) paleae (fig. 37.7.i) and (c) fine setae in the notopodia. Neuropodia with long-shafted hooks (fig. 37.7.j). Abdominal uncini (fig. 37.7.k) rhomboidal with six rows each with five to ten teeth above the large main fang. Anal segments without special features.

TYPE LOCALITY: "Cape of Good Hope".

RECORDS: Cape (33/18/i).

DISTRIBUTION: A single record.

JASMINEIRA Langerhans, 1880

Body small and elongate. Branchial lobes not spiral. Radioles without eyes or external stylodes, and the web between them is not developed. A few ventral radioles may lack pinnules. A pair of palps. A well developed collar. Otocysts and eyes present in the first segment. Thoracic notosetae include winged capillaries and paleae. Thoracic neurosetae are long-shafted hooks. Abdominal segments numerous with avicular uncini dorsally and capillaries ventrally.

TYPE SPECIES: *Jasmineira caudata* Langerhans, 1880.

KEY TO SPECIES

1	Three radioles to each branchial lobe. Pygidium with large glandular lappets	***J. analis***†
–	Eight or more radioles to each branchial lobe. Pygidium without large glandular lappets	2
2	Radioles with flattened, lamellate tips	***J. candela****
–	Radioles with normal tapering tips.	—
3	Pygidium with a slender caudal appendage	**J. caudata**
–	Pygidium without a caudal appendage	**J. elegans**

Jasmineira (?) *analis* Ehlers, 1908

Jasmineira analis Ehlers, 1908a: 48.

Length 3–5 mm. with eight thoracic and 7–15 abdominal segments. Branchial lobes each with three free radioles which bear double rows of long pinnules and end in long naked tips. Collar well developed dorsally, deeply notched laterally and with ventral triangular lobes which are reflected back. A pair of eyes and a pair of otocysts in the first segment. Thoracic notoseate of two lengths, the shorter ones hastate but not quite paleae and the longer ones normal winged capillaries. Thoracic neurosetae in a single row of about 12, probably avicular with serrated crests and long, sharply bent shafts. No pickaxe setae. Abdominal notosetae are uncini similar to those of the thorax but with shorter necks and tails. Abdominal neurosetae are a few, narrow-winged capillaries. Pygidium with large rounded, glandular lappets.

TYPE LOCALITY: Luderitzbucht, South West Africa.

RECORDS: South West Africa (26/15/i).

DISTRIBUTION: Only a single record.

†The affinity of *J. analis* is doubtful, this species should probably be referred to a different genus.

Jasmineira caudata Langerhans, 1880

Jasmineira caudata Langerhans, 1880: 114, pl. 5 fig. 32; Fauvel, 1927: 372, fig. 115 g–k.

Body about 5–7 mm. long with 25–28 segments. About seven or eight radioles in each branchial lobe; each radiole free and without lateral flanges, but with long pinnules and a breaking plane near the base. A pair of long, slender palps. Collar well developed, the two halves overlapping dorsally and united to the lips ventrally; margin straight, not oblique. Two elongate red eyes visible in fresh specimens through the base of the collar. Two otoliths. Thorax of eight setigers; first setiger with only winged capillaries, the remaining seven with both winged capillaries and spathulate setae in the notopodium and four to five long-shafted hooks in the neuropodium. Abdomen tapered with about 20 setigers and a pygidium with a long, slender caudal appendage. The winged capillaries of the thorax have blades of normal width but the spathulate setae have blades which widen distally and then suddenly taper to slender tips; they might almost be called paleae. The thoracic hooks have a prominent rostrum surmounted by about four arcs of long denticles. Abdominal capillaries have long slender blades; the hooks are z-shaped or avicular, each with a long rostrum surmounted by close set arcs of denticles (about 15 in all) and a long manubrium which bends back abruptly to form a lightly chitinised base.

Type locality: Madeira.

Records: Mocambique (24/35/d).

Distribution: Warm North Atlantic from Madeira (s) to Ireland (s).

Jasmineira elegans Saint-Joseph, 1894
(fig. 37.7.l–s)

Jasmineira elegans Saint-Joseph, 1894: 316, pl. 12 figs 337–348; Fauvel, 1927: 330, fig. 114 k–r; Day, 1961: 542.

Body (fig. 37.7.l) up to 20 mm. long with 30–40 setigers. Colour greyish green when fresh with a brilliant narrow line encircling the body between setigers 2–3. Branchial lobes each with 8–20 radioles. Web absent and the radioles have a breaking plane at the base. Two conical dorsal lips between the gills, two slender palps and two long radioles without pinnules ventrally (fig. 37.7.m). Collar well developed, inflected inwards dorsally and overlapping in the mid-ventral line. Two internal eyes and a pair of otocysts in the collar segment. Setigers 2–8 with large winged capillaries and short-tipped paleae (fig. 37.7.r) in the notopodia and a row of long-shafted hooks with a crest of long denticles and small winged capillaries in the neuropodia (fig. 37.7.o). Abdominal segments numerous with long-necked hooks (fig. 37.7.p, q) capped with 12–20 denticles in the notopodia and slender

winged capillaries (fig. 37.7.s) in the neuropodia. Pygidium pointed but no pygidial eyes or caudal appendage.

TYPE LOCALITY: France.

RECORDS: Cape)32/17/d, 33/17/s, 34/18/s); Natal (30/30/s and 29/31/d).

DISTRIBUTION: N. Atlantic from Scotland (s), Ireland and the English Channel (s) to Senegal (i, s); Angola (s).

FABRICIOLA Friedrich, 1939

Small Sabellids usually 2–3 mm. long with eight thoracic and three abdominal segments. Each branchial lobe with a branchial heart, and three radioles with long pinnules but without eyes or external stylodes. A membranous lip and a long filamentous palp without an internal blood-vessel on either side of the mouth. Collar distinct dorsally and united ventrally. A pair of eyes in the collar-segment. The first setiger bears winged capillaries only. Notosetae of setigers 2–8 are winged capillaries and sometimes a few spatulate setae in the middle thoracic segments. Thoracic neurosetae are long-shafted hooks. Three abdominal segments with short-shafted uncini in the notopodia and capillaries in the neuropdia. Pygidium with a pair of eye-spots.

TYPE SPECIES: *Manayunkia pacifica* Annenkova, 1934.

Fabriciola mossambica (Day, 1957)
(fig. 37.8.a–g)

Fabricia mossambica Day, 1957: 115, fig. 8 e–o; Day, 1963a: 440.

Body 2–5 mm. long with eight thoracic and three abdominal segments. Each branchial lobe with a branchial heart and three radioles bearing about five to eight pairs of pinnules (fig. 37.8.a). A pair of filamentous "palps". Collar rudimentary except for a large triangular ventral lobe which is retractile. A pair of eyes in the collar segment. Thoracic segments about as long as broad. Thoracic notosetae of two lengths, the longer ones (fig. 37.8.b) with normal blades, the shorter ones having very broad, hastate blades (fig. 37.8.c). Thoracic neurosetae are long-shafted hooks (fig. 37.8.d, e) each bearing a single large tooth and an arc of seven denticles above the main fang. Abdominal notosetae are uncini (fig. 37.8.f, g) with bent, flattened shafts and two to three rows each with six to seven teeth. The neurosetae are fine capillaries. Pygidium with eye-spots.

TYPE LOCALITY: Mocambique Island.

RECORDS: Mocambique (23/35/i and Mocambique Is.); ? Cape (34/17/d, 32/17/d, 36/21/d).

DISTRIBUTION: No other records.

FABRICIA Blainville, 1828

Small Sabellids measuring about 3–4 mm. with eight thoracic and three abdominal segments. Each branchial lobe with a branchial heart and three free radioles bearing long pinnules but without eyes or external stylodes. Palps not filamentous. Collar often reduced dorsally but united ventrally. A pair of eyes in the collar segment. First setiger with winged capillaries only. Setigers 2–8 with winged capillaries and sometimes a few spatulate setae in the notopodia; long-shafted hooks in the neuropodia. Three abdominal segments with long-handled hooks in the notopodia and fine capillaries in the neuropodia. Pygidium with eye-spots.

Type species: *Amphicora sabella* Ehrenberg, 1837.

Key to Species

1 Collar well developed dorsally. Middle thoracic segments elongated 2
– Collar rudimentary dorsally. Thoracic segments short. (Abdominal hooks with one to three longitudinal rows of teeth) . . . . . ***F. bansei***
2 Abdominal hooks with eight longitudinal rows each with about 18 teeth. A large species 10 mm.) . . . . . ***F. capensis***
– Abdominal hooks with three longitudinal rows each with six to seven teeth (fig. 37.9.g). A small species (3–4 mm.) . . . . . ***F. filamentosa***

Fabricia bansei Day, 1961
(fig. 37.8.h–l)

Fabricia bansei Day, 1961: 543, fig. 15 c–f.

Body (fig. 37.8.h) about 3 mm. long, dusky anteriorly. Branchial lobes each with a branchial heart and three radioles. No elongated palps or free ventral filaments. Collar small and indistinct dorsally but forms a triangular lobe ventrally closely apposed to the mouth. A pair of eyes in the collar segment. Body with eight thoracic and three abdominal segments. Thoracic notosetae of setigers 2–8 include four to five longer winged capillaries and two to three shorter paleae (fig. 37.8.i) with hastate blades and fine tips. Neurosetae are long-shafted hooks (fig. 37.8.l) with a single long tooth over the main fang and then an arc of several smaller teeth. Abdominal hooks 14 per row, each with a long handle (fig. 37.8.j, k) and a small rostrum surmounted by a single row of three to four larger teeth and a pair of terminal teeth.

Type locality: Cape Town.

Records: Cape 33 18 i and 34 18 i, s[1].

Distribution: Endemic.

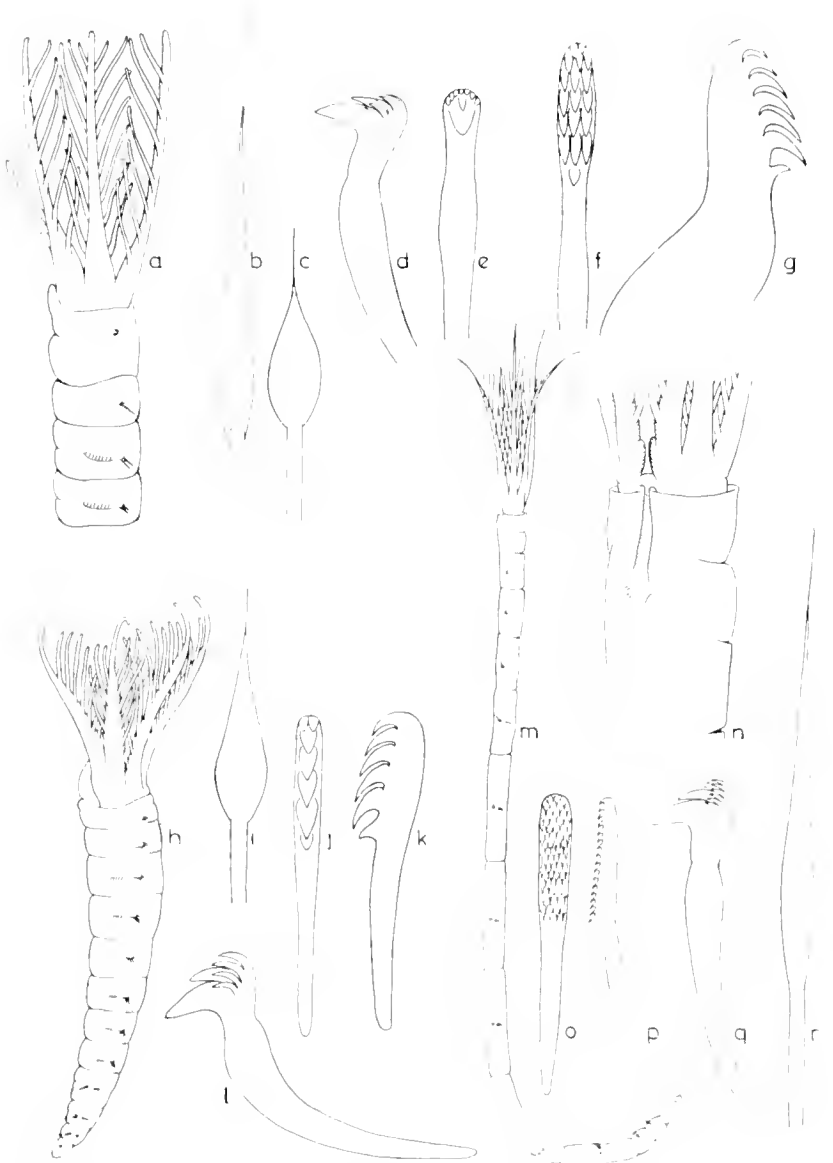

FIG. 37.8. *Fabriciola mossambica.* (A) Anterior end. (B) Thoracic winged capillary. (C) Thoracic hastate seta. (D, E) Thoracic hook. (F, G) Abdominal uncinus. *Fabricia bansei.* (H) Entire worm (20 times life size). (I) Thoracic palea. (J, K) Abdominal hook. (L) Thoracic hook. *Fabricia capensis.* (M) Entire worm (10 times life size). (N) Dorso-lateral view of collar region. (O, P) Abdominal hook. (Q) Thoracic hook. (R) Thoracic winged capillary.

Fabricia capensis (Monro, 1937)
(fig. 37.8.m–r)

Ordia capensis Monro, 1937: 366, figs. 1–8.
Fabricia capensis: Day, 1955: 447, fig. 8 g–k.

Body (fig. 37.8.m) slender, 5–10 mm. long and encased in a long sandy tube. Animals gregarious with juveniles in the tubes of the adults. Each branchial lobe with a branchial heart and three radioles bearing about six pairs of long pinnules. A pair of short dark flattened lips and a similar pair of palps. No free filamentous processes ventrally. Collar (fig. 37.8.n) well developed, reflected inwards on either side of the mid-dorsal groove to form a single small dorsal lobe and a pair of large lateral lobes which are smoothly continuous ventrally. Eyes in the collar segment. Middle thoracic segments greatly elongated, the sixth, seventh and eighth being five times longer than broad. Thoracic notosetae are all long, slender-winged capillaries (fig. 37.8.r). Thoracic neurosetae are long-shafted hooks (fig. 37.8.q) with one to two large teeth and an arc of 12–14 denticles above the main fang. Abdominal notosetae are long-handled hooks (fig. 37.8.o, p) with 18 rows with eight teeth each. Abdominal capillaries very slender. Pygidium slender with eye-spots.

Type locality: Port Elizabeth, South Africa.

Records: Cape (from 34°18′i and 34°25′s to 32°28′i).

Distribution: Endemic.

Fabricia filamentosa Day, 1963
(fig. 37.9.a–g)

Fabricia filamentosa Day, 1963a: 439, fig. 12 a–g.

A small thread-like species (fig. 37.9.a) about 4 mm. long by 0·2 mm. encased in a fragile mud tube. No colour pattern. Each branchial lobe with three radioles bearing five pairs of very long slender pinnules. No filamentous palps. Collar (fig. 37.9.b) well developed with a short dorsal lappet and a smooth-edged, cup-shaped flange which is continuous ventrally. A pair of conspicuous eyes. Body slender with eight thoracic and three abdominal segments. Setigers 5–8 greatly elongated. Thoracic notosetae (fig. 37.9.c) are four narrow-bladed capillaries; neurosetae are four long-shafted hooks (fig. 37.9.d, e) each with an arc of five to eight teeth above the rostrum. Abdominal capillaries are three very slender capillaries. About 15 abdominal uncini per segment, each with a long "handle" and about six rows of three teeth (fig. 37.9.f, g). Pygidium conical with a pair of eye-spots.

Type locality: Dredged off Lamberts Bay, South Africa.

Records: Cape (32°17′d, 34°17′d, 36°21′d).

Distribution: Endemic.

ORIOPSIS Caullery and Mesnil, 1896

Small Sabellids with eight thoracic and four or more abdominal segments. Branchial lobes without branchial hearts but each has three to five flanged radioles with long pinnules but without eyes or external stylodes. Usually one to two free ventral filaments simulating palps. Lips membraneous. Collar divided dorsally and united ventrally. A pair of eyes and sometimes a pair of otocysts in the collar segment. Thoracic notosetae are winged capillaries and the neurosetae are long-shafted hooks. Abdominal uncini serpuliform without shafts. Pygidium often with eye-spots.

Type species: *Fabricia armandii* Claparède, 1864.

Key to Species

1 Five to seven abdominal setigers 2
– Eight or more abdominal setigers 3
2 Collar absent (fig. 37.9.j). Abdominal uncini 15–20 per row . . . . ***O. neglecta***
– Collar low laterally and with a tongue-shaped projection ventrally. Up to 10 abdominal uncini per row . . . . . ***O. parvula***
– Collar with a smooth, straight margin (fig. 37.9.o). Abdominal uncini 12 per row ***O. ehlersi***
3 Collar with a scalloped margin (fig. 37.10.a). Abdominal uncini with an enlarged basal tooth . . . . . ***O. eimeri***
– Collar with a smooth, straight margin. Abdominal uncini without an enlarged basal tooth . . . . . ***O. bansei***

Oriopsis neglecta Banse, 1957
(fig. 37.9.h–n)

Oriopsis neglecta Banse, 1957: 85, fig. 5 d–e; Day, 1961: 546, fig. 15 g–m.

Body (fig. 37.9.n) fairly stout and 3–4 mm. long. Branchial lobes (fig. 37.9.j) without branchial hearts but each has three to four free radioles with broad flanges and long pinnules. Two triangular lips medially and a pair of slender "palps" ventrally each half as long as the radioles. Collar represented by a thickened ridge around the base of the branchial lobes with a triangular ventral expansion. No peristomial eyes. Body of eight thoracic and five to six crowded abdominal setigers. Pygidium without eye-spots. Thoracic neurosetae are long-shafted hooks (fig. 37.9.k, l) with one large tooth and an arc of several denticles above the main fang. Abdomen with two slender capillaries per neuropodium and 15–20 very small, roughly square uncini per notopodium. Each uncinus (fig. 37.9.h, i) with about six rows of six very long teeth above the large basal tooth and recurved prow.

Type locality: Luderitzbucht, South West Africa.

Records: South West Africa (22°14′ i and 26°15′ i, s); Cape (34°18′ i, s).

Distribution: Endemic.

Fig. 157. *Febricia filamentosa*. (A) Entire worm (30 times life size). (B) Dorsal view of collar. (C) Thoracic notoseta. (D, E) Thoracic hook. (F, G) Abdominal uncinus. *Ornopsis neglecta*. (H, I) Abdominal uncinus. (J) Ventral view of collar region. (K, L) Thoracic hook. (M) Thoracic capillary. (N) Entire worm (30 times life size). *Ornopsis ehlersi*. (O) Lateral view of collar region. (P, Q) Thoracic hook. (R, S) Abdominal uncinus. (T, U) Longer and shorter forms of thoracic capillary.

Oriopsis parvula (Ehlers, 1913)*

Oria parvula Ehlers, 1913 : 580.
Oriopsis parvula : Day, 1961 : 545.

Body 1·4 mm. long with eight thoracic and six abdominal setigers. Each branchial lobe with three flanged radioles bearing long pinnules and a shorter, stouter filament projecting between the dorsal pair. Collar widely gaping dorsally, low laterally and forming a triangular projection ventrally. Eyes present. Thoracic notosetae of setigers 2–8 with seven similar capillaries without wings (?). Neurosetae as four to five long-shafted hooks. Abdominal uncini up to 10 per row, each with several rows of several teeth above the recurved prow.

TYPE LOCALITY : Simonstown, South Africa.

RECORDS : Cape (34/18/s) – known only from the original record.

Oriopsis ehlersi Day, 1961
(fig. 37.9.o–u)

Oriopsis ehlersi Day, 1961 : 546, fig. 16 a–g.

Body 3 mm. long with eight thoracic and five to seven abdominal setigers. Each branchial lobe (fig. 37.9.o) with three flanged radioles having long naked tips and six to eight pairs of pinnules which all reach the same level. Two long filaments (? palps) between the ventral pair of radioles. Collar fairly well developed and equal laterally and ventrally. The edge is smooth apart from a deep notch in the mid-ventral line. Eyes present. Thoracic notosetae of setigers 2–8 are longer and shorter winged capillaries (fig. 37.9.t, u), the shorter forms having very narrow blades. Neurosetae are seven to eight long-shafted hooks (fig. 37.9.p, q) with two arcs of small denticles above the main fang. Abdominal uncini about 12 per notopodium, each uncinus (fig. 37.9.r, s) having eight to eleven rows of teeth with five teeth per row. Lowest tooth larger than the others.

TYPE LOCALITY : False Bay, South Africa.

RECORDS : Cape (34/18/s).

DISTRIBUTION : A single record.

Oriopsis eimeri (Langerhans, 1880)
(fig. 37.10.a–g)

Oria eimeri Langerhans, 1880 : 117, pl. 5 fig. 31 a–c.
Oriopsis eimeri : Day, 1961 : 547, fig. 16 h–o.

Body 1–2 mm. long with eight thoracic and eight to ten abdominal setigers. Branchial lobes (fig. 37.10.a) without branchial hearts but each with three flanged radioles with eight to ten pairs of long pinnules and long naked tips. A pair of membraneous lips. Collar widely divided dorsally, well developed laterally and

*This species was not figured by Ehlers and the exact characters are doubtful.

united ventrally. The free edges are crenulate with about 10 scallops on each side. Eyes and otocysts present internally. Thoracic notosetae (fig. 37.10.b, c) are longer and shorter winged capillaries. The long-shafted neuropodial hooks (fig. 37.10.d, e) have the main fang surmounted by a pair of large teeth and then two arcs of smaller denticles. Abdominal capillaries are very fine with the blade only visible at the base. Abdominal uncini nine to eleven per notopodium, each roughly square with a rather large basal tooth and a broad crest of about six rows each with six to eight teeth (fig. 37.10.f, g).

TYPE LOCALITY: Madeira Island.

RECORDS: Cape (34 18 i).

DISTRIBUTION: Madeira.

Oriopsis bansei Day, 1961
(fig. 37.10.h)

Oriopsis bansei Day, 1961: 546.
Oriopsis parvula: (non Ehlers) Banse 1957: 80, fig. 5 a–c.

Body about 2 mm. long with eight thoracic and nine abdominal segments. Each branchial lobe with three to four flanged radioles and at least one long ventral filament (? palp). Collar equally developed laterally and ventrally with a smooth edge. Thoracic notosetae of setigers 2–8 are six long and three to four short capillaries, the long ones having characteristically broad blades. Neurosetae have several closely packed denticles above the main fang. Abdominal uncini 10–12 per notopodium, each with about 10 rows of teeth and six teeth per row; basal tooth not enlarged (fig. 37.10.h).

TYPE LOCALITY: Luderitz, South West Africa.

RECORDS: South West Africa (26 15 i).

DISTRIBUTION: A single record.

DESDEMONA Banse, 1957

Small Sabellids closely related to *Oriopsis* with eight thoracic and four to twelve abdominal segments. Branchial lobes without branchial hearts but each with three free radioles with poorly developed lateral flanges or none at all. A pair of membranous lips on either side of the mouth and a pair of filamentous palps ventrally. Collar divided dorsally, but united ventrally to form a median ventral lobe. A pair of eyes within the collar segment. Thoracic notosetae are winged capillaries and the neurosetae are long-shafted hooks. Abdominal notosetae are square serpuliform uncini and the neurosetae are slender capillaries. Pygidium with or without eyes.

TYPE SPECIES: *Desdemona ornata* Banse, 1957.

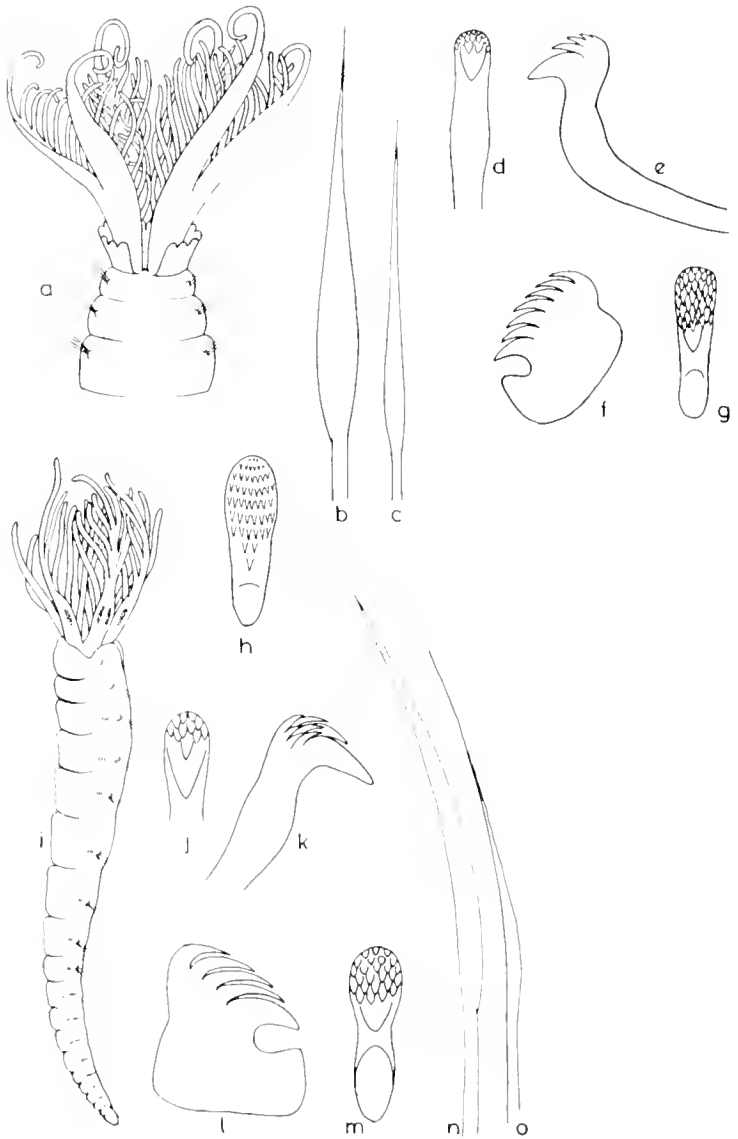

FIG. 37.10. *Oriopsis eimeri*. (A) Dorsal view of anterior end. (B, C) Longer and shorter types of thoracic capillary. (D, E) Thoracic hook. (F, G) Abdominal uncinus. *Oriopsis bansei* (from Augener, 1918). (H) Edge-on view of thoracic uncinus. *Desdemona ornata*. (I) Entire worm (30 times life size). (J, K) Thoracic hook. (L, M) Abdominal uncinus. (N, O) Longer and shorter forms of thoracic capillary.

Desdemona ornata Banse, 1957
(fig. 37.10.i–o)

Desdemona ornata Banse, 1957 : 90, fig. 7 a–e.

Body (fig. 37.10.i) about 2–4 mm. long with eight thoracic and seven to nine abdominal segments. Branchial lobes without branchial hearts but each with three free radioles with reduced lateral flanges and with four to five pairs of long stout pinnules. Each radiole has two streaks of dark pigment at the base and there is a pair of dark membraneous lips between the branchial lobes. The ventral lips are not pigmented. Between the ventral pair of radioles there is a pair of long filaments which simulate palps but have the same structure as adjacent pinnules. Collar indistinct dorsally, notched laterally and forms a stout contractile lobe ventrally. A pair of lateral eyes within the collar segment. Thoracic notosetae (fig. 37.10.n, o) are slender-winged capillaries of two lengths, the shorter ones having very fine tips. Thoracic neurosetae are two to three long-shafted hooks (fig. 37.10.j, k) with three to four denticles above the main fang as seen in lateral view and a close-set cap of about nine denticles in face view. Abdominal uncini (fig. 37.10.l, m) are quadrangular plates with four to six rows each with about five teeth. Pygidium without eye-spots.

Type locality : Hermanus Estuary, South Africa.

Records : Cape (from 33°18′/e to 33°27′/e) ; Natal (30°30′/e and 29°31′/i).

Distribution : Endemic.

Family **SERPULIDAE** Savigny, 1818

Tubicolous worms encased in calcareous tubes usually attached to hard objects. Body divided into three regions namely a head region provided with a branchial crown for respiration and filter-feeding, a thorax of three to eight segments and an abdomen of numerous segments. Prostomium indistinct and fused to the buccal segment which bears the branchial crown formed of two fans of bipinnate radioles. One radiole usually modified and enlarged to form a stalked operculum. Palps seldom present. A pair of large nephridia open by a single dorsal pore at the base of the branchial crown. Second segment (first setiger) expanded to form a membraneous collar, the two halves of which extend back as thoracic membranes above the notosetae. A tube-building glandular fillet associated with the collar. Parapodia biramous but poorly developed. Thoracic notosetae are bundles of limbate capillaries and the notosetae are rows of toothed plates (uncini). Abdominal setae similar but inverted so that the neurosetae are capillaries and the notosetae are uncini. A ventral groove or copragogue runs forward from the anus and bisects the glandular ventral pads of the abdomen but curves round to the dorsal surface at the junction of thorax and abdomen.

BIOLOGICAL NOTES

The serpulids are closely related to the sabellids and like them they are suspension feeders. But they are more specialised than the sabellids for they have lost their palps, the tube is always calcareous and one of the radioles of the branchial crown has been modified to form a stalked operculum which plugs the entrance of the tube. When alarmed the worm retracts extremely rapidly for it has well developed giant nerve fibres. The operculum serves not only for protection but also to reduce water loss and it is noteworthy that while non-operculate forms such as *Protula* are infratidal, forms with calcareous opercula such as *Pomatoleios kraussii* live above mid tide. Large coralliform masses of *Pomatoleios* dominate many Cape and Natal shores but the distribution stops sharply at Cape Point presumably because the water of the Benguela current is too cold.

The tubes of most serpulids are attached to rocks or other hard objects. In the tropics, of course, many of them grow on coral. *Hydroides norvegica* seems to prefer floating objects such as buoys and the hulls of ships, particularly the shaded area under the stern. It is not surprising that *H. norvegica* has a cosmopolitan distribution. *Mercierella enigmatica* is another traveller. About 1920 it suddenly appeared in the estuary of the river Seine in France, possibly carried by ship from some estuary in India. Since then it has been reported from warm estuaries all over the world and is even found in the warm conduits from power stations in England. It can tolerate salinities both above and below that of sea water but it is never found in the sea, always in estuaries.

The subfamily Spirorbinae includes some of the most specialised of the serpulids. They are all small and asymmetrical and, as described later, the larvae settle down with the dorsal surface against the substrate. Some species will settle on a variety of substrates but others, as Professor Knight-Jones and his colleagues have shown,

are very selective. In South African seas there is one species that lives on calcareous bryozoa, another that lives on shells inhabited by hermit crabs and another on the fronds of algae.

One of the very few serpulids that does not have an attached tube is *Ditrupa*, a deep water genus which lives on muddy bottoms in a tusk-shaped tube rather like that of the mollusc *Dentalium*. The method whereby it prevents itself from being buried in the silt is unknown.

DIVISION INTO SUB-FAMILIES

Useful reviews of the family Serpulidae will be found in Morch (1863), Pixell (1912 and 1913a) and Fauvel (1927). The three subfamilies are distinguished by the nature of the operculum and number of thoracic segments.

Key to Subfamilies

1 Thorax symmetrical with five to twelve thoracic setigers 2
– Thorax asymmetrical with three to four thoracic setigers (fig. 38.1.d). (Shell small and spirally coiled) . . . . . Spirorbinae(p. 792)
2 Operculum always present and never has pinnules on its stalk. Six to seven thoracic setigers . . . . . Serpulinae (p. 798)
– Operculum either absent or poorly developed and retains pinnules on its stalk. Five to twelve thoracic setigers . . . . . Filograninae (p. 816)

Subfamily **SPIRORBINAE** Chamberlin, 1919

Small Serpulids with spirally coiled shells. Thorax of three to four spirally twisted and asymmetrical segments, the last of which may lack setae on the convex side. Operculum always present and lacks pinnules on its stalk. Developing eggs retained either in the hollow operculum or inside the shell in a membraneous sac.

Records from southern Africa

Spirorbis (*Dexiospira*) *foraminosus* Moore . . .	45Pi, 51Cs
Spirorbis (*Laeospira*) *laevis* Quatrefages . . .	21Ci
Spirorbis (*Paralaeospira*) *adeonella* Day . . .	56Cs
as *Spirorbis* (*Laeospira*) sp.	51Cs
Spirorbis (*Paralaeospira*) *capensis* Day . . .	51Csd
Spirorbis (*Paralaeospira*) *patagonicus* Caullery & Mesnil	51Cs
as *Spirorbis borealis* Day (non Daudin) . . .	44Ci

THE MAIN DIAGNOSTIC CHARACTERS

The main works on the Spirorbinae are those of Caullery and Mesnil (1897) and Pixell (1912).

The tube. The larva settles with its dorsal surface against the substratum and the tube becomes spirally twisted. If it coils in a clockwise direction when viewed from above (i.e. from the morphologically ventral surface) it is said to be *sinistral* and if it

coils anticlockwise it is said to be *dextral*. The surface of the shell may bear longitudinal ridges or cross bars but only major differences are important.

The operculum. The stalk is expanded distally and the operculum is a calcareous plate, cone or hollow cylinder embedded in the stalk by a basal *talon*. Both the shape of the talon and the operculum are important, but it should be noted that the operculum thickens with age.

Reproduction. The fertilised eggs are retained either in the hollow and perforated operculum or in a membraneous sac (possibly corresponding to a false operculum) which lies inside the tube next to the abdomen.

The number of thoracic segments. There are three to four thoracic segments of which the first bears notopodial collar setae only and the rest both notopodial capillaries and neuropodial uncini. Occasionally the capillaries are missing from the convex side of the last thoracic segment.

Setae. Thoracic notosetae are limbate capillaries. The collar setae are often specialised with a separate toothed lobe or fin at the base of the blade which itself may be either smooth or saw-edged. Subsequent notosetae may include "setae of *Apomatus*" with minute comb-teeth on the distal part of the blade. Thoracic uncini have two to five rows of numerous teeth and the basal gouge may be truncate, emarginate or even be divided into five divergent teeth.

SPIRORBIS Daudin, 1800

Body minute and asymmetrical, encased in a spirally coiled tube. Operculum calcareous and sometimes contains the eggs; it may have a basal projection or talon in the stalk which lacks wings. Thorax of three to four segments. First few abdominal segments greatly elongated. Collar setae often with a separate toothed lobe at the base of the blade. Setiger 2 with smooth-bladed capillaries. Setiger 3 with smooth-bladed capillaries and often setae of *Apomatus* with the distal end of the blade denticulate. Thoracic uncini are rectangular plates with two or more rows of teeth and a basal gouge. Abdominal capillaries have toothed blades set at an angle to the shaft.

TYPE SPECIES: *Spirorbis borealis* Daudin, 1800.

KEY TO SPECIES

1 Three rows of uncini on the inner, concave side of the thorax. Tube coils clockwise when seen from above (*Paralaeospira*) (fig. 38.1.a, d) 2
– Two rows of uncini on the inner, concave side of the thorax. Tube coils clockwise or anticlockwise when seen from above 4
2 Tube smooth or longitudinally ridged. Setae of *Apomatus* present (fig. 38.1.h) . . . 3
– Tube transversely ridged (fig. 38.1.k). No setae of *Apomatus* . . . ***S. (P. adeonella***
3 Talon smoothly conical (fig. 38.1.b, c) . . . . . ***S. (P.) patagonicus***
– Talon warty (fig. 38.1.s) . . . . . ***S. (P.) capensis***

4 Tube coils clockwise when seen from above. Gouge of uncinus with a smooth edge . . . . . ***S.* (*L.*) *laevis***

– Tube coils anti-clockwise when seen from above. Gouge of uncinus with three to five prongs (fig. 38.2.c, f) . . . . . ***S.* (*D.*) *foraminosus***

Spirorbis* (*Paralaeospira*) *adeonella Day, 1963
(fig. 38.1.k–p)

Spirorbis (*Paralaeospira*) *adeonella* Day, 1963a: 442, fig. 12 h–p.
Spirorbis (*Laeospira*) sp. Day, 1961: 557.

Length 3 mm. Tube ((fig. 38.1.k) vitreous and coiled clockwise when viewed from above (sinistral) with a well marked series of annular ridges. Operculum (fig. 38.1.l, m), oval with a concave surface and a knob-shaped talon. Incubation in the tube. Seven branchial radioles. Collar separate dorsally. Four thoracic setigers, the first with collar setae only, the second and third with both notosetae and uncini and the fourth represented by a short row of uncini on the concave side of the body. No notosetae on setiger 4. Abdomen with about 13 setigers. Collar setae include a few fine capillaries and several setae with a separate dentate lobe at the base of the blade (fig. 38.1.n). Notosetae of setigers 2 and 3 are winged capillaries and a few finer capillaries. No setae of *Apomatus*. Thoracic uncini (fig. 38.1.o, p) with three to four rows of teeth and 18 teeth per row. Gouge expanded and truncate. Tube growing on the calcareous polyzoan *Adeonella* sp.

TYPE LOCALITY: Mossel Bay, South Africa.

RECORDS: Cape (34/22/s, 34/25/s).

DISTRIBUTION: Endemic.

Spirorbis* (*Paralaeospira*) *patagonicus Caullery & Mesnil, 1897*
(fig. 38.1.a–j)

Spirorbis (*Paralaeospira*) *patagonicus* Caullery & Mesnil, 1897: 205, pl. 8 fig. 12; Day, 1961: 554.

Length 3–4 mm. Tube (fig. 38.1.a) coiled clockwise when seen from above (sinistral), dense, chalky white (about 2 mm. in diameter), occasionally erect. Four asymmetrical thoracic setigers (fig. 38.1.d) the first with collar setae only, the second and third with both notopodial capillaries and neuropodial uncini, and the fourth with uncini only on the concave side. Twenty to thirty abdominal segments. Operculum (fig. 38.1.b, c) subcircular with a simple conical talon. Incubation in the tube. Adults with eight to nine radioles. Thoracic membrane free to the end of the thorax on the outer side. Collar setae (fig. 38.1.e, f) include fine capillaries and stouter forms with a separate toothed lobe at the base of the minutely serrated or pilose blade. Setiger 2 with limbate capillaries only (fig. 38.1.g). Setiger 3 with both capillaries and setae of *Apomatus* with three-quarters of the blade dentate

*Very close to *S. malardi* Caullery and Mesnil.

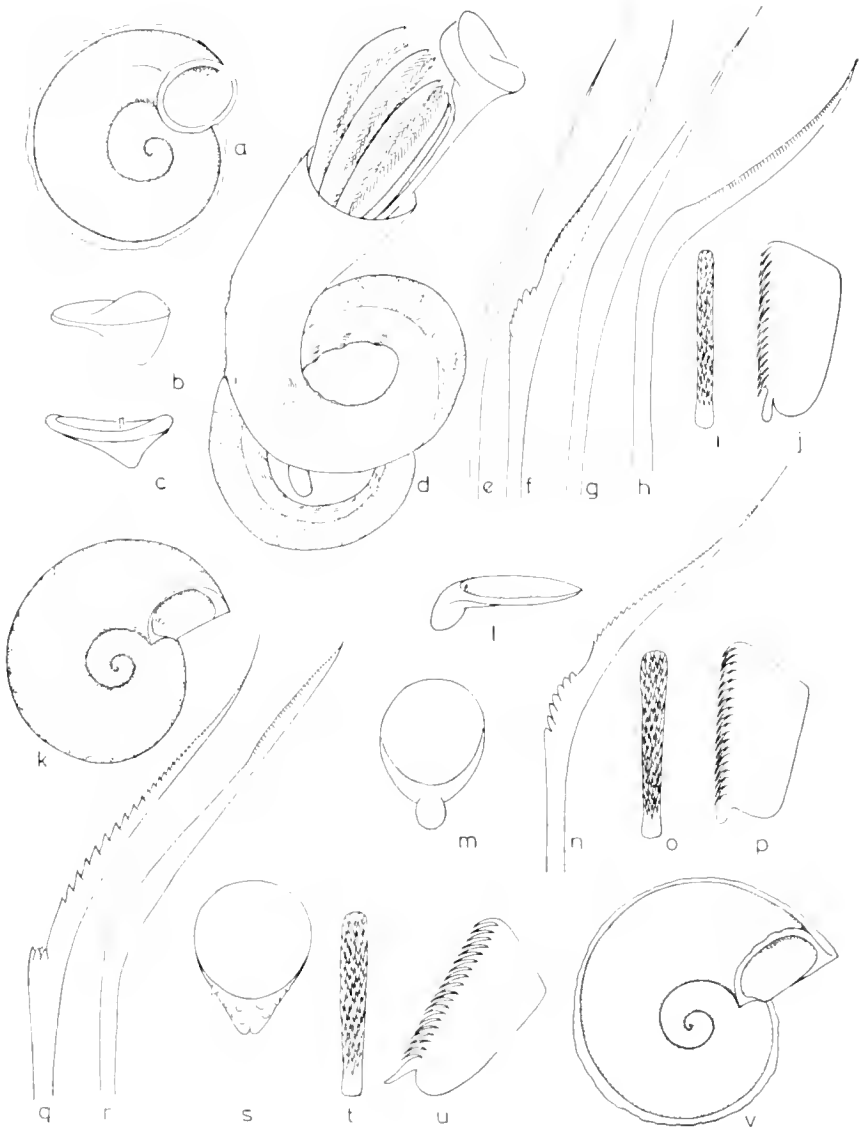

Fig. 38.1. *Spirorbis patagonicus*. (A) Tube. (B, C) Two forms of opercula. (D) Entire worm (25 times life size). (E, F) Collar setae. (G) Normal capillary from setiger 2. (H) Seta of *Apomatus*. (I, J) Thoracic uncinus. *Spirorbis adonella*. (K) Tube. (L, M) Operculum. (N) Collar seta. (O, P) Thoracic uncinus. *Spirorbis capensis*. (Q) Collar seta. (R) Seta of *Apomatus*. (S) Operculum. (T, U) Thoracic uncinus. (V) Tube.

(fig. 38.1.h). Uncini (fig. 38.1.i, j) with a large emarginate gouge and three to four rows of teeth with 14 teeth per row.

TYPE LOCALITY: Orange Bay, Patagonia.

RECORDS: South West Africa (22/14 i and 26/15 i); Cape (from 29/16 i to 34/18 i, s and 32/28 i).

DISTRIBUTION: Subantarctic (Kerguelen (i, s), Patagonia, Falkland Is., Tristan da Cunha (i), Marion Is. (i)).

Spirorbis (*Paralaeospira*) *capensis* Day, 1961
(fig. 38.1.q–r)

Spirorbis (*Paralaeospira*) *capensis* Day, 1961: 554, fig. 18 a–h.

Length 3 mm. Tube (fig. 38.1.v) coiled clockwise when seen from above (sinistral). Operculum subcircular with a conical talon having tooth-like outgrowths (fig. 38.1.s). Incubation in the tube. Four thoracic setigers, the first having collar setae only, the second and third with both notopodial capillaries and neuropodial uncini and the fourth with uncini on the concave side only. Collar setae of two types: (a) stout setae with coarsely serrate blades and a separate toothed boss at the base (fig. 38.1.q) and (b) slender setae with smooth blades. Setiger 3 with both smooth-bladed capillaries and setae of *Apomatus* with the distal third of the blade expanded and finely toothed (fig. 38.1.r). Thoracic uncini (fig. 38.1.t, u) with two to four rows of teeth and 20 teeth per row; basal gouge expanded and truncate.

TYPE LOCALITY: False Bay, South Africa.

RECORDS: Cape (34/18 s and 36/21 d).

DISTRIBUTION: Only two records.

Spirorbis (*Laeospira*) *laevis* Quatrefages, 1865*
(fig. 38.2.a–b)

Spirorbis laevis Quatrefages, 1865: 490.
Spirorbis (*Laeospira*) *laevis*: Fauvel, 1927: 347, fig. 134 l p.

Tube coiled clockwise when seen from above (sinistral). Body (fig. 38.2.a) with three thoracic and nine abdominal setigers. Only two branchial radioles on each side. Operculum (fig. 38.2.b) vase-shaped, covered with a calcareous lid and contains the developing eggs; no talon. Collar setae are plain, winged capillaries. Setae of *Apomatus* with minutely toothed blades are present in the third setiger.

TYPE LOCALITY: Gulf of Gascony, France.

RECORDS: Cape (34/18 i).

DISTRIBUTION: Bay of Biscay; Mediterranean; Senegal (d).

*According to Caullery and Mesnil (1897) the original description is vague and incomplete and probably refers to a young form of a well-known European species. The South African record is doubtful.

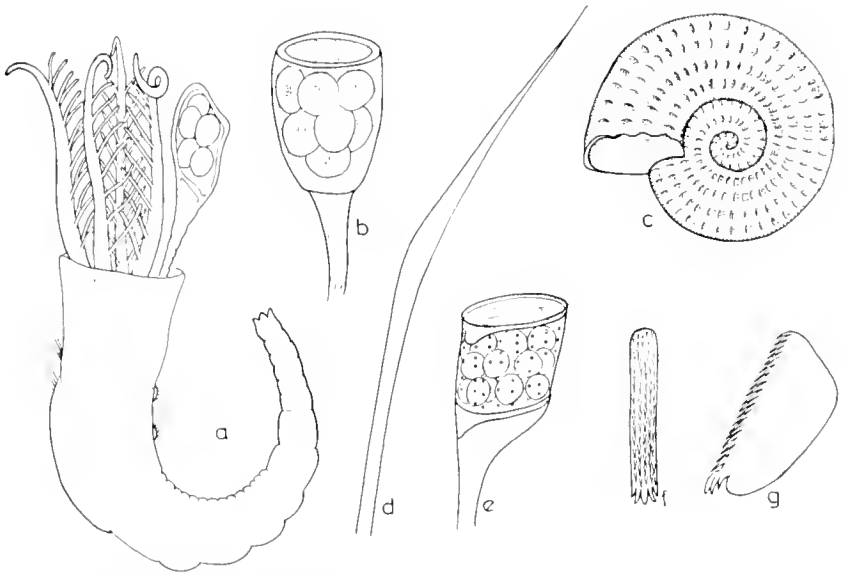

FIG. 38.2. *Spirorbis laevis*. (A) Entire worm (60 times life size after Claparède). (B) Operculum (after Quatrefages). *Spirorbis foraminosus*. (C) Tube. (D) Collar seta. (E) Operculum. (F, G) Thoracic uncinus.

Spirorbis* (*Dexiospira*) *foraminosus Busch, 1904
(fig. 38.2.c–g)

Spirorbis (*Dexiospira*) *foraminosus* Busch, 1904: 176, text-fig e; Day, 1961: 556, fig. 18 j–k.

Length 3–4 mm. Tube (fig. 38.2.c) coiled anticlockwise when viewed from above (dextral) with five longitudinal ridges and transverse slits in the grooves between them. Body with three thoracic setigers or two rows of uncini on each side. Incubation in the operculum which is cylindrical with perforated calcareous walls, a lid with a marked rim and a subcircular basal plate (fig. 38.2.e). Collar setae (fig. 38.2.d) with pilose blades and without basal lobes. No setae of *Apomatus* in setiger 3. Uncini (fig. 38.2.f, g) with four to five rows of teeth and 20–25 teeth per row; basal gouge with three to five divergent prongs. Tubes found on fronds of algae.

TYPE LOCALITY: Japan.

RECORDS: Cape (34/18/s); Mocambique (26/32/i).

DISTRIBUTION: West Indies; Indian Ocean (i, s); Japan (s).

Subfamily **SERPULINAE** MacLeay, 1819

Body symmetrical. Prostomium indistinguishable from the buccal segment. A well developed operculum without pinnules on the stalk. Thorax of seven segments but the first or collar segment may lack setae. Thoracic uncini with a single row of teeth.

Records from southern Africa

Ficopomatus capensis Day	51Cs
Hydroides bifurcatus (Pixell)	40Ni
Hydroides dipoma (Schmarda)	26Ai, 11Ci, 51Cs
as *Eupotamus dipoma* Schmarda	4Ci
as *Hydroides uncinatus* var. *macronyx* Ehlers	21Ci
Hydroides heteroceros (Grube)	56Ms
Hydroides lunulifera (Claparède)	45Ni
Hydroides monoceros (Gravier)	45Pi
Hydroides norvegica Gunnerus	33Cs, 45PsNs, 51Csd
as *Hydroides uncinata* var. *multispinosa* McIntosh	32CsNd
Hydroides talumianus Augener	45Pi, — Ps
Hydroides uncinata (Philippi)	45Pi
Mercierella enigmatica Fauvel	40Ne Ce
Neovermilia capensis Day	48Cs
Pomatoleios kraussii (Baird)	44Ci, 48Ci
as *Placostegus caniferus* var. *kraussii* Baird	5Ci
as *Placostegus caeruleus* Schmarda (pp)	4Ci
as *Pomatoleios crosslandi* Pixell	35Ci, 36NiCi, 40Ni
as *Pomatoceros caeruleus* Fauvel (non Schmarda)	27Mi
Serpula vermicularis Linnaeus	20Ci, 21Ci, 35Ci, 44Ci, 45NiPi, 51Csd
Serpula vermicularis var. *echinata* Linnaeus	51Cs
Spirobranchus giganteus (Pallas)	40Ni, 44Ci
Spirobranchus tetraceros (Schmarda)	45Pi, — Ms
Vermiliopsis babylonia Day	Vema Sea Mount
as *Vermiliopsis pygidialis* (non Willey)	51Cs, 44Ci
Vermiliopsis glandigerus (Gravier)	27Mi, 36Ci, 41Ci, 51Csd

THE MAIN DIAGNOSTIC CHARACTERS

The operculum is either well chitinised or bears a calcareous plate. Calcareous opercula become thicker with age changing from flat to dome-shaped. The most complex opercula are found in the genus *Hydroides* where a calyx-like *funnel* composed of numerous *radii* supports a *crown* of horny spines. The opercular stalk may be cylindrical or flattened with a pair of *wings* at the distal end below the operculum. Opercula are easily lost and a small reserve operculum often develops from the other branchial lobe. It has been termed a *false* operculum.

Thoracic membranes. The backward prolongations of the right and left sides of the collar may continue as free membranes to the posterior end of the thorax and form a ventral frilly membrane at the junction of the thorax and abdomen. In some species however the thoracic membranes are much shorter and end behind the second or fifth thoracic setiger. In rare cases the two sides of the collar fuse across the dorsal surface (e.g. *Neopomatus*). In most species the collar is divided into three main lobes – a ventral lobe and two lateral ones. On each side at the junction of the ventral and paired lateral lobes there is a small glandular fillet responsible for tube formation.

Thoracic notosetae. Although the second segment or *collar* lacks uncini it possesses notosetae in all genera except *Pomatoleios* and *Placostegus*. These *collar setae* are often different from those of later thoracic segments. There are two forms; one is hair-like with hardly a trace of a blade and the other form is usually much stouter with a coarsely toothed blade and in some genera they form *bayonet setae* with stout bosses at the base of a sword-like blade. Subsequent notosetae are mainly limbate capillaries but some genera develop a few *setae of Apomatus* in which the distal part of the blade has minute comb-like teeth.

Thoracic uncini are quadrangular plates with curved teeth along one side usually arranged in a single row. In some genera the first and largest tooth is expanded to form a *gouge*. Care is needed when examining the gouge for if the uncinus is twisted the gouge may appear forked.

Abdominal setae. While the neuropodial uncini are essentially similar to those of the thorax the capillaries are more variable. The posterior ones tend to be more elongated than the anterior ones which have toothed blades. *Geniculate setae* have gradually tapering blades set at a slight angle to the shaft. In others the base of the blade is expanded and the tip shortened to form a trumpet-shaped structure or in the extreme case of *Serpula* the toothed blade is expanded at right angles to the shaft forming a T-shaped structure. The elongate capillaries at the end of the abdomen may be quite smooth.

Key to Genera

1	Collar setae absent	2
–	Collar setae present	4
2	Opercular stalk winged. (Operculum a flattened calcareous plate)	***POMATOLEIOS*** (p. 800)
–	Opercular stalk smooth	3
3	Tube free, tusk shaped. No row of eyes on collar	***DITRUPA****
–	Tube attached. A row of eyes on the collar	***PLACOSTEGUS****
4	Opercular stalk winged (fig. 38.3.f)	5
–	Opercular stalk smooth	8
5	Collar setae few, fine and capillary	***POMATOCEROS*** (p. 801)
–	Collar setae numerous with a spinulose lobe at the base of the blade or bayonet-shaped with stout bosses at the base of the blade	6
6	Thoracic membranes reduced or absent. Collar with bayonet-setae	***OMPHALOPOMOPSIS****
–	Thoracic membranes well developed. Collar setae with a spinulose lobe at the base of the blade	7

7 Operculum a calcareous plate with branching processes . . . ***SPIROBRANCHUS*** (p. 801)
– Operculum as one or a vertical series of calcareous plates without branching processes ***POMATOSTEGUS****
8 Collar setae bayonet-shaped with a separate toothed boss at the base of the blade (fig. 38.4.d) 9
– Collar setae without a separate boss at the base of the blade 12
9 Operculum with a central crown of chitinous spines (fig. 38.4.e) . ***HYDROIDES*** (p. 804)
– Operculum without a crown of chitinous spines 10
10 Operculum funnel-shaped with marginal radii. Abdominal capillaries T-shaped ***SERPULA*** (p. 809)
— Operculum pear-shaped or conical without spines or marginal radii. Abdominal capillaries geniculate 11
11 Thoracic uncini with a single row of large teeth . . . ***FICOPOMATUS*** (p. 810)
— Thoracic uncini with three or four rows of small teeth . . . ***HYALOPOMATUS****
12 Collar setae with serrated blades. Operculum with numerous short spines . . 13
— Collar setae with smooth blades. Operculum without spines 14
13 Thoracic membranes fused across the dorsal surface . . . ***NEOPOMATUS****
– Thoracic membranes not fused . . . . . ***MERCIERELLA*** (p. 812)
14 Setae of *Apomatus* (fig. 38.6.e) among the notosetae. Operculum conical and horny with internal septa . . . . . ***VERMILIOPSIS*** (p. 812)
— No setae of *Apomatus*. Operculum spherical or concave, not horny; no internal septa ***NEOVERMILIA*** (p. 814)

POMATOLEIOS Pixell, 1913

Body symmetrical with six thoracic setigers and numerous abdominal ones. Operculum flat and calcareous. Opercular stalk winged. Collar setae absent. Thoracic notosetae are simple limbate capillaries. Uncini with a gouge and numerous teeth. Abdominal capillaries obliquely truncate with one side produced as a long spine. Tube with a projection over the mouth; worms often gregarious, forming coralliform masses.

Type species: *Placostegus caniniferus* var. *kraussii* Baird, 1865.

Pomatoleios kraussii (Baird, 1865)
(fig. 38.3.a–f)

Placostegus caniniferus var. *kraussii* Baird, 1865: 14.
Pomatoleios crosslandi Pixell, 1913: 85, pl. 9 fig. 10.
Pomatoleios kraussii: Day, 1955: 449.

Length up to 25 mm. Tubes gregarious forming blue coralliform masses (fig. 38.3.a). Individual tubes (fig. 38.3.b) with a flattened dorsal ridge projecting forward over the entrance. Operculum (fig. 38.3.f) a flattened or slightly concave calcareous plate. Opercular stalk broad and flattened with smooth wings. Branchial lobes each with 13–16 radioles which are banded blue and white and united by a web for half their length and end in bare tips. Collar notched deeply laterally and very broad ventrally. A separate dorso-lateral tube-building fillet inside the collar. Thoracic membranes extend to the end of the thorax and are united and free from the body ventrally. Collar setae absent. No eye-spots. Thoracic notosetae have simple striated blades. Thoracic uncini (fig. 38.3.c, d) with a gouge and eight to ten

teeth in a single row. Abdominal neurosetae (fig. 38.3.e) obliquely truncate with fine teeth and one side produced into a long spine.

TYPE LOCALITY: Cape of Good Hope.

RECORDS: Cape (from 34/18/i to 32/28/i); Natal (from 31/29/i to 27/32/i); Mocambique (26/32 i).

DISTRIBUTION: Tropical eastern Africa (i); Madagascar (i); Madras (i); Red Sea (i); Japan.

POMATOCEROS Philippi, 1844

Operculum flattened, sometimes with a few low spines. Opercular stalk winged. Collar setae small and capillary. Body symmetrical with seven thoracic segments and numerous abdominal ones. Thoracic notosetae are capillaries. Uncini with numerous teeth, the first one being enlarged and gouge-like. Abdominal capillaries trumpet-shaped with one side produced into a long spine. Tube triangular usually adnate with the upper side keeled and ending in a projection over the mouth.

TYPE SPECIES: *Serpula triquetra* Linnaeus, 1767.

Pomatoceros caeruleus (Schmarda, 1861)*
(fig. 38.3.g)

Placostegus caeruleus: Schmarda, 1861: 29, pl. 21 fig. 178.
Pomatoceros strigiceps Morch, 1863: 412; McIntosh, 1885: 520, pl. 55 figs. 3–4; pl. 31A figs. 26–28; Ehlers, 1905: 67, pl. 9 figs. 11–19.

Tube blueish, ridged dorsally, often with a projection over the entrance. Gills and body blue. Often gregarious. Operculum (fig. 38.3.g) flattened, sometimes with two tiers of plates. Opercular stalk with small smooth wings. Collar setae are a few fine, limbate capillaries. Subsequent notosetae are normal limbate capillaries. Thoracic uncini with a single row of 10 teeth and a basal gouge ending in a pair of divergent prongs. Abdominal capillaries expanded at the end and one side produced as a long spine. Thoracic membranes from collar to end of thorax.

TYPE LOCALITY: New Zealand.

RECORDS: Schmarda's original record from "Cape of Good Hope" is very doubtful.

DISTRIBUTION: New Zealand (i).

SPIROBRANCHUS Blainville, 1818

Body symmetrical with seven thoracic setigers and numerous abdominal ones. Operculum as a calcareous plate bearing a group of branched spines. Opercular stalk winged. Collar setae often hirsute. Subsequent thoracic notosetae are limbate

*According to Baird (1865), *P. caeruleus* Schmarda is a synonym of *P. carinifera* Gray, 1843.

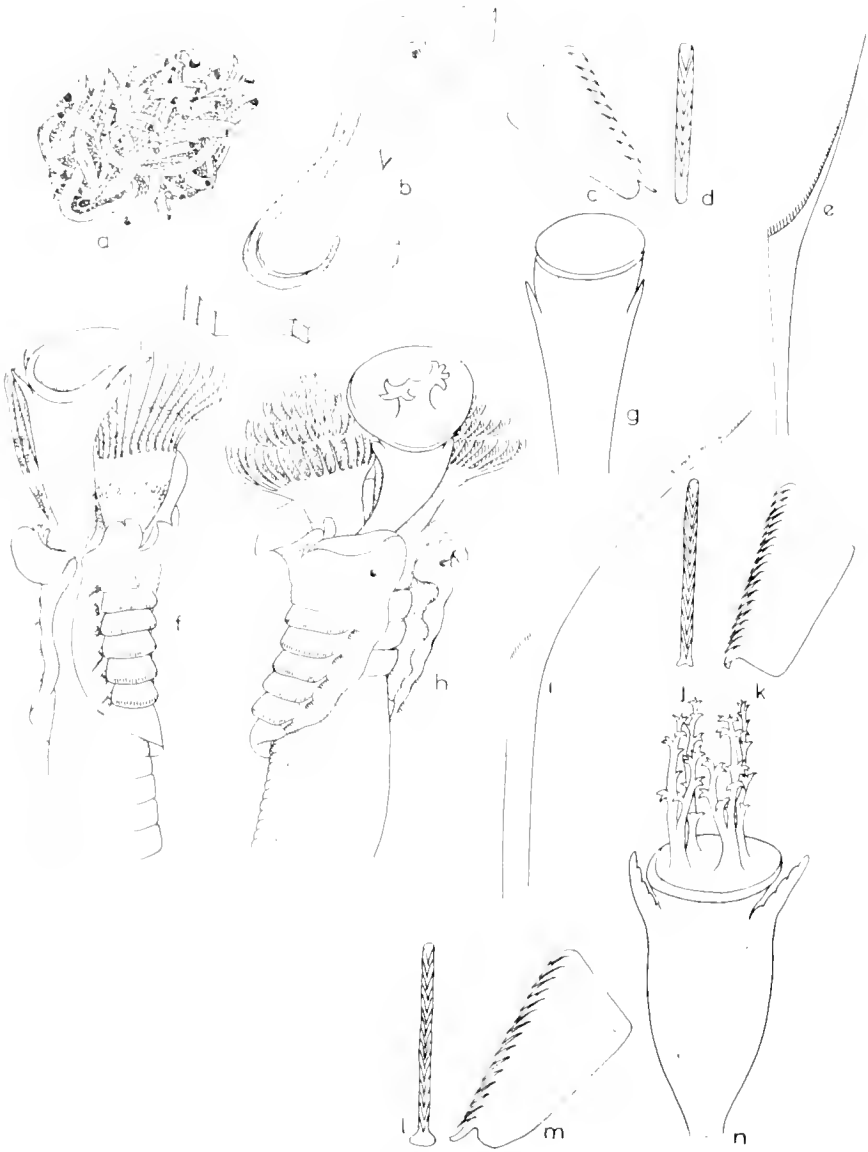

FIG. 38.3. *Pomatoleios kraussii.* (A) Part of colony. (B) Tube of solitary individual. (C, D) Thoracic uncinus. (E) Abdominal capillary. (F) Anterior end with operculum. *Pomatoceros caeruleus.* (G) Operculum (modified from McIntosh, 1885 as *P. strigiceps*). *Spirobranchus giganteus.* (H) Anterior end. (I) Collar seta. (J, K) Thoracic uncinus. *Spirobranchus tetraceros.* (L, M) Thoracic uncinus. (N) Operculum.

capillaries. Uncini with numerous teeth, the first one enlarged and gouge-like. Abdominal neurosetae are trumpet-shaped and denticulate with one side produced as a long spine.

TYPE SPECIES: *Serpula gigantea* Pallas, 1766.

KEY TO SPECIES

1 Branchial lobes spiral with four to six whorls of radioles (fig. 38.3.h) 2
– Branchial lobes flat with one circle of radioles. (Uncini with 13–16 teeth) 3
2 Thoracic uncini with 15–18 teeth. Operculum with two to four branching processes *S. giganteus*
– Thoracic uncini with 26 teeth. Operculum with one branching process . *S. gardineri**
3 Operculum without branching processes . . . . . *S. maldivensis**
– Operculum with four to six branching processes (fig. 38.3.n) . . . *S. tetraceros*

Spirobranchus giganteus (Pallas, 1766)
(fig. 38.3.h–k)

Serpula gigantea Pallas, 1766: 402.
Spirobranchus giganteus: Pixell, 1913: 80, pl. 8 fig. 6.

A large species reaching 120 mm. with a stout, ridged, cylindrical tube and four to six whorls of branchial radioles usually coloured red. Opercular stalk (fig. 38.3.h) with small, blunt wings. Operculum oval with two or four short, branching, antler-like processes. Collar usually blue and divided laterally with a fillet at the incision. Collar setae (fig. 38.3.i) with a hispid boss at the base of the blade which becomes more spinulose distally. Thoracic uncini (fig. 38.3.j, k) with 15–18 teeth in a single row. Abdomen two to three times as long as the thorax and has 200–300 segments.

TYPE LOCALITY: West Indies.

RECORDS: Natal (30/30/i); Mocambique (26/32/i).

DISTRIBUTION: West Indies; Suez (i); Tropical Indian Ocean; Japan (s); New Caledonia.

Spirobranchus tetraceros (Schmarda, 1861)
(fig. 38.3.l–n)

Pomatoceros tetraceros Schmarda, 1861: 30, pl. 21 fig. 179.
Spirobranchus tetraceros: Johansson, 1918: 7, fig. 2.
Spirobranchus semperi Morch, 1863: 405, pl. 2 figs. 24–25.

Length up to 30 mm. Tube stout and ridged. Branchial lobes flattened with a single whorl of radioles. Opercular stalk (fig. 38.3.n) broad with the wings dentate on their inner distal margins. Operculum arched or flat with four long branching antler-like processes. The anterior pair are deeply branched and the branches may separate forming six processes. Collar not divided ventrally but produced

forward as a tongue-shaped membrane. Thoracic uncini (fig. 38.3.l, m) with 13–16 teeth in a single row and a large expanded gouge.

TYPE LOCALITY: New South Wales.

RECORDS: Mocambique (26 32 i); Madagascar (8).

DISTRIBUTION: Tropical Indo-west-Pacific from Zanzibar (i) to the Great Barrier Reef (i).

HYDROIDES Gunnerus, 1768
(including *EUPOMATUS* Philippi, 1844)

Body symmetrical with seven thoracic setigers and numerous abdominal ones. Tube circular in section, often erect. Opercular stalk slender and without wings. Operculum with a basal funnel of fused radii from which arises a central crown of several horny spines. Collar split laterally forming a ventral lobe and a pair of lateral lobes which continue back as thoracic membranes past the end of the thorax, curve round and unite ventrally. Collar setae include bayonet-shaped forms, with two or more coarse teeth at the base of the blade and a few fine capillaries. Notosetae of setigers 2–7 are narrow-bladed capillaries. Thoracic uncini with about six coarse teeth in a single row and a basal gouge. Abdominal uncini similar. Abdominal capillaries with short, triangular blades with a toothed margin.

TYPE SPECIES: *Hydroides norvegica* Gunnerus, 1768.

KEY TO SPECIES

1 Spines of opercular crown all equal in size 2
– One or more spines of opercular crown enlarged 4
2 Spines of opercular crown with two to four pairs of lateral spinules. (Radii of funnel blunt) (fig. 38.4.c) . . . . . ***H. norvegica*** (p. 805)
– Spines of opercular crown without lateral spinules 3
3 Spines of opercular crown with curved, pointed ends (fig. 38.4.h) . . . ***H. uncinata*** (p. 807)
– Spines of opercular crown with anchor-shaped ends (fig. 38.4.k) . . ***H. lunulifera*** (p. 807)
4 Only one enlarged hooked spine in the opercular crown 5
– Two to three enlarged spines in the opercular crown (fig. 38.4.m) . . ***H. valumiana*** (p. 807)
5 Radii of opercular funnel with simple pointed ends 6
– Radii of opercular funnel with ovoid or anchor-shaped ends (fig. 38.4.l) ***H. heteroceros*** (p. 807)
6 Enlarged hook with a pair of lateral hooklets. Opercular funnel oval and slanting (fig. 38.4.o) . . . . . ***H. monoceros*** (p. 805)
Enlarged hook simple. Opercular funnel radially symmetrical 7
– Smaller spines of opercular crown end in two outwardly directed hooklets (fig. 38.4.q[1]) ***H. bifurcata*** (p. 808)
– Smaller spines of opercular crown end in one outwardly directed and one inwardly directed hooklet (fig. 38.4.t . . . . . ***H. dipoma*** (p. 809)

Hydroides norvegica Gunnerus, 1768
(fig. 38.4.a–g)

Hydroides norvegica Gunnerus, 1768: 53; Fauvel, 1927: 356, fig. 122 i–o.

Body (fig. 38.4.b) slender and up to 30 mm. long. Tube fragile, often erect. Opercular funnel (fig. 38.4.c) radially symmetrical with about 50 blunt radii. Opercular crown of 10–20 equal spines each with two to five pairs of lateral spinules, a pointed tip and sometimes one to two inner spines at the base. Collar incised laterally with a small fillet in the notch. Dorsal lobe of collar continuous with the thoracic membrane. Collar setae include plain capillaries (fig. 38.4.e) and bayonet-like setae (fig. 38.4.d) with serrated shaft heads culminating in a pair of stout bosses at the base of the blade which becomes spinulose distally. Subsequent thoracic notosetae are limbate capillaries. Thoracic uncini (fig. 38.4.f) have a single series of six to seven teeth and a slight gouge. Abdominal uncini smaller, with five teeth. Abdominal neurosetae have expanded, truncate and toothed blades (fig. 38.4.g). Tubes cause fouling on slow moving ships.

Type locality: Norway.

Records: South West Africa (26/14/d to 28/16/s); Cape (from 31/16/d to 34/18/s, d and 33/27/s); Natal (29/31/s, d).

Distribution: Cosmopolitan apart from polar seas (s, d, vd). Also world wide on ships' hulls.

Hydroides uncinata (Philippi, 1844)
(fig. 38.4.h–i)

Eupomatus uncinatus Philippi, 1844: 195, pl. 6 fig. 9.
Hydroides uncinata: Fauvel, 1927: 357, fig. 122 a–h.

Length up to 60 mm. Opercular funnel (fig. 38.4.h) radially symmetrical with about 30 radii ending in triangular points. Opercular crown of 8–12 equal horny spines curving towards the centre. Spines all similar in size with plain hooked tips. All spines are broad basally and may have a spinule low down on the inner side. Bayonet setae with a pair of simple bosses at the base of the smooth blade. Tube stout, often adnate on shells.

Type locality: Mediterranean seas.

Records: Mocambique (23/35 s).

Distribution: Bay of Biscay (i, s); North Carolina (s); Morocco (s); Senegal (s); Congo (i); Mediterranean; Japan.

FIG. 38.4. *Hydroides norvegica.* (A) Tubes. (B) Entire worm (five times life size). (C) Operculum. (D) Bayonet-seta from collar. (E) Normal thoracic capillary. (F) Thoracic uncinus. (G) Abdominal neuroseta. *Hydroides uncinata.* (H) Operculum. (I) Part of bayonet-seta. *Hydroides lunulifera.* (J) Part of bayonet-seta. (K) Operculum. *Hydroides heteroceros.* (L) Operculum. *Hydroides ralumiana.* (M, M¹) Operculum. (N) Part of bayonet-seta. *Hydroides monoceros.* (O) Operculum. (P) Part of bayonet-seta. *Hydroides bifurcata.* (Q, Q¹) Operculum. (R) Part of bayonet-seta. *Hydroides diploma.* (S) Operculum. (T) Opercular spine.

Hydroides lunulifera (Claparède, 1868)
(fig. 38.4.j–k)

Eupomatus lunulifera Claparède, 1868: 441, pl. 31 fig. 3.
Hydroides lunulifera: Fauvel, 1927: 358, fig. 122 p–s.

Body about 20 mm. long. Opercular funnel (fig. 38.4.k) radially symmetrical with about 40 radii having incurving pointed tips. Opercular crown of 10–14 similar horny spines, each smooth, rather flattened and of uniform width except at the end which is abruptly expanded like a very broad T or crescent moon. Tube stout, rugose, often adnate. Bayonet setae (fig. 38.4.j) with a pair of simple blunt bosses at the base of the smooth blade.

Type locality: Italy.

Records: Natal (29/31's).

Distribution: Mediterranean; Suez Canal; Madras (i).

Hydroides ralumiana Augener, 1927
(fig. 38.4.m–n)

Hydroides (Eupomatus) ralumianus Augener, 1927: 150, fig. 5; Fauvel, 1947: 85.

A small species about 10 mm. long with a bi-ridged tube. Opercular funnel (fig. 38.4.m) almost symmetrical with 25–30 short pointed radii. Opercular crown with 8–10 unequal hooks all curving inward like a clenched fist. The two to three largest hooks are smooth and curve over the others but the seven to eight smaller ones each have an external knuckle-like projection at the point of inflection. There may be smaller basal spinules. Bayonet setae (fig. 38.4.n) with a pair of simple bosses at the base of the smooth blade.

Type locality: New Pomerania.

Records: Mocambique (26/32 i, 24/34's, and 23/35's).

Distribution: Pacific (New Pomerania and New Caledonia).

Hydroides heteroceros (Grube, 1868)
(fig. 38.4.l)

Serpula (Eupomatus) heteroceros Grube, 1868: 639.
Hydroides heteroceros: Pixell, 1913: 75, pl. 8 fig. 2 a–c; Fauvel, 1953: 459, fig. 24.C.
Serpula (Hydroides) uncinata: (non Philippi) Gravier, 1902: 114, pl. 8 figs. 286–7, text-figs. 463–466.

Body up to 40 mm. long: tube thick and rugose with faint longitudinal ridges. Opercular funnel (fig. 38.4.l) composed of 30–50 radii whose tips are T-shaped with a pair of lateral points. Opercular crown with seven to nine inwardly curving spines. One spine is larger than the rest and is shaped like a plain hook without lateral spines. The others have a pair of lateral spines and a single inwardly directed spine near the base. Branchiae with 16–18 radioles ending in long naked tips. Collar large and incised laterally; ventral lobe entire. Collar setae include stout

bayonet setae with a pair of plain, blunt bosses at the base of the tapered blade and slender forms without obvious blades. Notosetae of setigers 2–6 as normal capillaries. Thoracic uncini with five to seven teeth. Abdominal uncini with six to seven teeth. Abdominal capillaries with tranvesrely expanded and serrated tips.

Type locality: Red Sea.

Records: Madagasdar (25 46 s).

Distribution: Tropical Indian Ocean (i, s).

Hydroides monoceros Gravier, 1908
(fig. 38.4.o–p)

Serpula Hydroides monoceros Gravier, 1906a: 115, pl. 8 fig. 288, text-figs. 467-472.

Body about 20 mm. long. Opercular funnel (fig. 38.4.o) oval and slating and composed of 16–20 stout, pointed radii of unequal size. Opercular crown of six to eight small spines and one very large dark hook with a pair of hooklets at its tip. Collar incised laterally. Collar setae include fine capillaries and bayonet setae (fig. 38.4.p) with a pair of plain bosses at the base of the smooth blade. Thoracic uncini with five to seven teeth and an obvious gouge. Tube stout, rugose and adnate.

Type locality: Red Sea.

Records: Mocambique (26 32 i).

Distribution: Red Sea (i); India; Ceylon; Zanzibar; Mocambique Is.; Gambier (S. Pacific)

Hydroides bifurcata (Pixell, 1913)
(fig. 38.4.q–r)

Eupomatus bifurcatus Pixell, 1913: 78, pl. 8 fig. 5.
Hydroides bifurcata: Day, 1951: 64, fig. 8 f–g.

Body about 30 mm. long. Opercular funnel (fig. 38.4.q) of 40 pointed radii. Opercular crown of one enlarged hook and 10 smaller equal spines (fig. 38.4.q[1]) each ending in a double hook whose divergent prongs both point outwards and each with an inwardly directed spinule at the base. Each branchial lobe with about 20 radioles. Collar deeply incised laterally with a small fillet in the notch. Bayonet setae (fig. 38.4.r) with four bosses at the base of the blade, two larger and two smaller.

Type locality: Indian Ocean.

Records: Natal (29 31 i.); Mocambique (26 32 i).

Distribution: Tropical Indian Ocean.

Hydroides dipoma (Schmarda, 1861)
(fig. 38.4.s–t)

Eupomatus dipoma Schmarda, 1861 : 29, pl. 21 fig. 177.
Eupomatus spinosus Pixell, 1913 : 78, pl. 8 fig. 5.

Body about 30 mm. long. Opercular funnel (fig. 38.4.s) slightly oblique with 30–40 long, pointed radii. Opercular crown with nine to eleven tall spines including one enlarged hook and eight or 10 smaller spines each with a terminal double hooklet of which one prong points inward and one outwards (fig. 38.4.t). An inwardly directed spinule or curved lobe may be present at the base of each spine. Each branchial lobe with 10–14 radioles ending in short tips. Collar entire and edged with brown, the thorax red with black bars marking the uncigerous rows. Collar setae include a few fine capillaries and numerous bayonet setae with smooth blades and a pair of simple bosses at the base. Thoracic uncini with six to seven teeth in a single row. Tube stout and rugose.

Type locality : Cape of Good Hope.

Records : Cape (from 33/18/i to 34/18/i, s and 33/26/i, s).

Distribution : Mediterranean ; Senegal ; Angola.

SERPULA Linnaeus, 1758

Body symmetrical with seven thoracic setigers and numerous abdominal ones. Operculum funnel-shaped and soft with marginal serrations formed by the ends of numerous fused radii. Opercular stalk smooth. Collar setae include capillaries and bayonet setae with two to four conical bosses at the base of a hispid blade. Subsequent thoracic notoseate are plain limbate capillaries. Uncini with only a few large teeth in a single row. Abdominal capillaries trumpet-shaped or T-shaped.

Type species : *Serpula vermicularis* Linnaeus, 1767 ("designated" Hartman, 1959: 592).

Serpula vermicularis vermicularis Linnaeus, 1767
(fig. 38.5.a–h)

Serpula vermicularis Linnaeus, 1767 : 1266 ; Fauvel, 1927 : 351, fig. 120 a–q.

Body up to 70 mm. long. Operculum (fig. 38.5.a) a deep symmetrical funnel formed about 40 fused radii with blunt tips. Thirty to forty branchial radioles in a semi-spiral united by an oblique web for about one-fifth of their length. Collar trilobed with a small fillet in the lateral notch. Thoracic membranes extend the full length of the thorax. Collar setae include fine capillaries (fig. 38.5.c) plus stout bayonet setae (fig. 38.5.b) which have two bosses at the base of the blade. Thoracic uncini (fig. 38.5.g) with six teeth of increasing size in a single row. Abdominal uncini similar in shape but with four to eight teeth. Most abdominal neurosetae (fig. 38.5.f) have shafts with a denticulate blade set transversely to form a rough T.

Neurosetae at the end of the abdomen (fig. 38.5.e) are slender wingless capillaries with curved tips. Tube (fig. 38.5.h) circular in section often ridged externally.

TYPE LOCALITY: Western Europe.

RECORDS: Cape (from 32°18'd to 34°20'i, s and 34°23'e, s, d, to 32°28 i); Natal (29°31 i); Mocambique (26°32 i).

DISTRIBUTION: Cosmopolitan (i, s, d).

Serpula vermicularis echinata Linnaeus, 1788
(fig. 38.5.i)

Serpula echinata Linnaeus, 1788: 3744.
Serpula vermicularis echinata: Fauvel, 1927: 352.

Generally similar to the nominate form but the tube (fig. 38.5.i) has five to seven longitudinal ridges bearing recurved teeth.

TYPE LOCALITY: Mediterranean Sea.

RECORDS: Cape (34°18 s and 34°21 s).

DISTRIBUTION: Mediterranean.

FICOPOMATUS Southern, 1921

Body symmetrical with seven thoracic and numerous abdominal segments. Operculum pear-shaped to conical, soft or chitinous but without spines. Opercular stalk without wings. Collar setae include some with a toothed boss at the base of the blade and others with simple serrated blades. Subsequent thoracic notosetae are limbate capillaries, there being no setae of *Apomatus* with denticulate tips. Uncini with relatively few large teeth in a single row. Abdominal capillaries have geniculate toothed blades.

TYPE SPECIES: *Ficopomatus macrodon* Southern, 1921.

KEY TO SPECIES

1 Thoracic membranes reach past setiger 7. Operculum fig-shaped . . . ***F. macrodon****
– Thoracic membranes stop at setiger 3. Operculum an elongate cone (fig. 38.5.j) . ***F. capensis***

Ficopomatus capensis Day, 1961
(fig. 38.5.j–n)

Ficopomatus capensis Day, 1961: 552, fig. 17 h–n.

Body 15 mm. long. Tube adnate and triangular in section. Operculum (fig. 38.5.j) an elongate chitinous cone without internal septa. Collar deeply incised laterally and the dorsal lobes extend back as thoracic membranes which end at setiger 3 so that there is no free ventral membrane at the end of the thorax. Collar setae of two types: a) large setae (fig. 38.5.k) with stout shafts and a boss with three

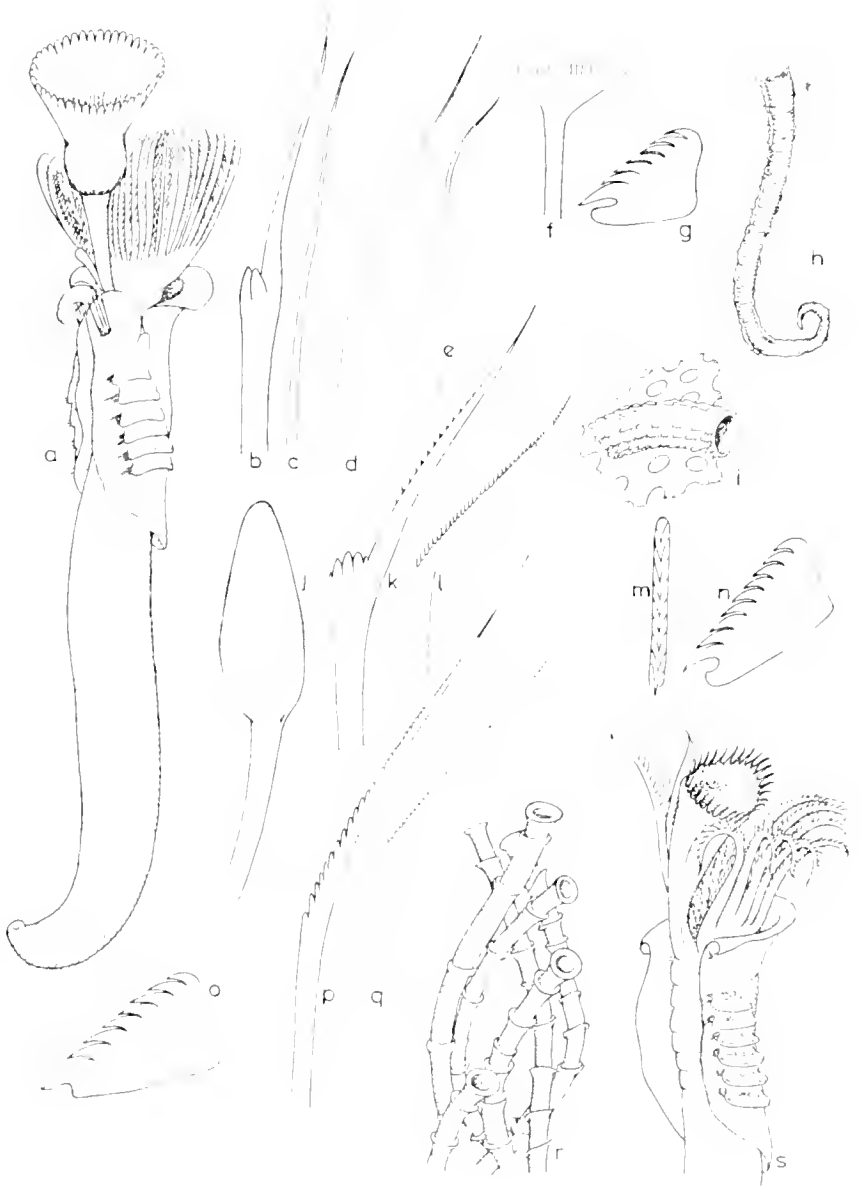

FIG. 38.5. *Serpula vermicularis*. (A) Entire worm (five times life size). (B) Bayonet-seta. (C) Slender collar seta. (D) Normal thoracic capillary. Capillary from end of abdomen. (E) Abdominal T-shaped neuroseta. (G) Thoracic uncinus. (H) Tube. *Serpula vermicularis echinata*. (I) Part of tube attached to *Retepora*. *Ficopomatus capensis*. (J) Operculum. (K) Bayonet-seta. (L) Abdominal capillary. (M, N) Thoracic uncinus. *Mercierella enigmatica*. (O) Thoracic uncinus. (P) Stout type of collar seta. (Q) Abdominal capillary. (R) Tubes. (S) Anterior end.

to five teeth at the base of the narrow serrated blade, (b) slender geniculate setae with hispid blades. Notosetae of setigers 2–7 are normal limbate capillaries. Thoracic uncini (fig. 38.5.m, n) with a single row of eight teeth the last of which extends beyond the blunt recurved basal prow. Abdominal capillaries (fig. 38.5.l) are geniculate with minutely toothed blades.

Type locality: Agulhas Bank, South Africa.

Records: Cape (34 21 s).

Distribution: A single record only.

MERCIERELLA Fauvel, 1923

Operculum saucer-shaped and crowned with concentric rows of horny spines. Opercular stalk wingless. Collar setae include fine capillaries and others with toothed bases. Subsequent thoracic notosetae are limbate capillaries. Uncini with a few teeth in a single row, the first being enlarged and gouge-like. Tube cylindrical with a series of rings representing earlier trumpet-shaped mouths.

Type species: *Mercierella enigmatica* Fauvel, 1923b.

Mercierella enigmatica Fauvel, 1923
(fig. 38.5.o–s)

Mercierella enigmatica Fauvel, 1923b: 424, fig. 1; Fauvel, 1927: 360, fig. 123 a–o.

Body up to 25 mm. long. Branchial lobes each with six to ten stout radioles ending in naked tips. Operculum (fig. 38.5.s) oblique, concave and edged with about 25 dark chitinous spines.* Opercular stalk smooth and triangular in section. Collar large, reflected back but not incised. Collar setae include fine capillaries and numerous stout forms (fig. 38.5.p) with blunt teeth set in two rows along the tapered blades. Subsequent thoracic notosetae are capillaries with finely hispid blades. Uncini (fig. 38.5.o) with a gouge and a single row of five to seven teeth. Abdominal neurosetae (fig. 38.5.q) are geniculate capillaries with denticulate blades. Tube (fig. 38.5.r) cylindrical with a trumpet-shaped mouth and the position of earlier mouths is shown by a series of rings. Twisted masses of tubes are attached to hard substrata in estuaries.

Type locality: Caen, France.

Records: Cape (from 33/18/e to 32/28/e); Natal (from 30/30/e to 28/32/e).

Distribution: World wide in warm estuaries.

VERMILIOPSIS Saint-Joseph, 1894

Operculum a cylindrical or conical horny cap with internal septa. Opercular stalk without wings. Collar setae are limbate capillaries. Body of seven thoracic

*Fauvel described the European form as having three rows of spines.

setigers and numerous abdominal ones. Thoracic notosetae include limbate capillaries and setae of *Apomatus* with distally toothed blades. Thoracic uncini with a single row of teeth, the first of which is enlarged and blunt. Abdominal capillaries are geniculate with toothed blades.

TYPE SPECIES: *Serpula infundibulum* Linnaeus, 1788.

KEY TO SPECIES

1 Thoracic membranes stop at setiger 2 (fig. 38.6.a) 2
– Thoracic membranes continue past setiger 2 3
2 Operculum smoothly conical with numerous (10–20) septa. Tube with four to five low longitudinal ridges . . . . . ***V. pygidialis****
– Operculum not smooth but with about five steps corresponding to the septa. Tube with three denticulate ridges (fig. 38.6.f) . . . . . ***V. babylonia***
3 Thoracic membranes continue to setiger 5. Operculum bluntly conical with three to four internal septa (fig. 38.6.i) . . . . . ***V. glandigerus***
– Thoracic membranes continue to setiger 7. Operculum terminating in a point (fig. 38.6.k) ***V. acanthophora****

***Vermiliopsis babylonia* sp. nov.**
(fig. 38.6.a–f)

Vermiliopsis pygidialis: (non Willey) Day, 1961: 532.

Body pale, about 4 mm. long. Tube (fig. 38.6.f) sinuous, attached throughout and with three well marked longitudinal ridges each bearing a series of rectangular teeth. Operculum (fig. 38.6.a) like the tower of Babylon with seven successive cylindrical towers each with vertical walls and steps with an outer flange marking the position of the internal septa. All but the youngest or basal annulus are yellow and heavily chitinised. Branchial lobes each with seven radioles. Collar apparently continuous laterally and ventrally but with a dorsal gap. The sides of the collar continue as rounded flaps to setiger 2. Collar setae (fig. 38.6.b) are four limbate capillaries and four smaller slender capillaries. Later thoracic notosetae are limbate capillaries plus two to three setae of *Apomatus* (fig. 38.6.c) in each of the last four bundles with the blade abruptly narrowed and toothed for most of its length. Thoracic uncini (fig. 38.6.e) with a single series of 11 teeth and a well marked gouge. Holotype: B.M. (N.H.) Reg. No. 1966. 26.8.

TYPE LOCALITY: Vema Sea Mount (32° S, 10° E).

RECORDS: Cape (32 10 s; 34 18 s).

Vermiliopsis glandigerus Gravier 1908,
(fig. 38.6.g–i)

Vermiliopsis glandigerus Gravier, 1908: 121, pl. 8 figs. 290–291, text-figs. 476–481.

Length 25 mm. Operculum (fig. 38.6.i) ovoid to conical, horny and with three to four septa internally but smooth on the surface. Collar deeply incised laterally to form a square ventral lobe and a pair of large lateral ones which continue back as thoracic membranes to end at setiger 5. Collar setae are long, limbate capillaries

and fine capillaries. Subsequent thoracic notosetae are of three types: (a) elongate limbate capillaries (b) setae of *Apomatus* with the distal three-quarters of the blade very finely toothed and (c) very fine wingless capillaries. Thoracic uncini (fig. 38.6.h) are quadrangular plates with 13–14 teeth preceding the enlarged rectangular terminal tooth. Abdominal neurosetae (fig. 38.6.g) are finely toothed geniculate capillaries and, in posterior segments, very elongated capillaries. Tube cylindrical, slightly rugose.

TYPE LOCALITY: Djibouti, Gulf of Aden.

RECORDS: Cape (from 33 17 S and 34 18 E, S, D to 32 28 E).

DISTRIBUTION: Western Africa (Annobon Is.); Red Sea (S); tropical Indian Ocean, (E, S, D); Tasmania (D).

Vermiliopsis acanthophora Augener, 1914
(fig. 38.6.j–k)

Vermiliopsis acanthophora Augener, 1914: 155, pl. 1 figs. 122–124, text-fig. 19; Fauvel, 1953: 467, fig. 243 c–e.

Length 20 mm. Tube (fig. 36.6.j) sinuous, attached throughout, surface with four low ridges and marks of successive apertures. Opercular stalk broad, often wrinkled; operculum a short broad cone (fig. 38.6.k) with three to four external ridges and often a terminal thorn-like spike. No internal septa. Collar with a large ventral and two lateral lobes which continue back as thoracic membranes to the end of the thorax (setiger 7) but are not continuous across the ventrum. Collar setae are limbate capillaries. Subsequent thoracic notosetae include smooth-bladed capillaries and setae of *Apomatus* with three-quarters of the blade minutely toothed. Thoracic uncini with about nine to ten teeth and a terminal gouge. Abdominal neurosetae geniculate with minutely toothed blades. A glandular patch at the end of the abdomen.

TYPE LOCALITY: Sharks Bay, Western Australia.

RECORDS: Not recorded from southern Africa.

DISTRIBUTION: Tropical Indian Ocean (Mombasa (E)); Ceylon (E); Western Australia (E).

NEOVERMILIA Day, 1961

Body symmetrical with seven thoracic and numerous abdominal setigers. Operculum spherical or funnel-shaped; opercular stalk without wings. Branchial lobes sometimes spiral. Collar setae are limbate capillaries similar to those of the following thoracic segments. No setae of *Apomatus*. Thoracic uncini with a few large teeth in a single row. Abdominal neurosetae are geniculate capillaries with finely toothed blades.

TYPE SPECIES: *Neovermilia capensis* Day, 1961.

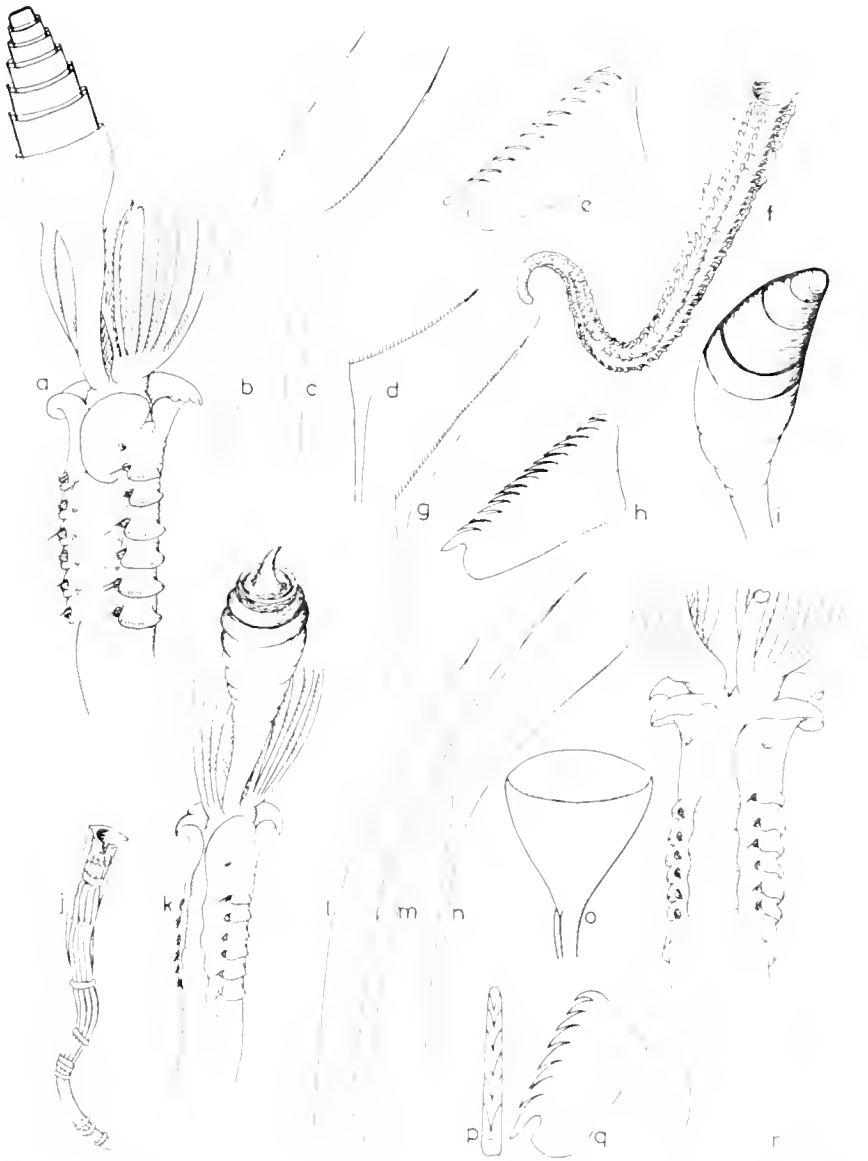

Fig. 38.6. *Vermiliopsis babylonia* n.sp. (A) Anterior end. (B) Limbate collar seta. (C) Seta of *Apomatus*. (D) Abdominal capillary. (E) Thoracic uncinus. (F) Tube. *Vermiliopsis glandigerus*. (G) Abdominal capillary. (H) Thoracic uncinus. (I) Operculum. *Vermiliopsis acanthophora* (modified from Augener, 1914). (J) Tube. (K) Anterior end. *Neovermilia capensis*. (L) Collar seta. (M) Thoracic winged capillary. (N) Abdominal capillary. (O) Operculum. (P, Q) Thoracic uncinus. (R) Anterior end.

KEY TO SPECIES

1 Operculum spherical . . . . . ***N. falcigera****
Operculum funnel-shaped (fig. 38.6.o) . . . . . ***N. capensis***

Neovermilia capensis Day, 1961
(fig. 38.6.l–r)

Neovermilia capensis Day, 1961 : 551, fig. 17 a–g.

Length up to 30 mm. Operculum (fig. 38.6.o) a smooth, shallow funnel without radii. Opercular stalk smooth and wingless. Branchial lobes spiral with four whorls of radioles. No palps. Collar (fig. 38.6.r) widely open dorsally, incised laterally and forming a ventral lobe and two lateral lobes which continue back as thoracic membranes to the end of the thorax and unite ventrally. Collar setae (fig. 38.6.l) smaller than subsequent notosetae and have narrower blades. Notosetae of setigers 2–7 with rather broader blades (fig. 38.6.m). No setae of *Apomatus*. Thoracic uncini (fig. 38.6.p, q, quadrangular with a single series of seven teeth of decreasing size above the main fang. Abdomen with about 60 segments. Abdominal neurosetae are geniculate capillaries with finely toothed blades (fig. 38.6.n). Tube unknown.

TYPE LOCALITY : False Bay, South Africa.

RECORDS : Cape (34 18 s).

DISTRIBUTION : A single record.

Subfamily **FILOGRANINAE** Rioja, 1923

Body symmetrical with five to twelve thoracic segments. Prostomium sometimes distinct and may bear eyes. Palps sometimes present. Operculum either absent or poorly developed with the stalk bearing lateral pinnules similar to those of other radioles. Thoracic uncini may have more than one row of teeth.

Records from southern Africa

Filograna implexa Berkeley	41Ci, 51Csd
as *Salmacina dysteri* (Huxley)	26Ai
as *Salmacina dysteri* var. *incrustans* Claparède . .	10Ni
Protula bispiralis (Savigny)	38Ci, 35Ci, 51Cs
as *Protula tubularia* var. *capensis* (non McIntosh) .	13Ci
Protula tubularia (Martini)	15Ni, 51Csd
as *Protula capensis* McIntosh	10Cd
Protula tubularia anomala Day	41Ci

THE MAIN DIAGNOSTIC CHARACTERS

The operculum may be entirely absent as in *Protula* or formed by a slightly modified radiole which retains pinnules on its stalk but becomes expanded at its apex to form a soft globular or cup-shaped structure. The operculum is never large or calcified

and in *Filograna* which reproduces by fragmentation the common growth phase lacks an operculum and has been regarded as a separate genus (*Salmacina*) even though it occurs in the same colony with the operculate form (*Filograna*).

Thorax. The number of thoracic setigers varies from five to twelve in different genera and in *Filograna* the number varies from one individual of a colony to another.

Setae. Collar setae are always present and may be represented by simple capillaries or limbate capillaries with a dentate fin at the base of the blade. Subsequent thoracic notopodia often have setae of *Apomatus* among the smooth-bladed capillaries particularly in posterior segments. Uncini are provided with one to four rows of numerous small teeth and an elongated terminal gouge. In the genus *Protula* they may be lacking not only from the collar segment but the next two to three segments as well. Abdominal uncini are similar to those of the thorax and abdominal capillaries are geniculate with finely serrated blades but become more elongate and often smooth towards the end of the abdomen.

Key to Genera

1 Five thoracic setigers. Operculum vase-shaped with strengthening ribs . ***JOSEPHELLA****
– More than five thoracic setigers. Operculum either absent or membraneous . . . 2
2 Collar setae with a dentate lobe at the base of the blade. (Operculum either absent or cup-shaped. Animal gregarious forming interlacing tubes) . ***FILOGRANA*** (p. 817)
– Collar setae are narrow-bladed capillaries without a dentate lobe 3
3 Operculum a globular vesicle . . . . . ***APOMATUS****
– Operculum absent . . . . . ***PROTULA*** (p. 818)

FILOGRANA Berkeley, 1835

Small gregarious worms whose twisted tubes form a lacy coralliform mass. Body symmetrical with six to twelve thoracic setigers and about 20 abdominal ones. Branchial lobes with few radioles which are not united by a basal web. The dorsal pair of radioles retain their pinnules but sometimes bear cup-shaped membraneous opercula at their ends. Two palps. A prominent prostomium with a pair of eyespots. A well developed collar. Collar setae with a dentate expansion at the base of the blade. Uncini rectangular with two to fourr ows of teeth and an enlarged terminal tooth or gouge. Abdominal capillaries geniculate with minutely dentate blades.

Type species: "*Serpula implexa* Turton" (Berkeley, 1835) = *Serpula compleva* Turton, 1819.

Filograna implexa Berkeley, 1835
(fig. 38.7.a–h)

Serpula filograna Linnaeus, 1766: 1265; Berkeley, 1828: 230, pl. 18 fig. 3.
Serpula compleva Turton, 1819: 153.
Filograna implexa Berkeley, 1835: 427; Fauvel, 1927: 376, fig. 129 a–b.
Protula dysteri Huxley, 1855: 113, figs. 1–11.
Salmacina dysteri; Fauvel, 1927: 377, fig. 129 c–k.

Body (fig. 38.7.c) about 4 mm. long with 25–35 setigers and pink when alive. Branchial lobes each with four radioles of which the dorsal one on each side may end in a small bivalve operculum (fig. 38.7.f). In the *Salmacina* form opercula are absent. Collar setae include normal capillaries and geniculate forms with a dentate expansion at the base of the blade (fig. 38.7.g). Subsequent thoracic notosetae include smooth-bladed capillaries (fig. 38.7.h) and setae of *Apomatus* (fig. 38.7.i) with finely toothed blades. Thoracic uncini (fig. 38.7.d, e) with two to four rows each with six teeth and a large terminal tooth or gouge. Abdominal capillaries (fig. 38.7.j) geniculate with dentate blades. The worms are gregarious and reproduce asexually by transverse fission, young forms having few segments and large ones up to 12 thoracic setigers. They commonly occur in large coralliform masses (fig. 38.7.a) formed of anastomosing bundles of tubes (fig. 38.7.b).

Type locality: Weymouth, England.

Records: Cape (from 29 16 i to 34 23 i, s, d and 32 28 i).

Distribution: Atlantic from Greenland (d) and Sweden (d) south to New England (i), the Gulf of Mexico (s) and tropical western Africa (i, s); Mediterranean (s); Red Sea; India; S.W. Australia (s); Tasmania (d); New Zealand (s); Japan.

PROTULA Montagu, 1804

Body symmetrical with seven thoracic and numerous abdominal segments. No operculum. Branchial lobes flat or spiral with several whorls of radioles. Thoracic membranes continue to the end of the thorax and form a free flange ventrally. Collar setae as simple capillaries. Subsequent thoracic notosetae include limbate capillaries and sometimes setae of *Apomatus*. Uncini with numerous teeth and long slender gouge. Abdominal neurosetae are dentate capillaries with either sickle-shaped or bayonet-shaped blades. Tube cylindrical, often erect.

Type species: *Protula tubularia* Martini, 1776.

Key to Species

1 Branchiae spiral with a central axis and three to ten whorls of radioles . . . ***P. bispiralis***
– Branchiae not spiral, no central axis 2
2 Dentate-bladed abdominal capillaries with a notch at the base of the blade
P. tubularia anomala
– Dentate-bladed abdominal capillaries without a notch at the base of the blade ***P. t. tubularia***

Protula bispiralis (Savigny, 1820)
(fig. 38.7.k–n)

Serpula bispiralis Savigny, 1820: 75.
Protula bispiralis: Fauvel, 1922: 408, fig. a–f; Day, 1957: 449.

A large species reaching a length of 180 mm. and with red gills. Branchial lobes (fig. 38.7.m) spiral with a central axis and three to ten whorls of radioles united by a

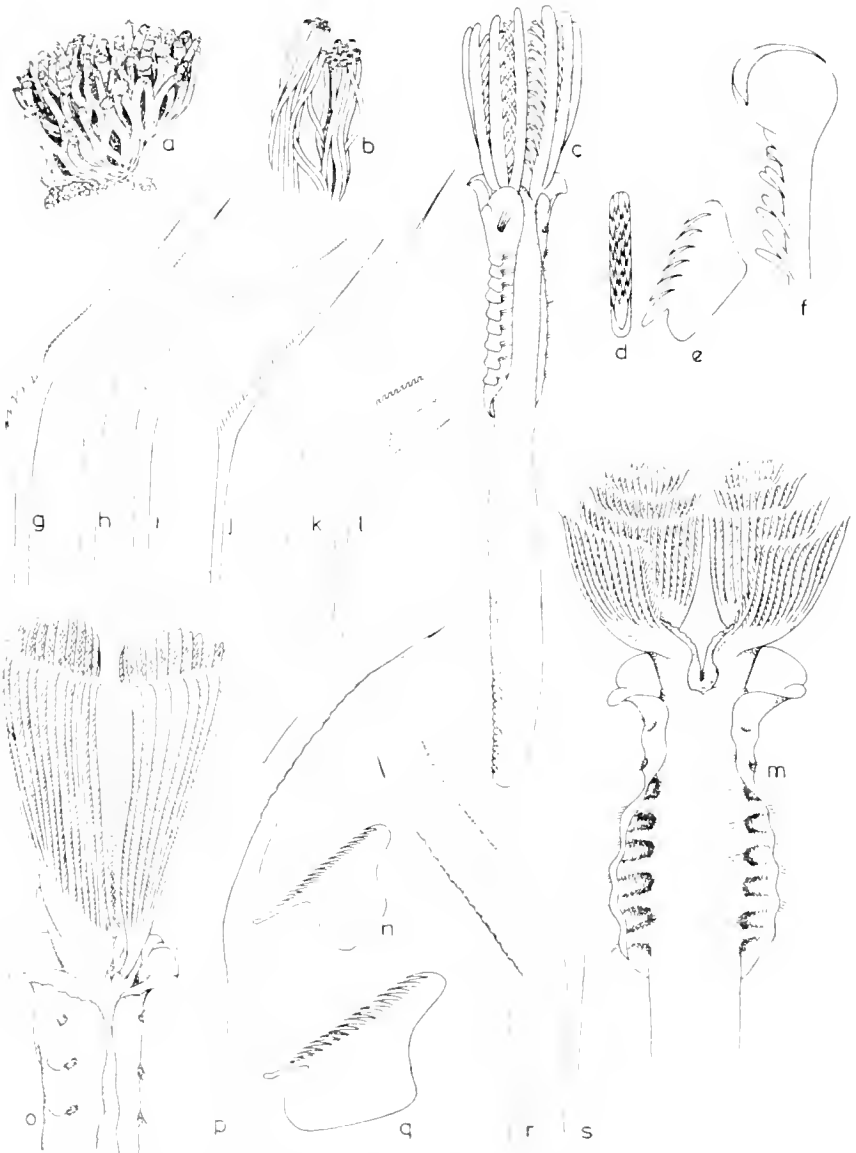

Fig. 38.7. *Filograna implexa.* (A) Colony (natural size). (B) Part of same showing individual tubes. (C) Entire worm (30 times life size). (D, E) Thoracic uncinus. (F) Operculum of *Filograna* form. (G) Collar seta. (H) Thoracic winged capillary. (I) Seta of *Apomatus.* (J) Abdominal capillary. *Protula bispiralis.* (K) Thoracic capillary. (L) Abdominal capillary. (M) Anterior end. (N) Thoracic uncinus. *Protula tubularia.* (O) Anterior end. (P) Seta of *Apomatus.* (Q) Thoracic uncinus. R) Abdominal capillary. *Protula tubularia anomala.* (S) Abdominal capillary.

web for one-third their length. Collar incised ventro-laterally forming two lateral lobes and a median ventral one. Thoracic membranes strengthened at segmental intervals. Thoracic notosetae are all smooth-bladed capillares (fig. 38.7.k) and setae of *Ipomatus* are absent. Uncini (fig. 38.7.n) with a single row of 15–20 teeth; they are lacking from the first three thoracic setigers. Abdominal capillaries (fig. 38.7.l) with finely dentate blades. Tube rugose mainly adnate.

Type locality: Indian Seas.

Records: Cape (from 34 18 i, s to 32 28 i).

Distribution: Indian Ocean.

Protula tubularia tubularia (Montagu, 1803)
(fig. 38.7.o r)

Serpula tubularia Montagu, 1803: 513.
Protula tubularia: Fauvel, 1927: 382, fig. 130 a l.

Length up to 50 mm. Branchial lobes (fig. 38.7.o) semi-circular with a single whorl of long, widely flanged radioles. Collar incised ventro-laterally to form a ventral and two lateral lobes. Thoracic notosetae are smooth-bladed capillaries in the first three to four segments and smooth-bladed capillaries plus setae of *Ipomatus* in the remainder. Individual setae of *Ipomatus* (fig. 38.7.p) with a frilly edge bearing very minute teeth. Uncini (fig. 38.7.q) with a single row of 20–25 teeth; the first row is on setiger 3 or 4. Blades of abdominal capillaries (fig. 38.7.r) dentate and frilly but smoothly continuous with the shaft.

Type locality: England.

Records: Cape (31 16 d and 35 18 d); Natal (29/31 s).

Distribution: Atlantic from Greenalnd (d) and Scotland (s) south to the English Channel (s), the Gulf of Mexico (d), Morocco (s, d) and Senegal (s); Mediterranean (s); Indian Ocean; New Caledonia; Japan.

Protula tubularia anomala Day, 1955
(fig. 38.7.s)

Protula tubularia var. *anomala* Day, 1955: 449, fig. 8 l–m.

This is a small form about 15 mm. long which is generally similar to the stem form but has a notch at the base of the dentate blade of the abdominal capillaries (fig. 38.7.s).

Type locality: Langebaan Lagoon, South Africa.

Records: Cape (33 18 i and 34 23 i).

Distribution: No other records.

GLOSSARY OF TECHNICAL TERMS

abdomen	the posterior region of the body behind the thorax and sometimes followed by a caudal region or "tail"
achaetous	without setae
acicular seta	a very stout projecting seta homologous with other setae but similar in thickness to an internal aciculum (fig. 0.3.6.v)
aciculum(a)	a stout internal chitinous rod which supports each of the two lobes of a parapodium (fig. 0.3.1.c)
anal cirrus(i)	one or more elongated projections from the pygidium or terminal segment on which the anus opens
antenna	a sensory projection arising from the anterior or dorsal surface of the prostomium
apodous segment	a segment without a foot or parapodium
arborescent	branching like a tree
aristate seta	a stout seta with a smooth shaft and a tuft of fine hairs at the end (fig. 1.17.e)
auricular	ear-shaped
avicular (seta)	beaked (fig. 0.6.7.v)
biarticulate	two-jointed
bidentate (seta)	with two teeth (fig. 0.2.8.v)
bifurcate (seta)	ending in two prongs (fig. 0.5.4.d)
bilabiate	with two lips
bilimbate capillary	a pointed seta with two wings or flattened margins like a feather (fig. 0.6.6.d)
bipinnate	a structure such as a feather with a main axis and two rows of side branches (fig. 0.4.4.d)
biramous	having two rami or forks
biramous parapodium	a foot or parapodium with two bundles of setae, one in the notopodium and one in the neuropodium (see also uniramous) (fig. 0.3.1.c)
branchial crown	a circle of filaments (radioles) for filter feeding and respiration which arises from the head of a sabellid or serpulid worm
branchial vesicles	soft baggy papillae on the parapodia with a respiratory function (fig. 1.17.i)
buccal	pertaining to the mouth
buccal tentacles or cirri	elongate or finger-shaped food gathering appendages either in or around the mouth (fig. 0.6.6.B)
calicinate	like the calyx of a flower
canaliculate	with fine canals
capillary	hair-like
capillary seta	strictly a hair-like bristle but often used to cover all long slender tapering setae (see types of notosetae shown in fig. 0.4)
caruncle	a sensory lobe extending behind the prostomium (figs. 0.2.2.b and 3.b)
caudad	towards the tail
cephalic cage	long, forwardly directed setae which enclose and protect the head (fig. 0.6.2.b)
cephalic rim	a flange encircling the head (fig. 0.5.7.b)
cephalic veil	a delicate hood-like membrane in the family Pectinariidae which separates the opercular paleae from the buccal tentacles (fig. 0.6.4.b)

cephalisation	the modification and fusion of anterior segments to form a head
ceratostyle	the distal joint of an antenna (fig. 1.4.c)
chromatophil gland	a densely staining gland in the ventral pinnule of *Tomopteris* (fig. 0.3.3.c)
chromatophore	a special cell or group of cells carrying pigment
ceratophore	the basal joint of an antenna (fig. 1.4.c)
cirriform	shaped like a cirrus
cirrigerous (segment)	a segment bearing a cirrus
cirrophore	a basal projection on which a cirrus is mounted (fig. 0.2.1.c)
cirrostyle	the distal part of a cirrus (fig. 0.2.1.c)
cirrus	a sensory projection (usually tapered) derived from the superior part of the notopodium (dorsal cirrus) or the inferior part of the neuropodium (ventral cirrus) (fig. 0.3.2.c)
clavate	club-shaped
compound (seta)	a jointed seta
compressed	flattened in the lateral plane
copragogue	a groove along the posterior region of a tubicolous worm along which the faecal pellets pass before being voided from the tube
cordate or cordiform	heart-shaped (fig. 0.3.8.c)
crenulate (seta)	with a series of small cusps (fig. 0.4.7.d)
crotchet	a long-shafted seta with a hooked or curved end
ctenidium (a)	a branchia or respiratory organ
cultriform	shaped like a knife (see blade of seta, fig. 0.4.3.d)
deciduous	liable to fall off like a leaf
dentate	toothed
dentate-crested hooks	setae with the apex of the shaft toothed (e.g. fig. 0.5.7.v)
denticle	a structure like a minute tooth
denticulate	with minute teeth or denticles
depressed	flattened in the dorso-ventral plane
detritus	particles of organic origin on the sea bed
digitiform	finger-shaped
distal	the part of a structure towards the end
dorsum	the dorsal surface of the body
echinulate	prickly like a sea-urchin
elytrigerous segment	a segment bearing an elytron or scale
elytron (a)	a dorsale scale-like structure found in the Aphroditidae (fig. 1.3.a. and c)
elytrophore	a projection above a parapodium bearing an elytron
entire (margin)	smooth edged, i.e. without papillae or other projections
eversible (proboscis)	capable of being extended by turning the inner part outwards (e.g. fig. 0.3.8.b)
excision	a part cut out
facial tubercle	a projecting lobe on the upper lip below the prostomium (see projection below median antenna in fig. 1.1.r)
falciform	hook-shaped
falciger	a compound seta having a stout, hooked blade or apex
felt	matted hairs (setae) produced by the notopodia in some species of Hermoninae (fig. 1.1.n, o)
filamentous	shaped like a filament or fine thread
filiform	thread-like, very slender
flanged (seta)	an elongate seta with a flattened edge or margin (fig. 0.5.1.d)

foliaceous	leaf-like
frontal peak	antero-lateral, often chitinised projections of the prostomium found in some species of Polynoinae (see also prostomial peaks) (fig. 1.2.a)
fusiform	spindle-shaped or cigar-shaped
geniculate	bent like a knee
genital papilla	projection below the neuropodium on which a reproductive duct opens
glabrous	smooth and glistening
harpoon seta	a stout pointed seta with recurved barbs near the apex (fig. 1.1.g)
hastate	shaped like the blade of a spear
heterogomph (compound seta)	a compound seta with a slanting or asymmetrical joint between shaft and blade (fig. 0.3.2.d)
hispid	minutely furry
homogomph (compound seta)	a compound seta with transverse or symmetrical joint between shaft and blade (fig. 14.1.d, e, l)
hooded hook	a stout, blunt or apically toothed seta with the apex protected by a delicate chitinous envelope or guard (fig. 0.4.1.v)
hook	a broad term used to cover a wide range of simple setae which have stout shafts and blunt or toothed apices (e.g. figs. 0.4.1.v. 6.v, 7.v)
hyaline gland	a gland which occurs in the pinnules of certain species of *Tomopteris* and appears relatively transparent, sometimes with a yellow spot in the centre (see notopodium of fig. 8.2.k)
imbricating	overlapping like tiles
inferior	the more ventral of two structures
intermediate cirrus	a cirriform projection between the notopodium and the neuropodium (fig. 0.4.8.ca)
intersegmental	between segments
introvert	the anterior part of the body which can be withdrawn inwards
lamella	a flattened or plate-like structure
lanceolate	pointed and shaped like a lance
ligule	a compressed conical lobe of a parapodium (fig. 0.3.2.c)
limbate (seta)	a seta with a flattened margin to the blade (fig. 0.5.1.d)
mammiliform	shaped like a breast
medial	on the side nearer the median or mid-line of the body
median	in the mid-line
membraneous	thin and flattened like a membrane
metastomium	the segmented body of an annelid worm, i.e. the whole length between the prostomium and the pygidium
moniliform	like a string of beads
multiarticulate	with many joints (see antennae of fig. 0.2.5.b)
multidigitate	with many finger-like lobes or projections
neotenic	pertaining to a young or immature stage which reproduces sexually
nephridial papilla	a projection on which the excretory organ opens, usually posterior or ventral to the parapodium
neuropodium	the lower or ventral part of a parapodium
neuroseta	a seta arising from the neuropodium
notopodium	the upper or dorsal part of a biramous parapodium
notoseta	a seta arising from the notopodium

nuchal epaulette	a raised and elongated sensory organ projecting postero-lateral to the prostomium
nuchal organ	a sensory organ on the prostomium or extending back from it usually in the form of a groove or ciliated ridge
occipital	pertaining to the posterior part of the prostomium
occipital collar, fold or lappet	a prominent fold immediately overlapping the posterior part of the prostomium (fig. 1.3.g)
occipital papilla	a papilla found on the posterior margin of the prostomium of some species of *Phyllodoce* which represents a reduced median dorsal antenna (fig. 0.3.8.b)
ocular	pertaining to the eye
ocular peduncle	the projection supporting an eye (fig. 1.17.g)
ommatophore	see ocular peduncle
operculum	a lid or stopper which closes an opening; part of the head of a tubiculous polychaet which plugs the tube when the worm retracts
ovoid	egg-shaped
palea	a broad flattened type of seta (fig. 0.2.3.b, c, d)
palmate	like the fronds of a palm
palps or palpi	paired projections growing out from the sides of the head. In errant polychaetes they arise from the ventral surface of the prostomium and have a gustatory function but in sedentary polychaetes they arise from the peristome and are usually grooved and adhesive and pass food into the mouth
palpode	a tapering anterior projection of the prostomium (fig. 0.5.2.b)
palpophore and palpostyle	the basal and distal parts of a jointed palp (fig. 0.3.2.b)
papillose	with papillae
paragnaths	horny or chitinous granules in the pharyngeal cavity of the Nereidae which help to grip the prey
parapodial trunk	the proximal, undivided part of an elongate parapodium (fig. 0.3.3.b, c)
parapodium (a)	segmental, foot-like projections bearing setae
pectinate	with a series of projections arranged like the teeth of a comb (fig. 0.2.8.c)
penicillate	like a little paint brush
peristomium (peristome)	the segment behind the prostomium, which is modified to form part of the head and surrounds the mouth. Only the first segment forms the true peristomium but in the families Nereidae, Hesionidae and others the possession of more than two pairs of tentacular cirri shows that two or more segments have fused to form the head
pharynx	the posterior part of the mouth cavity leading on to the oesophagus
pilose	velvety; covered with very short hairs
pinnate	feather-like; with a main axis and lateral branches (fig. 1.18.s[1])
pinnules	a series of side branches of some feather-shaped organ (fig. 1.18.s[1])
piriform	with a broad bulbous base and tapered tip; onion-shaped
pluriarticulate	many jointed (see multiarticulate)
polygonal	many sided
postsetal	posterior to the setae
post-trochal	posterior to the prototroch of the trochophore larva
presetal	anterior to the setae
pretrochal	anterior to the prototroch
proboscis	the anterior part of the alimentary canal derived from the stomodaeum which can be everted to project forwards

prostomial peaks	chitinised antero-lateral projections of the prostomium of certain *Polynoinae* (fig. 1.2.a)
prostomium	the anterior lobe in front of the mouth bearing eyes and antennae
prototroch	the main girdle of cilia anterior to the mouth of trochophore larva which is responsible for locomotion
proximal	part of a structure nearer to the base or main body; cf. *distal*
pseudo-penicillate setae	setae of the family Polyodontinae intermediate between true penicillate forms with a terminal tuft of fine spinules and forms with hairy blades and tapering tip projecting beyond the tuft of spinules (fig. 1.17.l)
pygidial	pertaining to the anal segment or pygidium
pygidium	the anal segment or terminal part of the body
radiole	one of the main radii or tentacles on the head of a fan worm (Sabellidae or Serpulidae). The radioles normally bear two rows of side branches or pinnules (fig. 0.6.7.a)
ramose	branched
ramus	a branch or prong; the notopodium and neuropodium which form the two parts of a parapodium are often termed the two rami
receptaculum seminis	a female organ to contain received spermatozoa
reniform	kidney-shaped
retort organ	a clear club-shaped gland in the head of the Typhloscolecidae which opens on the roof of the buccal cavity
rhomboidal	irregularly four-sided
rosette gland	yellowish star-shaped glands in the pinnules of some species of *Tomopteris*. They are situated next to the apices of the parapodial rami (fig. 8.1.c)
ringent seta	a seta with a series of annular serrations on both prongs (fig. 3.1.x)
rostrum	the enlarged first tooth or main fang of a seta
rugose	rough or lumpy
sabre-like seta	a seta with a broad curved blade
scaphe	a flattened caudal appendage bearing the anus in *Pectinaria*
secondary tooth	the second of two teeth, the first being the apical or terminal one
segmental organ	organs occurring in segmental arrangement. In the Alciopidae they are swellings (often pigmented) at the bases of the parapodia
sesquiramous	a parapodium with a notopodium reduced to a dorsal cirrus, an aciculum and sometimes one or two setae (see also sub-biramous)
sessile	without a stalk
setal	pertaining to setae of bristles
setiger	a segment with setae
setigerous lobe	that projection or part of the notopodium or neuropodium which bears the setae
simple seta	an unjointed seta
spathulate	like a spathula; flattened, and blade-like with a blunt tip
spindle-shaped	clipsoid; cigar-shaped with pointed ends
spiniger or spinigerous (seta)	a compound seta whose blade tapers to a fine point (fig. 0.2.4.v)
spinning gland	a modified setigerous gland opening between the notopodium and neuropodium of *Polyodontinae* which produces the chitinous threads of which the tube is made
spinous pocket	an enlarged serration on a seta, e.g. in *Scalisetosus* (Polynoinae) whose edge is divided into spinules which surround a pocket-like cavity (fig. 1.7.j)
spinule	a small spine

spinulose	provided with spinules
spirally-serrulate (seta)	a seta whose blade is encircled with spirally arranged serrations (fig. 1.17.n)
spur-gland	a gland found in some species of *Tomopteris* whose pointed end projects from the edge of the pinnule usually next to the chromophil gland (fig. 8.1.c)
striae	very fine parallel marks or lines
striated	with striae
stylet	a small pointed, tooth-like structure
stylode	a botanical term here used to mean a finger-like projection usually on a parapodium (fig. 1.18.r)
sub-biramous	a parapodium which is neither completely uniramous nor biramous
subequal	approximately equal
subspiral	approximately spiral
subterminal	almost at the end
subtriangular	approximately triangular
subuate	an elongate, blunt and tapering projection
subuluncini	setae with a stout shaft suddenly tapering to a slender tip intermediate between capillaries and uncini (fig. 23.2.e)
superior	the more dorsal of two structures
telotroch	the ciliated girdle around the anus of a trochophore larva
tentacle	a slender outgrowth from the head
tentacular cirrus	a cirrus arising from the peristome which is elongated to act as a tactile organ (fig. 0.3.8.b)
tentacular formula	a series of letters and numbers used to indicate the arrangement of the tentacular cirri and setae in the Phyllodocidae and Alciopidae
tentaculophore	the basal projection on which a tentacle is mounted (fig. 0.3.1.b)
tessellated	a surface with a network of grooves like a tiled wall (fig. 0.5.6.b)
thorax	the anterior region of the body
tori of parapodia	ridges from which the setae arise (see neuropodium of fig. 0.5.6.c)
trochophore larva	the larval stage of an annelid or mollusc which develops from the gastrula
truncate	with the end cut off; not tapering
uncigerous	bearing uncini
uncinus	a general term used to cover sharp claw-like setae; they may be square or oval plates with several curved teeth or S-shaped with a single tooth and a broad base (e.g. fig. 0.6.3.d, 4.v, 5.v, 6.v, 8.av)
uniramous	with a single lobe or prong where two might be expected; the opposite of biramous. (Uniramous parapodia lack one of the two setigerous lobes)
urite	a projection from the anal segment or pygidium
ventrum	the ventral surface of the body
winged capillary seta	a simple, unjointed seta whose blade has an axial rib but the margins are flattened and tapering (fig. 0.6.6.d)

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