

The Coastal Invertebrate Fauna of
Surtsey and Vestmannaeyjar

by

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Introduction

As soon as an island arose above the sealevel SW off Vestmannaeyjar in 1963, zoologists began to think of how and when the coastal fauna would be transported to the shore of the island. Already in 1964 zoologists began to survey the littoral zone of Surtsey, but no settling of animals was observed until the summer 1967.

In the beginning of August 1967 Dr. Sigurdur Jónsson and Mr. Sigurdur Hallsson found Balanus and Hydrozoa on the west coast of Surtsey, but did not collect them.

Some few days later a collection of the coastal fauna of Surtsey and Vestmannaeyjar was initiated.

The Icelandic coastal fauna is only sparsely known and it is therefore of great importance to carry out intensive surveying of the coastlines in the vicinity of Surtsey. This will give a valid background for comparison between the faunistic components there and the new coastal fauna of Surtsey.

The sampling

In August 1967 intensive sampling of the fauna and flora of Vestmannaeyjar was carried out partly from the splash-spray zone down to the low water mark and partly from 0-30 m depth using the technique of SCUBA-diving. On two occasions samples were collected by dredging. Bad weather conditions prevented landings on Surtsey in August, but the epifauna on the hard bottom at the west coast of the island was collected by the divers.

As both an algologist and a zoologist were sampling at the same time, the divers collected both algae and animals. The samples were put into plastic buckets closed by lids. A cross was cut in the center of the lids so the material could be pressed through the slits, which, however, prevented the material from escaping. Other important sampling equipment consisted of knives, chisels and hammers.

At the laboratory in Vestmannaeyjar the samples were sorted out and the algae and animals were preserved separately. However, some of the algae, which can shelter small animals, were preserved with their tiny inhabitants so the sorting out could be performed more safely later under the microscope.

The seawater in which the samples were brought up was passed through a fine plastic filter to catch the small invertebrates. The Protozoa and Ostracoda were neglected.

The animals were preserved in alcohol except the samples from six localities in the littoral zone of Heimaey, which were preserved in 4% formalin.

In the intertidal zone quantitative samples were taken wherever possible.

On the 21st of September and 20th of October 1967 samples were taken in the littoral zone of Surtsey.

Fig. 1 shows the approximate location of the sections which were worked last summer, as well as those from where the samples have been identified.

On the sandy shore of the northern part of the island the only animals found were those washed ashore and which are not going to become a part of the future population of the beach as they actually are planktonic or living on floating objects in the sea. The only exception was a dead mussel, Mytilus edulis, which was found in the sand far from the coast.

Under most of the cliffs forming the rest of the coastline, sand mixes with seawater in the surf which thus scours the rocks making animal life impossible there.

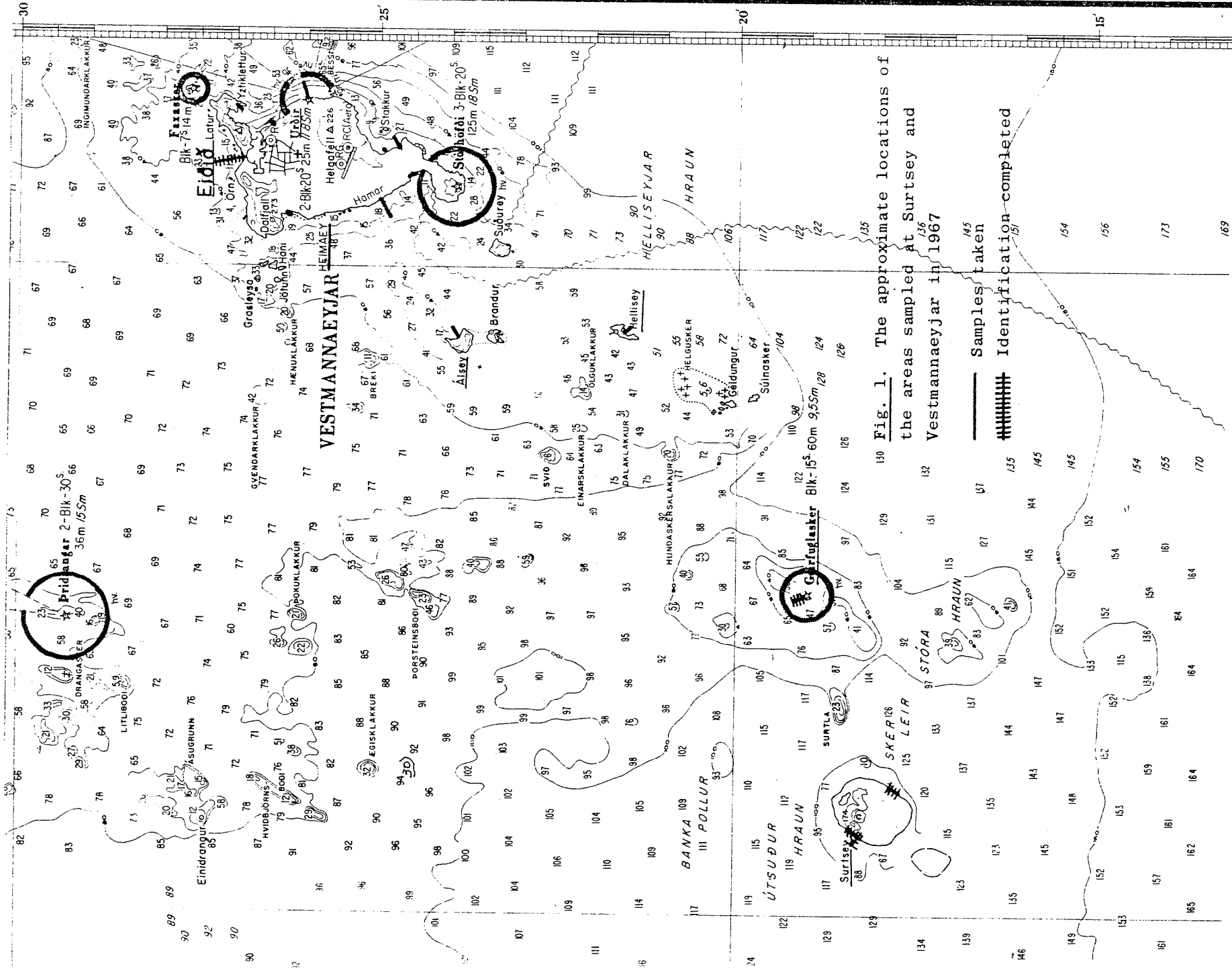


Fig. 1. The approximate locations of the areas sampled at Surtsey and Vestmannaeyjar in 1967

——— Samples taken
 ##### Identification completed

On the west coast, however, a stretch of the littoral and sublittoral zones, at least down to 20 m depth, is formed by large blocks of rocks. Therefore, the scouring effect of the sand occurring elsewhere on the rocky shore is absent.

The littoral zone was carefully surveyed for marine animals on the above mentioned dates and 13-15 species were found (see below).

In September gravel and shingles covered a very short stretch of the east coast, but the only animals found there had been washed ashore. In October small rocks and shingles had accumulated to a greater extent and 4-6 species of marine bottom animals were collected. Sampling was made difficult by the surf and some of the existing species may have escaped attention.

The material from 1967 is now being worked up and although only a small part of the work is finished 22 new species have been found for Vestmannaeyjar of which 8 species are new for Iceland.

Samples from the Littoral Zone of Surtsey

Table I shows the animals found in the littoral zone of Surtsey on September 21st and October 20th 1967 (see above). The number of specimens taken are listed wherever possible.

TABLE I

Animals from the intertidal zone of Surtsey on
September 21st and October 20th 1967.

	West Coast		East coast
	21st Sept.	20th Oct.	20th Oct.
Hydrozoa (not identified)	x	x	x
Nematoda (not identified)		x	
Polychaeta (not identified)	x	x	x
Bryozoa:			
1) Membranipora membranacea (L.)	x	x	
2) Celloporella hyalina (L.)	x		
Copepoda (Rock pools) (not identified)	x	Not sampled	
Cirripedia:			
1) Verruca stroemia (O.Fr.Müller) Schumacher	2	18	
1) Balanus balanoides (L.)	4		
Nudibranchia:			
Acanthodoris pilosa (Abildgaard)	3	2	
Lamellibranchia:			
1) Mytilus edulis L.	3	17	11
1) Anomia squamula (L.)	30	68	46
1) Saxicava arctica (L.)	15	51	

- 1) Pelagic larvae
- 2) No pelagic larval stage

Most of the animals listed in Table I were on stones or rocks which might have been thrown up from the sublittoral zone by the surf.

Samples from 10-20 m Depth West of Surtsey

On the 16th of August 1967 sampling was carried out at the west coast of Surtsey on rocky bottom down to 20 m depth. Animals were only found in the samples from 10-20 m (see Table II). In addition the SCUBA-divers observed many small crabs at a depth of 20 m together with 3 or 4 species of fish, but were unable to catch any of them.

TABLE II

Animals from the West Coast of Surtsey on August 16th
1967 at 10 - 20 m Depth

	10 m	20 m
Hydrozoa 2 or 3 species (not identified)		x
Polychaeta 3 or 4 species (not identified)		x
Bryozoa 1 species (not identified)		x
Copepoda (not identified)	x	x
Amphipoda 3 species (not identified)		x
Decapoda:		
<i>Spirontocaris pusiola</i> (Krøyer)		3
<i>Hyas coarctatus</i> Leach, juv.		3
<i>Portunus holsatus</i> I.C. Fabricius, juv.	2	
Nudibranchia 2-4 species		x
Lamellibranchia:		
<i>Mytilus edulis</i> L., juv.		50
<i>Anomia squamula</i> (L.), juv.		15
<i>Saxicava arctica</i> (L.), juv.		2
Bivalve juv.		1

Samples from Geirfuglasker and Heimaey

In this section the number of species in each systematic group will be given and also the names of all species new for the waters around Vestmannaeyjar.

As the larval development plays an important role in the possible transport of littoral invertebrates from Vestmannaeyjar to Surtsey, this aspect will as far as possible be taken into consideration. In this connection it should be mentioned that the distance from Geirfuglasker to Surtsey is approximately 2.5 nautical miles, while the distance between Heimaey and Surtsey is approximately 10 nautical miles. The prevailing surface current in this region is westwardly and pelagic larvae may therefore easily be transported from Vestmannaeyjar to Surtsey.

PORIFERA:

The few species found have not yet been identified.

COELENTERATA:

A. Hydrozoa:

Some species were collected, but they have not been identified yet and the results can not therefore be included in this report.

B. Anthozoa:

a. Octocorallia:

One common species was found.

b. Hexacorallia:

One or two species were found, but it has not been possible to have them identified.

VERMES:

A. Nemertina:

One specimen was found, but it has not been identified.

B. Nematoda:

They are very common, but it has not been possible to have them identified.

C. Annelida:Polychaeta:

Only one species has been identified so far.

Spinter miniaceus Grube.

One specimen was found at Eidid at 20-27 m depth. It had only been found once in Icelandic waters 5 nautical miles east of Seydisfjörður and is thus new for the south coast.

TENTACULATA:A. Bryozoa:

They are brood-protecting and the larvae are usually only few hours in the plankton although both non-pelagic and long-lasting pelagic stages are known. The material is now being worked up and so far 34 species have been identified of which 2 species have not been found earlier at Iceland. These records will be included in the Bryozoa of The Zoology of Iceland, which will soon be published.

B. Brachiopoda:

Only one specimen has been found and that was in the intertidal zone in Geirfuglasker. It has not been identified.

ARTHROPODA:A. Crustacea:a. Copepoda:

They have not been identified.

b. Cirripedia:

3 species, all with pelagic larvae, have been found. One of them, Balanus balanus (L.) da Costa, is new for Vestmannaeyjar. This species was taken in the samples from Geirfuglasker at 0-24 m (9 spec.) and in the intertidal zone (some shells) and also two shells from 32 m depth at Eidid.

The other two species have been found in Surtsey (see above).

c. Isopoda:

The non-parasitic Isopoda have brood-protection and no pelagic larval stage. 8 species of them were in the samples

from Geirfuglasker and Heimaey, and 3 of these are new for the region around Vestmannaeyjar.

Ianiropsis breviremis Sars, is new for Iceland. It was found at Geirfuglasker at 0-24 m (15 spec.) and Eidid at 10 m (2 spec.) and 0-5 m depth (8 spec.).

Ianira maculosa Leach, is new for Vestmannaeyjar. Previously it has only been found 6 times at Iceland at 40-326 m depth. This time it was found at Geirfuglasker at 0-24 m (10 spec.), at Eidid at 15 m (3 spec.) and 32 m (1 spec.).

Idothea pelagica Leach. Earlier Icelandic records are only from Grindavík (S.W.) and Snæfellsjökull (W.). It is now common in the intertidal zone of Geirfuglasker and Heimaey.

Of parasitic Isopoda one male was found, but has not been identified.

d. Amphipoda:

The Amphipoda have brood-protection and direct development. 18 species have been found of which 3 seem to be new for Iceland and one of them might be a new species.

Amphilocus manudens Bates is, however, new for Iceland. It was found at Eidid at 20-27 m, but only one specimen.

Additional 4 species are new for the south coast of Iceland and therefore also for Vestmannaeyjar. They are:

Metopa alderi Bates, 2 specimens from Geirfuglasker at 0-24 m.

Sympleustes glaber (Boeck.). 20 spec. from Geirfuglasker at 0-24 m and 2 spec. from Eidid at 6-10 m.

Parapleustes monocuspis (G.O. Sars). 17 spec. from Geirfuglasker at 0-24 m and 1 spec. from Eidid at 32 m.

Eurysteus melanops (G.O. Sars). Found at Eidid. Two spec. at 32 m, 6 spec. at 15 m and 1 spec. at 6-10 m.

e. Decapoda:

9 species were found, all with pelagic larvae. They are all recorded earlier from or close to Vestmannaeyjar.

B. Insecta:

Some insects, mostly larvae, were in the intertidal zone at Eidid. They have not been identified.

C. Arachnida:Acarina:

3 or 4 species have been found at Vestmannaeyjar, but they have not been identified as yet.

D. Pycnogonida:

3 species were found and only one of them was previously recorded from Vestmannaeyjar.

Ammonothea laevis (Hodge) was for the first time found at Vestmannaeyjar. It was found at Geirfuglasker at 0-24 m (15 spec.). Earlier records from Iceland are few and all from N.E. to S.E.

Cordylochele sp. is new for the Vestmannaeyjar and perhaps also for Iceland.

MOLLUSCA:A. Polyplacophora:

Few spec. were found, but they have not been identified.

B. Gastropoda:a. Prosobranchia:

17 species are in the samples which have been worked up from which 4 or 5 have pelagic larvae, 9 have non-pelagic larvae or direct development, but the development of the rest is unknown. All 17 species have been found earlier at or near Vestmannaeyjar.

b. Opisthobranchia:Nudibranchia:

Two species have been identified so far, but 2 or 3 are waiting for identification and one of these seems to be new for Iceland.

Tergipes tergipes (syn.: *T. despectus* (Johnston)). One specimen from Eidid at 20-27 m. Earlier Icelandic records are from Reykjavik and Grímsey and it is therefore new for the south coast.

Limapontia capitata (Müller). 7 spec. were found at Eidid in the littoral zone. It has only once been recorded from Icelandic waters and then from Reykjavik. It is thus new for Vestmannaeyjar.

C. Lamellibranchia:

11 species were found at Vestmannaeyjar, 9 of which have pelagic larvae, one has non-pelagic larval development and the development of one is not known. All the species have been recorded earlier from the region around Vestmannaeyjar. 3 of the species with pelagic larvae have already been found in the intertidal zone of Surtsey (see above).

ECHINODERMA:

A. Asteroidea:

2 species were found at Vestmannaeyjar, one with pelagic larvae, but the other brood-protecting with direct development. Both are recorded earlier from Vestmannaeyjar.

B. Ophiuroidea:

2 species were found at Vestmannaeyjar both with pelagic larvae and are earlier known from the area.

C. Echinoidea:

One common species with pelagic larvae was found.

D. Holothurioidea:

One species was found at Vestmannaeyjar. It has earlier been found there. The larval development is unknown.

TUNICATA:

A. Ascidiacea:

The larval stage is very short or sometimes missing. Usually it lasts only few hours and not more than 24 hours.

4 species were found. One of them has been recorded earlier from the area, but one is new for Iceland.

Molgula lanceplanei is a new species for Iceland. One spec. was found at Geirfuglasker at 0-24 m.

Boltenia echinata (L.) is a new species for the south coast of Iceland. It was found at Geirfuglasker at 0-24 m (8 spec.) and Eidid at 32 m depth (6 spec.).

Polycarpa pomaria (Savigny). Earlier Icelandic records are only from Faxaflói and the species is therefore new for Vestmannaeyjar.

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References

1. Einarsson, H., 1948: Echinoderma. Zool. of Iceland, Vol. IV, Part 70.
2. Huus, Johan and Jörgen Knudsen, 1950: Tunicata. The Zoology of Iceland, Vol. IV, Part 71b.
3. Jörgensen, C. Barker, 1946: Reproduction and Larval Development of Danish Marine Bottom Invertebrates, with Special Reference to the Planktonic Larvae in the Sound (Öresund). 9. Lamellibranchia. Medd. Komm. Danm. Fisk.-Havunders. Ser.: Plankton, Bd. IV, Nr. 1.
4. Kramp, P.L., 1939: Octocorallia. Zool. of Iceland, Vol. II, Part 7.
5. Lebour, Marie V., 1928: The Larval Stages of the Plymouth Brachynra. Proc. Zool. Soc. London, Part 2.
6. Lemche, Henning, 1938: Gastropoda Opisthobranchiata. The Zool. of Iceland, Vol. IV, Part 61.
7. Madsen, F.J., 1949: Marine Bivalvia. Zool. of Iceland, Vol. IV, Part 63.
8. Marcus, Ernst, 1940: Mosdyr. Danmarks Fauna, 46.
9. Óskarsson, Ingimar, 1952: Skeldýrafána Íslands. I. Samlokur í sjó. (Lamellibranchia).
10. Óskarsson, Ingimar, 1962: Skeldýrafána Íslands. II. Sæsniglar með skel (Gastropoda Prosobranchia & Tectibranchia).
11. Rees, C.B., 1950: The Identification and Classification of Lamellibranch Larvae. Hull Bull. Mar. Ecol., Vol. III, No. 19.
12. Stephensen, K., 1910: Skjoldkrebs (Storkrebs I). Danmarks Fauna, 9.
13. Stephensen, K., 1928: Storkrebs II. Ringkrebs. 1. Tanglopper (Amfipoder). Danmarks Fauna, 32.

14. Stephensen, K., 1933: Havedderkopper og Rankefødder. Danmarks Fauna, 38.
15. Stephensen, K., 1937: Marine Isopoda and Tanaidacea. Zoology of Iceland, Vol. III, Part 27.
16. Stephensen, K., 1937: Pycnogonida. The Zoology of Iceland, Vol. III, Part 58.
17. Stephensen, K., 1938: Cirripedia (incl. Rhizocephala). The Zoology of Iceland, Vol. III, Part 30-31.
18. Stephensen, K., 1939: Crustacea Decapoda. Zoology of Iceland, Vol. III, Part 25.
19. Stephensen, K., 1940: Marine Amphipoda. Zoology of Iceland, Vol. III, Part 26.
20. Stephensen, K., 1948: Storkrebs IV, Ringkrebs. Danmarks Fauna, 53.
21. Sæmundsson, B., 1937: Icelandic Malacostraca in the Museum of Reykjavik. Vísindafélag Íslendinga (Soc. Scient. Islandica) XX.
22. Thorson, Gunnar, 1936: The Larval Development, Growth and Metabolism of Arctic Marine Bottom Invertebrates Compared with those of other Seas. Meddelelser om Grönland, Bd. 100.
23. Thorson, G., 1941: Marine Gastropoda Prosobranchiata. Zool. of Iceland, Vol. IV, Part 60.
24. Thorson, G., 1946: Reproduction and Larval Development of Danish Marine Bottom Invertebrates, with Special Reference to the Planctonic Larvae in the Sound (Öresund). Medd. Komm. Danm. Fisk.- Havunders. Serie: Plankton, Bd. IV.
25. Wesenberg-Lund, Elise, 1951: Polychaeta. Zoology of Iceland, Vol. II, Part 19.