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THE GODTHAAB EXPEDITION 1928

ZOANTHARIA AND ACTINIARIA

BY

OSKAR CARLGREN

WITH 22 FIGURES IN THE TEXT

KØBENHAVN
C. A. REITZELS FORLAG
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INTRODUCTION

While the fauna of Zoantharia and Actiniaria of the Davis Strait, the banks, and the coast of West Greenland as far north as Umanak is fairly well known, only few species of these groups were taken until 1928 in the northern parts of the Baffin Bay, and none in its central deep basin. Through the "Godthaab" expedition, the principal object of which was to explore these waters, our knowledge of the distribution of the Zoantharia and Actiniaria in the waters west of the northern parts of Greenland has been considerably augmented. Most interesting is the fact stated by the dredgings of the expedition, that the deep basin of the Baffin Bay is inhabited by species of Actiniaria identical with those occurring in the cold deep polar area of the Norwegian Sea, the deep basin between Greenland and Norway north of Iceland. To the lists, given in "Conspectus Faunæ Groenlandicæ" (CARLGREN 1928), of species previously taken west of Greenland we can now add 4 species, one of which is new to science (*Parasicyonis groenlandica*, caught in the Davis Strait). The number of species of Actiniaria and Zoantharia known from the waters west of Greenland is now 44, of which, however, only 17 were taken by the "Godthaab" Expedition. Besides these I have here also mentioned localities, not published before, of some other species. The distribution of the species enumerated here is for the first time illustrated by maps. In a special chapter the zoogeography of the species is more thoroughly treated.

ZOANTHARIA

Fam. **Epizoanthidae.**

Epizoanthus erdmanni (Dan.) Hadd. & Shackl.

(Maps figs. 1 and 19.)

Mardoel erdmanni n. sp. Danielssen 1890 p. 116.
Epizoanthus erdmanni Carlgren 1913 p. 23; 1928 p. 264; 1932 p. 256.

Material: "Godthaab" stat. 77, 75°26′ N. 62°26′ W. 820 m, temp. 0°7, 4 specimens; stat. 144, 70°51′ N. 52°01′ W. 733 m, temp. 1°1, 17 specimens and colonies; "Tjalfe" exped. stat. 366, 66°22′ N. 57°16′ W. 686 m, some colonies and single polyps.

The species is not previously known from West Greenland.

Further distribution (see the map, fig. 1): East Greenland (new locality: King Oscar Fjord at the entrance to Sofia Sound 327 m, bottom-temp. 0°61, Norwegian exped. 1932); Eyjafjord, Iceland; N. of Spitzbergen; between Norway and Spitzbergen, several localities; Norway: Finmarken, Foldenfjord (the specimens from this latter locality were, however, small and may possibly be referred to *E. incrustatus*), at depths between 75 and 1591 m and at positive temperatures. In one locality, 74°52′ N. 17°16′ W., 350 m, the temperature was, however, not measured, but may possibly have been below 0°.

The specimens from stat. 366 were small, very strongly incrusted and provided with 14—16 capitular furrows. The gyrocnidæ of the filaments were 26—31 × 10—11 μ in three specimens examined.

The species may be characterized as a low-arctic form.

Epizoanthus lindahli Carlgr.

(Maps figs. 2, 19, 21.)

Epizoanthus lindahli n. sp. Carlgren 1913 p. 21; 1928 p. 264; 1932 p. 256.

Material: Stat. 73, 74°52′5 N. 62°12′ W. 450 m, temp. 0°7, 10 colonies and 7 single polyps; stat. 87, 77°05′5 N. 71°13′ W. 790 m, temp. ÷ 0°4, 3 colonies and 1 single polyp; stat. 131, 74°12′ N. 77°00′ W. 680 m, temp. ÷ 0°4, 2 colonies; stat. 135, 74°41′ N. 70°30′ W. 1200 m,

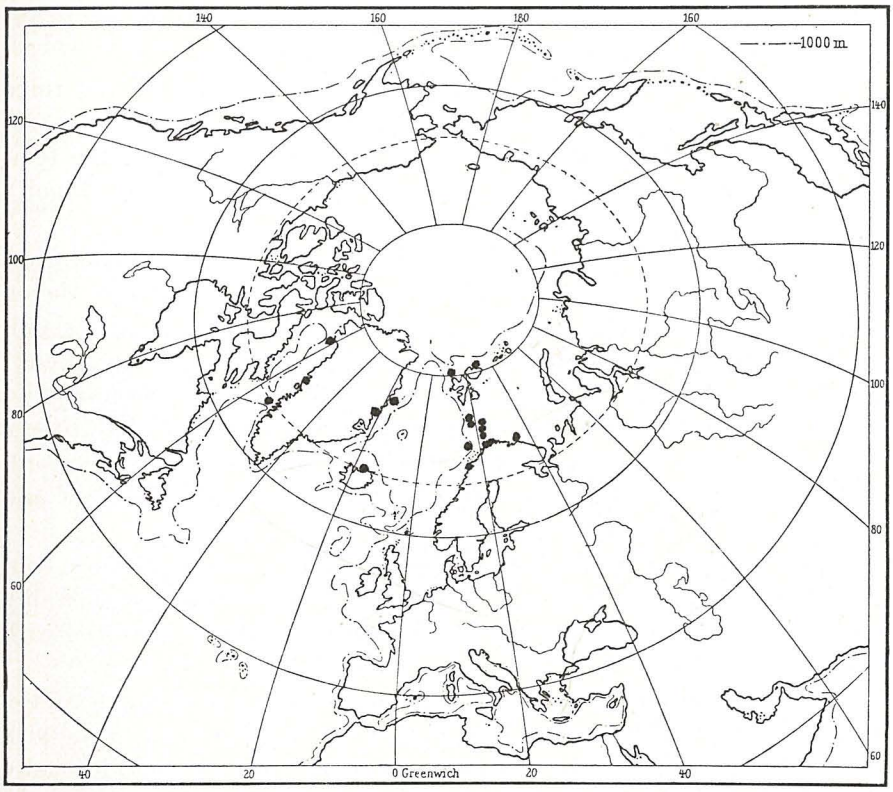

Fig. 1. *Epizoanthus erdmanni.*

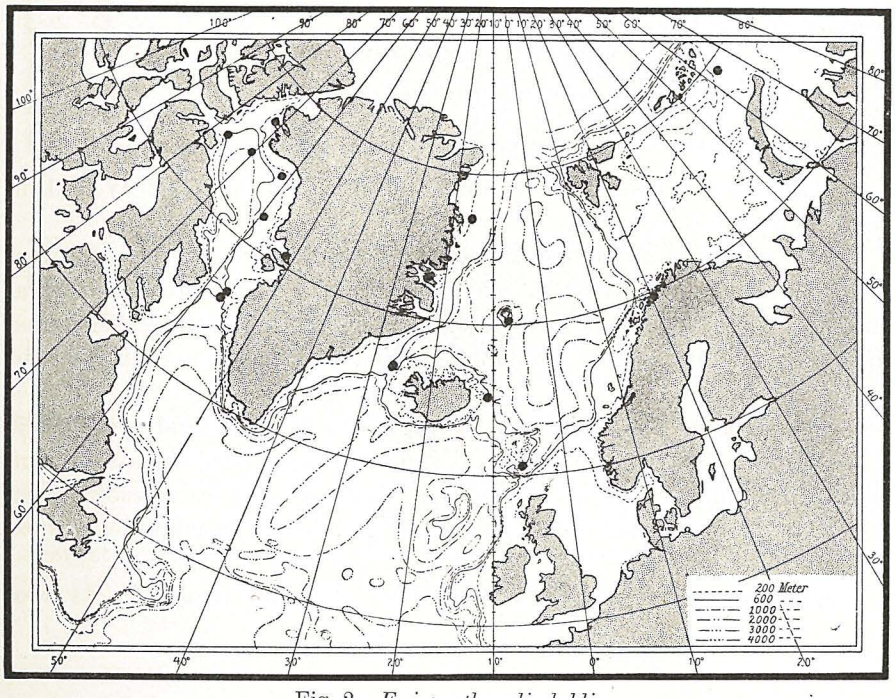

Fig. 2. *Epizoanthus lindahli.*

temp. ÷ 0°2, 6 colonies and 1 single polyp; stat. 144, 70°51′ N. 52°01′ W. 733 m, temp. 1°1, 2 colonies and 4 single polyps.

The species is previously taken at West Greenland on the ridge between Davis Strait and Baffin Bay ("Ingolf" St. 32, "Tjalfe" St. 366) and at 72°04′ N. 59°50′ W. between 404 and 606 m. Probably the temperature was positive in all localities (in one single locality, "Ingolf" stat. 32, 3°9 was measured).

Further distribution (see the map fig. 2): East Greenland (new locality: Vega Sound 250 m, Norwegian expedition 1930), Jan Mayen (new locality: 70°21′ N. 8°25′ W. 301 m, RYDER 1891); E. of Iceland, S. of the Faroes; between Novaya Semlya and Franz Joseph Land: 79°13′1 N. 63°27′7 E. 230 fms. (This station is previously localized by me as West Greenland owing to misreading of W. instead of E. on the label); Norway: Finmarken at depths between 280 m (Lyngenfjord, var. *nordgaardi*) and 301—686 m and at temperatures a little below and above 0°, up to 1°6 (in Lyngenfjord).

The specimens, partly single polyps, partly small colonies consisting of two polyps from the "Tjalfe" expedition, were considerably thinner than specimens from other localities and strongly incrusted with sand-grains.

I have before (1928 p. 259) characterized this species as low-arctic. The new localities, however, speak rather for that we have to do with a high-arctic form preferring temperatures near 0°, although exceptionally it can tolerate, at least for a shorter time, so high a temperature as 3°9 ("Ingolf" stat. 32). At any rate, is seems to prefer colder water than does *E. erdmanni*.

Fam. **Parazoanthidae.**

Isozoanthus ingolfi Carlgr.

(Map, fig. 19.)

Isozoanthus ingolfi n. sp. Carlgren 1913 p. 52; 1928 p. 267; 1932 p. 257.

Material: "Ingolf" expedition stat. 35, 65°16′ N. 55°02′ W. 681 m, temp. 3°6, a few colonies.

The species is previously known from only one locality off the west coast of Greenland: 64°54′ N. 55°10′ W. 740 m, at a bottom temperature of 3°8 ("Ingolf" stat. 27). Outside Greenland it has only been taken in Ögsfjord, Finmarken, probably at low positive temperatures (not higher than 2°2).

The colonies were attached to fragments of shells and sand-tubes. The polyps were rather robust and somewhat incrusted with sand and single foraminiferes. The coenenchym was distinct, the mesogloea of the body-wall provided with typical cell-islets. One specimen examined had 42 mesenteries.

Because this species is known from only few localities, its zoo-

geographical character is difficult to decide, but probably the species is low-arctic.

Isozoanthus bulbosus Carlgr.

(Maps figs. 3, 19, 21.)

Isozoanthus bulbosus n. sp. Carlgren 1913 p. 40; 1928 p. 266; 1932 p. 256.

Material: "Ingolf" stat. 35, 65°16′ N. 55°02′ W. 681 m, temp. 3°6; stat. 37, 60°17′ N. 54°05′ W. 3229 m, temp. 1°4, 1 specimen.

Previously known from the ridge between the Davis Strait and Baffin Bay together with *Epizoanthus lindahli* at the stations "Ingolf"

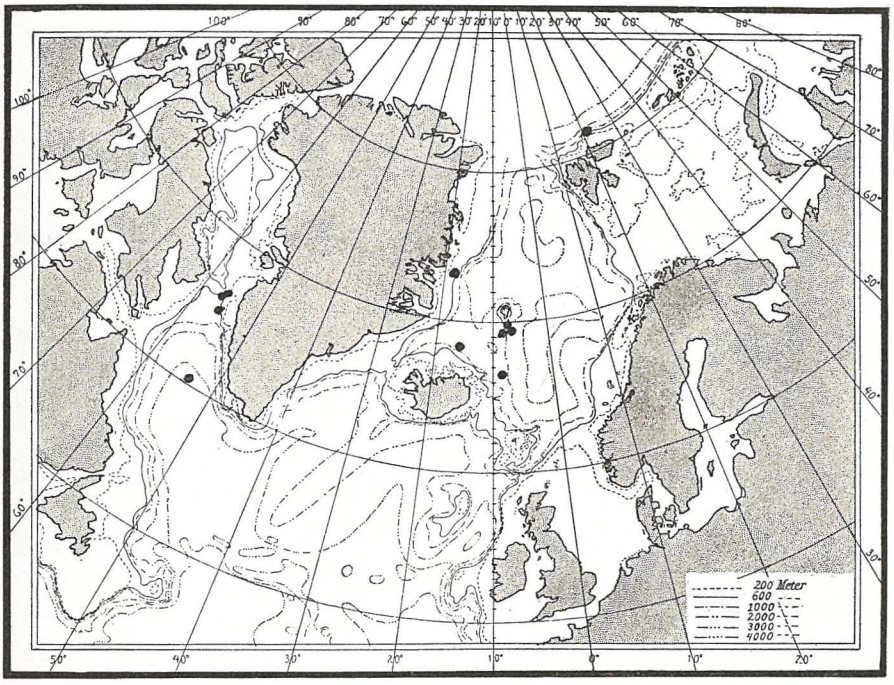

Fig. 3. *Isozoanthus bulbosus.*

32 and "Tjalfe" 366 at depths between 599 and 686 m and at positive temperatures (up to 3°9, "Ingolf" stat. 32).

The species is taken in six localities in the Norwegian Sea at depths between 698 and 2465 m and at temperatures between ÷ 0°4 and ÷ 1°1; moreover it is found at East Greenland at a depth of 410 m, temp. 2°, and N. of Spitzbergen 1000 m (see the map fig. 3).

The specimens from stat. 35 and especially from stat. 366 were strongly incrusted with coarse sand-grains like the specimens from stat. 32; some specimens were also provided with rather strong sand-incrusted capitular ridges. The single small specimen from stat. 37 was, on the other hand, more weakly incrusted.

There is much doubt as to the zoogeographical character of this species. The localities as known in 1913 involve that it was an arctic abyssal species, although in the Arctic it might sometimes be found in the deeper littoral area and also at fairly high positive temperatures on the ridge between the Davis Strait and Baffin Bay. The new localities confirm its specially abyssal character, but at the same time demonstrate that it must be an eurytherm form. Probably it may originally have been an arctic species, being more numerous in the arctic than in the Atlantic area. I shall come back to this species later on.

ACTINIARIA

Fam. **Actinernidae.**

Actinernus nobilis Verr.

(Map fig. 21.)

Actinernus nobilis n. sp. Verrill 1879 p. 474; 1885 p. 534.
— — Carlgren 1918 p. 32; 1921 p. 14; 1928 p. 268.

Material: "Godthaab" stat. 179, 63°36′ N. 55°15′ W. 1200 m, temp. 3°3, 1 specimen.

Previously found in a locality S.E. of and not far from the "Godthaab" station, depth 1096 m.

Further distribution: North Atlantic, northern part of the United States in deep water, rare, common at Nova Scotia at depths of 366—549 m (teste Verrill). — A North-Atlantic deep-littoral and abyssal species. Its bathymetrical distribution is 366—2893 m.

Fam. **Edwardsiidae.**

Edwardsia andresi Dan.

(Map fig. 4.)

Edwardsia andresi n. sp. Danielssen 1890 p. 106.
— — Carlgren 1921 p. 43; 1928 p. 270.

Material: "Godthaab" stat. 159, 68°23′5 N. 56°12′ W. 480 m, temp. 2°6, two specimens.

Previously known from two localities at the west coast of Greenland: Bredefjord 220—310 m, and Davis Strait 66°35′ N. 56°38′ W., 599 m.

Further distribution (see the map fig. 4): S.W. Iceland, Skagerrak, west coast of Norway, between Norway and Spitzbergen at depths from 149 to about 550 m at temperatures, measured on 5 stations, from 2°67 to 6°34.

The species is an arctic-boreal form, especially from the deeper littoral region.

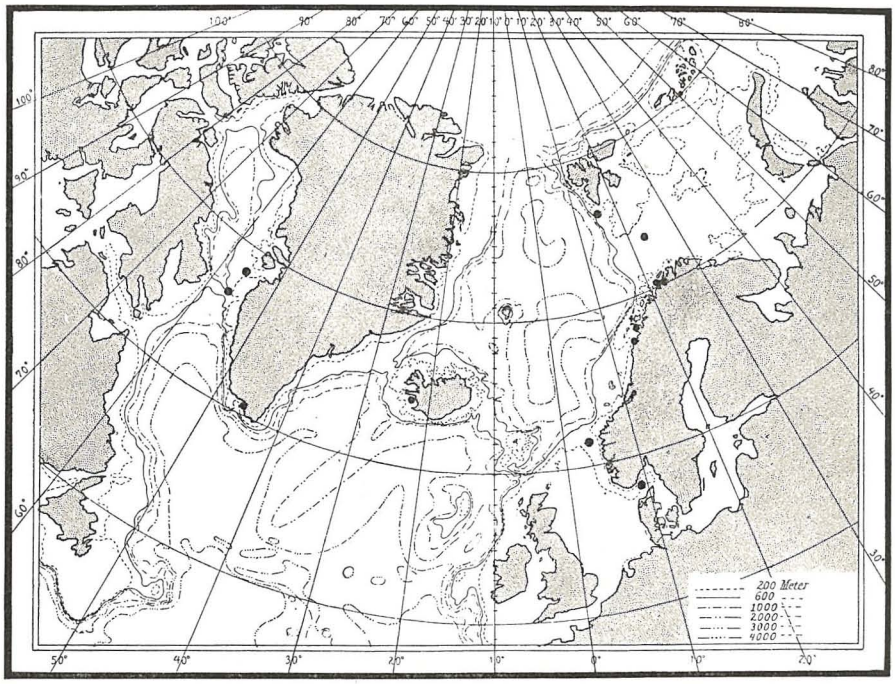

Fig. 4. *Edwardsia andresi.*

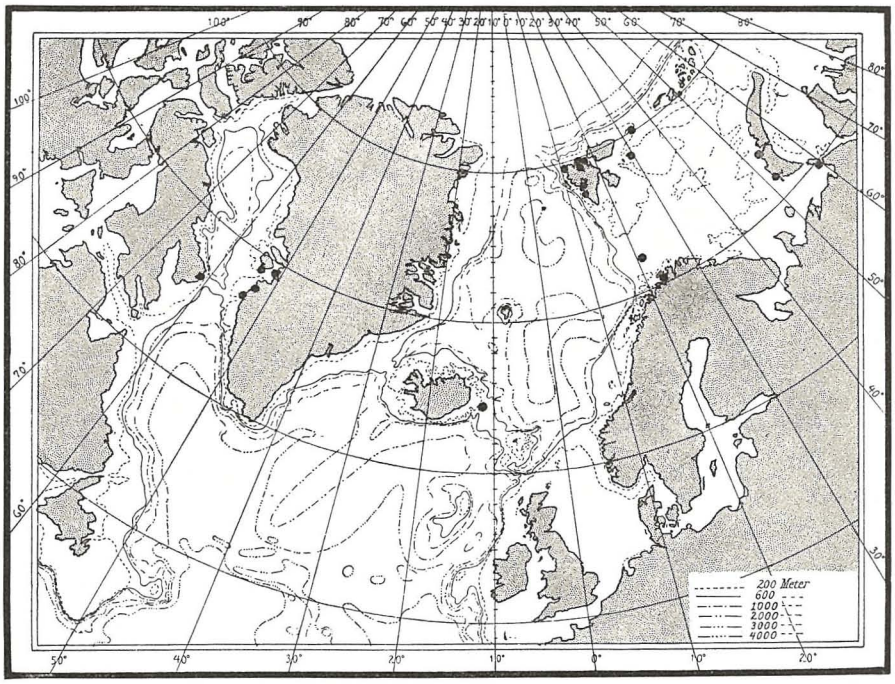

Fig. 5. *Halcampa arctica.*

Fam. **Halcampidae.**

Halcampa arctica Carlgr.

(Map fig. 5.)

Halcampa arctica n. sp. Carlgren 1893 p. 45; 1921 p. 120; 1928 p. 274; 1932 p. 259.
— — Gravier 1922 p. 15.

Material: "Godthaab" stat. 166 b, Totness Road, Exeter Sound, 75—200 m, temp. ÷ 1°6, one specimen.

Previously known along the west coast of Greenland from Godhavn, Jacobshavn, North Strömfjord, and Holstensborg, at depths of 38—380 m.

Further distribution (see the map fig. 5): E. of Iceland, West- and East-Spitzbergen, Finmarken, Novaya Zemlya, and the Kara Sea, 4—397 m. — From the geographical distribution of this species it seems evident that it is an arctic eurytherm form.

It is with some hesitation that I refer the Godthaab specimen to *Halcampa arctica*. The inner organization as also the size of the stinging capsules agree very well with the conditions in that species. The nematocysts of the body wall and those of the tentacles were namely 17—19 × abt. 2 μ, those of the actinopharynx partly 17—20 × 2 μ, partly 26—31 × 4.5—5 μ (penicilli), the spirocysts of the tentacles 24 × almost 2 to 65 × just over 2.5 μ. In the upper part of the body wall numerous spirocysts were also present. I have, however, not been able to find any real tenaculi. The ectoderm of the body wall was high also on the mesogloeal papillæ, probably due to the strong contraction of the body wall. In fact, the specimen reminds one of the abnormal specimen of this species described by me in 1921 (p. 118—119), but as far as I can see on the not too well preserved ectoderm there are, in the present specimen, hardly any traces of the formations there described at the base of the ectoderm. It calls then into consideration, if the tenaculi do not develop, when the species lives on a bottom which is not sandy.

Fam. **Actiniidae.**

Liponema multicornis (Verr.).

(Map fig. 6.)

Bolocera multicornis n. sp., Verrill 1879 p. 198; 1885 p. 534.
— — Carlgren 1921 p. 143.
— *longicornis* Gravier p. p. 1922 p. 21.
Eubolocera multicornis Verrill 1922 p. 1179.
Liponema multicornis Carlgren 1928 p. 275; 1928 b p. 148; 1932 p. 260.

Material: Davis Strait, 66°37′ N. 56°37′ W. 450 m, 1 specimen from the "Dana" expedition 1925.

The species is previously taken in three localities off the west coast of Greenland, viz. Great and Little Hellefiske Banks and on the "Ingolf" stat. 32 (66°35′ N. 56°38′ W.) at depths of 128—599 m, temp. 0°2—3°9.

Further distribution (see the map fig. 6): North America: Cape Cod, New Foundland (teste VERRILL), St. Lawrence estuary 300—330 m, S. Préfontaine (new locality); S.W. of the Faroe Islands; between Norway and Spitzbergen; Bering Sea: Bering Island. Bathymetrical distribution: 82—872 m.

The specimen reproduced by GRAVIER in figs. 3—5, Pl. I, 1922, found in 72°37′ N. 20° E., and determined by him as *Bolocera longicornis*, is undoubtedly *multicornis*.

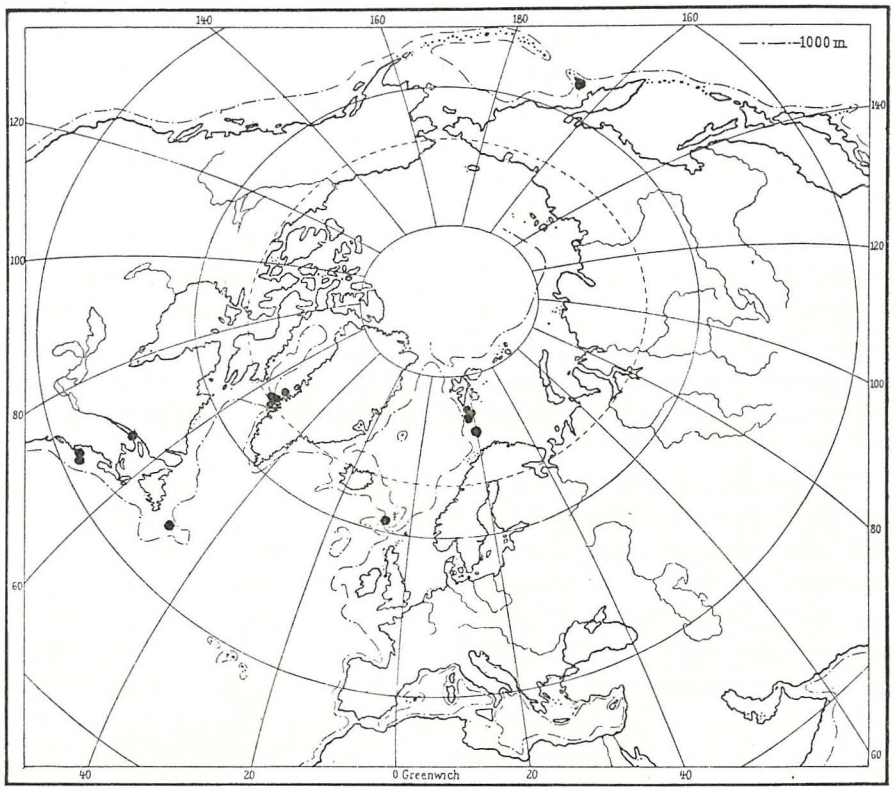

Fig. 6. *Liponema multicornis*.

The distribution of the species and the temperatures at which it has been taken indicate that it is a low-arctic form.

Urticina (*Tealia*) *felina crassicornis* (L., O. F. Müll.).

Urticina felina crassicornis Carlgren 1921 p. 170; 1928 p. 279; 1932 p. 260.

Material: "Godthaab" stat. 87, 77°05′5 N. 71°13′ W. 790 m, temp. ÷ 0°4, 1 specimen; stat. 99, 78°14′ N. 74°10′ W. 672 m, temp. abt. ÷ 0°5, 6 specimens.

This variety of *Urticina* (*Tealia*) *felina* is previously known from

several places at the west coast of Greenland from Bredefjord until Upernivik, at depths between 24 and 471 m. Most of the localities are in the Disko Bay, only one from the banks (Great Hellefiske Bank).

This species, of which some varieties exist (comp. CARLGREN 1921 p. 164) has a very wide distribution. The variety *crassicornis* is circumpolar and distributed throughout the arctic regions, and also known from Iceland and several places at Finmarken and the Murman Coast. It is very common at the coasts of W. and E. Spitzbergen. On the east coast of North America it occurs from Cape Cod to Labrador, and on the west coast from the arctic region until Puget Sound. I have, however, not examined any specimens from W. America, so that I cannot rectify the statement of its occurrence there, but as it has been taken in the Bering Sea the statement is probably correct. To the places enumerated by me (1921) Franz Joseph Land may be added. Its bathymetrical distribution ranges from a few metres until 600 m, rarely 790 m. It seems mainly to occur in the upper parts of the littoral region. — The variety *crassicornis* is an especially arctic, eurytherm form of *Urticina felina*.

Fam. **Actinostolidae.**

For reasons given by me (1932 p. 261) the family *Paractiidae* must be changed into *Actinostolidae*.

Anthosactis jan mayeni Dan.

(Map fig. 7.)

Anthosactis jan mayeni n. sp. Danielsen 1890 p. 24, Carlgren 1921 p. 191; 1928 p. 282; 1932 p. 261.

Material: Stat. 73, 74°52′5 N. 62°12′ W. 450 m, temp. + 0°7, 4 specimens; stat. 77, 75°26′ N. 62°26′ W. 820 m, temp. + 0°7, 1 specimen; stat. 81, 75°35′ N. 61°41′ W. 490 m, temp. + 0°7, 2 specimens; stat. 94, 77°28′5 N. 68°46′ W. 875 m, temp. ÷ 0°4, 5 specimens.

At the west coast of Greenland this species has previously been dredged by Swedish expeditions in two localities: Umanak and Melville Bay, at depths between 445 and 463 m. The specimens from the present expedition were found in Melville Bay and Inglefield Bay.

Further distribution (see the map fig. 7): *A. jan mayeni* was previously taken also at East Greenland, Jan Mayen, and in the Kara Sea. To the localities known up to now (comp. CARLGREN 1921) may be added: Franz Joseph Fjord in East Greenland, 502 m, temp. + 1°3 (Norwegian expedition 1931), King Oscars Fjord at the entrance to Sofia Sound, 327 m, bottom-temp. 0°61 (Norwegian expedition 1932), Siberean Polar Sea, S.E. of Jeanette Islands, 75°30′ N. 164°28′ E., 57 m, and 76°07′ N. 163°59′ E. 66 m, temp. between ÷ 1°43 and ÷ 1°47 (Maud expedition 1922—24). It mostly occurs in the littoral zone from

57 m downwards, the largest depth from which it is known is 875 m; the temperatures at the stations were from ÷ 1°7 in the Kara Sea and + 1°3 in Franz Joseph Fjord. Its distribution shows that it is a circumpolar high-arctic species, although, at least for a short time, it can tolerate low positive temperatures.

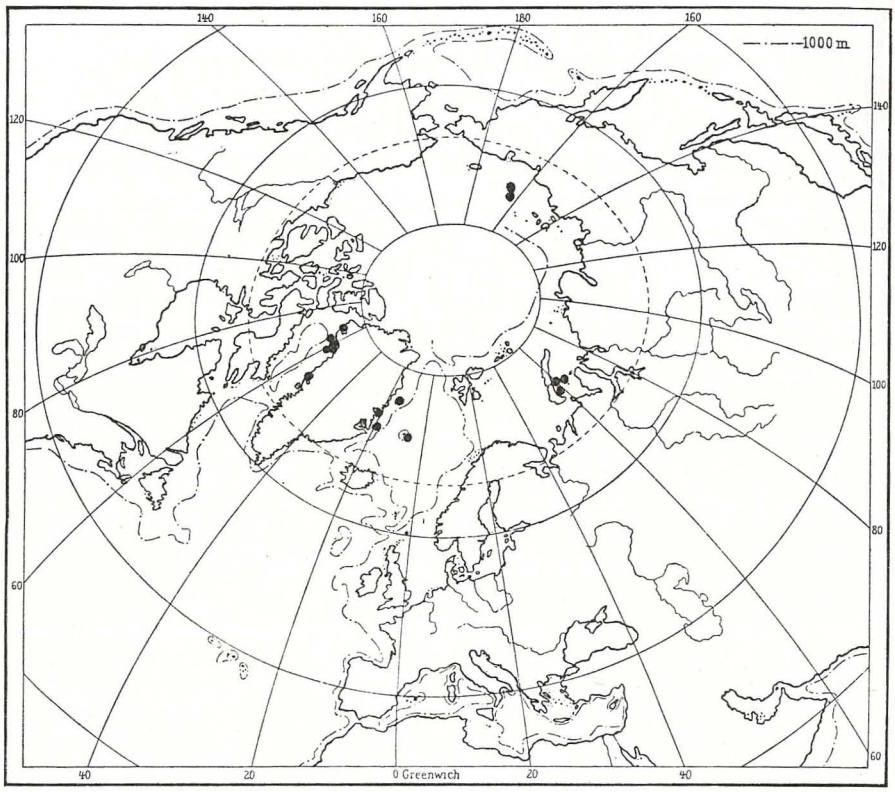

Fig. 7. *Anthosactis jan mayeni.*

Actinostola callosa (Verr.).

Actinostola callosa Verrill, Carlgren 1921 p. 227; 1928 p. 284; p. p. Gravier 1922 p. 29.

— *atrostoma* n. sp. Stephenson 1918 p. 118.

Catadiomene atrostoma Stephenson 1920 p. 558.

Material: "Godthaab" stat. 160, 68°17′ N. 58°14′ W. 410 m, temp. 2°6, one specimen.

According to A. JENSEN this species has also been taken by the "Dana" together with *Liponema* at 66°37′ N. 56°37′ W., 450 m. Previously found in some localities at West Greenland, one not far from the "Dana" station and one in Kvanefjord, at depths between 420 and 599 m.

Further distribution: East coast of North America from Cape Fear to New Foundland (new locality St. Lawrence estuary, 300—325 m, Préfontaine); the warm area of the northernmost part of the North Atlantic, coast of Norway, Skagerak, Kattegat; Japan. McMurrich (1893) has also described this species from the west coast of America not far from the equator, but it is questionable whether these specimens really belong to *callosa*. Likewise the specimen taken at the station 976 by the Monaco expedition (76°45′ N. 23°20′ E, 186 m), which Gravier refers to *callosa*, is probably not this species, as the locality is in the cold area. Gravier's specimen is probably *Actinostola spetsbergensis*. On the other hand, the specimens from stat. 922 are undoubtedly rightly determined.

The species is a boreal and Atlantic form, occurring in the deeper littoral and abyssal regions, although in the fjords it may be found in more shallow water. It lives at depths between 40 and 2047 m.

The relation between the number of tentacles and that of the mesenteries seems to vary between 1:1.27 and 1:1.59. Five examined specimens of this species with 256, 220, 186, 184 and 166 tentacles had 364, 350, 236, 276 and 212 mesenteries at the base. The relation was accordingly: 1:1.42; 1.59; 1.27; 1.5 and 1.28.

Actinostola spetsbergensis Carlgr.

(Maps figs. 8, 9, 21.)

Actinostola spetsbergensis Carlgr. Carlgren 1893 p. 76; 1921 p. 222; 1928 p. 285; 1932 p. 261; p. p.?, Gravier 1922, p. 29.

Material: Stat. 54, 69°50′ N. 61°36′ W. 1880 m, ÷ 0°4, 1 specimen; stat. 81, 75°35′ N. 65°41′ W. 490 m, temp. 0°7, 1 specimen; Thule harbour, 2 specimens; stat. 86, 76°36′ N. 68°54′ W. 180—80 m, temp. ÷ 1°3, 2 specimens; stat. 97, 78°15′5 N. 73°29′ W. 290 m, temp. ÷ 1°05, 2 specimens; stat. 99, 78°14′ N. 74°10′ W. 672 m, temp. about ÷ 0°5, 5 specimens; stat. 112, 76°37′4 N. 74°18′ W. 580 m, temp. ÷ 0°5, 2 specimens; stat. 162 a, 67°48′5 N. 60°48′ W. 1600 m, temp. ÷ 0°4, 9 specimens.

This species has previously been found in several localities at the west coast of Greenland from Bredefjord until Upernivik, on the banks as well as in the fjords, at depths between 14 and 410 m. All the numerous localities known up to now are within the littoral region (until 600 m), but the occurrence of the species at the stations 54 and 162 a shows that it can descend rather deep into the abyssal region (see the map, fig. 8).

Further distribution (see the map, fig. 9): Rice Strait, New Foundland (one locality). N., NW., and NE. of Iceland, East Greenland, West- and East-Spitzbergen, between Norway and Spitzbergen,

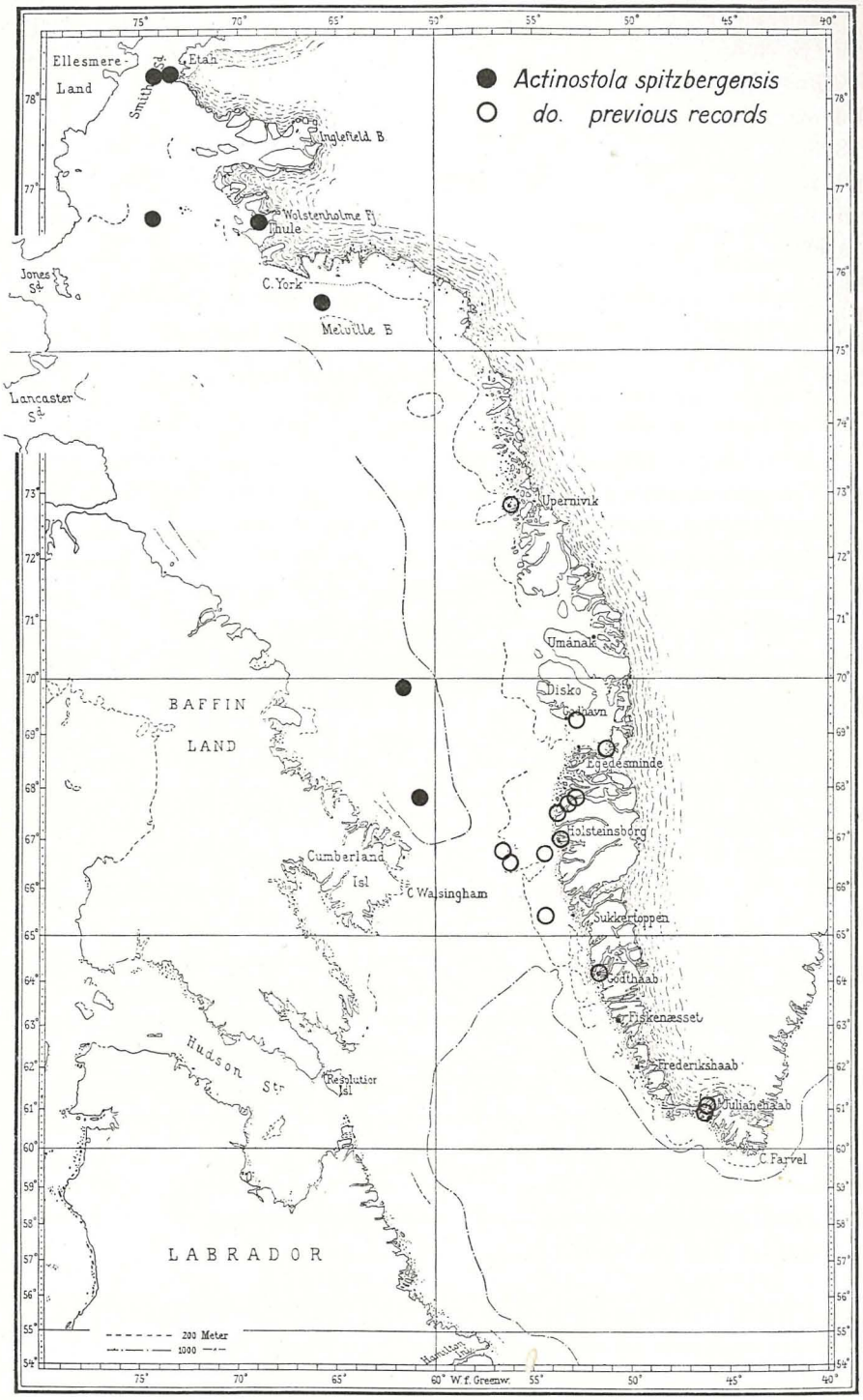
Actinostola spitzbergensis
do. previous records
Ellesmere Land
Etah
Smith
Inglefield B.
Wolstenholme Fj
Thule
Jones Sd.
C. York
Melville B.
Lancaster Sd.
Upernivik
Umának
Disko
Godhavn
Egedesminde
Holsteinsborg
BAFFIN LAND
Cumberland Isl
C. Walsingham
Sukkertoppen
Godthaab
Fiskenæsset
Frederikshaab
Julianehaab
C. Farvel
Hudson Str.
Resolution Isl
LABRADOR
200 Meter
1000
Hamilton Inlet
60° W.f. Greenw.

Fig. 8.

Kola peninsula, Barents Sea, Kara Sea, Siberean Polar Sea, Bering Sea. To the localities previously mentioned by me is to add: East Greenland, between Bontekoe Island and Cape Bennett, 290 m (Norwegian expedition 1930). The locality 66°45′ N. 59°30′ W. according to the list of stations of the Sofia-expedition should be read: 66°45′ N. 54°30′ W.

This is a circumpolar arctic species, preferring negative temperatures, but also occurring in comparatively warm water.

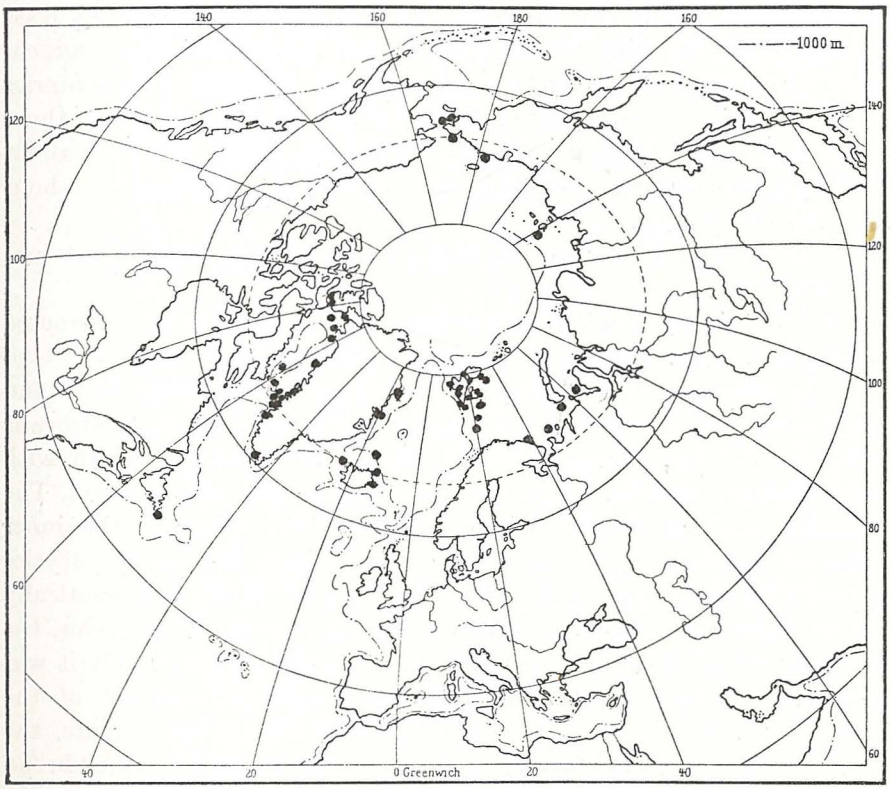

Fig. 9. *Actinostola spetsbergensis.*

I have examined three specimens regarding the relation between the tentacles and the mesenteries. The tentacles numbered 156, 148, and 130, the mesenteries at the base 186, 176, and about 148. The relation was then 1:1.11, 1:1.18, and 1:1.14, thus almost as in *Actinostola georgiana* (Carlgren 1927 p. 62).

Parasicyonis groenlandica n. sp.

(Fig. 10; map fig. 21.)

Material: "Godthaab" stat. 179, 63°36′ N. 55°15′ W. 1200 m, temp. 3°3, 1 specimen.

Diagnosis: Sphincter rather long and strong, capable to cover the tentacles, principally reticular with a little tendency to transversal and longitudinal stratification, not separated from the endodermal muscles of the body-wall. Tentacles about 120, practically not thickened at the abaxial side of the base. Longitudinal muscles of tentacles mesogloeal with mainly scattered meshes. Radial muscles of oral disc mesogloeal, strong, with the meshes forming a continuous band, somewhat weaker at the insertions of the mesenteries. 2 siphonoglyphs. Number of mesenteries about twice as many as that of the tentacles. At least 3 cycles + several single mesenteries perfect. Arrangement of mesenteries probably hexamerous but not regular. Muscles of mesenteries as in *P. sarsii*. Nematocysts of tentacles 29—36 × about 2.5 μ, those of the actinopharynx partly 19—29 × (2) 2.5 μ, partly 22—26 × about 4—4.5 μ, broader in the basal end. Spirocysts of tentacles about 26 × 2.5—62 × 3.5 μ.

Colour in alcohol: actinopharynx olive-brown, other parts uncoloured.

Dimensions: Breadth of the body 7 cm, height of the contracted body about 4 cm. Length of the inner tentacles about 2 cm.

The specimen was considerably damaged in its lower parts and some parts of the body and the pedal disc torn off. The pedal disc was wide, the column, the ectoderm of which was dropped, smooth with some irregular furrows. The margin was tentaculate without fossa. The tentacles were rather short, in contracted state wrinkled, the inner tentacles shorter than the outer ones. Sometimes the outer tentacles were a little thickened at the abaxial side of the base, but practically the tentacles were not swollen at the outside. About 120 tentacles, the arrangement of which was very difficult to decide, but probably it was hexamerous with several irregularities (compare arrangement of the mesenteries). The inner part of the oral disc was not tentaculate, the actinopharynx long and wrinkled, the two siphonoglyphs rather broad and symmetrically arranged.

The mesogloea of the column was thick, the sphincter strong, capable of covering the tentacles and occupying in its upper part about half the thickness of the mesogloea, but diminishing gradually in strength downwards (fig. 10 a). It was practically reticular, in some parts more alveolar and not separated from the endodermal circular muscles. The muscle meshes were small and elongated in the direction ectoderm—endoderm, so that sometimes an indistinct stratification of the meshes in transversal direction can be observed. In some places in the upper part of the sphincter a tendency to longitudinal direction seems to be present (fig. 10 b).

The ectoderm of the tentacles was high and contains very numerous

nematocysts and spirocysts, the former were 29—36 × 2.5 (just above 2.5) μ, the latter about 26 × 2.5—62 × 3.5—4.5 μ in size. The longitudinal muscles of the tentacles were wholly enclosed in the thick meso-

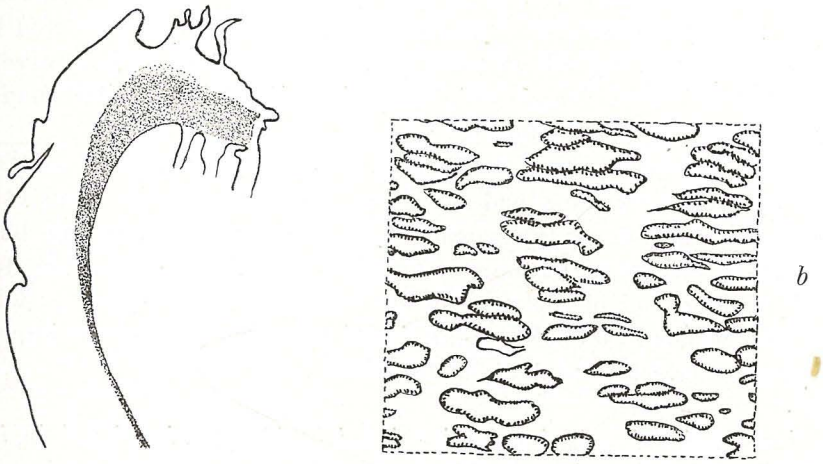

Fig. 10. *Parasicyonis groenlandica.* *a.* Longitudinal section of the upper part of the column showing the sphincter. *b.* Part of the sphincter

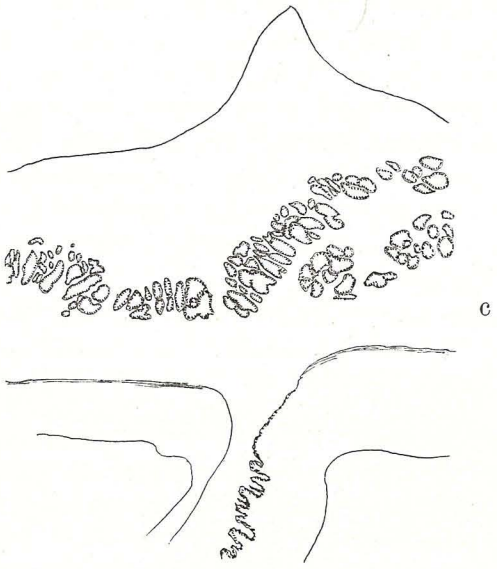

Fig. 10 *c. Parasicyonis groenlandica.* Section of a part of the oral disc and a mesentery.

gloea, the muscle meshes at least at the base of the tentacles mainly scattered and about equally developed on the abaxial and the axial side. Contrary to this the radial mesogloeal muscle meshes of the oral disc formed an almost continuous layer, only weaker at the insertions

of the mesenteries (fig. 10 c). The nematocysts of the actinopharynx are partly riblike (19—29 × (2) 2.5 μ, partly thicker in the basal end and with visible basal part to the spiral thread 22—26 × about 4.5 μ. In the maceration preparations also spirocysts were present, but whether these were normal components of the ectoderm or only attached to it, I have not ascertained. The riblike nematocysts in the actinopharynx were also here as in other *Parasicyonis* and *Sicyonis*-species smaller than the nematocysts of the tentacles.

The mesenteries were somewhat irregularly arranged in that some stronger compartments had developed more mesenteries than others, but probably the cardinal arrangement is hexamerous. In one half of the body there were 62 pairs of mesenteries, half of which were sterile. The arrangement of the stronger and sterile mesenteries was as follows (*p* perfect pairs, *i* imperfect pairs, *ip*, *pi* pairs consisting of one imperfect and one perfect mesentery, *d* directives):

d *d*

p, *i*, *p*, *i*, *p*, *i*, *p*, *i*, *p*, *i*, *pi*, *p*, *i*, *i*, *i*, *p*, *i*, *p*, *i*, *ip*, *i*, *p*, *p*, *p*, *i*, *p*, *i*, *p*, *i*, *ip*, *i*, (*p*);

= 13 *p*, 3 *ip*, *pi*, 15 *i* in all 31 pairs. In the other half of the body, which was more damaged, there were 4 pairs and 3 single mesenteries perfect. The fertile mesenteries, not reaching the oral end of the body, alternated as a rule with the sterile mesenteries, only rarely there are 2 (3) fertile pairs of mesenteries close to each other, in one endocoel a fertile pair was put in. The mesenteries were also about twice as many as the tentacles. The longitudinal muscles of the strongest mesenteries show coarse folds, the parieto-basilar muscles are broad but not strong. The filaments are in cross-section large, the ciliated streaks well developed also on the fertile mesenteries. The stronger mesenteries are provided with marginal stomata situated rather far from the column.

Remarks: The species is nearly related to *Parasicyonis sarsi*, the sphincter is, however, in *P. groenlandica* considerably stronger, the radial muscles of the oral disc not interrupted at the insertions of the mesenteries.

Fam. **Sagartiidae.**

Kadosactis rosea Dan.

(Maps figs. 11 and 21.)

Kadosactis rosea n. sp. Danielssen 1890 p. 8; Carlgren 1932 p. 264.
Phellia bathybia n. sp. Danielssen 1890 p. 7.
Phellia violacea n. sp. Danielssen 1890.
Hormathia? *musculosa* n. sp. Gravier 1918 p. 15, 1922 p. 69.

Material: Stat. 54, 69°50′ N. 61°36′ W. 1880 m, temp. ÷ 0°4, 22 specimens; stat. 162 a, 67°48′5 N. 60°48′ W. 1600 m, Bottom temp. ÷ 0°4, 3 specimens.

Not previously found in the waters west of Greenland.

Further distribution (see the map, fig. 11): Cold area of the North Atlantic in several localities at depths between 1629 and 2465 m and at bottom temperatures between $\div 1°2$ and $\div 0°9$. The species is thus a typical cold-water and deep-sea form. The discovery of this species in the deep basin of the Baffin Bay is very interesting, as it shows that there must have been a previous connection between the deeper parts of the Baffin Bay and the deep, cold region of the Norwegian Sea.

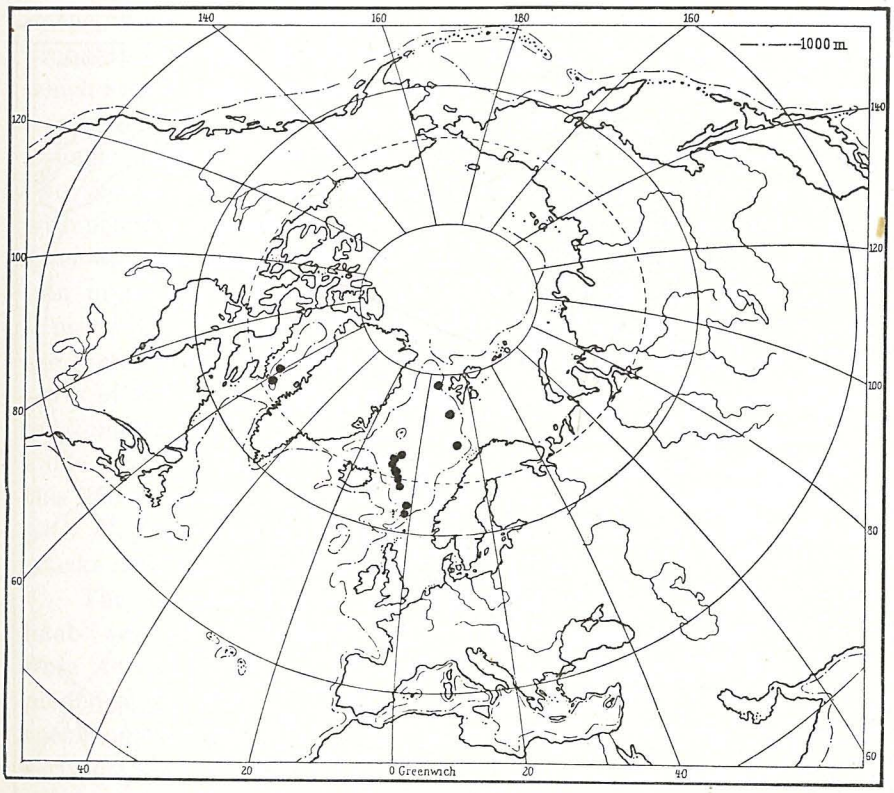

Fig. 11. *Kadosactis rosea.*

I will give a description of this species in the second part of the Actiniaria from the Ingolf expedition. Here I will only state that in the well preserved specimens from the Godthaab expedition I have found small cinclides, arranged in an annulus around the lowermost region of the scapulus, as well as also spirulæ in the acontia. In the previously examined specimens I was unable to isolate the acontia from the filaments and I supposed, therefore, that the smaller exploded penicilli in the maceration preparations belonged to the acontia; these penicilli, being in fact of almost the same size as the acontia-spirulæ, belong to the filaments. The consequence of this is that the genera *Sagartiogeton* and

Kadosactis are synonyms. Identical with *Kadosactis rosea* are also *Phellia bathybia* Dan., *Phellia violacea* Dan., and *Hormathia musculosa* Grav.

Fam. **Metridiidae.**

Metridium dianthus Ell.

(Map fig. 12.)

Metridium dianthus Ell., Carlgren 1893 p. 102; 1928 p. 298; 1932 p. 265.

Material: Stat. 33 a, Holstensborg, 22—35 m, 2 specimens, one

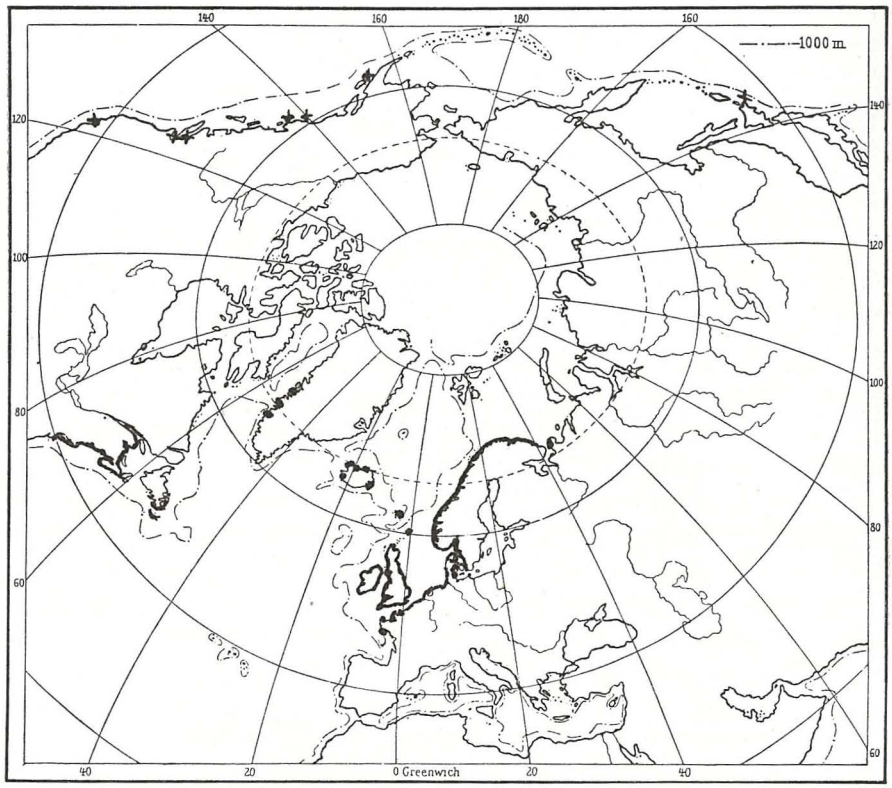

Fig. 12. *Metridium dianthus.* + *Metridium fimbriatum.*

of which is very small, 0.45 × 0.45 mm. Head of Kapisigdlik fjord W. of Laxeelv, 10—0 m, "Dana", one specimen.

Previously known from Ikamiut, Egedesminde, Holstensborg, and Ikertok fjord.

This species, which has been regarded by PAX as circumpolar, is certainly a low-arctic-boreal form (see the map, fig. 12). As a matter of fact it does not occur in the real arctic region. In the state-museum at Stockholm, it is true, there is a specimen of *M. dianthus* labelled "Spitzbergen" (the French expedition 1839), but it is very doubtful, whether this specimen was really taken at Spitzbergen and not at the Nor-

wegian coast. At any rate, it has not been found there afterwards. Its further distribution is as follows: East coast of North America from northern New Yersey (teste VERRILL) until the Gulf of St. Lawrence, New Foundland; around Iceland, the Faroe Islands, Scandinavian coasts from the Belts and the Sound and the Bay of Kiel; Kola peninsula, entrance of the White Sea, the North Sea, British Isles, northwest coast of France almost to Loire. It was also taken many years ago in two localities in the Adriatic Sea. PAX (1928), who has examined these specimens, states that the identification is correct, but that the specimens probably have been transported with ships to these places, a supposition which seems most reasonable. By several authors *Metridium fimbriatum* is placed together with *M. dianthus*. Judging from my examination of a single large specimen of *fimbriatum* from Nanaimo, I think that the two species are not identical, as the Nanaimo specimen was provided with penicilli in the acontia. It is true that the penicilli were few in number in comparison with the spirulæ, and besides unexploded in all maceration preparations of the wholly isolated acontia, but apparently there is no doubt but that the acontia also contain penicilli which, moreover, are larger than the spirulæ. Also the size of the nematocysts in other parts of the body disagree with the size of the corresponding capsules in *dianthus* (see below). WASILIEFF's *M. dianthus* from Nemuro, Hokkaido, Japan, and TILESIUS' *Actinia priapus* from Kamtschatka (if this latter species is really a *Metridium*) may possibly be identical with *M. fimbriatum* which has been found in several localities between Alaska and San Fransisco.

The very small specimen, 0.45 mm broad and high, from "Godthaab" stat. 33 a had also penicilli and spirulæ in the acontia. The former were 48—52 × abt. 5 μ, the latter commonly 46 × 3.5—4 μ in unexploded state. At first I was not able to identify the small contracted specimen, but sections of the body and the sphincter showed with certainty that it was a *Metridium*. Thus the specimen agreed with *M. fimbriatum* as to the presence of penicilli in the acontia. But how stands the matter in very small specimens of *M. dianthus*? I have examined such specimens, received from the zoological station Kristineberg, in preserved as well as in living state, and I have found that penicilli were also present in the acontia of these specimens. Several of the penicilli were exploded so that a mistake as to their presence is excluded. On the other hand, in larger specimens of *dianthus* penicilli are absent in the acontia. Thus it seems that in *fimbriatum* the penicilli persist throughout the life (to judge from the single, very large specimen examined by me), whereas in *dianthus* they are only present in very young specimens and soon disappear. However this may be, the genus *Metridium* can hardly be placed alongside with the genus *Hormathia*

and its allied which have only spirulæ in their acontia, but is nearer related to the family *Sagartiidae* or, perhaps, still more closely related to the *Aiptasiidae*. At present it may be the most suitable to maintain *Metridium* in a separate family *Metridiidae* as a link between the *Sagartiidae* resp. *Aiptasiidae* and the *Hormathiidae*. It seems to me very probable that the family *Hormathiidae* has developed from forms with penicilli as well as spirulæ in their acontia, for there may always — at any rate in the many species of different genera which I have examined — be penicilli in the cnido-glandular tract of the filaments, from which the acontia may have been derived.

At last I will give a comparison between the size of the nematocysts in the large, only slightly contracted, specimen of *fimbriatum* (length 19, breadth 10—11 cm) and those of a large, rather much contracted, specimen of *dianthus* from the Kattegat (length 11.5, breadth of the expanded pedal disk 12 × 11.5 cm):

acontia: penicilli 72—89 × 6—6.5 μ resp. not present, spirulae (63) 67—72 × about 4.5 μ resp. 58—67 × about 3.5—4 μ; tentacles: penicilli 31—36 × 3.5—4.5 μ resp. 21—30 × (2.5) 3 μ, spirulae 24—31 × about 2 μ resp. 20—23 × 2 μ; actinopharynx: penicilli 31—53, commonly 43—46 × 4(5) μ resp. 18—31 × about 3—4.5 μ, spirulae 35—43 × 2.5 resp. 24—34 × about 2.5 μ; column: penicilli 26—35 × about 4.5 μ resp. 20—28 × about 3 μ, spirulae 18—27 × about 2.5 μ resp. 14—18 × 2 (2.5) μ[1]).

M. dianthus has been identified with *Priapus* (*Actinia*) *senilis* by several authors. It is certainly very difficult to decide what LINNÉ understands by his species. VERRILL (1922 p. 92) suggests that LINNÉ's Actinia-names in his Systema naturae of 1761 "were usually latinized forms of vulgar names used by fishermen". If this is really so, there is hardly any Actinian, in which the name of *senilis* fits better than in *M. dianthus* in strongly contracted and poorly preserved state.

The species occurs only in the upper littoral region, until about 100 m.

[1]) Since the above was written I have received 3 specimens from the biological station at Puget Sound, Frida Harbour, Washington. The specimens were smaller than the specimens of *M. dianthus* mentioned above, and varied in length from about 6 to 8.5 cm with a breadth of about 5.5—6 cm; the specimens were not or a little introverted. I have examined their acontia in regard to the nematocysts, which agreed well in size with those of *fimbriatum*. The penicilli were 77—89 × 6—6.5 μ, resp. 72—82 × 6—6.5 μ, resp. 70—76 × 6 μ; the spirulæ 65—79 × abt. 4.5 μ, resp. 65—74 × 4.5 μ, resp. 62—74 × 4.5 μ. Thus it seems that we may regard *fimbriatum* at least as a variety of *dianthus*, retaining during its whole life the capacity to develop penicilli in the acontia. I am indebted to professor KINCAID for sending the specimens. Since I have turned professor STEPHENSON's attention to the presence of penicilli in the acontia of certain specimens of *Metridium*, he has informed me in these days (Febr. 1933) that also in England "races" of this species have been discovered with more or less numerous penicilli in the acontia.

Fam. **Hormathiidae.**

Hormathia digitata (O. F. Müll.).

(Map, fig. 13.)

Hormathia digitata (O. F. M.) Haddon 1898 p. 459; Carlgren 1928 p. 296, 1932 p. 263; Gravier 1922 p. 57.

— *margaritae* n. sp. Gosse 1860 p. 219; Carlgren 1928 p. 298; Stephenson 1928 p. 111.

Chondractinia digitata (O. F. M.) Lütken, Carlgren 1893, p. 110.

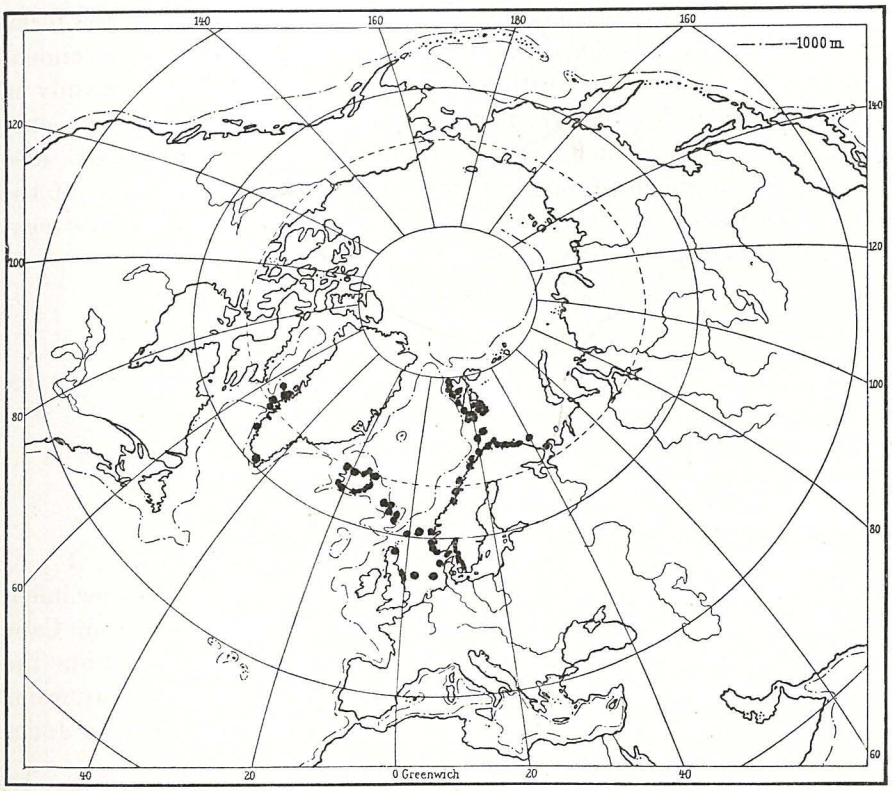

Fig. 13. *Hormathia digitata.*

Material: Stat. 160, 68°17′ N. 58°14′ W. 410 m, temp. 2°55, 1 specimen.

Previously known from several localities at the west coast of Greenland between Disko Bay and Julianehaab, from the fjords as well as from the banks, at depths between 2 m and 451 m. In my paper of 1928 (p. 297) I have also mentioned Upernivik district as locality for this species. Now I cannot find the specimen, wherefore the locality is somewhat dubious.

Further distribution (see the map, fig. 13): Iceland, Faroe Islands, Shetland Islands; West Spitzbergen, possibly East Spitzbergen,

but then at any rate very rare; Spitzbergen—Norway, entrance to the White Sea, the Kola peninsula; Scandinavian coasts until the middle of the Sound; the North Sea, at depths between about 10 and 660 m, especially common at depths of less than 200 m. None of the comparatively few *digitata*-localities from which temperature observations are at hand showed negative temperatures at the bottom; it is, however, possible that two of the "Monaco" stations (76°45′ N. 22°20′ E., 76°30′ N. 25°27′ E.) — if the determination of the specimens by GRAVIER (1922) is correct — were in the cold area. The species is a low-arctic-boreal form.

H. digitata varies considerably in its exterior. Most of the specimens from West Greenland are rather small and in their exterior mainly in agreement with GOSSE's *Hormathia margaritae*, that is to say: only coronial tubercles, which are sometimes indistinct, are present. Also some large specimens from deep water in the Skagerrak were of the same appearance. On the other hand, specimens from the Kattegat and the Sound are mostly large and strongly tuberculated.

Hormathia nodosa (Fabr.) Hadd.

(Map, fig. 14.)

Hormathia nodosa (Fabr.) Haddon 1898 p. 459; Carlgren 1928 p. 294, 1932 p. 262; Gravier 1922 p. 54 (p. p.).
Chondractinia tuberculosa n. sp. Verrill 1922 p. 102.
Chondractinia nodosa Fabr. Lütken 1861 p. 190; Carlgren 1893 p. 115.
Actinauge rugosa p. p. n. sp. Verrill 1922 p. 95. G.
Actinauge borealis n. sp. Verrill 1922 p. 985. Pl. 24 figs. 1, 1 h.

Material: Stat. 114, 76°40′ N. 76°20′ W. 85 m, temp. ÷ 1°1, 1 specimens; stat. 188, 60°22′ N. 47°27′ W. 120 m, temp. 5°8, 1 specimen.

Previously known from the west coast of Greenland from Cape Dudley Digges to Ilua, especially from the fjords, but also from the Little Hellefiske Bank, at depths between about 27 and 463 m. It seems to be very common in the Disko Bay and has also been found in Jones Sound, Havnefjord, during the Fram expedition.

Further distribution (see the map, fig. 14): East coast of North America from Georges Bank to New Foundland and in the Gulf of St. Lawrence at depths between 55 and 548 m (teste VERRILL), East Greenland, Jan Mayen, W. of Iceland, Faroe Islands, West- and East Spitzbergen, Spitsbergen—Norway (very common), Finmarken, Kola peninsula, Franz Joseph Land, Novaya Semlya, Siberean Polar Sea; new locality: East Greenland, Kangerdlugssuak 11—15 m (E. Mikkelsen's expedition 1932). The species is a panarctic eurytherm form, also occurring in the boreo-arctic regions. It seems to be principally distributed in the arctic area of the North Atlantic, only two adjacent localities are from the arctic sea of Siberia. It is not known from the Pacific. It occurs mainly in the upper part of the littoral region between 9 and

200 m, but has been taken at a depth of 650 m. It seems to be able to tolerate considerable changing in temperature, as it has been found at temperatures between ÷ 1°6 (in the Siberean Sea) and 5°8 (the "Godthaab" station 188). Probably this latter is accidental and only prevailing for a shorter time in this locality, but in several of the *nodosa*-localities the temperatures were between 1° and 2°.

Like *Actinauge verrillii* and *Hormathia digitata*, this species varies

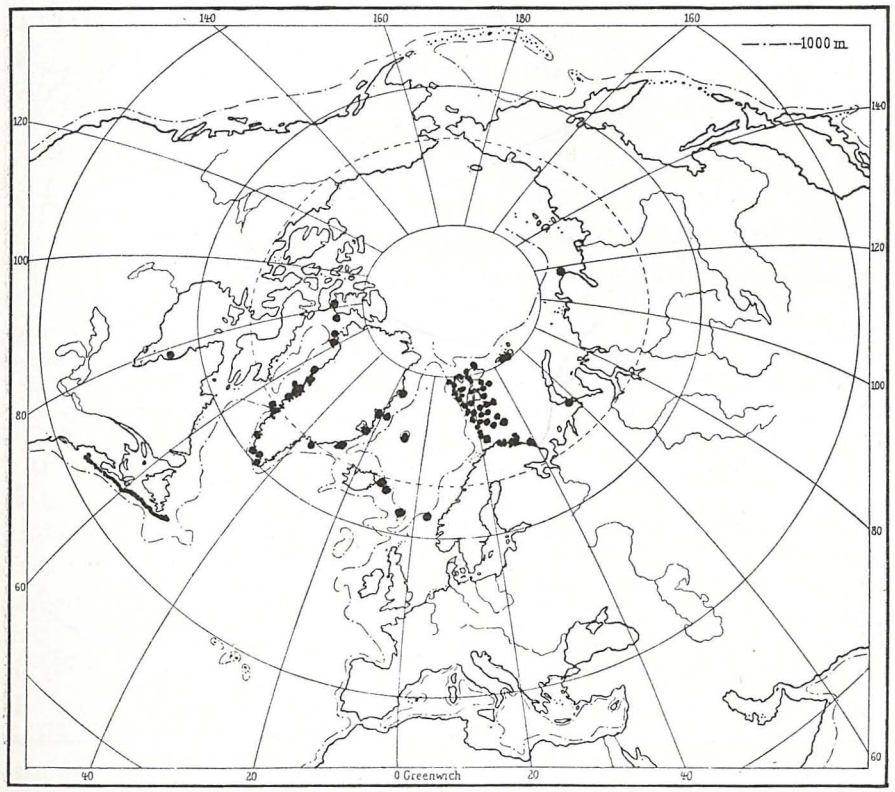

Fig. 14. *Hormathia nodosa.*

concerning the appearance and distribution of the tubercles of the scapus. Sometimes they are very strong, rarely acuminated, sometimes ordinarily developed. On rare occasions the specimens are almost smooth, also in large forms, with only coronial tubercles.

Among the specimens described by Gravier (1922) as *Chondractinia nodosa* only two from Treurenberg Bay (stat. 1074) may belong to this species. The specimens figured in Pl. 4 figs. 37 and 38 are certainly *Actinauge richardi*, the other forms figured are probably *Phelliactis*-species.

Since this paper was written and left to the printer, I have examined

the type specimen of *Actinauge borealis* and a specimen of *Actinauge rugosa*, both from Richmond Gulf, Hudson Bay, the latter collected by A. F. Low. Both specimens belong to *Hormathia nodosa*. In the jar containing *A. rugosa* a specimen of *Stomphia coccinea* was also present. I beg to thank Mr. K. M. ANDERSSON, chief of biology at the National Museum of Canada, for his kindness to lend me the specimens.

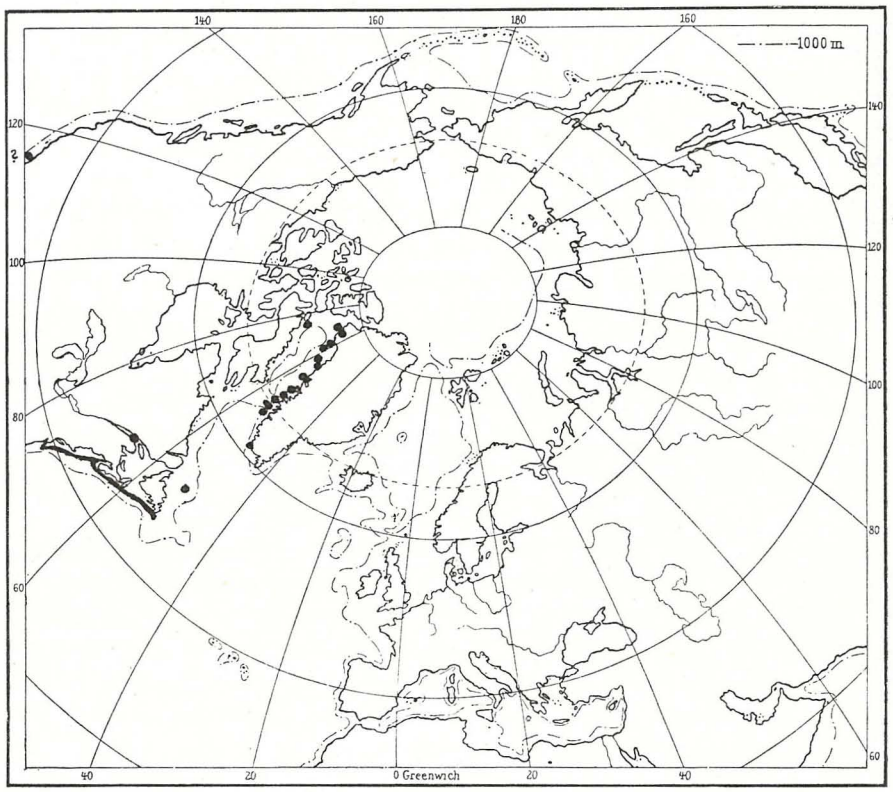

Fig. 15. *Actinauge verrillii.*

Actinauge verrillii McMurr.

(Maps, figs. 15, 20, 21.)

Urticina nodosa Verrill 1873 p. 440.
— *nodosa* p. p. Verrill 1883 p. 50.
Actinauge verrillii p. p. McMurrich 1893 p. 1831.
— *verrillii* Verrill 1922 p. 94, Carlgren 1928 p. 292; 1932 p. 263.

Material: Stat. 64, 73°12′ N. 58°08′ W. 850 m, temp. 0°5, 33 specimens; stat. 73, 74°52′5 N. 62°12′ W. 450 m, temp. 0°7, 2 specimens; stat. 77, 75°26′ N. 62°26′ W. 820 m, temp. 0°7 3 specimens; stat. 87, 77°05′5 N. 71°13′ W. 790 m, temp. ÷ 0°4, 2 specimens; stat. 94, 77°28′5 N. 68°46′ W. 875 m, temp. ÷ 0°4, 2 specimens; stat. 131, 74°12′ N. 77°00′ W. 680 m, temp. ÷ 0°4, 2 specimens; stat. 143,

70°53′ N. 54°03′ W. about 700 m, temp. 1°05, 7 specimens; stat. 144, 70°51′ N. 52°01′ W. 733 m, temp. 1°1, 11 specimens; Upernivik, DROSVAD leg, 1 specimen.

As we see the temperature at the bottom was in all stations above zero except at three stations from Inglefield Gulf and Lancaster Sound, where it was ÷ 0°4.

Previously found in several localities in the waters west of Greenland from Umanak to Kvanefjord and as well on the Great and the Little Hellefiske Banks as also west of these latter, at depths between 128 and 790 m. In one single locality (63°30′ N. 54°25′ W. "Ingolf" stat. 25) the depth was, however, 1096 m.

Further distribution (see the map, fig. 15): East coast of North America from Chesapeake Bay to west of New Foundland, 50—1098 fms. St. Lawrence estuary 50—330 m (G. Préfontaine, new locality).

There is much doubt as to the synonymy and identification of this species. VERRILL (1873) described a species *Urticina nodosa*, which he referred to *A. nodosa* Fabricius. In 1883 he gave a more detailed description of the species, of which he distinguished two varieties *coronata* and *tuberculosa*. As demonstrated by me (CARLGREN 1928 p. 289, 1928 b p. 216) the former variety (by MCMURRICH called *Actinauge fastigiata*) is a distinct species, *Chondrophellia coronata*, which has no connection with *Actinauge* and *Urticina*; the latter variety, rightly identified by HADDON as *A. nodosa* Fabricius and referred by him to the genus *Hormathia* (*Chondractinia*), was described by VERRILL (1922) as *Chondractinia tuberculosa*. There is no doubt but that VERRILL's two varieties of *nodosa* are distinct species belonging to other genera than *Actinauge*, but it is more difficult to identify VERRILL's main-form of *nodosa*. MCMURRICH (1893) gave this form a new name, *Actinauge verrillii*, and at the same time he identified some specimens from the west coast of North and South America with this species. In 1922 VERRILL, however, established a new species *Actinauge rugosa* for the same species which he in 1873 described as *nodosa*, while he referred the *nodosa* of 1883 to *verrillii*. Comparing, however, the occurrence of these two species in VERRILL's papers of 1883 and 1922 it seems clear that VERRILL included *rugosa* in his *nodosa* of 1883. It is thus very difficult to decide, whether *rugosa* is a distinct species, the more so as VERRILL's description of this form is rather imperfect. For my part, I am inclined to regard *verrillii* from the east coast of North America as identical with *rugosa*, at least until I have examined the Hudson Bay specimens of this latter form[1]). Besides it is questionable, whether MCMURRICH's specimens of *verrillii* from the west coast of America belong to the same species as those

[1]) The Hudson Bay specimens are *Hormatia nodosa*, comp. p. 28.

from the east coast. From VERRILL's statement, that large specimens of *verrillii* have 120 or more tentacles and that *rugosa* can likewise be provided with more tentacles than 96, it is very probable — providing VERRILL's observations are correct — that both species also comprise specimens of the genus *Phelliactis*, which in its exterior sometimes reminds one of *Actinauge*. As a matter of fact, I have never observed more than 96 or a few more tentacles even in large specimens of the genus *Actinauge* — a large specimen, 12 cm long and 7.5 cm broad, from the "Godthaab" expedition had 96 tentacles — whereas large specimens of *Phelliactis* have considerably more than 96 tentacles.

As also remarked by VERRILL, the species varies in its exterior. The specimens from the "Godthaab" expedition have frequently rather small indistinct tubercles in their upper parts; other specimens from the west coast of Greenland are provided with large, rather low tubercles, giving the specimens a robust appearance, while in other specimens the scapus is checkered and furnished with only a few irregular tubercles in its uppermost parts. At least several specimens agree more with VERRILL's figure of *verrillii* which has more distinct but not so large tubercles, arranged in longitudinal rows. If the tubercles are distinct they are always the largest in the upper part of the scapus. Also the tentacle-tubercles vary in size and are sometimes rather weak. Besides the specimens from Greenland I have examined *verrillii* from 40°03′ N. 70°28′ W. received from the U. S. National Museum and agreeing in its exterior with specimens from Kvanefjord, and from a locality N. of New Foundland. Recently I have also examined several specimens from the St. Lawrence estuary, which agree perfectly with these latter. The reading: "östliga delen ... ifrån Irland" in my paper (1928 p. 292) is to be removed, as it alludes to *Actinauge richardi* which I examined at the same time as *A. verrillii*.

This species is undoubtedly an eurytherm form, as it occurs at negative as well as at rather high positive temperatures. Its distribution is difficult to decide, until MCMURRICH's specimens and VERRILL's *rugosa* have been further examined[1]). I shall give a description of this species in the second part of the "Ingolf" Actiniaria.

Allantactis parasitica Dan.

(Map, fig. 16.)

Allantactis parasitica n. sp. Danielssen 1890 p. 20; Kwietniewski 1898 p. 122; Carlgren 1902 p. 50, 1928 p. 293, 1932 p. 263.

Material: Stat. 64, 73°12′ N. 58°08′ W. 850 m, temp. 0°5, 6 specimens; stat. 73, 74°52′5 N. 62°12′ W. 450 m, temp. 0°7, 2 specimens; stat. 77, 75°26′ N. 62°26′ W. 820 m, temp. 0°7, 18 specimens; stat. 81,

[1]) Compare p. 28—29.

75°35′ N. 65°41′ W. 490 m, temp. 0°7, 14 specimens; stat. 86, 76°36′ N. 68°54′ W. 180—80 m, temp. ÷ 1°3, 4 specimens; stat. 87, 77°05′5 N. 71°13′ W. 790 m, temp. ÷ 0°4, 3 specimens; stat. 90, 77°17′ N. 69°59′ W. 930 m, temp. ÷ 0°4, 3 specimens; stat. 94, 77°28′5 N. 68°46′ W. 875 m, temp. ÷ 0°4, 9 specimens; stat. 119, 75°54′ N. 81°01′ W. 610 m, temp. ÷ 0°6, 8 specimens; stat. 143, 70°53′ N. 54°03′ W. about 700 m, temp. 1°05, 1 specimen; stat. 144, 70°51′ N. 52°01′ W. 733 m, temp. 1°1;

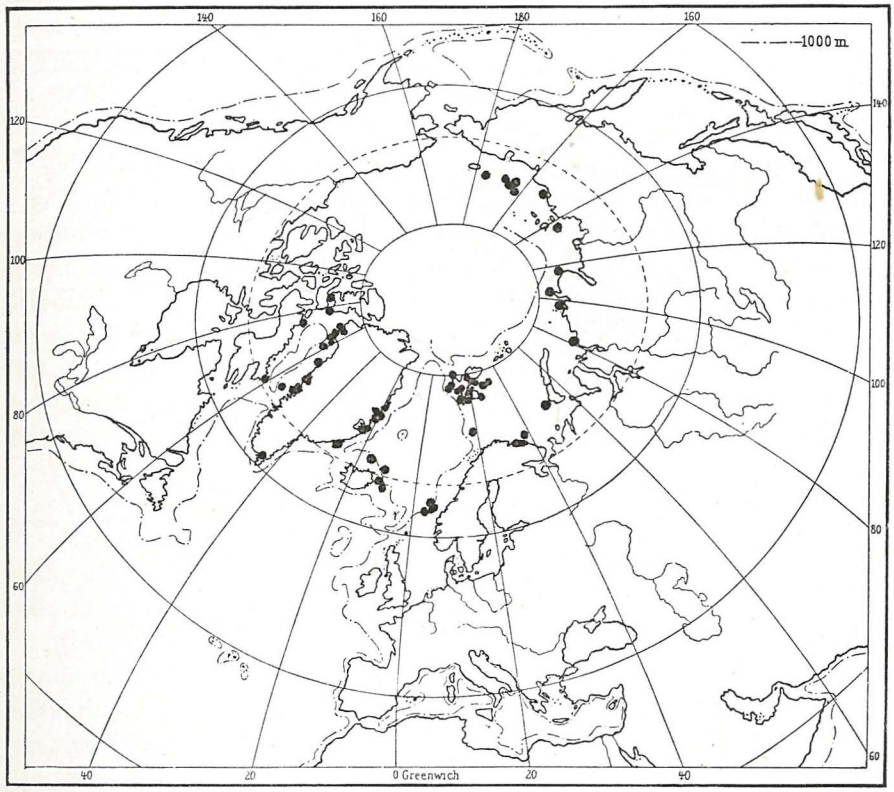

Fig. 16. *Allantactis parasitica.*

stat. 160, 68°17′ N. 58°14′ W. 410 m, temp. 2°55, 12 specimens; stat. 166, Totness Road, Exeter Sound 75—200 m, temp. ÷ 1°6, 8 specimens; Upernivik (Drosvad legit), 2 specimens.

Previously known from Melville Bay, Umanak, and several localities in Disko Bay, and from Tunugdliarfik (Eriksfjord) at depths between 53 and 623 m. The species has never been found on the banks. Moreover it has been taken in Jones Sound, Gaasefjord by the Fram-expedition.

Further distribution (see the map, fig. 16): East Greenland (new locality: Kangerdlugssuak 175 m, E. Mikkelsen's expedition 1932), the cold area of the Norwegian Sea, East and West Spitzbergen, Murman

Coast, Barents Sea, Kara Sea, Siberean Polar Sea, at depths between a few metres and 1150 m. It is very common in the upper part of the littoral region on the east coast of Greenland and in the Siberean Sea. The *Actinia*-formation, especially richly developed in Actinia Bay (STUXBERG 1880 p. 50) refers to this species. Its distribution shows that it is a circumpolar arctic form, especially common in the cold areas, though it is apparently able to tolerate fairly high positive temperatures (up to 3°78), at least for a short time.

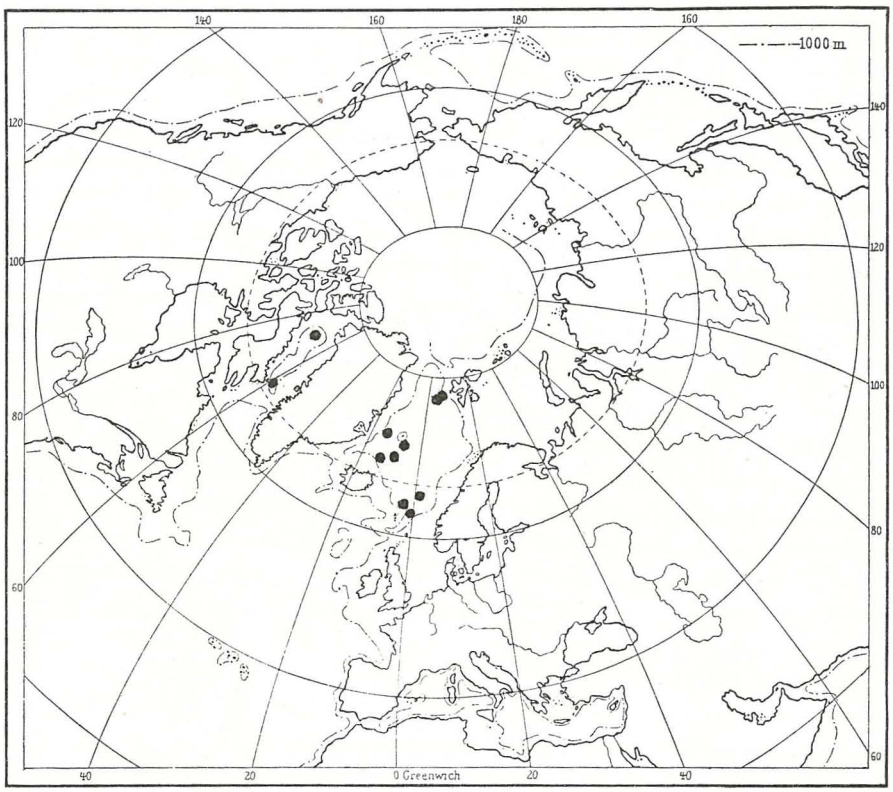

Fig. 17. *Amphianthus margaritaceus.*

Amphianthus (*Korenia*) *margaritaceus* (Dan.).

(Maps, figs. 17 and 21.)

Korenia margaritacea n. sp. Danielssen 1890 p. 1.

Amphianthus (*Korenia*) *margaritaceus* (Dan.), Carlgren 1928 p. 300, 1932 p. 264.

Material: Stat. 54, 69°50′ N. 61°36′ W. 1880 m, temp. ÷ 0°4, 1 specimen; stat. 135, 74°41′ N. 70°30′ W. 1200 m, temp. ÷ 0°2, 5 specimens.

This species was not previously known from the waters west of Greenland.

Further distribution (see the map, fig. 17): Several localities in the cold area of the Norwegian Sea. Its distribution mainly agrees with that of *Kadosactis rosea*. The northernmost locality in which it has been found is at 78°19′ N., the southernmost at 63°53′ N., at depths between 1373 and 2814 m and at temperatures between ÷ 0°8 and ÷ 1°4.

One of the specimens from stat. 135 was attached to the hydroid *Eudendrium planum* Bonnevie and four to an elongated sponge. A more thorough description of this species will be given in the second part of the "Ingolf" Actiniaria.

The species is a well marked high-arctic, abyssal form.

Besides the above-mentioned species, 2 very young, small, flattened specimens of a sterile Hormathiid, of which I have also examined some specimens from East Greenland, have been dredged at stat. 144. At present it is impossible to determine to which species they belong. The same is the case with one sterile specimen of a Hormathiid taken at stat. 143 and provided with 6 perfect pairs of mesenteries and a well developed reticular sphincter with large meshes, elongated in radial direction in the upper part of the sphincter.

Larvæ of Hormathiidae.

Material: "Godthaab" stat. 10, 56°56′ N. 51°17′ W. June 3rd 1928, depth 3500 m, ringtrawl 3000 m wire, 7 specimens. — "Tjalfe" stat. 333, 63°18′ N. 54°55′ W. 1300 m.

Colour: The best preserved specimens with more or less of the ectoderm left were yellowish brown, reminding one of the colour of *Hormathia nodosa*, the other specimens, in which the ectoderm was lost, were white.

The breadth of the smallest specimen was 0.25 cm, that of the largest one about 0.4 cm. One specimen was elongated and not much contracted, the others were contracted in oral-aboral direction, all specimens provided with 8 longitudinal furrows corresponding to the insertions of the 8 mesenteries. In one specimen one acontium was pressed out into the actinopharynx, giving me an opportunity of making maceration preparations of the acontium. The numerous nematocysts were spirulæ and 36—41 × abt. 3 μ in size. I have also made maceration preparations of the ectoderm in the aboral part of one specimen; there were numerous spirocysts but also, though more rarely, spirulæ 36—50 × 2.5—3 μ. The larvæ thus belong to the family *Hormathiidae*, but as *Hormathia nodosa* has considerably smaller nematocysts in its column, the larvæ can hardly be referred to that species. I have sectioned

5 larvæ showing no real difference in structure. No tentacles were developed. The ecto- and endoderm of the column had a vesiculous (vacuolised), reticular appearance; in the aboral part there was a well developed nerve-layer in the ectoderm. The 8 "Edwardsia"-mesenteries are present and occupy almost the whole inner cavity; only here and there in some of the larvæ larger parts of the coelenteric cavity were visible. The longitudinal muscles formed very weak pennons, the parietobasilar muscles

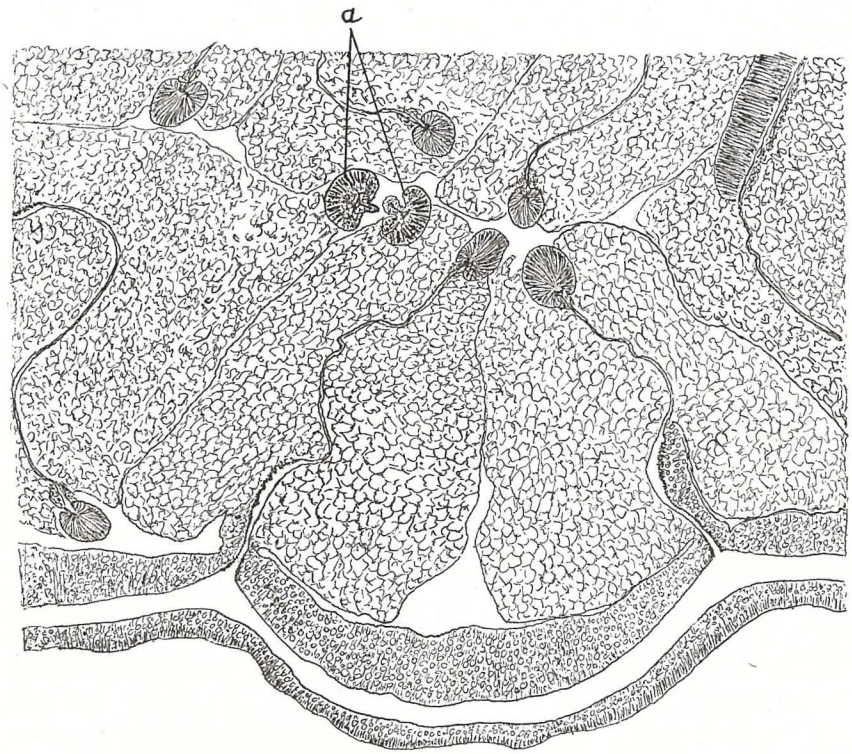

Fig. 18. Transversal section of a larva, belonging to the family Hormathiidae, with acontia (*a*).

were weak and unfolded. The filaments lacked ciliated streaks, but the cnido-glandular tract was well developed. At least four of the sectioned larvæ were provided with strong acontia, the fifth was not sufficiently well preserved for deciding this point. In fig. 18 I have given a transverse section of part of the body (a = acontia).

Similar larvæ have been taken by the "Tjalfe" expedition. Among three sectioned specimens at least two had acontia, and as the larvæ, in which the ectoderm was preserved, had spirocysts and nematocysts in their column of the same size as those from the "Godthaab" expedition, they certainly belong to the same species.

Distribution and zoogeographical Relations of the Zoantharia and Actiniaria found in the Waters West of Greenland.

In Conspectus Faunæ Groenlandicæ (1928) I have given a survey of the Zoantharia and Actiniaria in the waters west of Greenland and indicated the zoogeographical character of several species. To the species previously known from these waters, 3 species new to West Greenland, taken by the "Godthaab" expedition, are now to be added. One hitherto undescribed species, *Parasicyonis groenlandica*, is probably Atlantic, as it was dredged at 1200 m in the Davis Strait, the two others, *Amphianthus margaritaceus* and *Kadosactis rosea*, are from the deep basin in the Baffin Bay. Also a fourth species, *Epizoanthus erdmanni*, is really new to West Greenland, but it was taken by the "Tjalfe" expedition. Unquestionably the most interesting feature is the discovery of the named *Amphianthus* and *Kadosactis*, previously only known from several localities in the cold deep basin of the Norwegian Sea, showing that both of these deep-sea areas have at least some Actiniaria in common.

Before discussing the distribution of the species it may be suitable to give a list of them with information on the depths at which they have been found at West Greenland as well as in other localities (Table I). In a special column I have tried to state the zoogeographical character of the species. In several cases, especially when only few localities are known, this statement is more or less uncertain, but on the whole, I think, not too wrong. As far as the zoogeographical terminology is concerned I mainly follow v. Hofsten (Die Echinodermen des Eisfjordes. K. Svenska Vet.-Akad. Handl. 54, 2 1915).

Panarctic are species distributed over the whole arctic region — I disregard the area north of N. America, which is almost unknown as far as Actinians are concerned. Among the other arctic forms one can distinguish between high-arctic species always living at negative temperatures in the abyssal or, if present in more shallow water, sometimes for only a short time occurring at low positive temperatures, and low-arctic species preferring low positive temperatures but also living at temperatures below 0° and principally present in the boreo-arctic region. As merely arctic I have designated the species spread over a more limited area within the Arctic, or the arctic character of which I cannot clear up at present. Arctic-boreal are the species occurring in the arctic as well as in the boreal region. Some of them may be panarctic at the same time, some are principally or primarily arctic, others (low-arctic boreal) are principally boreal. The terms boreal and Atlantic need no further explanation.

Table I. List of Zoantharia and Actiniaria found in the waters West of Greenland.

Species (Species mentioned in this paper are marked by an *. Species new for W. Greenland are marked **).	Distributions in the waters west of Greenland		Depth at other localities m	Zoogeographical character
	Lat. N.	Depth m		
**Epizoanthus lindahli* Carlgr.	77°05′5—66°22′	404—1200	280—686	arctic.
***Epizoanthus erdmanni* (Dan.)	75°26′—70°51′	686—820	75—1591	low-arctic.
Epizoanthus danielseni Carlgr.	75°26′—66°22′	151—686	410—836	arctic, probably low-arctic.
Epizoanthus glacialis Dan.	70°53′—70°45′	210—707	142—1134	arctic.
**Isozoanthus bulbosus* Carlgr.	66°35′—60°17′	599—3229	410—2465	probably arctic.
Isozoanthus davisi Carlgr.	66°35′	599	?	atlantic?
**Isozoanthus ingolfi* Carlgr.	65°16′—64°54′	681—740	?	arctic, probably low-arctic.
**Actinernus nobilis* Verr.	63°36′—63°30′	1096—1200	366—2893	west-atlantic.
**Edwardsia andresi* Dan.	68°23′5—60°30′	265—599	149—534	arctic-boreal.
Halcampoides purpurea (Stud.)	67°50′—64°10′	178—200	1—1134	cosmopolitan but mainly arctic and antarctic.
Acthelmis intestinalis (Fabr.)	68°45′—67°50′	littoral	?	probably arctic.
Peachia parasitica (L. Agas.)	68°45′—67°50′	535—500	27—38	arctic, also parasitic on Cyanea arctica.
**Halcampa arctica* Carlgr.	69°20′—66°15′	38—226	5—397	arctic.
?Cactosoma abyssorum Dan.			349—836	probably low-arctic.
Haliactis arctica Carlgr.	67°45′—67°35′	375—410	7—70	arctic.
**Liponema multicornis* (Verr.)	68°20′—65°34′	128—599	82—872	low-arctic.
Bolocera tuediae (Johnst.)	65°14′—60°30′	490—791	10?—2023	atlantic, boreal.
Bolocera maxima Carlgr.	60°17′—59°12′	3229—3521	?	probably atlantic.
Bunodactis stella (Verr.)	72°45′—62°	6—70	1—102	pan-arctic.
?Bunodactis spetsbergensis Carlgr.		?	16—640	arctic.
Cribrinopsis similis Carlgr.	69°46′—60°30′	9—471	11—620	arctic, probably low-arctic.
**Urticina felina crassicornis* (L.)	78°14′—66°30′	20—790	0—600	panarctic.
Epiactis nordmanni Carlgr.	67°39′	325—330	?	arctic.
**Anthosactis jan mayeni* Dan.	77°28′5—70°45′	445—875	57—300	high-arctic.
Tealidium jungerseni Carlgr.	59°12′	3521	2448	atlantic.
Pycnanthus laevis Carlgr.	66°35′	599	1356	atlantic.
Sicyonis tuberculata Carlgr.	66°35′	599	2488	atlantic.
Sicyonis ingolfi Carlgr.	58°25′	3192	?	atlantic.
**Actinostola callosa* (Verr.)	68°17′—61°55′	420—599	40—1316	boreal, atlantic.
Actinostola groenlandica Carlgr.	69°45′—60°44′	9—424	?	?
**Actinostola spetsbergensis Carlgr.*	78°15′5—60°27′	14—1880	4—590	panarctic.
Stomphia coccinea (O. F. M.)	72°45′—60°20′	27—356	16—445	arctic-boreal.
***Parasicyonis groenlandica* n. sp.	63°36′	1200	?	probably atlantic.
***Kadosactis rosea* Dan.	69°50′—67°48′5	1600—1880	1629—2465	high-arctic.
Chondrophellia coronata (Verr.)	66°35′	599	549—2448	atlantic, south pacific.

Species (Species mentioned in this paper are marked by an *. Species new for W. Greenland are marked **).	Distributions in the waters west of Greenland		Depth at other localities m	Zoogeographical character
	Lat. N.	Depth m		
Phelliactis hertwigi Simon.....	64°05′	1100	616—1960	atlantic.
Phelliactis robusta Carlgr.....	66°35′—64°54′	599—740	1356—2448	atlantic.
**Actinauge verrillii* Mc.Murr....	77°28′5—63°30′	128—1096	91—2008	west-atlantic,pacific?
**Allantactis parasitica* Dan.....	77°28′5—69°15′ (61°51′)	53—930	6—1448	panarctic.
**Hormathia nodosa* (Fabr.).....	76°40′—60°22′	27—580	9—650	pan-arctic.
**Hormathia digitata* (O. F. M.)..	68°46′—61°10′	2—451	10—660	arctic-boreal.
**Metridium dianthus* (Ell.)	68°46′—64°30′	0—38	0—about 100	low-arctic-boreal
Stephanauge abyssicola (Mos.) .	66°49′	443	400—2941	atlantic.
***Amphianthus margaritaceus* (Dan.).....	74°41′—70°30′	1200—1800	1373—2814	high-arctic.

Of the 44 listed species two forms, *Cactosoma abyssorum* and *Bunodactis spetsbergensis* are certainly from West Greenland, especially the former, although they were labelled only Greenland, the former taken by Ryder. At present *Isozoanthus davisi*, *Acthelmis intestinalis*, *Bolocera maxima*, *Epiactis nordmanni*, *Sicyonis ingolfi*, *Actinostola groenlandica*, and *Parasicyonis groenlandica* are known only from the waters west of Greenland, *Sicyonis ingolfi* however somewhat south of this country. Of these species *Acthelmis*, taken in shallower water in Diskofjord, and *Epiactis*, only found in the cold North Strömfjord, are certainly arctic, on the other hand, *Bolocera*, *Parasicyonis*, and *Sicyonis*, occurring in the deep area of the Davis Strait, are Atlantic. As to *Actinostola groenlandica* it is difficult to decide its zoogeographical character, possibly it is low-arctic?

Of the Zoantharia I have (1928) preliminarily indicated *Epizoanthus erdmanni*, *E. lindahli*, *E. glacialis*, and *E. danielsseni* as low-arctic species. The new localities of *E. lindahli* (see maps figs. 2, 19) speak for that perhaps this species is not low-arctic. 4 of the *lindahli*-stations had a bottom temperature between ÷ 0°11 and ÷ 0°4, at two other stations the bottom temperature was probably negative, at 5 stations between 0°1 and 1°1. As, however, the species has been taken by the Ingolf expedition at a bottom temperature of 3°9, its zoogeographical character is somewhat dubious but at any rate arctic. As only arctic I have now indicated *E. glacialis*. On the other hand, I think *E. erdmanni* is a typical low-arctic form (see maps figs. 1, 19), taken always in low positive temperature at 17 stations between 0°61 and 4°1 — of these stations 13 had a bottom temperature from 0°61 to 2°85 — at two further stations between 6° and 7°. Also *E. danielsseni* and *Iso-*

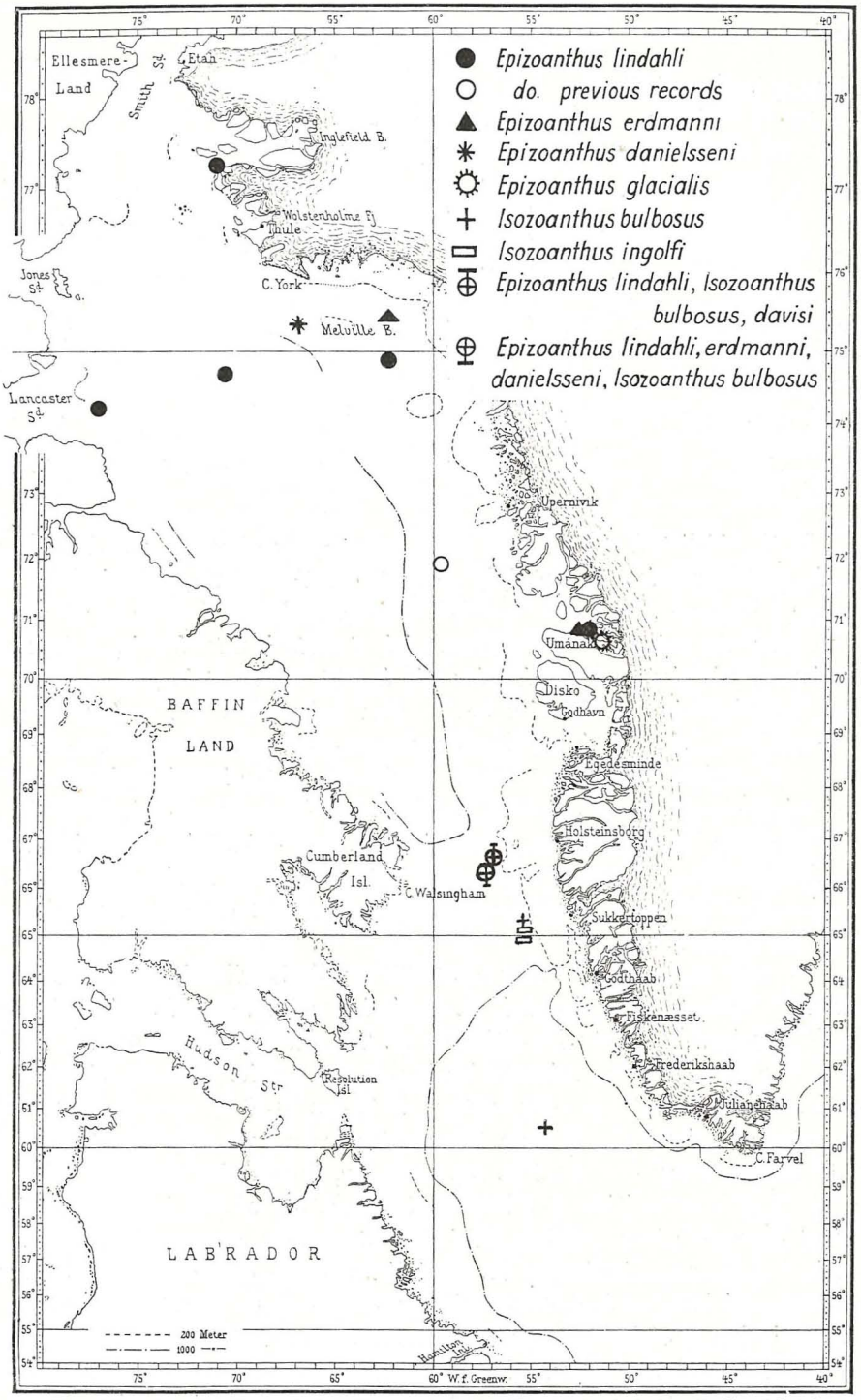

Fig. 19. Distribution of the Zoantharia in the waters west of Greenland.

zoanthus ingolfi probably may be low-arctic as taken at stations always, except one, with positive temperature. The localities of both these species are, however, too few for characterising them with certainty. As to *Isozoanthus bulbosus* I shall come back to it later on.

Among the Actiniaria 5 species with in the main similar distribution (see maps, figs. 9, 14, 16) are panarctic, the abyssal species *Kadosactis rosea* and *Amphianthus margaritaceus* (see maps, figs. 11, 17) as also *Anthosactis jan mayeni* (see map, fig. 7) high-arctic. Near the high-arctic species as to their zoogeographical character are the possibly panarctic *Haliactis arctica* and *Halcampa arctica* (see map, fig. 5). As far as we can state at present *Liponema multicornis* and *Cactosoma abyssorum* are low-arctic. The distribution of the former (see map, fig. 6) as also the bottom temperature, between 0°2 and 3°9, observed however at only 3 stations, speak for such a supposition. Also the occurrence of the latter between Norway and Spitzbergen and west of Norway at the limit to the ± curve at temperatures between ÷ 0°7 and 3°5 (only at one station negative) indicates that we have to do with a low-arctic form. As low-arctic I have indicated also *Cribrinopsis similis*, although this statement is somewhat uncertain. At West Greenland it has been dredged at many localities from Ritenbenk unto Bredefjord — one locality is from the banks — further at West and East Spitzbergen, Faroe Islands, Finmarken, Murman Coast, Bering Island, the Korea Strait, and in two localities in the Norwegian Sea, the one with negative (÷ 0°03), the other with positive temperature (about 4°5), but it is neither known from East Greenland nor from the Kara Sea and the arctic Sea of Siberia. As to the other specimens there is hardly any doubt of their zoogeographical character except that of *Actinauge verrillii*. As I have pointed out (compare p. 29—30) there is much doubt about the distribution of this species and its relation to *Actinauge rugosa*. Calling to mind VERRILL's statement of the distribution of both these species we may conclude that *verrillii* is a more southern form than *rugosa*. According to VERRILL (1922), *verrillii* is distributed between Chesapeake Bay and Nantucket, *rugosa* between Cape Cod and the Gulf of St. Lawrence, but also found in Hudson Bay. As I have examined (compare p. 30) specimens of *verrillii* from 40°03′ N. and 70°28′ W., N. of New Foundland, Kvanefjord and St. Lawrence Estuary agreeing very well with VERRILL's figures of *verrillii*, I think that this species has a rather continuous distribution along the east coast of N. America from Chesapeake Bay unto Smith Sound (see the maps, figs. 15, 20). If the Hudson Bay specimens of *rugosa* belong to *verrillii*[1]), it is the question if *verrillii* is not primarily an arctic eurytherm form.

[1]) Compare p. 28.

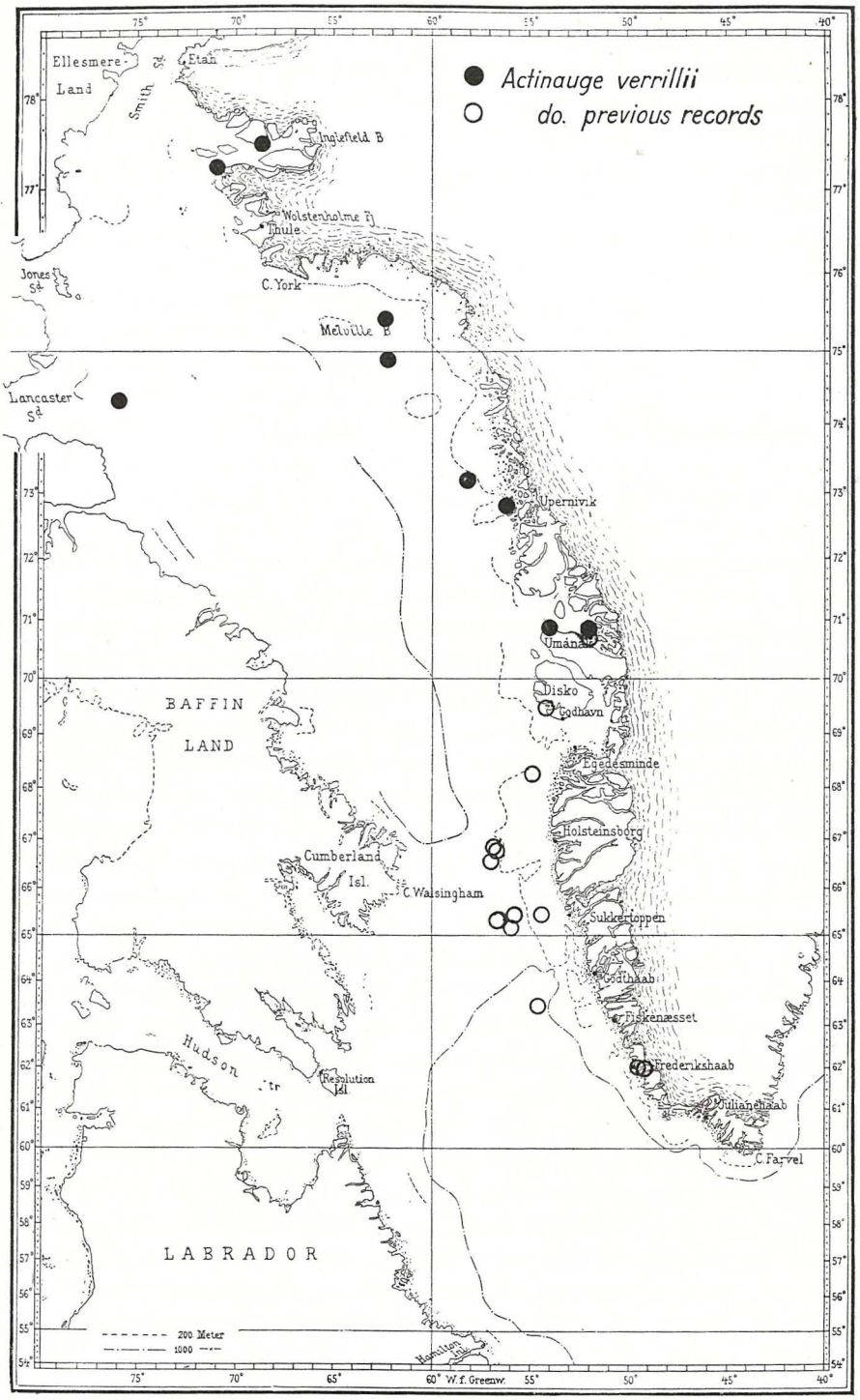
Actinauge verrillii
do. previous records
Ellesmere Land
Etah
Smith Sd.
Inglefield B.
Wolstenholme Fj.
Thule
Jones Sd.
C. York
Melville B.
Lancaster Sd.
Upernivik
Umanak
Disko
Godhavn
BAFFIN LAND
Egedesminde
Holsteinsborg
Cumberland Isl.
C. Walsingham
Sukkertoppen
Godthaab
Fiskenæsset
Hudson Str.
Resolution Isl.
Frederikshaab
Julianehaab
C. Farvel
LABRADOR
200 Meter
1000
Hamilton Inl.
W. f. Greenw.

Fig. 20.

I have first signified it as west-atlantic. Besides, a species taken at St. 10 by the "Michael Sars" expedition at a depth of 4700 m (off the Bay of Biscay) reminds me of *verrillii* — I have, however, not finished my examination of this species — but if both these species should prove to be identical, *verrillii* has a considerably wider distribution than before supposed.

After the short discussion of the zoogeographical character of this species it may be convenient to make a comparison between the Zoantharian and Actiniarian fauna on the one side in the deep area of the Baffin Bay and in that under 1000 m in the Davis Strait on the other side, with that living on the submarine ridge across the narrowest parts of the Davis Strait outside the Great Hellefiske Bank. As, however, several species occurring outside the named bank are also found near the Little Hellefiske Bank, where further two species have been dredged, I include also these species in the comparison.

The deep area of the Baffin Bay, in which depths of more than 2000 m have been measured, contains water of negative temperature between about ÷ 0°2 and ÷ 0°4 from 1200 m downwards, in opposition to that of the Davis Strait, where there is always positive temperature from about 3° unto 1°4 at depths of more than 3000 m. On the submarine ridge with a depth of unto 700 m, southwards somewhat more, the temperature is somewhat higher than 3° (at the "Ingolf" station 32 it was 3°9), but lower near the limit of the banks. Signifying the species found from 1200 m downwards in the Baffin Basin with A., those in the deep area of the Davis Strait with B., and those on the submarine ridge between these areas with C., the distribution of the species is the following (see the map fig. 21).

A.

Epizoanthus lindahli
Amphianthus margaritaceus
Kadosactis rosea
Actinostola spetsbergensis

B.

Isozoanthus bulbosus
Actinernus nobilis
Bolocera maxima
Parasicyonis groenlandica
Tealidium jungerseni
Phelliactis hertwigi
Actinauge verrillii

C.

Epizoanthus lindahli
— *erdmanni*
— *danielsseni*
Isozoanthus bulbosus
Pycnanthus laevis
Sicyonis tuberculata
Actinostola callosa
Actinostola spetsbergensis

Isozoanthus davisii
— *ingolfi*
Edwardsia andresi
Liponema multicornis
Bolocera tuediae
Chondrophellia coronata
Phelliactis robusta
Actinauge verrillii
Hormathia nodosa
— *digitata*
Stephanauge abyssicola

From the list and the map, fig. 21 we already see that there are other species living in A. than in B. In fact the species in A all are arctic. those in B are atlantic-abyssal except probably *Isozoanthus bulbosus*, to which I shall come back later on. Of the 4 species dredged in A the occurrence of *Epizoanthus lindahli* and *Actinostola spetsbergensis* is not so extraordinary, although deserving notice, as in the Baffin Basin they go considerably deeper down than usual. The largest depth, in which the former has previously been taken, is 686 m, but in the basin 1200 m. The corresponding depths are for the latter 590 resp. 1880 m. More interesting it is that *Kadosactis rosea* and *Amphianthus margaritaceus* occur in the Baffin Basin as they are typical high-arctic abyssal species always living in negative temperatures in the great depths in the Norwegian Sea as also the small *Bathyphellia margaritacea* which, however, seems not to have been dredged by the Godthaab Expedition but possibly also occurs in the Baffin Bay. The occurrence of these two species in these two areas separated from each other by more or less shallow thresholds leads to the conclusion that in earlier times there may have been a nearer connection between these deep basins, or that the transmission of the species has taken place through larvae having been transported with sea-currents to the new area and there developed to fertile animals forming new populations. Unfortunately we do not know, whether the two named species have planctonic larvae or if they, like *Actinostola spetsbergensis* and some other pan-arctic species, develop their embryos in the coelenteric cavity. In the former case the possibility is present — as far as the direction of the sea-currents permits — for a transition of larvae from the one area to the other and under favourable circumstances for an origination of new populations far from the old area. On the other hand, such a transition is hardly possible if the named *Amphianthus* and *Kadosactis* develop their embryos in the coelenteric cavity (or in especial brood-rooms). With such a development, I think, we may presuppose that they previously have had a more continuous distribution, which has later on been interrupted whether the connection has taken place always in a deep-sea or above shallower water. Such a "wandering" above shallower water *Isozoanthus bulbosus* possibly has made, its distribution being very peculiar (see map, fig. 3). Although this species in the Norwegian and

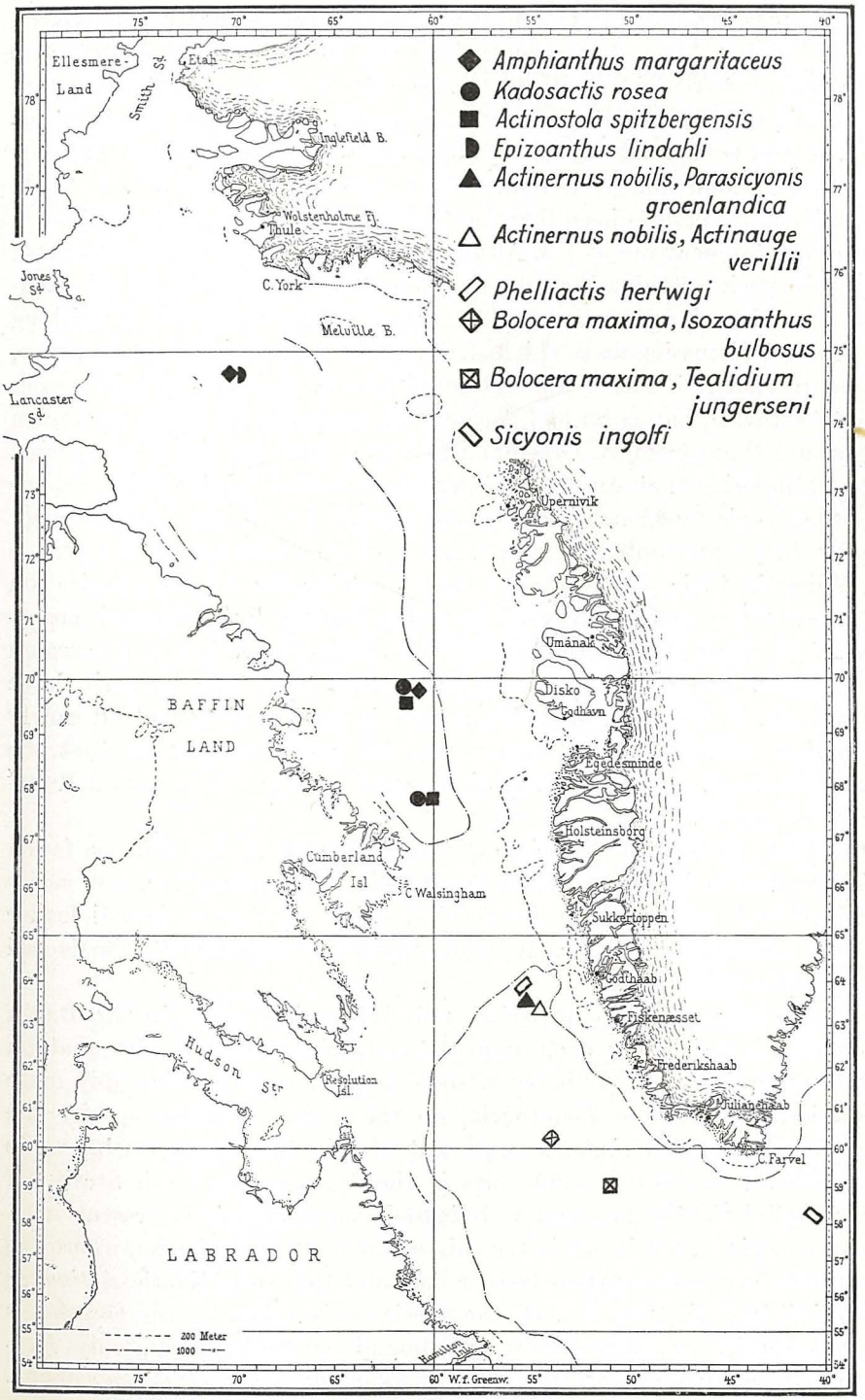

Fig. 21. Deep-sea localities, where Zoantharia and Actiniaria have been found.

Arctic seas certainly is abyssal, living in negative temperatures between ÷ 0°4 and ÷ 1°1 and at a depth between 698 and 2465 m, but at East Greenland taken in shallower water (410 m) and at a temperature of 2° (probably only temporary). It occurs also in the Davis Strait W. of the Great and the Little Hellefiske Banks in depths of between 599 and 686 m and at a temperature between 3°9 and 3°6. A single specimen has besides been taken in the Davis Strait at a depth of 3224 m and at a temperature of 1°4. Although we do not know the development of this species, I think it may be possible that a connection in the distribution exists along the E. and S.W. coasts of Greenland. Before finishing the short discussion as to the distribution of *I. bulbosus* I will, however, remark that it is rather difficult to determine especially certain species of Zoantharia, but as far as I can see, the specimens from the Norwegian Sea and those from W. Greenland belong to one and the same species.

Supposing that *Amphianthus* and *Kadosactis* do not develop pelagic larvae, their previously continuous distribution in the deep-sea may have been interrupted long ago. I say in the deep-sea, then there is nothing in their present distribution speaking for the communication to have taken place above shallow water. But the Baffin Basin is separated by rather shallow thresholds from the great Arctic and Norwegian deep-seas. The channels to the Baffin Bay may then formerly have been deeper. If the theory of WEGENER is right, that Greenland slowly wanders westwards, it is perhaps not impossible to suppose that the wandering has caused a filling up of especially the Kennedy and Robesons Channels.

The problems of the origin of the conformity in the deep-sea fauna in the Baffin Bay and in the Norwegian Sea is, however, not easily solved and may be later discussed, I think, by the zoological leader of the expedition, Dr. KRAMP, when the whole material of animals will have been examined.

Comparing the Zoantharian and Actiniarian fauna in the Baffin Basin (A) and in the deep area of the Davis Strait (B) with that on the submarine ridge (C) between these areas, we find considerably more species, especially of Zoantharia, on the latter. Of these species the arctic *Epizoanthus lindahli* is present also in the Baffin Basin, while *Isozoanthus bulbosus* is found also in the depth of the Davis Strait. Of the Actiniaria the pan-arctic *Actinostola spetsbergensis* is present in A as well as in C, but in the latter only at the limit of the banks, where the temperature is lower than farther out, and the west-atlantic *Actinauge verrillii* in both B and C. Of the species only taken on the thresholds most species are atlantic, atlantic-boreal or arctic-boreal, only *Epizoanthus danielsseni* and *erdmanni*, *Isozoanthus ingolfi*, *Liponema multicornis* and *Hormathia nodosa*, the latter only dredged at the limit of the

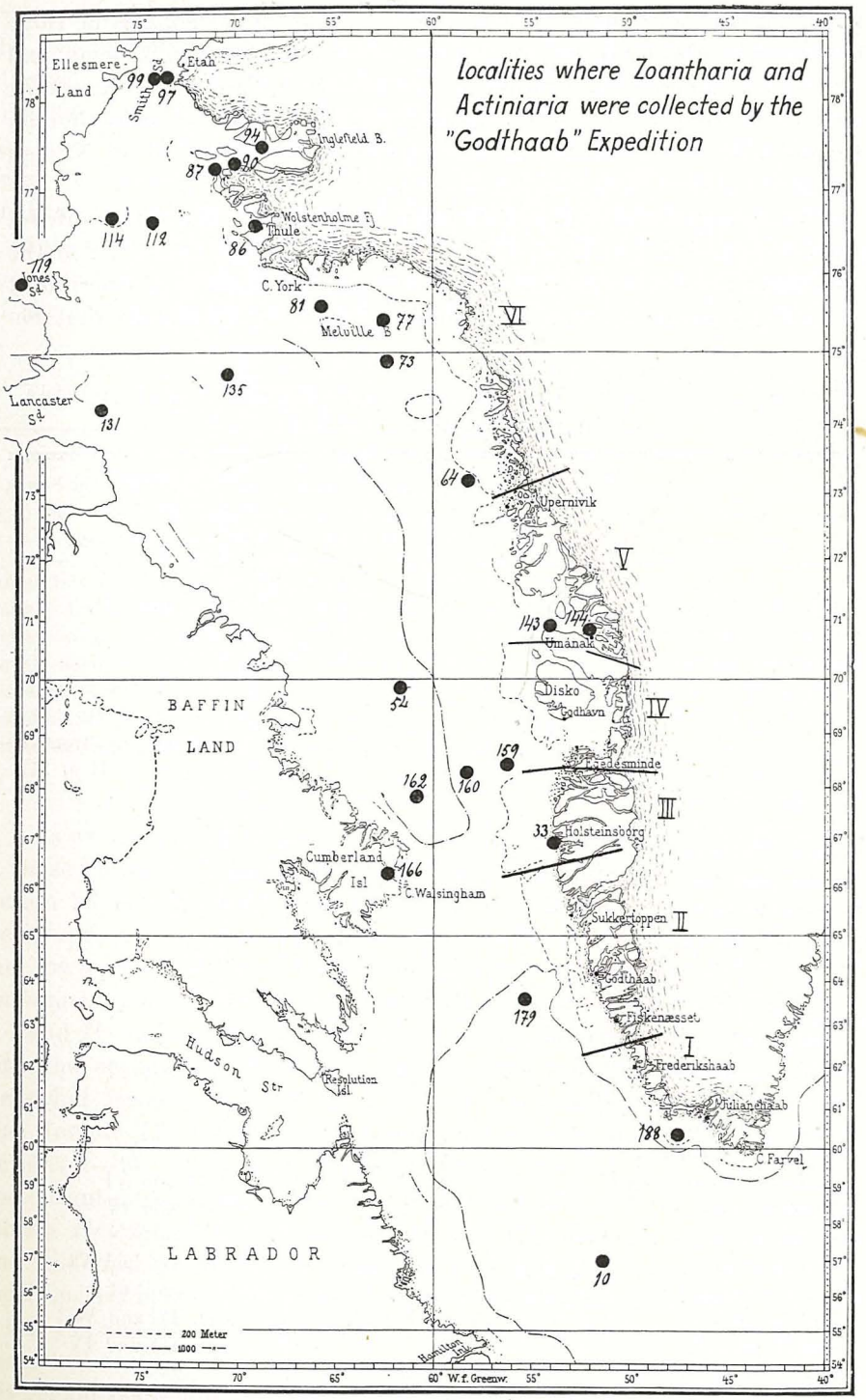
localities where Zoantharia and Actiniaria were collected by the "Godthaab" Expedition
Ellesmere Land
Etah
Inglefield B.
Wolstenholme Fj
Thule
C. York
Melville B.
Lancaster Sd.
Jones Sd.
Smith Sd.
Upernivik
Umának
Disko
Godhavn
Jakobshavn
Holsteinsborg
Sukkertoppen
Godthaab
Fiskenæsset
Frederikshaab
Julianehaab
C. Farvel
BAFFIN LAND
Cumberland Isl
C. Walsingham
Hudson Str.
Resolution Isl.
LABRADOR
Hamilton Inlet
I
II
III
IV
V
VI
200 Meter
1000
W.f. Greenw.

Fig. 22.

banks, are arctic, some of them low-arctic. Thus on the submarine ridge between the Baffin Basin and Davis Strait a mixed Zoantharian and Actinarian fauna lives. Almost all Zoantharia-species are arctic, while most Actiniaria-species are atlantic, atlantic-boreal or arctic-boreal. Remarkable is the great number of species found at 66°35′ N. and 56°38′ W. (Ingolf Exp. St. 32, 599 m).

In his paper on the Hydroids from the Godthaab-expedition (Medd. om Grønland Bd. 79, No. 1, 1932) KRAMP has divided the fauna of the fjords and the banks into 6 sections (see map, fig. 22). The southernmost section comprises the area unto about 62°30′, the second one that be-

Table II. Distribution of littoral and sublittoral species in the various sections.

Species	Sections						Aside from the banks or fjords also found in:
	I	II	III	IV	V	VI	
Epizoanthus lindahli	..	..	..	..	+	..	III and VI
Epizoanthus erdmanni ...	..	..	..	..	+	..	VI
Epizoanthus glacialis	..	..	..	..	+	..	
Epizoanthus danielsseni .	?	?	?	..	..	..	III; ? One locality: Davis Strait 121 m is certainty from the banks I, II or III
Edwardsia andresi	+	..	..	..	..	..	III and IV
Halcampoides purpurea ..	..	+	+	..	..	..	
Acthelmis intestinalis	..	..	..	+	..	..	
Peachia parasitica	..	..	+	+	..	..	
Halcampa arctica	..	..	+	+	..	..	
Haliactis arctica	..	..	+	..	..	..	
Bolocera tuediae	+	..	..	..	..	..	II
Liponema multicornis ...	..	+	+	..	..	..	III
Bunodactis stella	+	..	+	+	+	..	
Cribrinopsis similis	+	+	+	+	..	..	
Urticina felina crassicornis	+	+	+	+	+	+	IV and VI
Epiactis nordmanni	..	..	+	..	..	..	
Anthosactis jan mayeni ..	..	..	..	..	+	+	VI
Actinostola groenlandica .	+	..	..	+	..	..	
Actinostola spetsbergensis	+	+	+	+	+	+	III and VI
Actinostola callosa	+	..	..	..	..	..	III and IV
Stomphia coccinea	+	+	+	+	+	..	
Actinauge verrillii	+	+	+	+	+	+	II, III and VI
Allantactis parasitica	+	..	..	+	+	+	IV and VI
Hormathia nodosa	+	+	+	+	+	+	II, IV and VI
Hormathia digitata	+	+	+	+	?	..	II, III and IV
Metridium dianthus	..	+	+	+	..	..	
Total number of species	13	10	15	14	11 (12?)	6	

tween 62°30′ and 66°20′, the third one that from 66°20′ to 68°20′, the fourth between 68°20′ and 70°40′, the fifth comprises the deep Umanak fjord and the coastal area to about 73°, and the sixth the area between 73° and Smith Sound. As it may be of some interest to see, how the distribution of the Zoantharia and Actiniaria is in these areas in comparison with that of the Hydroids, I have made a similar analysis of the groups treated in this paper. I will, however, first give a table of the distribution (Table II).

As to their zoogeographical character the distribution of the species in the sections is the following (Table III):

Tabel III. Number of littoral and sublittoral species found in each section.

Zoogeographical character	Sections					
	I	II	III	IV	V	VI
pan-arctic	5	3	4	5	5	4
arctic + low-arctic	0+1 = 6	0+2 = 5	4+2 = 10	3+1 = 9	3+1 = 9	1+0 = 5
arctic-boreal + low-arctic-boreal	1+2	1+2	1+2	1+2	1+1?	0
boreal—atlantic	2	0	0	0	0	0
westatlantic	1	1	1	1	1	1
cosmopolitan	0	1	1	0	0	0
low-arctic? (*Actinostola groenlandica*)	1	0	0	1	0	0
	13	10	15	14	11 (12?)	6

As we see from the table the number of species in the areas, especially in those indicated with I, III, and IV, is not so different except in the section VI, where the number of species is considerably less. The pan-arctic species are about equally distributed in all sections, the arctic and low-arctic species are represented by a single high-arctic form, *Anthosactis jan mayeni*, in the section VI and only by low-arctic forms in I and II; they are the most numerous in the section III in connection with the occurrence of several species in the cold North Strömfjord, somewhat fewer in IV and V, in which only one low-arctic form has been found. The arctic-boreal species are equally distributed in the sections I—IV, in V there is probably only one and in VI none; the west-atlantic *Actinauge verrillii* is present in all sections, the cosmopolitan *Halcampoides* in the areas II and III, and the in W. Greenland endemic *Actinostola groenlandica* in I and IV. Summing up all arctic species in the different sections most such species have been found in III, IV, and V, while they are considerably fewer in the other sections. The small number of arctic species in the section VI is possibly due to this region being less thoroughly explored than the other regions. More

peculiar is the occurrence of so few arctic species in the areas I and II in comparison with the distribution of the Hydroids, of which most arctic species have been taken in the region II, some fewer in I, and the smallest number in section V. On the whole, the distribution of the Zoantharia and Actiniaria in the coastal regions of West-Greenland is in good conformity with the hydrographical conditions (compare KRAMP l. c. p. 75—76).

In conformity with STEPHENSEN, HARTMEYER, and KRAMP (compare KRAMP, Hydroids collected in West-Greenland fjords in 1911 and 1912, Meddel. om Grønland Bd. 91, No. 3, 1932) having compared the Crustaceans, Pycnogonids, Echinoderms, Ascidians, and Hydroids found in the southern ("Atlantic") fjords with those occurring in the arctic North Strömfjord, I have made a similar comparison as to the distribution of the Actiniarian fauna. The explored atlantic fjords are Bredefjord (B), Skovfjord (S), Eriksfjord (E), and Kvanefjord (K). From these fjords and from North Strömfjord the following Actiniaria are known.

Atlantic fjords	North Strömfjord
Edwardsia andresi (B. 220—310 m)	.....
.....	*Halcampoides purpurea* (375—380 m)
.....	*Peachia parasitica*
.....	*Halcampa arctica*
.....	*Haliactis arctica* (375—360, 400—410 m)
Bolocera tuediae (B 490 m)	.....
Bunodactis stella (K probably littoral)	(littoral)
Cribrinopsis similis (B 170—180 m)	(14—30 m)
Urticina felina crassicornis (B 24—100, K 34—40, 290—400 m)	(325—330 m)
.....	*Epiactis nordmanni* (325—330 m)
Actinostola callosa (K 420 m)	.....
Actinostola spetsbergensis (S 70—140 m)	(14—38, 325—330, 400—410 m)
Stomphia coccinea (B 170—180, S 70—140, 80—120 m)	(33—50, 325—330 m)
Allantactis parasitica (E 280—300 m)	.....
Actinauge verrillii (K 200—410, 420, 300—500 m)	.....

Atlantic fjords

Hormathia nodosa (B 170—180 m (deep?) E. deep?)

Hormathia digitata (S 70—140, B 115, 110—180, 220—310, 250—280, 280, 245—400, E 125—175 m)

From Bredefjord 7 Actiniaria are known, from Skovfjord 3, from Eriksfjord 3, and from Kvanefjord 4, from all these fjords together 12 and from North Strömfjord 11. They are distributed in the following manner:

Atlantic fjords	North Strömfjord
Edwardsia andresi	*Halcampoides purpurea*
Bolocera tuediae	*Peachia parasitica*
Actinostola callosa	*Halcampa arctica*
Actinauge verrillii	*Haliactis arctica*
Hormathia digitata	*Epiactis nordmanni*
Allantactis parasitica	

Common to the Atlantic fjords and North Strömfjord:

Bunodactis stella	*Actinostola spetsbergensis*
Cribrinopsis similis	*Stomphia coccinea*
Urticina felina crassicornis	*Hormathia nodosa*

Although the species of Actiniaria taken in the enumerated fjords are few in number, and in consequence of that it is difficult to give a definite answer to the question whether a difference exists in the distribution of these animals in the Atlantic fjords and in North Strömfjord, it seems to me that in reality such a difference is present. The Actiniarian fauna of North Strömfjord consists of considerably more arctic species than in the other fjords. Except the cosmopolitan *Halcampoides*, in the arctic regions, however, preferring cold water, the 4 other species found in the North Strömfjord but wanting in the Atlantic fjords are arctic species. On the other hand, of the species taken only in the latter fjords but not observed in North Strömfjord, 2 are boreal-atlantic, one West-Atlantic, two arctic-boreal, and only one *Allantactis parasitica* panarctic, dredged, however, only in the relatively cold Eriksfjord at 2°1. The analysis speaks then for a difference between the Atlantic fjords and North Strömfjord existing as the Actiniarian fauna. That is in conformity with Stephensen, having examined the distribution of the Crustaceans, Pycnogonids, and Echinoderms in the same waters. On

the other hand, HARTMEYER has not found any essential difference in the composition of the Ascidian fauna in the two types of fjords, KRAMP arrives at the same result concerning the Hydroids "except that Atlantic abyssal species are wanting in North Strömfjord".

In his paper on the "Godthaab" Echinoderms (Meddel. om Grønland Bd. 79, No. 2, 1932) MORTENSEN has made an attempt to answer the question from where the Greenland Echinoderm fauna originates, and pointed out that there are several Echinoderms which have probably wandered into the Atlantic from the North Pacific. As to the Actiniaria it is at present rather useless to discuss this problem because the Actiniarian fauna in the North Pacific is very imperfectly known, and it is necessary to reexamine the rather few species described from N.W. America. But when an attempt is made, one ought to begin with the west-Atlantic species and find out whether some forms among them have wandered from the Pacific. As far as we know at present it may be possible that *Actinauge verrillii* is such a species, if it is taken for granted that MCMURRICH has correctly determined some specimens from the N. Pacific. Also *Peachia arctica* may possibly have had a similar origin.

Finally it is worth mentioning that at least large Actinians probably are of certain importance to the nourishment of fishes. I have before mentioned (Die Actiniarien der Olga-expedition. Wiss. Meeresunters. Kiel und Helgoland. N. F. 5 Abt. Helgoland. A. 1) the occurrence of *Hormathia nodosa* and *digitata*, and probably *Actinostola spetsbergensis* in the stomach of cods, and GRIEG (Evertebrater fra Bankerne ved Spitsbergen. Bergens mus. Aarbog 1923—24 No. 9 and 1926 No. 5) had made similar observations in other *Gadus*-species. In the collections of Actiniaria from Greenland in the Museum of Copenhagen there are some bottles with Actinians, *Hormathia nodosa* and *Allantactis parasitica*, found in the stomach of dogfish.

LIST OF STATIONS

St. 10. $^{3}/_{6}$. 56°56′ N. 51°17′ W. 3500 m. Ring-trawl. 3000 m wire.
Larves of an Hormathiid.

St. 33 a. $^{2}/_{7}$. Holstensborg 22—35 m. Three-edged dredge.
Metridium dianthus.

St. 54. $^{14}/_{7}$. 69°50′ N. 61°36′ W. 1880 m. Bottomtemp. ÷ 0°4. Salinity 34.5. Sigsbee-trawl.
Kadosactis rosea
Actinostola spetsbergensis
Amphianthus (Korenia) margaritaceus.

St. 64. $^{28}/_{7}$. 73°12′ N. 58°08′ W. 850 m. Bottomtemp. 0°5, Salinity 34.5, Sigsbee-trawl.
Actinauge verrillii
Allantactis parasitica.

St. 73. $^{30}/_{7}$. 74°52′5 N. 62°12′ W. 450 m. Bottomtemp. 0°7, Salinity 34.3, Sigsbee-trawl.
Epizoanthus lindahli
Anthosactis jan mayeni
Actinauge verrillii
Allantactis parasitica.

St. 77. $^{31}/_{7}$. 75°26′ N. 62°26′ W. 820 m. Bottomtemp. 0°7, Salinity 34.5, Ottertrawl.
Epizoanthus erdmanni
Anthosactis jan mayeni
Actinauge verrillii
Allantactis parasitica.

St. 81. $^{1}/_{8}$. 75°35′ N. 65°41′ W. 490 m. Bottomtemp. 0°7, Salinity 34.4, Ottertrawl.
Actinostola spetsbergensis
Allantactis parasitica.
Anthosactis jan mayeni

St. 86. $^{4}/_{8}$. 76°36′ N. 68°54′ W. 180—80 m. Bottomtemp. ÷ 1°3, Salinity 33.75, Ottertrawl.
Allantactis parasitica
Actinostola spetsbergensis

St. 87. $^{4}/_{8}$. 77°05′5 N. 71°13′ W. 790 m. Bottomtemp. ÷ 0°4, Salinity 34.35. Ottertrawl.

Epizoanthus lindahli — *Actinauge verrillii*
Urticina felina crassicornis — *Allantactis parasitica*

St. 90. $^{5}/_{8}$. 77°17′ N. 69°59′ W. 930 m. Bottomtemp. ÷ 0°4, Salinity 34.4, Ottertrawl.

Allantactis parasitica

St. 94. $^{6}/_{8}$. 77°28′5 N. 68°46′ W. 875 m. Bottomtemp. ÷ 0°4, Salinity 34.4, Ottertrawl.

Anthosactis jan mayeni — *Actinauge verrillii*
Allantactis parasitica

St. 97. $^{8}/_{8}$. 78°15′5 N. 73°29′ W. 290 m. Bottomtemp. ÷ 1°05, Salinity 34.05, Three-edged dredge.

Actinostola spetsbergensis

St. 99. $^{8}/_{8}$. 78°14′ N. 74°10′ W. 672 m. Bottomtemp. about ÷ 0°5, Salinity 34.45, Ottertrawl.

Urticina felina crassicornis — *Actinostola spetsbergensis*

Thule Bay. $^{14}/_{8}$. 0 m. Aalevad.

Actinostola spetsbergensis

St. 112. $^{16}/_{8}$. 76°37′4 N. 74°18′ W. 580 m. Bottomtemp. ÷ 0°5, Salinity 34.45, Ottertrawl.

Actinostola spetsbergensis

St. 114. $^{16}/_{8}$. 76°40′ N. 76°20′ W. 85 m. Bottomtemp. ÷ 1°1, Salinity 33.6, Three-edged dredge.

Hormathia nodosa

St. 119. $^{17}/_{8}$. 75°54′ N. 81°01′ W. 610 m. Bottomtemp. ÷ 0°6, Salinity 34.3, Ottertrawl.

Allantactis parasitica

St. 131. $^{22}/_{8}$. 74°12′ N. 77°00′ W. 680 m. Bottomtemp. ÷ 0°4, Salinity 34,5, Sigsbee-trawl.

Epizoanthus lindahli — *Actinauge verrillii*

St. 135. $^{23}/_{8}$. 74°41′ N. 70°30′ W. 1200 m. Bottomtemp. ÷ 0°2, Salinity 34.5, Ottertrawl.

Epizoanthus lindahli — *Amphianthus* (*Korenia*) *margaritaceus*

St. 143. $^{5}/_{9}$. 70°53′ N. 54°03′ W. about 700 m. Bottomtemp. 1°05, Salinity 34.5, Ottertrawl.

Actinauge verrillii — *Allantactis parasitica*
Amphianthus sp.?

St. 144. $^{5}/_{9}$. 70°51′ N. 52°01′ W. 733 m. Bottomtemp. 1°1, Salinity 34.5, Ottertrawl.

Epizoanthus erdmanni *Actinauge verrillii*
Epizoanthus lindahli *Allantactis parasitica*
Small specimens of an Hormathiid.

St. 159. $^{12}/_{9}$. 68°23′5 N. 56°12′ W. 480 m. Bottomtemp. 2°6, Salinity 34.55, Four-edged dredge.

Edwardsia andresi

St. 160. $^{12}/_{9}$. 68°17′ N. 58°14′ W. 410 m. Bottomtemp. 2°55, Salinity 34.5, Sigsbee-trawl.

Allantactis parasitica *Hormathia digitata*
Actinostola callosa

St. 162 a. $^{13}/_{9}$. 67°48′5 N. 60°48′ W. 1600 m. Bottomtemp. ÷ 0°4, Salinity 34.5, Ottertrawl.

Kadosactis rosea *Actinostola spetsbergensis*

St. 166 b. $^{17}/_{9}$. Totness Road, Exeter Sound 75—200 m. Bottomtemp. ÷ 1°6, Salinity 33.2, Sigsbee trawl.

Allantactis parasitica *Halcampa arctica*

St. 179. $^{5}/_{10}$. 63°36′ N. 55°15′ W. 1200 m. Bottomtemp. 3°3, Salinity 34.95, Ottertrawl.

Actinernus nobilis *Parasicyonis groenlandica*

St. 188. $^{10}/_{10}$. 60°22′ N. 47°27′ W. 120 m. Bottomtemp. 5°8, Salinity 34.35, Ottertrawl.

Hormathia nodosa.

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