

MEDDELELSER OM GRØNLAND

UDGIVNE AF

KOMMISSIONEN FOR VIDENSKABELIGE UNDERSØGELSER I GRØNLAND

Bd. 80 · Nr. 10

THE GODTHAAB EXPEDITION 1928

LEADER: EIGIL RIIS-CARSTENSEN

PELAGIC TUNICATA

BY

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WITH 1 FIGURE IN THE TEXT

KØBENHAVN

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BIANCO LUNOS BOGTRYKKERI A/S

1942

I. APPENDICULARIÆ

Three species of Appendicularians are known from the waters west of Greenland. Two of them, *Oikopleura rufescens* (= *O. vanhoeffeni*) and *Fritillaria furcata* (= *F. borealis*) were recorded from Smith Sound by MOSS (1879). During DRYGALSKI's expedition in 1892—1893 (LOHMANN 1896) *Fritillaria borealis* and *Oikopleura labradoriensis* were taken almost everywhere during the voyage from the North Sea to Umanak Fjord in West Greenland in May and June 1892, while during the home voyage in September the next year *O. labradoriensis* was very rare, and *Fritillaria* was only found east of Long. 30° W. *Oikopleura vanhoeffeni*, on the other hand, was rare in spring, but very abundant off the west coast of Greenland in September. In Qarajaqfjord (innermost part of Umanak Fjord), where the expedition was stationed, *Fritillaria* occurred from August to November and *Oikopleura (labradoriensis)* from October to January (VANHÖFFEN 1897 p. 178); only one specimen of *O. vanhoeffeni* was taken in Qarajaqfjord (LOHMANN). From the Swedish expedition to Davis Strait and Baffin Bay in 1892 Appendicularians (*Oikopleura* sp. and *Fritillaria* sp.) are recorded as occurring in July, August, September, and October (AURIVILLIUS 1896 p. 212). Evidently, therefore, one cannot expect to find all the species at any time, and the periods of their maximal occurrence may even be different in different localities and in different years; their occurrence seems to be more or less correlated with the periodicity of the Diatoms. A survey of what was known hitherto about the Appendicularians and other pelagic Tunicata in the waters round Greenland is given, in Danish, by E. WESENBORG-LUND in "Conspectus Faunæ Groenlandicæ" (1926).

The "Godthaab" expedition in 1928 investigated the waters between the west coast of Greenland and the eastern coasts of the Arctic Canadian islands and Labrador, from 55°00' N. to 78°15' N. Some pelagic hauls were also made in a locality in the Irminger Sea, south-west of Iceland (stat. 1). *Oikopleura vanhoeffeni* was taken almost everywhere within this extensive area, sometimes in great abundance, while only some few specimens of *O. labradoriensis* were found, and *Fritillaria*

borealis was entirely lacking. In the numerous plankton samples collected by Mr. PAUL M. HANSEN during his fishery investigations along the west coast of Greenland in 1929—1939 Appendicularians were only found on three occasions, when some few specimens of *O. vanhoeffeni* were taken. In the collections of the Danish "Ingolf" expedition in 1895 there are several specimens of *O. vanhoeffeni* and some few *labradoriensis*.

The two species of *Oikopleura* are easily distinguished by means of the subchordacells in the tail, and in the "Godthaab" collection several specimens are so badly preserved that the identification is based on this character alone; numerous specimens are, however, in a condition which allows a control by means of other features, which always confirmed the identification by the subchordacells. Most of the "Ingolf" specimens are in excellent condition; they are preserved in alcohol, some of them after fixation in osmic acid.

In the following lists the relative frequency of the species collected by the "Godthaab" expedition is expressed by the usual designations, noted on board the ship: rr = very few specimens, r = few, + = neither rare nor common, c = common, cc = very numerous.

Oikopleura vanhoeffeni Lohmann.

Greenland records:

Oikopleura rufescens Moss 1879 p. 125.

Oikopleura vanhoeffeni Lohmann 1896a p. 33.

Oikopleura vanhoeffeni Lohmann 1896b p. 72.

Oikopleura vanhoeffeni Wesenberg-Lund 1926 p. 123.

Material (see the map, fig. 1):

"Godthaab" expedition 1928: South-west of Iceland, stat. 1, 63°19' N. 26°50' W., 24.V., depth of the bottom 1130 m, ringtrawl 50 m wire out (+), 150 m wire (r). The waters west of Greenland: stat. 3, 59°48' N. 44°26' W., 28.V., depth 223 m, 100 m wire (cc), 225 m wire (+); stat. 5, 59°30' N. 45°23' W., 29.V., 294 m, 35 m wire (r), 100 m wire (r), 300 m wire (+); stat. 14, 55°00' N. 56°34' W., 6.VI., 314 m, 35 m wire (rr), 100 m wire (rr), 300 m wire (+); stat. 18, 61°28' N. 63°44' W., 475 m, 35 m wire (rr), 100 m wire (r), 400 m wire (r); stat. 20, 61°39' N. 62°08' W., 12.VI., 629 m, 35 m wire (r), 100 m wire (rr), 600 m wire (r); stat. 24, 62°19' N. 56°00' W., 14.VI., 2550 m, 35 m wire (rr), 1000 m wire (r), 2500 m wire (r); stat. 26, 62°33' N. 52°43' W., 15.VI., 2600 m, 100 m wire (rr); stat. 27, 62°37' N. 51°40' W., 16.VI., 340 m, 35 m wire (rr), 100 m wire (r); stat. 29, 62°42' N. 50°27' W., 16.VI., 30 m, 25 m wire (r); stat. 30, 64°02' N. 52°19' W., 18.VI., 195 m, 100 m wire (+); stat. 31, 64°00' N. 52°41' W., 18.VI., 50 m, 45 m wire (r);

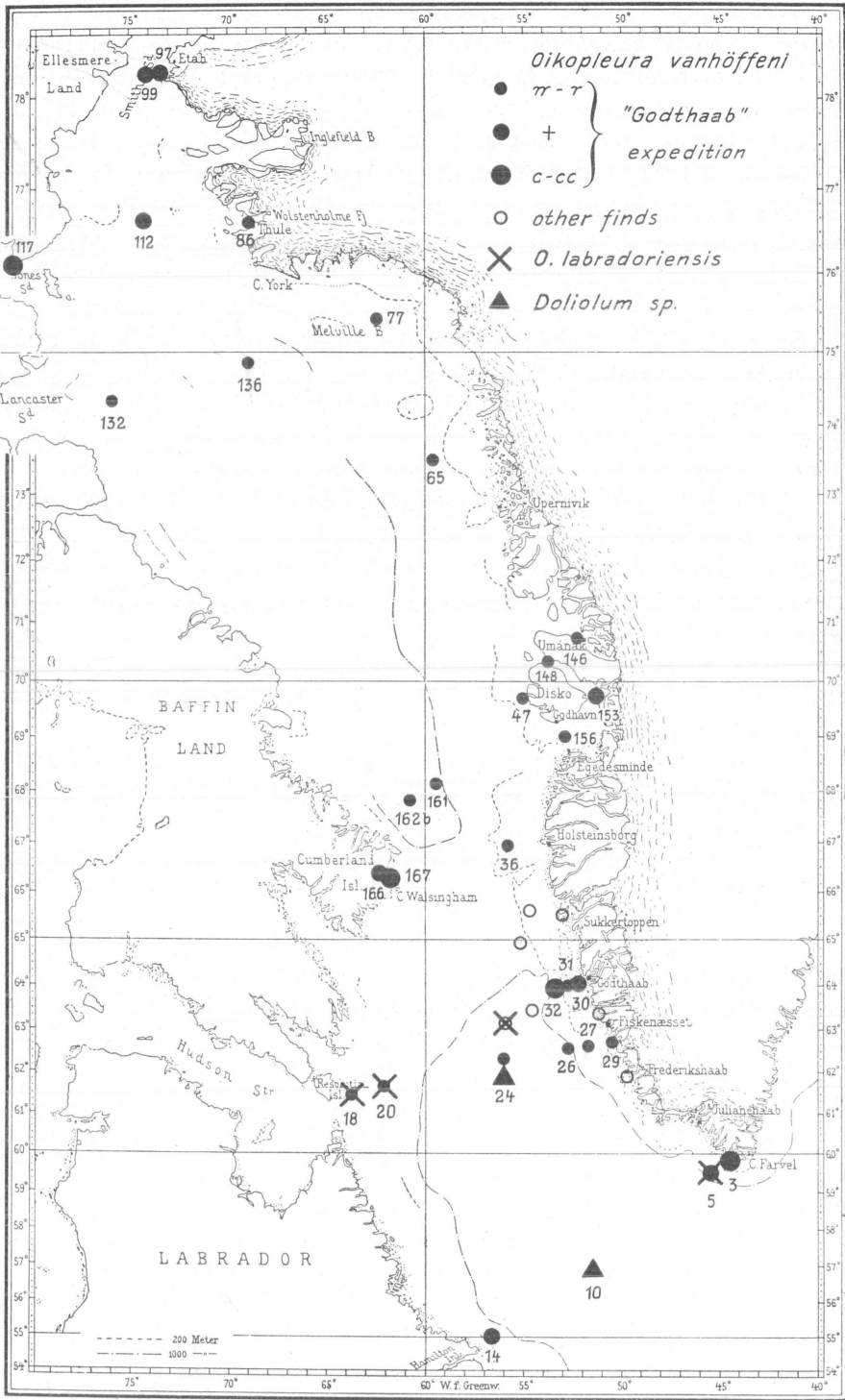


Fig. 1.

stat. 32, 63°57' N. 53°18' W., 19.VI., 680 m, 35 m wire (+), 100 m wire (cc); stat. 36, 66°56' N. 55°48' W., 2.VII., 97 m, 100 m wire (rr); stat. 47, 69°41' N. 55°01' W., 13.VII., 80 m, 100 m wire (rr); stat. 65, 73°31' N. 59°36' W., 28.VII., 225 m, 200 m wire (rr); stat. 77, 75°26' N. 62°26' W., 31.VII., 820 m, 100 m wire (rr), 800 m wire (rr); stat. 86, 76°36' N. 68°54' W., 4.VIII., 210 m, 80 m wire (rr); stat. 97, 78°15'5 N. 73°29' W., 8.VIII., 290 m, 200 m wire (+); stat. 99, 78°14' N. 74°10' W., 8.VIII., 672 m, 65 m wire (+), 675 m wire (+); stat. 112, 76°37'4 N. 74°18' W., 16.VIII., 580 m, 60 m wire (r), 460 m wire (+); stat. 117, 76°04'5 N. 80°56' W., 17.VIII., 690 m, 50 m wire (+), 670 m wire (c); stat. 132, 74°20' N. 75°56' W., 22.VIII., 685 m, 650 m wire (rr); stat. 136, 74°50' N. 69°00' W., 23.VIII., 1500 m, 1500 m wire (rr); stat. 146, 70°44' N. 52°16'5 W., 4.IX., 250 m wire (r), 600 m wire (rr); stat. 148, 70°20' N. 53°50' W., 6.IX., 575 m, 350 m wire (rr); stat. 153, 69°44' N. 51°29'5 W., 7.IX., 480 m, 50 m wire (r), 350 m wire (+); stat. 156, 68°58' N. 52°53' W., 9.IX., 185 m, 100 m wire (rr); stat. 161, 68°07' N. 59°27' W., 13.IX., 1250 m, 500 m wire (rr); stat. 162b, 67°42' N. 60°31' W., 14.IX., 1500 m, 1800 m wire (r); stat. 166b, 66°19' N. 62°18' W., 17.IX., 207 m, 100 m wire (+); stat. 167, 66°16' N. 61°53' W., 17.IX., 127 m, 130 m wire (c).

PAUL M. HANSEN: Grædefjord, 63°17' N. 51°10' W., 15.VII.1934; Hamborgsund, 65°30' N. 53°00' W., 22. VI. 1936; off Kvanefjord, 61°57' N. 49°30' W., 12.VII.1937.

"Ingolf" expedition 1895: Stat. 24, 63°06' N. 56°00' W., 25.VI.; stat. 25, 63°30' N. 54°25' W., 26.VI.; stat. 27, 64°54' N. 55°10' W., 1.VII.; stat. 29, 65°34' N. 54°31' W., 5.VII.

Previously recorded from Davis Strait, Baffin Bay, Qarajaqfjord, and Smith Sound.

The distribution as observed by the Danish expeditions is illustrated on the map, fig. 1, where the size of the black dots gives an impression of the frequency of the species in the localities, where it was taken by the "Godthaab" expedition. There is an indication of the species being less common in the middle of the sea than in the neighbourhood of the coasts on both sides, but otherwise the distribution, horizontal as well as vertical, seems to be rather irregular. *O. vanhoeffeni* was found at all depths, though it is possible that the few specimens taken in the deepest hauls (1200 to about 1600 m below the surface) were really caught in higher levels during the hauling in of the net. Numerous large specimens were found at stat. 3 near Kap Farvel in May, at stat. 32 off Godthaab in June, at stat. 117 in Jones Sound in August, and at stat. 167 in Exeter Sound, Baffin Land, in September. At stat. 3 near Kap Farvel the species was very numerous in the cold surface water of the Polar Current (temp. \div 0.4°), but on the opposite

side of the strait, off Hamilton Inlet, Labrador, most specimens were taken in the body of Atlantic water (temp. 2.2°) below the cold water of the Labrador Current; it was common in Smith Sound and Jones Sound (stat. 97, 99, 112, and 117) at temperatures between $\div 0.7$ and $\div 1.4^{\circ}$ and at similar low temperatures in Exeter Sound (stat. 166b and 167); at stat. 153, near Ritenbenk, some few specimens were taken in the upper strata at a temperature of 4.8° , but many deeper down, where the temperature was only 0.3° ; at stat. 32, off Godthaab, where the species was particularly numerous in both hauls, about 10 and 50 m below the surface, the temperatures were 1.2 and 0.8° respectively. *O. vanhoeffeni* is an arctic species, and it is quite natural, therefore, that it is particularly common in places where the water has a low temperature. The frequency in any given locality may, however, also depend on more accidental circumstances; Appendicularians seem to be inclined to appear in shoals, and if the net happens to pass through such a shoal, it will catch a large number of these animals, while perhaps a short distance away only a few specimens would be taken, though the physical conditions are very nearly identical; it is not easy to explain, for instance, the great difference in the quantities of *O. vanhoeffeni* at the three neighbouring stations 30, 31, and 32 off Godthaab.

In most of the hauls by the "Godthaab" expedition specimens of all sizes were taken, though in greatly varying proportion. Most of the specimens taken off the southern part of the Greenland coast between 28th May and 19th June (stat. 3, 5, 30, 31, 32) were large, partly of very considerable size, the tail being 25—27 mm in length; also small individuals were found at this season, mainly in the western area (stat. 14, 18, 20). In Smith Sound and Jones Sound specimens of every size were found in August; in the deepest haul in Jones Sound (stat. 117, 670 m wire) most of them were very large. Small and middle-sized individuals were predominant in the samples taken in September in Umanak Fjord, Vaigat, Disko Bay, and the central part of Baffin Bay, but the numerous specimens found in Exeter Sound 17th September were all very large. The specimens taken in vertical hauls by the "Ingolf" expedition in June and July were likewise of considerable size. Thus the seasonal occurrence of the different stages of development shows no distinct regularity, and no definite season of maximal propagation can be pointed out in Greenland waters. It is worth noticing that in October not a single Appendicularian was found in the hauls taken by the "Godthaab" expedition off the southern part of the west coast of Greenland, where *O. vanhoeffeni* was abundant in May and June.

Geographical distribution: *Oikopleura vanhoeffeni* is an arctic species; it is abundant in the waters west of Greenland but is not recorded from the east coast. It is common round Spitzbergen, in the

Kara Sea, on the Murman Coast, and off the northernmost part of the Norwegian coast. Moreover a single specimen has been found south-east of the Shetland Islands.

Oikopleura labradoriensis Lohmann.

Greenland records:

Oikopleura labradoriensis Lohmann 1896a p. 31.

Oikopleura labradoriensis Lohmann 1896b p. 73.

Oikopleura labradoriensis Wesenberg-Lund 1926 p. 125.

Oikopleura labradoriensis Ussing 1938 pp. 12, 29, 48, 98.

Material (see the map, fig. 1):

“Godthaab” expedition 1928: Stat. 5, off Kap Farvel, 59°30' N. 45°23' W., 29.V., depth 294 m, ringtrawl with 35—100 m wire out; stat. 18, off Resolution Island, Hudson Strait, 61°28' N. 63°44' W., 11.VI., 475 m, 100 m wire and 400 m wire; stat. 20, somewhat farther east, 61°39' N. 62°08' W., 12.VI., 620 m, 35 m wire.

“Ingolf” expedition 1895: Stat. 24, Davis Strait, 63°06' N. 56°00' W., 25.VI., in vertical haul.

Previously recorded from Davis Strait, Baffin Bay, Umanak Fjord, and Qarajaqfjord.

Also found at Ellaø and Eskimonæs on the east coast of Greenland (USSING).

Only some few specimens were found in each of the localities mentioned above. As mentioned in the introduction the Appendicularians are very capricious in their occurrence, and this is probably the reason why this species was so rarely taken by the “Godthaab” expedition in areas where, at other times, it may be quite common.

Geographical distribution: Greenland waters and Irminger Sea, Iceland, round Spitzbergen, the Murman Coast, the Kara Sea, and the North Sea.

II. CYCLOMYARIA

Material:

Doliolum sp.

"Godthaab" expedition 1928: Irminger Sea, south-west of Iceland, stat. 1, 63°19' N. 26°50' W., depth 1130 m, 24.V., ringtrawl with 1000 m wire out. Southern part of Davis Strait, stat. 10, 56°56' N. 51°17' W., 3.VI., 3500 m, 3000 m wire out; stat. 24, 62°19' N. 56°00' W., 14.VI., 2550 m, 1000 m wire and 2500 m wire out.

This is the first time that Doliolids have been found in the waters west of Greenland. Two species are known to occur in the Irminger Sea: *Doliolum krohni* Herdman and *D. intermedium* Neumann, and probably the specimens found by the "Godthaab" expedition belong to one of these species. Only some few specimens were taken in each haul. They all belong to the asexual generation; they vary in length between 7 and 18 mm, not including the cadophore, and all of them are in the degenerate stage, after the phorozoids have completed their development and detached themselves from the cadophore, the "nurse" now only consisting of the test with its muscular bands, while all the interior organs have disappeared. The species, therefore, cannot be identified with certainty. Both the said species are common in the North Atlantic, but the considerable depth at which the specimens were taken, makes it probable that they belong to *D. intermedium*. The asexual generation of this species is unknown, and the present specimens are unfortunately not in a condition which makes it possible to give a proper description; in shape of the test and configuration of the muscular bands they resemble the "nurse" of *Doliolum krohni*.

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