

NORTHERN HYDROIDA IN THE COLLECTIONS OF THE RIJKSMUSEUM VAN NATUURLIJKE HISTORIE AND THE ZOOLOGICAL MUSEUM AT AMSTER- DAM, WITH NOTES ON THEIR DISTRIBUTION

by

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In the course of 1941 I studied a great number of Hydroida from various northern localities present in the collections of the Zoological Museum at Amsterdam. Most of these collections were made by trawlers from IJmuiden and for the greater part presented to the Museum by Mr. F. P. Vermeulen. They are from localities which are accurately known.

Moreover, several samples of Hydroida are present in those collections, which were taken in the neighbourhood of Iceland, either by trawlers from IJmuiden or by Dr. J. Metzelaar and Dr. H. Engel. They were all sent to Dr. P. L. Kramp in 1938, who examined them for his list of Hydroida in "The Zoology of Iceland", vol. 2, pt. 5a. Most of these samples returned identified, but some bottles were returned unnamed from the Zoological Museum at Copenhagen. They contained several interesting species, some of which are not mentioned in Kramp's list. Only one sample contained some dried specimens, nevertheless in good condition (Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920). They were softened for determination and are now preserved in alcohol.

In addition to these Hydroida I studied several samples of Hydroida from corresponding localities present in the collections of the Rijksmuseum van Natuurlijke Historie at Leiden. One of these samples is of great interest, viz., the Hydroida collected near Waigatsch on August 17, 1882 by J. Mar. Ruys. These Hydroida were presented to the Rijksmuseum van Natuurlijke Historie by Prof. Dr. H. J. Lam, the director of the Rijksherbarium at Leiden, they had been sorted out of the collections of this institution by Miss Dr. Jos. Th. Koster, custodian of the algae of the Rijksherbarium.

As the Hydroida dealt with in the present paper for the greater part are

from exactly known localities, they furnished a number of additional data for our knowledge of the distribution of the species in the North Sea and adjacent waters.

I used Broch's "Hydroida" of the Danish Ingolf Expedition (1916 and 1918) and Kramp's "Hydroida" in "The Zoology of Iceland" (1938) as a base; for the synonyms I may refer to these two important papers. For some species, not mentioned in these papers by Broch and Kramp, it was necessary to cite some other papers.

I wish to express my gratitude to Prof. Dr. H. Boschma at Leiden and to Prof. Dr. L. F. de Beaufort and Miss W. S. S. van Benthem Jutting at Amsterdam, who kindly placed the material at my disposal.

LIST OF THE LOCALITIES

Collections Rijksmuseum van Natuurlijke Historie Leiden

Greenland, Neu Herrnhut, E. von Martens, 1849: *Sertularella tricuspida* (Alder) (no. 79), *Sertularia operculata* L. (?) (no. 76).

Waigatsch, on an ice floe, J. Mar. Ruys, Aug. 17, 1882: *Lafoea fruticosa* (M. Sars) f. *genuina* Broch (no. 495), *Grammaria serpens* (Hass.) (not separated), *Sertularella tricuspida* (Alder) (no. 496), *Abietinaria abietina* (L.) (no. 493), *Hydrallmania falcata* (L.) (no. 494), *Sertularia cupressina* L. f. *typica* Broch (no. 497), *Sertularia mirabilis* (Verrill) (no. 498).

4 miles E.N.E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935: *Tubularia dumortierii* Van Ben. (no. 467), *Eudendrium ramosum* (L.) (no. 452), *Halecium halecinum* (L.) (no. 455), *Calycella syringa* (L.) (no. 477), *Grammaria serpens* (Hass.) (no. 454), *Sertularella rugosa* (L.) (no. 466), *Abietinaria abietina* (L.) (no. 468), *Hydrallmania falcata* (L.) (no. 456), *Nemertesia antennina* (L.) (no. 463), *Laomedea geniculata* (L.) (no. 459), *Laomedea longissima* (Pall.) (no. 462).

54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935: *Corymorpha nana* Alder (no. 451), *Eudendrium ramosum* (L.) (no. 453), *Nigellastrum fallax* (Johnst.) (no. 464), *Abietinaria abietina* (L.) (no. 469), *Hydrallmania falcata* (L.) (no. 457), *Sertularia cupressina* L. f. *typica* Broch (no. 465), *Campanularia johnstoni* Alder (no. 450), *Laomedea geniculata* (L.) (no. 460), *Laomeda gelatinosa* (Pall.) (no. 458).

Collections Zoological Museum Amsterdam

Wash Bay, east coast of England, collected by the "Wodan", Aug. 8, 1905: *Halecium halecinum* (L.), *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.).

North Sea, J. Metzelaar, Aug. 1913: *Halecium beanii* Johnst., *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Thuiaria thuja* (L.), *Nemertesia ramosa* Lmx., *Campanularia verticillata* (L.), *Laomedea dichotoma* (L.), *Laomedea longissima* (Pall.).

North Sea, "Kleine Visschersbank", 3-5 fms., W. G. N. van der Sleen, Aug., 1924: *Lafoea dumosa* (Flem.), *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.).

55° 40' N, 5° 45' E, J. Gouda, s.s. "Freia", 1929¹⁾: *Hydrallmania falcata* (L.).

55° 44' N, 6° 55' E, J. Gouda, s.s. "Freia", 1929: *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Sertularia cupressina* L. f. *typica* Broch, *Laomedea dichotoma* (L.).

56° 58' N, 5° 55' E, J. Gouda, s.s. "Freia", 1929, 30 fms.: *Halecium muricatum* (Ell. & Sol.), *Lafoea dumosa* (Flem.), *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.), *Thuiaria thuja* (L.).

54° 30' N, 3° 10' E, A. Gisen, 1929: *Halecium halecinum* (L.), *Sertularia polyzonias* (L.) f. *typica* Broch, *Sertularia cupressina* L. f. *typica* Broch, *Laomedea geniculata* (L.), *Laomedea longissima* (Pall.).

54° 58' N, 7° 10' E, A. Gisen, July 23, 1929: *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.).

57° 45' N, 3° 30' E, A. Gisen, 1929: *Tubularia larynx* Ell. & Sol., *Grammaria serpens* (Hass.), *Hydrallmania falcata* (L.).

55° 20' N, 6° 10' E, J. Gouda, s.s. "Alma", 1935: *Tubularia larynx* Ell. & Sol., *Lafoea dumosa* (Flem.), *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.).

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935: *Tubularia indivisa* L., *Halecium halecinum* (L.), *Lafoea fruticosa* (M. Sars) f. *genuina* Broch, *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.), *Sertularia cupressina* L. f. *typica* Broch, *Laomedea longissima* (Pall.).

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935: *Halecium muricatum* (Ell. & Sol.), *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.), *Sertularia cupressina* L. f. *typica* Broch, *Thuiaria thuja* (L.), *Thuiaria lonchitis* (Ell. & Sol.), *Nemertesia antennina* (L.), *Nemertesia ramosa* Lmx.

56° 30' N, 4° 20' E, J. Gouda, s.s. "Alma", April 20, 1935: *Lafoea dumosa* (Flem.), *Hydrallmania falcata* (L.).

1) Most of these collections made in the North Sea and near the coast of Iceland by trawlers from IJmuiden were presented to the Zoological Museum at Amsterdam by Mr. F. P. Vermeulen.

60° 30' N, 3° 10' E, J. Gouda, s.s. "Alma", April 17, 1935: *Lafoea dumosa* (Flem.), *Nigellastrum alatum* (Hincks), *Thuiaria thuja* (L.), *Polyplumaria flabellata* G. O. Sars.

58° 25' N, 4° 15' E, F. P. Vermeulen, April, 1936: *Nigellastrum alatum* (Hincks), *Polyplumaria flabellata* G. O. Sars.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936: *Tubularia larynx* Ell. & Sol., *Tubularia indivisa* L.?, *Halecium halecinum* (L.), *Lafoea dumosa* (Flem.), *Grammaria serpens* (Hass.), *Sertularella polyzonias* (L.) f. *typica* Broch, *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.), *Thuiaria thuja* (L.), *Nemertesia ramosa* Lmx., *Campanularia johnstoni* Alder, *Laomedea gracilis* (M. Sars).

57° 01' N, 5° 30' E, F. P. Vermeulen, 1935: *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.), *Laomedea geniculata* (L.).

56° 48' N, 8° 00' E, K. Tromp, s.s. "Cornelis", 1936: *Nemertesia ramosa* Lmx., *Laomedea longissima* (Pall.).

60° N, 3° E, K. Tromp, s.s. "Cornelis", March, 1936: *Tubularia larynx* Ell. & Sol., *Lafoea dumosa* (Flem.), *Grammaria abietina* (M. Sars), *Hydrallmania falcata* (L.), *Thuiaria thuja* (L.).

60° N, 2°-4° E, G. J. Klooster, Nov. 29, 1936: *Lafoea dumosa* (Flem.), *Sertularella tenella* (Alder), *Hydrallmania falcata* (L.), *Thecocarpus myriophyllum* (L.) var. *radicellatus* Billard, *Laomedea geniculata* (L.).

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma": *Halecium halecinum* (L.), *Halecium beanii* Johnst., *Halecium muricatum* (Ell. & Sol.), *Grammaria serpens* (Hass.), *Sertularella tricuspida* (Alder), *Abietinaria abietina* (L.), *Hydrallmania falcata* (L.), *Thuiaria thuja* (L.), *Plumularia setacea* (L.), *Nemertesia antennina* (L.), *Nemertesia ramosa* Lmx., *Campanularia volubilis* (L.), *Campanularia verticillata* (L.), *Laomedea longissima* (Pall.).

Moray Firth, F. P. Vermeulen, 1929: *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Nemertesia ramosa* Lmx., *Campanularia volubilis* (L.), *Campanularia verticillata* (L.).

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen: *Bougainvillia ramosa* (Van Ben.), *Halecium halecinum* (L.), *Halecium beanii* Johnst., *Halecium muricatum* (Ell. & Sol.), *Stegopoma fastigiatum* (Alder), *Lafoea dumosa* (Flem.), *Nigellastrum rosaceum* (L.), *Nigellastrum pinaster* (Ell. & Sol.), *Dynamena pumila* (L.), *Sertularella polyzonias* (L.) f. *typica* Broch, *Antennella catharina* (Johnst.), *Plumularia setacea* (L.), *Nemertesia antennina* (L.), *Nemertesia ramosa* Lmx., *Thecocarpus myriophyllum* (L.) var. *radicellatus* Billard, *Campanularia verticillata* (L.), *Campanularia*

hincksii Alder, *Laomedea dichotoma* (L.), *Laomedea longissima* (Pall.), *Laomedea gracilis* (M. Sars).

55° 19' N, 5° 25' W, W. Gravenmaker, F. Rechtsteiner and A. de Groor: Aug. 1932: *Halecium beanii* Johnst., *Nigellastrum pinaster* (Ell. & Sol.), *Sertularella polyzonias* (L.) f. *typica* Broch, *Thuiaria lonchitis* (Ell. & Sol.), *Nemertesia ramosa* Lmx., *Campanularia hincksii* Alder.

64° 00' N, 14° 55' W, south coast of Iceland, L. C. Langbroek, s.s. "Anna", June, 1927: *Lafoea dumosa* (Flem.), *Grammaria serpens* (Hass.), *Abietinaria abietina* (L.), *Sertularia cupressina* L. f. *typica* Broch, *Campanularia volubilis* (L.), *Campanularia johnstoni* Alder. All of these were studied and are mentioned by Kramp (1938).

64° N, 13°-14° W, L. C. Langbroek, s.s. "Anna", June, 1927: *Nemertesia antennina* (L.).

64° 35' N, 12° 55' W, near Iceland, Van der Duin: *Zygophylax pinnata* (G. O. Sars), *Nemertesia antennina* (L.) (studied and mentioned by Kramp (1938)).

Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920: *Nigellastrum fallax* (Johnst.), *Sertularella tricuspadata* (Alder), *Abietinaria abietina* (L.), *Abietinaria fusca* (Johnst.), *Hydrallmania falcata* (L.), *Thuiaria thuja* (L.), *Thuiaria laxa* Allman, *Nemertesia antennina* (L.), *Cladocarpus campanulatus* Ritchie, *Cladocarpus bonnevieae* Jäderholm.

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl": *Lafoea dumosa* (Flem.), *Grammaria serpens* (Hass.), *Nigellastrum pinaster* (Ell. & Sol.), *Sertularella polyzonias* (L.) f. *typica* Broch (studied and mentioned by Kramp (1938)), *Antennella catharina* (Johnst.), *Nemertesia ramosa* Lmx. (studied and mentioned by Kramp (1938)), *Laomedea gracilis* (M. Sars).

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl": *Tubularia larynx* Ell. & Sol., *Halecium beanii* Johnst., *Halecium articulatum* Clark. All of these were studied and are mentioned by Kramp (1938).

***Tubularia indivisa* Linnaeus, 1758**

Tubularia indivisa, Broch, 1916, p. 24, fig. D.

Tubularia indivisa, Kramp, 1938, p. 5.

Localities:

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935. Some 20 cm high stalks without polyps, probably belong to this species. They have a somewhat yellow colour and are covered with colonies of *Lafoea dumosa* (Flem.) and *Grammaria serpens* (Hass.).

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Also some 15 cm high stalks without polyps, which may belong to this species.

***Tubularia larynx* Ellis and Solander, 1786**

Tubularia larynx, Broch, 1916, p. 27, fig. F.

Tubularia larynx, Kramp, 1938, p. 6.

Localities:

57° 45' N, 3° 30' E, A. Gisen, 1929. Some colonies, the stalks with the remainders of polyps, probably belong to this species.

55° 20' N, 6° 10' E, J. Gouda, s.s. "Alma", 1935. Some colonies with some polyp-bearing stalks. The gonophores, although in a bad condition, are present.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. One small colony with some polyp-bearing stalks. The gonophores are present.

60° N, 3° E, K. Tromp, s.s. "Cornelis", March, 1936. One colony with stalks without any polyp probably belongs to this species.

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl". Numerous stalks with some polyps on the tubes of *Sabella*. The polyps are in bad condition. (This colony was inspected by Kramp, but probably in consequence of its doubtful character it is not mentioned in his "Zoology of Iceland", vol. 2 pt. 2a).

Distribution: The geographical distribution of both *Tubularia indivisa* L. and *T. larynx* Ell. et Sol. was discussed by Broch (1916) and Kramp (1938). *Tubularia larynx* shows a more boreal distribution, whilst *T. indivisa* penetrates far into the arctic region (Barentz Sea, White Sea (Rylov, 1924)). In the North Sea, and especially in the southern part, *Tubularia larynx* seems to be more common than *T. indivisa*. Along the Dutch coast at least *T. larynx* is cast ashore much more frequently than *T. indivisa*, although the localities where *T. indivisa* is found alive are more numerous along our coast than those of *T. larynx*. The distribution of both species along the coast of the Netherlands shows curious characteristics, which may be due to varying ecological factors.

***Tubularia dumortierii* Van Beneden, 1844**

Tubularia dumortieri, Broch, 1928, p. 54.

Tubularia dumortieri, Leloup, 1933, pp. 2, 16.

Locality: 4 miles E. N.E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. One specimen, badly preserved, with very youthful gonophores.

The only specimen of this species shows all characteristics of *Tubularia dumortierii*, but the gonophores are too little developed to be certain about its determination. The base is torn off, probably from a piece of wood, which is still present in the sample, and which is covered by some thick hydrorhiza fibres. The periderm is rather distinct and vigorous.

Distribution: The distribution of *Tubularia dumortierii* is only very badly known. In the North Sea the polyp is undoubtedly rare, although the medusa (*Ectopleura dumortierii* (Van Ben.)), seems to be more common, and sometimes even rather abundant. It is not possible to settle the question about the geographical distribution of this species at present, as only very scanty recordings are available.

Corymorpha nana Alder, 1857

Corymorpha nana, Broch, 1928, p. 54.

Corymorpha nana, Kramp, 1935, p. 59.

Locality: 54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. 6 specimens with gonophores in several stages of development, 7-9 mm high. The bases of the stalks of the polyps have united together with the sand of the bottom.

Distribution: *Corymorpha nana* Alder seems to have a sporadic appearance in the boreal waters, in the North Sea at least only few localities are known, although its medusa (*Euphysa aurata* Forbes) frequently occurs there.

Bougainvillia ramosa (Van Beneden, 1854)

Bougainvillia ramosa, Kramp, 1935, p. 76, fig. 35a; 1938, p. 10.

Locality: 55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Some badly preserved specimens on the base of *Nemertesia ramosa* Lmx. probably belong to this species.

Eudendrium ramosum (Linnaeus, 1758)

Eudendrium ramosum, Broch, 1916, p. 59.

Eudendrium ramosum, Kramp, 1926, p. 241; 1938, p. 12.

Localities:

4 miles E.N.E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. Several colonies on tubes of *Sabella*, badly preserved, some gonophores.

54° 30' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. Several colonies on the carapace and legs of *Cancer pagurus* L. and *Hyas araneus* (L.). Some gonophores.

Halecium halecinum (Linnaeus, 1758)

Halecium halecinum, Broch, 1918, p. 36, fig. XI-XII.

Halecium halecinum, Kramp, 1938, p. 30.

Localities:

4 miles E.N.E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. One beautiful colony with expanded polyps and numerous female gonothecae.

Wash Bay, East coast of England, collected by the "Wodan", Aug. 8, 1905. Several 5-6 cm high colonies, feather like, without secondary hydrothecae, at the base some hydrorhiza fibres. No gonothecae.

54° 30' N, 3° 10' E, A. Gisen, 1929. 5 good developed colonies, 8 cm high, with numerous female gonothecae. At the base a dense tuft of hydrorhiza fibres.

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935. 7 colonies, varying in height between 6 and 15 cm, all without gonothecae and in bad condition.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Numerous male and female colonies and fragments in good condition, gonothecae present.

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". One beautiful female colony with numerous gonothecae, 12 cm high and a spread of 10 cm.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Some small colonies (12 mm high) at the base of *Nemertesia antennina* (L.). Gonothecae absent.

Distribution: Broch (1918) and Kramp (1938) have given the geographical distribution of this species, which is very common in the North Sea area, chiefly along the coasts of Great Britain. Besides the great, independently growing colonies, small colonies are found, especially on *Nemertesia* colonies, sometimes with gonothecae, together with *Halecium beanii* Johnst.

Halecium beanii Johnston, 1838

Halecium beanii, Broch, 1918, p. 38, fig. XIII.

Halecium beani, Kramp, 1938, p. 31.

Localities:

North Sea, J. Metzelaar, Aug. 1913. Several female colonies with gonothecae at the base of *Nemertesia ramosa* Lmx. and several separated colonies with some gonothecae (labelled *Obelia gelatinosa* Pall.).

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". A fragment of a colony without gonothecae, but with distinct hydrothecae and polyps.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. One small colony without gonothecae, with *Campanularia hincksii* Alder.

55° 19' N, 5° 25' W, W. Gravenmaker, F. Rechtsteiner and A. de

Groot, Aug. 1932. Several small, male colonies at the base of *Nemertesia ramosa* Lmx., with gonothecae.

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl". Several colonies on a Sabellid tube, without gonothecae (studied and mentioned by Kramp (1938, p. 31)).

Since Broch (1918) has pointed out the difference in the shape of the hydrothecae of *H. halecinum* and *H. beanii*, it is not very difficult to distinguish the two species. But as the shape of the hydrothecae seems to show some variation, there still remain sterile colonies, which cannot be brought with certainty to one of the two species. The female colonies especially can be easily separated by the shape of the gonothecae, but Broch himself has shown (1909) that these can also have aberrant characters, which make it necessary to investigate as many gonothecae as possible.

Distribution: As *Halecium beanii* has frequently been confused with *H. halecinum* and *H. scutum*, it is not possible to state its geographical distribution with certainty. Like *H. halecinum* it seems to be a form, mainly belonging to the southern-boreal, only occasionally penetrating into northern waters. Where *H. halecinum* has been found in several pure arctic localities (White Sea, Spitzbergen, Scoresby Sound and the east coast of Greenland (see Kramp, 1938)), the most northerly localities of *H. beanii* seem to be along the south coast of Iceland (Kramp, 1938). In the North Sea *H. halecinum* and *H. beanii* appear to be very common, whilst *H. beanii* is not so much restricted to the coasts of Great Britain as *H. halecinum*.

***Halecium articulatum* Clark, 1875**

Halecium articulatum, Jäderholm, 1909, p. 58, pl. 5 fig. 7.

Halecium articulatum, Kramp, 1938, p. 32.

Locality: Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl".

One sample of Hydroida from the Vestmannaeyar was labelled: "*Tabularia larynx* Ell. et Sol.?, *Halecium beanii* Johnst. and *Halecium articulatum* Clark, det. P. L. Kramp." These specimens of *Halecium articulatum* are also mentioned by Kramp (1938, p. 32). I could not find *H. articulatum* Clark in this sample.

Distribution: Although *H. articulatum* was described from the east coast of North America, it was found in several localities in the Danish waters (Kramp, 1938). Besides the locality in the neighbourhood of the Vestmannaeyar, Kramp (1938) mentions one other locality near Iceland: 63° 30' N, 20° 14' W, 80 m depth.

***Halecium muricatum* (Ellis and Solander, 1786) (fig. 1a)**

Halecium muricatum, Broch, 1918, p. 43, fig. XVII.

Halecium muricatum, Kramp, 1938, p. 33.

Localities:

56° 58' N, 5° 55' E, J. Gouda, s.s. "Freia", 1929, 30 fms. One beautiful colony without gonothecae, 8 cm high, spread 6 cm. Polyps expanded, in a perfect condition.

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. One beautiful colony, 20 cm high, the hydrocaulus at the base with a diameter of 6 mm. Gonothecae absent.

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Two colonies,

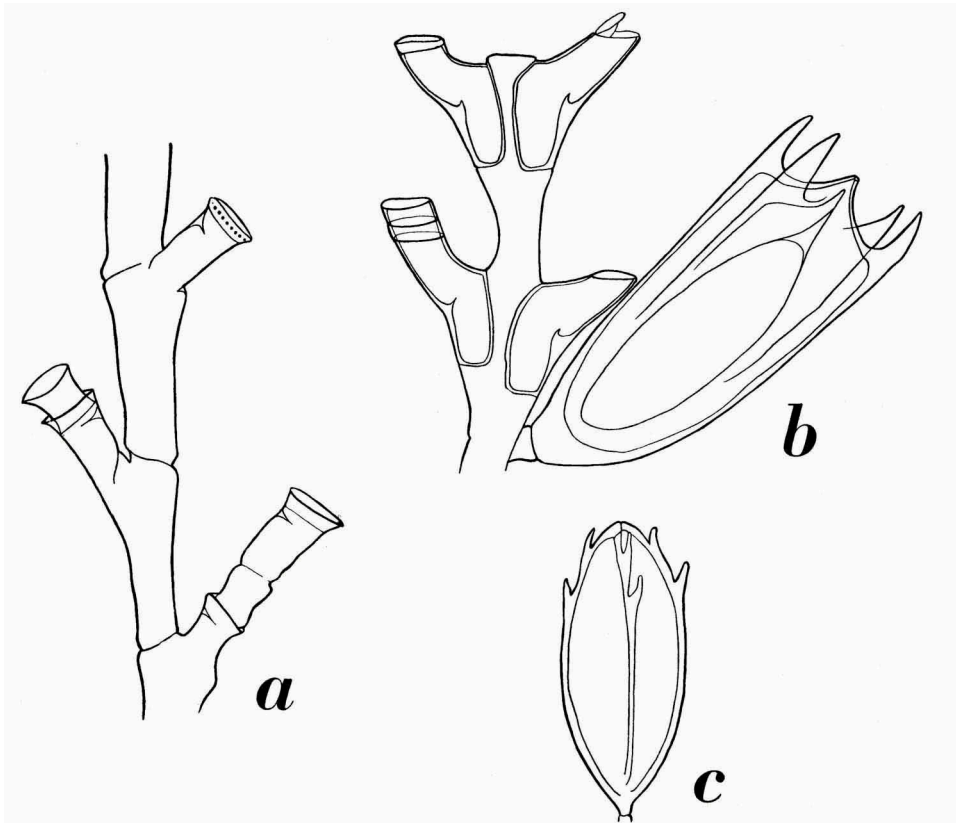


Fig. 1. a, *Halecium muricatum* Ellis and Solander, 56° 58' N, 5° 55' E, J. Gouda, s.s. "Freia", 1929, 30 fms.; hydrothecae in the upper part of the colony. b, c, *Nigellastrum pinaster* (Ellis and Solander), 55° 19' N, 5° 25' W, Clyde, W. Gravenmaker, F. Rechtsteiner and A. de Groot, Aug., 1932; b, part of the colony with hydrothecae and a male gonotheca; c, female gonotheca. a, $\times 34$; b, $\times 34$; c, $\times 20$.

one of these with numerous characteristic gonothecae, the other colony with some gonothecae only.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. One small colony of 18 mm height, on the base of *Nemertesia antennina* (L.). Gonothecae lacking.

It is not difficult to distinguish the sterile colonies from those of *H. halecinum*, *scutum* or *beanii*. The fully developed, large colonies have a characteristic appearance, the primary hydrothecae have a characteristic thickening of the periderm of the adcauline wall of the primary hydrothecae, which makes it possible to separate the small colonies on the base of *Nemertesia* from those of *H. halecinum* or *H. beanii*.

Distribution: Although *H. muricatum* is an arctic-boreal, circumpolar species, it penetrates into the North Sea along the coasts of Great Britain and Norway, chiefly restricted to the littoral region but occasionally occurring in deeper waters.

***Stegopoma fastigiatum* (Alder, 1860)**

Stegopoma fastigiatum, Vervoort, 1941, p. 196, fig. 1.

Locality: 55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Some hydrothecae with a creeping hydrorhiza on *Nemertesia antennina* (L.). Peduncle varying in length, but of about the same length as the hydrotheca in several occasions. The maximal length of the hydrotheca is 1150 μ , the greatest diameter 300 μ , the peduncles varying in length from 500-1300 μ .

Distribution: In a previous article I have given the synonymy and chief distribution of this species. Exact localities in Northern waters are given by Jäderholm (1909). The species is not uncommon in the North Sea on various other Hydroida.

***Calicella syringa* (Linnaeus, 1758)**

Calicella syringa, Broch, 1918, p. 32, fig. X.

Calicella syringa, Kramp, 1938, p. 30.

Locality: 4 miles E.N.E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. Several colonies with gonothecae on *Sertularia cupressina* L.

This cosmopolitan species is present in the material from one locality only, although it is very abundant in the North Sea.

***Lafoea dumosa* (Fleming, 1828)**

Lafoea dumosa, Broch, 1918, p. 7, fig. I.

Lafoea dumosa, Kramp, 1938, p. 23.

Localities:

North Sea, "Kleine Visschersbank", 3-5 fms., W. G. N. van der Sleen, Aug. 1924. Some small, creeping colonies without coppiniae on *Hydrallmania falcata* (L.).

56° 58' N, 5° 55' E, J. Gouda, s.s. "Freia", 1929, 30 fms. Numerous colonies, creeping, with coppiniae, on *Thuiaria thuja* (L.).

55° 20' N, 6° 10' E, J. Gouda, s.s. "Alma", 1935. One creeping colony on the hydrocaulus of *Hydrallmania falcata* (L.). No coppiniae.

56° 30' N, 4° 20' E, J. Gouda, s.s. "Alma", April 20, 1935. Several colonies on the hydrocaulus of *Hydrallmania falcata* (L.). No coppiniae.

60° 30' N, 3° 10' E, J. Gouda, s.s. "Alma", April 17, 1935. Creeping and partly upright colonies with hydrocaulome formation on the hydrocaulus of *Nigellastrum alatum* (Hincks). No coppiniae.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Several colonies without coppiniae on *Abietinaria abietina* (L.).

60° N, 3° E, K. Tromp, s.s. "Cornelis", March, 1936. Several creeping colonies on *Thuiaria thuja* (L.) No coppiniae.

60° N, 2°-4° E, G. J. Klooster, Nov. 29, 1936. Several colonies on *Hydrallmania falcata* (L.). Creeping colonies and rhizocaulomic colonies. One very distinct upright colony on a *Cardium* shell. Several coppiniae.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Numerous colonies on *Nemertesia antennina* (L.). They are all creeping, with abundant renovations of the margin of the primary hydrothecae and without coppiniae.

64° 00' N, 14° 55' W, south coast of Iceland, L. C. Langbroek, s.s. "Anna", June, 1927. A small colony with some hydrothecae on the hydrocaulus and side branches of *Abietinaria abietina* (L.) (seen and mentioned by Kramp (1938)).

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl". Numerous colonies without coppiniae on *Nemertesia ramosa* Lmx. Some colonies with the formation of rhizocaulome.

This species is very abundant in all samples of Hydroida which I inspected. The colonies from the Vestmannaeyar are not mentioned by Kramp, although he inspected the same bottle. *Lafoea dumosa* does not appear to be very peculiar as to the substratum; it occurs on all Hydroida forming colonies large enough to bear them.

Distribution: The distribution of this boreal species was discussed by Broch (1918) and Kramp (1938). It is very abundant in the North Sea and along the coasts of Great Britain, Norway and the south coast of Iceland, chiefly on other Hydroida in the upper and middle part of the littoral region.

Lafoea fruticosa (M. Sars, 1851) forma **genuina** Broch, 1918

Lafoea fruticosa f. *genuina*, Broch, 1918, p. 12. fig. III.

Lafoea fruticosa genuina, Kramp, 1938, p. 24.

Localities:

Waigatsch, on an ice floe, J. Mar. Ruys, Aug. 17, 1882. Some colonies on *Hydrallmania falcata* (L.), some of them rhizocaulomic. No coppiniae.

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935. Numerous colonies on *Hydrallmania falcata* (L.). No coppiniae.

Distribution: *Lafoea fruticosa* has its chief occurrence in arctic-boreal waters, although it is widely distributed in the Atlantic and the Pacific Oceans. The forma *genuina* mostly occurs on localities with a mixed arctic-boreal character, while the forma *grandis* was recorded from purely arctic localities. Bergh (1887) mentions *Lafoea fruticosa* from the Kara Sea.

Grammaria serpens (Hassall, 1848)

Grammaria serpens, Broch, 1918, p. 16, fig. IV.

Filellum serpens, Kramp, 1938, p. 25.

Localities:

Waigatsch, on an ice floe, J. Mar. Ruys, Aug. 17, 1882. Several colonies with coppiniae on *Abietinaria abietina* (L.).

4 miles E.N.E of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. Some colonies with coppiniae on *Abietinaria abietina* (L.).

North Sea, J. Metzelaar, Aug. 1913. Several colonies with coppiniae on *Abietinaria abietina* (L.). Labelled *Coppinia arcta*.

North Sea, "Kleine Visschersbank", 3-5 fms., W. G. N. van der Sleen, Aug., 1924. Numerous colonies with coppiniae on *Abietinaria abietina* (L.).

55° 44' N, 6° 55' E, J. Gouda, s.s. "Freia", 1929. Some colonies on *Abietinaria abietina* (L.). No coppiniae.

54° 58' N, 7° 10' E, A. Gisen, July 23, 1929. Numerous colonies on *Abietinaria abietina* (L.), with coppiniae.

57° 45' N, 3° 30' E, A. Gisen, 1929. Several colonies without coppiniae on *Hydrallmania falcata* (L.).

55° 20' N, 6° 10' E, J. Gouda, s.s. "Alma", 1935. Numerous hydrothecae and some coppiniae on *Abietinaria abietina* (L.).

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935. Numerous colonies with coppiniae on *Abietinaria abietina* (L.) and *Tubularia indivisa* L.

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. Numerous colonies with coppinae on *Abietinaria abietina* (L.).

56° 50' N, 4° 45' E, F. P. Vermeulen, May, 1936. Numerous colonies with several coppinae on *Abietinaria abietina* (L.).

57° 01' N, 5° 30' E, F. P. Vermeulen, 1936. Some small colonies without coppinae on *Abietinaria abietina* (L.).

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Numerous colonies on *Abietinaria abietina* (L.). No coppinae.

Moray Firth, F. P. Vermeulen, 1929. Numerous colonies with coppinae on *Abietinaria abietina* (L.).

64° 00' N, 14° 55' W, south coast of Iceland, L. C. Langbroek, s.s. "Anna", June, 1927. Some small colonies without coppinae on *Abietinaria abietina* (L.) (seen and mentioned by Kramp (1938)).

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl". Some colonies with almost trumpet-shaped hydrothecae on a *Bougainvillia ramosa* colony.

Grammaria serpens is very abundant in nearly all the samples, chiefly occurring on *Abietinaria abietina* (L.), but occasionally also on other Hydroida (*Tubularia indivisa*, *Hydrallmania falcata*, *Bougainvillia ramosa*). The colony on *Bougainvillia ramosa* from the Vestmannaeyar shows curious hydrothecae, with the margin bent outwards, giving them an almost trumpet-shaped appearance. In the same colony there occur hydrothecae of the normal shape. This colony, with some other species, was apparently overlooked by Kramp, who inspected the sample.

Distribution: This cosmopolitan species is very abundant in boreal waters, mainly belonging to the littoral region, and occurs there on several Hydroida, but especially on *Abietinaria abietina* (L.). It penetrates far into the Arctic region. According to Kramp (1938) it was also found on *Sertularia cupressina* L., *Sertularella tricuspida* (Alder) and *Lafoea dumosa* (Flem.). Bergh (1887) mentions colonies of this species on *Grammaria abietina* (M. Sars) from Novaya Zemlya.

Grammaria abietina (M. Sars, 1851)

Grammaria abietina, Broch, 1918, p. 18, fig. V.

Grammaria abietina, Kramp, 1938, p. 26.

Locality: 60° N, 3° E, K. Tromp, s.s. "Cornelis". Some fragments of a colony, 15 mm and 20 mm high, densely packed with the characteristic hydrothecae.

The colony agrees with the description of the forma *typica* (Broch, 1918, p. 18-19).

Distribution: This arctic species occasionally penetrates into the North Sea, mainly along the coasts of Great Britain and the entire west coast of Norway. Accordingly it is rare in the North Sea, occurring chiefly in the deeper parts.

Zygophylax pinnata (G. O. Sars, 1874)

Lictorella pinnata, Broch, 1918, p. 22, fig. VII.

Zygophylax pinnata, Totton, 1930, p. 165.

Locality: 64° 35' N, 12° 55' W, near Iceland, Van der Duin. One 15 cm high colony with scapus. Hydrothecae with polyps. Hydrocaulus at the base nearly 6 mm thick.

Distribution: This species is not mentioned in Kramp's list of Hydroida from Iceland, but he mentions it from the west coast of Norway and the Lofoten (Kramp, 1938, p. 67, table II). Broch (1918) gives several localities in the neighbourhood of Iceland and the west coast of Greenland. *Zygophylax pinnata* seems to be restricted to the upper part of the abyssal region, but occasionally occurs also in the littoral region, so showing a bathymetrical distribution from 90 to 1300 m. The occurrence in deeper waters may be the reason why this species is not mentioned in Kramp's list. It has its chief occurrence in northern Atlantic waters, although this species may have been confused now and then with *Zygophylax antipathes* (Lam.).

Nigellastrum fallax (Johnston, 1847)

Diphasia fallax, Broch, 1918, p. 108, fig. LIX.

Diphasia wandeli, Broch, 1918, p. 111.

Diphasia fallax, Kramp, 1938, p. 45.

Localities:

54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. One small colony of the forma *typica* Kramp on the hydrocaulus of *Abietinaria abietina* (L.). No gonothecae.

Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. Several colonies of the forma *typica* Kramp on *Thuinaria thuja* (L.), with male and female gonothecae on separated colonies. Numerous colonies of the forma *wandeli* (Levinsen) and all possible transitions to the forma *typica* on fixed objects like shells, stones, etc. Male and female colonies with gonothecae.

Kramp (1932, p. 49) has pointed out that it is impossible to separate *Nigellastrum fallax* (Johnst.) and *N. wandeli* (Levinsen). Even the two forms of *Nigellastrum fallax*, which in several occasions can be separated by the shape of the colonies and the arrangement of the hydrothecae, are

united by numerous transitions when a large material from northern localities is inspected. Especially the material collected by J. Metzelaar and H. Engel represents all possible types of growth between the characteristic thick-stemmed colonies of the forma *wandeli* and the slender colonies of the forma *typica*.

Distribution: Kramp (1938) has given the geographical distribution of both forms of this species, which are very abundant along the Iceland shores. The forma *typica* only penetrates into the North Sea, where it is rather abundant along the coast of Great Britain.

Nigellastrum rosaceum (Linnaeus, 1758)

Diphasia rosacea, Broch, 1918, p. 112, fig. LX.

Diphasia rosacea, Kramp, 1938, p. 46.

Locality: 55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Several female colonies on *Nigellastrum pinaster* (Ell. et Sol.), with mature female gonothecae.

Measurements:

Total length of the hydrotheca	450-500 μ
Length of the free adcauline part	110-170 μ
Diameter of the opening of the hydrotheca	160-210 μ
Distance between each pair of hydrothecae	280-330 μ
Distance between the openings of the two hydrothecae of each pair	250-370 μ
Length of the female gonotheca	1500 μ
Greatest diameter of the female gonotheca	650-700 μ

Distribution: *Nigellastrum rosaceum* is a southern-boreal species, common along the coasts of the British Isles, the Irish coasts and in the Irish Sea. In the North Sea it occurs on other Hydroida in the littoral region. It has been found in several localities along the coast of Denmark and the west coast of Norway. Kramp (1938) gives several localities in the neighbourhood of Iceland.

Nigellastrum pinaster (Ellis and Solander, 1786) (fig. 1 b, c)

Diphasia pinaster, Jäderholm, 1909, p. 84, pl. VIII, fig. 11.

Diphasia pinaster, Kramp, 1935, p. 182, fig. 76.

Localities:

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Numerous 6-10 cm high colonies with male gonothecae in several stages of development. Eight colonies with the base fused together by a dense and tangled mass of hydrorhiza fibres, together with *Thecocarpus myriophyllum* (L.). Several branches covered with *Lafoea dumosa* (Flem.).

55° 19' N, 5° 25' W, W. Gravenmaker, F. Rechtsteiner, and A. de Groot,

Aug., 1932. Numerous colonies with gonothecae. Male and female gonothecae on separated colonies.

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl". Some small colonies without gonothecae, 6 cm high, on the base of *Nemertesia ramosa* Lmx.

Measurements of specimens from the first mentioned locality:

Total length of the hydrotheca	550-660 μ
Length of the free adcauline part	160-220 μ
Diameter of the opening of the hydrotheca	130-200 μ
Distance between each pair of hydrothecae	330-430 μ
Distance between the openings of the two hydrothecae of each pair	600-800 μ
Length of the male gonotheca	1600 μ
Greatest diameter of the male gonotheca	500-650 μ

Distribution: *Nigellastrum pinaster* is a southern, atlantic species, penetrating to the north along the coasts of Great Britain, where it is rather abundant. It was recorded from several localities along the west coast of Norway. No localities in the neighbourhood of Iceland are mentioned, either by Broch (1918) or by Kramp (1938). The sample from the Vestmannaeyar containing this species was sent to the Zoological Museum at Copenhagen with some other bottles, containing Hydroida, but it returned unidentified, whilst some other species from the same locality were labelled.

***Nigellastrum alatum* (Hincks, 1858)**

Diphasia alata, Jäderholm, 1909, p. 84.

Diphasia alata, Kramp, 1935, p. 183, fig. 76A.

Localities:

60° 30' N, 3° 10' E, J. Gouda, s.s. "Alma", April 17, 1935. Two colonies with empty (male?) gonothecae and a dense tuft of hydrorhiza fibres at the base, 15 cm high.

58° 25' N, 4° 15' E, F. P. Vermeulen, April, 1936. Three 18 cm high colonies, one of these with numerous female gonothecae. All colonies branched and with a dense tuft of hydrorhiza fibres.

Measurements of specimens from the latter locality:

Diameter of the hydrocaulus at the base	1.5-2.0 mm
Total length of the hydrotheca	400-500 μ
Length of the free adcauline part	80-140 μ
Diameter of the opening of the hydrotheca	100-130 μ
Distance between each pair of hydrothecae	80-100 μ
Distance between the openings of the two hydrothecae of each pair	400-500 μ
Length of the female gonotheca	600-700 μ
Greatest diameter of the female gonotheca	300-350 μ

Distribution: This southern atlantic species penetrates into the North

Sea along the coasts of Great Britain, but apparently it is not abundant in the North Sea itself. Moreover, it was found in some localities along the west coast of Norway. It seems to belong to the deeper part of the littoral region.

Dynamena pumila (Linnaeus, 1758)

Dynamena pumila, Broch, 1918, p. 115, fig. LXI.

Dynamena pumila, Kramp, 1938, p. 47.

Locality: 55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Some small, 10 mm high colonies, without gonothecae, on fragments of *Fucus*.

Distribution: This species entirely belongs to the upper part of the littoral region of the boreal seas (tidal zone). It is found there in immense quantities on Fucoids and *Laminaria*, showing a great adaptability in regard to salinity.

Sertularella tricuspidata (Alder, 1856)

Sertularella tricuspidata, Broch, 1918, p. 98, fig. LII.

Sertularella tricuspidata, Kramp, 1938, p. 42.

Localities:

Neu Herrnhut, Greenland, E. von Martens, 1849. Several colonies on algae, with gonothecae.

Waigatsch, on an ice floe, J. Mar. Ruys, Aug. 17, 1882. Several colonies on *Abietinaria abietina* (L.) and *Hydrallmania falcata* (L.). Some gonothecae are present.

58° 16' 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Several colonies with some gonothecae on *Hydrallmania falcata* (L.).

Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. Numerous colonies with gonothecae on *Hydrallmania falcata* (L.).

Distribution: This circumpolar species, one of the most common Hydroida in arctic waters, has been discussed in respect of its distribution by Broch (1918) and Kramp (1938). Kramp (1938) gives several localities round Iceland, while Bergh (1887) mentions this species from the Kara Sea.

Sertularella polyzonias (Linnaeus, 1758) forma **typica** Broch, 1918

Sertularella polyzonias forma *typica*, Broch, 1918, p. 101, fig. LIV.

Sertularella polyzonias forma *typica*, Kramp, 1938, p. 42.

Localities:

54° 30' N, 3° 10' E, A. Gisen, 1929. Some colonies with gonothecae.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Some small colonies with numerous fragments, all without gonothecae.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. One small fragment with *Laomedea gracilis* (M. Sars).

55° 19' N, 5° 25' W, W. Gravenmaker, F. Rechtsteiner, and A. de Groot, Aug. 1932. Some small colonies on the base of *Nemertesia ramosa* Lmx., without gonothecae.

Vestmannaeyar, south of Iceland, J. van Oldenmarkt, s.s. "Schoorl". Several colonies without gonothecae on the base of *Nemertesia ramosa* Lmx. (seen and mentioned by Kramp (1938)).

Distribution: Only the cosmopolitan forma *typica* is present in the material. This form has its main distribution in boreal waters, although it penetrates into arctic waters, but it is never very common there. In the North Sea it is rather abundant, but mainly restricted to the coast of Great Britain and Western Norway, where it is found on Fucoids (*Halidrys*).

Sertularella tenella (Alder, 1856)

Sertularella tenella, Broch, 1918, p. 104, fig. LVI.

Sertularella tenella, Kramp, 1935, p. 178, fig. 73C.

Locality: 60° N, 2°-4° E, G. J. Klooster, Nov. 29, 1936. Some small, scarcely branched colonies on *Hydrallmania falcata* (L.). No gonothecae.

Distribution: The geographical distribution of this species was discussed by Kramp (1914), Broch (1918) and Kramp (1935). Broch (1918) gives several localities in the Northern part of the North Sea.

Sertularella rugosa (Linnaeus, 1758)

Sertularella rugosa, Broch, 1918, p. 106, figs. LVII-LVIII.

Sertularella rugosa, Kramp, 1938, p. 45.

Locality: 4 miles E. N. E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. Some colonies on *Flustra foliacea* (L.).

Distribution: This species belongs to the littoral zone of the boreal region. It is rather common in the North Sea, chiefly on *Flustra* or on Fucoids (see Kramp, 1935 and 1938).

Abietinaria abietina (Linnaeus, 1758)

Abietinaria abietina, Broch, 1918, p. 117, fig. LXII.

Abietinaria abietina, Kramp, 1938, p. 48, fig. 3.

Localities:

Waigatsch, on an ice floe, J. Mar. Ruys, Aug. 17, 1882. Some colonies without gonothecae. Covered with *Grammaria serpens* (Hass.) and its coppiniae.

4 miles E.N.E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. Several well developed colonies with numerous

gonothecae. One of the hydrocauli with a small colony of *Grammaria serpens* (Hass.).

54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. Several colonies with numerous gonothecae, one of the hydrocauli with a small colony of *Nigellastrum fallax* (Johnst.).

Wash Bay, East coast of England, collected by the "Wodan", Aug. 8, 1905. Some 8 cm high colonies without gonothecae.

North Sea, J. Metzelaar, Aug., 1913. Some colonies, partly covered with *Grammaria serpens* (Hass.) and its coppiniae.

North Sea, "Kleine Visschersbank", 3-5 fms., W. G. N. van der Sleen, Aug., 1924. Numerous colonies and fragments, with a creeping hydrorhiza on *Neptunea antiqua* (L.). Gonothecae lacking. Covered with *Grammaria serpens* (Hass.) and its coppiniae.

55° 44' N, 6° 55' E, J. Gouda, s.s. "Freia", 1929. Some colonies without gonothecae on *Mytilus* spec. Covered with *Grammaria serpens* (Hass.).

56° 58' N, 5° 55' E, J. Gouda, s.s. "Freia", 1929, 30 fms. Several colonies without gonothecae.

54° 58' N, 7° 10' E, A. Gisen, July 23, 1929. Two colonies, covered with *Grammaria serpens* (Hass.). No gonothecae.

55° 20' N, 6° 10' E, J. Gouda, s.s. "Alma", 1935. Some colonies with *Grammaria serpens* (Hass.) and its coppiniae. No gonothecae.

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935. Numerous colonies and fragments, without gonothecae, but with a thick cover of *Grammaria serpens* (Hass.) and its coppiniae.

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. Some colonies and numerous fragments, all covered with *Grammaria serpens* (Hass.) and its coppiniae. Gonothecae absent.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Several 20 cm high colonies on a piece of stone, covered with *Grammaria serpens* (Hass.) and its coppiniae.

57° 01' N, 5° 30' E, F. P. Vermeulen, 1936. One small colony without gonothecae, covered with *Grammaria serpens* (Hass.).

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Numerous colonies and fragments, most of them with *Grammaria serpens*, some other colonies with *Campanularia volubilis* (L.). Some gonothecae.

Moray Firth, F. P. Vermeulen, 1929. Numerous colonies without gonothecae, some on a piece of stone with a creeping hydrorhiza. Covered with *Grammaria serpens* (Hass.).

64° 00' N, 14° 55' W, south coast of Iceland, L. C. Langbroek, s.s. "Anna", June, 1927. Several colonies without gonothecae, but with *Cam-*

panularia johnstoni Alder, *Campanularia volubilis* (L.), *Lafoea dumosa* (Flem.) and *Grammaria serpens* (Hass.) (seen and mentioned by Kramp (1938)).

Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. One colony without gonothecae and a few fragments.

Distribution: The geographical distribution of this boreal species was discussed by Broch (1918) and Kramp (1938). There are numerous localities around Iceland and in the North Sea where this species has been found.

It was recorded from the Kara Sea by Bergh (1887). Numerous localities in arctic waters are given by Kudelin (1914). Gonothecae are very rare in the material which I investigated. They are found from May to June.

Abietinaria fusca (Johnston, 1847)

Abietinaria(?) fusca, Broch, 1918, p. 120, fig. LXIV.

Abietinaria fusca, Kramp, 1938, p. 51.

Locality: Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. One colony of 10 cm height, without gonothecae; at the base some hydrorhiza fibres.

Although this species is mentioned in Kramp's list of Hydroida from Iceland (Kramp, 1938), he did not see this specimen. With some other species it returned unidentified from the Zoological Museum at Copenhagen.

Distribution: Reliable geographical data still make a scattered impression (see Broch (1918) and Kramp (1935, 1938)). Kramp (1938) gives several localities in the neighbourhood of Iceland.

Hydrallmania falcata (Linnaeus, 1758)

Hydrallmania falcata, Broch, 1918, p. 135, figs. LXXIII- LXXIV.

Hydrallmania falcata, Kramp, 1938, p. 54, fig. 5.

Localities:

Waigatsch, on an ice floe, J. Mar. Ruys, Aug. 17, 1882. Several colonies and fragments without gonothecae. On some hydrocauli several colonies of *Sertularella tricuspida* (Alder).

4 miles E.N.E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. Several colonies and fragments with gonothecae.

54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. Several colonies and fragments without gonothecae.

Wash Bay, East coast of England, collected by the "Wodan", Aug. 8, 1905. Two colonies, 10 and 5 cm high on a piece of stone. No gonothecae.

North Sea, "Kleine Visschersbank", 3-5 fms., W. G. N. van der Sleen,

Aug., 1924. Several colonies without gonothecae, partly covered with *Lafoea dumosa* (Flem.).

55° 40' N, 5° 45' E, J. Gouda, s.s. "Freia", 1929. Numerous colonies on tubes of *Sabella*, partly covered with *Alcyonidium parasiticum* (Flem.). Gonothecae absent.

56° 58' N, 5° 55' E, J. Gouda, s.s. "Freia", 1929, 30 fms. Several colonies without gonothecae.

57° 45' N, 3° 30' E, A. Gisen, 1929. Several colonies without gonothecae, covered with Bryozoa and *Grammaria serpens* (Hass.).

55° 20' N, 6° 10' E, J. Gouda, s.s. "Freia", 1935. Numerous colonies without gonothecae, covered with *Lafoea dumosa* (Flem.).

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935. Numerous 10-15 cm high colonies, covered with Bryozoa. Several colonies with gonothecae.

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. Several colonies, with gonothecae, 15 cm high.

56° 30' N, 4° 20' E, J. Gouda, s.s. "Alma", April 20, 1935. Numerous beautiful colonies with numerous gonothecae on *Neptunea antiqua* (L.). Hydrocauli covered with *Lafoea dumosa* (Flem.). Maximal height of the colonies 30 cm.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Several fragments without gonothecae.

57° 01' N, 5° 30' E, F. P. Vermeulen, 1936. Several 8-16 cm high colonies without gonothecae.

60° N, 3° E, K. Tromp, March 1936, s.s. "Cornelis". Some small colonies without gonothecae.

60° N, 2°-4° E, G. J. Klooster, Nov. 29, 1936. Several colonies, among which there are some very young colonies. Gonothecae absent, some colonies with *Lafoea dumosa* (Flem.).

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Several colonies and fragments, without gonothecae.

Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. Several colonies, some on empty shells of *Tellimya ferruginosa* (Mont.). No gonothecae. Some colonies with *Sertularella tricuspadata* (Alder).

Some very young colonies (60° N, 2°-4° E, G. J. Klooster, Nov. 29, 1936), show the characters of young colonies as described by Broch (1918, pp. 135-137, fig. LXXIII). Gonothecae are not abundant in this material, although each sample contains numerous colonies or fragments. They are not so scarce as those of *Abietinaria abietina* (L.); they are found from April to July.

Distribution: The geographical distribution of this species was discussed by Broch (1918) and Kramp (1935 and 1938), so it is unnecessary to deal with it here. *Hydrallmania falcata* (L.) is very abundant in the North Sea and adjacent waters, along the west, south and east coasts of Iceland, etc. From the Kara Sea it was recorded by Bergh (1887, p. 337).

***Sertularia cupressina* Linnaeus, 1758**

Sertularia cupressina, Broch, 1918, p. 124, figs. LXV-LXVI.

Sertularia cupressina, Kramp, 1938, p. 51.

Localities:

Waigatsch, on an ice floe, J. Mar. Ruys, Aug. 17, 1882. Several small colonies and a few fragments. No gonothecae.

54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. Several beautiful colonies with numerous gonothecae and expanded polyyps.

55° 44' N, 6° 55' E, J. Gouda, s.s. "Freia", 1929. Some small colonies without gonothecae.

54° 30' N, 3° 10' E, A. Gisen, 1929. Some colonies without gonothecae.

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935. Several colonies and numerous fragments without gonothecae. Covered with Bryozoa.

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. One well developed colony without gonothecae.

64° 00' N, 14° 55' W, south coast of Iceland, L. C. Langbroek, s.s. "Anna", June, 1927. Some small fragments (seen and mentioned by Kramp (1938)).

All specimens probably belong to the forma *typica* Broch, 1918.

Distribution: The geographical distribution of this species was discussed by Broch (1918) and Kramp (1938). Kramp gives several localities in the neighbourhood of Iceland. It is a common species in the entire North Sea; the specimens from the Kara Sea recorded by Bergh (1887) under the names *Sertularia argentea* and *S. Dijnphnae* belong to *S. tenera* G. O. Sars (Broch, 1918).

***Sertularia mirabilis* (Verrill, 1873)**

Sertularia mirabilis, Kudelin, 1914, p. 224, figs. 62-65.

Sertularia mirabilis, Broch, 1918, p. 133, fig. LXXII.

Locality: Waigatsch, on an ice floe, J. Mar. Ruys, Aug. 17, 1882. One fragment of a colony, without gonothecae.

Distribution: This entirely arctic species was recorded from the west coast of Greenland (Broch, 1918), north-west Iceland (Broch, 1918; Kramp, 1938), Faroe Bank (Broch, 1918) and numerous arctic localities

(Barentz Sea, Murman Coast, Spitzbergen, White Sea, Ice Sea; Kudelin, 1914). From the Kara Sea it was recorded by Bergh (1887).

Sertularia operculata Linnaeus, 1758

Sertularia operculata, Jäderholm, 1909, p. 97.

Amphisbetia operculata, Leloup, 1933, pp. 9, 24.

Locality: Greenland, Neu Herrnhut, E. von Martens, 1849 (?). Several small colonies with some gonothecae.

Distribution: The distribution of this southern species was discussed by Jäderholm (1909). It was never found under purely arctic conditions; reliable data at least, are not available. It is very curious, therefore, that several specimens of this species are present in the collections of the Rijksmuseum Leiden, labelled: "Neu Herrnhut, E. von Martens, 1849". It is very questionable whether Von Martens visited Greenland himself or received the species from missionaries. Several other Hydrozoa from different localities are present in the collections of the Leiden Museum, labelled E. von Martens, moreover, a great number of species from missionaries (Herrnhutten's missionaries) are present in the same collections, which are most of them wrongly labelled, West Indian species labelled "Cape of Good Hope", etc. So it is very doubtful where the specimens of *Sertularia operculata* L. were collected.

Thuiaria thuja (Linnaeus, 1758)

Thuiaria thuja, Broch, 1918, p. 139, fig. LXXV.

Thuiaria thuja, Kramp, 1938, p. 54.

Localities:

North Sea, J. Metzelaar, Aug. 1913. Three colonies, without gonothecae, some hydrocauli with colonies of *Lafoea dumosa* (Flem.).

56° 58' N, 5° 55' E, J. Gouda, s.s. "Freia", 1929, 30 fms. Numerous colonies without gonothecae, hydrocauli with *Lafoea dumosa* (Flem.).

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. One colony without gonothecae, 10 cm high.

60° 30' N, 3° 10' E, J. Gouda, s.s. "Alma", April 17, 1935. One colony without gonothecae, 12 cm high.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Several colonies and fragments. Gonothecae absent.

60° N, 3° E, K. Tromp, s.s. "Cornelis", March, 1936. Five colonies without gonothecae, 18 cm high, the hydrocauli with *Lafoea dumosa* (Flem.).

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Several 10-15 cm high colonies without gonothecae.

Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. Eight colonies without gonothecae and a few fragments. One of the colonies with *Nigellastrum fallax* (Johnst.).

Distribution: The geographical distribution of this boreal species was discussed by Broch (1918) and Kramp (1938). There are numerous localities in the neighbourhood of Iceland and in the northern part of the North Sea where this species was found. Gonothecae are not present in the material which was investigated.

Thuiaria laxa Allman, 1874

Thuiaria laxa, Broch, 1918, p. 142, fig. LXXVII.

Thuiaria laxa, Kramp, 1938, p. 56.

Locality: Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. Two colonies of 12 cm height, and a few fragments. Gonothecae absent.

Although Kramp (1938) mentions this species in his list of Hydroida from Iceland, he did not inspect this sample, which contains several other interesting species, as it was returned from the Zoological Museum at Copenhagen unidentified.

Distribution: Several localities of this arctic species in the neighbourhood of Iceland and in the Northern part of the North Sea are given in the papers of Broch (1918) and Kramp (1938). The geographical distribution is discussed in the same papers.

Thuiaria lonchitis (Ellis and Solander, 1786)

Thuiaria lonchitis, Broch, 1918, p. 146.

Thuiaria lonchitis, Kramp, 1938, p. 58.

Localities:

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. One colony of 10 cm height and a fragment. Gonothecae absent.

55° 19' N, 5° 25' W, W. Gravenmaker, F. Rechtsteiner and A. de Groot, Aug. 1932. One fragment without gonothecae.

Measurements of the first mentioned specimen:

Diameter of the hydrocaulus at the base	0.9 mm
Total length of the hydrotheca	450-500 μ
Length of the free adcauline part	60-80 μ
Maximal diameter of the hydrotheca	160-200 μ
Diameter of the opening of the hydrotheca	100-130 μ
Distance between two successive hydrothecae	130-170 μ

Distribution: This arctic, circumpolar species penetrates into the boreal region. In the North Sea it has its chief occurrence along the coasts of the British Isles, mainly in the deeper parts of the littoral and the upper

parts of the abyssal region. Broch gives several localities in the northern part of the North Sea (Broch, 1918, p. 147).

Antennella catharina (Johnston, 1833)

Plumularia catharina, Broch, 1918, p. 56, figs. XXV-XXVI.

Schizotricha catharina, Kramp, 1938, p. 36.

Localities:

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Some small, 12-20 mm high colonies on *Nemertesia antennina* (L.), together with *Halecium halecinum* (L.) and *Laomedea gracilis* (M. Sars). Gonothecae lacking.

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl". Numerous colonies on *Nemertesia ramosa* Lmx. Gonothecae absent.

Distribution: This southern species is very common along the coasts of the British Isles and the West coast of Norway (see Broch, 1918 and Kramp, 1938). The only locality in the neighbourhood of Iceland given by Kramp is: "5 miles S.E. of the Vestmannaeyar, 150 m depth." The colonies from the Vestmannaeyar, present in the material here, are not mentioned by Kramp (1938), although he studied and labelled some other species in the same sample.

Plumularia setacea (Linnaeus, 1758)

Plumularia setacea, Broch, 1918, p. 55, fig. XXIV.

Plumularia setacea, Kramp, 1938, p. 35.

Localities:

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Several colonies with male and female gonothecae on *Nemertesia ramosa* Lmx.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Several colonies on *Nemertesia ramosa* Lmx. Most of the colonies are hermaphroditic, some others apparently are male or female. Male and female gonothecae nearly of the same shape and size.

Measurements of the last mentioned specimens:

Diameter of the hydrocaulus at the base	80-120 μ
Length of the articles of the hydrocaulus	380-500 μ
Length of the articles of the hydrocladia	360-460 μ
Diameter of the articles of the hydrocladia	60-70 μ
Length of the hydrothecae of the hydrocladia	80-110 μ
Diameter of the hydrothecae of the hydrocladia	100-120 μ
Length of the intermediate articles	230-300 μ
Diameter of the intermediate articles	50-80 μ
Length of the female gonothecae	1000-1200 μ
Maximal diameter of the female gonothecae	300-350 μ
Length of the male gonothecae	900-1200 μ
Maximal diameter of the male gonothecae	300-350 μ

These measurements show that the colonies from the Clyde at least belong to the forma *microtheca* Broch, 1918.

Distribution: *Plumularia setacea* is a common species in the North Sea, especially along the coasts of the British Isles. The geographical distribution was discussed by Broch (1918).

Polyplumaria flabellata G. O. Sars, 1874

Polyplumaria flabellata, Broch, 1918, p. 59, fig. XXVIII.

Polyplumaria flabellata, Kramp, 1938, p. 37.

Localities:

60° 30' N, 3° 10' E, J. Gouda, s.s. "Alma", April 17, 1935. One double pinnate, 12 cm high colony without gonothecae. Most of the hydrocladia are simple, some of them furcated. No gonothecae.

58° 25' N, 4° 15' E, F. P. Vermeulen, April, 1936. One colony of 10 cm height with a tuft of hydrorhiza fibres on a piece of stone. Gonothecae absent. Most of the hydrocladia furcated.

Measurements:

	60° 30' N, 3° 10' E J. Gouda, s.s. "Alma".	58° 25' N, 4° 15' E F. P. Vermeulen.
Diameter of the hydrocaulus at the base	1.6 mm	1.7 mm
Length of the hydrothecate articles	350-450 μ	330-420 μ
Diameter of the hydrothecate articles	60-85 μ	60-90 μ
Length of the hydrotheca	160-220 μ	160-200 μ
Diameter of the hydrotheca	150-180 μ	150-170 μ
Length of the intermediate articles	80-200 μ	80-150 μ

Distribution: *Polyplumaria flabellata*, an Atlantic deep sea species, rarely occurs in northern waters, and is mainly restricted there to the deeper water layers. It has been recorded from some localities at the coast of Scotland, the west coast of Norway and the Faroe Islands (Broch, 1918). Kramp (1938) gives one locality south of the Vestmannaeyar, where this species has been found.

Nemertesia antennina (Linnaeus, 1758)

Nemertesia antennina, Broch, 1918, p. 64, fig. XXXI.

Nemertesia antennina, Kramp, 1938, p. 37.

Localities:

4 miles E.N.E. of 54° 35' N, 7° 45' E, 9-10 fms. H. Boschma and G. C. A. Junge, May 31, 1935. The basal part of a large colony. Only a few hydrocladia are present, no gonothecae.

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. One small colony without gonothecae.

58° 16' N, 3° 00' W, Moray Firth, J. Gouda s.s. "Alma". Several well developed colonies without gonothecae, at the base with dense tufts of hydrorhiza fibres.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. One well developed colony without gonothecae. At the base a dense tuft of hydrorhiza fibres. Several smaller colonies without gonothecae.

64° N, 13°-14° W, L. C. Langbroek, s.s. "Anna", June, 1927. Two well developed colonies of 10 cm height.

64° 35' N, 12° 55' W, near Iceland, Van der Duin. Twelve well developed colonies without gonothecae, all with hydrorhiza fibres (these colonies were studied and are mentioned by Kramp (1938)).

Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. Three colonies without gonothecae. At the base hydrorhiza fibres.

Distribution: This widely distributed species, common in the North Sea and around Iceland, was discussed with regard to its geographical distribution by Broch (1918) and Kramp (1938). Gonothecae are not present in the material.

Nemertesia ramosa Lamouroux, 1816

Nemertesia ramosa, Broch, 1918, p. 66, figs. XXXII-XXXIII.

Nemertesia ramosa, Kramp, 1938, p. 38.

Localities:

North Sea, J. Metzelaar, Aug., 1913. Some small colonies with numerous gonothecae. Hydrocladia five in each circle.

56° 28' N, 3° 20' E, J. Gouda, s.s. "Alma", July 29, 1935. One small colony without gonothecae and some fragments.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Some fragments without gonothecae.

56° 48' N, 8° 00' E, K. Tromp, s.s. "Cornelis", 1936. One 15 cm high colony with distinct and repeated ramifications, at the base a dense tuft of hydrorhiza fibres. On some hydrocauli colonies of *Laomedea longissima* (Pall.). Gonothecae absent.

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Several well developed colonies with at the base some hydrorhiza fibres and with numerous gonothecae. Some hydrocauli with small colonies of *Plumularia setacea* (L.).

Moray Firth, F. P. Vermeulen, 1929. Some colonies and fragments without gonothecae, but with hydrorhiza fibres at the base of the colonies.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. One fragment and several well developed colonies without gonothecae. At the base dense tufts of hydrorhiza fibres.

55° 19' N, 5° 25' W, W. Gravenmaker, F. Rechtsteiner and A. de

Groot, Aug., 1932. Several colonies and numerous fragments with gonothecae. Some hydrocauli with colonies of *Halecium halecinum* (L.) and *Campanularia hincksii* Alder.

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl". Several well developed colonies without gonothecae. Hydrocauli with *Lafoea dumosa* (Flem.), *Sertularella polyzonias* (L.) f. *typica* Broch and *Antennella catharina* (Johnst.).

Distribution: This species has a more southern occurrence than *N. antennina* (L.). It was never found at the west coast of Norway, but it seems to be abundant along the coasts of the British Isles, in the Skagerrak, the Shetland Islands and the Faroe Islands. Kramp (1938) gives three localities in the neighbourhood of the Vestmannaeyar, in which he probably included the specimens from this locality present in the collections of the Zoological Museum at Amsterdam, although this is not mentioned in his list, but he examined and labelled these specimens.

Cladocarpus campanulatus Ritchie, 1912

Halicornaria campanulata, Broch, 1918, p. 72, fig. XXXVI.

Cladocarpus campanulatus, Kramp, 1938, p. 40.

Locality: Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. Two colonies with numerous gonothecae, 6 cm high.

Although Kramp mentions this species in his list of Hydroida from Iceland, he did not study these specimens, they were returned unidentified with several other species from the Zoological Museum at Copenhagen.

Distribution: Only a few localities are known: neighbourhood of Iceland (Ritchie, 1912); off the most southern part of the west coast of Greenland at a depth of 120 m (Kramp, 1932); N. of Skagata, 66° 33' N, 20° 05' W, 83 m; N. of Langanes, 66° 43' N, 14° 53' W, 147 m (Broch, 1918, Kramp, 1938).

Cladocarpus bonnevieae Jäderholm, 1909 (fig. 2 a-d)

Aglaophenia compressa Bonnevie, 1899, p. 94, pl. 7 fig. 7.

Halicornaria compressa Broch, 1909, p. 207.

Cladocarpus bonnevieae Jäderholm, 1909, p. 110; Bedot, 1921, p. 325.

Locality: Iceland, near the south coast, 100 fms., J. Metzelaar and H. Engel, July, 1920. One 12 cm high colony and some fragments.

Description.

Trophosome: Colony erect, with a distinct hydrocaulus, 12 cm high. At the base of the hydrocaulus some hydrorhiza fibres, by which probably the colony was attached to the sand or silt of the bottom. Hydrocaulus of a dark, brown colour, at the base 2 mm in diameter, with a canaliculated

structure, probably polysiphonic in the lower parts. In front of the hydrocaulus there are two rows of apophysae, which show an alternating

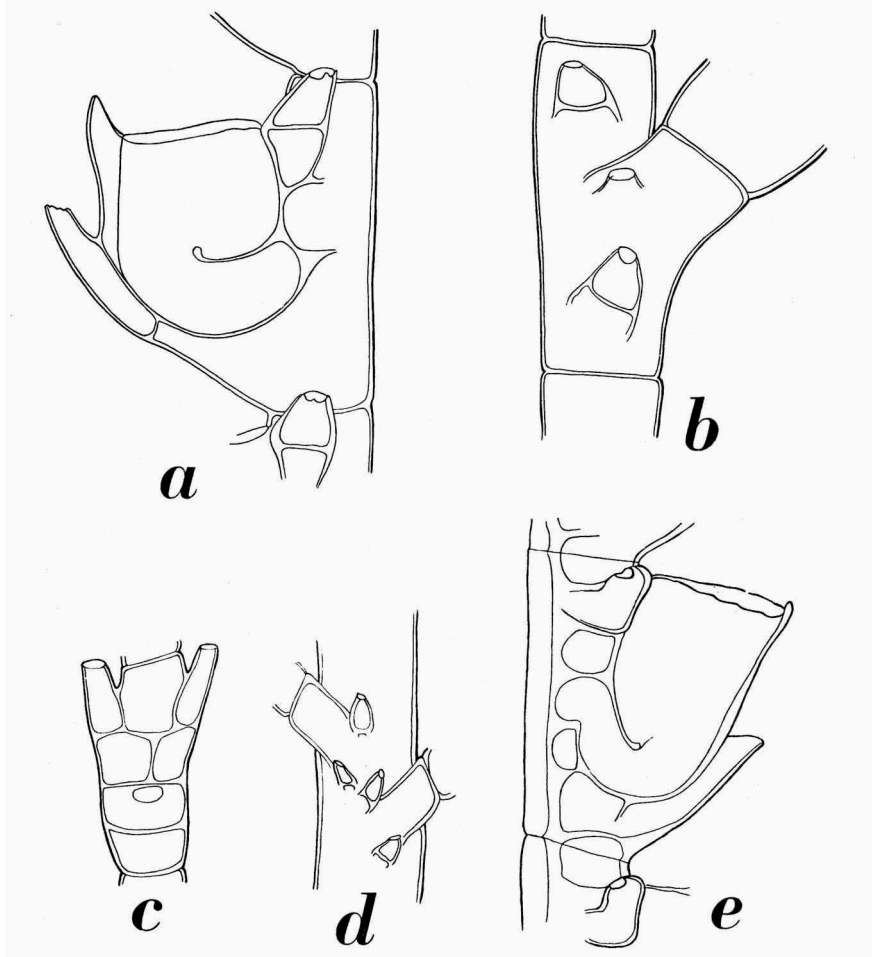


Fig. 2. a-d, *Cladocarpus bonnevieae* Jäderholm, Iceland, near the south coast, 100 fms, J. Metzelaar and H. Engel, July, 1920; a, hydrotheca in side view; b, article of a secondary hydrocladium, showing two sarcothecae and the "mamelon", the third sarcotheca is behind the apophysis; c, hydrotheca seen from the back; d, part of the hydrocaulus in the upper part of the colony, showing the apophysae with two sarcothecae, the third sarcotheca is behind the apophysis. e, *Thecocarpus myriophyllum* (L.) var. *radicellatus* Billard, 55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen; hydrotheca. a, $\times 54$; b, $\times 54$; c, $\times 43$; d, $\times 43$; e, $\times 83$.

arrangement. Each row is turned to the left or to the right side of the colony. Between the apophysae there are no indications of septa of the hydrocaulus, but according to Bonnevie these septa must be present in the

younger colonies. At the base of each apophysa, partly on the apophysa itself and partly on the hydrocaulus there are three sarcothecae (not two as in the original description of Bonnevie). There is one sarcotheca which stands more or less in the axil of the apophysa and the hydrocaulus and two at the base of the apophysa, one in front of the hydrocaulus and the other on the back. The apophysae are cut off obliquely at the top and there they are almost parallel with the hydrocaulus. The hydrocladia are found on the apophysae, they alternately bend to the left and to the right. These hydrocladia give the colony a rigid but somewhat featherlike appearance. They are sometimes branched or have several secondary hydrocladia on small apophysae, which at the top are cut off transversely. The hydrocladia are divided into internodes by distinct septa. Each internode has one hydrotheca and three sarcothecae. The hydrotheca is almost cup-shaped, large, somewhat laterally compressed, with in front a sharply carinated projection, which runs out into a pointed tooth, projecting above the margin of the hydrotheca. The margin of the hydrotheca is almost without any indication of teeth, near the hydrocladium one or two small teeth on each side may be present. The opening of the hydrotheca is almost perpendicular to the axis of the hydrocladium. The mesial sarcotheca is short, not reaching the margin of the hydrotheca, the margin with a number of very small teeth, the free part one to two times as long as the diameter of the opening. About half way up the sarcotheca there is a distinct septum. Lateral sarcothecae short and tubular, the opening circular, with a number of small teeth or a small number of larger teeth. They project far above the margin of the hydrotheca. In the hydrotheca there is a very distinct septum, attached to the back of the hydrotheca. This septum forms a strong, linguiform projection in the cavity of the hydrotheca. Near the end it is somewhat thickened and turned upward. Each internode of the hydrocladium shows two very distinct septa, one close to the base of the lateral sarcothecae, so that sometimes the lateral sarcothecae seem to be two-chambered, and one septum under the hydrothecal septum. When the hydrocladia are seen from the back, a distinct connection between the two septa of the internodes is visible. Moreover, a circular opening is visible, close under the lowest septum, indicating the communication between the cavity of the hydrotheca and the hydrocladium. Under that opening a third septum sometimes is visible, viz., the septum in the mesial sarcotheca. When the hydrocladia have secondary hydrocladia, these are also placed on apophysae. These apophysae also have three sarcothecae, one in the axil and two at the base. Apparently a fourth

sarcotheca is present, a reduced one (mamelon) in front of the hydrocladium. The apophysae of the hydrocladia are cut off transversely at the top.

Gonosome: Not present in the colony. Some characteristics can be given according to the description of Bonnevie (1899, p. 94). Gonothecae oviform, with an oval opening, lying obliquely at the distal end. They have a short stalk, consisting of two or three lids, attached to the base of the first hydrotheca of the hydrocladia, or born on separate branchlets, growing out from the same spot. Bonnevie does not mention sarcothecae at the base or on the gonothecae.

All these characteristics, except those of the gonosome, were taken from one, dried and later on softened, specimen. The examination of a better preserved specimen probably will show that some of the characters summed up in the description given above are only partly true or incomplete.

Measurements.

Diameter of the stem at the base	1-1.8 mm
Total length of the hydrocladia	9-20 mm
Length of the articles of the hydrocladia	540-580 μ
Diameter of the articles of the hydrocladia	130-180 μ
Depth of the hydrotheca	330-370 μ
Length of the spine above the margin of the hydrotheca	110-140 μ
Diameter of the hydrotheca	215-230 μ
Length of the free part of the medium sarcotheca	80-110 μ

Distribution: Up to the present this species has only been recorded from one locality: 74° 55' N, 15° 49' E, W. of Bear Island, on a depth of 373 m (Bonnevie, 1899, p. 94).

Thecocarpus myriophyllum (Linnaeus, 1758) var. **radicellatus** Billard, 1906 (fig. 2 e)

Thecocarpus myriophyllum, Broch, 1918, p. 92, fig. L.

Thecocarpus myriophyllum var. *radicellatus*, Billard, 1922, p. 346, fig. 1 B.

Thecocarpus myriophyllum, Kramp, 1938, p. 40.

Localities:

60° N, 2°-4° E, G. J. Klooster, Nov. 29, 1936. Two colonies of 100 mm height, without gonosome. At the base some hydrorhiza fibres.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. One colony with some hydrorhiza fibres at the base and at the top some hydrocladia, 120 mm high, together with eight colonies of *Nigellastrum pinaster* (Ell. & Sol.), and a fragment of a colony, probably the upper part of the first colony, with numerous hydrocladia. The first colony with a thick, polysiphonical hydrocaulus, without distinct articles.

Measurements:

	60° N, 2°-4° E, G. J. Klooster.	Clyde, 55° 15' N, 5° 15' W. F. P. Vermeulen.
Diameter of the hydrocaulus at the base	0.5 mm	1.6 mm
Length of the hydrothecate articles	600-700 μ	500-590 μ
Diameter of the hydrothecate articles	140-180 μ	130-215 μ
Total length of the hydrotheca	460-500 μ	360-460 μ
Diameter of the opening of the hydrotheca	200-260 μ	200-250 μ
Length of the abcauline wall of the theca above the medium sarcotheca	330-270 μ	200-270 μ

Distribution: The geographical distribution of this species was discussed by Billard (1906), Jäderholm (1909), Broch (1918) and Kramp (1938). The exact distribution of the var. *radicellatus* is not quite clear at present.

Campanularia volubilis (Linnaeus, 1758)

Campanularia volubilis, Broch, 1918, p. 153, fig. LXXX.

Campanularia volubilis, Kramp, 1938, p. 14.

Localities:

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Numerous hydrothecae on *Abietinaria abietina* (L.). No gonothecae.

Moray Firth, F. P. Vermeulen, 1929. Several hydrothecae, rising from a creeping hydrorhiza on a tube of *Sabella*. Gonothecae lacking. Length of the hydrothecae 880 μ , diameter 250 μ .

64° 00' N, 14° 55' W, south of Iceland, L. C. Langbroek, s.s. "Anna", June, 1927. Small colonies with some hydrothecae on *Abietinaria abietina* (L.). No gonothecae. Studied and mentioned by Kramp (1938).

Distribution: This species seems to be rather rare in the North Sea itself, although it is rather abundant along the coasts of the British Isles, particularly along the coast of Scotland. Kramp (1938) gives a great number of localities around Iceland, discussing the geographical distribution in the same paper.

Campanularia verticillata (Linnaeus, 1758)

Campanularia verticillata, Broch, 1918, p. 155, fig. LXXXI.

Campanularia verticillata, Kramp, 1938, p. 15.

Localities:

North Sea, J. Metzelaar, Aug., 1913. Some well developed rhizocaulomic colonies with several gonothecae and hydrothecae.

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". Several fragments of a colony, hydrothecae in perfect condition, the gonothecae absent.

Moray Firth, F. P. Vermeulen, 1929. Some small fragments of a colony without gonothecae.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. One fragment of a colony with some hydrothecae and gonothecae.

Distribution: This northern-boreal, circumpolar species is rather abundant in the North Sea, chiefly in the middle and deeper parts of the littoral region. Along the coasts of the North Sea it penetrates southwards.

Campanularia hincksii Alder, 1856

Campanularia hincksii, Broch, 1918, p. 162.

Campanularia hincksii, Kramp, 1938, p. 16.

Localities:

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Some small colonies with a creeping hydrorhiza on *Halecium beanii* Johnst. No gonothecae.

55° 19' N, 5° 25' W, W. Gravenmaker, F. Rechtsteiner, and A. de Groot, Aug., 1932. Several colonies without gonothecae but with very distinct hydrothecae at the base of *Nemertesia ramosa* Lmx. and *Sertularella polyzonias* (L.) f. *typica* Broch.

Distribution: This southern species seems to be rare in the North Sea, but appears to have its main distribution along the coast of England and Scotland, as far north as the Lofoten, moreover along the west coast of Norway and the south coast of Iceland.

Campanularia johnstoni Alder, 1856

Campanularia johnstoni, Broch, 1918, p. 163, fig. LXXXIV.

Campanularia johnstoni, Kramp, 1938, p. 16.

Localities:

54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. Numerous colonies on Bryozoa, Crustacea, other Hydroida, etc. Gonothecae always numerous.

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Some small colonies without gonothecae on *Abietinaria abietina* (L.).

64° 00' N, 14° 55' W, south coast of Iceland, L. C. Langbroek, s.s. "Anna", June, 1927. Some colonies on *Abietinaria abietina* (L.). No gonothecae. Studied and mentioned by Kramp (1938).

Distribution: *Campanularia johnstoni* is a southern species, which is particularly abundant in the North Sea, entirely belonging to the littoral region. It is very abundant along the British Isles, along the west coast of Norway only as far north as Bergen, some localities near Hammerfest (see Kramp, 1938).

Laomedea geniculata (Linnaeus, 1758)

Laomedea geniculata, Broch, 1918, p. 166, fig. LXXXV.

Laomedea geniculata, Kramp, 1938, p. 18, fig. 1.

Localities:

4 miles E. N. E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. Numerous colonies with mature and empty gonothecae on drifting pieces of wood.

54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. Numerous colonies on drifting pieces of wood and on *Flustra foliacea* (L.), together with *Membranipora pilosa* (L.). Numerous mature and empty gonothecae. A very fine form, with a slight thickening of the periderm under each hydranth stalk.

54° 30' N, 3° 10' E, A. Gisen, 1929. Numerous colonies on the hydrocauli of *Laomedea longissima* (Pall.) with mature and empty gonothecae.

57° 01' N, 5° 30' E, F. P. Vermeulen, 1935. Numerous colonies with many gonothecae on *Fucus* spec.

60° N' 2°-4° E, G. J. Klooster, Nov. 29, 1936. Numerous colonies on *Fucus* spec., with mature and empty gonothecae. A fine, branched form, with a scarcely visible thickening of the periderm under each hydranth stalk.

Distribution: The geographical distribution of this almost cosmopolitan species is extremely wide. It is very common in the North Sea, where it occurs in immense quantities along the coasts on all possible fixed and drifting objects. It is cast ashore in great quantities, especially on Phaeophyceae, like *Fucus*, *Ascophyllum*, *Laminaria*, *Halidrys*, etc.

Laomedea dichotoma (Linnaeus, 1758)

Laomedea dichotoma, Kramp, 1938, p. 20.

Localities:

North Sea, J. Metzelaar, Aug., 1913. Some colonies on the base of *Nemertesia ramosa* Lmx. No gonothecae.

55° 44' N, 6° 55' E, J. Gouda, s.s. "Freia", 1929. Four colonies of 30 mm height on a piece of stone. No gonothecae but the hydrothecae in perfect condition.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Several colonies without gonothecae on *Nigellastrum pinaster* (Ell. et Sol.), covered with hydrothecae of *Laomedea gracilis* (M. Sars).

Distribution: Kramp (1938) claims that this species has an almost cosmopolitan distribution, but its main distribution is in the boreal seas on the European coasts. In the North Sea it is not rare, although it is not so abundant as *L. geniculata*, *L. longissima* or *Campanularia johnstoni*.

Laomedea longissima (Pallas, 1766)

Laomedea longissima, Broch, 1918, p. 167, fig. LXXXVI.

Laomedea longissima, Kramp, 1938, p. 21.

Localities:

4 miles E.N.E. of 54° 35' N, 7° 45' E, 9-10 fms., H. Boschma and G. C. A. Junge, May 31, 1935. Young colonies on *Halecium halecinum* (L.) and on *Fucus* spec., without gonothecae.

North Sea, J. Metzelaar, Aug., 1913. Several colonies with empty gonothecae.

54° 30' N, 3° 10' E, A. Gisen, 1929. Numerous colonies, some hydrocauli with *Laomedea geniculata* (L.). Gonothecae and hydrothecae in bad condition.

56° 20' N, 3° 10' E, J. Gouda, s.s. "Alma", 1935. Some badly preserved colonies with few hydrothecae and without gonothecae probably belong to this species.

56° 48' N, 8° 00' E, K. Tromp, s.s. "Cornelis", 1936. One colony with badly preserved hydrothecae and without gonothecae at the base of *Nemertesia ramosa* Lmx.

58° 16' N, 3° 00' W, Moray Firth, J. Gouda, s.s. "Alma". One colony with a few hydrothecae and without gonothecae probably belongs to this species.

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. One colony of 15 cm without gonothecae.

Distribution: *Laomedea longissima* has an almost cosmopolitan distribution, it is very abundant in the North Sea, mainly restricted to the littoral region and there it is abundant in the tidal zone.

Laomedea gelatinosa (Pallas, 1766)

Laomedea gelatinosa, Broch, 1928, p. 75.

Laomedea gelatinosa, Kramp, 1935, p. 114, fig. 40 C.

Locality: 54° 38' N, 7° 45' E, 8-10 fms., H. Boschma and G. C. A. Junge, June 1, 1935. Several 1-6 cm high colonies on legs and carapace of *Hyas araneus* (L.). Some immature gonothecae.

Distribution: This species seems to have a southern distribution, although it penetrates to the north along the North Sea coast of Great Britain, Holland and Denmark. It is a very common species in the littoral region, where it is abundant on all kinds of objects. It seems very doubtful whether the specimens recorded by Leloup (1933, p. 10) under the name of *Laomedea spinulosa* (Bale) = *L. bicuspidata* (Clark) actually belong to this species or to *Laomedea gelatinosa*. The margin of the hydrotheca is sometimes very thin and the dentation difficult to observe.

Laomedea gracilis (M. Sars, 1851)

Laomedea gracilis, Broch, 1918, p. 170, fig. LXXXVIII.

Laomedea gracilis, Kramp, 1938, p. 22.

Localities:

56° 05' N, 4° 45' E, F. P. Vermeulen, May, 1936. Some hydrothecae with a creeping hydrorhiza on the hydrocaulus and branches of *Halecium halecinum* (L.).

55° 15' N, 5° 15' W, Clyde, F. P. Vermeulen. Some small colonies on hydrocauli of *Laomedea dichotoma* (L.) and *Antennella catharina* (Johnst.). No gonothecae.

Vestmannaeyar, south of Iceland, J. v. Oldenmarkt, s.s. "Schoorl". Some hydrothecae on *Bougainvillia* (?) spec.

Distribution: This southern species is not abundant in the North Sea, although it is not rare, even abundant, along the coasts of the British Isles and the west coast of Norway. It was also recorded from the Faroe Islands and from some localities on the south and south west coasts of Iceland.

LITERATURE

- ALLMAN, G. J., 1874. Report on the Hydroida collected during the expedition of the "Porcupine". Trans. Zool. Soc., London, vol. 8, pp. 469-481, pls. LXV-LXVIII.
- BEDOT, M., 1921. Notes systématiques sur les Plumularides. Part 1. Rev. Suisse Zool., vol. 28, pp. 311-356.
- BERGH, R. S., 1887. Goplepolyper (Hydroider) fra Kara Havet. C. F. Lütken, Djmphna-Togtet zoologisk-botaniske Udbytte, pp. 329-338, pl. 28.
- BILLARD, A., 1922. Thecocarpus myriophyllum et ses variétés. Ann. Sc. Nat., Zool. (10), vol. 5, pp. 343-350, 4 textfigs.
- BONNEVIE, K., 1899. Hydroida. Den Norske Nordhavs Expedition 1876-1878, Zool., vol. 26, 144 pp., 8 pls., 1 chart.
- BROCH, HJ., 1903. Die von dem norwegischen Fischereidampfer "Micheal Sars" in den Jahren 1900-1902 in dem Nordmeer gesammelten Hydroiden. Bergens Mus. Aarbog, 1903, no. 9, pp. 1-14, 4 pls.
- , 1905. Nordsee-Hydroiden von dem norwegischen Fischereidampfer "Michael Sars" in den Jahren 1903-1904 gesammelt. Bergens Mus. Aarbog, 1905, no. 6, pp. 1-25, pls. I-II, 8 textfigs.
- , 1908. Hydroiden Untersuchungen I. Thecophore Hydroiden von dem nördlichen Norwegen nebst Bemerkungen über die Variation und Artabgrenzung der nordischen Lafoea Arten. Tromsø Mus. Aarshefter, vol. 29, pp. 27-40, 6 textfigs.
- , 1909. Die Hydroiden der Arktischen Meere. Fauna Arctica, vol. 5, pp. 129-248, pls. II-IV, 46 textfigs.
- , 1916. Hydroida I. Danish Ingolf Expedition, vol. 5, pt. 6, 66 pp., 2 pls., textfigs. A-U.
- , 1918. Hydroida II. Danish Ingolf Expedition, vol. 5, pt. 7, 205 pp., 1 pl., 95 textfigs.

- BROCH, HJ., 1928. Hydrozoa I (Hydroida + Trachylina). Die Tierwelt der Nord- und Ostsee, vol. 3b, 100 pp., 105 textfigs.
- , 1933. Zur Kenntnis der Adriatischen Hydroidenfauna von Split. Skrift. Norske Vid. Akad., Oslo, Mat. Nat. Kl., 1933, no. 4, 115 pp., 46 textfigs.
- JÄDERHOLM, E., 1902. Die Hydroiden der schwedischen Zoologischen Polarexpedition. Bih. Sv. Vetensk. Akad. Handl., vol. 28, afd. IV, no. 12, pp. 1-11, 1 pl.
- , 1908. Die Hydroiden des Sibirischen Eismeer. Mem. Acad. Imp. Sci. Petersbourg, Cl. Phys. Math., (8), vol. 18, no. 12, 28 pp., 3 pls.
- , 1909. Northern and Arctic Invertebrates in the Collection of the Swedish State Museum IV, Hydroiden. Kgl. Sv. Vetensk. Akad. Handl., vol. 45, pt. 1, pp. 1-124, pls. 1-12.
- KRAMP, P. L., 1911. Report on the Hydroids collected by the Danmark Expedition at North East Greenland. Medd. om Grønl., vol. 45, pp. 341-396, 6 pls., 8 textfigs.
- , 1914. Hydroider og Siphonophorer. Medd. om Grønl., vol. 23, pp. 381-456.
- , 1926. Occasional notes on Coelenterata I. Vidensk. Medd. Dansk naturh. Foren., vol. 82, pp. 241-247, 1 textfig.
- , 1932. The Godthaab Expedition, 1928, Hydroids. Medd. om Grønl., vol. 79, pt. 4, pp. 1-86, 34 textfigs.
- , 1932a. Hydroids collected in the West Greenland Fjords in 1911 and 1912. Medd. om Grønl., vol. 91, pt. 3, 35 pp., 8 figs.
- , 1935. Polypdyr I. Ferskvandpolypper og Goplepolypper. Danmarks Fauna, pt. 41, 207 pp., 81 textfigs.
- , 1938. Marine Hydrozoa (Hydroida). Zool. of Iceland, vol. 2, pt. 5a, 82 pp. 5 figs., 4 tab.
- KUDELIN, N. V., 1914. Hydriaires (Hydroidea). Faune de la Russie et des Pays Limitrophes, vol. 2, pt. 2, pp. 139-526, pls. I-V, 180 textfigs.
- LELOUP, E., Contribution à la Connaissance des Hydropolypes de la côte des Pays Bas. Bull. Mus. Hist. Nat. Belge, vol. 9, no. 45, 30 pp., 3 textfigs.
- MARKTANNER-TURNERETSCHER, G., 1895. Zoologische Ergebnisse der im Jahre 1889 auf Kosten der Bremer geographischen Gesellschaft von Dr. Willy Kükenthal und Dr. Alfred Walter ausgeführten Expedition nach Ost-Spitzbergen. Zool. Jahrb. (Syst.), vol. 8, pp. 391-438, pls. 11-13.
- MATHISEN, O., 1928. Hydroids from Northern Norway. Tromsø Mus. Aarshefter, vol. 49, no. 4, 40 pp., 4 textfigs.
- MESJATZEW, I., 1922. Die Polarexpedition des schwimmenden wissenschaftlichen Meeresinstituts. Russ. Hydrobiol. Zeitschr., vol. 1, pt. 2, pp. 48-54.
- RYLOW, V. M., 1923. Zoologische Ergebnisse der Russischen Expedition nach Spitzbergen. Hydroidea Athecata. Ann. Mus. Zool. Acad. Sc. Russe, vol. 24, pp. 140-160, pl. VI.
- , 1924. Hydroidea Athecata aus den Sammlungen der Expedition des Institutes im Jahre 1921. Ber. Wiss. Meeresinst. Moscou, pt. 9, pp. 1-10.
- *SCHYDLOWSKY, A., 1902. Matériaux relatifs à la faune des Polypes Hydriaires des mers arctiques I. Les Hydriaires de la mer Blanche le long du littoral des îles Solowetsky. Trav. Soc. Nat. Univ. Imp. de Kharkow, pt. 36, pp. 1-277, pls. 1-5.
- TOTTON, A. K., 1930. Hydroida. British Antarctic ("Terra Nova") Expedition, 1910. Nat. Hist. Rep., Zool., vol. 5, no. 5, pp. 131-252, pls. I-III, 70 textfigs.
- VERVOORT, W., 1941. The Hydroida of the Snellius Expedition. Temminckia, vol. 6, pp. 186-240, 11 textfigs.

*) not available to me.