NO

REPORT OF THE SECOND NORWEGIAN ARCTIC EXPEDITION
IN THE „FRAM“ 1898—1902. No. 8.

O. NORDGAARD:

BRYOZOA FROM THE 2ND FRAM EXPEDITION 1898–1902

(WITH 4 PLATES)

AT THE EXPENCE OF THE FRIDTJOF NANSEN
FUND FOR THE ADVANCEMENT OF SCIENCE

PUBLISHED BY

VIDENSKABS-SELSKABET I KRISTIANIA

(THE SOCIETY OF ARTS AND SCIENCES OF KRISTIANIA)

KRISTIANIA
PRINTED BY A. W. BRØGGER
1906

INTRODUCTION.

My investigations on the subject of Bryozoa have, until quite lately, been based exclusively upon material from the Norwegian shores, the more northerly of which exhibit a number of arctic forms, although the animal life there, on account of the peculiar hydrographic conditions, is of a mixed character. It was therefore with pleasure, that I acceded to the request of Hr. P. Schei to work up the Bryozoa material collected during the 2nd Fram Expedition, as it might be assumed beforehand the species it contained would be of a purely arctic character. In general it may also be said that the Bryozoa in the east arctic region are better known than those in the west arctic, for which reason any contribution from the last named region cannot fail to be an object og zoogeographical interest.

Before going on to mention the various species, I will make a few remarks regarding the places in which dredgings were made, referring moreover to the maps that accompany Captain Sverdrup's account of his travels, these maps having been drawn by Captain Isachsen[1].

The dredging-stations at which Bryozoa were found are here given in chronological order:

August 24, 1898, Rice Strait. The Fram's first winter quarters were within Rice Strait, which is in latitude 78° 45′ N. and longitude 74° 55′ W.

July 22, 1899, winter haven. In Rice Strait.

---

[1] See Otto Sverdrup, Nyt Land, Vol. I & II. Christiania 1903.
Vol. 1, p. 48, Map of the route of the Expedition.
Vol. I, p. 64, The Fram's surroundings, first winter haven, 1898–99.
Vol. I, p. 240, " " " 2nd winter haven, 1899–1900.
Vol. II, p. 112, " " " 3rd & 4th winter havens, 1900–1902.

July 3, 1900, winter haven; July 18, 1900, winter haven; July 22, 1900, winter haven; July 24, 25 & 29, 1900, winter haven; July 31, 1900, winter haven; August 1, 1900, off the mouth of Stordalen; August 3, 1900, Foshem's Peak and the valley on the west side of the fjord; August 4, 1900, Sjöpölse Ness; August 7, 1900, Öst Cape; August 8, 1900, winter haven; August, 1900, north side of N. Devon.

All the dredging-stations from the 3rd July to the 8th August, 1900, are in the Havne Fjord, which runs up from Jones Sound into King Oscar's Land.

Thus Stordalen is one of the valleys that join the abovenamed fjord, Fosheim's Peak — afterwards called Fosheim's Baby — is a small island in Havne Fjord, and Øst Cape is on the east side of the entrance to that fjord.

September 9, 1900, off Forvisnings Valley.

September 20, 1900, the head of Gaase Fjord.

June 28, 1901, the mouth of Hvalros Fjord.

July 5, 1901, the Sound (in the southern part of Hell Gate).

July 8, 1901, Ren Bay.

July 9, 1901, between Ren Bay and Cape Land's End.

July 12, 1901, bay at Land's End.

July 13, 1901, a little to the north of Land's End.

July 18, 1901, the winter haven (Gaase Fjord).

July 18, 1901, the mouth of Gaase Fjord.

July 19, 1901, lower part of Gaase Fjord.

August 16, 1901, Gaase Fjord.

August 30, 1901, Gaase Fjord.

July 15, 1902, off Havhest Mountain, N. Devon.

Gaase Fjord and Hvalros Fjord, are the two most westerly of the series of fjords that run up from Jones Sound into King Oscar's Land.

The stations from July 5—13, 1901, are all situated near Hell Gate, which, together with Cardigan Strait, forms the northern outlet of Jones Sound. This sound is bordered on the south and west by N. Devon, on the west of which projects a tongue of land called Colin Archer's Peninsula. The eastern point of this peninsula is Cape Vera with the Havhest Mountain. The 76th parallel of latitude cuts Jones Sound almost down the middle, and most of the dredgings took place in a latitude of about 76° 30′, and between 84° and 90° W. Long. It will also be seen from the above that most of the dredgings were made in the months of July and August. Before the beginning of July, the ice would place a barrier in most places in the way of that kind of work. In 1900, for

instance, Capt. SVERDRUP describes the coming of spring in the following suggestive manner (Vol. II, p. 38): „About the 9th June (1900), the fine weather made its entry into Havne Fjord. The snow began to melt up on the mountain sides, and the brooks to hop and leap over the slopes.“ Here I will also quote a couple of faunistic remarks from the description of the voyage. He thus writes of the dredgings in Havne Fjord in July, 1900 (Vol. II. p. 72): „Dredgings were now more frequent and wherever we could get at the bottom, they gave good results. The bay we lay in was an especially fruitful field of research.“ Gaase Fjord also receives a good character for its stock of marine animals. According to BAY, this fjord had an unusually abundant fauna (see Vol. II. p. 112). A special account of the dredgings on the east side of Hell Gate in July, 1901, is given by SIMMONS (Voll. II, p. 374). From this account it appears, *inter alia*, that in the above-named waters the current is very strong, a circumstance which is of importance in judging the faunistic character.

In the following list of species, there are several places in which, instead of giving long lists of synonyms, I have only put „BIDENKAP, Kat. p. . .“ which refers to the most recent work of that author[1].

In giving the lengt and breadth of the zoœcia, I have in every case where it allowed of being done, taken the measurements at the back of the colony, between the bases of the transversal walls, and between the bases of the lateral walls. In giving the proportion between the length and the breadth of the mandible of the avicularium, the ordinary mathematical sign, $l \lesseqgtr b$, is sometimes used.

[1] Fortegnelse over de arktiske Bryozoa. Bergens Museums Aarbog 1905, No. 9.

Order Gymnolæmata.

Sub-order Cheilostomata.

Gen. Gemellaria, Savigny.

1. *Gemellaria loricata*, LIN.

July 5, 1901, the Sound; July 9, 1901, between Ren Bay and Cape Land's End.

As SMITT[1] has indicated, the length of the zoœcia is subject to considerable variation. In a colony on *Hyas coarctatus* from northern Norway (North Cape, 1894), the zoœcia had a length of 0,52 mm., while the aperture measured 0.26 mm. The corresponding measurements in a colony from Station 363 of the Norwegian North Atlantic Expedition (80° 3′ N, 8° 28′ E, depth 475 metres) were respectively 1.1 mm. and 0.32 mm.; and in specimens from the 2nd Fram Expedition (July 9, 1901), the corresponding measurements were found to be 1.0 mm. and 0.58 mm. On colonies from Northumberland Island (West Greenland), ANDERS HENNIG[2] found that the length of the zoœcia was 0.74 mm., and that of the aperture 0.34 mm. The high arctic forms of this species thus seem to be characterised by a lengthening of the zoœcia.

Gen. Menipea, Lamouroux.

2. *Menipea gracilis*, J. VAN BENEDEN[3].

July 22, 1900, winter haven, about 30 fathoms; Sept. 19, 1900, off the mouth of Forvisnings Valley, 2—20 fathoms; Sept. 20, 1900, the head of Gaase Fjord; July 8, 1901 Ren Bay; July 12, 1901, bay at Land's End; July 19, 1901, lower end of Gaase Fjord; August 16, 1901 Gaase Fjord, about 7 fathoms.

In specimens from Ren Bay (July 8, 1901), there were 9 zoœcia in one internodium. In colonies from Gaase Fjord (Aug. 16, 1901), the aperture of the zoœcia had a length of 0.39 mm. and a breadth of 0.195 mm.

---

[1] Öfversigt af Kgl. Vet. Akad. Förh., 1867, p. 325.
[2] Bryozoer från Vestgrönland. Öfvers, Kgl. Vet. Akad. Förh., 1896, p. 353.
[3] See NORMAN, Ann. Mag. Nat. Hist., ser. 7, Vol. 11, p. 578.

3. *Menipea elongata*, Smitt.

1867. *Cellularia scabra*, f. *elongata*. Smitt, Ofvers. Kgl. Vet. Akad. Förh. 1867, pp. 284, 317, Pl. 27, figs. 35 & 36.
1897. *Scrupocellaria scabra*, f. *elongata*, Bidenkap. Zool. Jahrb. Vol. 10. p. 614.
1900. *Scrupocellaria elongata*, Waters, Journ. of the Linn. Soc., Vol. 28, p. 58.

July 22, 1899, the winter haven, 8 fath.

The aperture of the zoœcia was 0.52 mm. in length and 0.195 mm in breadth. The margin of the aperture was granulated as in *Cellularia (Bugulopsis) peachi*, Busk. Sub-oral and lateral avicularia were present, and under the latter from 3 to 5 pores sometimes occurred. On the distal part of the oral margin, there was one spine in each corner. The fornix was rather narrow. There were two lateral rosette-plates with numerous pores. The pore-tubes issued from the lower (proximal) part of the zoœcium, and the depression or hollow in which these tubes were attached had at the bottom a pore-plate with several pores. Norman gives this form from Davis Strait (Valorous Exp., 1875)[1]. Among *Menipea* species from the same place, there are moreover the following:

M. ternata, Ell. and Sol.; *M. gracilis*, J. van Beneden;
M. smitti, Norman; *M. arctica*, Busk.

Among the boreal and arctic species of this genus, I have up to the present only made the acquaintance of *elongata*, *gracilis*, *ternata*, *jeffreysi* and *normani*.

Gen. Scrupocellaria, J. van Beneden.

4. *Scrupocellaria scabra*, J. van Beneden.

July 22, 1900, the winter haven, about 30 fath.; August 4, 1900, Sjöpölse Ness, 15—20 fath.; Sept. 10, 1900, off Forvisnings Valley 2—20 fath.; Sept. 20, 1900, head of Gaase Fjord; July 8, 1901, Ren Bay; July 9, 1901, between Ren Bay and Cape Land's End; July 12 1901, bay at Land's End; July 19, 1901, lower part of Gaase Fjord.

In specimens from the lower part of Gaase Fjord (July 19, 1901) the aperture was 0.4 mm. long, and 0.25 mm. wide.

Gen. Bugula, Oken.

5. *Bugula murrayana*, Johnston.

July 12, 1901, bay near Land's End.

The principal form appears to be rare, while var. *fruticosa* occurred quite frequently in the collection.

[1] Ann. Mag. Nat. Hist., ser. 7, vol. 17, p. 91.

5 a. *Bugula murrayana, var. fruticosa,* PACKARD.

August 8, 1900, the winter haven; September 19, 1900, off Forvisnings Valley, 2--20 fath.; September 20, 1900, the head of Gaase Fjord, 3—20 fath.; July 5, 1901, the Sound; July 12, 1901, bay near Land's End. In specimens from the head of Gaase Fjord (September 20, 1900), the length of the aperture is 0.9—1.2 mm.

6. *Bugula harmsworthi,* WATERS.
Pl. I, figs. 1—5.

1900. *Bugula Harmsworthi,* WATERS. Bryozoa from Franz Josef Land, Journ. Linn. Soc., vol. 28, p. 54, pl. 7, fig. 13, pl. 8. fig 1.

August 1, 1900, off the mouth of Stordalen, about 10 fath.;

August 8, 1900, the winter haven, on *Escharopsis sarsi,* SMITT.

It is of no little interest to be able to demonstrate the presence of this *Bugula,* which WATERS originally described from Franz Josef Land, in west arctic waters. There is reason for assuming that the species has a somewhat more general distribution in arctic waters. The specimens hitherto found have been characterised by their small size (the colony on *Escharopsis* from the winter haven of 1900, was about 1 cm. in height), and if this is a general feature, the colonies can be easily overlooked. The aperture occupies the greater part of the front of the zoœcia. The spines in the distal corners are of various lengths (figs. 1 & 3); there are often two in each corner, but may also be three in one of them (fig. 2). The terminal wall often presents an appearance like that shown in fig. 3.

On the inner lateral wall, there are two rosette-plates (fig. 4); but I could not find the lower of these in all of them. The oœcium is cup-shaped; when seen from above, it was circular in section, but semicircular from the side. It is possible, however, that the oœcia I had the opportunity of seeing, were not fully developed.

Gen. Cellaria, Lamouroux.

7. *Cellaria articulata,* FABR.

July 8, 1901, Ren Bay; July 9, 1901, between Ren Bay and Cape Land's End; July 12, 1901, bay at Land's End.

From Ren Bay (July 8, 1901) there was a splendid bunch of this species, 90 mm. in height. The branches were to some extent covered with other Bryozoa, e. g. *Menipea gracilis, Scrupocellaria scabra, Flustra serrulata, Schizoporella plana,* etc. The species are known

from Queen Charlotte Islands (HINCKS), and from Greenland (FABRICIUS, BUSK, NORMAN, VANHÖFFEN). I know of only one locality in the east arctic waters where it is found, namely Ice Fjord in Spitsbergen, from which place it is recorded by F. A. SMITT[1].

Gen. Flustra, Lin.

8. *Flustra membranaceo-truncata*, SMITT.

Syn. BIDENKAP kat., p. 9.

September 9, 1900, off Forvisnings Valley, 2—20 fathoms;
September 20, 1900, the head of Gaasefjord, 3—20 fathoms.

There were numerous colonies from the head of Gaase Fjord, with irregular zoaria, sometimes with narrow-leaved lobes. They were often attached to worm-casts. The length of the zoœcia was 1.2—1.3 mm.

9. *Flustra serrulata*, BUSK.

Pl. I, fig. 6.

1881. *Flustra serrulata*, BUSK, Journ. Linn. Soc, Vol. 15, p. 234, pl. 13, figs. 2, 3, 4.
1886. *Membranipora serrulata*, LEVINSEN, Bryozoer fra Karahavet, p. 12, pl. 27, figs. 1 & 2.
1896. *Flustra serrulata*, WATERS, Journ. Roy. Micr. Soc., 1896. p. 283, pl. 8, figs. 1, 2 & 3.
1896. *Flustra serrulata*, HENNIG, Ofvers. Kgl. Vet. Akad. Förh. 1896, No. 5, p. 355.

July 22, 1900, the winter haven, about 30 fath.: August 7, 1900, Öst Cape, 10—25 fath.; incrusting hydroids; August 8, 1900, the winter haven, sometimes incrusting *Escharopsis sarsi*; Sept. 9, 1900, off Forvisnings Valley, 2—20 fath.; July 8, 1901, Ren Bay, incrusting *Cellaria articulata*; July 18, 1901, the mouth of Gaase Fjord; July 19, 1901, lower part of Gaase Fjord.

At some stations, this species has occurred in great quantities, for instance, at the winter haven, about 30 fath. (July 22, 1900). It generally formed free colonies (fig. 6), but also incrusted other objects, and was thus to some extent single-layered in its structure. There was no trace of either oœcia or avicularia. The length of the zoœcia in specimens from the winter haven was about 1.2 mm., their width 0.4 mm. In specimens from Ren Bay (July 8, 1901), the corresponding measurements were 1.3 and 0.46 mm. There were two lateral and two distal rosette-plates.

---

[1] Öfvers. Kgl. Vet. Akad. Förh. 1867, pp. 361, 384, Pl. 20, fig. 17.

The species was previously known from Franklin Pierce Bay (BUSK), Inglefield Gulf (HENNIG), the Kara Sea (LEVINSEN). It thus appears to belong to those species of which the occurrence in the east arctic waters is rare.

Gen. Membranipora, Blainville.

10. *Membranipora, catenularia*, JAMESON.

Syn. BIDENKAP kat., p. 5.

July 22—25, 1900, the neighbourhood ot the winter haven, small chains upon rock.

11. *Membranipora craticula*, ALDER.

Syn. BIDENKAP kat., p, 13.

July 22, 1899, the winter haven, 8 fath., on algœ.

July 22, 1900, the neighbourhood of the winter haven; July 8, 1901, Ren Bay; July 9, 1901, between Ren Bay and Cape Land's End. on algæ; July 12, 1901, bay at Land's End, on algæ.

This species was not of infrequent occurrence among the specimens, but I could not find any form that I could with certainty classify as *M. lineata*, LIN.

Dr. HENNIG[1] states that the frontal area in specimens from west Greenland, measured 0.34 mm. in length, and 0.18 mm. in width. In colonies from the bay at Land's End (July 12, 1901), I found the corresponding measurements to be 0.33 and 0.21 mm.

12. *Membranipora arctica*, D'ORBIGNY.

Syn. NORMAN, Ann. Mag. Nat. Hist., ser. 7, vol. 11, p. 590.

July 15, 1902, off Havhest Mountain, N. Devon, incrusting stones.

NORMAN (l. c.) designates this species as *Callopora Sophiæ*, BUSK, setting a note of interrogation to *Reptoflustrina arctica*, D'ORB. WATERS[2], however, in a later work, makes it probably that D'ORBIGNY's species from Spitsbergen is the one that SMITT, LORENZ and others have described from arctic regions. (See also remarks of WATERS in Journ. Linn. Soc., vol. 28, p. 60.) It must therefore surely be right to employ the name that D'ORBIGNY gave. I have also found this species in the north of Norway. In specimens from Sværholt in Finmark, the frontal

[1] Öfvers. Kgl. Vet. Akad. Förh., 1896, p. 356.
[2] Ann. Mag. Nat. Hist., Ser. 7, vol, 15, p. 12.

area was from 0.26 to 0.3 mm. in length, from 0.2 to 0.26 mm. in breadth. There were as a rule 2 or 3 spines on each side, and the lateral avicularia were very often found. When boiled in potasium hydrate, the mandibles fell off, and the hollow in the median avicularium became visible. This hollow proved to be connected with the zoœcial cavity by from 2 to 5 pores. In the colonies from N. Devon, the lateral spines had fallen off. The length of the area was from 0.33 to 0.39 mm., its breadth 0.26 mm. When the spines are absent, the species may be mistaken for *M. unicornis*, var. *armifera*. NORMAN has pointed out, however, a good distinguishing mark; in *armifera* the point of the mandible is directed downwards or outwards, while in *arctica* it is directed upwards or inwards.

13. *Membranipora unicornis*, FLEM., *var. armifera*, HINCKS.

1867. *Membranipora lineata*, forma *americana*, SMITT, Öfvers. Kgl. Vet. Akad. Förh. 1867, pp. 366 & 400, Pl. 20 fig. 31.
1892. *Membranipora armifera*, HINCKS, Ann. Mag. Nat. Hist., Ser. 6, vol. 9, p. 155. Pl. 8, fig. 4.
1898. *Membranipora Sophiæ*, var. *armifera*, WATERS, Journ. Linn. Soc., vol. 27, p. 680, Pl. 48, fig. 18.
1903. *Callopora unicornis*, var. *armifera*, NORMAN, Ann. Mag. Nat. Hist., Ser. 7, vol. 11, p. 591, Pl. 13, figs. 10 & 11.

September 19, 1900, off Forvisnings Valley; September 20, 1900, head of Gaase Fjord, 3—20 fath.; July 9, 1901, between Ren Bay and Cape Land's End; July 12, 1901, bay at Land's End, on algæ; August 16 1901, Gaase Fjord, about 7 fath.; August 30, 1901, Gaase Fjord, 8 m.

NORMAN, who has unravelled the synonymy of this form (l. c., p. 591), looks upon *M. armifera*, HINCKS, as a variety of *M. unicornis*; and there is much to be said in favour of this view.

In the typical *M. unicornis*, there are 2 spines on each side of the upper part of the area. I have moreover once seen in a colony from Bergen, instead of the one spine, a small laterally situated avicularium. On the other hand no one has observed an avicularium on each side in *M. unicornis*, while the appearance of two such is of frequent occurrence in var. *armifera*.

With regard to *armifera*, I refer the reader to NORMAN's excellent description (l. c., p. 592). I have made some measurements of the frontal area in the typical form, and in *armifera*.

In a colony of *M. unicornis* from Bergen, the length of the frontal area was 0.39 mm., its breath 0.26 mm. There was a form from the 2nd Fram Expedition (August 30, 1901), in which the dimensions of the

area were exactly the same, and it also had no lateral avicularia, but, on the other hand, one of medium size above the oœcium. On the distal part of the oral margin there were a couple af spines, one of which formed a cylindrical tube, while the other was pointed. This form will therefore have to been referred to var. *armifera*, of which typical specimens were found in the same place (August 30, 1901), with the length of the area from 0.52 to 0.65 mm., and its breadth 0.39 mm. A colony was found on *Smittina jeffreysi* from Gaase Fjord (August 16, 1901), which best answers to HINCKS description of *M. armifera*[1].

The zoœcia were very large, their length being from 1.0 to 1.3 mm., their breadth 0.6 mm. The area occupies almost the whole of the front of the zoœcium, its length being 0.78 mm., its breadth 0.5 mm. Occasionally a spine was found on one side, and a small avicularium on the other. The lateral walls of the zoœcia were furnished with 4 polyporous rosette-plates, and the transverse wall between the zoœcia had a belt of pores on its lower part. The pores were thus not gathered into the two groups of rosette-plates, as is the case, for instance, in *M. nigrans* (fig. 7).

The oœcia were small and spherical, with a transverse rib that was not so marked as usual. With the oœcium there generally appeared an unusually large avicularium with pointed mandible, which would sometimes be hooked, sometimes straight. In addition to this, there was also sometimes seen a small, medially-situated avicularium at the proximal end of the zoœcium, with a pointed mandible, that was directed sidewards. Occasionally, moreover, a small lateral avicularium was observed, of which the pointed mandible was directed either downwards or to the side.

Among the specimens from the 2nd Fram expedition, I found no *Membranipora* that I could put with the boreal *M. unciornis*, FLEM.

14. *Membranipora nigrans*, HINCKS.
Pl. I, figs. 7—9.

1882. *Membranipora nigrans*, HINCKS, Report on the Polyzoa of the Queen Charlotte Islands. Ann. Mag. Nat. Hist., ser. 5, vol. 10, p. 9 (reprint), Pl. 19, fig. 2.
1900. *Membranipora macilenta*, WATERS, Journ. Linn. Soc., vol. 28, p. 61, Pl. 8, fig. 10.
1903. *Callopora nigrans*, NORMAN, Ann. Mag. Nat. Hist., ser. 7, vol. 11, p. 593, vol. 12, Pl. 8, figs. 1 & 2.

[1] Ann. Mag. Nat. Hist., Ser. 7, vol. 9, p. 155, Pl. 8, fig. 4.

September 19, 1900, off Forvisnings Valley, on algæ; Sept. 20, 1900, the head of Gaase Fjord, on algæ; July 5, 1901, the Sound, incrusting stones; July 12, 1901, bay at Land's End; August 30, 1901, Gaase Fjord on algæ.

This interesting *Membranipora* formed a dark brown incrustation on algœ and stones. On colonies from Gaase Fjord (August 30, 1901), the length of the zoœcia was from 0.78 to 0.97 mm., their breadth 0.39 mm. There are four polyporous rosette-plates on each side. There are 2 rosette-plates (fig. 7) in the transverse walls, situated near the basal wall. The oœcia were of various shapes. On all of them there was a frontal part which was not calcified, and which was covered with a membrane. At the bottom of the oœcium 2 small rosette-plates were observed, through which the oœcium communicated with the zoœcium lying above it (fig. 8). The avicularia, which were at the distal end of the zoœcium, two on each side, had a pointed mandible. They are connected by a rosette-plate (fig. 9) with the hollow of the zoœcium. The presence of a similar rosette-plate at the bottom of an avicularium has been demonstrated by Levinsen[1] in *Membranipora aurita*. Hincks. On the other hand I do not think a connection has been proved between the oœcium and the zoœcium above it, as is the case in *M. nigrans*.

15. *Membranipora cymbæformis*, Hinhks.

September 9, 1900, off Forvisnings Valley, 2—20 fath., on hydroids and algæ; Sept. 20, 1900, the head of Gaase Fjord, 3—20 fath., on hydroids; July 8, 1901, Ren Bay, on algæ; July 12, 1901, bay at Land's End, on algæ.

16. *Membranipora trifolium*, S. Wood.

July 22, 1900, the neighbourhood of the winter haven, incrusting stones; July 12, 1901, bay at Land's End.

Gen. Cribrilina, Gray.

17. *Cribrilina annulata*, Fabr.

Syn. Bidenkap kat., p. 18.

July 9, 1901, between Ren Bay and Cape Land's End, on algæ; July 12, 1901, bay at Land's End, two small colonies on algæ; August 30, 1901, Gaase Fjord, 8 m., on algæ.

---

[1] Fauna danica, Bryozoa, Pl. 4, fig. 35.

WATERS[1] has described a form from Franz Josef Land, which NORMAN[2] has taken to be a variety of *C. annulata*, and called var. *spitsbergensis*. It is without the oral spines, the frontal carina, and the dentiform projection on the lower oral margin.

The specimens I had for examination from the 2nd Fram Expedition must, however, be classed as the principal form.

Gen. Harmeria, Norman.

18. *Harmeria scutulata*, BUSK.

Syn. BIDENKAP kat., p. 19 (*Cribrilina scutulata*).

July 20, 1900, the winter haven, on algæ; July 8, 1901, Ren Bay on algæ.

Gen. Doryporella, Norman.

19. *Doryporella spathulifera*, SMITT.

Syn. BIDENKAP kat., p. 20 (*Lepralia spathulifera*).

July 12, 1901, bay at Land's End, on algæ.

Gen. Porina, D'Orbigny.

20. *Porina tubulosa*, NORMAN.

Syn. BIDENKAP kat., p. 15.

July 22, 1900, the winter haven, on algæ: July 9, 1901, between Ren Bay and Cape Land's End; July 12, 1901, bay at Land's End, on algæ.

Gen. Hippothoa, Lamouroux.

21. *Hippothoa hyalina*, LIN.

Syn. BIDENKAP kat., p. 18 (*Celleporella hyalina*).

July 22, 1899, the winter haven, 8 fath., on algæ; September 19, 1900, off Forvisnings Valley, 2—20 fath., on algæ; July 8, 1901, Ren Bay, on algæ; July 12, 1901, bay at Land's End, on algæ; August 30, 1901, Gaase Fjord, 8 m., on algæ.

This species has a cosmospolitan distribution.

22. *Hippothoa expansa*, DAWSON.

Syn. HINCKS, Brit. Mar. Pol. (1880), p. 291, pl. 1, fig. 1.

July 18, 1900, the winter haven, about 30 fafh., on a stone.

---

[1] Journ. Linn. Soc., vol. 28, p. 64, Pl. 8, fig. 21.

[2] Ann. Mag. Nat. Hist., Ser. 7, vol. 12, p. 103, pl. 8, fig. 11.

23. *Hippothoa divaricata*, LAMOUROUX.

Syn. BIDENKAP kat., p. 17.

July, 1900, the winter haven and adjoining waters, on stones.

Gen. Leieschara, M. Sars[1].

24. *Leieschara subgracile*, D'ORBIGNY

Syn. BIDENKAP kat., p. 18 (*Myriozoum subgracile*).

July 22, 1901, the winter haven, fine colonies, about 30 fathoms.

If *Myriozoum truncatum*, PALLAS, can be placed in the same genus as *subgracile* and *coarctata*, which Canon NORMAN doubts, the name *Leieschara* must give place to *Myriozoum*, DONATI. *Leieschara coarctata*, M. SARS, is known from Alaska, Greenland, the north of Norway, Jan Mayen, Spitsbergen and Franz Josef Land; and *subgracile* has a similar distribution, except that it has not, up to the present, been found in the north of Norway.

Gen. Schizoporella Hincks.

25. *Schizoporella plana*, DAWSON.

August 24, 1898, Rice Strait, on algæ; July, 1900, the neighbourhood of the winter haven, incrusting stones; June 28, 1901, the mouth of Hvalros Fjord, incrusting stones; July 8, 1901, Ren Bay, on algæ; July 19, 1901, Gaase Fjord, incrusting stones; July 15, 1902, off Havhest Mt., N. Devon, incrusting stones.

HINCKS[2] and NORMAN[3] agree in thinking that the form that SMITT described under name of *Myriozoum crustaceum* is identical with *Lepralia plana*, DAWSON[4]. WATERS[5] transferred the species to the genus *Schizoporella*, which is indeed its right place.

26. *Schizoporella biaperta*, MICHELIN.

Pl. I, figs. 12—14.

1859. *Lepralia biaperta*. BUSK, Mon. Foss. Pol. Crag. p. 47, Pl. 7, fig. 5.
1867. *Escharella linearis*, f. *biaperta*, SMITT, Öfvers. Kgl. Vet. Akad. Förh., 1867 (appendix), pp. 14, 98, Pl. 24, figs. 70—73.
1880. *Schizoporella biaperta*. HINCKS, Brit. Mar. Poly., p. 255, Pl. 40, figs. 7—9.

[1] Cf. NORMAN, Notes on the Natural History of East Finmark; Ann. Mag. Nat. Hist., Ser 7. vol. 12, p. 110.
[2] Ann. Mag. Nat. Hist., Ser. 6, vol. 9, p. 137.
[3] Ann. Mag. Nat. Hist., Ser. 7, vol. 12 p. 110.
[4] See NORMAN's synonyms (l. c.).
[5] Journ. Linn. Soc., vol. 28, p. 64.

July 22, 1900, the neighbourhood of the winter haven, incrusting stones; July 19, 1901, Gaase Fjord, incrusting stones.

In specimens from the 2nd Fram Expedition, the mandible of the avicularia was unusually small (fig. 3). SMITT (l. c. p. 98) mentions that in his specimens (from Greenland), on a zoœcium there might be one avicularium with a pointed mandible, and one with a rounded mandible. SMITT has also drawn a similar one (Pl. 24, fig. 73). In the specimens I had to examine, there was as a rule one avicularium with rounded mandible on each side of the oral aperture, as indicated in fig. 12; but in a few cases I also found that in addition to the two avicularia at the oral aperture, there was a third below the lateral oral avicularium on the left side; and this third avicularium had a pointed mandible.

There is reason to suppose that the boreal specimens that HINCKS examined and made drawings of, and the arctic ones that SMITT and I have examined belong to the same species. It is true there are no marginal pores in HINCKS's drawings, but these may easily be overlooked, especially if the colonies are not examined with a light that falls through them. Similarly BUSK's *Lepralia biaperta* from the Crag must belong to the same species. On the other hand, it is probable that *Lepralia linearis*, var. *biaperta*, WATERS[1], and *Hippothoa biaperta* and *divergens*, SMITT[2], should rather be removed from the boreal and arctic form bearing the name of *biaperta*.

Schizoporella biaperta is also known from the Miocene of Calabria[3].

27. *Schizoporella lineata*, NORDGAARD.

1895. *Smittia lineata*, NORDGAARD, Berg. Mus. Aarb. 1894—95, No. 2, p. 27, Pl. 2, fig. 2.
1903. *Smittia lineata*, NORMAN, Ann. Mag. Nat. Hist., Ser. 7. vol. 12, p. 122, Pl. 9, figs. 14, 15.
1905. *Schizoporella lineata*, NORDGAARD, Hydr. Biol. Inv. Norw. Fj., p, 167, Pl. 5, figs. 33, 34.

July 12, 1901, bay at Land's End on algæ.

The zoœcia were 0.7 mm. in length, and 0.5 mm. in breadth; there was a row of pores by the lateral walls. The median avicularium had an almost semicircular mandible. I am not quite sure whether this species can be maintained. It is possible that my forms come under

[1] Bryozoa of the Bay of Naples. Ann. Mag. Nat. Hist., Ser. 5, vol. 3, p. 37, Pl. 11, fig. 1 & 2.
[2] Floridan Bryozoa, part. II, p. 46, Pl. 8, figs. 173—176; p. 47, Pl. 9, figs. 177, 179.
[3] See ANTONIO NEVIANI, Briozoi fossili di Carrubare, Roma, 1905.

Schizoporella auriculata, HASSALL; but this I cannot at present decide with certainty.

28. *Schizoporella reticulato-punctata*, HINCKS.

Syn. Hydr. Biol. Inv. Norw. Fj., p. 166.

July 22, 1900, the winter haven, about 30 ft.; September 19, 1900, off Forvisnings Valley, 2—20 ft.; September 20, 1900, the head of Gaase Fjord, 3—20 ft.; July 8, 1901, Ren Bay.

29. *Schizoporella stormi*, NORDGAARD.

Pl. I, figs. 10 & 11.

1905. *Schizoporella stormi*, NORDGAARD, Hydr. Biol. Inv. Norw. Fj., p. 166. Pl. 5. figs. 1, 2.

1900, the north side of North Devon, incrusting stones; July 22, 1900, the winter haven, incrusting stones: July 13, 1901, a little north of Cape Land's End, incrusting stones.

There was perfect similarity between the specimens from the 2nd Fram Expedition and the colonies from Hammerfest and the North Cape. Avicularia did not often occur, and oœcia still less often, the latter being punctured like the frontal wall of the zoœcia, and with an indication of the ring of projections that are so marked in the next species.

Fig. 1 on Pl. 5 in Hydr. Biol. Inv. Norw. Fj., gives the impression that the mandible is rather stumpy; but this is a mistake. It is subulate. An excrescence or elevation may sometimes be seen on the front of the oœcia.

30. *Schizoporella bispinosa*, NORDGAARD, n. sp.

Pl. II, fig. 15.

July 12, 1901, bay at Land's End, on algæ.

This form exhibits a great similarity to *Schizoporella stormi*, but for safety's sake I have given it name of its own. I have never seen *S. stormi* with spines at the oral aperture; whereas they seem to occur pretty regularly in *bispinosa*. The zoœcia have the same dots upon the frontal wall in both species, but there are fewer perforations in *bispinosa* than in *stormi*. In the few cases in which I have seen oœcia, they have had a very much more marked ring of prominences (fig. 15) in *bispinosa*. On the oœcia of both forms, a prominence may sometimes be seen, which is somewhat pointed upwards. The avicularium is situated below the margin of the oral aperture, a little to the

right or the left; and the mandible is very long and pointed. The operculum is of the same shape as in the preceding species, but the opercular ribs do not appear to be so marked as in that species. As a rule there are only two oral spines, but occasionally I have also seen three such spines.

31. *Schizoporella levinseni*, NORDGAARD.

1905. *Schizoporella levinseni*, NORDGAARD, Hydr. Biol. Inv. Norw. Fjords, p. 166 Pl. 5, figs. 3 & 4.

August, 1900, the north side of North Devon, incrusting stones.

At the above-named place, I took a little reddish incrustation with a few zoœcia, which I referred, with some hesitation, to *levinseni*. The paucity of material prevented an altogether exact investigation. The lower margin of the oral aperture was cut right off by a small median sinus. There were neither avicularia nor oœcia. The perforation upon the frontal wall of the zoœcia was like that in the specimens from the north of Norway, and the shape of the zoœcia varied, there being both rounded oval, and very angular zoœcia.

32. *Schizoporella condylata*, NORDGAARD, n. sp.
Pl. II, figs. 16—18.

July, 1900, the winter haven, incrusting stones.

I conclude that this *Schizoporella* must be a new species, and will therefore state its most important characteristics. The limits of the zoœcia are marked by distinct lines or sutures; and these are also found to some extent on the oœcia (fig. 16). The frontal wall of the zoœcia has few perforations, which at any rate in the young zoœcia, are not arranged like a row of marginal pores. Both zoœcia and oœcia are punctured, the oœcia having no perforations. Avicularia could not be discovered. On the lower margin of the oral aperture, there is a broad sinus, and the operculum has a corresponding lobe (fig. 17). The condyles, which serve as a support to the operculum, were as a rule very marked. Fig. 18 shows the interzoœcial connection in a young colony. I will assume that *S. condylata* is a different species to those previously described by me, *levinseni* and *hexagona* (Hydr. Biol. Inv. Norw. Fj., p. 166). *Condylata* exhibits a conspicuous difference from *levinseni*, but it is a more difficult matter to separate it from *hexagona*. Of the latter too, I have so little, that a detailed comparison cannot be made. They seem, however, to be two different species, the smaller

zoœcia of *hexagona* having no pores in the frontal wall, while the operculum also exhibits a somewhat different form to that in *condylata*.

33. *Schizoporella producta*, Packard.
Pl. II. figs. 19—21.

1888. *Smittia producta*, Hincks, Polyzoa of the St. Lawrence. Ann. Mag. Nat. Hist., Ser. 6, vol. 3, p. 430. Pl. 21, fig. 2.

July 5, 1901, the Sound, incrusting stones; July 18, 1901, the winter haven, incrusting stones.

Hincks (l. c.) has described forms of *Smittia producta* from the St. Lawrence, very carefully, and judging from this description, I think there can be no doubt that it is the species that I scraped off stones from the above-named places. And as Hincks has made it very probable that his forms from the St. Lawrence correspond with *Lepralia producta*, Packard. from the coasts of Labrador, it must be right to retain Packard's name. I have little to add to Hinck's description. The frontal wall of the zoœcia was furnished with large pores (fig. 19), and in young specimens an arrangement of the interzoœcial pore-tubes might be seen on the basal wall similar to that in *Schizoporella condylata*. Judging from the shape of the oral aperture and the operculum (fig. 21), it would seem natural to refer the species to the genus *Schizoporella*. In specimens from Greenland (the „Valorous", 1875), for which I am indebted to the kindness of Canon Norman, I saw a confirmation of Hincks's statement that in young zoœcia the lower margin of the oral aperture is cut off almost straight. This character points to the genus *Eschara* (*Lepralia*).

34. *Schizoporella bidenkapi*, Nordgaard, n. sp.
Pl. II, figs. 22—24.

August 4, 1900, Sjöpölse Ness, 15—25 ft., incrusting mussel shells.

Although the oral aperture differs greatly from the typical form of the aperture in the genus *Schizoporella*, I have nevertheless referred the forms in question to this genus. There is only dried material consisting of a greyish white incrustation on fragments of mussel shells. The zoarium consisted of large zoœcia, whose frontal wall was thickly perforated with pores, of which the marginal ones differed from the others in being somewhat larger (fig. 22). The colonies were highly calified. and there being no marked depressions between the zoœcia, gave the colonies a fairly even appearance on the surface. The oral aperture

was nearly oval, but was also sometimes of a shape that somewhat recalled *Schizoporella sinuosa*. There were no avicularia to be seen. The oœcia, which were of extremely rare occurrence, were almost as broad as they were long. There was an indication of a median pore, from which a line or suture ran to the margin of the oral aperture; but with this exceptions there were neither hollows nor perforations (fig. 23). The operculum (fig. 24) was furnished with a lobe, which was bent to one side. When the flap of the operculum is lying horizontally, only the projection of this lobe is seen.

I have taken the liberty of calling this species after Hr. OLAF BIDENKAP, formerly curator at the Tromsö Museum.

Upon an examination of the above species, I was induced to look through my specimens of *Schizoporella sinuosa*, BUSK. It then appeared *inter alia*, that this species also had an opercular lobe that was bent to one side, which in many cases gives it the appearance of a thickening of a lower margin. For this very reason, I have apprehended and drawn the operculum inaccurately in an earlier work[1]. It proved also, that the form from Herlö Sound near Bergen, which I had taken to be *S. sinuosa*, diferred not a little from the one I had taken in the Trondhjem Fjord and in the north of Norway. They ought at any rate to be distinguished from one another as varieties; in reality, I think they ought to be considered as independent species.

On *Modiola modiolus* from Herlö Sound, not far from Bergen, I have a *Schizoporella* which, in a living state, formed a yellow incrustation, which when dried, assumed a bright reddish brown colour. In the frontal wall of the zoœcia there were large pores, of which those on the margin were larger than the others (fig. 25). The oœcia had a large median pore; and the width of the opercular lobe amounted to about half the width of the operculum (fig. 27). The interzoœcial pore tubes exhibited an arrangement that is usual in the genus *Schizoporella*; there were two terminal pore-chambers (fig. 26).

It is probable that fig. 5 (Pl. XLII in Brit. Mar. Pol.) is meant for this form; and it is also almost certain that this is what LEVINSEN (*Fauna danica*) calls *Schizoporella sinuosa*.

In the specimens from the north of Norway, the zoœcia were larger and the frontal perforation closer than in colonies from Herlö Sound (fig. 31). But the marginal pores differed here too from the others. The oral aperture was of the same shape in both; but on the colonies

[1] Hydr. Biol. Inv. Norw. Fj., p. 165, Pl. 3, fig. 10.

from the Trondhjem Fjord and the north of Norway, I could see no median pore in the oœcia, which were moreover closely set with depressions (fig. 29). The opercular lobe was bent to one side; when the operculum was horizontal, only the projection of the lobe could be seen (fig. 32). In fig. 30 the lobe is seen, while the flap itself has been somewhat compressed.

The colour of the dried incrustation was a dull brown.

As far as I can understand, it is this form that Busk originally described under the name *Lepralia sinuosa*.

It is at any rate certain that there is a complete similarity between my specimens from the north of Norway, and a dull brown colony from Shetland, which I received from Canon Norman, under the name of *Schizoporella sinuosa*, Busk. There was no median pore in the oœcia in this either, the oœcia being moreover furnished with depressions.

It is possible that after a thorough examination of a large number of specimens, the form from Herlö Sound cannot be accorded higher rank than a variety; but I will set it up temporarily as a species, calling it *Schizoporella magniporata*; and I will here give the most important synonyms for both species.

Schizoporella magniporata, Nordgaard, n. sp.
Pl. II, figs. 25—27.

1894. *Schizoporella sinuosa*, Levinsen, Fauna danica, Bryozoa, p. 66, Pl. 5, figs. 42 & 43.

Schizoporella sinuosa, Busk.

1860. *Lepralia sinuosa*, Busk, Quart. Journ. Mic. Soc., Vol. 8, 1860, p. 125. Pl. 24, figs. 2 & 3.

1867. *Escharella linearis*, f. *secundaria*, Smitt, Öfv. Kgl. Vet. Akad. Förh., Appendix, pp. 14 & 99. Pl. 24, figs. 74—77.

1880. *Schizoporella sinuosa*, Hincks (part), Brit. Mar. Poly. p. 266, Pl. 42, fig. 3(?).

I suppose that *magniporata* has on the whole a more southern distribution than *sinuosa*, and both are certainly nearly allied to the previously described *Sch. bidenkapi*.

Gen. Eschara[1].

35. *Eschara suturata*, Nordgaard, n. sp.
Pl. III, figs. 33—35.

July, 1900, the neighbourhood of the winter haven, incrusting stones; July 13, 1901, a little north of Cape Land's End, incrusting stones.

[1] Cf. Norman, Notes on the Natural History of East Finmark. Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 110.

This form somewhat resembled *Schizoporella condylata*. In a dried condition, both forms had a brownish colour, which was especially concentrated at the oral aperture. There was also considerable resemblance in the appearance of the zoœcia, when the shape of the oral aperture is disregarded; and the oœcia in both presented the same raised lines. They cannot, however, be regarded as different stages of development of the same species, and I will therefore give a short diagnosis.

The zoœcia are separated by distinct lines or sutures, which are also to some extent found on the oœcia (fig. 34). The frontal wall of the zoœcia, as also that of the oœcia, is coarsely punctured, but there are few perforations (fig. 33). The majority of these are arranged in the form of a row of marginal pores on each side. There were no avicularia to be seen. The shape of the oral aperture is that which characterises the genus *Eschara (Lepralia)*, but the operculum (fig. 35) resembles that in *Schizoporella*. The species cannot thus be considered to be a typical *Eschara*. The interzoœcial connections are long pore-channels, which also call *Schizoporella* to mind. It may perhaps be regarded as a connecting or transition form between the two above-named genera.

36. *Eschara nordlandica*, NORDGAARD.

1905. *Eschara nordlandica*, NORDGAARD, Hydr. Biol. Inv. Norw. Fj., p. 167, Pl. 4, figs. 32—35.

July, 1900, the neighbourhood of the winter haven.

It seems certain that some incrustations from the neighbourhood of the winter haven belonged to the species that I described from the north of Norway. The little elevation below the oral aperture is not found in the specimens from the 2nd Fram Expedition; but this was also very frequently the case in the Norwegian specimens. The strongly-marked ribs on the operculum are a characteristic feature. The species is new to the west Arctic fauna.

37. *Eschara hipposus*, SMITT.
Pl. III, figs. 36 & 37.

1867. *Lepralia hipposus*, SMITT, Öfvers. af Kgl. Vet. Akad. Förh., 1867 (Appendix) pp. 20 & 127, Pl. 26, figs. 99—105.

July 19, 1901, the lower part of Gaase Fjord.

The zoœcia in the colonies from the 2nd Fram Expedition, exactly resembled SMITTS's drawings. There were marginal pores, and as a rule

there was a little elevation below the oral aperture. The operculum (fig. 37) exhibited the properties characteristic of the genus. This species was found by LOVÉN in Finmark (SMITT), and is also reported from Greenland. the Murman Coast and Spitsbergen (SMITT, BIDENKAP).

38. *Eschara sincera*, SMITT.

Syn. BIDENKAP Kat., p. 28 (*Mucronella sincera*).

July 3, 1900, the winter haven, on *Cellepora ventricosa*; July, 22 1900, the winter haven. about 30 ft.; August 4, 1900, Sjöpölse Ness. 15—25 ft.; September 19, 1900, off Forvisnings Valley, 2—20 ft: July 12, 1901, bay at Land's End, on *Cellepora incrassata*.

The zoœcia on the colonies from the winter haven (July 22. 1900) were from 1.2 to 1.3 mm. in length, and from 0.46 to 0.5 mm. in breadth.

Gen. Discopora, Lamarck[1].

Umbonula, Hincks.

39. *Discopora (Mucronella) pavonella*. ALDER.

July 8, 1901. Ren Bay, a little colony grown round a seaweed stalk.

Among other places, the species occurs in the Pliocene of Calabria (A. NEVIANI).

Gen. Porella, Gray.

40. *Porella saccata*. BUSK.

Pl. III, fig. 38.

Syn. BIDENKAP Kat., p. 21.

July 22, 1900, the winter haven, about 30 ft.; August 1, 1900. right off the mouth of Stordalen, 10 ft.; August 4, 1900, of Sjöpölse Ness, 15—25 ft.; Sept. 20, 1900. the head of Gaase Fjord, 3—20 ft.

This fine *Porella* seems to be comparatively common in arctic waters. The specimens from the winter haven (July 22, 1900) were unusually large and beautiful (see fig. 38). One of them was 5 cm. in height and 6.5 cm. in breadth.

40 a. *Porella saccata*, var. *rostrata*, HINCKS.

1888 *Porella, elegantula*, var. *rostrata*, HINCKS, Polyzoa of the St. Lawrence, Ann. Mag. Nat. Hist., ser. 6, vol. 1, p. 223, Pl. 15, fig. 5.

Sept. 19, 1900, off Forvisnings Valley, 2—20 f.

Two small colonies of this easily recognisable variety — of whose zoœcia HINCKS has given good drawings — were found in the above-

[1] Cf. NORMAN, Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 112.

named locality. One of the specimens consisted of a single stem, 11 mm. in height, the lower portion of which was round, with a diam. of 1.5 mm. The other was a fragment (14 mm. in length) with flattened branches, and forked at the point. This variety has hitherto only been known from the St. Lawrence (HINCKS) and from the above-named Station in the 2nd Fram Expedition.

41. *Porella plana*, HINCKS.
Pl. III, fig. 39.

1888. *Porella skenei*, f. *plana*, HINCKS, Ann. Mag. Nat. Hist., ser. 6, vol. 1, p. 221, Pl. 14, fig. 6.
1900. *Porella plana*, WATERS, Journ. Linn. Soc., vol. 28, Pl. 11, figs. 11—13.
1902. *Porella plana*, K. A. ANDERSSON, Zool. Jahrb., vol. 16, p. 543.

July 31, 1900, the winter haven.

A free-growing, compressed, and higly calcified *Porella* from the above-named locality proved to be of this species. The colony was about 2 cm. in height, with a distance of 2.5 cm. between the extreme points of the branches. The zoœcia exactly resembled those figured by HINCKS (l. c., Pl. 14, fig. 6). The arrangement of the avicularia was also the same as that given by HINCKS, there being one central and two lateral. The surface of the zoœcia was granulated, and there were marginal pores in the frontal wall (cf. Waters, l. c., fig. 13). The operculum, on the other hand, (fig. 39) was cut off rather straighter than WATERS has represented it.

42. *Porella concinna*, BUSK.
Syn. BIDENKAP Kat., p. 22.

Aug., 1900, the north side of N. Devon, incrusting stones; July 22, 1900, the winter haven, 30 fath.; July 8, 1901, Ren Bay.

There seems to be some difference between the boreal and the arctic forms of this species; but the difference is scarcely so great as to allow of a separation.

In the arctic forms there were also large marginal pores, and the oral denticle was rather narrow. In some specimens from Ren Bay, the oœcia were more elongated than they have been in colonies that I have seen from more southern latitudes.

43. *Porella acutirostris*, SMITT.
Syn. BIDENKAP Kat., p. 22.

July 22, 1900, the winter haven, about 30 fath., incrusting stones; July 12, 1901, bay at Land's End.

The zoœcia and oœcia were thickly punctured. On the whole. there seemed to me to be a close resemblance to SMITT's and WATERS' drawings. On some specimens from the winter haven (July 22, 1900), marginal pores were distinctly visible.

44. *Porella alba*, NORDGAARD, n. sp.
Pl. III, figs. 43—46.

Sept. 19, 1900, off Forvisnings Valley, 2—20 fath.; July 8, 1901, Ren Bay, on algæ; July 12. 1901, bay at Land's End, on algæ.

Round incrustations of this species, especially on algæ, were found in the bay at Land's End; and at first I thought they must be *Porella inflata*, WATERS[1]. It proved, on a closer examination, that this idea was not maintable. I now believe that the above *Porella* is a new species, and will therefore briefly characterise it.

The frontal wall of both the oœcia and the zoœcia is finely punctured. On boiling a colony in lye, and looking at it with the light falling through it, there proved to be marginal pores (fig. 43). The oral aperture is oval or semicircular, and resembles that in *P. acutirostris* rather than that in *inflata*. The insertions of the muscles are high up on the operculum (fig. 44). The avicularium is on a prominence just below the oral aperture; and in the mandible (fig. 45), $l < b$. The mandible has a „median lucida" as in *P. inflata* a character which may be regarded as a connecting point of the two species. Neither in *P. acutirostris* nor in *P. alba* have I found any indication of a median oral denticle; and it is therefore probable that these two species will in time be removed from the genus *Porella*.

45. *Porella proboscidea*, HINCKS.
Syn. BIDENKAP Kat., p. 22

July 15, 1902, off Havhest Mt., N. Devon, incrusting stones.

The oœcia are quite smooth, but the frontal wall of the zoœcia is much perforated, and there are often ribs and transverse bars.

46. *Porella umbonata*, NORDGAARD, n. sp.
Pl. III, figs. 40—42.

July 22, 1900, the neighbourhood of the winter haven, incrusting stones; Aug., 1900, the winter haven, incrusting stones.

---

[1] Journ. Linn. Soc., vol. 28, p. 83, Pl. 10, figs. 1—5.

This form, which is near *P. proboscidea*, ought by rights to be separated as a species of its own. The colonies of *umbonata* formed incrustations upon stones; they are easily distinguished from the first named species by the fact that the frontal wall of the zoœcia (fig. 40) has only a few marginal pores, whereas in *proboscidea* it is abundantly perforated. But small hollows are found on the frontal wall. On the lateral walls, there was a similar arrangement of rosette-plates to that in *proboscidea*[1]. The basal walls of the zoœcia were thin and smooth. The oœcia (fig. 40) were almost globular, and were furnished anteriorly with small hollows without perforation. The operculum (fig. 42) had a distinct thickening of the margin. The avicularium is situated on the upper side of the rostrum, and the mandible (fig. 41) is semicircular.

Gen. Escharopsis, Verrill[2].

47. *Escharopsis sarsi*, Smitt.

Syn. Bidenkap Kat., p. 23 (*Escharoides*).

July 22, 1900, the winter haven, about 30 fath.; Aug. 4, 1900, Sjöpölse Ness, 12—25 fath., on *Balanus* and old *Cellepora* branches; Aug. 8, 1900, the winter haven.

The branches of the colonies were throughout narrower than, for instance, in specimens from Tromsö Sound in the north of Norway. There were a large number of specimens from the winter haven (July 12, 1900).

Gen. Monoporella, Hincks[3].

48. *Monoporella spinulifera*, Hincks.

Syn. Bidenkap Kat., p. 29 (*Mucronella*).

To this may be added the following:

1889. *Mucronella spinulifera*, Hincks, Ann. Mag. Nat. Hist., ser. 6, vol. 3, p. 431, Pl. 21, fig. 3.
1903. *Monoporella spinulifera*, Norman, Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 115.

July, 1900, the neighbourhood of the winter haven, incrusting stones; Aug., 1900, the north side of N. Devon; July 18, 1901, the winter haven, about 30 fath.; July 19, 1901, Gaase Fjord, incrusting stones.

---

[1] See Hydr. Biol. Inv. Norw. Fj., Pl. 4, fig. 8.
[2] See Norman, Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 123.
[3] See Norman, Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 115.

Gen. Escharella, Gray.

Mucronella, Hincks[1].

49. *Escharella ventricosa*, Hassall.

Syn. Bidenkap Kat., p. 27 (*Mucronella*).

July 22, 1900, the winter haven, upon algæ and incrusting stones; Aug., 1900, the north side of N. Devon incrusting stones; Sept. 20, 1900, the head of Gaase Fjord, on algæ; July 12, 1901, bay at Land's End, on algæ; July 13, 1901, a little north of Cape Land's End; July 15, 1902, off Havhest Mt., N. Devon, incrusting stones.

This species appears to be fairly common in the region investigated by the 2nd Fram Expedition.

50 & 51. *Escharella abyssicola*, Norman & *laqueata*, Norman.

Syn. Bidenkap Kat., p. 28 & 29 (*Mucronella*).

July 22, 1900, the neighbourhood of the winter haven, incrusting stones; Aug., 1900, the north side of N. Devon, incrusting stones; Aug. 3, 1900, Fosheim's Peak and the valley on the west side of the fjord.

The commonest *Escharella* is *ventricosa*, but there also occurred a form with much larger zoœcia, and with the peristome drawn out.

This should probably be referred to *abyssicola*, although specimens also occurred that were more like *laqueata*. The relation between *abyssicola* and *laqueata* ought to be more closely investigated; but at present I have not sufficient material for that purpose.

52. *Escharella labiata*, Boeck.

Syn. Bidenkap Kat. p. 28 (*Mucronella*).

Aug., 1900, the north side of N. Devon, incrusting stones.

Among some detached colonies, a few zoœcia of this species were also found. They were recognisable by their short, broad, median denticle and the lateral perforation.

Gen. Escharoides, Milne-Edwards.

53. *Escharoides Jacksoni*, Waters.

1897. *Mucronella coccinea*, Bidenkap, Bryozoen von Öst-Spitsbergen. Zool. Jahrb., vol. 10, p. 624, pl. 25, figs. 5 & 6.
1900. *Smittia jacksoni*, Waters, Bryozoa from Franz Josef Land. Journ. Linn. Soc., vol. 28, p. 87, pl. 12, fig. 18.
1902. *Mucronella jacksoni*, K. A. Andersson, Bryozoen. Zool. Jahrb., vol. 16, p. 547.
1905. *Escharoides jacksoni*, Nordgaard, Hydr. Biol. Inv. Norw. Fj., p. 170, pl. 3, fig. 19.

[1] See Norman, Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 117.

Sept. 19, 1900, outside Forvisnings Fjord, on *Balanus;* Sept. 20, 1900, the head of Gaase Fjord, 3—20 fath.

In his „Notes on the Natural History of East Finmark"[1], Canon NORMAN maintains that the form that has hitherto been called *Mucronella coccinea,* Abildgaard, must be regarded as the type of MILNE-EDWARDS' genus *Escharoides;* and the reasons given for this seem to be satisfactory. As a natural consequense of this, the form *jacksoni* must also be entered as an *Escharoides* species.

It is possible that this species also will prove to be circumpolar; for besides being found in the above-mentioned places, it is now known from East Greenland (K. A. ANDERSSON), the north of Norway (NORDGAARD), East Spitsbergen (BIDENKAP), King Carl's Land (K. A. ANDERSSON) and Franz Josef Land (WATERS).

Gen. Smittina.[2]

Smittia, Hincks.

54. *Smittina smitti.* KIRCHENPAUER.

Syn. BIDENKAP Kat., p. 25.

Jnly 22, 1900, the winter haven, about 30 fath.

The operculum was extremely thin, which indeed is the case in all typical *Smittina* species.

55. *Smittina jeffreysi,* NORMAN.

Pl. IV, fig 48.

Syn. BIDENKAP Kat., p. 25.

Sept. 19, 1900, outside Forvisnings Fjord; Aug. 16, 1901, Gaase Fjord, about 7 fath.

Unusually beautiful colonies of this species (see fig. 48) were found in Gaase Fjord.

56. *Smittina minuscula,* SMITT.

Pl. III, figs. 46 & 47.

1867. *Escharella porifera, f. minuscula,* SMITT, Öfv. Kgl. Vet. Akad. Förh., 1867, Appendix, pp. 9 & 73, pl. 24, figs. 33—35.

July 12. 1901, bay near Land's End, 2 small colonies on algæ.

Under *Escharella porifera,* SMITT has placed no less than 5 forms, which systematists of the present day will find so very different that

[1] Ann. Mag. Nat. Hist., ser. 7, vol. 12, pp. 116 & 117.

[2] See NORMAN Ann. Mag. Nat. Hist., ser. 7, vol. 12, p. 120.

they ought properly speaking to be regarded as separate species. I will even go so far as to say that two of them must be referred to another genus.

Canon NORMAN, in „A Month on the Trondhjem Fjord" (Ann. Mag. Nat. Hist., ser. 6, vol. 13, p. 128), has suggested that SMITT's forms, *minuscula* and *majuscula*, should be united unner the name of *Smittia arctica*; and several later writers have adopted this arrangement. While working up the material from the north of Norway, I came upon SMITT's form *majuscula*, and I assumed that it must be regarded as an independent species. Unfortunately I overlooked the fact that NORMAN regarded *majuscula* as the type of his species, while *minuscula* was looked upon as a variety of it. After having now had an opportunity of seeing a typical *minuscula*, I still maintain that NORMAN's *S. arctica* ought to be divided; and I now suggest that SMITT's *Escharella porifera* be diveded in the following manner:

1. *Schizoporella porifera*. SMITT.

Escharella porifera, f. *typica*, SMITT, Öfv. Kgl. Vet. Akad. Forh., 1867, Appendix, pp. 9 & 70, pl. 24, figs. 30—32.

2. *Smittina minuscula*, SMITT.

Escharella porifera f. *minuscula*, SMITT, l. c. p. 9, pl. 24, figs. 33—35.

3. *Smittina arctica*, NORMAN.

Escharella porifera, f. *majuscula*, SMITT, l. c. p. 9, pl. 24, figs. 36—38.

Smittia arctica, NORMAN, A Month on the Trondhjem Fjord. Ann. Mag. Nat. Hist,, ser. 6, vol. 13, p. 128.

4. *Schizoporella reticulato-punctata*, HINCKS.

Escharella porifera, f. *edentata*, SMITT, l. c. p. 9, pl. 24, fig. 39.

1877. *Lepralia reticulato-punctata*, HINCKS.

Ann. Mag. Nat. Hist., ser. 4, vol. 19, p. 103, pl. 10, figs. 3 & 4.

5. *Smittina cancellata*, SMITT.

L. c. p. 9, pl. 24, figs. 40, 41.

The last-named I have not seen.

The forms *porifera* and *reticulato-punctata* are not typical species of the genus *Schizoporella*; but for the time being I know of no better place to put them in.

Gen. Rhamphostomella, Lorenz.

57. *Rhamphostomella scabra*, Fabr.

Syn. Bidenkap Kat., p. 31.

July 8, 1901, Ren Bay.

While *Rhamphostomella costata* was of common occurence among the specimens from the 2nd Fram Expedition, *scabra* appeared there from only one locality. The two species are distinguishable from one another by the different size of the avicularia, and still more by the fact that *costata* has a median oral denticle, while *scabra* is without one. The puncturing on the back of the colony in *scabra*, which I have drawn in „Hydr. Biol. Inv. Norw. Fj.". Pl. 5, fig. 10, seems to be a very variable character, and the direction of the ribs cannot serve either, as a distinguishing mark between the two species, as some of the ribs in *costata* too, may continue on to the prominence below the proximal oral margin. In *R. scabra* from Ren Bay, the zoœcia were 0,9 mm. in length and 0,5 mm. in width.

58. *Rhamphostomella costata*, Lorenz.

Syn. Ridenkap Kat., p. 31.

July 22, 1900, the winter haven, about 30 fath.; Sept. 19, 1900, off Forvisnings Valley, 2—20 fath., on algæ and hydroids; Sept. 20, 1900, the head of Gaase Fjord, 3—20 fath.; June 28, 1901, the mouth of Hvalros Fjord, on *Halecium muricatum*[1]; July 8, 1901, Ren Bay, on algæ; July 12, 1901, bay near Land's End; July 19, 1901, the lower part of Gaase Fjord.

The average length of the zoœcia was from 0,8 to 0,9 mm., and their breadth 0,4 mm. In the colonies from Ren Bay, some of the zoœcia were furnished with large vicarious avicularia, some of which stood parallel with the longitudinal direction of the zoœcia, some perpendicular to, or forming an acute angle with it. The species appears to be common in the west arctic region, and it has also been found on Jan Mayen, in the north of Norway, Spitsbergen and Franz Josef Land.

59. *Rhamphostomella plicata*, Smitt.

Pl. IV, figs. 49 & 50.

1867. *Cellepora plicata* (part), Smitt, Öfv. Kgl. Vet. Akad. Förh. (Appendix), pp. 30 & 184, pl. 28, figs. 189 & 190.

---

[1] Determined by Hj. Broch.

July 8. 1901, Ren Bay.

This species is distinguishable from the next one (*R. hincksi*) by the circumstance that the proximal margin of the oral aperture is more rounded, the aperture has not so marked a triangular shape as is the case with *hincksi*. The most conspicuous difference, however, is that *plicata* has a distinct median denticle that is absent in *hincksi* (cf. figs. 49 and 51). The frontal wall has no ornamentation; but in the colonies from Ren Bay, the same puncturing was found on the back of the zoœcia as is given by SMITT in fig. 190 (l. c.). The length of the zoœcia varied between 0.85 and 1.04 mm., their breadth between 0.46 and 0.52 mm.

The peristome rose on one side partly in the form of a tongue, and beside the large median denticle, there was sometimes an indication of a small denticle on each side.

In the mandible of the avicularia (fig. 50), l ≧ 2b.

The specimens described by SMITT were from Spitsbergen.

60. *Ramphostomella hincksi*, NORDGAARD, nom.nov.
Pl. IV, fig. 51.

1877. *Cellepora plicata*, HINCKS. Polyzoa from Iceland and Labrador. Ann. Mag. Nat. Hist., ser. 4 vol. 19, p. 106, pl. 11, figs. 3 & 4.

Aug. 4, 1900, Sjöpölse Ness, on *Escharopsis sarsi*; Aug. 8, 1900, the winter haven, on *Escharopsis sarsi*; Sept. 19, 1900, off Forvisnings Valley, 2—20 fath.; July 8, 1901, Ren Bay; Aug. 16, 1901, Gaase Fjord, about 7 fath.

In the above-named work, HINCKS has described and figured a form which I suppose is so different from the typical *Rh. plicata*, SMITT, that it ought to be separated as a species of its own. HINCKS's description is as follows:

„In this species the cells are ovate, somewhat depressed; surface smooth and glistening, sometimes traversed by ribs radiating from the circumference; mouth subtriangular, slightly arched above the sides running to a point in front so as to form an acute angle; peristome thin and slightly raised at the sides; on one side a prominent mucro bearing a large elongate-oval avicularium with rounded mandible, looking obliquely sideways. Oœcium semicircular, punctured in front."

This description fits well the specimens that occurred among those from the 2nd Fram Expedition. The zoœcia were fairly large, the length being 0.85 mm., and the breadth about 0.39 mm. The ornamentation of the frontal wall is not particularly marked, but yet there are

sometimes indications of ribs (see fig. 51). The basal wall was not punctured. In the upper half of the lateral wall, there were 2 or 3 polyporous rosette-plates. In the mandible of the avicularia $l \begin{smallmatrix} > b \\ < 2b \end{smallmatrix}$

61. *Rhamphostomella spinigera*, LORENZ.
Pl. IV, figs. 52—55.

Syn. BIDENKAP Kat., p. 32.

August 4, 1900, Sjöpölse Ness, on *Balanus*; July 8, 1901, Ren Bay.

There were four spines on the margin of the oral aperture (fig. 52). When there were oœcia, there was generally only one spine on each side. The median denticle is large and characteristic, but variable in form (figs. 53 & 54). In the mandible $l \begin{smallmatrix} > b \\ < 2b \end{smallmatrix}$ The length is only a little greater than the breadth. The length of the zoœcia was from 0.9 to 1.2 mm., their breadth about 0.6 mm.

The frontal wall of the zoœcia has a reticulated ornament (fig. 55). and is furnished on both sides with a row of marginal pores. In the upper half of the lateral walls there are two or three polyporous rosette-plates. The basal wall is smooth and without puncturing.

62. *Rhamphostomella ovata*, SMITT.
Pl. IV, fig. 56.

Syn BIDENKAP Kat., p. 32.

September 19, 1900, off Forvisnings Valley, 2—20 fath.; July 12, 1901, bay near Land's End; Aug. 16, 1901, Gaase Fjord, about 7 fath.

The oœcia are thickly and minutely punctured, not perforated thereby distinguishing this species from the other hitherto known species of this genus. In young zoœcia the oral aperture is almost circular, in older ones it is oval. The frontal wall of the zoœcia is punctured and perforated with large pores; and there may sometimes be traces of ribs. The basal wall has sometimes a peculiar transverse striation. In the mandible $l \begin{smallmatrix} > b \\ < 2b \end{smallmatrix}$ The length as a rule, is only a little greater than the width, and the free end is rounded. The length of the zoœcia was from 0.65—0.78 mm., their breadth about 0.5 mm.

63. *Rhamphostomella radiatula*, HINCKS.

Syn. BIDENKAP Fort., p. 32.

July 12, 1901, bay near Land's End, on algæ.

In this species the peristome is elongated upwards over the oœcia. The frontal wall of the zoœcia is furnished with ribs and depressions.

The best drawing of the species is to be found in LORENZ's „Bryozoen von Jan Mayn."

64. *Rhamphostomella bilaminata*, HINCKS.

Pl. IV, fig. 57.

Syn. BIDENKAP Fort., p. 32.

Also

1905. *Rhamphostomella plicata*, NORDGAARD. Hydr. Biol. Inv. Norw. Fj. p. 171. pl. 5, figs. 14 & 15.

September 19. 1900, off Forvisnings Valley, 2—20 fath.; July 12. 1901, bay at Land's End.

The peristome is folded a little outwards. The avicularium, which is borne on a lateral prominence, is considerably smaller than in *plicata*. The length of the mandible is only a little greater than its width. Occasionally a few ribs are found upon the frontal wall of the zoœcia. I presume that on SMITT's Plate 28[1], figs 189 & 190 represent *Rh. plicata*, while fig. 191 is *bilaminata*. The length of the zoœcia varies greatly (from 0.5 to 0.9 mm.), the width being from 0.4 to 0.5 mm. The frontal wall had as a rule no special ornament, but the basal wall had a strongly-marked puncturing, although this character appears to be very variable. The median denticle on the lower oral margin is very marked, and there are indications of a little short denticle on each side of it. As a rule there are few pores in the oœcia, but there is great variation in the number of pores.

The only representatives hitherto known of the genus *Rhamphostomella* are from northern cold waters. Neither WATERS[2] nor CALVET[3] give any species of the genus from southern cold seas.

Among the specimens from the 2nd Fram Expedition, all the species of the genus known at present occurred, except *Rh. fortissima*, Bidenkap[4].

In order to facilitate the determination of these species, the following little table is given:

A. Without median denticle.

a. With large, ribbed zoœcia:

Rh. scabra.

b. Frontal wall entire and quite even:

[1] Öfv. Kgl. Vet. Akad. Förh., 1867.
[2] Bryozoa. Voyage du S.Y. „Belgica". Antwerp, 1904.
[3] Bryozoen. Hamburger Magalhaensische Sammelreise. Hamburg, 1904.
[4] Die Bryozoen. Fauna Arctica (RÖMER & SCHAUDINN edit.), 1900.

Rh. hincksi.

c. Frontal wall perforated: oœcium with small depressions, but no pores:

Rh. ovata.

B. With distinct median denticle.

a. Large zoœcia with strongly-marked ribs:

Rh. costata.

b. Large zoœcia with smooth frontal wall and distinct puncturing on the basal wall:

Rh. plicata.

c. The zoœcia with marginal pores and reticulated ornamentation of the frontal wall, and 4 oral spines:

Rh. spinigera.

d. The zoœcia crowded together; frontal wall generally without ornament. Peristome folded outwards:

Rh. bilaminata.

e. The zoœcia crowded together; the peristome drawn up over the oœcium, and the frontal wall furnished with ribs and depressions:

Rh. radiatula.

In addition to the above there also occurred among the specimens from the 2nd Fram Expedition, the following:

65. *Rhamphostomella contigua*, SMITT.

1867. *Cellepora ramulosa* f. *contigua* SMITT. Öfv. Kgl. Vet. Akad. Förh., 1867 (Appendix), pp. 31 & 189, pl. 28, figs. 198—201.

1905. *Rhamphostomella contigua*, NORDGAARD. Hydr. Biol. Inv. Norw. Fj., p. 172. pl. 5, figs. 18—20.

July 22, 1900, the neighbourhood of the winter haven; 1900, the north side of N. Devon, incrusting stones; July 13, 1901, a little north of Cape Land's End, incrustation on stones.

According to the form of the operculum, this species cannot well be regarded as a *Cellepora*, and in my above-named work I referred the species to *Rhamphostomella*, because I knew of no better place to put it in; but it can hardly be regarded as a typical form of this genus. In higly calcified colonies from the neighbourhood of the winter haven (July 22, 1900), little or nothing of the spines on the oral margin were visible.

NORMAN[1] informs us that his *Cellepora whileavesi*, MS. in the „Valorous" Report = *Rh. contigua*, SMITT.

Gen. Cellepora. Fabricius.

66. *Cellepora incrassata*, SMITT.

Syn. BIDENKAP Kat., p. 34.

July 24, 1900, the winter haven; Aug. 1, 1900, right off the mouth of Stordalen, 10 fath.: Aug. 3, 1900, Fosheim Peak and the valley on the west side of the fjord, 2—20 fath.; Aug. 4, 1900, Sjöpölse Ness 15—25 fath.; Aug. 7, 1900, East Cape, 10—25 fath.; Sept. 20, 1900, the head of Gaase Fjord, 3—20 fath.; July 12, 1901, bay at Land's End.

67. *Cellepora ventricosa*, LORENZ.

Syn. BIDENKAP Kat., p. 32.

July 3, 1900, the winter haven; July 25, 1900, the winter haven; Aug. 4, 1900, Sjöpölse Ness, 15—25 fath.; July 12, 1901, bay at Land's End.

When the two species are placed side by side *ventricosa* is distinguishable by its remarkably large zoœcia.

Gen. Retepora, Lamarck.

68. *Retepora wallichiana*, BUSK.

Syn. BIDENKAP Kat., p. 31.

July 22, 1900, the winter haven, about 30 fath.; Aug. 3, 1900, Fosheim Peak and the valley on the west side of the fjord, 2—20 fath.; Sept. 19, 1900, off Forvisnings Valley; Sept. 20, 1900, the head of Gaase Fjord, 3—20 fath.: July 19, 1901, the lower part of Gaase Fjord.

Sub-order Cyclostomata.

Gen. Crisia, Lamouroux.

69. *Crisia denticulata*, LAMARCK.

July 18, 1900, the winter haven, about 20 fath.; July 22, 1900, the winter haven, about 30 fath.; July 29, 1900, the winter haven, about 6 fath.; Sept. 19, 1900, off Forvisnings Valley, 2—20 fath.;

[1] Ann. Mag. Nat. Hist., ser. 7, vol. 17, p. 92.

Sept. 20, 1900, the head of Gaase Fjord, 3—20 fath.; July 8, 1900, Ren Bay; July 9, 1901.

In several specimens there were oœcia, situated, as usual, at the ends of the internodes. They were sometimes 1.04 mm. in length, with a maximum width of 0.47 mm.

Gen. Tubulipora, Lamarck.

70. *Tubulipora flabellaris*, FABR.

Cf. HARMER, On the Development of Tubulipora, Quart. Journ. Mic Soc. vol. 41, No. 3.

July 22, 1900, the winter haven, young colonies on algæ; Sept. 19, 1900, off Forvisnings Valley, 2—20 fath., on algæ; July 8, 1901, Ren Bay, on algæ.

HARMER has shown that the oœciostome in this species is a flattened tube, and the oœciopore a slit. The latter, in specimens from the 2nd Fram Expedition, was about 0.13 mm. in length. The largest of the colonies found had a width of 9 mm.

Gen. Idmonea, Lamouroux.

71. *Idmonea atlantica*, FORBES.

Cf. WATERS, Bryozoa from Franz Josef Land, Part II. Cyclostomata, Ctenostomata and Endoprocta. Journ. Linn. Soc., vol. 29.

Sept. 19, 1900, off Forvisnings Valley 2—20 fath.; Aug. 16. 1901, Gaase Fjord, about 7 fath.

I could not find oœcia in any of the colonies, but on the whole it must be said that there was a good resemblance to specimens of this species that I have seen from more southern latitudes.

In the specimens from the station off Forvisnings Valley, the length of the zoœcia was 0.52—0.65 mm., their thickness about 0.14 mm. The distance between the rows of zoœcia was about 0.6 mm.

In the specimens from the second-named locality, the length of the zoœcia was 0.65—0.78 mm., their thickness about 0.195 mm.

The distance between the rows of zoœcia was about 0.6 mm. The number of zoœcia in each row was found not to exceed 4 in any specimen.

Gen. Diastopora, Lamouroux.

72. *Diastopora obelia*, var. *arctica*, WATERS.

Cf. WATERS, Bryozoa from Franz Josef Land, Part II, Journ. Linn. Soc., vol. 29, p. 171, pl. 21, fig. 1.

July 22, 1900, the winter haven, about 30 fath.; Aug. 4. 1900, Sjöpölse Ness, 15—25 fath.

The colonies from the winter haven were attached to *Flustra serrulata*. There were oœcia. The oral aperture of the zoœcia was 0.13 mm. in diameter, and the diameter of the tubules was about half that. In *Diastopora obelia*, the diameter of the tubules is comparatively less.

Gen. Lichenopora, Defrance.

73. *Lichenopora verrucaria*, Fabr.

July 22, 1900, the winter haven, upon algæ; July 8, 1901, Ren Bay on algæ; July 9, 1901, between Ren Bay and Cape Land's End; July 12, 1901, bay at Land's End, on algæ.

The diameter of the largest specimen was 5 mm. In several cases the trumpet-like oœciostome was observable.

74. *Lichenopora crasiuscula*, Smitt.

Discoporella crasiuscula, Smitt, Öfvers. Kgl. Vet. Akad. Förh., 1866. pp. 406 & 482, pl. 11, figs. 7—9.

Lichenopora crasiuscula, Waters, Journ. Linn. Soc., vol. 29, p. 177.

July 18, 1900, the winter haven; July 5, 1901, the sound; July 8, 1901, Ren Bay; July 18, 1901, the mouth of Gaase Fjord.

Smitt states that the colonies of *crasiuscula* are rather raised, so as to be almost hemispherical. I have compared colonies of *hispida* from By Fjord near Bergen and from the Trondhjem Fjord, with *crasiuscula* from the 2nd Fram Expedition, and have found that as a rule *hispida* forms thinner, more compressed colonies than *crasiuscula*. The zoœcia, moreover, in the latter, project less from the calcarous mass than is the case in *hispida*, which, on this account, appears to the naked eye as if furnished with distinct radial ribs.

In both forms, the walls of the pores are finely denticulated (stellate pores).

The largest specimen of *crasiuscula* from the 2nd Fram Expedition was 7 mm. in diameter.

Sub-order. Ctenostomata.

Gen. Alcyonidium, Lamouroux.

75. *Alcyonidium, mytili*, DALYELL.

July 12, 1901, bay at Land's End, little colony on a seaweed.

Among the specimens from the 2nd Fram Expedition, there was only one small colony; but this is sufficient to extend the already considerable area of distribution of this species.

The zoœcia were about 0.6 mm. in length, and about 0.26 broad. In a colony from the coast outside Bergen, the corresponding measurements were found to be from 0.65 to 0.78 mm., and about 0.39 mm. The species has so large a distribution, that it may almost be said to be cosmopolitan. It has been found in Spitsbergen and King Carl's Land (K. A. ANDERSSON). Jan Mayen (LORENZ), the Norwegian coast, Denmark (LEVINSEN), the Baltic (MÖBIUS), the French side of the Channel (BAROIS), the Mediterranean and the Adriatic (CALVET, WATERS), Australia, Port Philip, (KIRKPATRICK), south of Tierra del Fuego, Isle Navarin, Puerto Toro (CALVET[1]), Alaska (ROBERTSON).

76. *Alcyonidium mamillatum*, ALDER.

July 9, 1901, between Ren Bay and Cape Land's End.

On *Buccinum* from the above locality, an *Alcyonidium* was found which I believe is identical with *mamillatum*. The latter has also previously been found in arctic seas. It is given by LEVINSEN from the Kara Sea, by SMITT from Spitsbergen and Novaja Semlja, by LORENZ, from Jan Mayn by K. A. ANDERSSON from East Greenland, and by VANHÖFFEN from West Greenland. It is also known from Gullmar Fjord, Bohuslen (SMITT) and from Northumberland, deep water (ALDER).

In „Öfvers af Kgl. Vet. Akad. Förh.", 1866 (p. 497), SMITT has given *mamillatum* as a form of *A. hirsutum*; and of the figures belonging to *hirsutum* (Pl. 12, figs. 3—8), only figs. 5 and 6 are given by HINCKS in Brit. Mar. Pol. as of the species *mamillatum*.

As figs. 5 and 6 represent zoœcia of a specimen from Gullmar Fjord, while figs. 3 and 4 are of zoœcia of a colony from Bell Sound, Spitsbergen, this of itself indicates a difference between the arctic and the boreal specimens of the species; but whether the difference is sufficiently great to allow of a systematic separation, I am at present unable to decide. In the specimen that I found among those from the 2nd Fram Expedition, the young zoœcia showed a great resemblance to

[1] Hamburger Magalhaensische Sammelreise. Bryozoen, p. 38. Hamburg 1904.

SMITT's fig. 3 on pl. 12. The semicircular thickening that recalls the operculum in *Cheilostomata* was present. In a colony from Bell Sound, SMITT found the length of the zoœcia to vary between 0.7 and 0.85 mm. In the specimen from the 2nd Fram Expedition, the length of the zoœcia was from 0.9 to 1.17 mm., and their breadth from 0.39 to 0.52 mm. I am most inclined to regard *Alcyonidium mamillatum* as an originally arctic species, which, in the most southerly of the places where it is found, is a relict form the Glacial Period, and has thus become somewhat dwarfed in those localities.

77. *Bowerbankia imbricata*, ADAMS.

July 19, 1901, the lower part of Gaase Fjord.

On *Bugula murrayana*, var. *fruticosa* from the above locality, there were found creeping colonies of a *Bowerbankia* which I have identified with *imbricata*. Among the Bryozoa collected by Captain H. W. FEILDEN in the North Polar Expedition, BUSK[1] found only one ctenostomatous species, which occurred on *Bugula fruticosa*. He describes it as follows: „Zoœcia in opposite pairs at very distant intervals on a slender tubular stem." And he adds: „In case it be new, it might be termed *Farella*, or, if with a gizzard, perhaps *Bowerbankia arctica*." The specimen mentioned was in such a bad condition that no more minute examination could be made. Since that time, no arctic *Farella* has been found, and the name *Farella arctica* ought for the present to be put aside. VANHÖFFEN[2], on the other hand, found a form in the Karajak Fjord in Greenland, which he names *Bowerbankia arctica*. BUSK. This name would indeed be right if the form found by VANHÖFFEN were specifically different from *imbricata*; but it is most probable that it was *imbricata* that occurred in the Karajak Fjord; for HINCKS mentions the species from the White Sea and Queen Charlotte Islands and ALICE ROBERTSON from Alaska, thus giving *imbricata* an arctic distribution. Nor could I find any systematic difference between specimens from the Bergen coast and the colonies from the lower end of Gaase Fjord. The first-named have as a rule free colonies, in which the zoœcia are gathered into small groups, while the arctic were creeping. The arctic specimens also seem to have larger zoœcia (up to 1.3 mm.);

---

[1] Journ. Linn. Soc., vol. 15, p. 240, pl. 13, fig. 9.

[2] Die Fauna u. Flora Grönlands. Grönland-Expedition der Gesellschaft für Erdkunde zu Berlin. 1891–1893, vol. II, p. 234.

but no systematic distinguishing feature could be discovered. Until the arctic *Bowerbankia* proves to be different from *imbricata* therefore, the name *arctica* must be set on one side.

Some Remarks on certain Species and their Distribution.

I thus believe that among the specimens brought back by the 2nd Fram Expedition, I have demonstrated the occurrence of the following species:

1. *Gemellaria loricata*, LIN.
2. *Menipea gracilis*, I. v. BENEDEN.
3.* — *elongata*, SMITT.
4. *Scrupocellaria scabra*, I. v. BENEDEN.
5. *Bugula murrayana*, JOHNSTON.
6 a. — — var. *fruticosa*, PACKARD.
6.* — *harmsworthi*, WATERS.
7.* *Cellaria articulata*, FABR.
8. *Flustra membranaceo-truncata*, SMITT.
9.* — *serrulata*, BUSK.
10. *Membranipora catenularia*, JAMESON.
11. — *craticula*, ALDER.
12. — *arctica*, D'ORBIGNY.
13.* — *unicornis*, FLEM., var. *armifera*, HINCKS.
14.* — *nigrans*, HINCKS.
15. — *cymbæformis*, HINCKS.
16. — *trifolium*, S. WOOD.
17. *Cribrilina annulata*, FABR.
18. *Harmeria scutulata*, BUSK.
19. *Doryporella spathuliferra*, SMITT.
20. *Porina tubulosa*, NORMAN.
21. *Hippothoa hyalina*, LIN.
22.* — *expansa*, DAWSON.
23. — *divaricata*, LAMOUROUX.
24.* *Leieschara subgracile*, D'ORBIGNY.
25. *Schizoporella plana*, DAWSON.
26.* — *biaperta*, MICHELIN.
27. — *lineata*, NORDGAARD.
28. — *reticulato-punctata*, HINCKS.
29. — *stormi*, NORDGAARD.
30.* — *bispinosa*, NORDGAARD, n. sp.
31. — *levinseni*, NORDGAARD.
32.* — *condylata*, NORDGAARD, n. sp.
33.* — *producta*, PACKARD.
34.* — *bidenkapi*, NORDGAARD, n. sp.
35.* *Eschara suturata*, NORDGAARD, n. sp.
36. — *nordlandica*, NORDGAARD.
37. — *hipposus*, SMITT.
38. — *sincera*, SMITT.

39. *Discopora pavonella*. ALDER.
40. *Porella saccata*, BUSK.
40 a.* — — var *rostrata*, HINCKS.
41.* — *plana*, HINCKS.
42. — *concinna*, BUSK.
43. — *acutirostris*, SMITT.
44.* — *alba*, NORDGAARD, n. sp.
45. — *proboscidea*. HINCKS.
46.* — *umbonata*. NORDGAARD, n. sp.
47. *Escharoptis sarsi*, SMITT.
48. *Monoporella spinulifera*, HINCKS.
49. *Escharella ventricosa*, HASSALL.
50. — *abyssicola*, NORMAN.
51. — *laqueata*, NORMAN.
52. — *labiata*, BOECK.
53. *Escharoides jacksoni*, WATERS.
54. *Smittina smitti*, KIRCHENPAUER.
55. — *jeffreysi*, NORMAN.
56.* — *minuscula*, SMITT.
57. *Rhamphostomella scabra*, FABR.
58. — *costata*, LORENZ.
59.* — *plicata*, SMITT.
60.* — *hincksi*, NORDGAARD, n. nom.
61.* — *spinigera*, LORENZ.
62.* — *ovata*, SMITT.
63. — *radiatula*, HINCKE.
64. — *bilaminata*, HINCKS.
65. — *contigua*, SMITT.
66. *Cellepora incrassata*. SMITT.
67. — *ventricosa*, LORENZ.
68. *Retepora wallichiana*, BUSK.
69. *Crisia denticulata*, LAMARCK.
70. *Tubulipora flabellaris*, FABR.
71. *Idmonea atlantica*, FORBES.
72.* *Diastopora obelia*, var. *arctica*, WATERS.
73. *Lichenopora verrucaria*, FABR.
74.* — *crasiuscula*, SMITT.
75. *Alcyonidium mytili*, DALYELL.
76.* — *mamillatum*, ALDER.
77. *Bowerbankia imbricata*, ADAMS.

An asterisk before a name indicates that up to the present the species has not been observed on the Norwegian shores. The number of such species makes up about one third of the whole. There is reason to suppose that continued search would reduce this third to some extent; but there would be almost sure to be a considerable remainder which probably be sought for in vain on the Norwegian coast. When, on the other hand, the higher latitudes of the arctic region are reached, the number of species that are common to both increases and the resemblance between the east and west arctic Bryozoan fauna must be admitted to be very great. There seems, however, to be a difference, and it

may be worth while to find out in which direction this difference manifests itself.

In the arctic fauna, there is only one species of the Genus *Cellaria*, namely, *C. articulata*, FABR. (*C. borealis*, BUSK). This genus also seems to be especially associated with the southern hemisphere. This is possibly connected with the circumstance pointed out by F. CANU, that the Bryozoan fauna of the southern hemisphere is of an old character[1]. Among the British *Cellaria* species, *C. fistulosa*, LIN. is of recent distribution from Malangen Fjord in the north of Norway to Australia and New Zealand, and the species is found in a fossil state in Tertiary deposits in S. W. Victoria (WATERS) and in the Eocene of Calabria (NEVIANI). *C. sinuosa*, HASSALL, has not such a wide recent distribution, but is found in fossil state in the Crag (BUSK), in the Italian Pliocene (MANZONI), and in Tertiary strata in South Australia (see HINCKS, B. M. P .. p. 110). *C. johnsoni*, BUSK, has been found in the present day from Shetland to Madeira, and in the fossil state in the Calabrian Miocene (NEVIANI). The genus *Cellaria* occupy a somewhat isolated position in the present fauna, and for this reason alone, one is inclined to look upon it as a veteran genus. WATERS[2] says moreover that he has come to the conclusion „that *Cellaria* and *Onychocella* branched from a common ancestor before the Cretaceous". But it is not easy to arrive at any certain result with regard to the age of the various species. As far as I know, *C. articulata* has not been found as a fossil; and it is possible that it has originated from some Tertiary primitive form or other, and has little by little established its characters under the severe natural conditions which took the place of the mild climate of the Tertiary Period. The comparatively limited field of its distribution may also possibly be regarded as an indication that the age of the species is not very great. The distribution of a species ought scarcely to be looked at only in the light of the hydrographic conditions. It thus appears to be a more or less general rule that a wide distribution in time corresponds with a wide distribution in space. While HINCKS and ROBERTSON state that *C. articulata* is abundant at Queen Charlotte Islands, and according to the descriptions of several investigators, is thought to be quite common off Greenland, and was found by the 2nd Fram Expedition in several places on the east side of Hell Gate, there

[1] „Un caractère nettement archaïque quand on considère les genres surtout". Cf. F. CANU, Les Bryozoaires du Patagonien, p. 5. Mémoires de la Soc. Géol. de France, Paléontologie, vol. 12, fasc. 3, mem. no. 33. Paris, 1904.
Bryozoa, p. 36. Expéd. Antarctique Belge.

is only one report of its occurrence in the east arctic region (Ice Fjord on Spitsbergen, according to SMITT). The reason that the species is not found in the numerous sounds and currents of East Spitsbergen, can scarcely be that they cannot thrive there. And if, in reality, it is not more widely distributed in the east arctic region than our present acquaintance with this matter indicates, the reason must be sought in the fact that the species has not yet had time enough for a circumpolar distribution.

There is another thing that may possibly be deduced from the distribution of this species. As it occurs in abundance off Greenland and in the North American archipelago, but very sparsely off Spitsbergen. it is highly probable that Greenland lies nearer to the distribution-centre than Spitsbergen, whither it must have come from the west. A similar chain of reasoning may be applied to *Flustra serrulata*. In the east arctic region, this species has only been found in the Kara Sea (LEVINSEN), and it is natural to suppose that it has come thither from Greenland.

The species described as new cannot in the mean time be employed in zoö-geographical considerations, and with regard to the others, the greater number of them are circumpolar, while again others such as *Schizoporella producta*, PACKARD, and *Porella saccata*, var. *rostrata*, HINKS, are up to the present found only in west arctic waters.

There thus appears to be a difference between the west and east arctic waters as regards the Bryozoan fauna, and one would think that a careful study of the distribution of the different species, would lead to important conclusions regarding the locality in which the arctic conditions first took the place of the Tertiary. The above seems to point to the probability that the first creation of the arctic forms took place north of America, and not north of Europe. On the whole, it is possible that the great changes in the natural conditions of the earth are the most important, or one of the most important, of the species-forming reasons.

HINCKS described a *Cellaria* from Queen Charlotte Islands, *C. mandibulata*, which, on account of its occurrence might possibly be supposed to be arctic. This is not the case, however, for A. ROBERTSON[1] now states that the above-named species has a large distribution, and is most general in southern waters. *C. articulata* is thus left as the sole representative of its genus in the arctic fauna. On the other hand,

[1] Non-incrusting chilostomatous Bryozoa of the West Coast of N. America. Univeristy of California Publications. Zoology. Vol 12, no. 5, p. 289.

CANU[1] gives 3 species of *Cellaria* from Patagonia; and from the Belgian antarctic expedition, WATERS mentions 4 species, one of which, *C. lata*, is described as new. Even in this there is an indication that CANU's general remark on the relation between the Bryozoan fauna in the northern and in the southern hemispheres, may probably have a special application to the character of the arctic and antarctic fauna. The similarity in the hydrographic conditions of the arctic and antarctic waters in the present day, is not reflected at all in the Bryozoan fauna, as there are few species in common[2]. And whatever the reasen may be, this dissimilarity is connected with the fact that the age of the species seem throughout to be less in the arctic than in the antarctic Bryozoan world, which on the whole bears the impress of age.

---

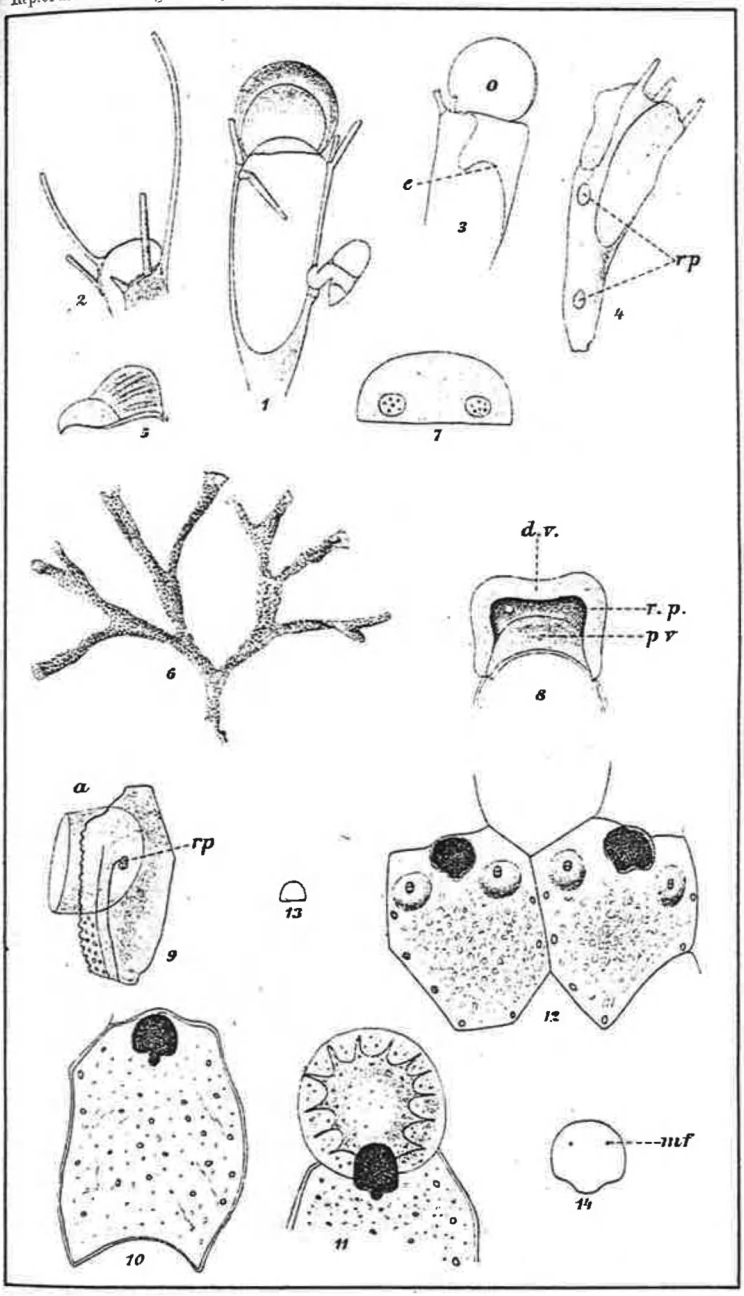
[1] Les Bryozoaires du Patagonien.

[2] See WATERS, Bryozoa, Expédition Antarctique Belge; CALVET, Bryozoen, Hamburger Magalhaensische Sammelreise.

Pl. I.

Pl. I.

Fig. 1—5. *Bugula harmisworthi*, Waters, $^{9}/_{8}$ 1900, Vinterhavnen.
- 1. Zoœcium and Oœcium, frontal view, $^{60}/_{1}$.
- 2. The anterior part of a Zoœcium, lateral view, $^{52}/_{1}$.
- 3. Zoœcia, dorsal view, o, Oœcium, e, terminal wall, $^{52}/_{1}$.
- 4. Zoœcium, lateral view, rp, rosette-plates, $^{52}/_{1}$.
- 5. Avicularium, $^{83}/_{1}$.
- 6. *Flustra serrulata*, Busk, $^{22}/_{7}$ 1900, Vinterhavnen. $^{1}/_{1}$.
- 7—9. *Membranipora nigrans*, Hincks, $^{30}/_{8}$ 1901, Gaasefjord.
- 7. Terminal wall with rosette-plates, $^{83}/_{1}$.
- 8. Oœcium, frontal view, rp, rosette-plates, dv, distal wall, pv, proximal wall of the oœcium, $^{52}/_{1}$.
- 9. Lateral wall of the zoœcium, a, avicularium, $^{52}/_{1}$.
- 10—11. *Schizoporella stormi*, Nordg., $^{22}/_{7}$ 1900, Vinterhavnen.
- 10. Frontal wall of the Zoœcium, $^{52}/_{1}$.
- 11. Oœcium, $^{52}/_{1}$.
- 12—14. *Schizoporella biaperta*, Michelin, $^{22}/_{7}$ 1900, Vinterhavnen.
- 12. Zoœcia, $^{52}/_{1}$.
- 13. Mandible, $^{83}/_{1}$.
- 14. Operculum, mf, muscular insertion, $^{83}/_{1}$.

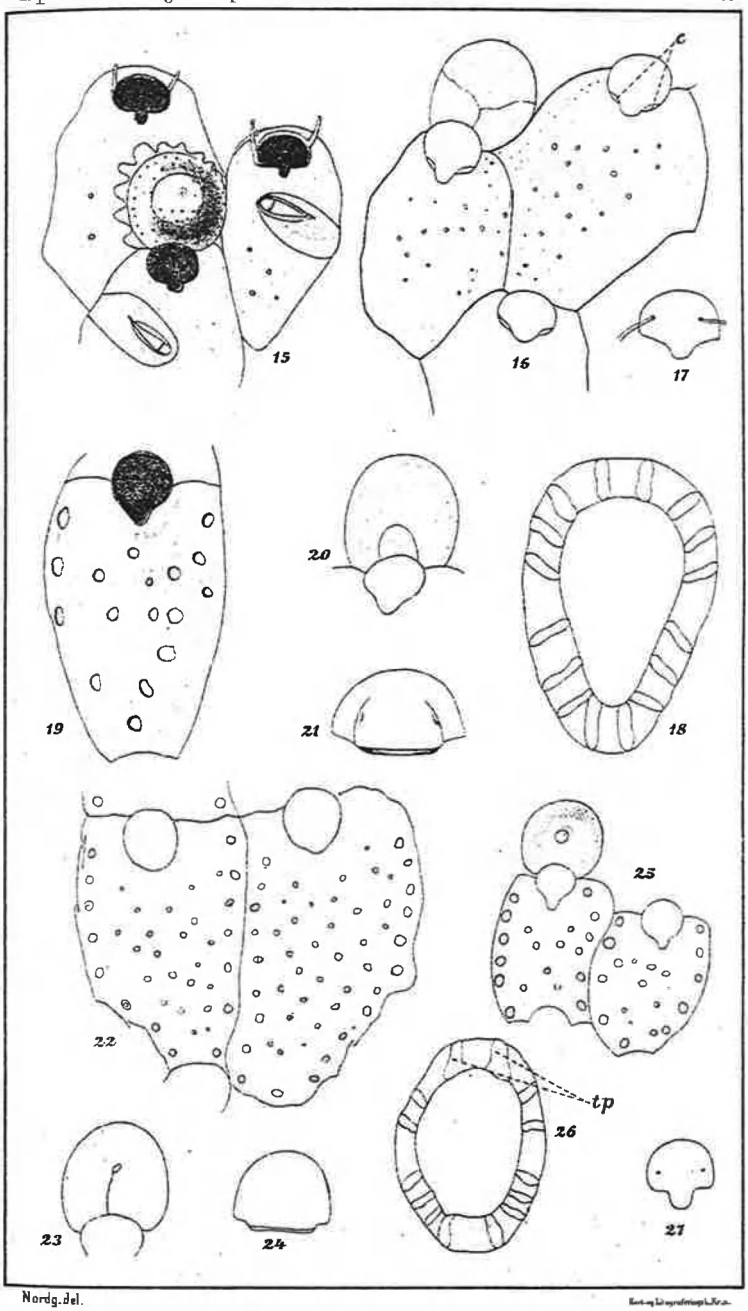


Nordg. del. except fig. 6 which Bucher del.

Aftr.-og Litografiskogl. Kr.a.

Pl. II.

Fig. 15. *Schizoporella bispinosa*, Nordg., n. sp., $^{12}/_{7}$ 1901, Bugt ved Landsend, $^{32}/_{1}$.
- 16–18. *Schizoporella condylata*, Nordg., n. sp., $^{22}/_{7}$ 1900, Vinterhavnen.
- 16. Zoœcia and Oœcia, $^{32}/_{1}$.
- 17. Operculum, $^{83}/_{1}$.
- 18. Pore-chambers, $^{32}/_{1}$.
- 19–21. *Schizoporella producta*, Packard, $^{5}/_{7}$ 1901, Sundet.
- 19. Zoœcium, $^{32}/_{1}$.
- 20. Oœcium, $^{32}/_{1}$.
- 21. Operculum, $^{83}/_{1}$.
- 22–24. *Schizoporella bidenkapi*, Nordg., n. sp., $^{1}/_{8}$ 1900, Sjopolseneset.
- 22. Zoœcia, $^{32}/_{1}$.
- 23. Oœcia, $^{32}/_{1}$.
- 24. Operculum, $^{83}/_{1}$.
- 25–27. *Schizoporella magniporata*, Nordg., n. sp., $^{10}/_{7}$ 1902, Herlosund, Bergen.
- 25. Zoœcia and Oœcium, $^{32}/_{1}$.
- 26. Pore-chambers, tp, terminal p. c., $^{32}/_{1}$.
- 27. Operculum, $^{83}/_{1}$.

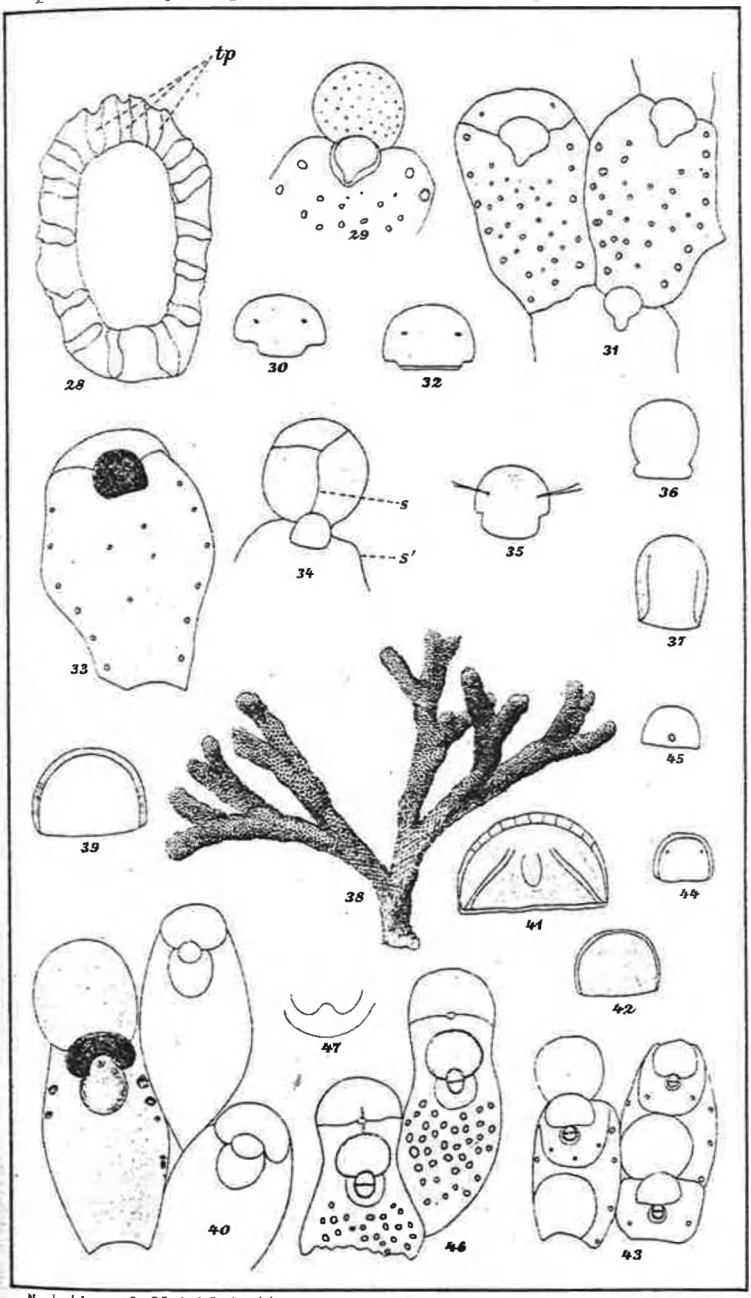


Nordg. del.

Pl. III.

Fig. 28. *Schizoporella sinuosa*, Busk, 1894, Heg i Trondhjemsfjorden, pore-chambers, tp, terminal p. c., $^{52}/_{1}$.

- 29—30. *Schizoporella sinuosa*, Busk, $^{14}/_{2}$ 1899, Østnesfjord, Lofoten.
- 29. Oœcium and the anterior part of the zoœc., $^{52}/_{1}$.
- 30. Operculum, $^{83}/_{1}$.
- 31—32. *Schizoporella sinuosa*, Busk, $^{16}/_{2}$ 1899, Digermulen, Lofoten.
- 31. Zoœcia, $^{52}/_{1}$.
- 32. Operculum, $^{83}/_{1}$.
- 33—35. *Eschara suturata*, Nordg., n. sp., $^{13}/_{7}$ 1901, North of Cape Land's End.
- 33. Zoœcium, $^{52}/_{1}$.
- 34. Oœcium. s and s_1 are sutural lines, $^{52}/_{1}$.
- 35. Operculum, $^{83}/_{1}$.
- 36—37. *Eschara hipposus*, Smitt, $^{19}/_{7}$ 1901, Ytre Gaasefjord.
- 36. Oral aperture, $^{52}/_{1}$.
- 37. Operculum, $^{83}/_{1}$.
- 38. *Porella saccata*, Busk, $^{22}/_{7}$ 1900, Vinterhavnen, $^{1}/_{1}$.
- 39. *Porella plana*, Hincks, $^{31}/_{7}$ 1900, Vinterhavnen, Operculum. $^{83}/_{1}$.
- 40—42. *Porella umbonata*, Nordg., n. sp., Aug. 1900, Vinterhavnen.
- 40. Zoœcia with oœcium, $^{52}/_{1}$.
- 41. Mandible, $^{260}/_{1}$.
- 42. Operculum, $^{83}/_{1}$.
- 43—46. *Porella alba*, Nordg., n. sp., $^{12}/_{7}$ 1901, Bugt ved Landsend.
- 43. Zoœcia, $^{52}/_{1}$.
- 44. Operculum, $^{83}/_{1}$.
- 45. Mandible, $^{260}/_{1}$.
- 46—47. *Smittina minuscula*, Smitt, $^{12}/_{7}$ 1901, Bugt ved Landsend.
- 46. Zoœcia, $^{52}/_{1}$.
- 47. Oral denticle, $^{60}/_{1}$.

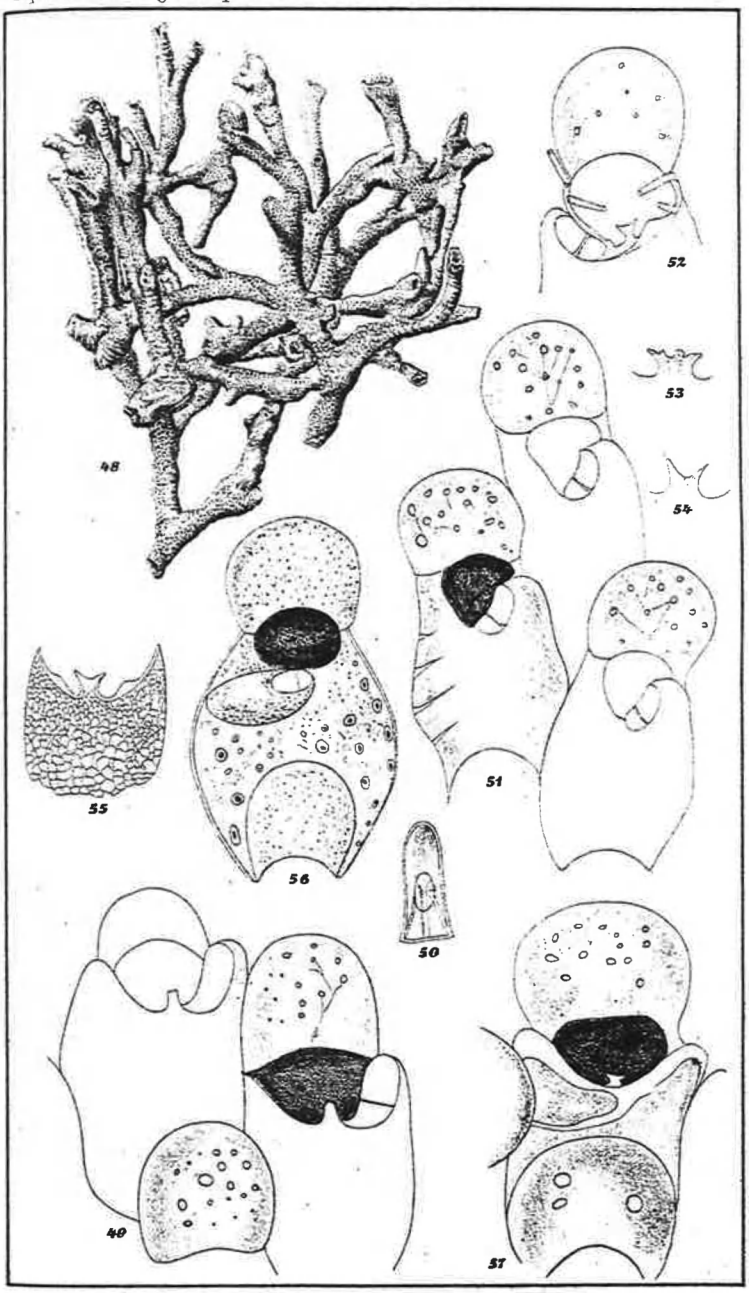


Nordg. del. except fig. 38 which Bucher del.

Pl. IV.

Fig. 48. *Smittina jeffreysi*, Norman. $^{16}/_{8}$ 1901, Gaaseljord, $^{1}/_{1}$.
- 49—50. *Rhamphostomella plicata*, Smitt, $^{8}/_{7}$ 1901, Renbugten.
- 49. Zoœcia and oœcia, $^{40}/_{1}$.
- 50. Mandible, $^{83}/_{1}$.
- 51. *Rhamphotomella hincksi*, Nordg., n. nom., $^{8}/_{7}$ 1901, Renbugten, Zoœcia and Oœcia, $^{52}/_{1}$.
- 52—55. *Rhamphostomella spinigera*, Lorenz, $^{8}/_{7}$ 1901, Renbugten.
- 52. Oœcium and the anterior part of the Zoœc., $^{52}/_{1}$.
- 53—54. Different forms of oral denticles, $^{52}/_{1}$.
- 55. Ornamentation on the frontal wall of the Zoœc., $^{52}/_{1}$.
- 56. *Rhamphostomella ovata*, Smitt, $^{10}/_{9}$ 1900, off Forvisningsdalen. Zoœcium and Oœcium, $^{52}/_{1}$.
- 57. *Rhamphostomella bilaminata*, Hincks, $^{19}/_{9}$ 1900, off Forvisningsdalen, Zoœcium and Oœcium, $^{52}/_{1}$.

Printed 20. december 1906.



Nordg. del. except fig. 48 which Bucher del.