BRYOZOA OF THE NETHERLANDS

BY

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LEIDEN

On the occurrence and the distribution of the Bryozoa in the Netherlands only little has been published up to now; this contrary to the surrounding countries of Western Europe where their occurrence is better known.

In 1826 BENNET EN VAN OLIVIER published a summary of the Bryozoa then known. MAITLAND (1851) listed a number of them, and once more in 1897. VIGELIUS (1884) enumerated Bryozoa collected in the Oosterschelde. VAN DER SLEEN (1929) dealt with the marine Bryozoa. VAN BENTHEM JUTTING (1922) and VORSTMAN (1936) treated with the Bryozoa of the former Zuiderzee.

I found also much information on the distribution of the Bryozoa in the lists of the investigations of the late DR. ROMIJN and of the "Rijksinstituut voor biologisch Visscherij-onderzoek" (the lists of the "Meerval").

The material put at my disposal belongs to the collections of the "Rijksmuseum van Natuurlijke Historie" at Leiden (ML), the "Zoologisch Museum" at Amsterdam (MA), the zoological laboratories at Amsterdam, Leiden and Utrecht, the "Zoologisch Station" at den Helder, the "Rijksinstituut voor biologisch Visscherij-Onderzoek," preserved in the "Hugo de Vries Laboratorium" at Abcoude (RVO), the "Comité ter bestudeering van de Nederlandsche mariene Fauna" at 's Gravenhage (Com) and my own (coll. A). I express my thanks to all, also to a number of private persons, who furnished me material and information. Though the material is not very extensive, together with literature and information it gives an impression of the occurrence of the Bryozoa in the Netherlands. Further investigations must be made to get a more detailed knowledge, for from many parts of the country nothing or but little is known. Up to now 78 species have been found, one of them and some varieties I propose to be new.

According to VAN DEINSE (1931 Proefschrift p. 154) and VAN REGTEREN ALTENA (1937 Proefschrift p. 3), the coast is divided into three parts: part I is the region from the Belgian frontier to

Hook of Holland, part II lies between Hook of Holland and den Helder, part III from den Helder to the German frontier.

The following list could be compiled:

A. MARINE BRYOZOA.

Ordo Cyclostomata.

Crisidia cornuta (L.).
HINCKS 1880, p. 419, pl. 56: 1-4; MARCUS 1940, p. 37, fig. 18.
I: fort den Haak on Walcheren, on seaweed and corallines, (MAITLAND 1851).
II: Noordwijk, Scheveningen; both on cork (ML).
III: Terschelling, on cork (ML).

Crisia eburnea (L.).
HINCKS 1880, p. 420, textfig. 21, pl. 56: 5-6.
I: Oosterschelde (VIGELIUS 1883, ML).
II: Scheveningen (ML, Com), Katwijk (coll. A), Zandvoort-IJmuiden (ML), den Helder (VAN DEINSE in litt.).
III: Terschelling (ML).
On *Flustra foliacea* (L.), hydroids, cork.

Crisia aculeata Hassall.
MARCUS 1940, p. 43, fig. 22.
II: Noordwijk (ML), on cork.

Crisia denticulata (Lamarck).
HINCKS 1880, p. 422, pl. 56: 7-9.
I: Westkapelle, on *Flustra foliacea* (L.). (MAITLAND 1851).

Tubulipora phalangea Couch.
MARCUS 1940, p. 62, fig. 32.
II: Scheveningen, on *Saccorhiza bulbosa* (Huds.), (ML); Noordwijk, three young colonies (?) on cork (ML).
Up to now not found in the Northsea.

Tubulipora liliacea (Pallas).
Idmonea serpens L., HINCKS 1880, p. 453, pl. 60: 2, pl. 61: 2-3;
Tubulipora liliacea (Pallas), BORG 1930, p. 45, fig. 23-24.
I: Westkapelle (MAITLAND 1851).
II: Scheveningen (Com), Katwijk (ML), Noordwijk (ML), Castricum (ML), den Helder (MA).
On seaweed, on a limb of *Lithodes maja* Leach, on cork.

Berenicea patina (Lamarck).
Diastopora patina Lamarck, HINCKS 1880, p. 458, pl. 66: 1-6;
Berenicea patina (Lamarck), BORG 1930, p. 48, fig. 26-27.
II: Scheveningen, Wassenaar, Katwijk, Noordwijk, den Helder, (ML and MA). On cork.

Hornera lichenoides (L.).
HINCKS 1880, p. 468, pl. 67: 1-5.
III: Westgat near den Helder, (HOFFMANN in VAN DER SLEEN 1919).

Lichenopora hispida (Fleming).
Lichenopora (Disporella) hispida (Fleming), BORG 1930, p. 51, fig. 32.
II: Scheveningen (ML), Noordwijk (Com). On cork.

Lichenopora verrucaria (Fabr.).
BORG 1930, p. 52, fig. 33.
II: Zandvoort-IJmuiden (ML), on hydroids; den Helder (MA), on *Lithodes maja* Leach.

Ordo Cheilostomata.

Aetea anguina (L.).
HINCKS 1880, p. 4, pl. 1: 4-5.
II: Scheveningen, one zoarium measuring 30 x 15 mm, on cork. (Com).

Aetea sica (Couch).
Aetea recta Hincks, HINCKS 1880, p. 6, pl. 1: 6-7.
II: Scheveningen, one zoarium measuring 15 x 9 mm, on cork. (Com).

Scruparia chelata (L.).
Eucratea chelata L., HINCKS 1880, p. 14, pl. 1: 3, pl. 2: 4-8, pl. 3: 9-11.
II: Scheveningen (ML), Katwijk (MAITLAND 1851 and ML), Noordwijk (ML).
III: Terschelling (ML).
On seaweed, cork, *Scrupocellaria scruposa* L. on cork, on *Campanularia verticillata* (L.), on *Polysiphonia.*

Eucratea loricata (L.).
Gemellaria loricata L., HINCKS 1880, p. 18, pl. 3: 1-4.
I: Domburg (MAITLAND 1851).
II: Scheveningen (ML), IJmuiden (MA) on trawler, den Helder (VAN DER SLEEN 1919, communicated by TESCH).

Membranipora (*Membranipora*) *membranacea* (L.).
HINCKS 1880, p. 140, pl. 18: 5-6.

I: Westenschouwen (VAN DER SLEEN 1919), de Beer (Com).

II: Katwijk (MAITLAND 1851 and coll. A), along the shore from IJmuiden to den Helder (VAN DER SLEEN 1919, BENNET EN VAN OLIVIER 1826, VAN DEINSE in litt.).

III: the island of Ameland (VAN DEINSE in litt.), on amber; Groningen (MAITLAND 1851, BORGHORST 1944).

On seaweed, stones, shells, hydroids, crabs. This species, however, may be confused with *Membranipora* (*Electra*) *crustulenta* (Pallas). It has also been found in brackish water: the former Haarlemmer meer, the former IJ and the former Zuiderzee respectively (BENNET EN VAN OLIVIER 1826, MAITLAND 1851, VAN BENTHEM JUTTING 1922).

Membranipora (*Electra*) *pilosa* (L.).
Flustra pilosa L., BENNET EN VAN OLIVIER 1826;
Membranipora pilosa (L.), HINCKS 1880, p. 137, pl. 23: 1-4; NORMAN 1894, p. 115, MAITLAND 1851 and 1897, VIGELIUS 1883, VAN DER SLEEN 1919, VAN BENTHEM JUTTING 1922, VORSTMAN 1936.

I: Oosterschelde, the seashore of the island of Walcheren, Brouwershavensche Gat, Ierseke, the seashore of the island of Schouwen, Lake of Rockanje †, de Beer.

II: along the whole shore in this part.

III: Oude Schild on the island of Texel, Terschelling, Scheurrak in the Waddenzee, Groninger Wadden, on a pier near Westerland on Wieringen. (Material in ML and MA.)

On all kinds of substratum: seaweed, shells, hydroids, egg-capsules of *Nucella lapillus* (L.) and of Rajidae, crabs, worm-tubes, Bryozoa, cinder, cork, drift-wood, pilework.

This species is abundant and extremely variable: the zooecia may be short or elongated, strongly calcified or hyaline; the wall thickened or thin and sharp; when elongated, commonly narrow; when short, commonly small all over. Often the zooecia are deformed: distorted, cup- bowl- or urn-shaped. The length and the number of the marginal spines also vary greatly, they may be absent but also luxuriantly developed, forming a hairy tuft. Though connected by intermediate forms, several formae can be distinguished and it is useful to fix them by a name, as far as this has not been done. HINCKS (1880, p. 138) has given already a brief description of this subject, NORMAN (1894, p. 115) has paid much attention to it and I could observe many of the character-

istics they mention. I do not follow NORMAN, except in one case, for his varieties based on the form of the zoaria, are due to the kind of substratum on which they were growing; they have no real value.

The formae refer: 1st to the shape of the zooecia and 2nd to the mode of growth of the zoarium.

Forma *typica* Levinsen (1894, p. 54), (HINCKS 1880, pl. 23: 1): opesia surrounded by a number of small spines, proximally a large corneous spine, abundant;

forma *dentata* Ellis and Solander (1786), (HINCKS 1880, pl. 23: 2): stout zooecia with numerous marginal spines, which are short and pointed and bend over the opesia, without proximal spine, common;

forma *tridentata* Loppens (1906), (HINCKS 1880, pl. 23: 4): with only three spines round the opesia, abundant;

forma *quinquedentata*, forma nova; with five spines round the opesia, abundant;

forma *luxurians*, forma nova: with numerous, very long, corneous spines round the opesia, the proximal spine being multiplied, rare;

forma *tenuis* Norman (1894, p. 117, pl. VI: 2): delicate, with very thin wall and short spines, lustrous, common;

forma *callosa*, forma nova: small, strongly calcified, all spines usually slightly developed, common;

forma *laxa* Smitt (1868, p. 370): zoarium consisting of lines of zooecia, rare;

forma *erecta* Loppens (1906, p. 136): from the adherent zoarium bilaminar shoots originating from lateral superfluous buds arise, possibly by want of space on the substratum. The buds and the zooecia in the shoots are often deformed, rather common.

It seems possible to me that shoots which are torn off can live pelagically and grow on. I have found zoaria consisting of a number of shoots, growing in the mode of forma *erecta*, which have the form of a ball and not or no longer were attached on a substratum; these zoaria were found in fresh condition with living polypides and apparently had lived in a floating state;

forma *verticillata* Ellis and Solander (1786, p. 15, Tab. 4): this forma has reference to the mode of arrangement of the zooecia, viz., in transverse rows which arrangement may occur also in the formae *tridentata*, *quinquedentata* and *erecta*. The spines are like those in the forma *typica*, common.

Membranipora (Electra) hastingsae Marcus.
MARCUS 1940, p. 118, fig. 62.

I: Oostgat near the island of Walcheren (MA), Galgeput near Vlissingen (fossil) (MA), Inlagen on the island of Schouwen (ML). On shells and reed. In brackish water with projecting crusts in the manner of *Membranipora (Electra) crustulenta* (Pallas). Zooecia without the marginal spines, only the distal ones present; sometimes one or two rudimentary spines near to the distal ones occur. Sometimes the zooecia are elongated, narrowed and rectangular, in specimens on seaweed, but in the same zoarium normal oval zooecia are always present; the opesia are large. This material differs from the typical form, but the presence and the place of the distal spines, the non-calcareous operculum and the distal margin of the operculum projecting in the margin of the opesium are characteristic and distinguish this species from its allies, specially from *Membranipora (Electra) crustulenta* (Pallas).

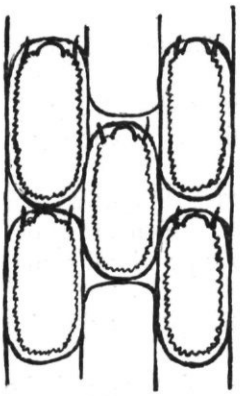

Fig. 1.
M. (Electra) hastingsae Marcus.
Deviating zooecia out of brackish water.

Membranipora (Electra) crustulenta (Pallas).
BORG 1930, p. 64, fig. 54 and 55; do. 1931, p. 27, pl. 3: fig. 4-5.
Eschara lapidescens, BASTER 1759 and 1762;
Millepora crustulenta Pallas, BENNET EN VAN OLIVIER 1826;
Flustra crustulenta (Pallas), MAITLAND 1851;
Hoornwiersoort (Eschara of Flustra), VAN BEMMELEN 1874;
Membranipora crustulenta (Pallas), LORIÉ 1896;
Eschara lapidescens Baster, MAITLAND 1897 and 1898;
Membranipora membranacea Linné, ROMIJN 1907-1925 (in Archives);
Palingbrood (Brachiopora crustulenta), JONKER 1912;
Eschara lapidescens Baster, BLAAUW 1917;
Membranipora crustulenta (Pallas), REDEKE 1918-1923 (in Archives);
Membranipora membranacea L. *var. erecta* Loppens, VAN DER SLEEN 1919; VAN BENTHEM JUTTING 1922;
Conopeum lacroixii Audouin, VAN KAMPEN 1925;
Membranipora crustulenta (Pallas), VAN MASTENBROEK 1927;
Membranipora membranacea L. var. *erecta* Loppens, OTTO EN WIELINGA 1933;
Membranipora crustulenta (Pallas), VORSTMAN 1936, DE VOS 1939;
Membranipora (Electra) crustulenta (Pallas) *var. fossaria* (HINCKS), VAN BENTHEM JUTTING 1946.

I: many localities in the streams, in Zeeuwsch Vlaanderen and on the islands of the province of Zeeland; Lake of Rockanje †;

II: "provincie Zuid-Holland", preparation of MAITLAND without date or locality; in the province of Noord Holland: Noordzeekanaal and many localities north of that canal;

III: brackish water round Harlingen in the province of Friesland and in the province of Groningen, some localities on the island of Texel, Westerland on Wieringen.

In the former Zuiderzee; in the adjacent brackish pool near Blankenham and in the Anne Ruardipool in the province of Overijssel. (Material in ML and MA).

On all kinds of substratum: stones, walls, lock-gates, campshot, waterplants. The species may live under different conditions: Cl 1287-4652 mg/l (ROMIJN in archives), 770-3040 mg/l (DE VOS 1939), in the province of Noord Holland, 1575-2425 mg/l (DE VOS 1939) in the province of Overijssel, 17644 mg/l (VAN BENTHEM JUTTING 1922) in the former Zuiderzee. So the limits lie, as far as known, between 770 and 17644 mg/l.–H_2CO_3 0,227-0,354 o/oo (ROMIJN in archives).–pH 7-8,5.

This species forms extensive zoaria which may cover large areas (VAN BENTHEM JUTTING 1922, photographs by VAN DER SLEEN). LORIÉ (1896) and BLAAUW (1917) have made investigations about incrustations and calcifications of this species in the Lake of Rockanje; the former, moreover, has examined a great number of brackish pools in the province of Zeeland on the occurrence of this species. VAN BENTHEM JUTTING (1946) has reported that this species ". . . rapidly took advantage of the new surroundings . . ." during the inundation of the island of Walcheren, October 1944-October 1945 and that ". . . these minute animals within the course of one year can accumulate to mighty colonies of 200 mm and more in length . . .".

There has been much confusion about this species until BORG (1931) has given us a clear explanation, dividing the species into several geographical varieties. According to his article, the material found in the brackish water of Holland belongs to the variety *fossaria* Hincks. Now it is remarkable that in one zoarium, found in the estuary of the river Schelde, the zooecia show much resemblance to the variety *arctica* Borg: they are much more calcified, they show a well-developed protuberance and chitinous spine; they much agree with plate I fig. 5 by BORG (1931); the zooecia are broader than those of the variety *fossaria*, the opercula

are more calcified, shorter and broader. This is a specimen from seawater, while in Holland this species usually has been found in brackish water!

Another specimen, from Enkhuizerzand in the entrance of the former Zuiderzee, also shows much calcification with well-developed proximal spine and broad operculum.

Membranipora (*Conopeum*) *reticulum* (L.).
Membranipora lacroixii Audouin, HINCKS 1880, p. 129, pl. 17: 5-8.

I: on the island of Walcheren: Domburg, Veere; on the island of Schouwen: Zierikzee, Burghsluis, Bruinisse; Oosterschelde, Veersche Gat, Brouwershavensche Gat, Oostgat. Lake of Rockanje †.

II: Kijkduin, Wassenaar, Katwijk, Noordzeekanaal: on pile-work of the Velsen ferry-boat, den Helder.

III: Scheurrak and Westmeep in the Waddenzee, Eierlandsche Gat, Vliestroom, Westerland on Wieringen, Noordpolderzijl in the lock. (Material in ML and MA).

On shells, *Balanus*, crab, cork, drift-wood, stone.

This species has often been found together with *Membranipora* (*Electra*) *crustulenta* (Pallas) in the province of Zeeland and in the Noordzeekanaal; it also has been found in the famous Lake of Rockanje but neither LORIÉ (1896) nor BLAAUW (1917) have seen this species among the material that they found in the lake.

The species shows sometimes marginal spines and nearly always the two characteristic kenozooecia near each autozooecium which, however, may show differences in form and place; in one specimen, from den Helder, the kenozooecia are not only developed proximally but also laterally, all around the zooecium. Sometimes two kenozooecia are fused together into a big one, sometimes they are much enlarged and deformed.

Total regeneration often happens in this species; in one case I have seen some double-zooecia as a monstrosity. As an example of strong growth I mention a zoarium on an oyster-shell that has reached a thickness of 25 mm by means of repeated deposition in layers.

Membranipora (*Acanthodesia*) *tenuis* Desor.
MARCUS 1940, p. 126, fig. 66.

I: West Hinder (MA).

II: Scheveningen (ML), Katwijk (coll. A), Noordwijk (ML).

In this species too the zoaria sometimes grow in thick layers on shells.

Membranipora (*Tegella*) *unicornis* (Fleming).
HINCKS 1880, p. 154, pl. 20: 4.
I: Zeeland (MAITLAND 1851).
II: Katwijk (MAITLAND 1851).

Membranipora (*Callopora*) *lineata* (L.).
HINCKS 1880, p. 143, pl. 19: 3-6.
I: some localities on the island of Schouwen (ML).
II: Terheyde (coll. A), Scheveningen (Com), Katwijk (coll. A), Noordwijk (ML).
III: Terschelling (Com).
On shells, seaweed, cork, stones.

Membranipora (*Amphiblestrum*) *flemingii* Busk.
HINCKS 1880, p. 162, pl. 21: 1-3.
II: den Helder, on a limb of *Lithodes maja* Leach (MA), "Nederland", rare, (MAITLAND 1897).

Membranipora (*Ramphonotus*) *minax* Busk.
HINCKS 1880, p. 169, pl. 22: 2; MARCUS 1940, p. 142, fig. 76.
II, Scheveningen (ML). On cork.

Flustra foliacae (L.).
HINCKS 1880, p. 115, pl. 14: 10, pl. 16: 1. 1a. 1b.
I: Breskens (MA), on the seashore of the island of Walcheren (ML), Oosterschelde (VIGELIUS 1883), Renesse on the island of Schouwen (Com), de Beer (Com).
II: along nearly the whole beach in this part from Hoek van Holland to Petten (Com, VAN DER SLEEN 1919, ML).
III: Vlieland (BENNET EN VAN OLIVIER 1826), Terschelling (Com), Ameland (Zoologisch Laboratorium Leiden), Groningen (MAITLAND 1851 and BORGHORST 1944).
(In the former Zuiderzee, MAITLAND 1851.)
On shells, a piece of peat, cork. Height of the zoarium: to 22 cm. Sometimes in enormous numbers.
One zoarium bears a superficial layer; in this layer the zooecia are not typical, they represent an intermediate form between *Flustra foliacea* and *Membranipora*. This layer has probably originated from a regenerated zooecium that became an ancestrula.
Some zoaria show dark zones which have been caused by (traumatic?) fractures; in these zones the zooecia are deformed, strongly enlarged, broadened or lengthened, with a pointed distal part or polygonal; sometimes multilocular cysts grow out from

these damaged zooecia, originated possibly by budding which was caused by a traumatic stimulus but not led to the formation of fullgrown zooecia.

According to HINCKS (1880) the zoarium is variable in shape, divided into lobes chiefly in two manners: either into broad lobes for which form the name *palmata* Hincks (1880, p. 117, pl. 14: 10) must be used or into narrow strips for which form I propose the name *secta* forma nova.

Flustra securifrons (Pallas).
HINCKS 1880, p. 120, pl. 16: 3-3a.
I: near fort den Haak on the island of Walcheren (MAITLAND 1851), Renesse on the island of Schouwen (Com).
II: Wassenaar (coll. A), Katwijk (Zoologisch Laboratorium Leiden), Zandvoort and IJmuiden (VAN DER SLEEN 1919), den Helder (VAN DEINSE in litt.), "Nederland", common, (MAITLAND 1897).
III: Groninger Wadden (BORGHORST 1944).

Cellaria salicornis (Pallas).
Cellaria fistulosa (L.), HINCKS 1880, p. 106, pl. 13: 1-4.
II: Katwijk-Zandvoort (MAITLAND 1851).

Tricellaria ternata (Ellis and Solander).
Menipea ternata (Ellis and Solander), HINCKS 1880, p. 38, pl. 6: 1-4.
II: Katwijk (MAITLAND 1851). On hydroid.

Scrupocellaria scruposa (L.).
HINCKS 1880, p. 45, pl. 7: 8-10.
I: Oosterschelde (VIGELIUS 1883), Sas van Gent (ML), Goes (Zoologisch Laboratorium Leiden), Westkapelle (MAITLAND 1851), on the shore of the island of Schouwen (ML and coll. A).
II: along the whole beach in this part (MAITLAND 1851, VAN DER SLEEN 1919, ML, MA, Zoologisch Laboratorium Utrecht).
On seaweed, shells, *Hyas araneus* (L.), Tunicata sp., *Flustra foliacea* (L.), sponge, cork, stone.

Scrupocellaria scabra (Van Beneden).
HINCKS 1880, p. 48, pl. 6: 7-11.
"Nederland" (MAITLAND 1897).

Scrupocellaria reptans (L.).
HINCKS 1880, p. 52, pl. 7: 1-7.
II: Terheyde (coll. A), Scheveningen (ML and Com), Katwijk (coll. A), Noordwijk (ML), Petten (coll. A).
On seaweed, *Flustra foliacea* (L.), cork.

Bicellariella ciliata (L.).
Bicellaria ciliata (L.), HINCKS 1880, p. 68, pl. 8: 1-5.
I: Westkapelle (MAITLAND 1851), Vlissingen (MA), Schelde near Goes (Zoologisch Laboratorium Leiden), on the shore of the island of Schouwen (ML).
II: Scheveningen (Com), Katwijk (coll. A), Noordwijk (ML), den Helder-Nieuwediep (ML and MA), numerous.
On hydroids, *Flustra foliacea* (L.), sponge, seaweed, cork.

Bugula avicularia (L.).
HINCKS 1880, p. 75, pl. 10: 1-4.
I: harbour and lock at Veere, canal through the island of Walcheren, (both in Zoologisch Laboratorium Leiden).
II: Katwijk, (MAITLAND 1851), shore of the Netherlands (BENNET EN VAN OLIVIER 1826), Scheveningen (Com).
(In the former Zuiderzee HORST 1885.) On hydroids and lock-gates.

Bugula plumosa (Pallas).
HINCKS 1880, p. 84, pl. 12: 1-5.
I: fort den Haak on the island of Walcheren (MAITLAND 1851), Vlissingen (MA), in the river Oosterschelde near Goes (Zoologisch Laboratorium Leiden) and near Ierseke (ML), Kisters Inlaag near Zierikzee (Zoologisch Laboratorium Leiden).
II: den Helder (ML), shore of the Northsea (BENNET EN VAN OLIVIER 1826).
(In the former Zuiderzee, Zoologisch Laboratorium Leiden.)
On Tunicata, hydroids, stones. Height of the zoarium: up to 8,5 cm.

Bugula flabellata (Thompson).
HINCKS 1880, p. 80, pl. 11: 1-3.
II: Scheveningen (ML). On cork.

Dendrobeania murrayana (Johnston).
HINCKS 1880, p. 92, pl. 14: 2-9.
II: Petten (coll. A).

Membraniporella nitida (Johnston).
HINCKS 1880, p. 200, pl. 27: 1-8.
I: Heertjes Inlaag near Serooskerke on the island of Schouwen (ML).
II: Scheveningen (Com), den Helder (MA).
"Nederland" (MAITLAND 1897). On seaweed and cork.

Aspidelectra melolontha (Busk).
HINCKS 1880, p. 202, pl. 27: 9-10.
I: Oosterschelde: perceel 416 (coll. A) and near Gorishoek (ML), Oostgat (MA); Westerschelde near Ellewoutsdijk (coll. A), between Westkapelle and Domburg (coll. A).
II: Scheveningen (ML).
On recent and fossil shells.

Cribrilina annulata (Fabr.).
HINCKS 1880, p. 193, pl. 25: 11-12.
"Nederland" (MAITLAND 1897).

Cribrilina punctata (Hassall).
HINCKS 1880, p. 190, pl. 16: 1-4, pl. 14: 3.
I: Schelde (Zoologisch Laboratorium Leiden).
On *Mya arenaria* (L.).

Hippothoa hyalina (L.).
HINCKS 1880, p. 271, pl. 18: 8-10.
I: on the shore of the island of Schouwen (ML).
II: Terheyde-Wassenaar (Com), Katwijk (coll. A), Noordwijk (ML).
III: Terschelling (ML).
"Nederland" (MAITLAND 1897).
On *Flustra foliacea* (L.), *Patella*, seaweed, cork.

Chorizopora brogniartii (Audouin).
HINCKS 1880, p. 224, pl. 32: 1-4.
II: Scheveningen (Com). On cork.

Escharella immersa (Fleming).
Mucronella peachii (Johnston), HINCKS 1880, p. 360, pl. 50: 1-5.
Escharella immersa (Fleming), MARCUS 1940, p. 226, fig. 114.
II: Zandvoort (coll. A). On cork.

Peristomella coccinea (Abildgaard).
HINCKS 1880, p. 371, pl. 34: 1-6.
II: Scheveningen (Com), Noordwijk (ML). On cork.

Schizoporella unicornis (Johnston).
HINCKS 1880, p. 238, pl. 35: 1-5; MARCUS 1940, p. 237, fig. 121.
II: Scheveningen (Com). On *Patella vulgata* (L.).

Schizomavella linearis (Hassall).
HINCKS 1880, p. 247, pl. 38: 5-10, pl. 24: 1; MARCUS 1940, p. 244, fig. 125.
I: Oosterschelde: perceel 311 (coll. A).
II: Katwijk (coll. A). On shells.

Escharina spinifera (Johnston).
HINCKS 1880, p. 241, pl. 35: 6-8.
II: den Helder, Noorderhoofd (VAN DER SLEEN 1919). On stones.

Hippodiplosia pertusa (Esper).
HINCKS 1880, p. 305, pl. 43: 4-5, MARCUS 1940, p. 251, fig. 129.
I: Heertjes Inlaag near Serooskerke on the island of Schouwen.

Cryptosula pallasiana (Moll).
HINCKS 1880, p. 297, pl. 33: 1-3.
I: Oosterschelde (ML), on the island of Walcheren: Middelburg (MA), in the lock at Veere (VAN KAMPEN 1925, Zoologisch Laboratorium Leiden), on the island of Schouwen: Scharendijke (ML), Zierikzee (ML) and Serooskerke-Leinshoofd (ML), on stones of the dike. Also on oyster-tiles, Ostrea and Balanus.
II: Scheveningen (Com), on cork; den Helder (VAN DER SLEEN 1919), on stones of the dike and on *Balanus* from the piers near the dam (MA).
Two monstrosities have come under my eyes: giant-zooecia, 3-5 times as large as normally with the orificium in the middle and two zooecia which were grown together, the orificia being fused.

Microporella ciliata (Pallas).
HINCKS 1880, p. 206, pl. 28: 1-8.
I: Oosterschelde (VIGELIUS 1884, ML), Flauwers Inlaag near Kerkwerve on the island of Schouwen (ML).
II: Scheveningen (ML, Com), Katwijk (coll. A), Noordwijk (ML).
On shells, *Flustra foliacea* (L.), seaweed, stones, cork.

Smittina reticulata (J. Macgillivray).
HINCKS 1880, p. 346, pl. 48: 1-5.
II: den Helder-Noorderhoofd (VAN DER SLEEN 1919). On stones.
"Nederland" (MAITLAND 1897).

Discopora arctica (M. Sars).
Mucronella pavonella (Alder), HINCKS 1880, p. 376, pl. 39: 8-10.
Discopora arctica (M. Sars), MARCUS 1940, p. 284, fig. 146.
II: den Helder (MA), On a limb of *Lithodes maja* Leach.

Cellepora armata Hincks.
HINCKS 1880, p. 410, pl. 54: 10-13.
II: Terheyde (Com), Scheveningen (ML), Katwijk (coll. A), Zandvoort-IJmuiden (ML).
On hydroids, stones, cork.

Cellepora pumicosa (L.).
HINCKS 1880, p. 398, pl. 54: 1-3.
II: Scheveningen (Com), Katwijk (MAITLAND 1851), Noordwijk (ML).
On hydroids, cork, stones.
III: on the island of Ameland: the eastern part "het Oerd" (coll. A) a zoarium measuring: length 42 mm, breadth 38 mm, height 19 mm. This zoarium was growing on tubes of Serpula. Two more zoaria which were growing on tubes of Serpula, are known to me, viz., one from Horn Reef Grounds (MA), measurements: length 50 mm, breadth 40 mm, height 25 mm and one from Berry Head at Bringham (ML) resulting from repeated deposition in layers, five zones of growth distinctly visible.

Siniopelta costazii (Audouin).
HINCKS 1880, p. 411, pl. 55: 11-14.
I: Heertjes Inlaag near Serooskerke on the island of Schouwen (ML).
II: Scheveningen (Com), Katwijk (coll. A), Noordwijk (ML).
On *Patella*, seaweed, cork.

Ordo Ctenostomata.

Alcyonidium gelatinosum (L.).
Plate XIV A; Fig. 3A; Fig. 5A.
Halodactylus diaphanus Lamouroux, MAITLAND 1851 and 1897;
Alcyonidium gelatinosum (L.), BENNET EN VAN OLIVIER 1826, VIGELIUS 1884, VAN DER SLEEN 1919, VAN BENTHEM JUTTING 1922, MARCUS 1940, p. 301, fig. 155.
I: along the shore of the islands of Walcheren and of Schouwen, Oosterschelde.
II: along the whole shore in this part.
(Material in ML, MA, zoological Laboratories at Leiden and Amsterdam.)
III: Westmeep (Zool. Station den Helder), Blauwe Slenk and Inschot in the Waddenzee (both in Com), Terschelling (Com).
Sometimes in enormous numbers. Specially found on *Buccinum*

undatum (L.), *Natica catena* (Da Costa), and the tube of *Mya arenaria* L., also on other shells, stones and drift-wood.

A certain number of zoaria shows a brownish-violet colour. It is not possible to me to explain this colour; microscopical examination shows the presence of capsulated organisms in the septa between the zooecia. The colour is brown or green. These organisms are not capsulated "brown bodies", for a structure is distinguishable. They may be parasitic Protozoa or Algae. I add a photo-micrograph (pl. XIII fig. 1) hoping that some zoologist will be able to identify them. The material is at his disposal.

Alcyonidium polyoum (Hassall).

Alcyonidium mytili (Dalyell), VAN KAMPEN 1925;
Alcyonidium polyoum (Hassall), MARCUS 1940, p. 302, fig. 156.

I: Heertjes Inlaag near Serooskerke (ML), Ierseke (Zoologisch Laboratorium Leiden), Vlissingen-harbour (VAN KAMPEN 1925).

II: Kijkduin (ML), Amsteldiep near van Ewijcksluis at Amsterdam (MA), den Helder-Nieuwediep (MA).

III: Scheurrak (MA), Westmeep (ML) and Wierbalg (MA) in the Waddenzee, Vliestroom (ML).

(In the former Zuiderzee, VORSTMAN 1936.) On *Carcinus moenas* L., shells, seaweed, stones.

Alcyonidium hirsutum (Fleming).

Plate XIV B; Fig. 3B; Fig. 5B.

MARCUS 1940, p. 304, fig. 157.

I: Schouwen (MAITLAND 1851), Renesse (Com), Domburg (MAITLAND 1851).

II: Scheveningen (MAITLAND 1851), Katwijk and Zandvoort (VAN DER SLEEN 1919), IJmuiden and den Helder (MA).

III: Texelstroom (Zool. Station den Helder), Terschelling (MA). (In the former Zuiderzee, HORST 1885.) On shells, seaweed, pebble.

All zoaria belong to the erect form. One zoarium from the Northsea reaches a height of 38 cm.

Alcyonidium parasiticum (Fleming).

MARCUS 1940, p. 304, fig. 158.

I: Serooskerke (ML), Zeeland? (probably already mentioned by BASTER 1762 under a non-scientific name and not recognized by him as a Bryozoan).

II: from Hoek van Holland to Zandvoort (VAN DER SLEEN

1919), Scheveningen (MAITLAND 1851), "Nederland" (MAITLAND 1897), dredged off Scheveningen (ML).

III: Delfzijl (MA).

On hydroids, seaweed, Bryozoa.

Alcyonidium mamillatum Alder.

MARCUS 1940, p. 306, fig. 159.

I: Brouwershavensche Gat (ML), Anna Jacoba on St. Filipsland (ML).

II: dredged off Zandvoort, one mile out of shore (ML).

On crabs.

Flustrella hispida (Fabr.).

HINCKS 1880, p. 506, pl. 72: 1-5; MARCUS 1940, p. 308, fig. 161.

I: along the shore of the island of Schouwen (ML).

II: Scheveningen (ML), "Nederland" (MA).

On indigenous and exotic seaweed.

Vesicularia spinosa (L.).

HINCKS 1880, p. 513, pl. 73: 3-7.

I: Westkapelle (MAITLAND 1851), the island of Walcheren (ML), Haamstede on the island of Schouwen (ML).

II: Katwijk (BENNET EN VAN OLIVIER 1826, MAITLAND 1851), off Scheveningen (ML).

"Nederland" (MAITLAND 1897).

Amathia lendigera (L.).

HINCKS 1880, p. 516, pl. 74: 7-10.

II: Scheveningen (MA, MAITLAND 1851).

On seaweed.

Bowerbankia imbricata (J. Adams).

BORG 1930, p. 101, fig. 127; MARCUS 1940, p. 313, fig. 163.

I: Ierseke (ML), Oosterschelde (ML, VIGELIUS 1884), Bergsche Bank (MA), in the lock at Veere on the island of Walcheren (Zoologisch Laboratorium Leiden), Veersche Gat (MAITLAND 1851).

II: Helder-Nieuwediep (ML, VORSTMAN 1921).

On hydroids and seaweed.

Bowerbankia caudata (Hincks).

HINCKS 1880, p. 521, pl. 75: 7-8; BORG 1930, p. 101, fig. 128-129.

I: Veere on the island of Walcheren (Zoologisch Laboratorium Leiden).

(In the former Wieringermeer, VORSTMAN 1936.)

Valkeria uva (L.).

HINCKS 1880, p. 551, pl. 75: 1-5; MARCUS 1940, p. 318, fig. 166.

I: Ierseke (ML), Zeeland (BENNET EN VAN OLIVIER 1826, MAITLAND 1851).

II: den Helder (MA), Westgat near den Helder (VAN DER SLEEN 1919).

(In the former Zuiderzee, VAN BENTHEM JUTTING 1922.)

On *Flustra foliacea* (L.), hydroids, crabs, seaweed.

Farrella repens (Farre).

HINCKS 1880, p. 529, pl. 78: 5-6; BORG 1930, p. 103, fig. 134-135.

I: Oosterschelde (VIGELIUS 1884, ML), Veersche Gat (MAITLAND 1851), Brouwershavensche Gat (ML).

II: Kijkduin (ML), off Zandvoort one mile out of shore (ML), den Helder (ML, Zoologisch Laboratorium Leiden), along the whole shore (VAN DER SLEEN 1919).

III: Harlingen-harbour (?) (OTTO EN WIELINGA 1933).

(In the former Zuiderzee, MA, and in the former Wieringermeer ML.)

On seaweed, crabs, hydroids, stones.

Anguinella palmata Van Beneden.

HINCKS 1880, p. 539, fig. 30; pl. 77: 5-5a.

II: den Helder-harbour (VAN DER SLEEN 1919).

III: Texelstroom (VAN BENTHEM JUTTING 1922).

(In the former Zuiderzee, VAN BENTHEM JUTTING 1922.)

Victorella pavida S. Kent.

HINCKS 1880, p. 561, pl. 79: 4-7; BORG 1930, p. 106, fig. 141-143.

II: Amsterdam: harbour and canals (ML, MA, Zoologisch Laboratorium Amsterdam), floating beam in the Zaan (MA), den Helder (ML). Schellingwouderbroek in the province of Noord Holland (DE VOS 1939).

On *Mytilus edulis* L., *Congeria cochleata* (Nyst), *Balanus improvisius* L., hydroids, seaweed, wood; in brackish water.

Paludicella articulata (Ehrenberg).

BORG 1930, p. 107, fig. 144-146.

Paludicella ehrenbergi Van Beneden, DE VRIES 1887, BLAAUW 1912, ROMIJN EN WIBAUT-ISEBREE MOENS 1920, VAN DER SLEEN 1920.

Part Z I: (see for these parts under Phylactolaemata): Langweerder Wielen, Foxholstermeer.

Part Z II: Drentsche A near de Punt, an old branch of the Beilerstroom near Lheebroek.

Part Z III: Sonsbeek: immediately above the waterfall and in a pond.

Part Z IV: in the river Vecht, in a pond near the Plantagehuis at Vreeland, in the Lake of Abcoude.

Part Z V: in the Ringvaart of the Haarlemmermeerpolder, Drecht near Leimuiden, Kagerplassen, Brasemermeer near Roelofarendsveen, Heimanswetering at Woubrugge, Zijl near Leiden, in the river Oude Rijn: Bodegraven, Zwammerdam, Alphen near Gouwsluis, Leiderdorp; in the river Gouwe: north of Gouda and near Gouwsluis, in the waterworks of Rotterdam, in the waterworks Lek en IJssel at Lekkerkerk, in the Kilwaterworks at 's-Gravendeel, Snellerak on the Hollandsche IJssel, in the river Linge at Leerdam.

Part Z VI: Heusden on the river Maas, the Zuid-Willemsvaart, in the river Maas above Nierskanaal.

(Material in ML, MA, coll. A, Zoologisch Laboratorium Amsterdam.)

Often found together with Plumatellidae and *Christatella mucedo* Cuvier; not always growing on a special substratum as pilework, dead branches, Nuphar but often lying loose, growing among the zoaria of other fresh-water Bryozoa or in mud. The zoaria vary in length, the walls of the zooecia are as clear as glass as a rule but sometimes incrustated. Among the material at my disposal and gathered from 26th May until 27th September there is only one zoarium with hibernacules, elongated and spindle-shaped, from Sonsbeek, August 7th 1942.

Cl 30-1719 mg/l, the last named number in brackish water near Halfweg. pH 7.2-8.42. H_2CO_3 0.274-0.291 o/oo.

Among the material of *Alcyonidium* from various localities there were some zoaria with deviating characteristics, determined as *Alcyonidium gelatinosum* (L.), much resembling that species but not belonging to it. I propose a new name for them: *Alcyonidium proliferans* species nova. Pl. XIII, fig. 2; Pl. XV; Fig. 2; Fig. 3 C and D; Fig. 5 C.

Diagnosis:

zoarium: an erect stem, robust, with a thin proximal part, not or sparingly branched, rounded or flattened in section, set with knobs and lobes; colour greenish-brown;

zooecia: concentrically disposed in the flat parts of the zoarium and spread out, in the knobs crowded together; distally broadly rounded, proximally narrowed, with an orificium that is surrounded by an annulus; cuticula and septa very thick. Measurements on an average: length 481 μ, breadth 298 μ. The polypide is slender, the number of tentacles 14-16; intertentacular organ perceived.

Localities: I: de Haart on the island of Schouwen (ML.).

II: Terheide (ML), Scheveningen (MA), Katwijk (coll. A, ML), Noordwijk (ML), IJmuiden (MA). Horn Reef (MA), Leman Grounds (coll. A).

Distribution as far as known: Northsea.

Type-specimen: in coll. A, Katwijk, 27 XI 1938.

The zoaria are robust, the greatest height known to me is 27 cm, the surface is nodulated. The species is not rare but was probably overlooked.

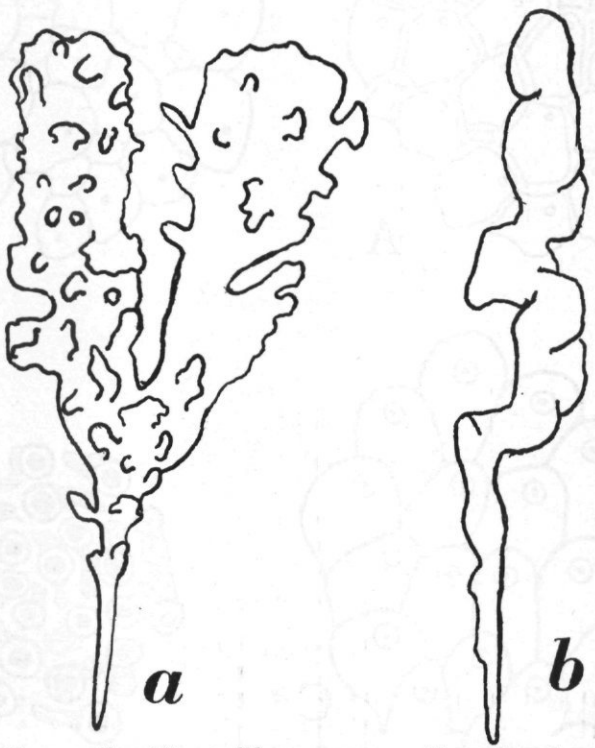

Fig. 2. *Alcyonidium proliferans* sp. nov. outlines of zoarium;
a: from Scheveningen,
b: from Leman Grounds.

A comparison of this species which has 14-16 tentacles with *Alcyonidium gelatinosum* which has 15-17 tentacles and *Alcyonidium hirsutum* which has 17-18 tentacles shows distinct differences. In the new species the zoaria are pear-shaped, only autozooecia are present. In *A. gelatinosum* the autozooecia are irregularly hexagonal, separated by small furrows; small zooecia, which contain a rudiment of a polypide (kenozooecia) occur, lying scattered between the autozooecia. In *A. hirsutum* the autozooecia are surrounded by papillae, which also contain elements of a polypide, visible after staining by eosine and haematoxyline.

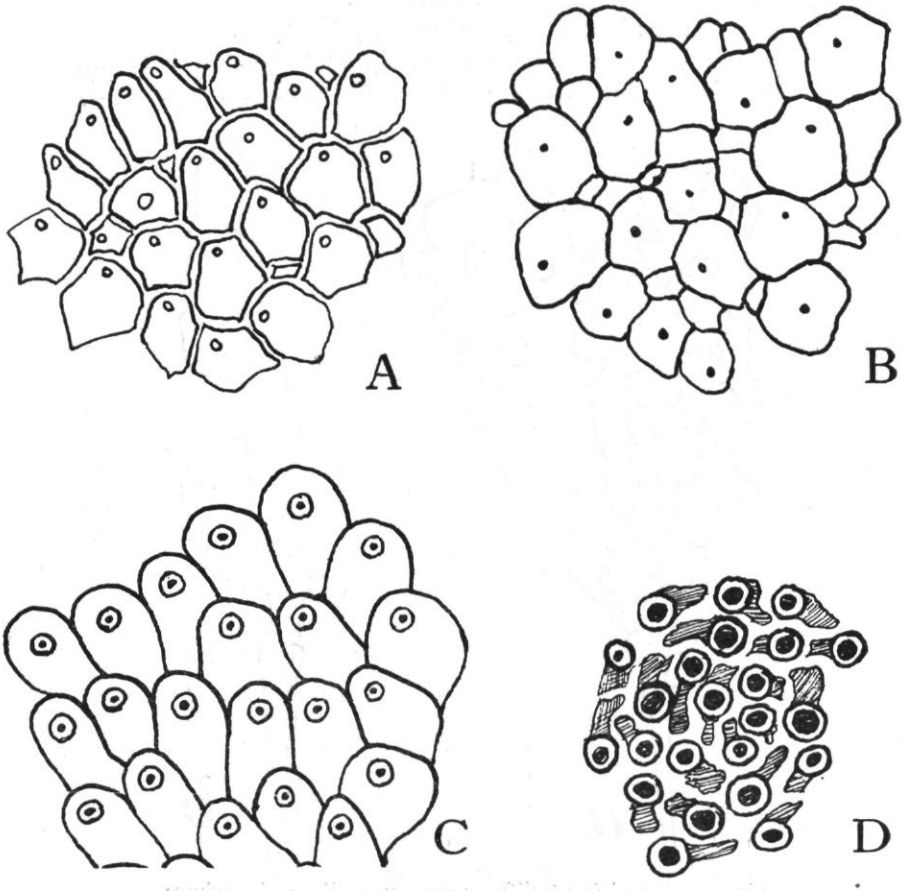

Fig. 3. Form of the zooecia:
A *Alcyonidium gelatinosum* (L.)
B ,, *hirsutum* (Fleming),
C, D ,, *proliferans* sp. nov.

The microscopical section of the stem shows that the centre is composed of vacuoles, which are invested by epithelium. These vacuoles originate from the zooecia which come to lie centrally by budding on the periphery. In the outer layer the autozooecia are found. In the new species they are narrow, the vacuoles are small, the polypide is tall and long, the cuticula and the septa are very thick, the centre and the outer layer are not distinctly separated but merge into each other. It appears that the zooecia in *A. gelatinosum* are much more spacious, the vacuoles are large also; the polypide is big, the cuticula and the septa are thin; the centre and the outer layer are distinctly separated. In *A. hirsutum* the zooecia are about half as spacious as in *A. gelatinosum*, the vacuoles are rather broad but flat; the polypide is less big, the cuticula and the septa are thin; the centre and the outer layer are not distinctly separated.

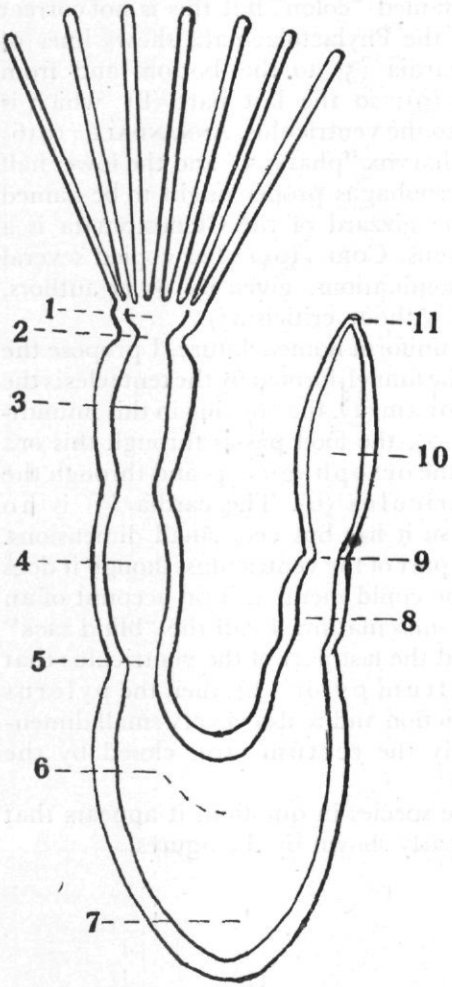

Fig. 4. Alimentary canal of the Bryozoa, schematically drawn. (Explanation in the text)

Before I compare the alimentary canal of the three species, some remarks on this organ must be made.

Several authors have called the same parts by different names. So the under part of the stomach (7) is named "blind sack" or "colon". As the colon is properly speaking a part of the intestine

that leads from the stomach to the anus, it is not possible that a part of the stomach should be "colon". The last part of the stomach (8) is also often named "colon" but this is not correct either. The ventriculus of the Phylactolaemata shows lines of cells, running from the cardia (5) to the bottom and from the bottom to the pylorus (9); so the last part (8) which is slightly narrowed belongs to the ventriculus. ANNANDALE (1916) calls the upper half of the pharynx "pharynx" and the lower half "oesophagus"; how the oesophagus proper ought to be named he does not mention. The gizzard of the Ctenostomata is a modification of the oesophagus. CORI (1941) has copied several figures and erroneous denominations, given by other authors, also that by ANNANDALE, without criticism[1]).

As it is necessary to use a uniform nomenclature, I propose the following: the lower part of the funnel, formed by the tentacles is the infundibulum tentaculorum (1), the opening in this infundibulum, the "mouth": ora (2), the food passes through this ora into the pharynx (3) and the oesophagus (4) and through the cardia (5) into the ventriculus (6). The cardia (5) is no more than a constriction, so it has but very small dimensions. One may speak of a cardiac part of the ventriculus, though it does not exist physiologically; one could mention it on account of an anatomical peculiarity, the musculature. I call the "blind sack" fundus ventriculi (7) and the last part of the ventriculus that is slightly narrowed, the antrum pylori (8); then the pylorus (9) which too is but a constriction and is also of very small dimensions like the cardia; finally the rectum (10), closed by the anus (11).

Now comparing the three species in question, it appears that distinct differences exist, clearly shown by the figures.

[1]) The legends of some figures are also wrong: fig. 350 is not *Flustrella hispida* (Fabr.) but *Alcyonidium albidum* Alder; fig. 429, 432 and 433: *Plumatella princeps varietas fungosa* is now named: *Plumatella fungosa* (Pallas).

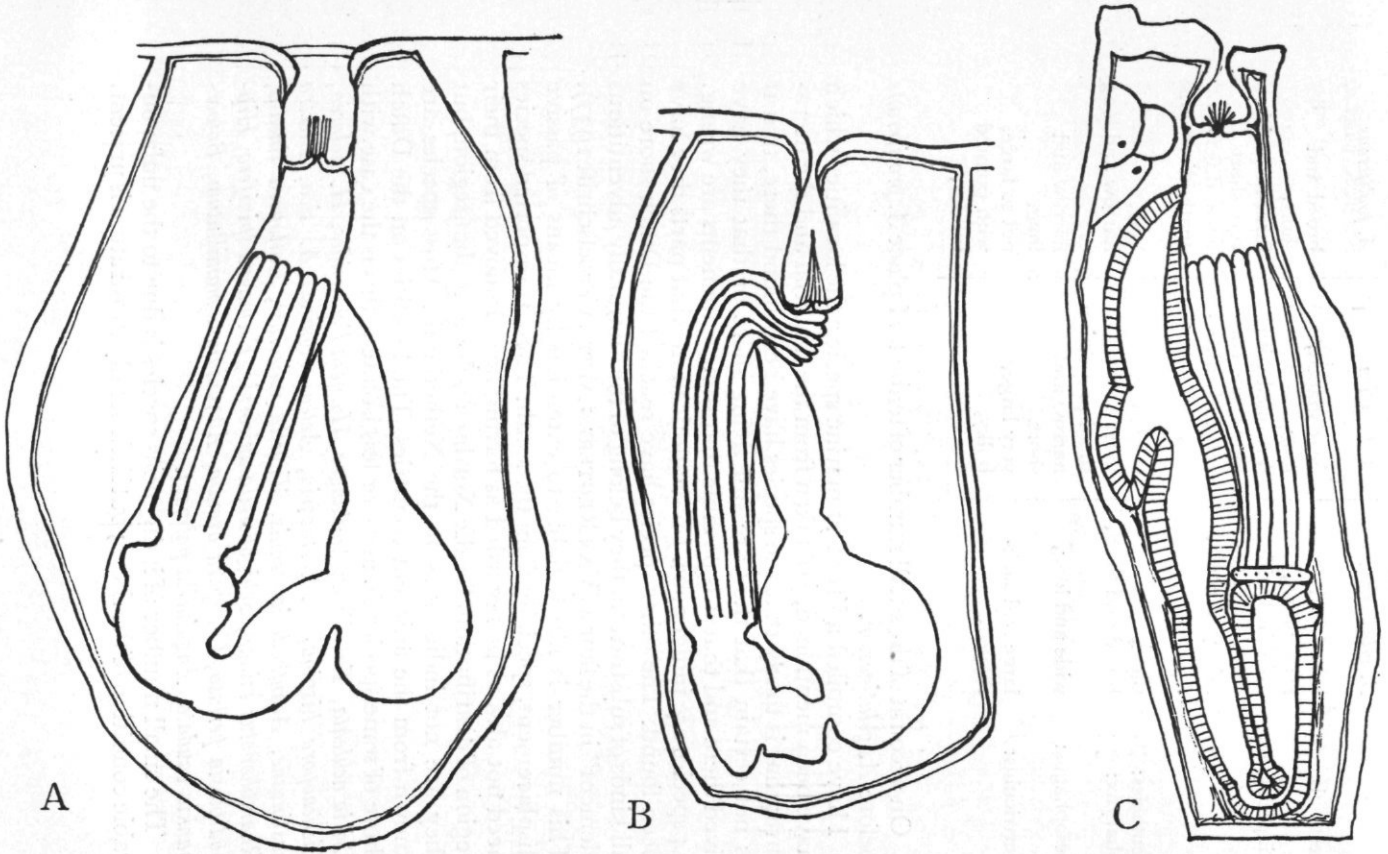

Fig. 5. Alimentary canal:
A *Alcyonidium gelatinosum* (L.);
B ,, *hirsutum* (Fleming);
C ,, *proliferans* sp. nov.

	A. gelatinosum	*A. hirsutum*	*A. proliferans*
vestibulum:	broad and rather long,	pear-shaped, long,	broad and short,
diaphragma:	furnished with short setae, paralelly directed,	furnished with long setae, convergently directed,	furnished with very short setea, divergently directed,
tentacles:	short,	very long,	long,
pharynx:	broad and short,	short and of small proportion	narrow and long
oesophagus:	wide and long,	narrow and short,	narrow and long,
vertriculus:	large and sack-shaped,	very large, bulky,	not so large, with pointed fundus,

On account of the small number of tentacles I place *A. proliferans* before *A. gelatinosum.*

I have compiled a list of 71 marine species; the localities which have been mentioned, are taken from the material and the literature; that is to say that the species have been found there, that it is not certain that they are still living there or that they have lived there and that it is possible that some statements are wrong. 44 species are indigenous. I have noticed in what parts they have been found. The other species have reached the Dutch shore on all kinds of substratum, they belong to the "naturally adventitious element" in the fauna (VAN REGTEREN ALTENA Proefschrift 1937). This number is much liable to extension by means of passive displacement, specially from the south. These transported species need not always be regarded as having been removed from their region of distribution, for the Northsea belongs to that region, but they are not indigenous to the Netherlands. Most species are known from the adjacent countries. The localities on the Dutch shore of some species lie more or less isolated; this is the case with *Crisia aculeata, Tubulipora phalangea, Hornera lichenoides, H. violacea, Lichenopora hispida, L. verrucaria, Aetea anguina, A. sica, Electra hastingsae, Acanthodesia tenuis, Tegella unicornis, Callopora lineata, Rhamphonotus minax, Schizoporella unicornis, Escharina spinifera, Hippodiplosia pertusa, Cellepora armata, Alcyonidium mamillatum, Bowerbankia caudata, Anguinella palmata.*

The small number of indigenous species is due to the unfavourable condition of the shore; but little steady substratum is present.

Moreover the knowledge of the Dutch Bryozoan-fauna is insufficient. Nearly all the marine material has been washed ashore; only little has been obtained by dredging. The small number of Cyclostomata 4 is striking; Cheilostomata 26, Ctenostomata 14. The last ordo is relatively most widely distributed, they are more able to adaptation in brackish water than the other species. In region I 34 species (resp. 3, 19, 12) were found; this is the region of the estuaries of Zeeland and Zuid Holland with favourable substratum in some places; from the waters round the islands of Zuid Holland nothing is known. In region II 37 species (resp. 2, 23, 12) were found. It contains the continental shore with den Helder-Nieuwediep as locality of some species; here *Flustra foliacea* (L.) is substratum for other Bryozoa as well as in the other regions; from the piers and breakwaters, "artificial rocks", in this part still nothing is known, except for den Helder: *Cryptosula pallasiana* (Moll) was found here on stones of the sea-dike. In region III only 13 species (resp. 1, 6, 6) were found; this region, including the Waddenzee, the Islands, the coast of Friesland and Groningen has been but little investigated; but there is few favourable substratum here. *Hypophorella expansa* Ehlers, living in worm-tubes, was found on the German shallows and may undoubtedly live here too.

B. FRESH-WATER BRYOZOA.

Ordo Phylactolaemata.

While the marine Bryozoa are represented only in small numbers, the fresh-water species do comparatively better; 7 out of 9 European species were found in the Netherlands. Since I was able to compare my material with foreign material I have to mention that my two new species *Plumatella wysteri* and *Plumatella serrulata* Lacourt (1944) must be dropped.

In order to have an impression of their distribution, I have divided the country into parts which are based upon the regions of FABER (Nederlandsche Landschappen, 1942), enumerated I-VI, with the indication "Z" to distinguish them from the marine regions. Part Z I, the northern part, covers Friesland en Groningen; part Z II Drente; part Z III, the eastern part, covers Overijssel and Gelderland east of the river IJssel; part Z IV, the central part, covers Gelderland west of the river IJssel, Utrecht

and Gooiland; part Z V, the western part, covers Zeeland, Zuid Holland, Noord Holland minus Gooiland but including the Wadden Islands; part Z VI, the southern part, covers Noord Brabant and Limburg.

Fredericella sultana (Blumenbach).
Pl. XVI, fig. 1; BORG 1930, p. 111, fig. 151-153.

Z II: Drentsche A near De Punt: on the stakes of the boathouse and on the inlet of the waterworks, Leisloot between Eemster and Dwingelo'sche vaart near the weir on bricks under a bridge (both in coll. A. ML).

Z IV: Arnhem-Sonsbeek, (HOFKER 1928), (coll. A).

Z V: Roelofarendsveen, Rotterdam waterworks (statoblasts), waterworks Lek en IJssel at Lekkerkerk, Kil-waterworks at 's-Gravendeel (all in coll. A), (ML).

This species possesses only fixed statoblasts; measurements: length 398-498 μ, breadth 249-298 μ.

Plumatella fruticosa Allman.
Pl. XVII, fig. 2-3. BORG 1941, p. 485, Taf. I, fig. 1-2.

Z II: an old branch of the Beiler stroom near Lheebroek in the province of Drente on Nuphar and near the small weir in the Dwingelo'sche stroom (the same river but downstream) on Nuphar, (coll. A).

Measurements of the fixed statoblasts: length 697 μ, breadth 265 μ; of the free statoblasts: length 520-600 μ, breadth 200-249 μ.

Plumatella emarginata Allman.
Pl. XVI, fig. 2; BORG 1941, p. 488, Taf. I, fig. 3-4.
Plumatella lucifuga (Vaucher), DE VRIES 1887.

Z II: Drentsche A near de Punt: on the stakes of the boathouse of the waterworks, (coll. A), (ML).

Z V: Rotterdam waterworks, Kil-waterworks at 's-Gravendeel, waterworks Lek en IJssel at Lekkerkerk (all in coll. A), (ML).

The fixed statoblasts are rare; they are found in the basal parts of the tendrils only and will rest on the substratum when the zoarium is torn off. Measurements: length 500 μ, breadth 380 μ. The free statoblasts are abundant; usually they are uniformly rounded oval in outline, more oval than in the figure by BORG (1941). Measurements: length 415-500 μ, breadth 230-265 μ.

Plumatella repens (L.).
Pl. XVI, fig. 3-4; BORG 1930, p. 116, fig. 149, 159-161.

DE VRIES 1887, MAITLAND 1897, POSTHUMA 1916, PEETERS 1919, DORSMAN 1919, HOFKER 1928.

Z II: waterpassage along Eelderwolderhooiweg, Drentsche A near De Punt, an old branch of the Beiler stroom near Lheebroek, old branches of the Dwingelo'sche stroom near the old lock.

Z III: a pond of the country-seat Stokhorst at Enschede, Buurser Beek, canal of the pumping-station Afsched.

Z IV: the river Waal at Nijmegen, Sonsbeek, Hurwenensche Kil near Zaltbommel, Lake of Abcoude, Gein and Holendrecht at Abcoude, in the river Vecht, Nieuwersluis, Spakenburg.

Z V: Geldersche Hoek in the province of Noord Holland, in the environs of Amsterdam, Ringvaart of the Haarlemmermeerpolder, a number of localities in the northern part of the province of Zuid Holland, Rotterdam waterworks.

Z VI: Nieuw Wiel overflow at Drunen. (ML, MA, Zoologisch Laboratorium Amsterdam, ROMIJN in archives, DE VOS in litt.). Specially on *Nymphea* leaves, also on floating beams, treebark, bricks. Occasionally this species occurs in brackish water also, but far less than the following. It lives under different conditions: Cl 1.5-261 mg/l. pH 7.3-7.8, H_2CO_3 0,034-0,183 o/oo.

Measurements of the fixed statoblasts: length 560-600 μ, breadth 430-515 μ; of the free statoblasts: length 350-380 μ, breadth 265-280 μ.

Plumatella fungosa (Pallas).

P. XVII, fig. 1; BORG 1930, p. 117, fig. 162-163.

BENNET EN VAN OLIVIER 1826, MAITLAND 1851 and 1897, DOCTERS VAN LEEUWEN 1912, POSTHUMA 1916, BLAAUW 1917, ROMIJN 1918, DORSMAN 1919, OTTO 1927, HOFKER 1928, OTTO EN WIELINGA 1933.

Z I: in brackish water in the environs of Harlingen, Harlingen-harbour (statoblasts), Langweerderwielen (statoblasts of this species?), pond of the Hortus Botanicus at Groningen, van Starkenborchkanaal near railway-bridge near Dorkwerd.

Z II: waterpassage along Eelderwolderhooiweg, Hijkermeer, Friesche Veen.

Z IV: fish-ponds at Emst, Sonsbeek, Beek near Nijmegen, Oosterbeek-oorsprong, Roodvoet near Rijswijk in the Betuwe, Culemborg, in the river Vecht (statoblasts).

Z V: canals and environs of Amsterdam, harbour Oude Zeug in the Wieringermeerpolder, a number of localities throughout the provinces of Zuid Holland and Noord Holland, Rotterdam-

waterworks, Lake of Rockanje, some localities on the island of Beierland, waterworks Lek en IJssel at Lekkerkerk,

Z VI: in the river Maas on breakwater opposite to Heyen, Bergen op Zoom, Melanen at Bergen, Stein in the province of Limburg.

(ML, MA, RVO, Zoologisch Laboratorium Amsterdam, ROMIJN in archives, DE VOS in litt.).

On waterplants, roots, immersed branches, stakes, tree-bark, on a ship's hull, on living *Unio pictorum* (L.), *Anodonta piscinalis* (Nilsson) and *Dreisena polymorpha* (Pallas) round their sipho where the molluscs cause a current of water and food is carried on, on *Balanus*.

This species can live very well in slightly brackish water. Some chemical conditions are known for this species: Cl 1.5-261 mg/l, pH 7-8, H_2CO_3 0.183-0.264 o/oo.

I have found the fixed statoblasts in the basal parts of the tendrils only; measurements: length 480-610 μ, breadth 365-500 μ. The free statoblasts of the material at my disposal show a peculiarity. In one case they are as small as those of *P. repens*. The measurements of these different statoblasts are given in a table.

statoblasts	small form	normal form
length:	320 μ	380-465 μ
breadth:	249 μ	233-330 μ

Plumatella fungosa is the most common fresh-water species in the Netherlands, contrary to the other countries of Europe where *Plumatella repens* is regarded as the most common.

Plumatella (Hyalinella) punctata Hancock.

BORG 1930, p. 119, fig. 164-166; MARCUS 1940, p. 374, fig. 216.

Z V: Kilwaterworks at 's-Gravendeel, waterworks Dubbeldam. (Always at the inlets of all waterworks here mentioned.) Oostkapelle (ditch along Kalfhoeksche weg, brackish water).

Free statoblasts were present in two dimensions in the same zoarium. The measurements of these different statoblasts are given:

	large form	small form
length:	431-464 μ	298 μ
breadth:	282-298 μ	232-249 μ

Lophopus cristallinus (Pallas).

BORG 1930, p. 120, fig. 167-169.

Z IV: Sonsbeek (HOFKER 1928).

Z V: Sorgvliet (TREMBLEY 1744).

Z VI: Haelensche beek (REDEKE 1932).

Cristatella mucedo Cuvier.

BORG 1930, p. 125, fig. 172-175.

MAITLAND 1897, BLAAUW 1912 and 1916, OTTO 1927 and 1930, HOFKER 1928.

Z I: Paterswoldsche meer.

Z II: waterpassage along Eelderwolderhooiweg, an old branch of the Beilerstroom at Lheebroek (statoblast).

Z III: Zwarte water at Hasselt, Enschede.

Z IV: Apeldoornsch kanaal (statoblast), Sonsbeek, Oosterbeek: brook before the waterfall, Betuwe, the river Rhine at Wageningen: many statoblasts washed on the bank underneath the Wageningsche berg (BEIJERINCK in litt.), Holendrecht at Abcoude, in the river Vecht (statoblasts), Loenerveensche plas, Loosdrechtsche plassen.

Z V: Diepsmeer in the province of Noord Holland, Vrijenhoef and Nieuwenbroek near Gouda.

Z VI: Doode Maas at Giesen, Wiel on the road west of Terheyden, Lunet before Kraayenstein at Vught, Zuid Willemsvaart, Maas above Nierskanaal. In all the localities in Z VI only statoblasts.

(ML, Zoologisch Laboratorium Leiden and Amsterdam, ROMIJN in archives, DE VOS in litt.).

On water-plants, bricks, immersed branches, stakes. Cl 180 mg/l.

Measurements of statoblasts in diameter: 710-780 μ, the marginal spines on the dorsal side are long 150 μ; they are on the ventral side mostly long 130 μ, they may reach 180 μ.

The fresh-water Bryozoa occur almost throughout the whole country; if their occurrence in some parts has not yet been stated, it is due to our insufficient knowledge in the first place. They live in clear, deep water, only by way of exception in small ponds or pools. In regions where brackish water is found Phylactolaemata occur far less or not at all; here *Electra crustulenta* predominates. I figure the statoblasts of 5 species by means of photomicrographs of my own, enlarged 120×. BORG (1941) represents photomicrographs of the statoblasts of *Plumatella fruticosa* and *Plumatella*

emarginata. I do not know others from literature. I figure the free statoblast of *Plumatella emarginata* with the oval form which is the most common in this country as far as known.

APPENDIX

After this article has been written a paper by BLOKLANDER EN LEENHOUTS (1948) has appeared. They record a number of species of which 11 are new for the Dutch fauna, the total number of species now known from the Netherlands bringing up to 90. The new species are: *Filicrisia geniculata* (M. Edwards), *Beania mirabilis* Johnston, *Caberea boryi* Audouin, *Membranipora (Callopora) dumerilii* (Audouin), *Scrupocellaria scrupea* Busk, *Haplopoma impressum* (Audouin), *Escharella variolosa* Johnston, *Rhynchozoon (Rhynchopora) bispinosum* Johnston, *Stephanosella biaperta* (Michelin), *Discopora (Umbonula) littoralis* Hastings, *Porella concinna* (Busk).

All species have been found on floating substratum.

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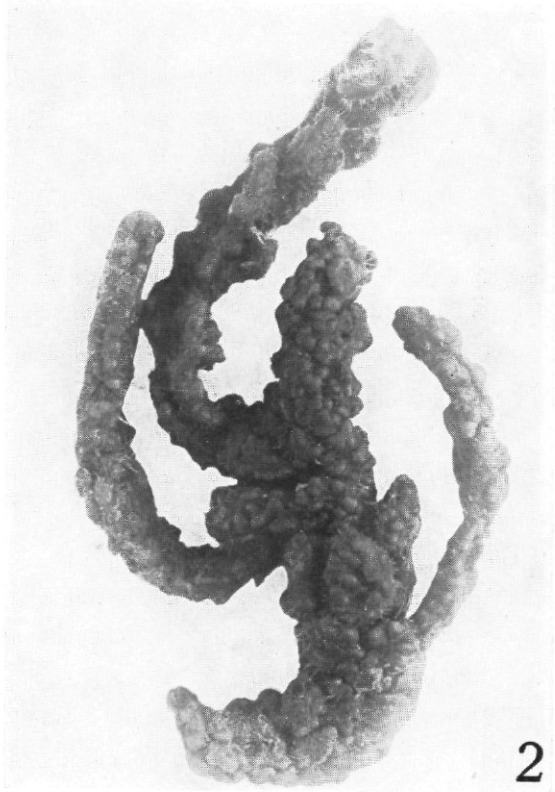
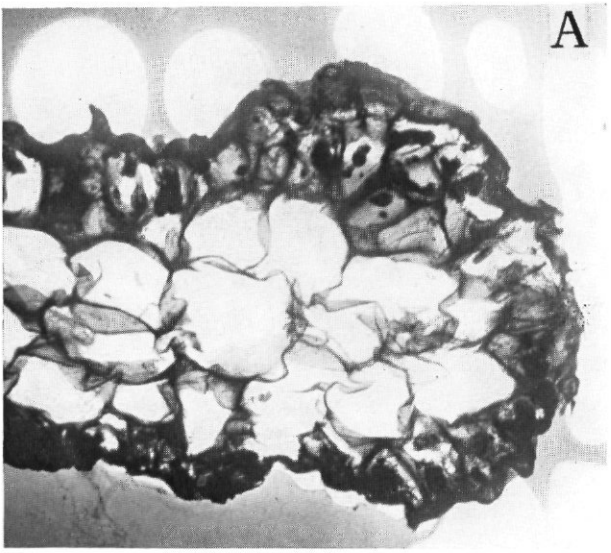
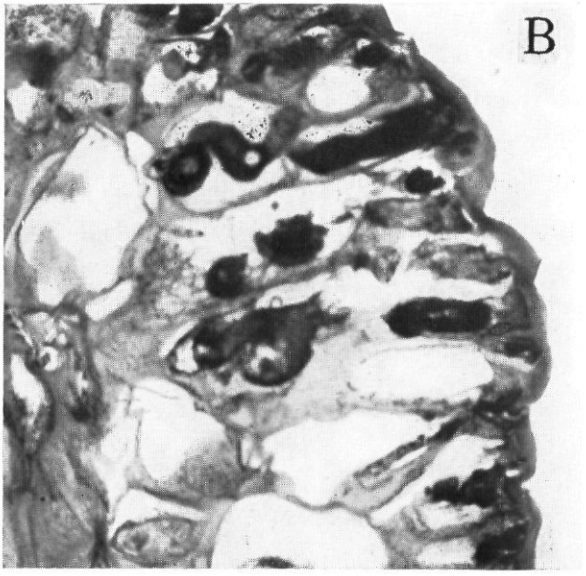
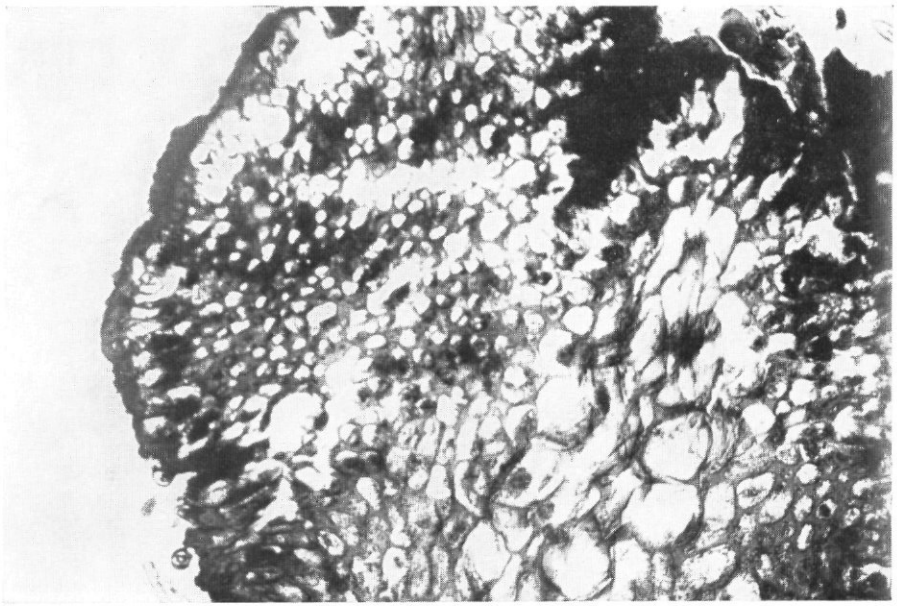


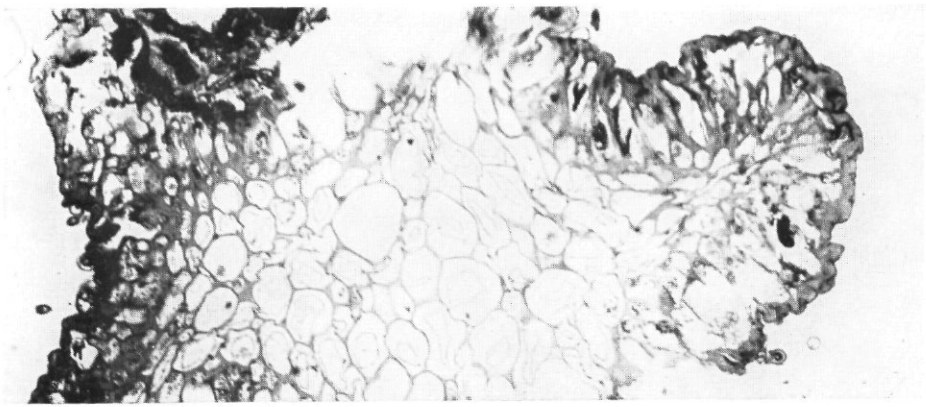
Fig. 1. Foreign bodies in the septa of *Alcyonidium gelatinosum* (L.), which cause a brownish-violet colour of the zoarium.
(Parasitic Protozoa or Algae?).
Fig. 2. *Alcyonidium proliferans* sp. nov., the type-zoarium.





Microscopical sections of the stem of:
A *Alcyonidium gelatinosum* (L.);
B *Alcyonidium hirsutum* (Fleming).





Microscopical sections of the stem of *Alcyonidium proliferans* sp. nov.

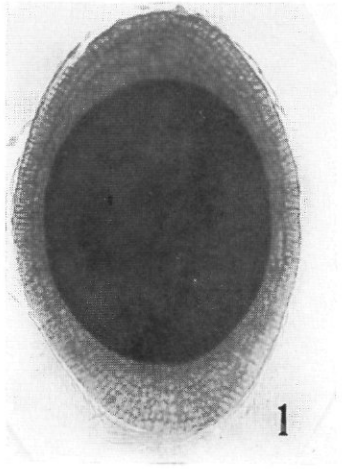


Fig. 1. Free statoblast of *Plumatella fungosa* (Pallas).

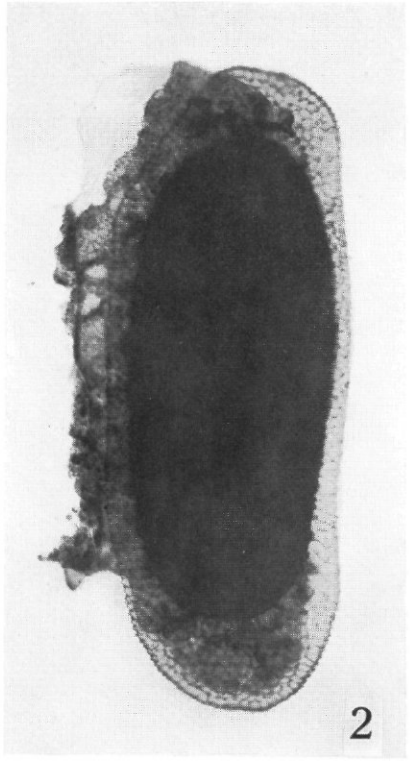


Fig. 2. Fixed statoblast of *Plumatella fruticosa* (Allman).

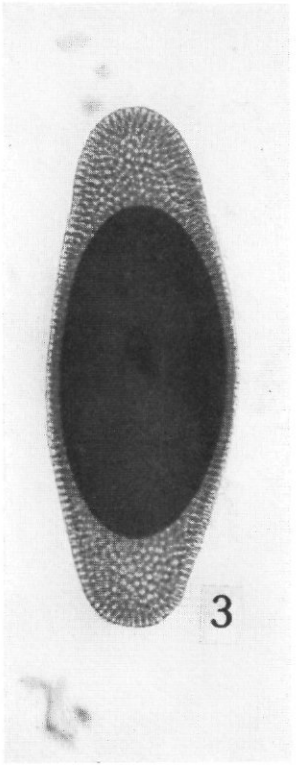
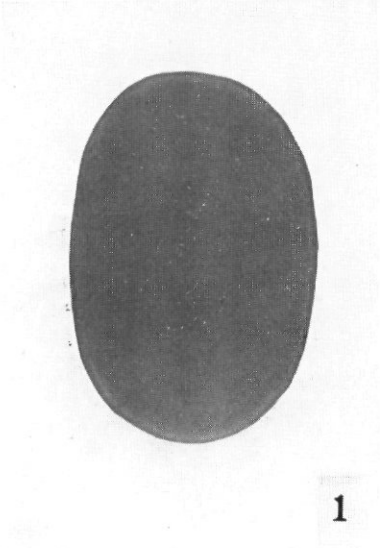
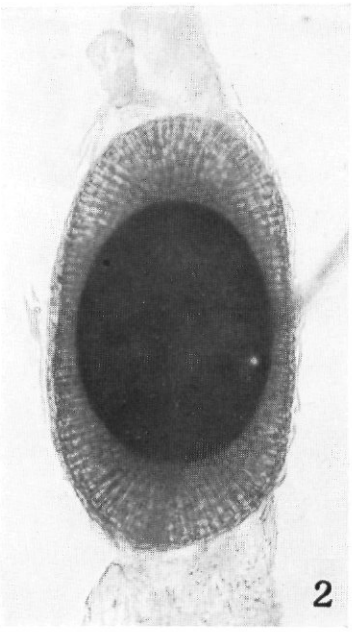
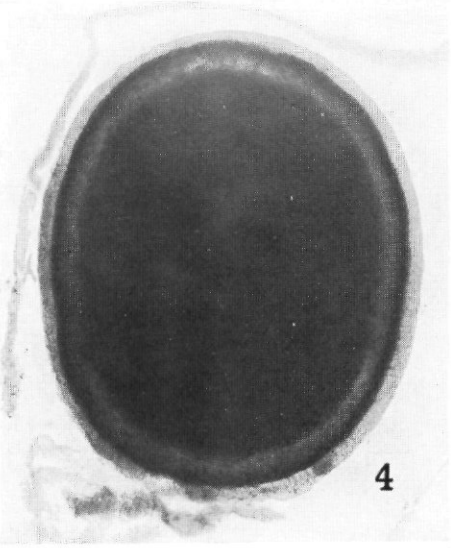


Fig. 3. Free statoblast of *Plumatella fruticosa* (Allman).







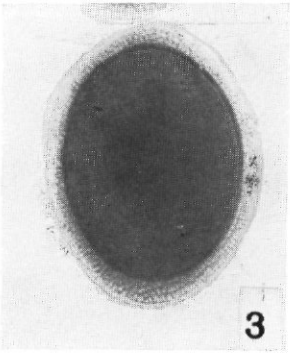


Fig. 1. Statoblast of *Fredericella sultana* (Blumenbach);
Fig. 2. Free statoblast of *Plumatella emarginata* Allman;
Fig. 3. Free statoblast of *Plumatella repens* (L.);
Fig. 4. Fixed statoblast of *Plumatella repens* (L.).

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