BRYOZOA FROM LAKE TITICACA

by **Eveline du Bois-Reymond Marcus**

(with 4 plates)

The Percy Sladen Trust Expedition to Lake Titicaca in 1937 collected an ample material of Bryozoa, that were entrusted to my husband and me for classification. Leaving aside the samples that could not be determined with certainty, because they did not contain any statoblasts, I can report two species from three localities :

From Capachica (for maps, see Gilson 1939), collected on july 30, august 6, and september 15 in shallow water of a slow stream, just below the village of Capachica (altitude : 3840 m.), from big sandstone boulders and under stones clear of the bottom, many colonies of *Fredericella australiensis browni* Rogick (Fig. 1-15). Among the accompanying fauna I noted *Chætogaster spongillæ* Annandale. This is an addition to Cernosvitov's account of the Oligochæta from Lake Titicaca. *Chætogaster spongillæ* was previously reported from South America by Marcus (1943, p. 16) as occurring in the southern part of the State of São Paulo (river Ribeira de Iguape), where it was found in *Ephydatia crateriformis arndti* Paiva Carvalho.

Fredericella australiensis browni Rog. was also present in a sample from the lake Lagunilla Saracocha (Gilson 1939, map 4) in an altitude of 4100 m. The material was taken on september 4 under stones in 0-0,2 m. depth.

A number of tubes from Lagunilla Lagunilla (4150 m.) contained *Fredericella australiensis browni* Rog. together with algae (*Cladophora* and *Chara*) and sponges, and numerous colonies and fragments of the new subspecies *Stolella agilis tica* (Fig. 16-26). The samples were collected on september 3 at depths from 12 to 42 m. Many zoaria of *Stolella agilis tica* are growing on Hydrobiinæ, probably of the genus *Littoridina* (*Heleobia*) that Pilsbry (1925) recorded from Lake Titicaca. There were also two Turbellaria of the genus *Macrostomum* that could not be determined because one was young and the other mature one damaged. *Macrostomum* is not represented in the Titicaca collection of Turbellaria (Beauchamp 1939).

Fredericella australiensis browni Rogick (Fig. 1-15)

Fredericella australiensis var. *browni* Rogick 1945, p. 215-228 t. 1-2

The ample material of the present Fredericellidæ contains colonies of very different ages and aspect. They resemble the various growing types that occur in the Plumatellidæ. The young creeping branches on stems of rushes (*Scirpus tatora* Kunth.) agree with Mary Dora Rogick's fig. 2 of *F.*

australiensis var. *browni*. Some of them have longer erect tips (Fig. 4). Several colonies are free shoots with scarce branches (Fig. 3), entangled with algae and *Stolella agilis tica*. Others that are detached from their substratum (Fig. 1) liken *Plumatella emarginata* Allm. (Kraepelin 1887, f. 108). A number of older colonies are preserved on the stones where they had grown. The greatest diameter of these patches is 4 cm. In the center there are black sessoblasts from a preceding growth period and very crowded rows of polypides (Fig. 2). The greater part of the latter is erect, so that a coralloid growth results.

The degree of incrustation varies. Sometimes the ectocyst is quite transparent, f. ex. in some of the free shoots (Fig. 3). Others of these are dark brown, almost black. The creeping colonies on the stones are incrusted with light debris and are grayish brown. In the detached colonies the adherent parts are transparent, the erect portions incrusted (Fig. 4). This apparently strange phenomenon is due to the mode of growth of the colonies. When the adherent peripheric branches shoot out, they are nourished by the older polypides of the colony, and their chitinous ectocyst hardens, before the young zooecia feed for themselves and produce the debris that might incrust the ectocyst. On the erect zooecial tubes growth continues while the polypide feeds and egests, so that its dejected particles stick to the soft chitin of the new grown part of the tube.

The presence (Fig. 5) or absence of a keel varies. Some tubes are distinctly triangular in cross-section, others elliptical. The original description of *Fredericella australiensis* Goddard with the contradictory statements (1909, p. 490) : "tubes not cylindrical . . . not keeled. Stems roughly triangular" evidences perhaps the same variation. The diameter of the zooecial tubes ranges from 0,315 to 0,5 mm., with an average of 0,45 mm., and up to 0,7 mm. near branchings. In slides of *Fredericella sultana* (Blbch.) from England that I owe to our old friend, the late HARRY EDWARD HURRELL, F. R. M. S., Great Yarmouth, these measurements are 0,24-0,40 mm., with an average of 0,35 mm., and up to 0,52 mm. near branchings. The distance from one zooecial orifice to the next in straight creepers is 2-4 mm. and more, according to the age and type of growth. In *F. sultana* this distance may attain 30 mm. (Wesenberg-Lund 1897, p. 263).

There are no dissepiments or septa at the beginnings of the branches. This absence is characteristic for *Fredericella australiensis* (Rogick 1945, p. 217). All my slides of *Fredericella sultana* show them.

The polypides vary widely in length. They are all retracted. Generally the biggest polypide in the branch attains 1,5-2,3 mm. in length. The tentacles are 0,475-0,875 mm. long, that are 30-41,5% of the total length of the polypide. In the slenderest colony (Fig. 3) the measurements are : polypide 3,6 mm., tentacles 1 mm., that are 27,7% of the length.

I compared these data with total mounts of *Fredericella sultana* from the river Yare. This material is in the same phase of development with masses of sperm on the funiculi. The length of the polypides is the same, though their diameter is smaller in *F. sultana*, 0,085-0,180 mm., against 0,13-0,24 mm. in *F. australiensis browni*.

As mentioned, the tentacles were only seen in retracted stage, except one quite young crown, that was torn off. My measurements refer to the bundle in the tentacular sheath, where the points are often curled, so that the data for extended, living crowns are certainly bigger.

The number of tentacles ranges from 24 to 27, and is 26 in 12 of the 20 counted polypides. The young tentacular crown (Fig. 15) is horseshoe--shaped as always in young *Fredericella* (Dumortier & Van Beneden 1850, p. 59, 62 ; Marcus 1926, f. 4). In the sectioned polypides the lophophore folded in the tentacular sheath is also horseshoe-shaped, so that one cannot infer the form of the expanded crown.

The statoblasts are numerous (Fig. 6). Floatoblasts are absent, as is characteristic for the family Fredericellidæ. The statoblasts have no annulus (Fig. 10), so that they would be classified as sessoblasts (Rogick 1943, p. 172). However only part of them is fixed to the substratum or to the endocyst by means of an adhesive apparatus (Fig. 14). The latter was described and figured by Kraepelin (1887, p. 101), Rogick (1945, p. 227 f. 8, 9, CH), and Toriumi (1951, f. 3 H-J, f. 6 A-C, a). A greater number of the statoblasts is free in the zooecial tube. They fall into the water if the colony is torn or dissected. I call this type of statoblasts, that do not float and are not sessile, piptoblasts. Shape and structure of sessoblasts and piptoblasts are nearly equal in *Fredericella australiensis browni* from Lake Titicaca ; only the former are a little smaller. I have measured a total of 52 statoblasts. In the sessoblasts (Fig. 9) the maximum length is 0,38 mm., the minimum 0,32 mm., the average 0,358 mm. ; the maximum width is 0,32 mm., the minimum 0,28 mm., the average 0,298 mm.

The length of the piptoblasts (Fig. 8) is maximum 0,42 mm., minimum 0,34 mm., average 0,385 mm. ; their width maximum is 0,37 mm., minimum 0,25 mm., average 0,325 mm.

The proportion of length to width varies in sessoblasts from 1:1 to 1,32:1, with an average of 1,2:1 ; in piptoblasts it is from 1,1:1 to 1,5:1, and the average proportion is 1,18:1.

The measurements of piptoblasts of the present material agree completely with those of the sessoblasts of *Fredericella australiensis browni* from Wyoming (Rogick 1945, p. 225).

The surface of the valves is perfectly smooth after treatment with caustic potassium (Fig. 11). A reticulate structure like that of the old sessoblasts (Rogick 1945, p. 223 t. 2 f. 12, 13) was only seen in some statoblasts that were studied in glycerine without previous treatment. In many young piptoblasts freed from the tubes (Fig. 13) there were small, more or less hexagonal pits, that are vestiges of the formative cells of the capsule (du Bois-Reymond Marcus 1946, p. 3 t. 2 f. 9, f). The upper or dorsal, slightly concave valve (Fig. 12) often shows the concentric ridges of Rogick's figure 5 (1945, t. 2). On the lower, convex valve, that is the fixed half of the sessoblasts, there are only feeble traces of the attaching chitinous patches, even in old black sessoblasts that were scraped off from the stone. Also in the sessoblasts of *Fredericella sultana* the attaching structures may be feeble or absent (Toriumi 1951, p. 175). Sections of sessoblasts in the zooecial tube (Fig. 14) stained after Mallory reveal, that the adhesive apparatus is produced by the endocyst, as it stains blue like the ectocyst and not red like the chitinous capsule of the sessoblast.

The statoblast capsule is 17-22 micra thick, that is equal to the thickness of 19 micra in *Fredericella sultana crenulata* (du Bois-Reymond Marcus 1946, p. 3). This measurement does not envolve a disjunctive character against typical *F. sultana*. Previous to Toriumi's figure 6 (1951) no exact indication or illustration for ripe statoblasts of *F. sultana* was available. However, Toriumi's sections of japanese and north american *sultana* show, that also the sessoblasts of this species have a similar thick chitinous capsule.

Apart from the different proportions (Fig. 7) a slight specific difference between the statoblasts of *F. sultana* and *F. australiensis browni* consists in the development of the border of the statoblasts. This border is even in *F. australiensis browni* from Wyoming (Rogick 1945, f. 8) and from Lake Titicaca (Fig. 10), while it is drawn out and forms a transparent ring in *F. sultana* (Allman 1856, t. 9 f. 4 ; Annandale 1911, p. 208 : "surrounded by a chitinous ring devoid of air spaces" ; Borg 1930, f. 153 ; Toriumi 1951, f. 6).

Discussion of Fredericella australiensis browni Rogick

Absence of dissepiments in the tubes, larger diameter of the latter, greater number of tentacles, and broader sessoblasts distinguish *F. australiensis* from *F. sultana*. The adult expanded tentacular crown of the former is elliptical, while it is nearly circular in the latter. Perhaps also the piptoblasts are peculiar to *australiensis*, at least I have not found any record of them in typical *sultana*. The material from the central Sahara with "statoblastes libres dans le canal du cystide" (Borg 1936, p. 274) has been considered in part as belonging to *australiensis* (Rogick 1945, p. 219-222). True piptoblasts are the statoblasts that lie free in the cystidial tubes of *Fredericella sultana crenulata* du Bois-Reymond Marcus (1946) from hills (1750 m.) in southern middle Brazil. This form is evidently intermediate between typical *sultana* and *australiensis*.

Distribution of Fredericella australiensis Godd.

The finding in Lake Titicaca shows, that *F. australiensis* occurs also in the one continent, from which it was not mentioned yet (Rogick 1945, p. 225-226). The other localities are : Australia, New South Wales (Goddard 1909 : *australiensis australiensis*) ; Russia, Tiflis District (Abricossoff 1927 ; 1927a : *australiensis transcaucasica*) ; Central Sahara (Borg 1936, partly : *australiensis browni*) ; North America, Wyoming (Rogick 1945 : *australiensis browni*).

Fredericella sultana f. *major* Borg (1936, p. 275) from mountains in northern Sweden may belong to *australiensis* (Rogick 1945, p. 222), but is not sufficiently characterized for a definitive statement. In his later paper on swedish Freshwater Bryozoa (1941) Borg (p. 484-485) did not mention this form.

Stolella agilis tica, subspec. nov. (Fig. 16-26)

The present material consists of numerous colonies and branches growing on masses of algae and *Fredericella* without a solid substratum, except some branches of *Elodea* and a number of small, slender snails (Hydrobiinæ), on which the Bryozoa fix themselves with their adhesive pads.

The clumsy, whitish-hyaline zoaria adhere to the fine threads of algae (Fig. 16) or pass with a thin pseudostolon from one substratum to another. Their growth resembles that of typical *Stolella agilis* Marcus (1942, t. 2 f. 4, 7). The size of the zooecial tubes agrees better with *agilis iheringi* (ibid., p. 84). The groups of polypides are separated from the successive groups by septa (Fig. 18), behind which the zooecial tube is often slenderized (Fig. 19). The number of polypides between two septa is generally one to three ; in the growing shoots there are more, because the septa develop later than the polypides. The types of branching, straight or curved or angular (Rogick 1943, p. 167 t. 1 f. 1-8) are not clearly recognizable, due to the preservation of the entangled colonies. Generally the point of origin of new groups from the older lies in the prolongation of the growth direction (Fig. 21), but branches arise on the sides or even on the anterior surface of a zooecial tube near its tip (Fig. 20). Frequently an entire group is quite free from the substratum (Fig. 18). Such groups probably move about in search of a new hold and then tear off and begin a new colony (Fig. 16) like *Stolella agilis agilis* (l. c., p. 74 t. 2 f. 4 C).

The zooecial tubes are smooth and rounded, not keeled. Their diameter attains up to 0,6-0,8 mm. (0,4-0,5 in *agilis agilis* ; 0,4-0,6 in *agilis iheringi*). The zooecia vary considerably in length (Fig. 18, 19). They can begin behind a septum with a narrow pseudostolon of 10 mm. length and more (Fig. 20), or be quite short and wide. I presume that they are even able to change from one form to the other, if the nature of their substratum permits it.

The soft ectocyst is transparent and thin, 20-60 micra in diameter, in older colonies it is yellowish or incrusted. In *agilis agilis* the diameter is 50-80 micra, in *agilis iheringi* 20-30 micra. In sections the ectocyst shows two layers, a thinner outer with particles of dirt and diatoms, and a thicker inner that is homogeneous. A circular inward fold forms the septum between one group of zooecia and the next, or closes a gap originated by the tearing off of a pseudostolon. As long as the parts are continuous, a strand of endocyst passes through the circular hole (Fig. 18) in the middle of the septum (Rogick 1943, f. 16).

The distribution of incrusting particles in the ectocyst is like Rogick (l. c., p. 169 f. 9, 14) described and figured it for *Stolella indica* Annand. The particles form lines and bands circularly around the zooecial tip, diagonally downward from the dorsal region and parallel to the length of the tube (Fig. 17).

The endocyst is very flat in most parts of the zoarium. Only in the tips of the branches it is thicker (20-28 micra), especially on the underside where it forms the adhesive pad (Marcus 1942, p. 78 t. 2 f. 7). The epithelial elements are indifferent and vacuolized cells (Fig. 22, i, v). The latter form the sticky ectocyst in the adhesive pads, where they stain intensely blue with azocarmin (Mallory). As far as they are present on other regions of the body, their contents do not stain. The granulated cells that are characteristic of *Stolella agilis iheringi* and *St. evelinæ* Marcus (1941, p. 106 t. 14 f. 61) are wanting in the present form like in *agilis agilis*.

The zooecial vestibulum, that was studied in sections to see whether it shows the vestibular pore, differs from that in *agilis agilis* and *agilis iheringi* by an extremely high cylindrical epithelium (Fig. 22). The height of the cells is 8-20 micra in *agilis agilis*, 20-40 micra in *agilis iheringi* and 20-70 micra in *agilis tica*.

A vestibular pore (Marcus 1941, p. 101 f. 58-60, 63, 66 ; 1942, p. 75 t. 2 f. 5, t. 4 ; Wiebach 1952) is present (Fig. 22, p). It lies at the bottom of the vestibulum nearer to the diaphragm (d) than to the orifice (o).

The length of the polypides agrees with that of *agilis iheringi* compared in total mounts. In *agilis agilis* the preserved, retracted polypides, the biggest of a group, are 2-2,3 mm. long, in *agilis iheringi* 2-2,8 mm., and in *agilis tica* 2-3 mm. The number of tentacles cannot be determined with security in the sections (Rogick 1943, p. 170), as the arms of the lophophore are folded upwards, so that in basal sections of the tentacular crown not all the bases of the tentacles are attained. A little farther ectally appear the tips of the tentacles that are tucked into the sheath, so that the number of sectioned tentacles is increased. The approximate count of 15 polypides revealed 28-43 tentacles, with an average of 35, that is a little less than *agilis iheringi* with 35-45, and *agilis agilis* with 40-50, average 45. The length of the tentacles cannot be indicated by the same reasons as their number. The length of the retracted tentacular crown is 0,6-0,9 mm., and the expanded tentacles are certainly longer.

There are masses of male gonocytes on the funiculi, and big ovaries in the budding zone, but no embryos were seen in the stained and clarified or sectioned branches.

The colonies do not contain many statoblasts and not any sessoblasts. The floatoblasts (Fig. 23-26) are rather similar to those of *agilis iheringi*, however they are not straight in lateral view (Fig. 26) as the latter and those of *Stolella indica*, *St. evelinæ*, and *St. agilis agilis*. Their tips are bent to the dorsal face, as f. ex. in the floatoblasts of *Hyalinella carvalhoi* Marcus (1942, f. 46 B) and in many others.

The measurements of 19 floatoblasts of *Stolella agilis tica* are in micra ; length 440-640, average 567 (average *agilis agilis* 405 ; *agilis iheringi* 492) : width 290-390, average 339 (average *agilis agilis* 236 ; *agilis iheringi* 278) ; proportion 1,5:1-2,0:1, average 1,68:1 (average *agilis agilis* 1,71:1 ; *agilis iheringi* 1,75:1).

Discussion of Stolella agilis tica, subspec. nov.

The aspect and growth of the colonies from Lake Titicaca are similar to *agilis agilis*, but the measurements are nearer to *agilis iheringi*. The differences between the latter and *tica* were mentioned in the preceding description, they refer chiefly to the size and shape of the floatoblasts, the elements of the endocyst, and the epithelium of the vestibulum.

The young colonies from Lake Titicaca, that Beauchamp (1939, p. 51) reared from statoblasts and found likening *Plumatella repens* (L.), may well have been *Stolella agilis tica*.

Distribution of Stolella agilis Marc.

The species is only known from South America, where *agilis agilis* was found in southern and middle, *iheringi* in northeastern Brazil.

REFERENCES

Abricossoff, G. 1927, Ueber die Süsswasser-Bryozoen der USSR. Compt. Rend. Acad. Sci. URSS 1927, p. 307-312. Leningrad. **1927a,** To the knowledge of the fauna of the Bryozoa of the Caucasus. Russ. Hydrobiol. Zeitschr. v. 6 no. 3-5, p. 84-92. Saratow. **Allman, G. J. 1856,** A Monograph of the Fresh-Water Polyzoa, etc. Printed for the Ray Society. VIII + 119 p. 11 t. London. **Annandale, N. 1911,** The Fauna of British India, etc. Freshwater Sponges, Hydroids and Polyzoa. Part III, Freshwater Polyzoa : p. 161-238, 240, 245-247 t. 3-5. London (Calcutta, Bombay, Berlin). **Beauchamp, P. de 1939,** Rotifères et Turbellariés. Transact. Linn. Soc. London Ser. 3 v. 1 part 1, p. 51-79 t. 4. London. **du Bois-Reymond Marcus, E. 1946,** On a new Brazilian form of Fredericella sultana, etc. Com. Zool. Mus. Hist. Nat. Montevideo v. 2 no. 31, p. 1-10 t. 1-2. Montevideo. **Borg, F. 1930,** Moostierchen oder Bryozoen (Ectoprocten). F. Dahl, Tierwelt Deutschlands part 17, p. 25-142. Jena (G. Fischer). **1936,** Sur quelques Bryozoaires d'eau douce Nord-Africains. Bull. Soc. Hist. Nat. Afrique du Nord v. 27 no. 7, p. 271-283 t. 17. Alger. **1941,** Ueber die Süsswasserbryozoen Schwedens. Zool. Bidr. Uppsala v. 20, p. 479-494 t. 1-2. Uppsala. **Cernosvitov, L. 1939,** Oligochaeta. Percy Sladen Trust Exp. Lake Titicaca. Tr. Linn. Soc. London Ser. 3 v. 1 pt. 1, p. 81-116. London. **Dumortier, B.-C. & Van Beneden, P.-J. 1850,** Histoire Naturelle des Polypes composés d'eau douce ou des Bryozoaires fluviatiles. 130 p. 6 t. Bruxelles. **Gilson, H. C. 1939,** The Percy Sladen Trust Expedition to Lake Titicaca in 1937. I. Description of the Expedition. Tr. Linn. Soc. London Ser. 3 v. 1 pt. 1, p. 1-20 t. 1-3, 4 maps. London. **Goddard, E. J. 1909,** Australian fresh-water Polyzoa, part 1. Proc. Linn. Soc. N. S. Wales v. 34 (1909-1910) part 3 (1909), p. 487-496 t. 47. Sydney. **Kraepelin, K. 1887,** Die deutschen Süsswasser-Bryozoen. I. Anatom. - system. Teil. Abhandl. aus d. Gebiet d. Naturwiss., herausgeg. v. Naturwiss. Ver. v. 10, p. 1-168 t. 1-7. Hamburg. **Marcus, E. 1926,** Beobachtungen und Versuche an lebenden Süsswasserbryozoen. Zool. Jahrb. Syst. v. 52, p. 279-350 t. 6. Jena. **1941,** Sôbre Bryozoa do Brasil. Bol. Fac. Fil. Ci. Letr. Univ. S. Paulo, Zool. no. 5, p. 3-208 t. 1-18. S. Paulo. **1942,** Sôbre Bryozoa do Brasil II. Ibid. Zool. no. 6, p. 57-106 t. 1-5. S. Paulo. **1943,** Sobre Naididae do Brasil. Ibid. Zool. no. 7, p. 3-247 t. 1-33. São Paulo. **Pilsbry, H. A. 1925,** Mollusks of Lake Titicaca. Proc. Ac. Nat. Sci. Philadelphia v. 76 (1924), p. 49-54 t. 4. Philadelphia, Pa. **Rogick, M. D. 1943,** Studies on Fresh-Water Bryozoa. XIV. The Occurrence of Stolella indica in North America. Ann. New York Ac. Sci. v. 45 no. 4, p. 163-178 t. 1- 3. New York. **1945,** Studies on Fresh-Water Bryozoa. XVI. Fredericella australiensis var. browni, n. var. Biol. Bull. v. 89 no. 3, p. 215-228 t. 1-2. Woods Hole, Mass. **Toriumi, M. 1951,** Taxonomical Study on Fresh-Water Bryozoa I. Fredericella sultana (Blumenbach). Sci. Rep. Tôhoku Univ. Ser. 4 Biol. v. 19 no. 2, p. 167-177. Sendai. **Wiebach, F. 1952,** Ueber den Ausstoss von Flottoblasten bei Plumatella fruticosa (Allman). Zool. Anz. v. 149, p. 181-185. Leipzig.

PLATE 1

Fredericella australiensis browni Rogick

Fig. 1 — Part of a heavily incrusted colony grown among algae.

Fig. 2 — Center of old colony growing on stone.

Fig. 3 — Transparent branch grown among algae and *Stolella.*

Fig. 4 — Detached branch with erect zooecia.

Fig. 5 — Detached branch with distinct keel.

Fig. 6 — Clarified part of colony with piptoblasts.

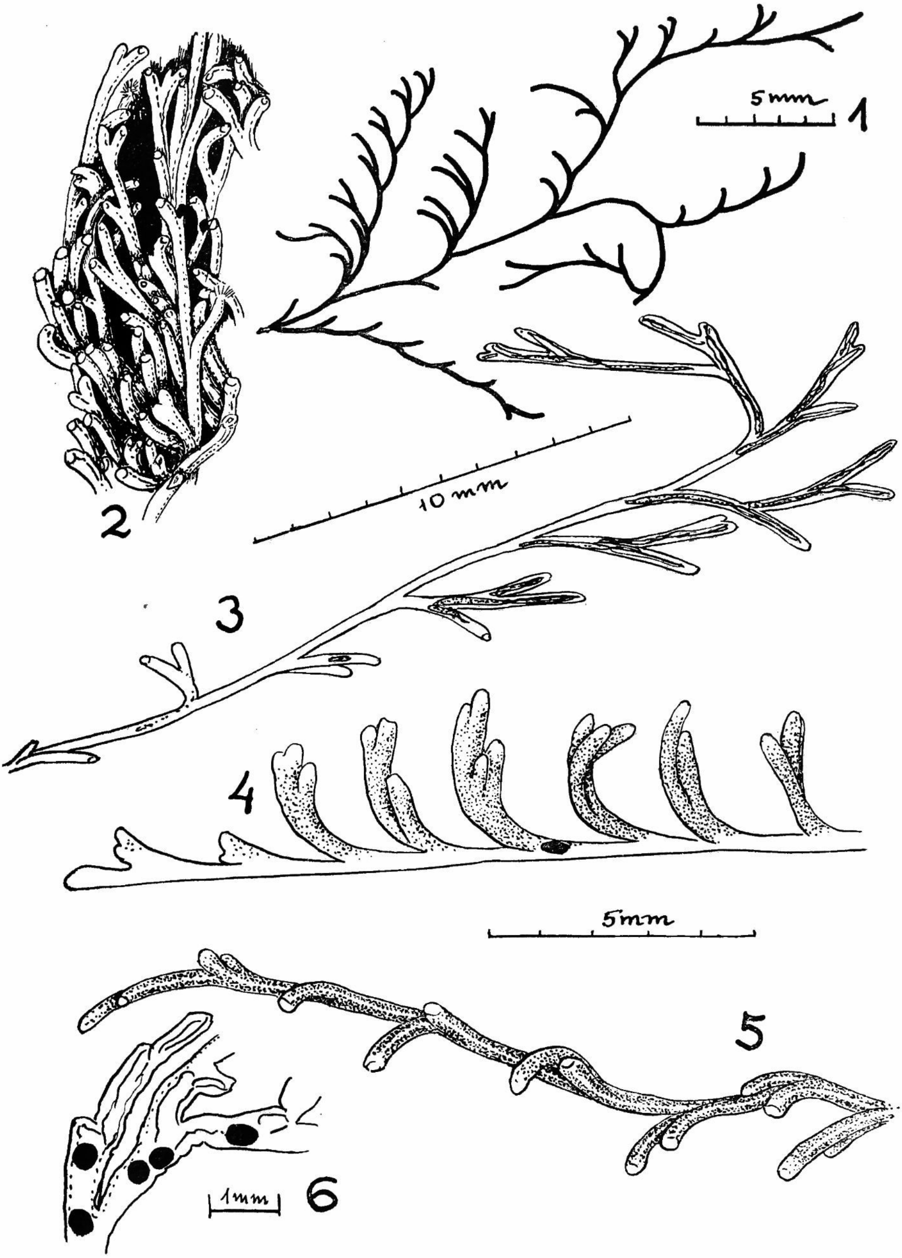
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PLATE 2

Fredericella australiensis browni Rogick

Fig. 7 — Camera lucida drawing of piptoblasts and sessoblasts treated with KOH.

Fig. 8 — Same of piptoblasts only.

Fig. 9 — Same of sessoblasts only.

Fig. 10 — Side view of piptoblast.

Fig. 11 — Side view of piptoblast treated with KOH.

Fig. 12 — Upper valve of piptoblast treated with KOH.

Fig. 13 — Lower valve of piptoblast treated with KOH.

Fig. 14 — Section of sessoblast.

Fig. 15 — Tentacular crown of young polypide.

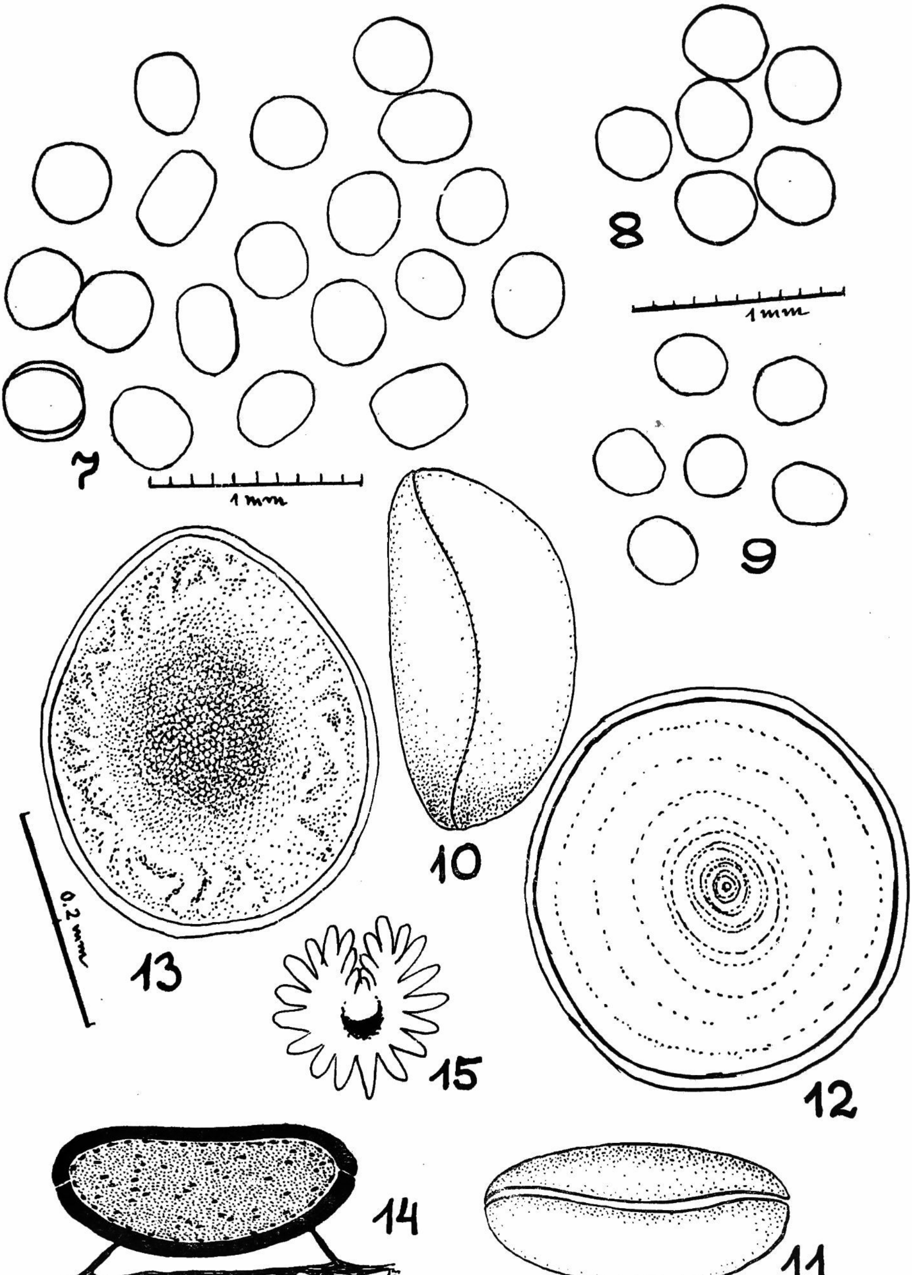
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PLATE 3

Stolella agilis tica, subspec. nov.

Fig. 16 — Recently isolated fragment of colony (S) on alga (A) with ***Fredericella*** **(F)**.

Fig. 17 — Creeping branch showing lines of encrusting particles.

Fig. 18 — Stout budding region with septa (s).

Fig. 19 — Stretched budding region.

Fig. 20 — Long pseudostolons with 3 floatoblasts in zooecial tube, the latter beset with peritrichous Ciliata.

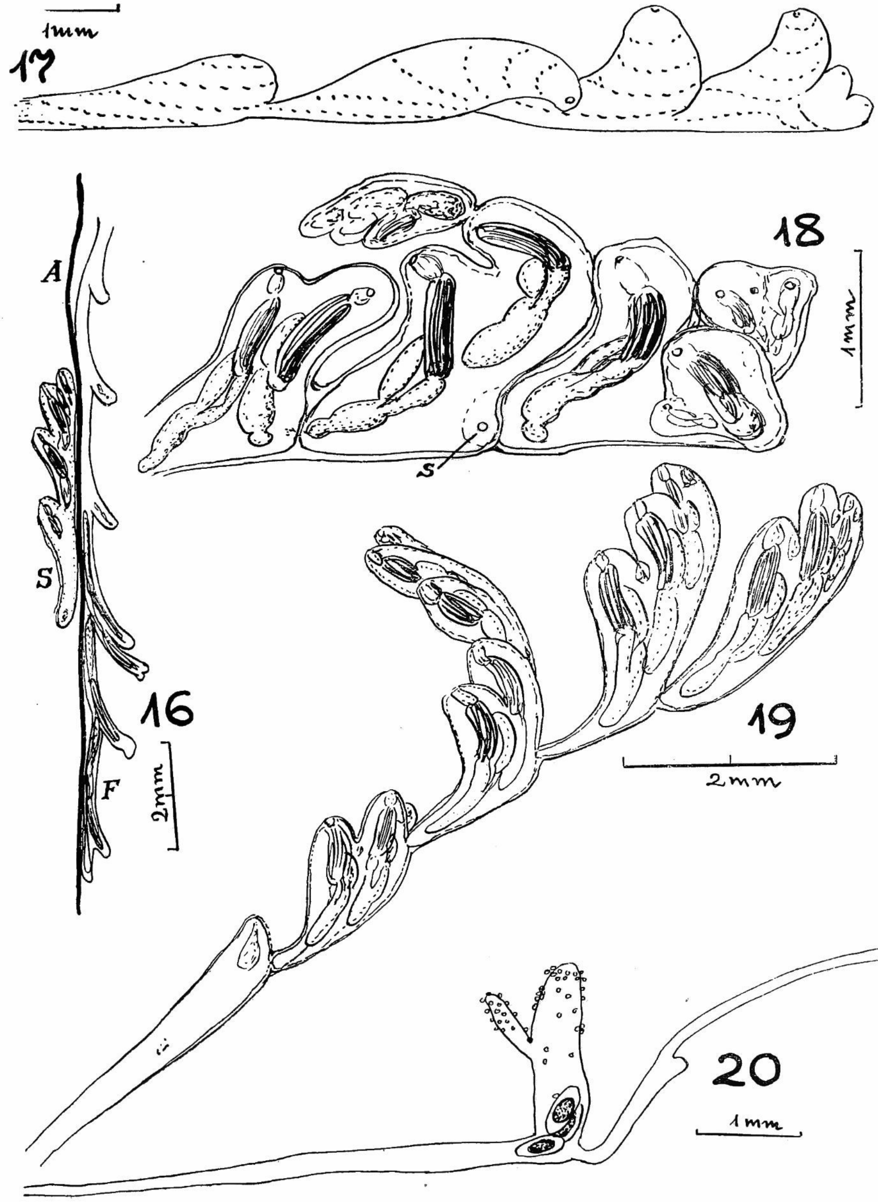
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PLATE 4

Stolella agilis tica, subspec. nov.

Fig. 21 — Colony growing on leaf of *Elodea* (E).

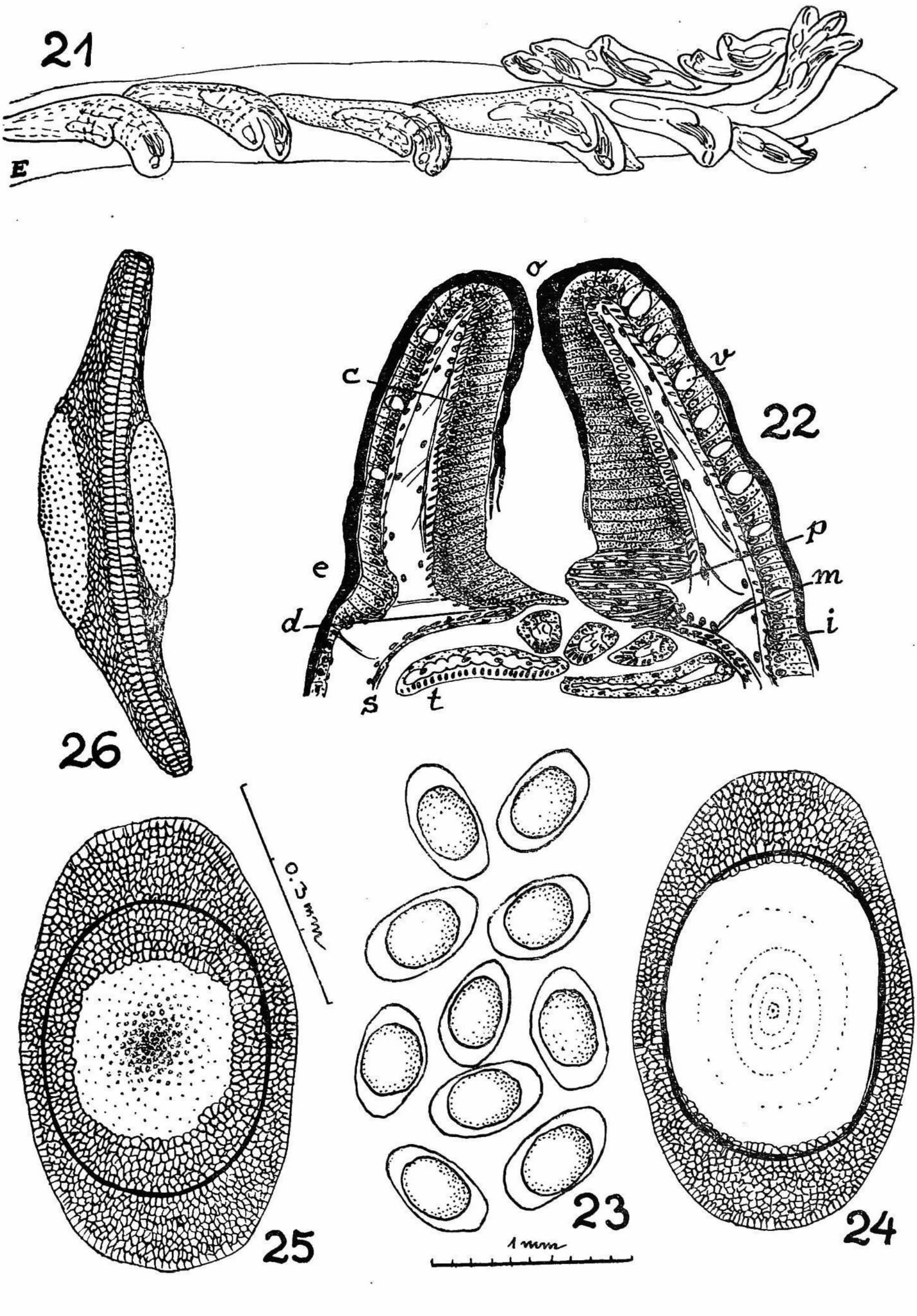
Fig. 22 — Section through vestibulum. c — circular muscles. d — diaphragm. e — ectocyst. i — indifferent cells of endocyst. m — parietal muscle. o — orifice. p — vestibular pore. s — tentacular sheath. t — tentacle. v — vacuolized cell.

Fig. 23 — Camera lucida drawing of floatoblasts treated with KOH.

Fig. 24 — Camera lucida drawing of upper face of floatoblast treated with KOH.

Fig. 25 — Camera lucida drawing of lower face of floatoblast treated with KOH.

Fig. 26 — Lateral view of floatoblast.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