

NEW MARINE ALGAE FROM BRAZIL

A. B. Joly (1), M. Cordeiro - Marino (2), Y. Ugadim (1),
N. Yamaguishi - Tomita (2) and F. C. Pinheiro (3)

1 — INTRODUCTION

As a result of extensive collections of marine algae made along the Brazilian shores with the purpose of collecting representative specimens of all genera in order to prepare illustrations for a planned publication we came across very interesting plants that are believed to be new to Science and are described herein.

Among these novelties two are outstanding because they represent the first finding of species belonging to genera until now unreported along the shores of the American Atlantic. Another species herein described belong to a genus where the last novelty was described long ago.

The plants were collected near Fortaleza, Ceará State (Lat. S 3° 46' Long. W 38° 33'), at Maceió, Alagoas State (Lat. S 9° 40' Long. W 35° 42'), Salvador, Bahia State (Lat. S 12° 57' Long. W 38° 29') and near Vitória, Espírito Santo State (Lat. S 20° 19' Long. W 40° 20').

2 — DESCRIPTIONS AND DISCUSSION

Rhipilia fungiformis Joly et Ugadim sp. n.
Plate I, figures 1-7; text figure 1.

Plantae erectae in colonias solitarias vel pulviniformes, pedunculis brevibus, calcem defectae. Thallus crassus, viridis, integer aut irregulariter lobatus, ecorticatus, indefinitus, filamentis laxe intertextis, structura spongiosa. Singulae plantae ad 2,5 cm altae usque et circa 4 cm latae; filamentis trichotomicè ramosis intervallis irregularibus. Dichotomiae copiosae ramis irregulariter evolutis. Filamenta interna pervariabilia 22,2-55,5 micra diametro. Filamenta superficialia ut illa pervariabilia 37-48 micra diametro. Haptera rara, vulgo bidenticulata, dentibus triangularibus ad apicem ramorum brevium insertis.

Habitat typus in stagnis maris post saxa corallina ad Mar Grande, Ilha de Itaparica (Bahia).

Plants erect forming cushion-shaped colonies, or solitary, short stalked, uncalcified. Thalli composed of laxly interwoven filaments producing a spongy, greenish, thick structure, entire or irregularly lobed, without a definite shape and without a cortex. Solitary plants measuring up to 2,5 cm high and about 4 cm wide. Structural filaments trichotomously ramified at irregular intervals. Dichotomies also frequent and with branches irregularly developed. Internal filaments having a very variable diameter, from 22,2 up to 55,5 micra. Superficial filaments also very variable having a diameter from 37 up to 48 micra. Hapteral connections not frequent, usually represented by two small triangularly-shaped teeth ending certain short branches.

Type locality: Tidal pools behind the coral reef at Mar Grande, Itaparica Island, Salvador, Bahia State, Brazil.

Type Deposited at the Phycological Herbarium of the Dept. of Botany, Univ. of São Paulo, collected October 6, 1964.

This plant is very different from the two other species known to occur in Brazil, namely *Rhipilia tomentosa* Kützinger (Taylor 1960, p. 162, pl. 22, fig. 3) and *Rhipilia tenaculosa* A. et E. S. Gepp. (A. and E. S. Gepp 1911, p. 56, figs. 130-133). The first one was dredged off Cabo Frio, Rio de Janeiro and the last mentioned was dredged off Barra Grande, Pernambuco (Challenger Expedition). These species have a distinct flabelar portion which is not the case with our material. In fact there is no other species in the genus with the habitus of the Brazilian plant.

Our plant resembles somewhat the figure of *Avrainvillea rawsoni* Howe pictured in the Monograph of the Codiaceae of the Siboga Expedition by the Gepps (1911 pl. VII, fig. 76) which is the only known *Avrainvillea* without a distinct flabelar portion. We believe that our species is in *Rhipilia* the counterpart in habitus of that species in *Avrainvillea*, both being without a definite flabelar portion.

(1) — Dept. of Botany, Univ. of São Paulo. (2) — Criptogamic Section, "Instituto de Botânica do Estado de São Paulo". (3) — Research Fellow of the "Comissão Central de Pesquisas, Universidade do Ceará".

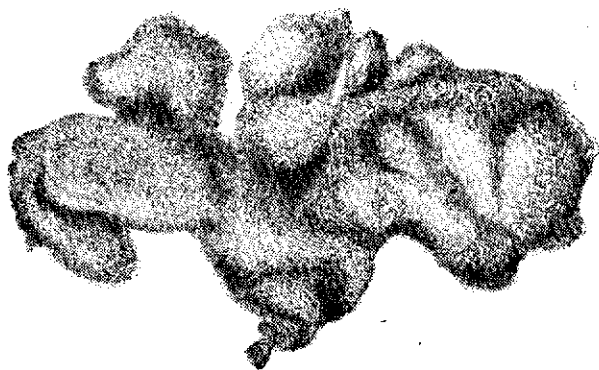


Fig. 1 — *Rhipilia fungiformis*. Habitus (drawing from formalin preserved material).

Acetabularia myriospora Joly et Cordeiro-Marino sp. n.

Plate II, figures 1-10

Plantae minutae vel solitariae vel in colonias parvas aggregatae, saturate virides vivo in statu, usque ad 1 cm altae, juvenute vesiculosae, cylindratae et magis minusve clavatae, virides, ramis lateralibus defectae ac substrato affixae basi stolonifera. Vesicula clavata ca. 825 micra diametro apicali. Prope maturitatem vesicula 7-8 ramis fertilibus verticillatim dispositis ad apicem exhibens; ramis apicalibus mox in discum ampliatis. Discus plene evolutus 2,5-4 mm diametro, atro-viridis, radiis 7, 8 vel 9. Radii triangulares, 1050-1425 micra diametro apicali, 1410-1695 micra longitudine et 15,2 micra crassitudine, connati, superne corona parviuscula rotundata sive angulata 80-87,4 micra longa atque 106,2 micra lata praediti. Segmenta coronae filamentis assimulantibus 6, bis-terque ramosis, brevibus viridibusque. Post segmenta delapsa cicatriculae 22,8-30,4 micra manent. Corona quoad crassitudinem 11,4 micra. Corona infera desideratur. Radius fertili in statu plus quam 300 aplanosporis minutis, sphaericis, 57-68,4 micra diametro, parietibus 3,8-5,8 micra crassis refertus.

Crescit typus super rupes calcarias sub algis magnioribus, in arenosis mari proximis ad Amaralina, Salvador (Bahia).

Plants minute, growing isolated or a few together forming small colonies, of a dark green colour when alive, measuring up to 1 cm high. The young plant is an elongated cylindrical, somewhat clavated green vesicula without lateral branches, fixed to the substratum by a stoloniferous portion. Prior to the production of the disc, the club shaped vesicula has a diameter of about 825 micra at the apex. Approaching maturity at the summit of the vesicula there is the production of 7 to 9, verticillately placed, lateral, fertile branches. These start as globose buds giving a peculiar appearance to the apex. These branches elongate and produce the flat disc shaped umbrella. The adult disc has a diameter varying

from 2,5 up to 4 mm, with 7, 8 or 9 rays and is dark green in colour. The rays are short-triangular in shape having a diameter at the apex varying from 1,050 up to 1,425 micra and are from 1,410 up to 1695 micra long. The rays are lightly calcified and all are joined together in one structure. On each ray, on the upper side at the center of the disc, there is a small roundish or angular corona superior, each segment of the corona bears six ramified (two to three times) short, green, assimilatory filaments. When these are shed one can see six roundish differently sized scars, with a diameter varying from 22.8 up to 30.4 micra. The wall of the corona is about 11.4 micra thick. There is no corona inferior. The fertile ray has over three hundred roundish small aplanospores (gametangia) having a diameter varying from 57 up to 68,4 micra, with a thick wall measuring from 3.8 up to 5.8 micra. The wall of the ray is about 15.2 micra thick. Each segment of the corona measures from 80 up to 87.4 micra long and about 106.2 micra wide.

Our species belongs in the section *Polyphisa* of Solms Laubach, because of the absence of the corona inferior, being related to *Acetabularia parvula* Solms-Laubach, *A. polyphysoides* Crouan, *A. mobii* Solms Laubach and *A. pusilla* (Howe) Collins, in view of the fact that the rays of the disc are united by calcification of the side walls.

The first named species is an inhabitant of the Indian Ocean (Macassar), has about 16 rays in each disc and has only 3 hair scars on the corona superior (Solms-Laubach 1895, p. 29, pl. II, figs. 3, 5).

The second species lives in the Caribbean region (Bermuda, Bahamas, Jamaica, Guadeloupe and Barbados), has from 12 to 15 rays in each disc and has 8-9 hair scars on the corona superior (Solms-Laubach 1895, p. 29, pl. IV, figs. 2, 6).

The third species is an inhabitant of the Indian Ocean (Mauritius, Karachi), has about 15 rays in each disc and about 5 hair scars on the corona superior (Solms-Laubach 1895, p. 30, pl. IV, fig. 1; Nizamuddin 1964, figs. 1-13).

The last named species lives in the Caribbean region (Florida, Bahamas, Jamaica) has about 6 to 17 rays in each disc, 2 or 3 hair scars on the corona superior and has only 15 to 60 aplanospores in each ray. (Taylor 1960, p. 104, pl. 6, fig. 13).

As can be seen from the above listed characteristics our species is quite different from the four related species of the Section. The main differences being the number of rays in each fertile disc, the number of hair scars present on the corona superior and the enormous number of aplanospores (over 300) in each fertile ray. Such a number is not known to occur in other species of the genus.

Also remarkable is the complete lack of the assimilatory filaments previous to the development of the fertile disc. This is produced directly at the apex of the club shaped vesicula without the production of the verticillately placed assimilatory filaments known to occur in certain other species of the genus.

Type: Deposited at the Phycological Herbarium of the Dept. of Botany, Univ. of São Paulo, collected October 4, 1964.

Type locality: Growing on calcareous-covered rocks under larger algae at the beach of Amaralina, Salvador, Bahia State — Brasil.

Pseudogloiophloea brasiliensis Joly et Cordeiro-Marino sp. n.

Plate VI, figures 1-4

Plantae ad 15 cm altae usque, solitariae, colore vinose miniatae, thallo cylindrico dichotomice ramoso e basi parva rotundata orto. Dichotomiae intervallis irregularibus apicem versus distantibus. Rami teretes vulgo 2,3 mm lati, axi centrali abdito. Stratus medullaris laxo filamentosus, filamentis 3-3,8 micra diametro. Stratus corticalis densus ex utriculis amplis compositus, filamentis brevibus cellulis parvioribus pigmentatis intertextus. Utricula maxima usque ad 23 micra altitudine. Cortex externus 42 micra crassus, internus 53 micra. Ramus carpogonialis leviter recurvatus, e 4-5 cellulis constitutus, ad partem subcorticalem insertus. Trichogynes longe exsertae. Cystocarpia thallo prorsus immersa, 235-258 micra diametro et 304-323 micra alta. Gonimoblasta carposporangiaque 3-4 stratis filamentorum obvallata.

Habitat typus ad Praia do Pimenta, Maceió (Alagoas), super saxa secundum oram maritimam.

Plants up to 15 cm high growing isolated, of a wine-red colour when alive; from a small roundish holdfast the erect cylindrical dichotomically ramified thallus arise. The plant is repeatedly up to 11 times furcately ramified, without constrictions, being the dichotomies irregularly spaced, approximated below and spaced above. Branches of all orders cylindrical of a uniform diameter, being commonly 2-3 mm wide with the central axis invisible. Structurally the plant is formed by a loose, filamentous medullary region and a more dense cortex. The medullary filaments have a diameter varying from 3.0 up to 3.8 micra. The cortical region is formed by large juxtaposed utricles radially elongated and here and there this layer is interpenetrated by short filaments composed by much smaller pigmented cells originated from the sub cortex. Between the large colourless utricles which measures up to 23 micra high one finds here and there differently sized smaller colourless utricles. These small celled filaments are to

be found mainly on the older portions of the thallus. The outer cortical and inner regions are about 42 micra and 53 micra thick, respectively. The carpogonial branch has four to five cells and is borne in the subcortical region; it is slightly curved. The trichogynes are long, exceeding much the outer cortical layer. The cystocarps are completely immersed having from 3-4 layers of filaments protecting the mass of gonimoblasts and carposporangia. The gonimoblasts are completely free from this kind of pericarp. The cystocarp has a diameter varying from 235 to 258 micra and is from 304 up to 323 micra high.

Type: Cystocarpic, collected January 31, 1965. Deposited at the Phycological Herbarium, Dept. of Botany, Univ. of São Paulo.

Type locality: Praia do Pimenta, Maceió, Alagoas State where it was growing on rocks exposed during low tide.

The present species is very different from the two other species of this recently established genus (see Levring 1956 p. 420) known in the American tropical atlantic area (see Taylor 1960, p. 332) namely:

Pseudogloiophloea caribaea (Taylor) n. comb.

(*Gloiophloea caribaea* Taylor 1943, p. 148, pl. I. fig. 2) and *Pseudogloiophloea halliae* (Setchell) n. comb.

(*Gloiophloea halliae* Setchell 1914, p. 116, pl. 10, fig. 13)

From *P. caribaea* our plant differs mainly in its larger (up to 15 cm against 3-4 cm) size and broader thallus, as well as in being dioecious. From *P. halliae* our plant is larger, has a much larger cystocarp and is dioecious.

Tylotus cearensis Joly et Pinheiro sp. n.

Plate V, figures 1-4

Plantae erectae aut solitariae aut caespitosae, atro-purpureae in vivo, usque ad 15 cm altae. Thallus stipitatus applanatus, 180 micra crassus, praeter partem basalem indivisam 3 cm longam dichotomice vel polytomice ramosus. Rami taeniiformes 2-6 mm lati, interdum 11 mm. Frons ex strato medullari cellulis magnis ac strato corticali cellulis parvis pigmentatis superstructa. Cellulae medullae 120 micra diametro, 66 micra altae. Cellulae corticis exterioris ca. 7,4 micra diametro, 9,2 micra altitudine. Tetrasporangia e strato corticali externo orta, cruciatim divisa, 22 micra diametro atque usque ad 36,7 micra alta. Cystocarpia conspicua in ambobus paginis frondis, ad 1095 micra diametro basili usque ac 660 micra alta, poro distincto. Pericarpium circiter 180 micra crassum.

Habitat typus ad Fortaleza (Ceará), in arenosis maritimis repertus. Etiam ad Paracuru et Mundaú (Ceará), ejusdem loci.

Plants erect growing isolated or tufted of a deep wine-red colour when alive, measuring up to 15 cm high. From a small holdfast a short stipe arises rapidly expanding in the strap shaped thallus. This has a lower ramified portion, measuring up to 3 cm. From there on the thallus is more or less regularly di-to polychotomously ramified. The distances between successive dichotomies is variable. The strap shaped branches have a diameter varying from 2 to 6 mm being up to 11 mm wide. Proliferations sometimes are developed at the dichotomies and at the lower portions of the thallus from the margins. Structurally the frond is composed of a large celled medular region and pigmented small celled cortex. The thallus is up to 180 micra thick. The medular cells have a diameter up to 120 micra and are up to 66 micra high (as seen in cross section of the thallus). The pigmented cells of the outer cortex have a diameter about 7.4 micra and are up to 9.2 micra high. The tetrasporangia are produced in the outer slightly modified cortex. They are found in both surfaces, and are cruciately divided. They measure about 22 micra of diameter and are up to 36.7 micra high. The cystocarps are a prominent rounded structure scattered on both surfaces, having a diameter up to 1095 micra at the base, and are up to 660 micra high with a distinct pore. The pericarp wall is about 180 micra thick and is connected with the mass of carposporangia and the placenta by distinct nutritive filaments. The placenta formed by the base of the gonimoblasts is wide and has a mass of sterile tissue in its middle portion. From the other known species of the genus, *Tylotus obtusatus* (Sonder) J. Agardh, *T. beckeri* (J. Agardh) Kylin, *T. proliferus* (Harvey) Kylin (Kylin 1932, p. 59-60, figs. 17 A, B, T. 22, figs. 55-56; Kützing 1869, T. 34, a, b) our plant has a somewhat different habitus. *T. beckeri* is not so regularly dichotomically ramified as our plant and lacks the flabellate disposition of the branches. *T. proliferus* has much less dichotomies as our species. *T. obtusatus* has a wider strap shaped thallus and has less, not regularly spaced dichotomies.

This is the first reference of the occurrence of this genus in the American Atlantic. There is one species occurring in S. Africa (*T. beckeri*). Kylin (1956 p. 256) suggests that "wahrscheinlich wäre es besser die flachen bis blattähnlichen *Gracilaria* Arten zur Gattung *Tylotus* hinzustellen".

The main difference between *Gracilaria* and *Tylotus* is in the cystocarp.

Type: Cystocarpic, April 27, 1963; Tetrasporic July 6, 1964

Additional material examined: Cystocarpic and sterile July 12, 1964; cystocarpic and sterile, July 22, 1964. Deposited at

the Phycological Herbarium, Dept. of Botany, Univ. of São Paulo.

Type locality: Fortaleza, Ceará. Additional material examined: Paracuru, Ceará; Mundaú, Ceará. All washed ashore.

Meristotheca gigartinoides Joly et

Ugadim sp. n.

Plate III, figures 1-5

Plantae conspicuae pallide roseo-rubellae in vivo, gelatinosae, foliaceae, integrae vel irregulariter fissae in parte suprema vel lobatae in basi, usque ad 43 cm altae, 18 cm latae, stipite leviter complanato 0,5-1 cm longo in thallum foliaceum gradatim ampliato suffultae. Margines integri aut plus minusve denticulati excrescentiis brevibus. Specimina feminea utrinque papillosa, papillis cystocarpis instructis. Frons vegetativa 1155-1200 micra vel 1275-1320 micra crassa, interdum excrescentiis plurimis brevibusque obducta, e strato medullari et strato corticali composita. Cortex externus 1-2 stratis cellularum minutarum, pigmentum exhibentium, elongatarum, 7,6-11,4 micra diametro. Cortex internus cellulis parvis, stellatis, inordinatim dispositis, cellulis magnioribus e strato medullari conniventibus, quae autem cellulis stellatis permagnioribus 114-150 micra diametro conniventes. Ex istis cellulis filamenta perramosa stratum medullarem internum formatia oriunda, 15-19 micra diametro. Cuticula externa ad 15,2 micra usque diametro. Cortex ca. 75 micra crassus. Cystocarpium ca. 2 mm diametro, poro elongato dehiscens. Carposporangia aggregata circa massam sterilem cellulis magnis incoloribus. Exemplaria tetrasporica laevia. Tetrasporangia magna, zonatim divisa, in zona corticali immersa, utrisque paginis frondis dispersa, 15,2-22,3 micra diametro atque 53,2 micra alta.

Super arenam juxta-mare ad Piúma (Espírito Santo).

Plants large of a light rosy-red (pink) colour when alive, of a gelatinous slippery texture, foliaceous, entire or irregularly cleft above, sometimes irregularly lobed from the base measuring up to 43 cm high and 18 cm wide adering well to the paper when dried. From a small holdfast, a short, somewhat flattened stipe arises, measuring up to 1 cm (commonly 0,5 cm), then gradually expanding into the blade which has a cuneate basis. Margins entire or appearing irregularly denticulated by the development of short proliferations. Female plants with both faces of the blade with numerous short papillae, each with one cystocarp, giving a peculiar appearance to the frond. The vegetative frond has a variable thickness from 1155 to 1200 micra or 1275 up to 1320 micra sometimes the blade has numerous small proliferations on the face.

Structurally the vegetative frond is composed of medular and cortical regions. The outer cortex is formed by one, sometimes two layers of small pigmented, radially elongated, cells having a diameter varying from 7.6 up to 11.4 micra. The inner cortex is formed by small irregularly placed stellate cells; these cells are in turn conneted to the somewhat larger cells of the outer medular region which in turn are connected to very large, many-armed, stellate cells having a diameter from 114 up to 150 micra. From these cells originate the abundant ramified filaments, diversely oriented, that compose the inner medullar region. These filaments have a diameter ranging from 15 up to 19 micra. The external cuticle measures up to 15.2 micra thick. The cortex is about 75 micra thick (including all the pigmented cells). The cystocarp has a diameter of about 2 mm and it opens by a large pore. The carposporangia are placed in very definite groups surrounding a large celled colourless sterile tissue. Surrounding the carposporangia there is a region of concentrically disposed filaments separating the groups of carposporangia from the sterile wall of the large cystocarp. The tetrasporic plants have a smooth surface. The tetrasporangia are large, zonately divided and immersed in the cortical region scatered on both surfaces of the frond. They have a diameter ranging from 15.2 up to 22.8 micra and are up to 53.2 micra high. *Type*: Cystocarpic, tetrasporic. collected May 12, 1964 at the beach facing the town of Piúma, Espírito Santo State, washed ashore. Deposited at the Phycological Herbarium of the Dept. of Botany, Univ. of São Paulo.

Our plant resembles somewhat *M. floridana* Kylin (Kylin 1932, p. 29, fig. 6 A, B, C; P.B.A. n.º 884) but is essentially different as one compares the vegetative structure of both species. Our species has a much simple cortex than *M. floridana* and this species lacks the beautifull stellate cells so characteristic of the Brazilian plants. Another difference is to be seen in the organisation of the cystocarp. The Brazilian plants have a much largecelled placenta than *M. floridana* and has a single layer of sterile tissue surrounding the mass of carpospores instead of two layers found in *M. floridana* (Kylin 1932, p. 27, fig. 6 A).

Meristotheca papulosa (Mont. J. Agardh) has a very different habitus.

Meristotheca japonica Kylin also has a different habitus (Okamura 1923-1928 pl. 234 figs. a, b, c). The structure of the outer cortex is not the same as in our plant (Okamura, lc., pl. 235 fig. 11) and also the structure of the placenta is different in our plant (Okamura, lc., pl. 235 fig. 12). We could not locate the paper where *M. coacta* Okamura was described.

This is the first reference of the occurence of this genus in the American South Atlantic.

Calliblepharis occidentalis Joly et Yamaguishi-Tomita sp. n.

Plate IV, figures 1-10, text figure 2.

Plantae erectae roseo-rubentes in vivo, copiose et irregulariter ramosae, thallo applanato taeniiformi, inferne elongato-cuneato sed gradatim sursum versus ampliato, ramificatione copiosa et irregulari e margine orta; marginibus ramulis cylindraceis denticuliformibus distiche ordinatis praeditis. Specimina maxima collecta 10-20 cm alta et 1,2 cm lata; fronde 247-300 micra crassa, dentibus marginalibus magis minusve cylindricis, 225-1275 micra longis, circiter 150 micra diametro. Stratum medullare 190-247 micra crassum, cellulis magnis incoloribus 114-171 micra diametro. Stratum corticale 38-76 micra crassum, cellulis pigmentatis parvis, 14,2-38 micra diametro. Cortex externus e 1-2 stratis cellulis parvis subsphaericis cum alteris incoloribus paulo magnioribus irregulariter agglomeratis formatus. Cystocarpia ad dentes marginis frondis inserta, figuram intumescientiae revocantia, 600-750 micra diametro. Carposporangia 19-22,8 micra diametro. Stirpes masculae soro marginali continuo, irregulari, fasciam decoloratam similante in parte complanata ramorum supremorum. Spermatangia is cellulis corticalibus enata. Tetrasporangia zonatim divisa, 26-33,3 micra diametro, 44,4-55,5 micra alta, e strato corticali orta et inter dentes marginales posita.

Typus e Mundaú (Ceará) proveniens, ad oram maritimam repertus.

Plants erect of a rosy-red colour when alive, abundantly and irregularly ramified. From a small inconspicuous holdfast the strap shaped thallus arise. It may have a long cuneate basis passing evenly to the broader portion of the thallus. Branching repeatedly irregular from the margins. All categories of branches with the margins dissected by numerous distichously placed more or less cylindrical, short, teeth-like branches. These in turn are minutely denticulated. Sometimes the last order branching is so dense that they appear crowded giving a black-red colour to the plant.

The largest plants we had measured from 10 up to 20 cm high being the widest portion of the strap shaped thallus up to 1.2 cm broad. The thickness of the frond is between 247 micra and 300 micra. The last order marginal teeth are more or less cylindrical measuring from 225 micra to 1275 micra long having a diameter of about 150 micra. The vegetative strap shaped thallus is formed by a large celled medullar region and pigmented small

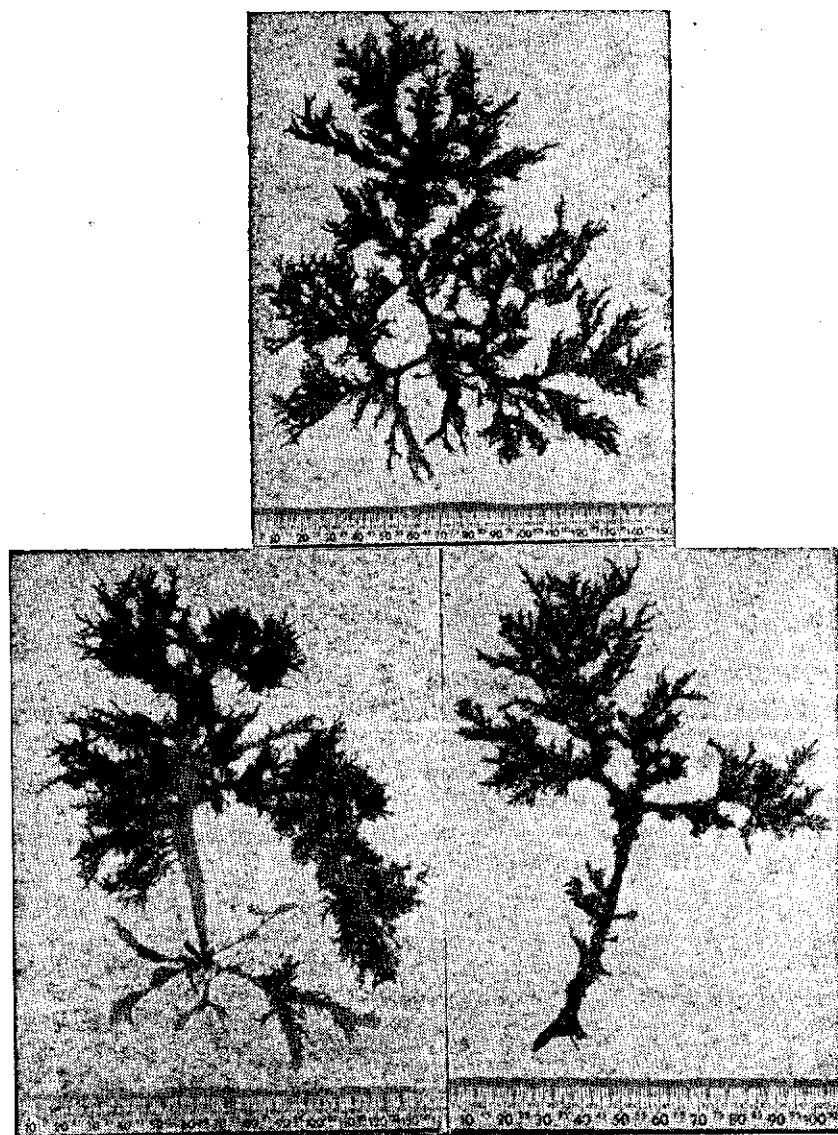


Fig. 2 — *Calliblepharis occidentalis*. Photos of the type specimens.
Above tetrasporic. Right male. Left cystocarpic.

celled cortical region. The outer cortex is formed by one or two layers of somewhat rounded small cells and then follows median sized colourless cells that compose the inner cortical region. These cells are not evenly disposed, they form groups. Sometimes smaller cells are to be found in between the large cells of the medullar region. The medullar region is from 190 up to 247 micra thick and the cortical region from 38 up to 76 micra thick. The largest cells of the medullar region have a diameter varying from 114 up to 171 micra. The inner cortical cells have a very variable diameter, they range from 38 up to 95 micra. The cortical cells have a diameter varying from 14.2 up to 38 micra.

The cystocarps are produced on the last order marginal teeth forming an unilateral roundish swelling. They have a diameter

varying from 600 up to 750 micra. The carposporangia have a diameter between 19 up to 22.8 micra.

The male plant produces an irregular continuous band on the flattened portions of the upper branches. The spermatangia are formed directly by the cortical cells.

The tetrasporangia are produced at the cortical region, scattered on the last order marginal teeth. They are zonately divided and have a diameter varying from 26 up to 33.3 micra being from 44.4 up to 55.5 micra high. *Type*: Cystocarpic, male and tetrasporic, collected July 22, 1964, at the beach of Mundaú, Ceará State. Additional material examined: Barra do Ceará, Fortaleza, July 5 1964, tetrasporic and sterile washed ashore. Paracuru, Ceará State, July 12, 1964, tetrasporic, washed ashore.

Type locality: Mundaú, Ceará State, washed ashore.

The general organisation of the plant as well as the reproductive features are in good accordance with the concept of the genus *Calliblepharis*. The male plant is here for the first time described in this genus. The production of spermatia is of the pattern known in the family (compare the figures given by Kylin 1960, p. 298, fig. 231 A, C for *Cystoclonium* with our plate IV, fig. 7). Our plant is very different of the other known species of the genus. The habitus is different from *C. ciliata* (Hudson) Kützinger, of the European Atlantic (Kützinger 1868, T. 12, fig. b) the type of the genus. It is also markedly different from *C. jubata* (Good. et Woodw.) Kützinger, the other European Atlantic species (Kützinger 1868, T. 13, fig. a; Harvey 1849, Pl. 175). *C. fimbriata* (C. Agardh) Kützinger of the Cape of Good Hope region is also different, being our plant much more ramified (Kützinger 1868, T. 11, fig. a). *C. planicaulis* (Harvey) Kylin of Tasmania (Harvey 1862 Pl. CXCIX) has an habitus that resembles somewhat our plant, being the main differences that our species has no branching from the face of the frond and our plant has a much more variable and irregular strap shaped main portion of the thallus. This is the first reference of the finding of this genus in the American coasts.

3 — ACKNOWLEDGMENTS

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4 — SUMMARY

The present paper gives the description of 6 species believed to be new to science. It is to be noted that among these plants, two belong to genera never reported from the American Atlantic (*Tylotus* and *Calliblepharis*).

Another novelty is the occurrence of *Meristotheca* in the American South Atlantic. This also is the first time that male reproductive structures are described in the genus *Calliblepharis*.

5 — SUMÁRIO

Este trabalho apresenta a descrição de seis espécies de algas marinhas que acreditamos serem novas para a ciência: *Pseudogloioophloea brasiliensis*, *Rhipilia fungiformis*, *Acetabularia myriospora*, *Tylotus cearensis*, *Meristotheca gigartinoides* e *Calliblepharis occidentalis*. Esta é a primeira vez que representantes dos gêneros *Tylotus* e *Calliblepharis* são encontrados no Atlântico americano. Também pela primeira vez é referida a ocorrência do gênero *Meristotheca* no Atlântico sul americano. Salienta-se, de outro lado, que as estruturas masculinas de reprodução são, pela primeira vez, descritas no gênero *Calliblepharis*. Seis pranchas com numerosas figuras ilustram o trabalho.

6 — LITERATURE

- Gepp, A. & Gepp, E. S. — 1911 — The Codiaceae of the Siboga Expedition including a monograph of *Flabellarieae* and *Udoteae*. Siboga Expeditie LVII. Uitkomsten op. Zool., Bot., Oceanogr. en Geol. Gebied verzameld in Nederlandsch Oost Indie 1899-1900 : 1-150 + 22 Pls., Leiden.
- Harvey, Wm. H. — 1849 — *Phycologia Britannica* II: Pls. CXXI — CCXL., London.
- Harvey, Wm. H. — 1862 — *Phycologia Australica* IV: VIII + Pls. CLXXI — CCXL., London.
- Kützinger, F. T. — 1868 — *Tabulae Phycologicae* XVIII: 35 + T. 1-100, Nordhausen.
- Kylin, H. — 1932 — Die Florideenordnung Gigartinales, *Lunds. Univ. Arssk. N. F. Avd. 2*, Bd. 28(8): 1-88 + 28 t., Lund.
- Levring, T. — 1956 — Contributions to the marine algae of New Zealand. I. *Arkiv. for Botanik* 3,5 (11): 407-432., Stockholm.
- Nizamuddin, M. — 1964 — The life history of *Acetabularia mobilis* Solms-Laubach. *Annals of Botany*, (N.S.), 28 (109): 77-81.
- Okamura, K. — 1923-1928 — *Icones of Japanese algae*. 5: Pls. CCI-CCCL, Tokyo.
- Setchell, Wm. A. — 1914 — The *Scinaia* assemblage. *Univ. Cal. Publ. Bot.*, 6 (5): 79-152 (incl. pls. 10-16), Berkeley.
- Solms-Laubach, H. — 1895 — Monograph of the *Acetabularieae*. *Trans. Linn. Soc.*, 2nd. ser., *Botany* V: 1-39 + 4 Pls., London.
- Taylor, Wm. R. — 1943 — Marine algae from Haiti collected by H. H. Bartlett in 1941. *Pap. Mich. Acad. Science Arts & Letters*, XXVIII: 143-163 + Pls. 1-4, Ann Arbor.
- Taylor, Wm. R. — 1960 — Marine algae of the eastern tropical and subtropical coasts of the Americas: IX + 1-870 (incl. 80 pls.), Ann Arbor.

PLATE I. *Rhipilia fungiformis* Joly et Ugadim

Fig. 1 — Filaments from the apex of the frond. Note abundance of trichotomies.

Fig. 2 — Inner filaments.

Fig. 3 — Filaments with two hapteral branches.

Fig. 4 — Details of the hapteral branches.

All drawings from formalin preserved material of the type collection.

PLATE II. *Acetabularia myriospora* Joly et Cordeiro-Marino

Fig. 1 — Two young plants. Note absence of assimilatory filaments.

Fig. 2 — A young plant with the beginning of the fertile disk.

Fig. 3 — Three plants from a clump.

Fig. 4 — A mature plant. Note corona superior.

Fig. 5 — Apex of a mature plant.

Fig. 6 — Detail of the fertile disk with corona superior.

Fig. 7 — Median longitudinal section through the disk, passing by two rays.

Note corona superior with few-branched assimilatory filaments.

Fig. 8 — Detail of corona superior. Note the hair scars. Above two young hairs are still attached.

Fig. 9 — Detail of a ray with aplanospores (gametangia).

Fig. 10 — Detail showing aplanospores.

All drawings from formalin preserved material of the type collection. Figs. 4, 6, 7, 8, 9 and 10 from carbonate-free material.

PLATE III. *Meristotheca gigartinoides* Joly et Ugadim

Fig. 1 — Habitus of a cystocarpic plant.

Fig. 2 — Cross section of the vegetative thallus.

Fig. 3-4 — Detail of the tetrasporangia.

Fig. 5 — Median section of the cystocarp.

All drawings from formalin preserved material of the type collection.

PLATE IV. *Calliblepharis occidentalis* Joly et Yamaguishi-Tomita

Figs. 1-2 — Detail of the last order branching.

Fig. 3 — Cross section of a cylindrical last order branch.

Fig. 4 — Cross section of the median portion of the flattened thallus.

Fig. 5 — Idem as above, marginal portion.

Fig. 6 — Detail seen from above of a portion of a male frond.

Fig. 7 — Detail of the development of spermatangia.

Figs. 8-9 — Detail of tetrasporangia.

Fig. 10 — Median longitudinal section of a cystocarp.

All drawings from formalin preserved material of the type collection.

PLATE V. *Tylotus cearensis* Joly et Pinheiro

Fig. 1 — Habitus of a cystocarpic plant.

Fig. 2 — Cross section of the vegetative thallus.

Fig. 3 — Median longitudinal section of the cystocarp.

Fig. 4 — Cross section of a tetrasporic thallus.

All drawings from formalin preserved material of the type collection.

PLATE VI. *Pseudogloiophloea brasiliensis*
Joly et Cordeiro-Marino

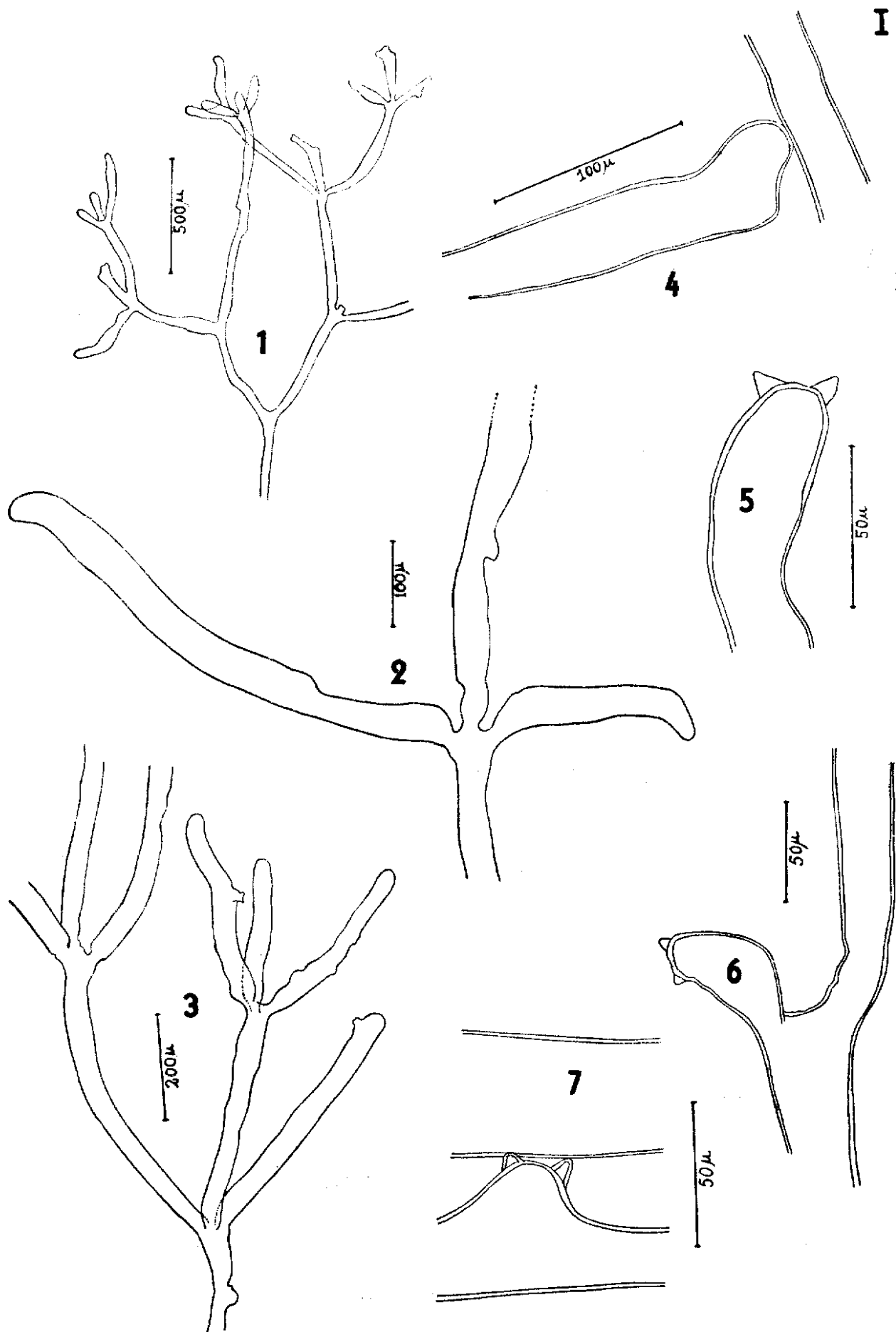
Fig. 1 — Habitus of a cystocarpic plant. Not all branches were represented.

Fig. 2 — Cross section of a very young (upper) portion of the thallus.

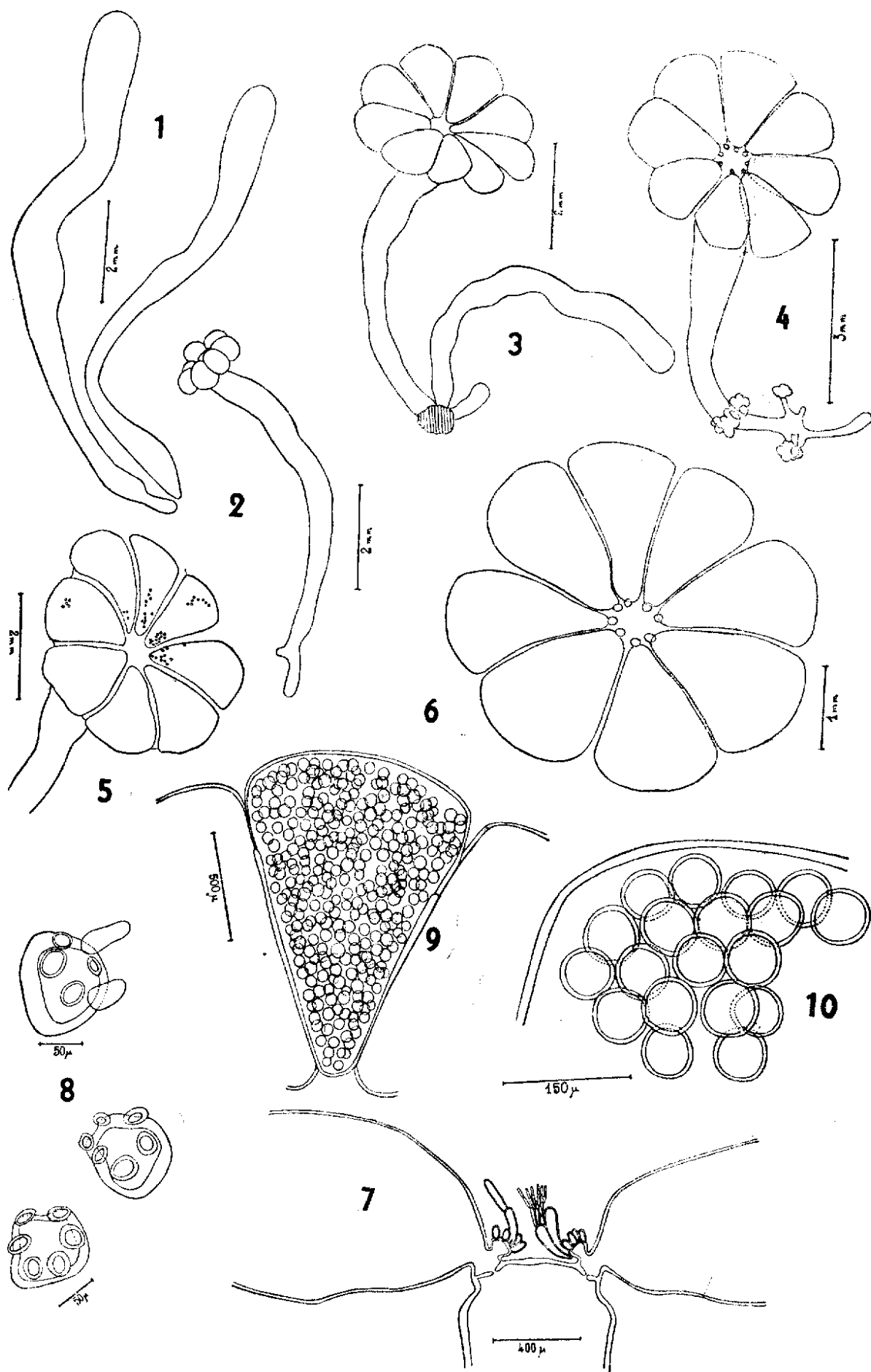
Fig. 3 — Cross section of the mature thallus.

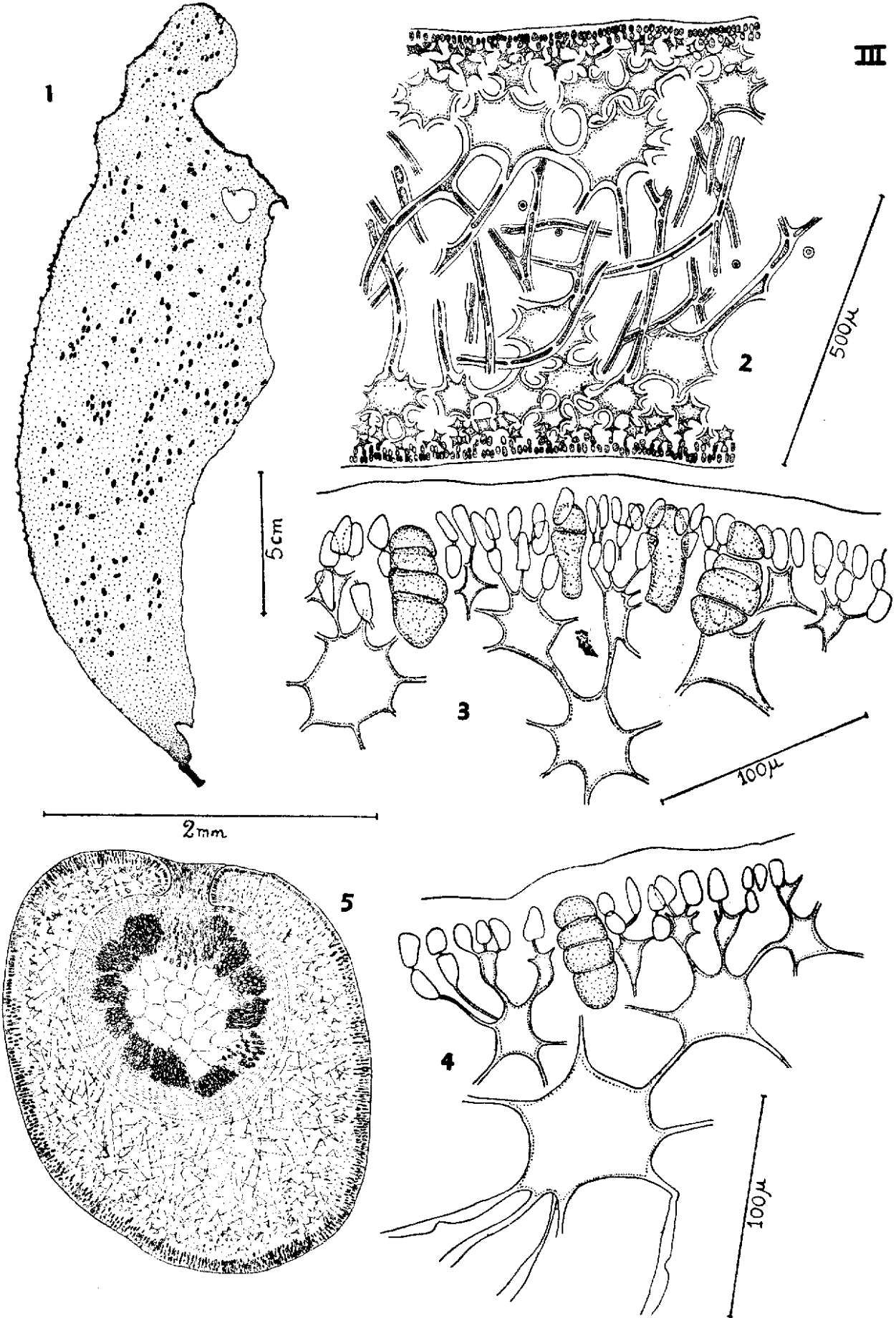
Fig. 4 — Young carpogonial branch.

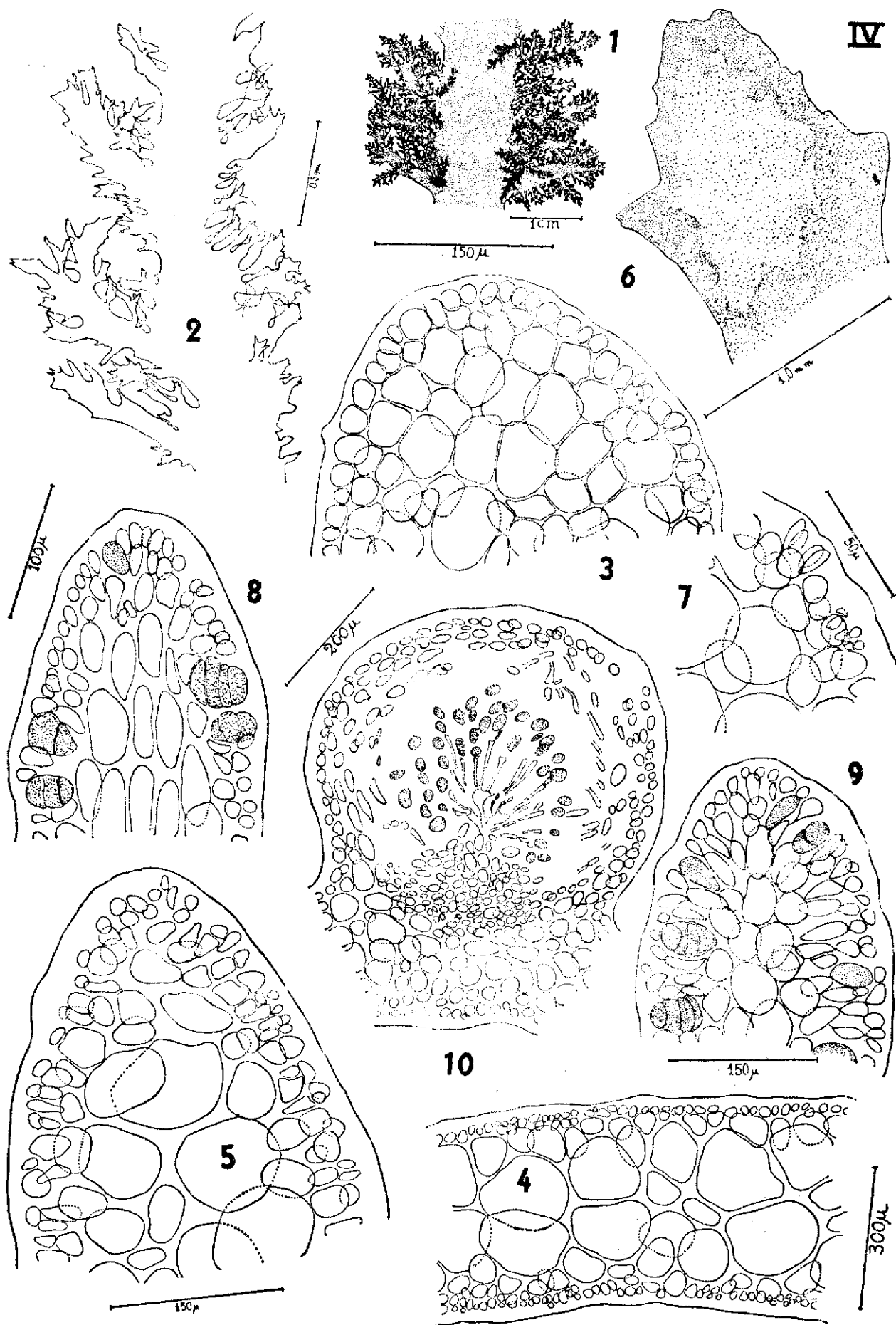
All drawings from formalin preserved material of the type collection.



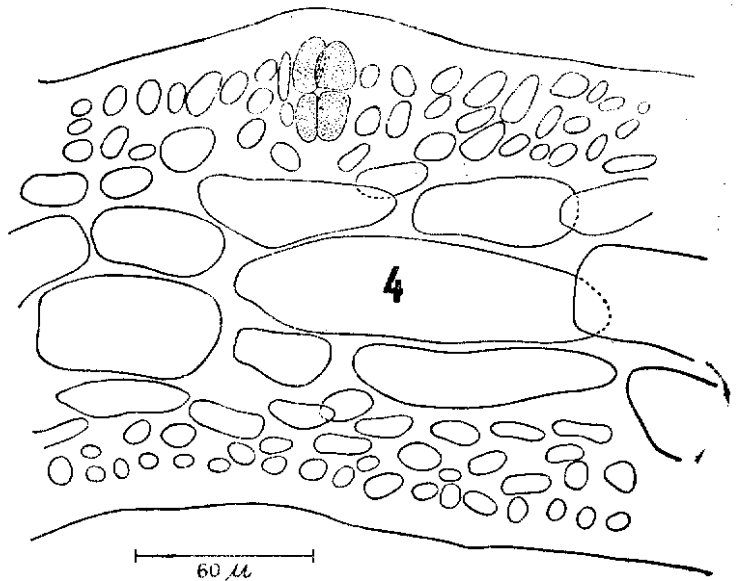
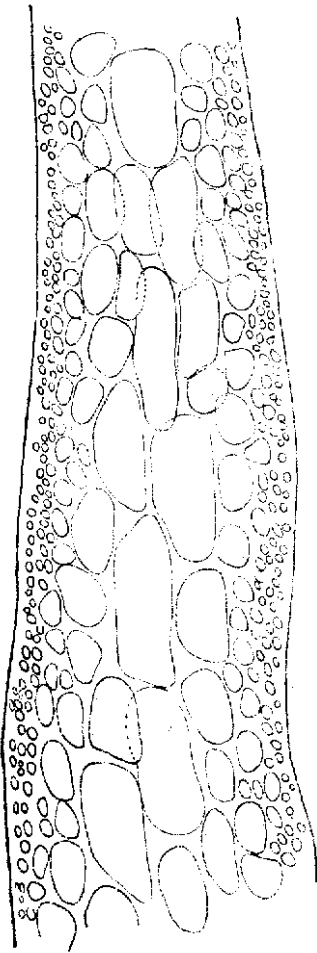
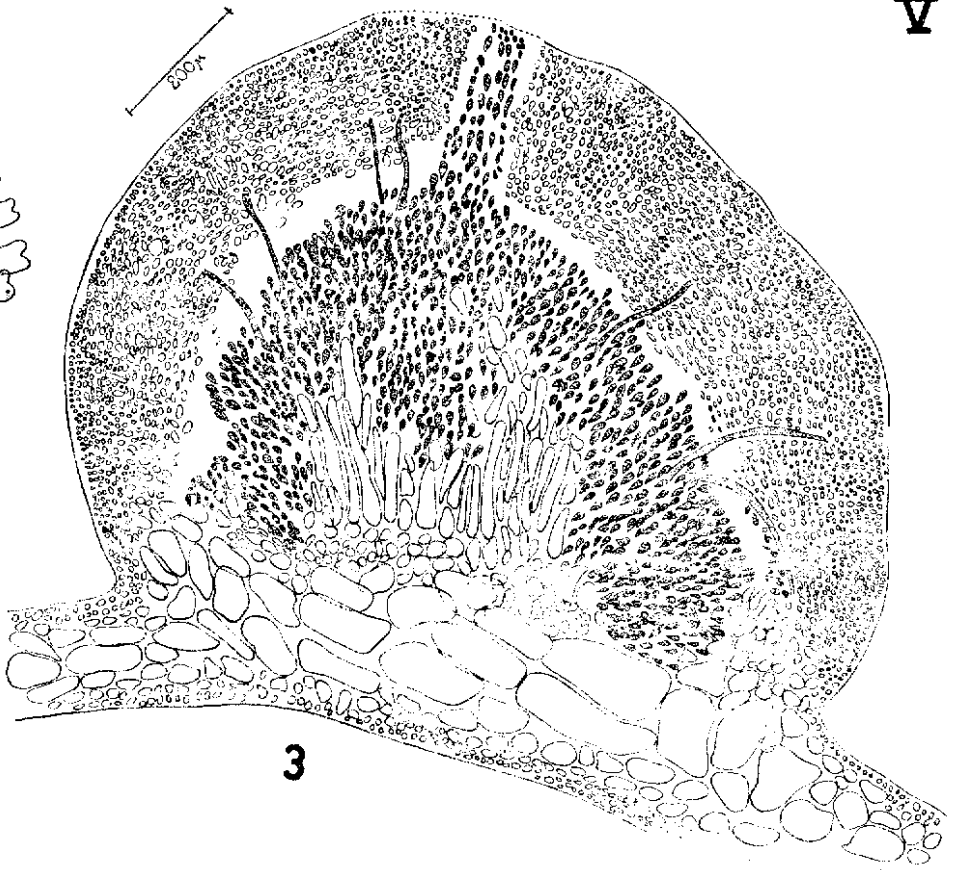
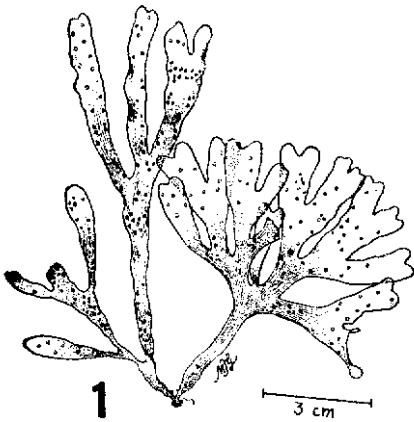
II







V



VI

