

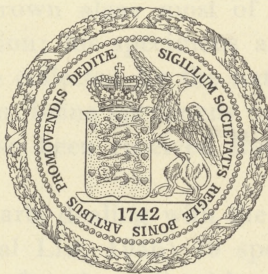
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SOME MARINE ALGAE FROM MAURITIUS

ADDITIONAL LISTS TO THE CHLOROPHYCEAE
AND PHAEOPHYCEAE

BY

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KØBENHAVN

I KOMMISSION HOS EJNAR MUNKSGAARD

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Since the former parts of the *Chlorophyceae* and *Phaeophyceae* were published I have from Director, Dr. R. E. VAUGHAN received several collections of algae from Mauritius and among the algae in these collections several species of *Chlorophyceae* and *Phaeophyceae* are found which are not mentioned in the previously published contributions. These species are mentioned in the present paper.

But besides these species I have furthermore added such species of which I have formerly seen very little or badly preserved material or such ones of which I have found some facts of interest.

As to the *Chlorophyceae* all the material now examined has been received from Dr. VAUGHAN; in most cases it has been collected by Dr. VAUGHAN himself, but some of it has been gathered by his assistants. Of nearly all the material, besides a few dried specimens of each species, a smaller part has been preserved in formol and seawater, which has been a great help to me in the examination.

Regarding the brown algae most of the material originates from JADIN's collection; his specimens are in most cases small and especially those collected by the native DARUTY often in a rather bad condition, being specimens cast ashore. But some of the material has also been received from Dr. VAUGHAN.

In the former parts dealing with the *Chlorophyceae* (Part I, 1940, and Additional List, 1946) 79 species of this group are mentioned as being found on the island; in the present part another 9 species are found and the number of species of *Chlorophyceae* known from Mauritius is thus augmented to 88.

In the former part dealing with the *Phaeophyceae* (1941) 38 species of this group are listed from the island; in the present

part another 3 species are mentioned, thus 41 species in all are known from the island.

I want to express my most cordial thanks to Director, Dr. R. E. VAUGHAN, Mauritius Institute and Public Museum, Port Louis, for the infatigable interest he has taken in the examination of the algal flora of Mauritius by procuring a rich and interesting material in order to make the examination of the algal flora of the island as thorough and extensive as possible.

To the Trustees of the Carlsberg Foundation I am much indebted for a continued grant for algological investigations.

CHLOROPHYCEAE

I. Cladophorales.

As appears from the following I agree with FRITSCH (1935, p. 229 and 1947, p. 29) in considering the fam. *Cladophoraceae*, which I have hitherto placed in the order *Siphonocladales*, as a separate order: the *Cladophorales*, basing this especially upon the very different way in which the septation of the thallus is performed. With this exception I retain the remaining families hitherto referred to the *Siphonocladales* in this order.

Fam. 1. *Cladophoraceae*.

Rhizoclonium Kütz.

1. *Rhizoclonium Kockianum* Kütz.

Alg. Mauritius, Addit. List, 1946, p. 30.

A form of this species forming a green cover on roots of mangroves has been collected by Dr. VAUGHAN. The specimens are fixed to the substratum by means of basal rhizoids; lateral rhizoids were not present. The filaments had a breadth of 19–20 μ . The plant comes very near to that form which I have mentioned and figured in Mar Alg. D. W. I., vol. II, 1920, p. 424, fig. 406 d, e, f, g.

As to the possibility of keeping these fixed forms of *Rhizoclonium* separate from *Chaetomorpha* compare my remarks in the paper quoted above.

Mauritius: Îlot Brocus, $\frac{25}{3}$ 46, R. E. V. no. 589.

2. *Rhizoclonium grande* Børgs.

Alg. Mauritius, Addit. List, 1946, p. 31.

In the paper quoted above it is mentioned that this large *Rhizoclonium* occurs on the shores of Réunion. Among some algae recently received from Dr. VAUGHAN this species has now also been found in material from Mauritius.

The *Rhizoclonium* was growing upon rocks "in rocky pools near shore" and served as a substratum for *Cladophora saviniana* nov. spec., the rhizoids of which were attached to the *Rhizoclonium*.

The latter agreed perfectly with the plant from Bombay.

Mauritius: Savinia, April 4, 1947, R. E. V. no. 682.

Geogr. Distr.: Bombay, Réunion, Hainan (China).

Chaetomorpha Kütz.

1. *Chaetomorpha natalensis* (Hering) De-Toni.

Alg. Mauritius, I, 1940, p. 42 and Addit. List, 1946, p. 30.

In lately received collections from Dr. VAUGHAN some specimens of a *Chaetomorpha* are found which I think are referable to this species. The filaments in these collections are fastened by a disc to the substratum and have cells which are from two to four times longer than the breadth, which varies from 60—80 μ .

Forma exposita f. n.

Upon exposed basaltic cliffs laid dry during low tide Dr. VAUGHAN has collected a small *Chaetomorpha* which forms a dense, low, about 2—3 mm high, "slippery coating on the flat basalt rocks between the tide levels".

The plant thus is not only exposed to the strong surf, but also liable to be dried up during ebb-tide. This plant I think is to be considered as a form of this species.

The plant is strongly fastened to the rocks by means of a disc and these discs, fused with those of neighbour filaments, in this way form larger tufts (Fig. 1 a). The specimens rarely reach more than a length of 2 mm, generally they are much

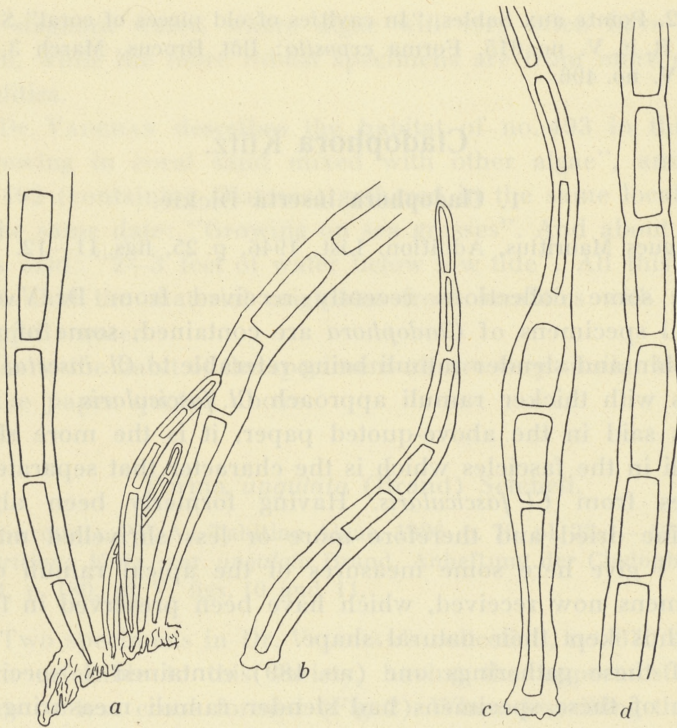


Fig. 1. *Chaetomorpha natalensis* (Hering) De-Toni. forma *exposita*. a, b, c, filaments with the base; d, part of a filament ($\times 75$).

shorter, being killed at their upper ends; but rather often thin elongations are given out from their summits (Fig. 1 a, b, c).

The cells in the filaments are about 2–3 times as long as broad, but just before they are going to be divided, they are longer. In the lower part of the filaments their breadth is about 40–80 μ , reaching in the thickest filaments up to 100–130 μ .

By through-growing of the cells above downwards into the basal one, this may be rather long, up to 500 μ or more, and the walls of the basal cells become thick and stratified. Also the walls in the upper parts of the filaments above the basal one are rather thick, while the above-mentioned thin elongations have thinner walls, and the cells of which they are composed are about 20–40 μ broad only, and 4–5 times as long.

Mauritius: Ilôt Brocus, "On mangrove roots", Aug. 1938, R. E. V. no. 202. Pointe aux Sables, "Dense green mats", Sept. 1, 1946, R. E. V.

no. 612. Pointe aux Sables, "In cavities of old pieces of coral" Sept. 1, 1946, R. E. V. no. 615. Forma *exposita*: Îlot Brocus, March 3, 1946, R. E. V. no. 496.

Cladophora Kütz.

1. *Cladophora inserta* Dickie.

Algues Mauritius, Addition. List, 1946, p. 25, figs. 11—12.

In some collections recently received from Dr. VAUGHAN several specimens of *Cladophora* are contained, some of which with thin and slender ramuli being referable to *Cl. inserta*, while others with thicker ramuli approach *Cl. fascicularis*.

As said in the above-quoted paper, it is the more slender ramuli in the fascicles which is the character that separates this species from *Cl. fascicularis*. Having formerly been able to examine dried and therefore more or less shrivelled material only, I give here some measures of the apical ramuli of the specimens now received, which have been preserved in formol and thus kept their natural shape.

Of these gatherings one (no. 489) contained 4 specimens. Three of these specimens had slender ramuli measuring from $20\ \mu$ to $38\ \mu$ in breadth, but the fourth had much thicker and broader ramuli, from $40\ \mu$ to about $64\ \mu$, thus coming near those of *Cl. fascicularis*.

In another collection (no. 493) the ramuli varied as to breadth from $28\ \mu$ to $48\ \mu$.

And in a third collection with two dried specimens and one in formol (no. 622) the breadth of the ramuli was from $34\ \mu$ to $50\ \mu$.

From the above it must be presumed that the breadth of the ramuli varies much, in those with broader ramuli coming near in size to those in *Cladophora fascicularis*. Upon his specimens DICKIE wrote the name of the species "*incerta*", (the specific name "*inserta*", as is pointed out by SETCHELL, being certainly a misprint), surely himself being doubtful as to the justification of his species. For my part I am of opinion that *Cl. inserta* most probably is to be considered a variety only of *Cl. fascicularis*. It seems to me very probable that the specimens with slender ramuli originate from protected localities or lagoons with shallow and more or

less stagnant water, where algae will very often have slender thalli, while the more robust specimens are from more exposed localities.

Dr. VAUGHAN describes the habitat of no. 493 in this way: "Growing in coral sand mixed with other algae", and about no. 492 (containing Diatoms) gathered in the same locality and at the same date: "Growing on sea grasses". And about no. 489 it is said: "2—3 feet of water below low tide". All this goes to show that the material originates from localities with shallow, tranquil water.

As to the habit of the specimens all are very similar to Fig. 11 in the paper quoted above.

Forma *ungulata* (Brand) Setchell.

SETCHELL, W. A., Tahitian Algae, 1926, p. 75, pl. 22. — *Cladophora mauritiana* Kütz. var. *ungulata* Brand, Anheftung der Cladophoraceen, 1904, p. 180, pl. V, figs. 10 and 11.

Two specimens in Dr. VAUGHAN's collection, no. 670 and 662 seem referable to this variety, having the uppermost ramuli more or less crook-formed (Fig. 2). When describing this form BRAND (1904, p. 180, pl. V, figs. 10—11), who refers it to *Cladophora mauritiana* Kütz., points out that the ramuli suddenly taper to about 30—40 μ , while SETCHELL says that "f. *ungulata* has them gradually reduced". This is also the case of the specimens I have seen. But while SETCHELL about his plant points out that the apical segments taper to 18—20 μ , those in the Mauritian plant are thicker, about 30—55 μ .

The habit of the specimens is rather different from the forma *typica* mentioned above, forming much entangled masses which most probably have been lying loose and both being found in a lagoon.

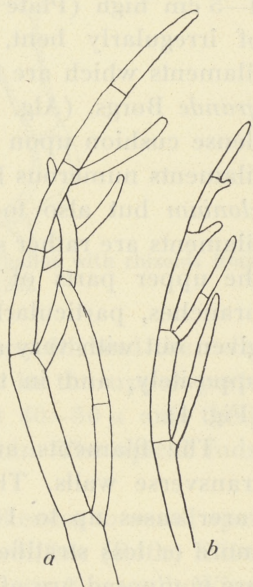


Fig. 2. *Cladophora inserta* Dickie forma *ungulata* (Brand) Setchell. Crookformed branchlets. ($\times 70$).

Mauritius: Grand Baie, 16. Febr. 1946, R. E. V. no. 493. Îlot Barkly, 1 of April 1946, G. MORIN no. 489. Cassis near Port Louis, 7. Jan. 1947, G. MORIN no. 622.

Forma *ungulata*: Pointe aux Sables, March 30, 1947, G. MORIN no. 662, and no. 670 same locality and collector, April 2, 1947.

2. *Cladophora saviniana* nov. spec.

Cladophora caespitosa, erecta, subarbuscula, ca. 4—5 cm alta, in sicco olivaceo-viridis, irregulariter ramosa.

Filamenta basalia plus-minus decumbentia, rhizoideis substratum adfixa.

Filamenta erecta di-trichotoma divisa, ramos erectos alternos aut superne unilaterales gerentia.

Cellulae cylindricae, in filamentis basalibus ca. 80—100 μ latae et ultra crassae, in media parte thalli ca. 80 μ —100 μ latae et ca. 6 plo longae, ad apicem filamentorum versus tenuiores, 40—50 μ latae et 600—800 μ longae. Apices filamentorum obtusi.

Mauritius: Savinia, "in rocky pools near shore", April 4, 1947, R. E. V. no. 682.

This species forms dense, erect, dark green tufts about 4—5 cm high (Plate I, fig. 1). The base is formed of a plexus of irregularly bent, more or less decumbent and entangled filaments which are intermingled with and fixed to *Rhizoclonium grande* Børgs. (Alg. Bombay, 1935, p. 14), the latter forming a dense cushion upon the rocks. From the lowermost parts of the filaments numerous hapters issue, fixing themselves to the *Rhizoclonium* but also to the rocky substratum (Fig. 3). The erect filaments are rather straight upwards directed, especially towards the upper parts of the thallus, di-trichotomously divided, the branches, particularly in the upper parts of the thallus, being given out with very acute angles, mostly alternately, more rarely oppositely, and in the upper parts now and then unilaterally (Fig. 4).

The filaments are cylindrical with no constrictions at the transverse walls. The basal filaments are about 70—100, in rarer cases up to 140 μ broad, with rather thick (about 20 μ), more or less stratified brown walls; and the cells of which they are composed are of rather variable length. In the middle of the

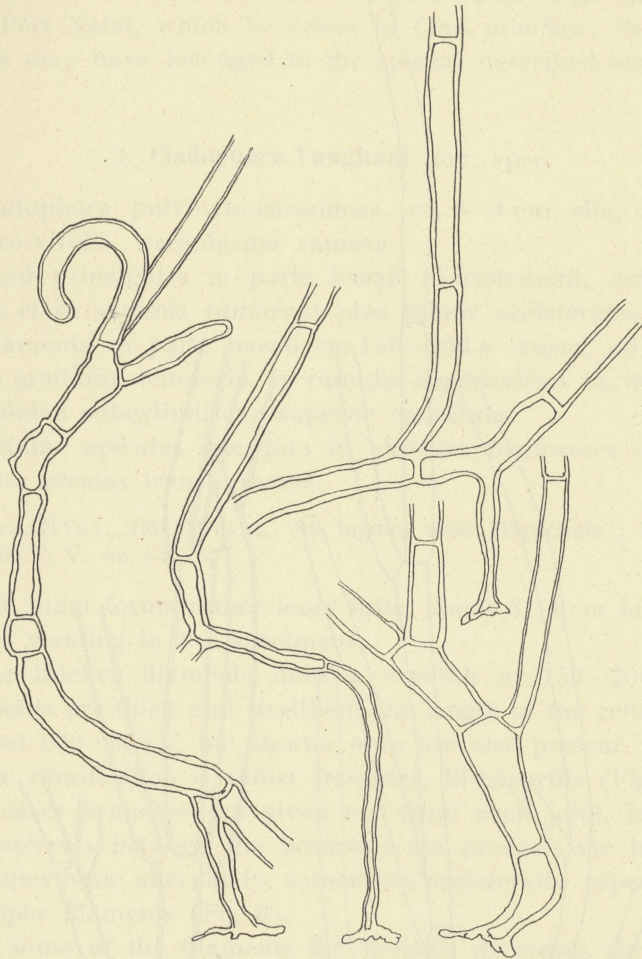


Fig. 3. *Cladophora saviniana* Bergs. Fragments of the thallus with rhizoids from the basal part of the plant. ($\times 125$).

thallus the filaments have about the same breadth and the cells are about 6 times longer than the breadth. In the upper parts the breadth of the cells decreases to about $40\text{--}50\ \mu$ and their length is between $600\text{--}800\ \mu$; their wall is thin. The apical ends of the top cells of the filaments are blunt.

As to its habit this species has some likeness to small specimens of *Cl. rupestris* (L.) Kütz., and *Cl. prolifera* (Roth) Kütz. GRUNOW in "Reise der österreichischen Fregatte Novara", Wien

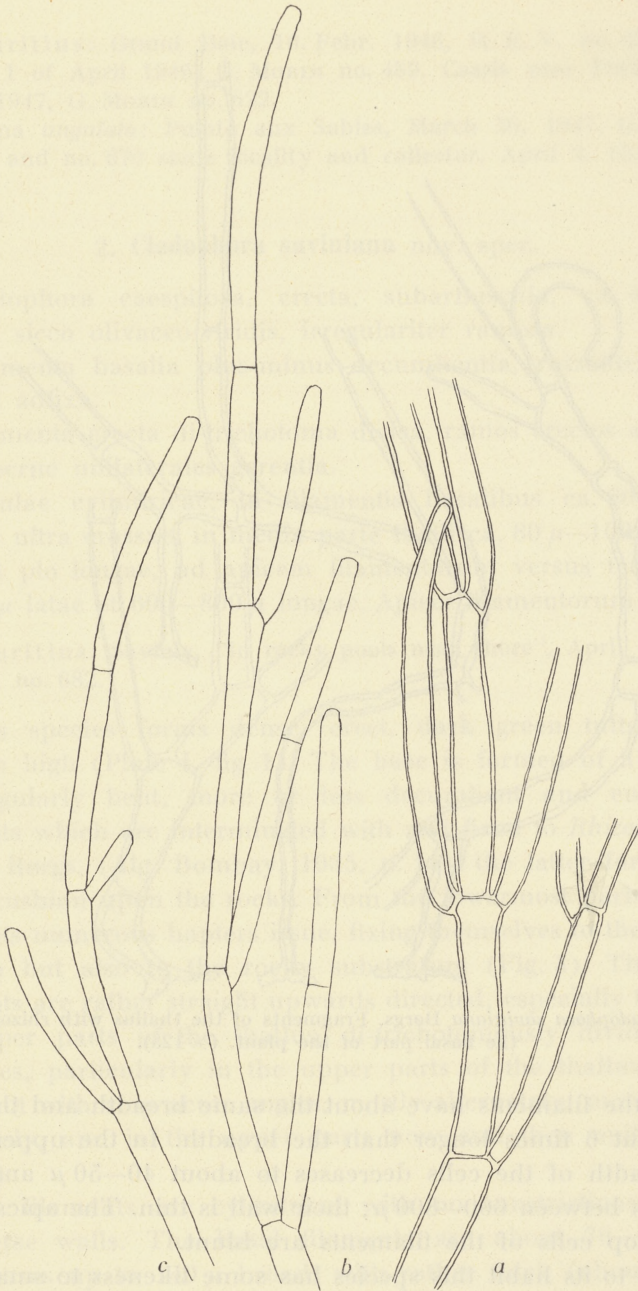


Fig. 4. *Cladophora saviniana* Børgs. *a*, part of filaments from near the middle of the thallus; *b*, *c*, branchlets uppermost in the thallus. (*a* \times 75; *b*, *c* \times 30).

1870, p. 38, mentions that he has seen some large specimens from Port Natal, which he refers to *Clad. prolifera*; these specimens may have belonged to the species described here.

3. *Cladophora Vaughani* nov. spec.

Cladophora pulvinato-caespitosa, ca. 3—4 cm alta, in sicco olivaceo-viridis, irregulariter ramosa.

Rami principales in parte basali di-trichotomi, dein alternantes et in summis ramorum plus minus unilaterales.

Filamenta in parte basali ca. 150—200 μ crassa, ad apicem versus gradatim tenuiora, in ramulis superioribus ca. 30 μ lata.

Cellulae subcylindricae superne crassiores.

Cellulae apicales interdum in akinetes fusiformes aut irregulariter creatas transformatae.

Mauritius: Îlot Brocus, "in lagoon near Barachois", March 8, 1947, R. E. V. no. 647.

The plant forms rather loose tufts, about 3—4 cm high. The base is wanting in the specimens.

The thicker filaments have a breadth of 150—200 μ and their walls are thick and stratified; the length of the cells mostly is about 600—900 μ , but shorter ones are also present.

The ramification is rather irregular, bi-tripartite (Fig. 5); in some cases branches are given out from each joint, in others long intervals between the branches are present; the branches sometimes issue alternately, sometimes unilaterally, especially in the upper filaments (Fig. 6).

In some of the filaments the breadth decreases slowly upwards, the filaments above running out in quite thin filaments reaching a breadth of 30—35 μ only, the length of the cells being of variable length up to 600 μ (Fig. 5).

In other filaments the uppermost part of the filaments keep a breadth of about 60 μ . The apical cells in several of these filaments become more or less swelled, often first spindle-shaped, but later by spine-like outgrowths getting a very irregular shape; compare Figs. 6, 7.

These bodies get thick walls and dense dark-green chromatophores and are loaded with starch; they are surely to be con-

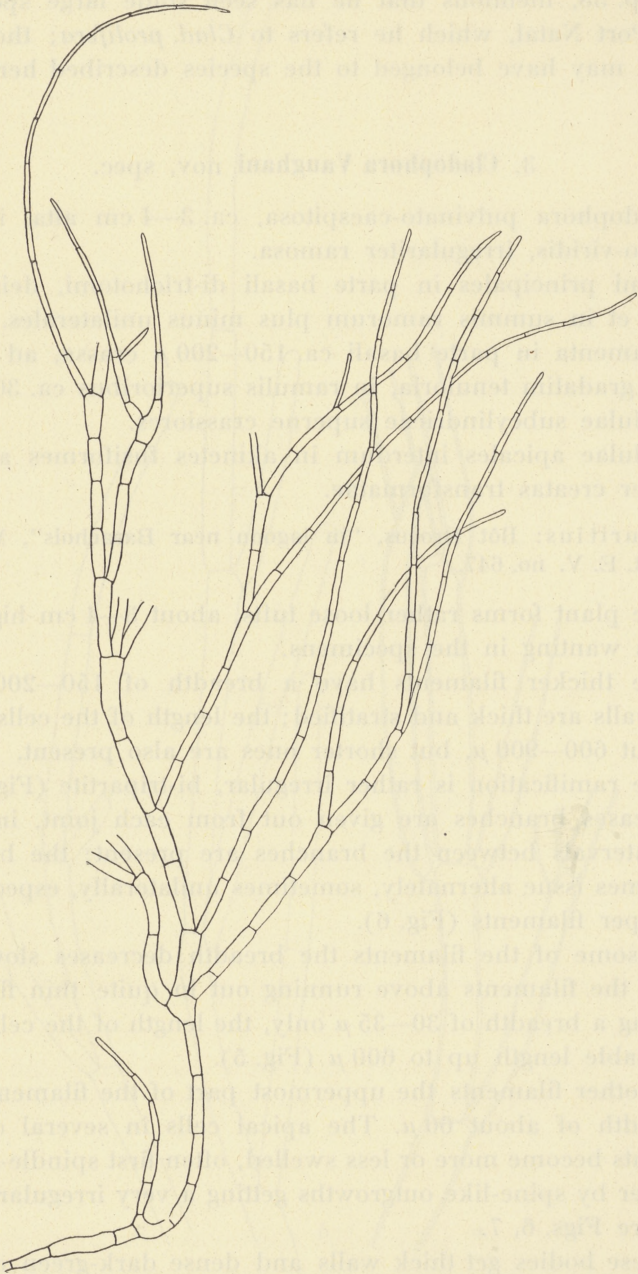


Fig. 5. *Cladophora Vaughani* Børgs. Fragment of the thallus. ($\times 25$).



Fig. 6. *Cladophora Vaughani* Børgs. *a*, a branchlet in which the apical cell has become spindleshaped; *b*, *c*, the uppermost cells issuing excrescences; *d*, showing similar conditions; *e*, an adventitious branch begins to grow out. Besides compare the text. (\times ca. 100).

sidered as akinetes. When the uppermost of these akinetes are dropped, the cells below in some cases seem gradually to be transformed into similar bodies (Fig. 6), in other cases a single akinete only is formed.

Formerly akinete-formation has been found in *Cladophora glomerata* in which all cells in the filaments may be more or

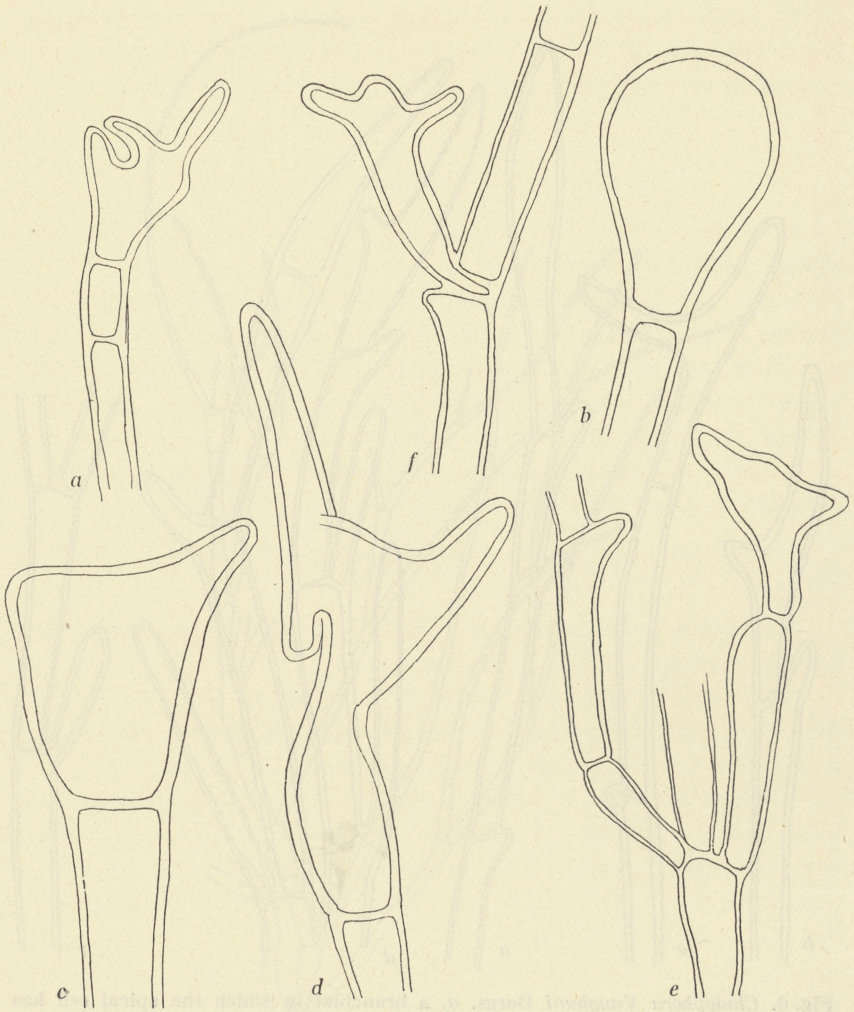


Fig. 7. *Cladophora Vaughani* Borgs. Differently shaped akinetes formed by the apical cells. *f*, an akinete formed by an intercalary, adventitious branch. (\times ca. 100).

less transformed (BRAND, F., *Cladophora-Studien*, 1899, p. 1145 and CHOLNOKY, B., *Dauerorgane von Cladophora glomerata*, 1929—30, p. 545).

The description of this plant is based upon some little material preserved in formol and seawater; in the two dried specimens having the same number (647) I have been unable to find

any of the akinetes at all. Upon the whole the dried material does not seem to be the same species as that preserved in formol.

4. *Cladophora Echinus* (Bias.) Kütz.

KÜTZING, Phycologia Germanica, p. 220; Spec. Alg., p. 414; Tab. Phycol., IV, pl. 62, fig. 1. HAUCK, Meeresalgen, p. 448, fig. 197. HAMEL, G., Quelques *Cladophora* des côtes françaises, p. 50, fig. 18 b. — *Conferva Echinus* Biasoletto, Viaggio di S. M. Frederico Augusti Re di Sassonia per l'Istria, Dalmazia e Montenegro, Trieste 1841 (after Hauck).

In my paper on the marine algae from the Iranian Gulf, 1939, p. 68, I have referred a specimen of *Cladophora* to this species because the plant seemed to me to agree quite well with the figure of HAMEL drawn after an authentic specimen of BIASOLETTO. From Mauritius I have been able to examine some

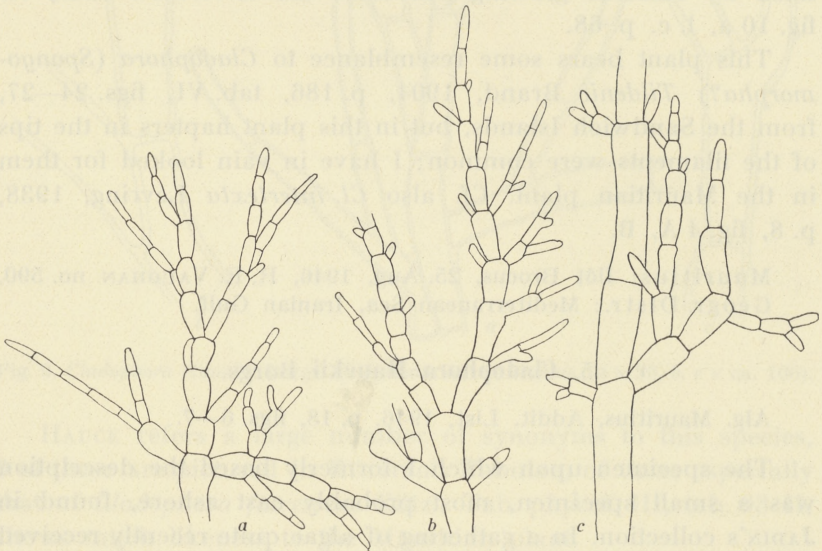


Fig. 8. *Cladophora Echinus* (Bias.) Kütz. a, b, apical fragments of the thallus. c, fragment from the middle of the thallus. (\times about 20).

material, sent to me by Dr. VAUGHAN, of a small *Cladophora* which coincides rather well with that from the Iranian Gulf. Fig. 8 shows some parts of the plant.

According to Dr. VAUGHAN the plant forms "inconspicuous cushion-like growths in between rocks". The cushions are scarcely

1 cm high and the *Cladophora* is mingled with other small algae, especially *Gelidium*. The ramification is very irregular, a single, sometimes two opposite, or 3—4 branches are given out from the cells. The cell-walls in older parts of the thallus are very thick and stratified, up to $25\ \mu$ thick. The cells increase in breadth more or less upwards. The length of the cells is greatly varying, from about $1\frac{1}{2}$ times the breadth up to 5—6 times. The uppermost cells in the filaments have thinner walls and these cells become transformed more or less in zoosporangia. The thicker basal cells may reach a breadth up to $150\ \mu$, while the uppermost cells are about $30\ \mu$. The apical cells are blunt. The plant is more or less covered by diatoms.

In the material scraped from the substratum I have not been able to find the base, in the plant from the Iranian Gulf it is fixed by rhizoids growing out from the lowermost cells; cf. fig. 10 a, l. c. p. 68.

This plant bears some resemblance to *Cladophora* (*Spongomorpha*?) *Tildenii* Brand, 1904, p. 186, tab. VI, figs. 24—27, from the Sandwich Islands, but in this plant hapters in the tips of the filaments were common; I have in vain looked for them in the Mauritian plant. Cf. also *Cl. intertexta* Levring, 1938, p. 8, fig. 4 A, B.

Mauritius: Îlot Brocus, 25. Aug. 1946, R. E. VAUGHAN no. 590.
Geogr. Distr.: Mediterranean Sea, Iranian Gulf.

5. *Cladophora Hauckii* Borgs.

Alg. Mauritius, Addit. List, 1946, p. 18, figs. 6—7.

The specimen upon which I formerly based the description was a small specimen, most probably cast ashore, found in JADIN's collection. In a gathering of algae quite recently received from Dr. VAUGHAN some well prepared specimens of the same species as that of JADIN are contained (Pl. I, fig. 2). These specimens form about 7—8 cm high, dark green tufts composed of much intertwined, irregularly ramified, rather stiff, thick-walled filaments. Like the previously examined specimens those now received are in good conformity with HAUCK's description in "Meeresalgen", 1885, p. 461; in one respect only, there is a difference, viz. in the breadth of the filaments, this rarely reaching

more than $150\ \mu$. Another peculiarity, not mentioned in HAUCK's description, is that especially in the adventitious branches the basal wall is formed late at some distance from where the branches issue; compare fig. 6, l. c. and fig. 9.

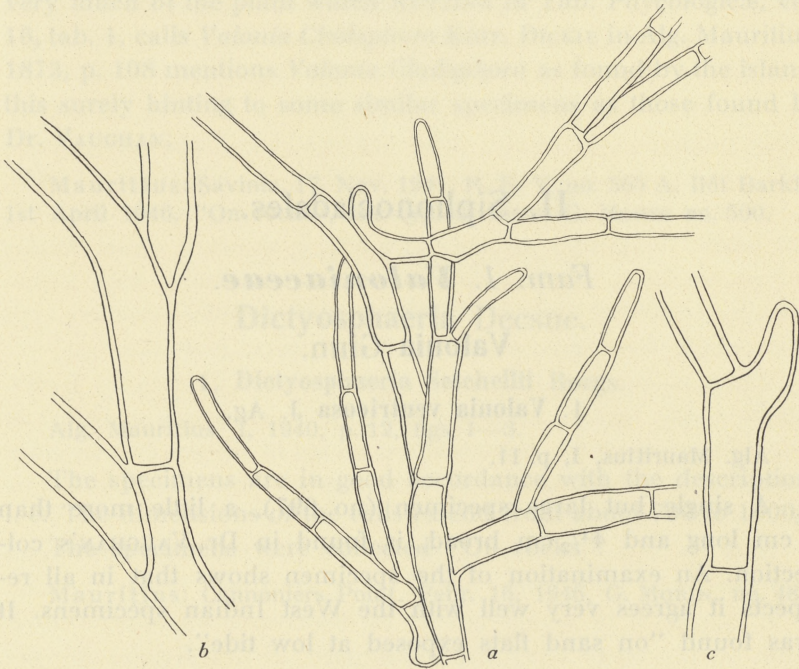


Fig. 9. *Cladophora Hauckii* Børgs. Fragments of the thallus. ($a \times 30$, $b, c \times \text{ca. } 100$).

HAUCK refers a large number of synonyms to this species, 3 of these are pictured in KÜTZING's *Tabulae*; of these especially that of *Cladophora fuscescens* Kütz., *Tab. phycol.* III, tab. 93 II, shows much likeness to the Mauritian plant.

Mauritius: Near Gris-Gris. Mouth of Rivière Bain des Nègresses, 5th of June 1947, R. E. V. no. 691.

6. *Cladophora* (*Aegagropila*) *socialis* Kütz.

Addit. List, 1946, p. 28.

Two specimens in Dr. VAUGHAN's collection are referable to this species. The one (no. 653) forms large roundish clumps

upon *Digenea simplex*, the other (607) was attached to *Sargassum* in shallow water. In the latter specimens apical cells were found having a length up to 1500 μ .

Mauritius: Pointe aux Sables, Sept. 1, 1946, R. E. V. no. 607.
Savinia, April 4, 1947, R. E. V. no. 653.

II. Siphonocladales.

Fam. 1. *Valoniaceae*.

Valonia Ginn.

1. *Valonia ventricosa* J. Ag.

Alg. Mauritius, I, p. 11.

A single but large specimen (no. 697), a little more than 5 cm long and 4 $\frac{1}{2}$ cm broad, is found in Dr. VAUGHAN's collection. An examination of the specimen shows that in all respects it agrees very well with the West Indian specimens. It was found "on sand flats exposed at low tide".

Mauritius: Pointe d'Esny, April 16, 1947, P. O. WIEHE, no. 697.

2. *Valonia utricularis* (Roth) C. Ag.

Alg. Maur., I, p. 11.

Forma *crustacea* Kuck., 1907, p. 42, tab. IV, fig. 10.

Dr. VAUGHAN has gathered some specimens of this form "in rock crevices dashed by waves". The specimens from Mauritius agree very well with the plant I have collected in the West Indies; compare my description and figures 17 and 18, 1913, pp. 30—31. The firmly connected cells forming the compact thallus had a breadth of about 1—2 mm.

Mauritius: Pointe aux Sables, March 31, 1946, R. E. V. no. 494.

3. *Valonia aegagropila* C. Ag.

Alg. Mauritius, I, 1940, p. 11, Additional List, 1946, p. 13.

Dr. VAUGHAN has collected some fine, rather regularly ramified, specimens preserved in formol, the habit of which reminds very much of the plant which KÜTZING in Tab. Phycologicae, vol. 16, tab. 1, calls *Valonia Cladophora* Kütz. DICKIE in Alg. Mauritius, 1873, p. 108 mentions *Valonia Cladophora* as found by the island, this surely hinting to some similar specimens as those found by Dr. VAUGHAN.

Mauritius: Savinia, 17. Nov. 1941, R. E. V. no. 565 A. Îlot Barkly, 1st April 1946, "On rocks", the typical form, G. MORIN no. 500.

Dictyosphaeria Decsne.

1. *Dictyosphaeria Setchellii* Børgs.

Alg. Mauritius, I, 1940, p. 12, figs. 1—3.

The specimens are in good accordance with the description, l. c. The dimensions of the cells extend from about 700 to 1500 μ . The specimens were collected "On rocks".

Mauritius: Cannoniers Point. Febr. 16, 1946, G. MORIN, no. 485.

Fam. 2. *Siphonocladaceae*.

Boergesenia Feldm.

1. *Boergesenia Forbesii* (Harv.) Feldm.

FELDMANN, J., Sur la classification de l'ordre des Siphonocladales, 1938, p. 18, figs. 3—5. — *Valonia Forbesii* Harv., Alg. Ceylon Exsicc., no. 75 and Friendly Islands Algae no. 112. BØRGESEN, F., Alg. Ceylon, 1936, p. 62, fig. 1. AGARDH, J., Till Algernes Systematik, 5te Afd., VIII, 1886, p. 96. — *Pseudovalonia Forbesii* Iyengar, On the Structure and Life-History of *Pseudovalonia Forbesii* (Harv.) Iyengar, 1938, p. 191, figs. 1—4.

In their papers both the investigators FELDMANN (1938, p. 13) and IYENGAR (1938, p. 191) point out that this alga is no *Valonia*,

but that its structure places it in the order *Siphonocladales*. And FELDMANN at the end of his description remarks that *Boergesenia* "peut être considéré comme le type le plus simple et le plus primitif de la famille" (*Siphocladaceae*).

And when describing the basal segmented filaments of the plant, IYENGAR, basing his description upon living material, gives the very interesting information that the septation of the basal branches of the plant is performed by segregative division.

I mention this particularly here because FRITSCH in his recently published paper on "The Status of the Siphonocladales", 1947, p. 43 about *Boergesenia*, referring to FELDMANN, 1938, p. 16, says that "it exhibits none of the segregative division", and adds: "although in other respects it shows a close affinity to *Siphonocladus*, for example". And in conformity with FELDMANN he adds that "it may well be a replica of the primitive type from which the whole series of forms originated".

When comparing the small *Siphonocladus Feldmanni* Børgs. (1939, p. 61, fig. 5), in the erect vesicles of which species, in more rare cases only, segmentation seems to be present, to judge from the scarce material, the likeness to *Boergesenia* must be said to be very great.

And no less likeness seems to be present with the small *Siphonocladus perpusillus* Setch. and Gardner (1930, p. 135, pl. 4, figs. 6,7), in which species no transverse walls are found, while on the other hand the basal parts of the vesicles are not annularly constricted, and about the rhizoids it is said only that they are branched. In *Siphonocladus pusillus* (Kütz.) Hauck annular constrictions near the base of the erect vesicles were not found by FELDMANN (1937, p. 59), and in *Siphonocladus Feldmanni* I found them only very feebly developed in a single specimen.

Mauritius: Gris-Gris near Souillac, May 20, 1946, R. E. V. no. 606.

Geogr. Distr.: Red Sea (according to specimens from Ghardaka by A. A. NAYAL), much distributed in the Indian and Pacific Oceans.

Cladophoropsis Børgs.

1. *Cladophoropsis Zollingeri* (Kütz.) Børgs.

Alg. Mauritius, Additional List, 1946, p. 15.

In Dr. VAUGHAN's collection some fine specimens are found. They form dark-green, about 4—6 cm high tufts composed of the stiff and much entangled filaments. These had a breadth of about 260—350 μ .

Mauritius: Cassis, 18. Jan., 1947, G. MORIN, no. 640.

A note on *Cladophoropsis*.

Spongocladia vaucheriaformis Aresch.

Alg. Mauritius I, 1940, p. 25, Addit. List, 1946, p. 17.

In a collection of algae recently received from Dr. VAUGHAN a form is found quite different in shape from that which I have formerly seen of this sponge. living in symbiosis with an alga

While the specimens formerly examined agreed with ARESCHOUG's figures, that which I have now received forms an expanded, thick,

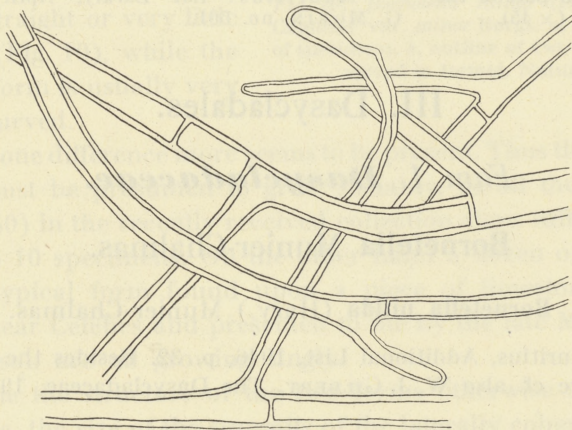


Fig. A. Fragments of the *Cladophoropsis* from the upper part of the sponge. ($\times 45$).

tough, $\frac{1}{2}$ —1 cm thick mat, from which on the upper side erect, elongate-conical, 2—3 cm high outgrowths arise.

On the other hand the alga, being the biont of the sponge, is quite like that found in the formerly examined specimens, and thus in my opinion is a *Cladophoropsis*. Fig. A shows some fragments of the filaments from the upper parts of the thallus, in which transverse walls and ramifications are rare. Especially in the erect

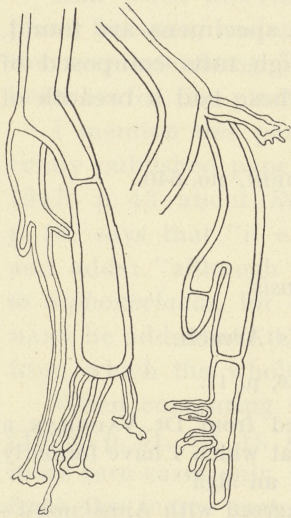


Fig. B. Fragments of the *Cladophoropsis* with rhizoids from the basal part of the sponge. ($\times 45$).

prominences the extended filaments are nearly without transverse walls or ramifications, running straight upwards and closely connected, which makes it look as if the alga made efforts to escape the embrace of the sponge. The filaments have here a diameter of about $50-100 \mu$. The filaments in the basal part (Fig. B) are irregularly and rather much ramified, often moniliform or swollen and very intricate. From their basal parts numerous irregularly ramified rhizoids emerge, the alga, carrying out the whole process of fastening the sponge to the substratum. Besides *Cladophoropsis* fragments of other algae, for instance *Cladophora* and *Rhizoclonium*, might occur in the basal part of the sponge, the latter during its growth covering what is found upon the substratum.

The wall of the filaments especially in the basal parts is thick and stratified, up to 5μ thick.

Mauritius: Îlot Barkly, April 1, 1946, G. MORIN, no. 501.

III. Dasycladales.

Fam. 1. *Dasycladaceae*.

Bornetella Munier-Chalmas.

1. *Bornetella nitida* (Harv.) Munier-Chalmas.

Alg. Mauritius, Additional List, 1946, p. 32. Besides the literature quoted there cf. also W. J. GILBERT, The Dasycladaceae, 1943, p. 25, fig. 1, e-f.

var. *minor* nov. var.

A forma *typica* var. *minor* eo praecipue differt, quod thallus tantum 2 cm altus et 4 mm latus est; praeterea thallus in varietate *minore* prope erectus, non valde curvatus, ut in forma *typica*.

Denique planta mauritiana caespites format, forma vero *typica* solitaria est.

In the above-quoted paper (1946, p. 32) it is mentioned that the very few specimens from Mauritius examined at that time were rather small. Having now received from Dr. VAUGHAN a very fine and rich collection of the Mauritian plant showing that all the specimens are a good deal smaller than the typical form and as the specimens in other respects also show some differences, I prefer to consider the Mauritian plant as a new variety. Fig. 10.

As to the size the Mauritian specimens are about 2 cm high, the largest specimens reaching a length of 2.4 cm, while on the other hand the typical form is 3 cm high; the breadth of the thallus is about 4 mm in the specimens from Mauritius, while the breadth in the typical form comes up to 7.5 mm.

Another difference is that the plant from Mauritius is nearly straight or very little curved (Fig. 10), while the typical form is usually very much curved.

And one difference more seems to be present. Thus the Mauritian plant must be presumed to grow sociably, as all the specimens (about 50) in the recently received collection show tufts composed of up to 10 specimens. On the other hand a dozen of specimens of the typical form found upon a piece of limestone from an island near Celebes and presented to me by the late MME WEBER VAN BOSSE are all growing singly.

While the structure of the two forms otherwise seems to be the same, the size of the summits of the laterally coherent capitate branches, which form the cortex, are somewhat smaller in the specimens from Celebes than those in the plant from Mauritius, which is easily seen when comparing the drawings of both plants at the same magnification (Fig. 11).

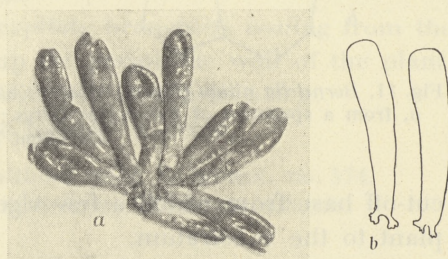


Fig. 10. *Borneletta nitida* (Harv.) Munier-Chalmas var. *minor* Borgs. a, a dried colony of specimens. b, outline of two specimens preserved in formol. Natural size.

The plant from Mauritius has no stipe. From the broadly rounded apex the thallus tapers gradually to the broad abruptly

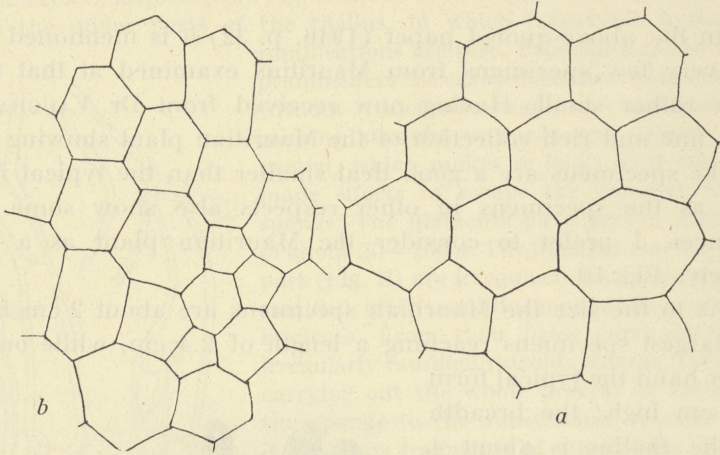


Fig. 11. *Bornelella nitida* (Harv.) Munier-Chalmas. Parts of the peripheral cortex: *a*, from a specimen of var. *minor* Borgs.; *b*, from a specimen from Celebes. (\times about 75).

cut-off base from which a few vigorous hapters issue, fixing the plant to the substratum.

The plant was growing on old coral in 2' of water at low tide.

Mauritius: Ilôt Barkly collected by G. MORIN, Nov. 19th 1945, no. 576.

2. *Bornetella sphaerica* (Zanard.) Solms.

SOLMS LAUBACH in Ann. Jard. Buitenzorg, vol. V, 1892—93, p. 92. GILBERT, W., Philippine Chlorophyceae I, 1942, p. 22, figs. 1 a-b. — *Neomeris* (?) *sphaerica* Zanard., in Nuovo Giorn. Ital., vol. X, 1873, p. 38.

Of this small interesting species, hitherto known only from some few localities in the Malayan Archipelago and the Philippine Islands, some few specimens (5 in all) preserved in formol are contained in a collection of algae recently received from Dr. VAUGHAN.

The specimens are nearly spherical with a diameter of about 6 mm. No stipe is present in the specimens and any other hold-fasts have not been found either, the specimens, when torn loose

from the substratum, having lost them. Regarding the anatomical structure of the Mauritian specimens this agrees quite well with that described in the papers mentioned above, for which reason I restrict myself to give here only some measures of the aplanosporangia and spores. The former are nearly globular, containing from 4 to 12 spores and their size, according to the number of spores contained being smaller or larger, the former having a diameter of about 175μ , while that of the larger one reaches a length of about 275μ . The spores are nearly globular or more often somewhat tri-pentagonal because of the mutual pressure in the sporangia; they have a diameter from 80 to 120μ . Their wall is about 5μ thick and plain; according to GILBERT the wall is slightly stratified; I have not found this much developed in the specimens from Mauritius.

The inflated ends of the capitate branchlets issuing from the primary ones, which make up the peripheric wall of the plant, are of rather variable size from about 170 to 530μ .

No information about the locality is given.

Mauritius: Îlot Barkly, without date, G. MORIN, no. 574.
Geogr. Distr.: Malayan Archipelago, Philippine Islands.

IV. Siphonales.

Fam. 1. *Bryopsidaceae*.

Pseudobryopsis Berthold.

1. *Pseudobryopsis mauritiana* nov. spec.

Frons caespitosa, irregulariter ramosa, mollissima, ad 10 cm alta.

Filamenta in parte basali nuda et 400μ lata, ad apicem versus ramellifera et gradatim tenuiora. Ramuli cylindrici, ca. 1 mm longi et $70-80 \mu$ lati, simplices, aut interdum ramellos gerentes, apicibus obtusis.

Chromatophorum disciforme, rotundatum, $4-7 \mu$ latum, pyrenoide instructum.

Gametangia mucronata vel lateralia, obovata, in latere ventrali ramulorum orta, vel terminalia, magis elongata, in apicibus ramulorum et ramellorum formata.

Mauritius: Cassis, "floating in surface, brought in after a storm", Jan. 7, 1947, G. MORIN, no. 621.

This new species of *Pseudobryopsis* (Pl. II) is a comparatively large plant, reaching a height of up to 10 cm and perhaps more, having been found floating only without base. Regarding the base a bundle of rhizoids were issued from the basal end of the stem in some specimens, for which reason the base most probably is a plexus of rhizoids; the latter are irregularly bent and inflated and now and then furcated (Fig. 12 *b*). Most likely rhizoids may be developed anywhere in the thallus, in any case I have once

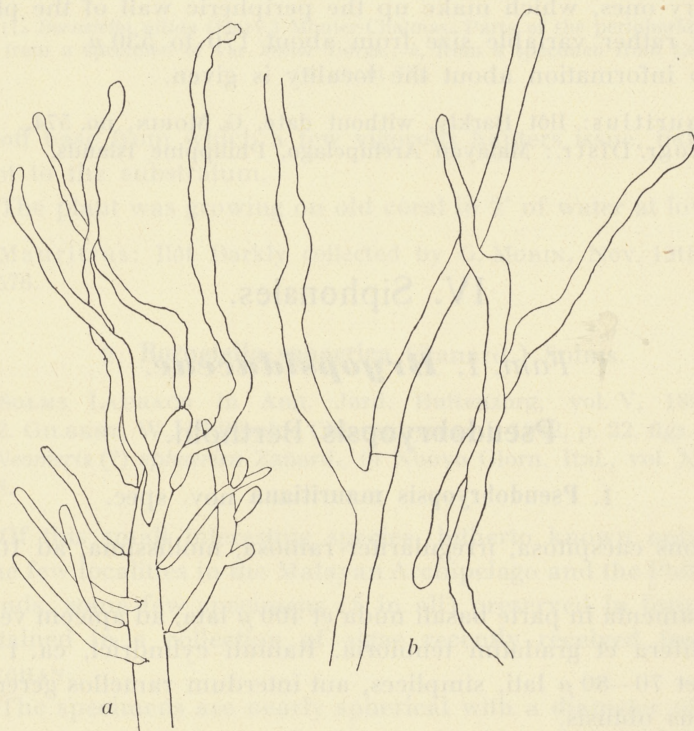


Fig. 12. *Pseudobryopsis mauritiana* Børgs. *a*, an apical end of a branch with ramuli and rhizoids. *b*, rhizoids from the base of the plant. ($\times 30$).

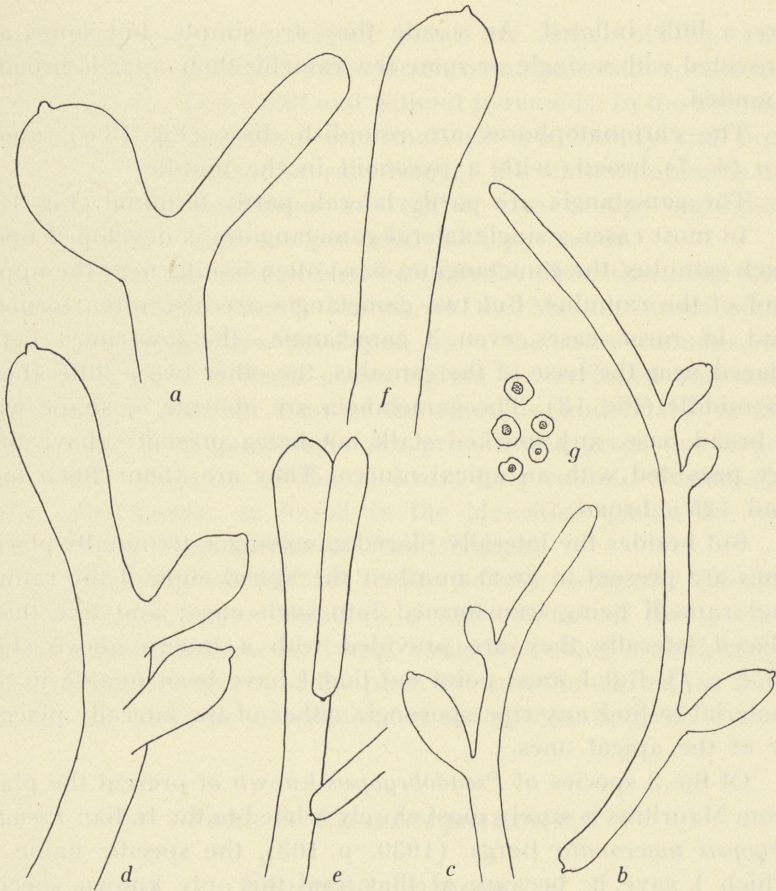


Fig. 13. *Pseudobryopsis mauritiana* Borgs. *a, b, c*, ramuli with lateral gametangia; *d*, a ramulus with apical and two lateral gametangia; *e, f*, apical gametangia; *g*, chromatophores with pyrenoids. (*a, d, f* $\times 150$; *b, c, e* $\times 75$; *g* $\times 500$).

found the ramuli near the apical end of a branch transformed into rhizoids. (Fig. 12 *a*).

Near the base the main axes are naked, but soon they become covered with ramuli issuing from all sides. At some distance from the base lateral branches are given out often in a rather great number, and the branches are again ramified, all being covered by ramuli. The main filaments are below about $400\ \mu$ thick and taper evenly but very slowly upwards.

The ramuli are very soft, about 1 mm long and $70\text{--}80\ \mu$ thick, about cylindrical except near the base, where they mostly

are a little inflated. As a rule they are simple, but some are provided with a single or some few ramelli; their apex is broadly rounded.

The chromatophores are roundish discs (Fig. 13 *g*), about 5μ (4—7) broad, with a pyrenoid in the middle.

The gametangia are partly lateral, partly terminal (Fig. 13).

In most cases a single lateral gametangium is developed upon each ramulus, the gametangium most often issuing near the upper end of the ramulus. But two gametangia are also often formed, and in rarer cases even 3 gametangia, the lowermost being placed near the base of the ramulus, the other two a little above its middle (Fig. 13). The gametangia are obovate of shape with a broad base, any marked stalk not being present; above they are provided with an apical mucro. They are about 200μ long and 125μ broad.

But besides the laterally placed gametangia, terminally placed ones are present in great number, the apical ends of the ramuli and ramelli being transformed into such ones; and like those placed laterally they are provided with a mucro above (Fig. 13 *d, e, f*). But I must point out that I have been unable in the material to find any ripe sporangia either of the laterally placed, or of the apical ones.

Of the 3 species of *Pseudobryopsis* known at present the plant from Mauritius is surely most closely related to the Indian *Pseudobryopsis mucronata* Børgs. (1930, p. 163), the specific name of which I gave it, because at that time the only known species *P. Myura* (J. Ag.) Berth. from the Mediterranean Sea was supposed to have gametangia without a mucro; but later FELDMANN (1937, p. 93) has at Banyuls in France found a form with a mucro and as mentioned by FELDMANN I have also myself, when reexamining some material of *P. Myura* from the Canary Islands, found that some of the gametangia had a mucro, and mucronated sporangia are also found in the third species *P. hainanensis* Tseng (1936, p. 171). Meanwhile Dr. FELDMANN, when comparing some material of the Indian *P. mucronata* preserved in alcohol, which according to his wish I had sent to him for comparison with specimens preserved in alcohol of the plant from Banyuls, has found an essential difference between the Indian plant and that from the Mediterranean, viz. that the

chromatophores in the Indian plant are large, oblong, and provided with a pyrenoid, while the chromatophores in specimens of *P. Myura* are quite small and without pyrenoids. In the Chinese plant the chromatophores are small (2—3 μ broad) and provided with pyrenoids. As said above, the chromatophores in the plants from Mauritius as regards size occupy an intermediate position and are provided with pyrenoids.

To continue the comparison between the Mauritian plant and the three species formerly known, in the Mediterranean plant several gametangia are developed upon the same ramulus, in the Chinese plant a single gametangium is developed only and this is placed near the base of the ramulus, and finally in the Indian plant 1—2 gametangia are present and given out somewhat below the apex of the 2—3 mm long ramuli. Terminally placed gametangia, as found in the Mauritian plant, are not found in the other species of *Pseudobryopsis*.

In Proceedings of the 25th Indian Science Congress, Calcutta 1938 M. O. P. IYENGAR mentions a new species of this genus: *Pseudobryopsis pambanensis* Iyeng. Some interesting investigations about the swarm-spores of the plant are mentioned, but, as far I am able to state, no description of the species is given.

Fam. 2. *Caulerpaceae*.

Caulerpa Lamour.

1. *Caulerpa brachypus* Harv.

Alg. Mauritius, Additional List, 1946, p. 37, figs. 14—15.

Of this species I have recently received from Dr. VAUGHAN some fine material, and an examination has shown that the specimens were in good accordance with the fragment which is pictured in Fig. 14 l. c. having the margin of the thallus sinuate and dentate as seen in Fig. 15.

Meanwhile being able to examine complete specimens of this species it became clear to me that this plant as to its habit highly reminded of *Caulerpa Mauritiana* described by me in Part I, p. 45, the characteristic features of which were that it

has an even, not sinuate margin and being not dentate; besides it is a good deal larger. Because of this I undertook a renewed thorough examination of the specimen of *Caulerpa mauritiana* and after much search I succeeded in finding two small dentate outgrowths like those found in *Caulerpa brachypus*, while the margin on the other hand was even. Because of this discovery I do not feel entitled to keep up *Caulerpa mauritiana* as a species but only as a variety: var. *mauritiana* of the very much variable species *Caulerpa brachypus*; compare WEBER VAN BOSSE, 1926, p. 89 and OKAMURA, Icones, vol. III, pl. 125. While the above-mentioned specimen was dredged at a depth of 2—3 fathoms of water in a sheltered locality, the later received specimens were growing in shallow water, about 2 feet at low tide on sandy bottom. When compared with the specimens pictured in Part I, pl. III, the later received specimens are scarcely half as big.

Mauritius: Cannoniers point, Febr. 16, 1946, G. MORIN, no. 484.

2. *Caulerpa eupressoides* (Vahl.) Ag. Weber emend.

Alg. Mauritius, I, p. 50.

var. *mamillosa* (Mont.) Weber, Monographie, p. 332, pl. 28, figs. 2—7.

Of this variety a fine specimen is found in Dr. VAUGHAN'S collection.

Mauritius: Ilôt Barkly, "On rocks", 17th Jan. 1946, G. MORIN, no. 486.

3. *Caulerpa racemosa* (Forssk.) J. Ag., Web. van Bosse.

Alg. Mauritius, I, 1940, p. 51, Addit. List, 1946, p. 39.

A well developed specimen of the var. *clavifera* is found in Dr. VAUGHAN'S collection.

Mauritius: Ilôt Barkly, April 1, 1946, G. MORIN, no. 507.

Fam. 3. *Codiaceae*.*Avrainvillea* Decsne.1. *Avrainvillea amadelpha* (Mont.) Gepp.

Alg. Mauritius, I, 1940, p. 54.

Forma *Montagneana* Gepp, l. c.

Of this species some fine specimens preserved in formol have been received from Dr. VAUGHAN.

The specimens have an expanded cushion-like, irregularly shaped, tough base firmly fixed to the substratum, from which

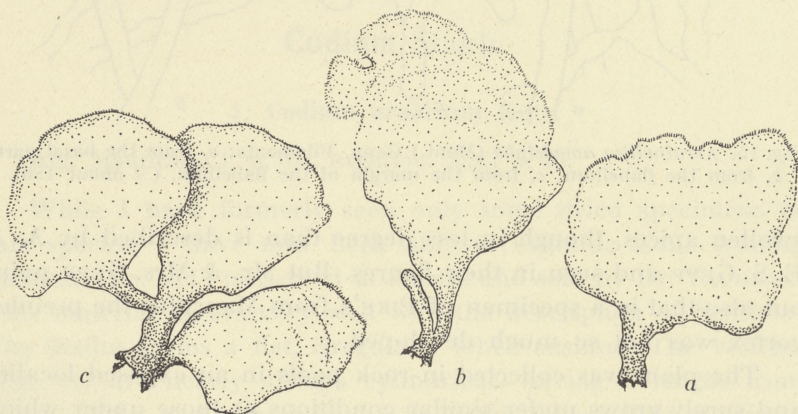


Fig. 14. *Avrainvillea amadelpha* (Mont.) Gepp. Three erect shoots. ($\times 1,4$).

a great number of erect fan-shaped shoots arise. The erect shoots (Fig. 14) are densely placed, about 3—5 cm high. They have a short, up to about 1 cm long, vigorous stipe. This is often ramified, giving out a single or some few erect shoots (Fig. 14 *b, c*). The fan-shaped flabellum is about 3—4 cm broad and high with a cuneate or subcordate base, and with a semicircular or more irregularly sinuated upper outline. The flabellum is of a soft and rather loose consistency, especially near the upper margin. In some of them a zonation is visible.

I give some figures of the filaments of which the flabellum is composed, partly taken from the flabellum, partly from the basal part. As appears from Fig. 15, the filaments are much torulose and often also moniliform, and they have more or less



Fig. 15. *Avrainvillea amadelpha* (Mont.) Gepp. Filaments: *a*, from the basal part; *b*, from the flabellum; *c*, from the margin of the flabellum. (\times about 150).

swollen apices, though in less degree than is described by A. & E. S. GEPP and seen in their figures. But Mr. & Mrs. GEPP point out also that in a specimen of PIKE's from Mauritius the pseudocortex was not so much developed.

The plant was collected in rock pools in an exposed locality and surely grows under similar conditions as those under which I have found *Avr. Ridleyi* A. & E. S. Gepp on a coral reef near Galle in Ceylon (1936, p. 70).

Mauritius: Pointe aux Sables, March 31, 1946, R. E. V. no. 497.

Udotea Lamx.

1. *Udotea Palmetta* Decsne.

Alg. Mauritius, I, 1940, p. 59.

A well developed specimen and a smaller one of this rather rare species is found in a collection received lately from Dr. VAUGHAN.

The large specimen including the stipe is 11 cm high and the slender stipe is $1\frac{1}{2}$ mm broad and including the thicker base 5 cm long. The flabellum has a cordate base and a roundish-circular outline, 6 cm high and broad, with irregularly sinuated margin. The surface of the flabellum is irregularly striped, the stripes radiating from the upper end of the stalk upwards on all sides, and it shows a distinct zonation, especially in the lower half of the flabellum. The margin is more or less lacerate.

The specimens were dredged at a depth of 5–6 fathoms.

Mauritius: Pointe aux Sables, April 18, 1941, G. CLOSEL, no. 558.

Codium Stakh.

1. *Codium arabicum* Kütz.

Alg. Mauritius, I, p. 61; Addition. List, p. 45.

While I have formerly seen only some dried specimens of this species, I have now been able to examine some fruiting material (no. 511) preserved in formol and sent by Dr. VAUGHAN. This material agrees very well with the description of SCHMIDT. The thallus forms a flat, irregularly lobed cushion. The vesicles (Fig. 16) are nearly always cylindrical, having a length from 400 to 770 μ and a breadth up to 200 μ , thus a little slenderer than those measured by SCHMIDT. The vesicles have a broadly rounded apical end with thin walls and are very often strongly contracted below the apex. Most of the vesicles are without hairs, but when present many hairs or scars after these are often found upon the same vesicle. The vesicles are firmly connected and therefore difficult to separate.

The fruiting vesicles carry a single, comparatively large gametangium, about 240–270 μ long and up to 110 μ broad (Fig. 16 *d*).

In another collection (no. 654) the vesicles were somewhat smaller, about 550–650 μ long and 60–150 μ broad. In some of the vesicles the apex was a little thickened and speckled.

Mauritius: Îlot Barkly, Jan. 19, 1946, G. MORIN, no. 511. Trou d'Eau Douce, March 22, 1947, G. MORIN, no. 654.

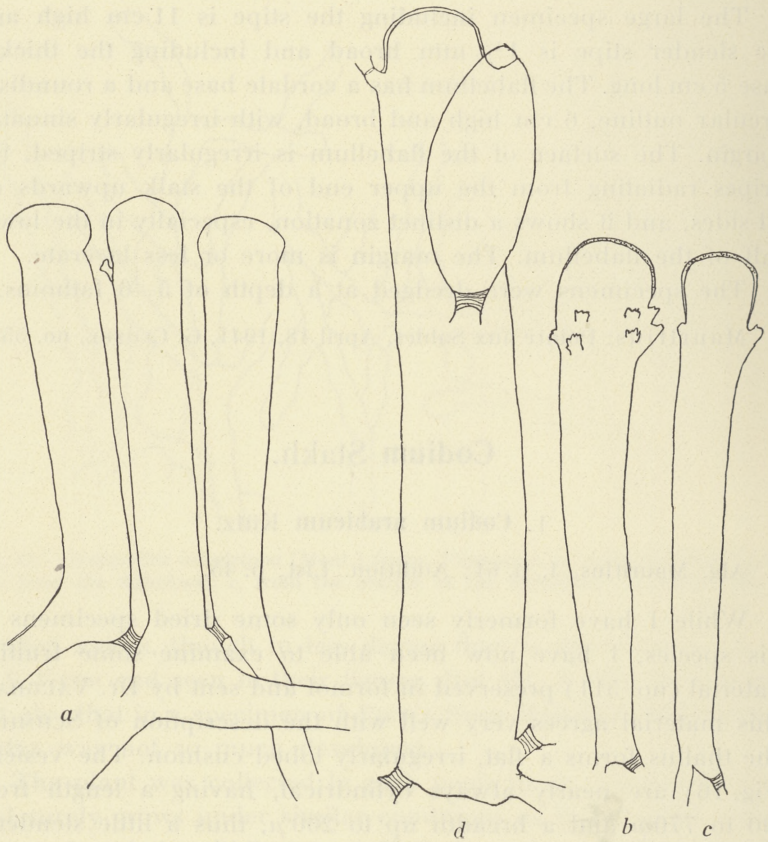


Fig. 16. *Codium arabicum* Kütz. *a*, *b*, *c*, vesicles; *d*, a vesicle with gametangium. ($\times 150$).

2. *Codium mauritianum* Børgs.

Alg. Mauritius, Additional List, 1946, p. 46, fig. 16.

Some fertile material of this species has been collected by Dr. VAUGHAN. The gametangia in all cases I have seen are born solitarily near the upper end of the vesicles, about $400\ \mu$ below the apex of these (Fig. 17).

The gametangia are elongate-obovate with broadly rounded apex, about $90\text{--}110\ \mu$ broad and $250\ \mu$ long.

In most cases the gametangia contained microgametes, but some few with macrogametes were also found in the same spe-

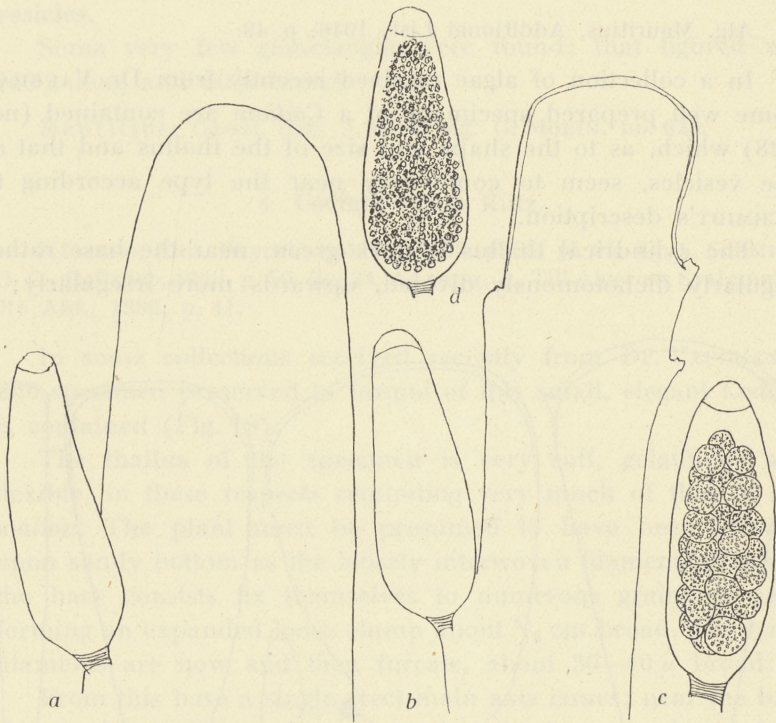


Fig. 17. *Codium mauritianum* Borgs. *a, b*, apical ends of vesicles with gametangia; *c*, a gametangium with macrogametes; *d*, a gametangium with microgametes. ($\times 150$).

cimen, this species being thus monoecious; compare SCHMIDT (1928, p. 625).

According to the figure 15 A of SCHMIDT (1923, p. 33) the gametangia in *C. spongiosum* likewise issue near the upper ends of the vesicles, but they are somewhat larger and especially broader than those in the Mauritian plant. And as compared with *C. difforme*, the gametangia in this species are larger, more spindle-shaped and issue near the middle of the vesicles according to SCHMIDT's figure 13, l. c. p. 32.

To judge from the material preserved in formol and seawater the thallus is quite amorphous, forming semiglobular or flattened masses, the consistency of which is very soft and slimy.

Mauritius: "Trou d'Eau Douce", March 22, 1947, R. E. V. no. 661.

3. *Codium Geppei* O. Chr. Schmidt

Alg. Mauritius, Additional List, 1946, p. 49.

In a collection of algae received recently from Dr. VAUGHAN some well prepared specimens of a *Codium* are contained (no. 628) which, as to the shape and size of the thallus and that of the vesicles, seem to come very near the type according to SCHMIDT's description.

The cylindrical thallus is dark green, near the base rather regularly dichotomously divided, upwards more irregularly; it

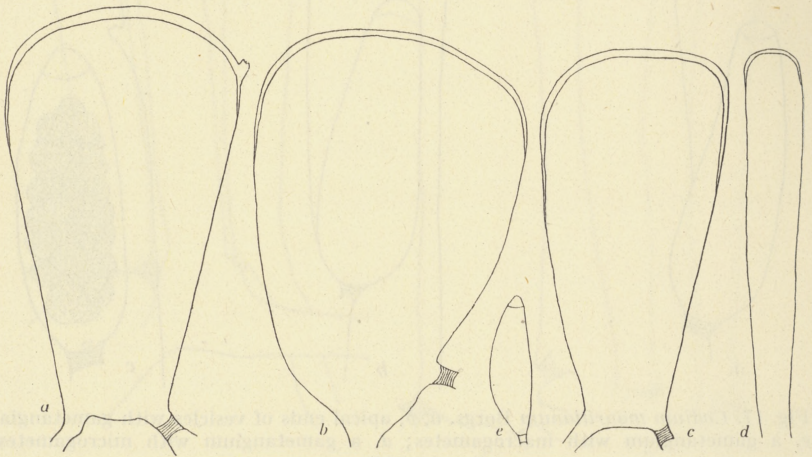


Fig. 18. *Codium Geppei* Schmidt. *a-d*, vesicles of different size; *e*, a gametangium. ($\times 115$).

is about $2\frac{1}{2}$ mm broad at the base, tapering slowly upwards to about 1 mm.

The vesicles are broadly abovate to pyriform (Fig. 18); as to size that figured in Fig. 18 *a* is $572\ \mu$ long and $330\ \mu$ broad, that in Fig. 18 *b* was $550\ \mu$ long and $350\ \mu$ broad and that in Fig. 18 *c* $500\ \mu$ long and $275\ \mu$ broad; thinner vesicles are found mingled among the broader ones (Fig. 18 *d*). Only in one respect a difference from SCHMIDT's description was present as the apical ends in some of the vesicles were much thickened, up to $15\ \mu$, and clearly stratified, while SCHMIDT states the thickening to be only $8\ \mu$. But having taken samples from different parts in the thallus it was found that this was not always the case,

in some parts the apical ends were less thickened in most of the vesicles.

Some very few gametangia were found; that figured was $160\ \mu$ long and $50\ \mu$ broad.

Mauritius: Cassis, Jan. 7, 1947, leg. G. MORIN, no. 628.

4. *Codium tenue* Kütz.

KÜTZING, Tab. Phycol., vol. VI, 1856, p. 33, pl. 95, fig. 1. SCHMIDT, O. C., Beiträge, 1923, p. 50, fig. 34. AGARDH, J., Till Algernes Systematik, 5te Afd., 1886, p. 41.

In some collections received recently from Dr. VAUGHAN a fine specimen preserved in formol of this small, elegant *Codium* is contained (Fig. 19).

The thallus of the specimen is very soft, gelatinous and flexible, in these respects reminding very much of that of *Nemalion*. The plant must be presumed to have been growing upon sandy bottom as the loosely interwoven filaments of which the base consists fix themselves to numerous grains of sand forming an expanded loose clump about $\frac{3}{4}$ cm broad. The basal filaments are now and then furcate, about $30\text{--}40\ \mu$ broad.

From this base a single erect main axis issues; near the base this is about $1\frac{1}{2}$ mm broad tapering slowly upwards to about $\frac{1}{2}\text{--}\frac{3}{4}$ mm. The thallus is repeatedly irregularly furcate with a distance of $2\text{--}3$ cm between the divisions.

The vesicles (Fig. 20) are mostly barrel-shaped or nearly square when seen from the side, their length reaching from about $270\ \mu$ to $450\ \mu$ and their breadth from $170\ \mu$ to $330\ \mu$. Thus the vesicle shown in Fig. 20 *d* is $176\ \mu$ broad and $275\ \mu$ long, while that represented in Fig. 20 *c* is $440\ \mu$ long and $330\ \mu$ broad; according to SCHMIDT the length of the vesicles is $300\text{--}650\ \mu$, rarely up to $700\ \mu$, and the breadth $120\text{--}400\ \mu$.

The vesicles in the plant from Mauritius are thus comparatively broader and shorter than those examined by SCHMIDT.

Vesicles tapering more or less towards the base are also found (Fig. 20 *c*), but not in a great number.

When seen from above the rather flat, broadly rounded or irregularly sinuate apex (Figs. 20 *e*, *f*) has a number of roundish or acute outgrowths from which the hairs, when present, are

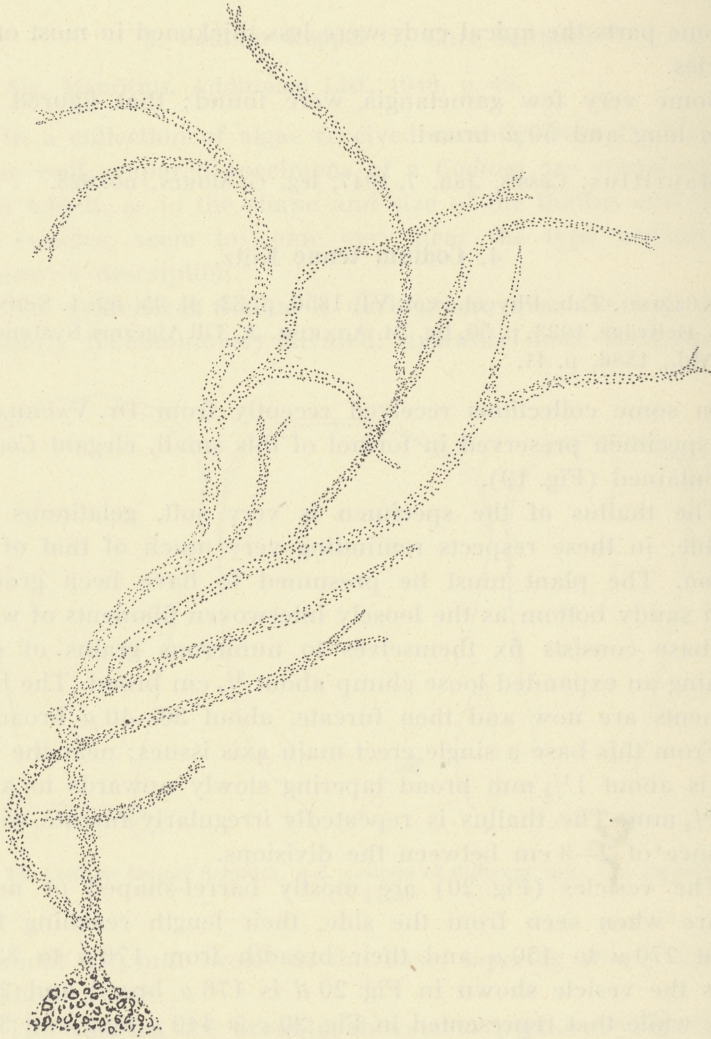


Fig. 19. *Codium tenue* Kütz. Habit of a specimen. ($\times 1\frac{1}{4}$).

given out. Because of these outgrowths the vesicles, when seen from above, often get a very irregular shape, compare fig. 20 e. The apical wall is thin.

The plant was sterile, but in KÜTZING'S figures gametangia are pictured.

Mauritius: Îlot Barkley, without date, G. MORIN, no. 575.

Geogr. Distr.: Red Sea, Cape, Port Natal, Malayan Archipelago.

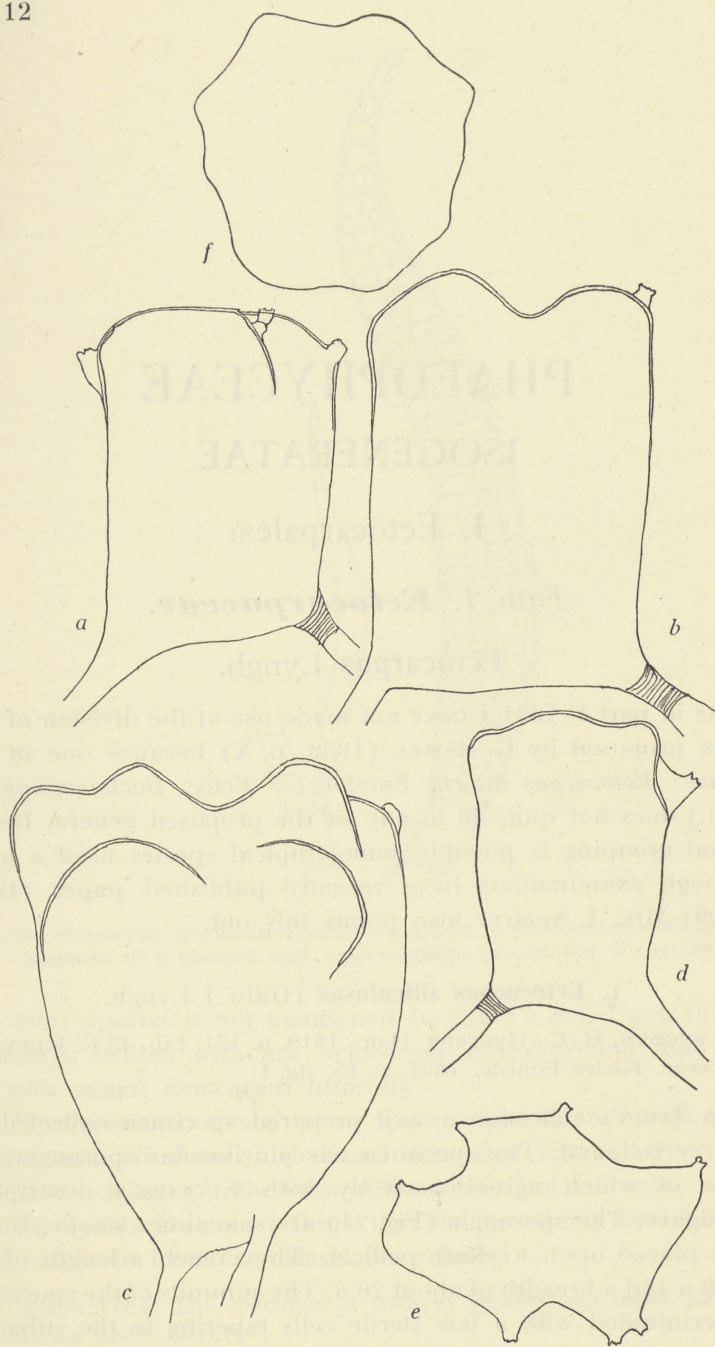


Fig. 20. *Codium tenue* Kütz. a-d, vesicles in lateral view; e, f, vesicles seen from above. ($\times 150$).

PHAEOPHYCEAE

ISOGENERATAE

I. Ectocarpales.

Fam. 1. *Ectocarpaceae*.

Ectocarpus Lyngb.

As in part I, 1941 I have not made use of the division of this genus proposed by G. HAMEL (1939, p. X) because one of the species: *Ectocarpus indicus* Sonder (= *Ectoc. Duchassaingianus* Grun.) does not quite fit to any of the proposed genera. Before a final grouping is possible some tropical species need a more thorough examination. In a recently published paper (1947, p. 199) Mrs. I. ABBOTT also points this out.

1. *Ectocarpus siliculosus* (Dillw.) Lyngb.

LYNGBYE, H. C., *Hydroph. Dan.*, 1819, p. 131, tab. 43 C. KUCKUCK P., *Ectoc. Kieler Föhrde*, 1891, p. 15, fig. 1.

In JADIN's collection a well prepared specimen collected by DARUTY is found. The specimen has plurilocular sporangia, the shape of which agrees perfectly with KUCKUCK's description and figure. The sporangia (Fig. 21) are sometimes sessile, sometimes placed upon a short pedicel. They reach a length of up to 400 μ and a breadth of about 26 μ . The summits of the sporangia are terminated with a few sterile cells tapering to the subacute apex or with a hair.

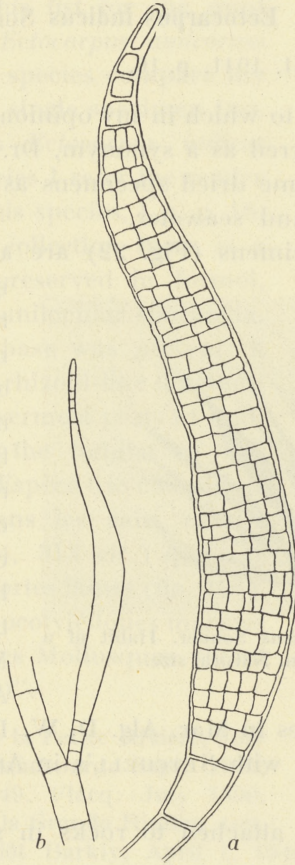


Fig. 21. *Ectocarpus siliculosus* (Dillw.) Lyngb. *a*, a plurilocular sporangium. *b*, fragment of a filament with a sporangium; (*a* \times ca. 400, *b* \times ca. 200).

This species is not mentioned in JADIN's list. Upon the specimen is written with ink *Ectocarpus indicus* Sonder and below it with pencil *Ectocarpus littoralis*.

The specimen seems to me quite in accordance with typical *Ectocarpus siliculosus*. I shall not deny that I have some doubts as to its belonging to the flora of Mauritius, but as it was collected by the native DARUTY I think that the possibility that it should not originate from the island is excluded.

Mauritius: The specimen is without locality and date, only "Ile Mauritius dedit Daruty".

Geogr. Distr.: Northern and temperate seas.

2. *Ectocarpus indicus* Sonder.

Alg. Mauritius, II, 1941, p. 16.

Of this species, to which in my opinion *Ect. Duchassaingianus* Grun. is to be referred as a synonym, Dr. VAUGHAN has sent me for examination some dried specimens as well as material preserved in formol and seawater.

The dried specimens (Fig. 22) are about 4 cm high, forming a tuft of erect



Fig. 22. *Ectocarpus indicus* Sonder. Habit of a dried specimen. Natural size.

rather straight filaments. An examination of the material in formol shows that the filaments are not much ramified, issuing the characteristic plurilocular sporangia irregularly scattered here and there in agreement with MME WEBER'S fig. 34 in Alg. Siboga, 1913, p.

130, with my figures in Mar. Alg. D. W. I, 1914, pp. 159—162, figs. 127—128, and with SETCHELL'S in American Samoa, 1924, p. 171, fig. 35.

The plant was attached to rocks in shallow water.

Mauritius: Savinia, April 4, 1947, R. E. V. no. 678.

3. *Ectocarpus irregularis* Kütz.

Alg. Mauritius, II, 1941, p. 23.

A small specimen in JADIN'S collection (no. 372) seems to belong to this species. In his list it is referred to *Ectocarpus indicus* Sonder.

Mauritius: Port Louis, August 1890, JADIN, no. 372.

1. *Ectocarpus Mitchellae* Harv.

Alg. Mauritius, II, 1941, p. 7.

In JADIN'S collection several specimens of this species are

contained, which in his list for the most part are referred to *Ectocarpus amicum* Harv. As to the latter species compare my remarks, l. c. p. 15. A single specimen (no. 394) JADIN refers to *Ectocarpus indicus* Sonder, for which species I refer the reader to the chapter about this species, l. c. p. 16.

In Dr. VAUGHAN'S collection there is a specimen (no. 521), preserved in formol, with plurilocular and unilocular sporangia. In this specimen the base was present; it consists of decumbent, rhizoid-like filaments given out from the lowermost parts of thallus (Fig. 23). About the habitat of this species JADIN writes: "Espèce très commune, cueillie aussi bien dans les eaux calmes des lagunes (Nos. 234, 313 etc.) que sur les récifs exposés aux fortes lames (no. 496), sur des feuilles de Monocotylédones marines que sur la coquille des Mollusques vivant sur les récifs (no. 447)".

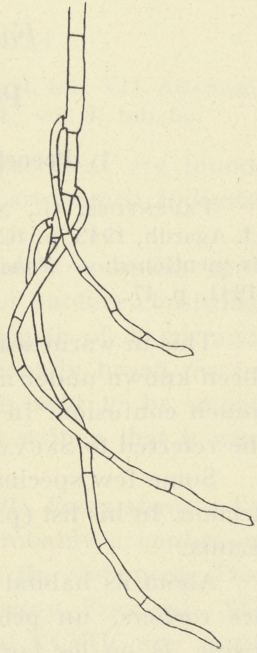


Fig. 23. *Ectocarpus Mitchellae* Harv. Base of a filament with rhizoids. ($\times 150$).

Mauritius: Baie de la Petite Rivière, July 1890, JADIN no. 234. Mahébourg: Sept. 1890, JADIN nos. 447 and 449. Flacq: July 1890, JADIN no. 287. Baie de la Grande Rivière, Oct. 1890, JADIN no. 394. Îlot Barkly, April 1, 1946, G. MORIN no. 521.

5. *Ectocarpus breviarticulatus* J. Ag.

Alg. Maurit., II, 1941, p. 39.

Several specimens of this species are found in JADIN'S collection. In his list p. 158 DICKIE'S name: *Ect. spongiosus* is used for it. About its habitat JADIN writes: "Espèce assez commune croissant sur les récifs, ou dans les anfractuosités sinueuses des roches basaltiques, mais toujours soumise aux fortes vagues ou aux courants violents des remous".

Mauritius: Savinia, "attached to rocks in shallow water", April 4, 1947, R. E. V no. 680. Mahébourg, Sept. 1890, JADIN, no. 425.

Réunion: Saint-Gilles, April 1890, JADIN, nos. 85, 125, and 127.

II. Dictyotales.

Fam. 1. *Dictyotaceae*.

Pocockiella Papenfuss.

1. *Pocockiella variegata* (Lamx.) Papenf.

PAPENFUSS, G., Notes on Algal Nomenclature, II. Gymnosorus J. Agardh, 1943, p. 463, where a long series of synonyms and literature is mentioned. — *Zonaria variegata* (Lamx.) J. Ag., Alg. Mauritius, II, 1941, p. 47.

This in warm seas much distributed plant has for many years been known under many different names and accordingly caused much confusion. In recent years the difficulties are, I think, to be referred to SAUVAGEAU's description of *Aglaozonia canariensis*.

Some few specimens of this plant are present in JADIN's collection. In his list (p. 161) JADIN mentions it as *Zonaria variegata* Lamx.

About its habitat he writes: "Formant un enduit marron sur les rochers, un peu au-dessous du niveau de l'eau à marée basse, là où les lames sont assez fortes".

Mauritius: Flacq, July 1890, JADIN, no. 247; Mahébourg, Sept. 1890, JADIN, no. 432. Pointe aux Cannoniers, 16. Febr. 1946, R. E. V. no. 534. Pointe aux Sables, 7. April 1947, G. MORIN, no. 701.

Réunion: Saint-Gilles, April 1890, JADIN, no. 180.

Dictyota Lamour.

1. *Dictyota divaricata* Lamour.

Alg. Mauritius, II, p. 50.

In the collection of JADIN several small specimens of *Dictyota* are present. They all seem to be sterile and any more exact determination is therefore excluded. I refer them all to *D. divaricata*, a species being formerly known from the island. JADIN in his list, p. 160, refers them to *D. Bartagresiana* and *D. indica*.

Mauritius: Flacq, July 1890, JADIN, nos. 296, 472. Baie du Tombeau, July 1890, JADIN, no. 308. Mahébourg, Sept. 1890, JADIN, no. 449. Baie de la Grande Rivière, Sept. 1890, JADIN, no. 403.

Dictyopteris Lamour.

1. *Dictyopteris serrata* (Aresch.)

Haliseris serrata Aresch., Icones Algarum, I, p. 4, tab. VII, AGARDH, J., Spec. Alg., I, p. 119. KÜTZING, Tab. Phycol., vol. 9, tab. 60.

Of this stately *Dictyopteris* some few specimens are found in JADIN's collection; in his list, p. 161, they are named *Haliseris serrata* Aresch.

From Réunion two specimens are found, a complete specimen with the basal disc and a fragment of another consisting of a single large undivided lobe having a length of 30 cm and a breadth of 4 cm and 4 mm, thus exceptionally broad, as in the description the breadth of the lobes is said to be about 14—18 mm only; upon the sheet JADIN has written that it was taken at a depth of 40 fathoms.

In MONTAGNE and MILLARDET's list, p. 21, *Fucus serratus* L. is mentioned as found at Réunion; most probably a confusion with the present species forms the base of the statement. The two figures being referred to here, viz. TURNER, Fuci, tab. XC and HARVEY, Phycologia Britannica, tab. XLVII are both *Fucus serratus* L.

Regarding its habitat JADIN writes: "L'exemplaire de la Réunion m'a été apporté par un pêcheur. Il me dit l'avoir prise avec son hameçon, en dehors des récifs et ramenée d'une grande profondeur sans pouvoir me préciser cette profondeur. L'exemplaire reçue de DARUTY avait été rejeté sur la plage".

Mauritius: Without locality, DARUTY 1892.

Réunion: Saint-Gilles, April 1890, JADIN, no. 153.

Geogr. Distr.: Port Natal.

Padina Adans.

1. *Padina gymnospora* (Kütz.) Vickers.

Alg. Mauritius, II, p. 49.

In JADIN's collection several specimens of *Padina* are found, some of which are referable to this species, some to the following one, but most of the specimens are in bad condition, not fruiting

and therefore undeterminable. JADIN in his list, p. 160, refers all the specimens to *Padina Pavonia*.

From Dr. VAUGHAN I have recently received a large fruiting specimen.

Mauritius: Point aux Sables, 12. Oct. 1946, R. E. V. no. 626. Without locality, July 1890, JADIN, no. 318.

Réunion: Saint-Gilles, April 1890, JADIN, no. 68.

2. *Padina Commersonii* Bory.

Alg. Mauritius, II, p. 49.

As to the mutual arrangement of fructiferous organs and hairs the few specimens referable to this species in JADIN's collection agree with HAUCK's description of this species. Cf. also my remarks in "Some Indian Green and Brown Algæ", I, 1930, p. 170.

Some well developed fruiting specimens have furthermore been gathered by Dr. VAUGHAN. The specimens were "growing on rocks in large pools".

Mauritius: Flacq, June 1890, JADIN, no. 222. Blue Bay, 15. Sept. 1890, JADIN, no. 423. Îlot Brocus, 25. Aug. 1946, R. E. V. no. 596.

HETEROGENERATAE

A. *Haplostichineae*.

I. Chordariales.

Fam. 1. *Spermatochneaceae*.

Nemacystus Derb. et Sol.

1. *Nemacystus decipiens* (Sur.) Kuck.

Alg. Mauritius, II, 1941, p. 57, fig. 23.

Several specimens of this species are found in JADIN's collection.

In his list, p. 159, it is called *Myriocladia capensis* J. Ag. About its habitat he writes: "Croît aussi bien dans les eaux calmes que dans les eaux moyennement agitées."

Furthermore I have received some specimens from Dr. VAUGHAN, who about its habitat writes: "Lagoon, in 1—2 ft. of water at low tide."

Mauritius: Flacq, Oct. 1890, JADIN, no. 486, 487. Point aux Sables, Oct. 12, 1946, R. E. V. no. 625.

B. Polystichineae.

I. Punctariales.

Fam. 1. *Encoeliaceae.*

***Colpomenia* Derb. et Sol.**

1. *Colpomenia sinuosa* (Roth.) Derb. et Sol.

Alg. Mauritius, II, 1941, p. 61.

A single small specimen is found in JADIN's collection. In his list it is named *Hydroclathrus sinuosus* Zanard. About its habitat he writes: "Sur les récifs, formant des boules arrondies de différentes dimensions."

Mauritius: Port Louis, Aug. 1890, JADIN, no. 504.

***Hydroclathrus* Bory.**

1. *Hydroclathrus clathratus* (Bory) Howe.

Alg. Mauritius, II, 1941, p. 62.

Some specimens are found in JADIN's collection; in his list, p. 159, they are called *Hydroclathrus cancellatus* Bory.

About its habitat he writes: "Espèce très commune; elle croît sur les récifs formant de grosses touffes arrondies, avec l'aspect

d'éponges; cette espèce voisine avec les *Eucheuma* et souvent recouvrent la surface plane des récifs”.

Mauritius: Flacq, June 1890, JADIN, no. 214. Baie de Rivière Noire, Oct. 1890, JADIN, no. 467.

Réunion: Saint-Gilles, April 1890, JADIN, nos. 65 and 196.

Chnoospora J. Ag.

1. *Chnoospora fastigiata* J. Ag.

Alg. Mauritius, II, p. 63.

A small specimen from Réunion referable to var. *pacifica* J. Ag. is found in JADIN's collection. It is mentioned in JADIN's list, p. 158. About its habitat it is said: "Croissant sur les roches plates de la plage."

Réunion: Saint-Gilles, April 1890, JADIN, no. 144.

2. *Chnoospora implexa* (Her.) J. Ag.

Alg. Mauritius, II, p. 63.

A single, well-prepared specimen of this species is present in JADIN's collection. About its habitat JADIN writes in his list, p. 158: "Dans la rade, à 75 centimètres au-dessous des eaux à marée basse."

Mauritius: Port-Louis, Aug. 1890, JADIN, no. 384.

Rosenvingea Børgs.

1. *Rosenvingea intricata* (J. Ag.) Børgs.

Alg. Mauritius, II, p. 65.

A small much divided specimen with narrow lobes is found in JADIN's collection (no. 404). In his list, p. 159, it is mentioned under its older name *Asperococcus intricatus* J. Ag. About its habitat JADIN writes: "Observé seulement là, en quelques touffes, hors de l'eau à marée basse."

Mauritius: Baie de la Grande Rivière, Sept. 1890, JADIN, no. 404.

CYCLOSPOREAE

I. Fucales.

Fam. 1. *Sargassaceae*.*Cystoseira* Ag.1. *Cystoseira Myrica* (Gmel.) J. Ag.

AGARDH, J., Spec. Alg., I, p. 222. ZANARDINI, Pl. Mar. Rubr., 1858, p. 35. — *Fucus Myrica* Gmelin, Hist. Fuc., p. 88, tab. III, 1. TURNER, Fuci, III, p. 137, tab. 192. — *Phyllacantha Myrica* Kütz., Tab. Phyc., vol. X, pl. 37.

A large specimen of this species is found in JADIN's collection. It is not mentioned in his list. The specimen is said to have been cast ashore.

Mauritius: Flacq, Sept. 1890, JADIN.

Geogr. Distr.: West Indies, Red Sea, Iranian Gulf, Kamchatka.

Cystophyllum J. Ag.1. *Cystophyllum muricatum* (Turn.) J. Ag.

AGARDH, J., Spec. Alg. I, p. 231. — *Fucus muricatus* Turn., Fuci, II, p. 108, tab. 112. For more literature cf. DE-TONI, Syll. III, p. 154.

Of this species a large and well prepared specimen is found in JADIN's collection.

In his list it is mentioned on p. 159, where it is said that it is: "Rejeté sur la plage après gros temps."

Mauritius: Flacq, Sept. 1890, JADIN (without no.).

Geogr. Distr.: Malayan Archipelago, Australia, India, Iranian Gulf, etc.

An Additional Note to *Bornetella sphaerica*
(Zanard.) Solms, p. 26.

Quite recently I have received from Dr. VAUGHAN a fine collection of specimens of this small alga (Fig. 24).

Most of the specimens are put on paper and dried, but some are preserved in formol and seawater. Regarding the shape

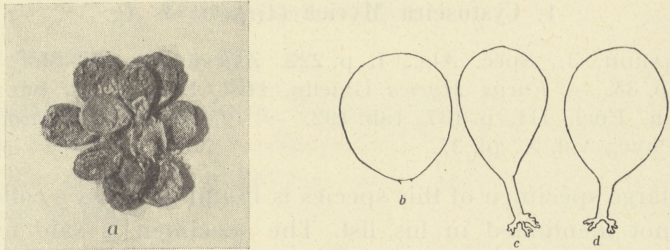


Fig. 24. *Bornetella sphaerica* (Zanard.) Solms. *a*, a colony of dried specimens; *b*, *c*, *d*, outlines of specimens preserved in formol, *b*, without the stipe. (*a*, natural size; *b*, *c*, *d*, $\times 2$).

of the thallus most of the specimens are abovate to pyriform, but some are nearly globular.

The plant has a shorter or longer stipe up to about 4 mm; rhizoids are given out from the base by means of which the plant is firmly fastened to the substratum. The plant is growing sociably and was found "on pieces of dead coral".

Mauritius: Ilôt Barkly, Oct. 29th, 1947, G. MORIN no. 753.

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together with some more essential synonyms, these being printed in italics.

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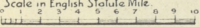
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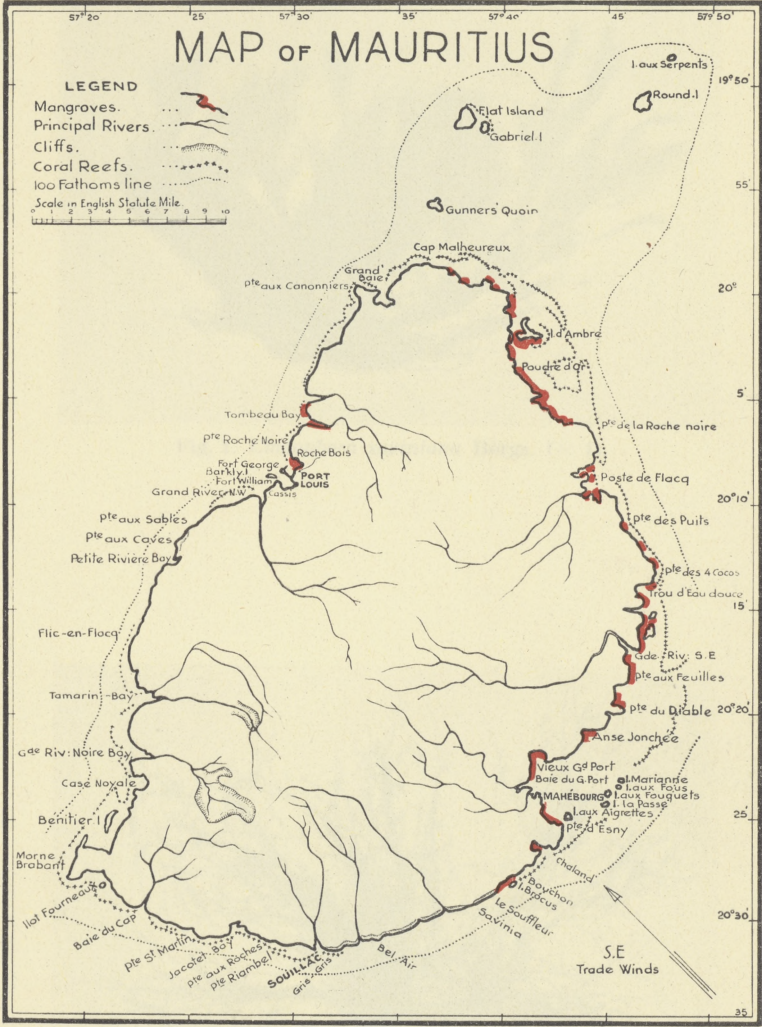
Indleveret til Selskabet den 9. December 1947.

Færdig fra Trykkeriet den 4. Juni 1948.

MAP OF MAURITIUS

LEGEND

- Mangroves.
 - Principal Rivers.
 - Cliffs.
 - Coral Reefs.
 - 100 Fathoms line.
- Scale in English Statute Mile.
- 



S.E.
Trade Winds



Fig. 1. *Cladophora saviniana* Borgs. ($\times 1$).



Fig. 2. *Cladophora Hauckii* Borgs. ($\times 1$).

PLATE II.



Pseudobryopsis mauritiana Borgs. About natural size.

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