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# SOME MARINE ALGAE FROM MAURITIUS

ADDITIONS TO THE PARTS PREVIOUSLY  
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BY

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## CHLOROPHYCEAE

Also during the past year I have received some collections of algae from Mauritius and the examination of these has shown that they contained not only several species of which I have formerly seen very little material, but also that several new species and even two, as I think, new genera are contained in them.

I have previously pointed out that the algal flora of the island must be said to be very rich and an examination of the lately received collections has confirmed this. In this connection I want to point out that it is almost only the litoral and upper sublitoral algal flora from which the collections originate and from the large brown algae found there as well I have seen very little.

I have had very little material of the algae growing in the deeper sublitoral region for examination; what I have had has nearly all been collected by the late zoologist Dr. TH. MORTENSEN during his stay on the island.

I want to thank Dr. R. E. VAUGHAN, Director of the Mauritius Institute in Port-Louis, and his assistant Mr. G. MORIN for their continual interest in collecting the algal material.

To Mme, Dr. GENEVIÈVE FELDMANN and Professor, Dr. JEAN FELDMANN, Université de Paris, I am much indebted for very valuable information as to some specimens of algae.

I also want to thank Cand. mag. TYGE CHRISTENSEN for his valuable help with the Latin diagnoses.

The lady artist Miss INGEBORG FREDERIKSEN has also this year helped me with the drawings of most of the figures for which help I thank her very much. A single figure is drawn by Mr. HELGE HØVRING, M. Sc.

To the Trustees of the Carlsberg Foundation I am much indebted for a continued grant also this year.



# CHLOROPHYCEAE

## I. Siphonocladales.

### *Fam. 1. Valoniaceae.*

#### **Valonia** Ginn.

##### 1. *Valonia Ægagropila* C. Ag.

Alg. Mauritius I, 1940, p. 11; 1945, p. 21; 1946, p. 13.

Some few specimens are found in a batch of algae received recently.

Mauritius: Ile aux Aigrettes, 12-5-52, G. MORIN, no. 1224.

### *Fam. 2. Boodleaceae.*

#### **Struvea** Sonder.

##### 1. *Struvea anastomosans* (Harv.) Piccone.

Alg. Mauritius, Additions IV, 1952, p. 7, fig. 3.

Two gatherings of this species are included in a collection of algae recently received.

The specimens form rather large, up to 2—3 cm high tufts; they are much felted together and adhering to each other.

About the localities it is said: "On reef in 3' water at low tide and on dead coral near reef."

Mauritius: Ilot Barkly, 26-4-52, G. MORIN, no. 1217 and the same locality, 10-6-52, G. MORIN, no. 1229.

## II. Siphonales.

### Fam. 1. *Bryopsidaceae*.

#### *Bryopsis* Lamour.

##### 1. *Bryopsis indica* A. & E. S. Gepp.

Alg. Mauritius, I, 1940, p. 44.

Some fine specimens (Fig. 1) of this little *Bryopsis* are present in a lately received batch of algae. The specimens form small,

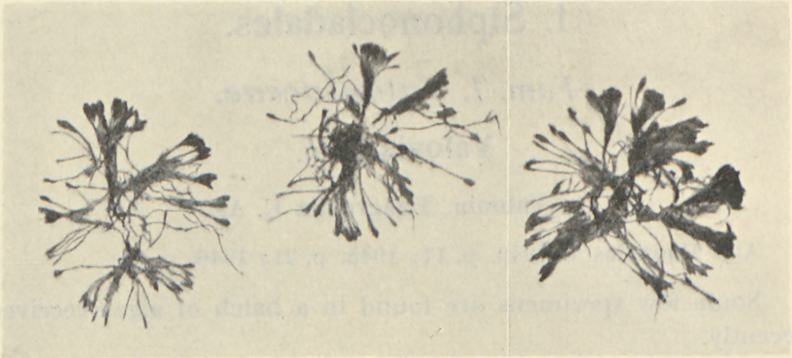


Fig. 1. *Bryopsis indica* A. & E. S. Gepp ( $\times 1$ ).

ca.  $1\frac{1}{2}$  cm high, dense tufts in which *Chaetomorpha antennina* (Bory) Kütz. is intermixed.

As to the locality it is said: "In deep pools near reef."

TAYLOR in his interesting book: *Plants of Bikini*, 1950, p. 50, mentions that this species was found in the Eniwetok Atoll.

Mauritius: Near Pointe aux Sables, 1-12-51, G. MORIN.

### Fam. 2. *Caulerpaceae*.

#### *Caulerpa* Lamour.

##### 1. *Caulerpa Vickersiae* Borgs.

Alg. Mauritius, Additions I, 1949, pp. 6—12, figs. 1—2.

In a quite recently received collection of algae from Mauritius it was a pleasure for me to find that this nice little *Caulerpa* was

found again in the island. The specimens were in good accordance with those formerly found, referable to the var. *typica*.

As to the locality it is only said: "attached to old pieces of coral".

This new record of the species in the island enables me briefly to reply to the points of view stated by authors of two quite recently appearing papers as to the correct name of this species.

The former of these papers is Dr. LOIS EUBANK EGEROD's very valuable and beautifully illustrated work "An Analysis of the *Siphonous Chlorophycophyta*, with Special Reference to the *Siphonocladales*, *Siphonales* and *Dasycladales* of Hawaii", Berkeley and Los Angeles, 1952.

In this paper p. 368 Mrs. EGEROD briefly says: "On grounds of priority, OKAMURA's name for the species is retained instead of *C. Vickersiae* Børgs." On the other hand Mrs. EGEROD "concurs with BØRGESEN (1949) in not recognizing the varietal entities". The latter being in agreement with my opinion is of course quite satisfactory to me, and as to the right naming of the species according to my view, I refer the reader to my remarks about the question given in my paper quoted above.

The other paper is that of Professor G. F. PAPENFUSS, "Notes on South African Marine Algae", III, likewise published at the end of 1952 and received by me together with Mrs. EGEROD's in January this year.

In this paper PAPENFUSS follows his pupil's opinion in using OKAMURA's name for the species. Having first mentioned that the species is now found in South Africa, PAPENFUSS continues: "BØRGESEN (1949, p. 8) prefers to retain the name *Caulerpa Vickersiae* Børgesen (1911) for this taxon because he . . . was the first to give a proper description of the species. It is true that OKAMURA's (1897) description of *C. ambigua* is misleading, but nevertheless it is sufficient to value this name, which according to the International Rules of Botanical Nomenclature must be retained."

To this I shall only repeat, what was said already in my paper of 1949, p. 7, that Mme WEBER VAN BOSSE, the monographer of the genus *Caulerpa*, in her work on the genus, after correspondence with OKAMURA himself about the species, places

it in the group *Opuntioides* together with *C. sedoides*; the conclusion of this must be that OKAMURA's description is not only misleading but wrong and his figures are not better.

The locality of the specimens now found was: Îlot Barkly, 26-4-52, G. MORIN, no. 1218.

## 2. *Caulerpa serrulata* (Forssk.) J. Ag. emend. Børgs.

Alg. Mauritius, I, 1940, p. 50; 1946, p. 38; 1948, p. 13.

Some specimens of this species coming near to the var. *typica* are found in a collection received lately.

They were collected "in lagoon".

Mauritius: La Preneuse, 12-4-52, G. MORIN, no. 1214.

## 3. *Caulerpa cupressoides* (Vahl) Weber.

Alg. Mauritius, I, 1940, p. 50; 1946, p. 38; 1948, p. 32; 1951, p. 9.

A rather small form with erect, irregularly ramified assimilators up to about 2' cm high and covered with nearly cylindrical ramuli mucronated above is found in a collection received recently from Mauritius. The ramuli remind somewhat of those in var. *ericifolia* Weber, *l. c.* p. 327.

It was collected in a lagoon.

Mauritius: La Preneuse, 12-4-52, G. MORIN, no. 1213.

## 4. *Caulerpa racemosa* (Forssk.) Weber v. Bosse.

var. *clavifera* (Turner) Weber v. Bosse.

Alg. Mauritius, I, 1940, p. 51; 1946, p. 39; 1948, p. 32; 1951, p. 10; 1952, p. 11.

A gathering of fine specimens of var. *clavifera* (Turner) Weber v. Bosse are contained in a collection of algae received recently from Mauritius. It was gathered in a "Deep pool near reef".

forma *simplicissima* Børgs.

In Additions I, 1949, p. 14, fig. 4 I referred a peculiar form having subcylindrical-subclavate assimilators only as a forma





Fig. 2. *Caulerpa racemosa* (Forssk.) Weber v. Bosse, var. *clavifera* (Turner) Wb. v. Bosse. A form ad f. *simplicissimam* Børgs. vertens ( $\times$  about  $\frac{1}{2}$ ).

*simplicissima* to *Caulerpa racemosa*, var. *clavifera*. In a batch of algae received recently a specimen was found (Fig. 2) in which, as is seen in the figure, some of the assimilators are naked like those in f. *simplicissima*, some carrying a few nearly globular ramuli.

The specimens were collected "on reef".

Mauritius: var. *clavifera*, Pointe aux Sables, 12-3-52, R. E. V. no. 1197; forma *simplicissima* Børgs., Ilôt Barkly, 26-4-52, G. MORIN, no. 1219.

### 5. *Caulerpa peltata* Lamour.

Alg. Mauritius, 1940, p. 51; 1946, p. 39; 1951, p. 10.

Several fine specimens of this species are found in a collection received lately.

They were collected "in pools near shore".

Mauritius: Pointe aux Sables, 12-3-52, G. MORIN, no. 1198.

### 6. *Caulerpa lentillifera* J. Ag.

Alg. Mauritius, Additions I, 1949, p. 15.

As I had formerly seen very little material of this small, elegant *Caulerpa* it was of interest in a collection of algae received lately from Mauritius to get some large well prepared specimens.

These were quite typical, having the characteristic marked constriction of the pedicel just below the globose upper part of the ramuli.

The assimilators reached a height of up to 3 mm and are densely covered by the small globose ramuli nearly to their base. They are much ramified and the ramification was upon the whole very irregular, also owing to the peculiarity that rhizomes sometimes are given out from the assimilators in a way very similar to that found in assimilators of *Caulerpa racemosa*; compare my figure 4, p. 61 in *The Journal of the Indian Bot. Soc.*, vol. XI, Madras 1932.

As to the locality it is said: "Calm water near reef submerged at low tide".

Mauritius: Îlot Barkly, 30-10-51, G. MORIN, no. 1174.

### *Fam. 3. Codiaceae.*

#### *Avrainvillea* Decaisne.

##### 1. *Avrainvillea amadelpa* (Mont.) Gepp.

Alg. Mauritius, I, 1940, p. 54, and 1948, p. 33.

Two small specimens are found in a collection of algae recently received from Mauritius.

They were "growing in a lagoon and attached to corals".

Mauritius: La Preneuse, 12-4-52, G. MORIN, no. 1212.

#### *Codium* Stackh.

##### 1. *Codium Geppi* O. Chr. Schmidt.

Alg. Mauritius, 1946, p. 49, and 1948, p. 38.

Of this species I have lately received some fine, well prepared specimens forming large, much entangled patches made by the creeping and mutually coherent thalli.

As to the locality and way of growing of the specimens it is said by the collector: "Densely entangled growth on the under-

surface of overhanging rocks." The locality has surely been on an exposed shore; I refer in this respect to the detailed description of its way of growing. Dr. E. C. T. HOLSINGER, Colombo, has sent me several years ago; compare my paper: Some Marine Algae from Ceylon, 1936, pp. 69—70.

Mauritius: Riambul near Souillac, 8-2-51, R. E. V. no. 1042.

## 2. *Codium Bartlettii* Tseng and Gilbert.

Alg. Mauritius, Additions I, 1949, p. 23, fig. 12.

A large and well prepared specimen of this species is contained in a gathering of algae recently received from Mauritius. Fig. 3 shows the specimen; as appears from the figure the characteristic features of this species are easily observable in this specimen. This for instance is true of the characteristic unequal development of the branches, when the thallus becomes forked, the one of the branches becoming more vigorous than the other and continuing the axis below it. Another characteristic feature found in this species is that the angles of the branches are very broadly rounded. Upon a small part of a specimen preserved in formol and sea water it is easily observable that the thallus below the furcations is complanate, but otherwise subterete.

As to the vesicles the shape of these are in good accordance with the figures of TSENG and GILBERT and mine.

The specimen was sterile.

As to the locality it is said: "In deep pool growing in coral sand."

Mauritius: Riambel, 24-10-50, R. E. V. no. 953.



Fig. 3. *Codium Bartlettii* Tseng and Gilbert ( $\times$  ca.  $\frac{1}{2}$ ).

# PHAEOPHYCEAE

## ISOGENERATAE

### I. Ectocarpales.

#### *Fam. 1. Ectocarpaceae.*

##### **Ectocarpus** Lyngb.

##### 1. **Ectocarpus** *Vaughani* Borgs.

Alg. Mauritius, II, Phaeophyceae, 1941, p. 31, figs. 12—14.

This species, hitherto found in Mauritius only, occurred abundantly upon specimens of *Nemacystus erythraeus*.

About the locality it is said: "in calm water near shore."

Mauritius: Les Salines, Roche Noire, Pont Louis, 11-11-50, R. E. V. no. 961.

### II. Dictyotales.

#### *Fam. 1. Dictyotaceae.*

##### **Padina** Adanson.

##### 1. **Padina** *Commersonii* Bory.

Alg. Mauritius, II, 1941, p. 49; Additions III, 1951, p. 14.

Already in a postscript in Additions III, 1951, p. 14, I was able to state that a specimen of *Padina* (no. 1118), sent by air-mail

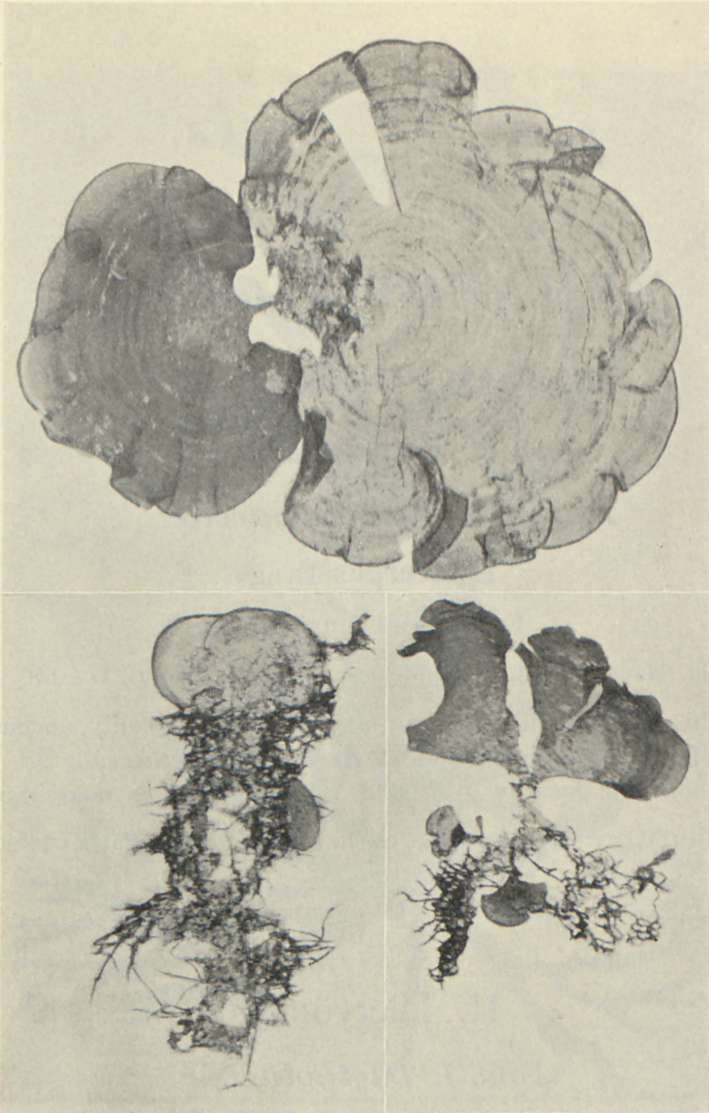


Fig. 4. *Padina Commersonii* Bory. a, a fertile thallus. b and c, young ones with basal, creeping filaments (*Vaughaniella*) ( $\times 1$ ).

from Mauritius, to which the basal filaments (*Vaughaniella*) were attached, was *Padina Commersonii* Bory.

Later I have received more material of the same number containing some well developed fertile thalli with the basal creeping filaments (Fig. 4).

Regarding the locality it is said: "Shallow calm water exposed at low tide—on flat sand-covered basaltic rock." Here "exposed" surely means that the locality is laid dry during low tide but not exposed to the surf in which places the extensive patches of *Vaughaniella* are found and where the plant is unable to develop the erect *Padina*-thalli.

In a medley of different algae (no. 1049) *Vaughaniella* was present in abundance.

According to Dr. VAUGHAN'S information about the locality and the algae found there, they were "growing entangled with *Gelidiella acerosa*, from which they were often difficult to separate", and furthermore it was said: "forms a dense entangled matlike growth on large rocks protected from strong surf."

One of the commonest algae in this community was *Vaughaniella*, the creeping, much ramified filaments of which were fixing themselves round about to the other algae by means of the long rhizoids. The specimens were sterile and no traces of *Padina Commersonii* were found.

Very common in this medley of algae was further more *Wurdemannia miniata* (Drap.) Feldm. et Hamel, which was in good accordance with my figures in Mar. Alg. D. W. I., 1919—20, figs. 360—61; moreover *Champia parvula* was common, and so were fragments of *Centroceras*, *Ceramium*, *Polysiphonia*, *Laurencia*, and finally *Jania adhaerens* was rather abundantly present, fixing itself especially to *Wurdemannia miniata*.

Mauritius: Flic-en-Flacq, 22-2-51, R. E. V. no. 1049. Blue Bay, 8-5-51, R. E. V. no. 1118.

## Dictyota Lamour.

### 1. *Dictyota dichotoma* (Huds.) Lamour.

LAMOUREUX, Essai, p. 58. — *Ulva dichotoma* Hudson, Flora Anglica, p. 476.

Of *Dictyota* I have formerly seen very little material; it is therefore of interest that in a batch of algae received recently some well prepared fertile material of this genus was included.

The specimens, having obtuse apices and the fertile organs scattered over the surface of the thallus, some of them, though, also near the margins, are, I think, referable to *Dictyota dichotoma*,

even if they are not so regularly dichotomously divided as the specimens from Europe mostly are. Of the many illustrations KÜTZING in *Tabulae* gives of this species the Mauritian specimens are rather like Fig. 1, Tab. 10 in vol. 9.

As to the locality it is said: "Calm water near shore."

Mauritius: Pointe aux Sables, 22-6-51, G. MORIN, no. 1144.

Geogr. Distr.: Atlantic coasts of Europe and Africa, Mediterranean Sea, Natal, Japan, Philippine Islands, etc.

## 2. *Dietyota divaricata* Lamour.

Alg. Mauritius, II, 1941, p. 50. Addit. List, 1948, p. 46.

Some few specimens of this species are present in collections received lately.

Mauritius, no locality, C. NEYROLES, no. 452. Trou d'Eau Douce, 22-3-47, R. E. V. no. 652.

# HETEROGENERATAE

## A. HAPLOSTICHINEAE

### I. Chordariales.

#### *Fam. 1. Spermatochnaceae.*

#### *Nemacystus* Derb. et Sol.

##### 1. *Nemacystus erythraeus* (J. Ag.) Sauv.

SAUVAGEAU, C., Alg. mar. Golfe Gasc., 1897, p. 279 (repr., p. 48).  
 KYLIN, H., Chordariales, 1940, p. 46. — *Cladosiphon erythraeus* J. Ag.,  
 Spec. alg., vol. I, 1948, p. 55. *Mesogloia gracilis* Hering et Martens in  
 herb. KÜTZING, Tab. Phyc., vol. 8, tab. 10.

Some specimens (no. 961) lately received from Mauritius (Pl. I) seem to be referable to this species, but I want to point out that I have not been able to compare the Mauritian specimens with authentic material.



According to KYLIN, p. 46 the characteristic features of this species are that the cells in the assimilatory filaments are proportionally short and furthermore that in the middle of the plurilocular sporangia the cells may sometimes have longitudinal walls. As to the first-mentioned character the cells of the assimilating filaments are short in the Mauritian specimens; as to the second this cannot be stated, as I have not found plurilocular sporangia in the material.

The dried specimens have a length of about 20—30 cm and have a dark brown colour. They are very irregularly ramified and have surely been very much entangled. The thicker parts of the thallus are about 1 mm thick, tapering upwards to a half mm or less. The thallus becomes hollow when old. The uppermost cells in the assimilating filaments are often rather broad, shorter than their breadth and often obliquely inflated on the convex side of the filaments.

I have formerly referred (II, 1941, p. 57) some few specimens to *Nemacystus decipiens* (Sur.) Kuck. These specimens have a slender thallus agreeing quite well with OKAMURA's figure in *Icones Jap. Alg.*, vol. II, pl. 89 and also in several ways deviate from the specimens mentioned here, for instance, by the presence of hairs; on the other hand these specimens had plurilocular sporangia in the middle of which longitudinal walls sometimes were found, a character which KYLIN, as said above, points out as being a characteristic of *Nemacystus erythraeus*.

The specimens here referred to *Nemacystus erythraeus* (J. Ag.) Sauv. were collected "in calm water near shore".

Mauritius: Les Salines, Roche Noire, Port Louis, 11-11-50, R. E. V. no. 961.

Geogr. Distr.: Red Sea.

## B. POLYSTICHINEAE

## I. Punctariales.

*Fam. 1. Encoeliaceae.***Chnoospora** J. Ag.1. **Chnoospora implexa** (Her.) J. Ag.

Alg. Mauritius, II, 1941, p. 63. Add. Lists, 1948, p. 50.

Several fine gatherings of this species were found in a lately received collection.

The specimens were collected in calm water.

Mauritius: Black River, La Preneuse, 17-10-51, G. MORIN, nos. 1166 and 1168.

# RHODOPHYCEAE

## Florideae.

### 1. Nemalionales.

#### Fam. 1. *Helminthocladiaceae*.

##### a. Nemalieae.

#### *Liagora* Lamour.

##### 1. *Liagora rugosa* Zan.

Alg. Mauritius, III, 1, 1942, p. 30, fig. 14. Additions I, 1949, p. 28. Additions, IV, 1952, p. 21, figs. 10—11.

In a collection of algae received quite recently from Mauritius some specimens of *Liagora* are found which are like those which in the parts quoted above have I referred to this species and which as to the habit must be said to be in good accordance with the figures of ZANARDINI in Plant. Mar. Rubr., p. 65, pl. IV, fig. 2.

The specimens were tetrasporic like those formerly seen.

About the locality it is said: "Submerged at low tide but exposed to strong currents and waves."

Mauritius: Pointe aux Caves, 1-12-51, G. MORIN, no. 1186.

##### 2. *Liagora pinnata* Harv.

Alg. Mauritius, Additions I, 1949, p. 32.

Of this elegant species I have formerly seen only two specimens from Mauritius, kept in the Kew Herbarium and collected by

Colonel PIKE; they have been determined by DICKIE as *Liagora obtusa* n. spec. It was therefore of interest that in a collection of algae recently received from Mauritius I found two specimens of this species together with some little material preserved in formol and seawater. An examination of the two dried specimens has shown that they are antheridial, while the material in formol is female but with young carpogonial branches only.

This species belongs to the section *Farinosae* of YAMADA, "*Liagora* from Japan", 1938, p. 23, characterized by the nearly cylindrical assimilating filaments, the lateral, nearly straight carpogonial branches, and the large globular antheridial bodies. Besides I may refer to my figures in Mar. Alg. D. W. I., vol. II, p. 74, figs. 76—81 and to YAMADA'S figures 17—18 l. c.

It is most regrettable that gonimoblasts were not found in the specimens, since YAMADA in Japanese specimens has found that the carpospores are transformed to tetrasporangia.

While in the West Indies I found the plant to be monoecious, the plant in Japan is dioecious and the fine specimens from Mauritius are likewise so.

As to the locality it is only said: "calm water, near reef."

Mauritius: La Preneuse, 17-10-51, R. E. V. no. 1164.

### 3. *Liagora valida* Harv.

Alg. Mauritius, Additions I, 1949, p. 26, fig. 26.

Lately I have from Mauritius received some few, fine specimens which I think are best placed in the form cycle of this very variable species.

The specimens (Plate II above) are of a whitish-rosy colour and when seen through a lens they display a mealy surface. The densely ramified thallus is repeatedly furcated, becoming gradually very thin, the uppermost ramifications scarcely reaching  $\frac{1}{4}$  mm.

As compared with other specimens of this very variable species, it is essentially the densely placed and very thin branches and branchlets of the thallus which distinguish these specimens.

In the part from 1949, p. 28, mentioned above I have pointed out the great variability which is found in the specimens referred

to this species, which makes it questionable, if it ought not to be divided into several species; cf. Howe's statement on this question.

The specimens here mentioned are very alike in all respects except in size, the smallest of the specimens having only a breadth of 5 cm while on the other hand the largest one is ca. 15 cm broad.

An examination has shown that their structure agrees quite well with my former description and figures in Mar. Alg. D.W.I., vol. II, p. 70, figs. 71—75.

In two of the specimens I have found carpogonial branches, in one gonimoblasts, and one specimen was sterile.

As to the locality it is said: "Behind reef in lagoon; shallow water."

Mauritius: La Preneuse, 17-10-51, R. E. V. no. 1162.

#### 4. *Liagora bella* nov. spec.

Frons caespitosa, parva, ca. 5 cm alta, teres, a basi ca. 1 mm crassa, ad apicem versus attenuata, repetite furcata, mollissima et mucosissima, flaccida, calcificatione frustulosa, exigua.

Specimina exsiccata superficie farinaceo-scabra, colore sordide albo-rosea.

Axis centralis ex filamentis crassioribus, ca. 20  $\mu$  crassis, et filamentis tenuioribus compositus.

Stratum periphericum assimilationis ex filamentis repetite furcatis, ca. 300—400  $\mu$  longis formatum, cellulis in parte basali subcylindrico-fusiformibus, in media parte crassioribus, oblonge-pyriformibus, ad apicem versus gradatim minoribus.

Species dioica. Antheridia non observata. Rami carpogoniorum robusti, recti vel subcurvi, ex 5—6 cellulis compositi.

Gonimoblasti semiglobulari-complanati, filamentis involucralibus validis circumcincti.

Mauritius: Black River, La Preneuse, 17-10-1951, in shallow water near reef. R. E. V. no. 1163.

The thallus of this little nice *Liagora* (Plate II below) has, in accordance with the small fragments of it preserved in formol and seawater and in a dried condition, when living, formed a roundish tuft about 5 cm high.

The thallus is repeatedly furcated with about right angles between the branches; the lowermost main branches are up to about 1 mm broad tapering evenly towards the uppermost tips, which are less than half a mm broad.

The colour of the dried specimens is whitish-greyish with a reddish tinge and the surface of the dried specimens is farinaceous.

The thallus is embedded in a thick layer of slime and therefore very lubricous and slippery.

The numerous long hairs issuing from the tips of the assimilating filaments, especially in a very large number from those in the uppermost young parts of the thallus, are completely embedded in the slime.

The rather scarce calcification consists of scattered, incoherent clumps found among the uppermost parts of the assimilating filaments and giving the surface of the dried thallus a gritty appearance; and when the thallus preserved in formol and seawater is seen through a lens the calcification looks like small roundish grains very nicely distributed among the tips of the assimilating filaments; but under higher magnification the particles of chalk are seen to be of rather irregular size and shape and also to be rather irregularly distributed.

The central axis is composed of rather thick filaments, about  $20 \mu$  broad, with thick walls winding very loosely about each other and more or less mixed with thinner ones.

The assimilating filaments (Fig. 5), issuing from the central ones, are ca. 300—400  $\mu$  long; from their basal cells thin rhizoid-like filaments are given out, bending about the thallus. The repeatedly furcated assimilating filaments are straight outwardly directed, in their basal parts composed of elongated nearly cylindrical cells which become gradually broader and shorter upwards; somewhat below their apices the cells in the filaments are broadest, oblong-roundish and hence become gradually smaller towards their summits. From the apical broadly oblong or subpyriform cells long thin hairs issue abundantly and likewise short ones.

The specimens are female.

No antheridial bodies were found in the specimens, which surely all are fragments of a single specimen; the plant must therefore be presumed to be dioecious.

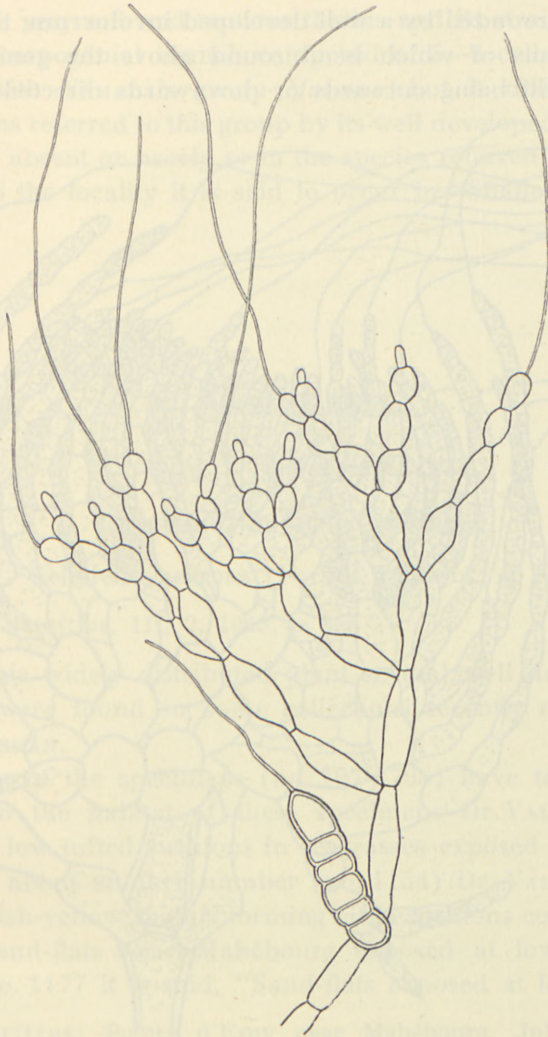


Fig. 5. *Liagora bella* Borgs. Assimilating filaments with a carpogonial branch ( $\times 220$ ).

The carpogonial branch is laterally placed upon a cell near the middle of the assimilating filaments and is composed of 6, sometimes only 5 cells; it is nearly straight, about  $60 \mu$  long and up to  $15 \mu$  broad (Fig. 5).

The rather large and compact gonimoblasts (Fig. 6) are flattened-semiglobular with a more or less excavated base reaching a breadth of about  $200 \mu$  and a height of about  $50 \mu$ ;

they are surrounded by a well developed involucrem, the uppermost filaments of which bend round above the gonimoblasts, the lowermost being outwards or downwards directed.

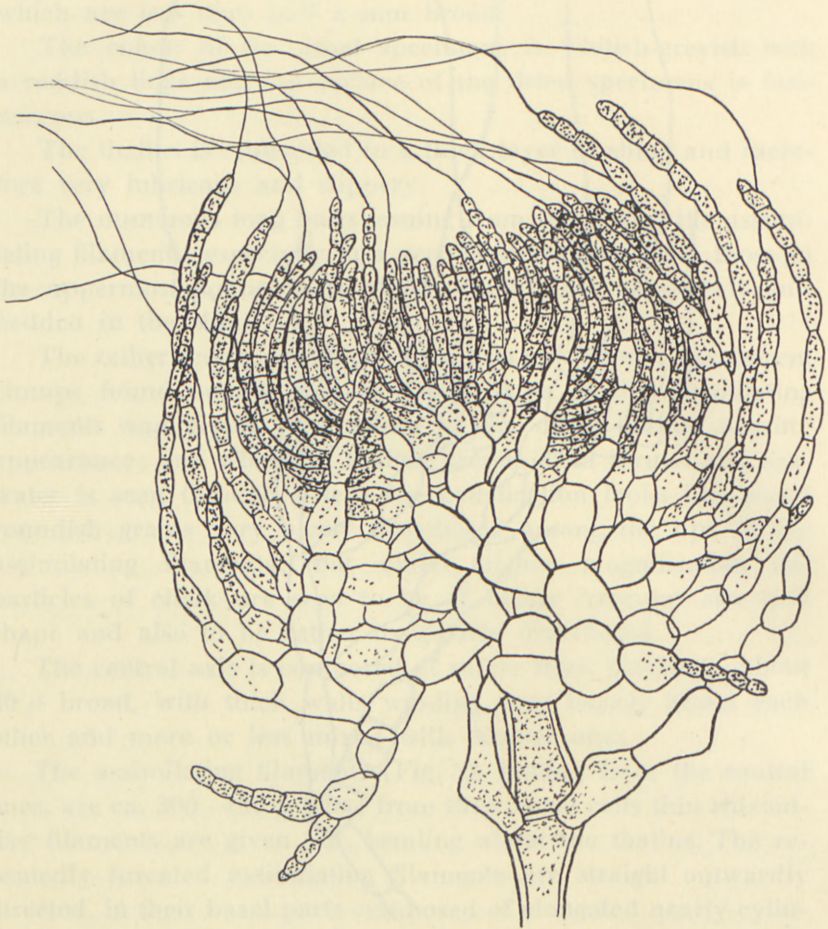


Fig. 6. *Liagora bella* Borgs. A gonimoblast ( $\times 400$ ).

After fertilization from the cells uppermost in the stalk below the gonimoblast a number of often much branched filaments issue in all directions. The basal cells in these filaments become large, up to  $5-20 \mu$  broad, globular, or more irregularly shaped, and almost without chromatophores; they form an often dense cover round the stipe. The upper ends of these filaments have chromatophores and become like the involucrel filaments.



By its very soft and mucous thallus and its straight or almost straight carpogonial branch composed of 5—6 cells, this species agrees with YAMADA'S group *Mucosae*, but it differs from the specimens referred to this group by its well developed involucre, which is absent or nearly so in the species referred to this group.

As to the locality it is said to occur in "Shallow water near reef".

## Gelidiales.

### Fam. 1. *Gelidiaceae*.

#### *Gelidiella* Feldm. et Hamel.

##### 1. *Gelidiella acerosa* (Forssk.) Feldm. et Hamel.

Alg. Mauritius, III, 2, 1943, p. 5.

Of this widely distributed plant several well developed specimens were found in some collections recently received from Dr. VAUGHAN.

Some of the specimens (no. 707—708) have tetrasporangia.

As to the habitat of these specimens Dr. VAUGHAN writes: "Forms low tufted cushions in seagrasses exposed at low tide."

And about another number (no. 1154) Dr. VAUGHAN writes: "Brownish-yellow thallus forming large cushions covering a wide area. Sand-flats near Mahébourg exposed at low tide." And about no. 1177 it is said, "Sand-flats exposed at low tide".

Mauritius: Pointe d'Esny near Mahébourg, July 18th, 1947, R. E. V. nos. 707—708. Mahébourg, 19-7-51, R. E. V. no. 1154. Mahébourg, 15-11-51, G. MORIN, no. 1177.

## Cryptonemiales.

### Fam. 1. *Corallinaceae*.

### Subfam. 1. *Corallineae*.

### *Cheilosporum*. (Decsne) Aresch.

#### 1. *Cheilosporum jungermannioides* Rupr.

Alg. Mauritius, Additions II, 1950, p. 8.

Having formerly seen only a small specimen of this species without any statement of locality and dates but Mauritius, I have lately received some very fine material of it (Fig. 7).



Fig. 7. *Cheilosporum jungermannioides* Rupr. Part of a tuft ( $\times 2$ ).

A comparison of the specimens from Mauritius with some collected by SETCHELL in Tahiti, the type locality of the species, has brought out that the specimens from both localities are in very good accordance with each other.

The specimens which form tufts up to about 10 cm broad were collected "On reef, exposed to strong surf" and were, when collected, "greyish-pink" of colour.

Mauritius: Mahébourg reef, 26-3-51, R. E. V. no. 1075.

## Jania Lamour.

### 1. *Jania adhaerens* Lamx.

LAMOUREUX, I., Hist. Polypiers corallig., 1816, p. 270. ARESCHOUG, J. G., in J. AGARDH, Spec. Alg., vol. II, p. 559. BORGESSEN, F., Mar. Alg. D. W. I., 1919, p. 195, figs. 184—187. TAYLOR, W. RANDOLPH, Pacific Marine Algae, Los Angeles 1945, p. 195.

This little species was found abundantly in a collection of various small algae entangled in tufts of *Gelidiella acerosa*; among these *Wurdemannia miniata* was also found and it was especially to the thalli of this species that *Jania adhaerens* fixed itself by means of a small semiglobular disc.

The diameter of its thallus varies somewhat in the different specimens but it is as a rule between 40—80  $\mu$  and the length of the joints is also rather variable; it comes up to 200—250  $\mu$ .

Besides I refer to TAYLOR's detailed comparative examination of the various forms mentioned in the literature.

The specimens from Mauritius are in rather good conformity with KÜTZING's fig. f. in Tab. Phycologicae, vol. 8, tab. 83.

Mauritius: Flic-en-Flacq, 22-2-51, R. E. V. no. 1049.

Geogr. Distr.: Widely distributed in warm seas.

## *Fam. 2. Grateloupiaceae.*

### Grateloupia C. Ag.

#### 1. *Grateloupia filicina* (Wulf.) Ag.

Alg. Mauritius, III, 2, 1943, p. 27.

Several gatherings of this species, of which I formerly have seen only some few specimens from JADIN's collection, are found in collections received lately.

According to the information about the localities in which the specimens were taken, they are found in pools or in protected places in shallow water.

Mauritius: Pointe aux Sables, 24-4-51, G. MORIN, no. 1110. Flic-en-Flacq, 2-9-51, R. E. V. no. 1157. Îlot Barkly, 27-1-52, G. MORIN, no. 1199.

## Gigartinales.

### Fam. 1. Solieriaceae.

#### Eucheuma J. Ag.

1. *Eucheuma speciosum* (Sonder.) J. Ag.  
var. *mauritiana* Børgs.

Alg. Mauritius, III, 2, 1943, p. 49, figs. 21—22.

Of this variety I have formerly seen only a single specimen collected by the late Dr. TH. MORTENSEN; this specimen was preserved in formol and part of it is shown in fig. 21 *l. c.*

In a collection of algae lately received from Mauritius some fine specimens were found which agree very well with HARVEY'S figure in *Phycologia Austr.*, tab. LXIV, showing a specimen having a rather regularly constricted thallus; on the other hand the thallus in KÜTZING'S figure in *Tabulae*, vol. 18, pl. 6, fig. c is not constricted.

In the specimen lately received from Mauritius the thallus is in some parts articulated, in other parts not. It is densely covered by the conical spines. In a dried condition the colour of the specimens is reddish-brown.

The specimens were collected "in lagoon, attached to dead corals".

Mauritius: La Preneuse, 12-4-52, G. MORIN, no. 1220.

#### **Tenaciphyllum** nov. gen.

Frons membranacea, tenax, carnosae, prostrata, dorsiventralis, irregulariter lobata et flabellata, pagina inferiore thalli radicibus firmioribus saxo adfixa.

Frons e stratis tribus contexta, strato superiore et inferiore e cellulis subcylindricis aut magis oblongis, densissime aggregatis compositis, strato medullari e cellulis parietibus crassis indutis, in media parte thalli majoribus, subglobosis aut subpolygonalibus, in exteriori parte gradatim minoribus contexto.

Tetrasporangia fusiformia, zonatim divisa, in nematheciis crassis, macularibus extensis, superficiem thalli plus minus gentibus orta. Organa sexualia ignota.

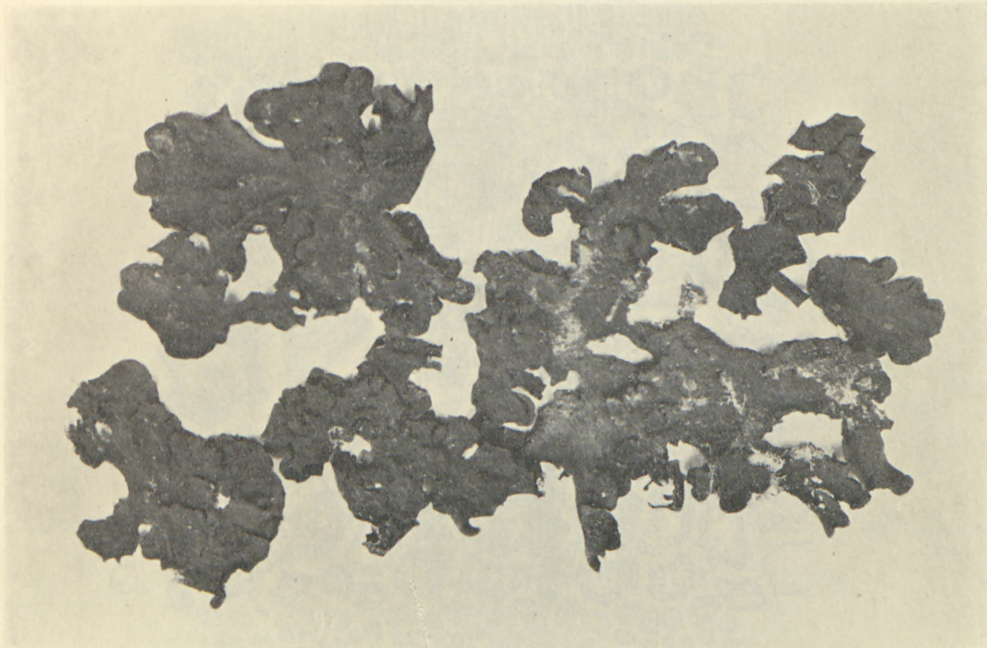


Fig. 8. *Tenaciphyllum lobatum* Børgs. A dried specimen (Nat. size).

### 1. *Tenaciphyllum lobatum* nov. spec.

Thallus disciformis, ca. 1 mm crassus, irregulariter in lobos profunde divisus, margine rotundato-sinuoso. Color thalli in vivo obscure ruber, in sicco nigrescens, superficies opaca, scaber.

Stratum superius et inferius thalli ex cellulis oblongis, densissime aggregatis composita. Medulla ca. 600—700  $\mu$  crassa, ex cellulis subglobularibus aut magis irregularibus, parietibus crassis indutis, in media parte maioribus, ca. 150  $\mu$  latis, sursum et deorsum gradatim minoribus contexta.

Tetrasporangia ca. 30—40  $\mu$  longa et 7—8  $\mu$  lata, in nematheciis expansis, usque ad ca. 300  $\mu$  crassis, in superficie thalli formati ubique orta.

According to information from the collector it has "a flat dark-red, disk-like thallus"; it is not stated by the collector, but it has surely been found upon an exposed coast.

Mauritius: Flic-en-Flacq, 3-4-50, R. E. V. no. 905.

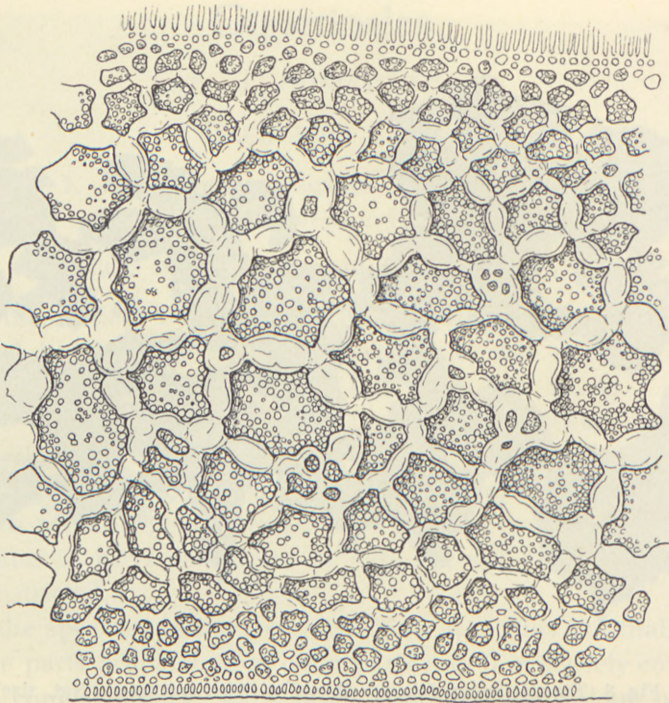


Fig. 9. *Tenaciphyllum lobatum* nov. spec. Transverse section of the thallus. The cell-contents are more or less stellately contracted. Above, the lowermost part of the thick fertile layer is seen ( $\times$  ca. 150).

The thallus of this, as I think, representative of a new genus (Plate III and Fig. 8), is prostrate, flat, tough and fleshy, ca. 1 mm thick, most irregularly lobed, with lobes up to 4–5 cm broad, when preserved in formol and seawater, but only half this size in a dry condition. The surface of a dry specimen is dull, not shining, and its colour is dark reddish-brown to blackish. From the underside of the thallus numerous, short, vigorous, rootlike processes are given out without any order; in places many are densely crowded, in others few occur and in some places none at all; they become root-like hapteres, with a short, rather thick stipe, 3–4 mm long, from the basal end of which irregularly shaped processes issue by means of which the thallus becomes strongly fixed to rocks and corals.

A transverse section of the thallus shows that it is plainly dorsiventrally built (Fig. 9).

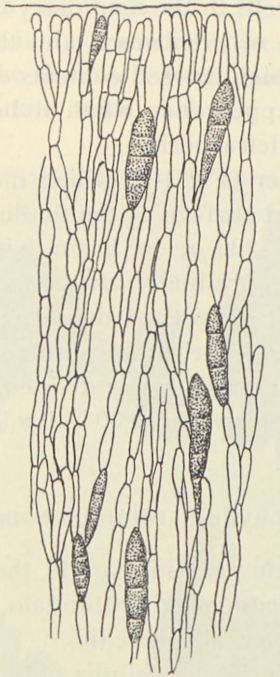


Fig. 10. *Tenaciphyllum lobatum* nov. spec. A small part of a transverse section of the fertile layer showing the zonately divided sporangia scattered in the tissue ( $\times$  ca. 400).

In the cortical layer, when sterile, the dorsiventrality, to be sure, is not so much developed; that upon the side of the thallus turned upwards is about  $25 \mu$  thick and composed of densely placed elongated subcylindrical cells, that below is a little less thick and composed of more oblong-shaped cells.

The medullary tissue has a thickness of about  $500-700 \mu$ ; it consists of a parenchymatous tissue, uppermost and below composed of small roundish cells increasing in size inwards, but still so that the largest cells often are found somewhat below the middle of the thallus, from where the cells rather abruptly decrease in size towards the lower side. The part of the thallus above this line is up to about  $\frac{2}{3}$  of the whole thickness of the thallus and the dorsiventrality is thus markedly pronounced. The largest cells in the medulla have a diameter of up to about  $150 \mu$ ; here and there, mixed among the large cells, a single or a group of some few small cells are found.

The walls of the cells in the medullary layer are stratified and very thick about  $50\ \mu$  or even more, and they are perforated by long pores through which the cell contents communicate and give the latter a stellate appearance when it becomes contracted.

The specimen is tetrasporic.

The stichidial layer (Fig. 10), which more or less covers the whole upwards turned surface of the thallus, reaches a thickness of up to about  $250\text{--}300\ \mu$ ; to begin with it forms roundish elevations which are gradually merged. A transverse section (Fig. 10) shows that it consists of densely placed filaments composed of, narrow, subcylindrical to spindle-shaped cells. Scattered about in this layer the transversely divided, spindle shaped sporangia are formed; they are about  $30\text{--}40\ \mu$  long and  $7\text{--}8\ \mu$  broad.

## 2. *Tenaciphyllum rotundilobum* nov. spec.

A praecedente, facie persimili specie, thallo in omnibus rebus minore, circuitu loborum magis rotundato, colore atropurpureo, superficie sublaevi inter alia recedit.

Stratum thalli superius ex cellulis oblongis compositum sicut inferius paululo tenuius.

Medulla ca.  $150\text{--}200\ \mu$  crassa, ex cellulis rotundato-subpolygonis, in media parte maioribus, ca.  $70\text{--}80\ \mu$  latis, sursum et deorsum minoribus formata.

Stratum nematheciale in superficie thalli expansum ca.  $100\ \mu$  crassum, ex filamentis laxius quam in specie praecedente conatis formatum. Tetrasporangia  $20\ \mu$  longa et  $6\text{--}7\ \mu$  lata, in nematheciis dispersa.

Mauritius: Riambel near Souillac, 23-11-50, G. MORIN, no. 984.

The flat, tough, leathery thallus of this species (Plate III below and Fig. 11) is fixed to the substratum by means of vigorous, rootlike hapters given out from the under side of the thallus often in small groups or solitarily.

The thallus is much and deeply, irregularly lobed and the irregularity is augmented by proliferations, all with broadly rounded circumferences and up to about 2 cm broad. The largest specimen is about 7 cm broad.



In a dry condition the surface of the thallus is dull, not shining, and its colour is dark reddish; the specimens preserved in formol show that the thallus is tough and lubricous and that the thallus is about  $\frac{1}{2}$  mm thick.

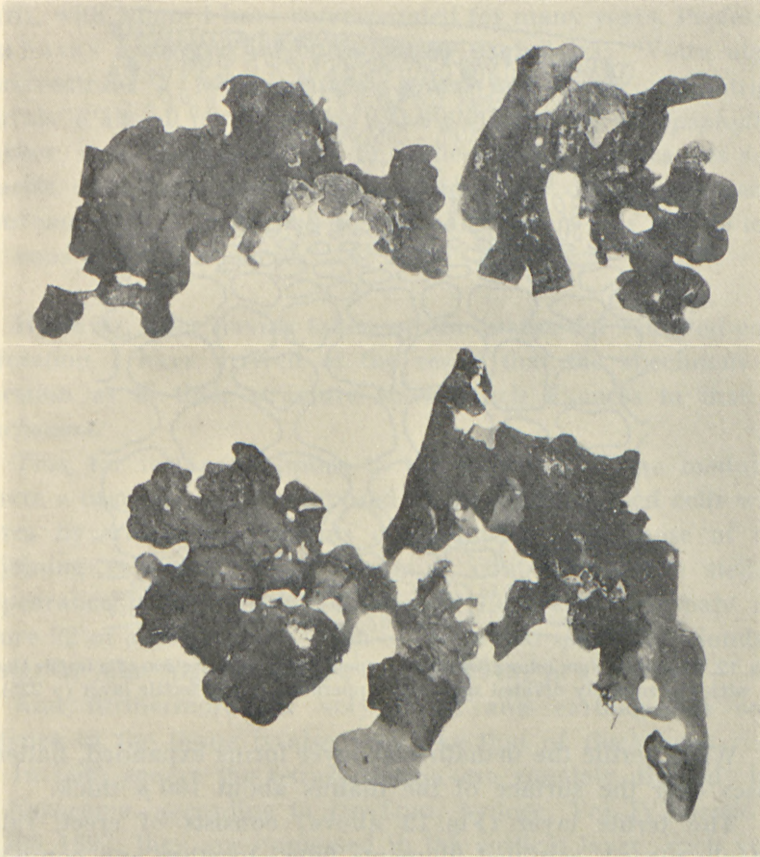


Fig. 11. *Tenaciphyllum rotundilobum* Børgs. Some specimens ( $\times 1$ ).

When the plant is sterile the upper side of the thallus has a thick cuticula about  $10 \mu$  thick and below that a layer of densely placed oblong, thick-walled cells with chromatophores; the peripheral layer in the side below is built in a similar way except for its being a little thinner.

The medullary layer in the middle of the thallus consists of roundish polygonate, very thick-walled cells, small above and

below, but increasing in size towards a little below the middle of the thallus, where the cells in transverse section may reach a diameter of up to about  $70-80\ \mu$ , and the dorsiventrality is thus often very easily observable; the medullary layer is about  $150-200\ \mu$  thick.

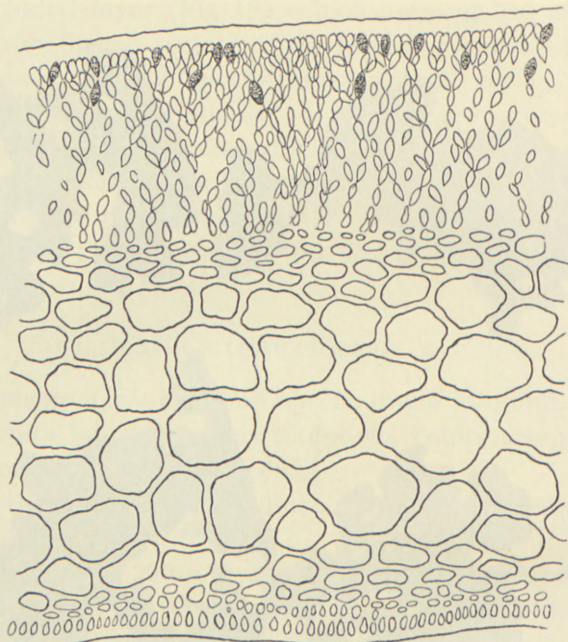


Fig. 12. *Tenaciphyllum rotundilobum* nov. spec. Transverse section of a fertile thallus with the zonately divided sporangia uppermost in the fertile layer ( $\times 225$ ).

When fertile the nemathecium forms expanded, flattened discs over the surface of the thallus about  $100\ \mu$  thick.

The fertile layer (Fig. 12 above) consists of erect, rather openly placed, ramified filaments felted together and composed of oblong-subcylindrical cells. They are about  $5-6\ \mu$  thick. From these filaments in their upper part the spindle-shaped zonately divided sporangia are given out. The fertile layer is about  $100\ \mu$  thick.

As to the locality in which the specimens were found it is said: "Growing on rocks submerged at low tide."

It is not easy to say where in the system this new genus is to be placed so long as cystocarpic specimens are not found. And being unable to solve the question with the resources at my disposal here I wrote about the question to my French colleague, Monsieur le Professor J. FELDMANN, Université de Paris, with whom I have corresponded for many years. Professor FELDMANN answered me most kindly as follows: "Votre algue dorsiventrale à tetrasporanges zonés m'a beaucoup intrigué. J'avais d'abord pensé à un *Weberella* ou à un *Herpophyllon* Farlow, mais la structure est différente et les tetrasporanges sont cruciés dans ces deux genres. Il s'agit sans doute d'un genre nouveau, mais en l'absence de cystocarpe, je ne vois pas de tout ou vous pouvez le placer."

However, after having taken up the matter for renewed consideration I have arrived at the result that the specimens in question as to their structure show much likeness to that of *Eucheuma*.

This, for instance, applies to the structure of the medulla, where a tissue is found composed of very thick-walled cells with pores by which the contents communicate with those of the adjoining cells and when becoming contracted get a stellate appearance in agreement with that of *Eucheuma*; compare my figure 22 of a transverse section of *Eucheuma speciosum* (Sonder) J. Ag. in Mar. Alg. Mauritius, III, 2, 1943, p. 51.

And furthermore the very tough and cartilaginous consistence of the tissue is also very like that of *Eucheuma*.

In both genera the tetrasporangia are zonately divided; but in *Eucheuma*, according to DE-TONI, Sylloge, Vol. IV, Sectio I, p. 368 1897, they are immersed in the cortical layer; such very thick, expanded nemathecial layers, as are found in *Tenaciophyllum*, are not present in *Eucheuma*.

*Fam. 2. Rhodophyllidaceae.*

**Gelidiopsis** Schmitz.

1. **Gelidiopsis scoparia** (Mont. et Mill.) Schmitz.

Alg. Mauritius, Additions IV, 1952, p. 26, figs. 13—14.

Of this species some larger specimens, up to about 10—12 cm high, with more slender thalli and without or with much reduced fanlike broadenings out of the thallus when it becomes ramified are contained in two collections recently received.

Both are taken from "base of large rocks". Most probably they have been growing in a more sheltered locality.

Mauritius: Point aux Sables, 24-4-51, G. MORIN, no. 1114. Same locality: 22-6-51, R. E. V. no. 1146.

*Fam. 3. Plocamiaceae.*

**Plocamium** (Lamour.) Lyngbye.

1. **Plocamium Telfairiae** Harv.

Alg. Mauritius, III, 2, 1943, p. 64.

Some small specimens received recently are referable to this species.

The collector writes about them: "usually epiphytic."

Mauritius: Riambel, 8-12-50, R. E. V. no. 1002.

2. **Plocamium cornutum** (Turn.) Harv.

Alg. Mauritius, III, 2, 1943, p. 64.

Some fine specimens of this species have recently been received from Mauritius.

As to the locality it is said: "Reef near Ile aux Aigrettes."

Mauritius: Mahébourg, 8-3-51, R. E. V. no. 1063.

*Fam. 4. Sarcodiaceae.***Sarcodia** G. Ag.1. *Sarcodia ceylanica* Harv.

Alg. Mauritius, III, 2, 1943, p. 66, fig. 34; Additions II, 1950, p. 21, figs. 7—8.

var. *mauritiana* nov. var.

Planta caespitosa, ex surculis erectis ca. 6 cm altis, basi simplicibus a medio fere sursum repetite pseudodichotomis formata. Lobuli ultimi ca. 1—2 mm lati, obtusi.

Of this, as it seems, highly variable species I have formerly seen only some rather poorly developed specimens in most cases surely cast ashore, and—as pointed out in Additions II, p. 21—a great variability prevails among the specimens, which makes it difficult to clear up the specific value of them.

Among the specimens I have formerly seen, a single small female specimen from JADIN'S collection agrees quite well with the specimens of HARVEY'S Alg. Ceylon. Exsicc, no. 27, and KÜTZING'S figure in Tab. Phycologicae, vol. 19, p. 12, pl. 33a, b.

Meanwhile in a collection of algae lately received some few better developed specimens of *Sarcodia* are found, which show a likeness to some of those which I have formerly seen from Mauritius, but which in reality are rather different from the form from Ceylon.

The collection contains 3 specimens of this form (no. 1037); to judge from the largest one of these (Fig. 13), the others are fragments only, the plant must be presumed to have had a basal disc from which a number of erect flat shoots arise, thus forming a small tuft about 6—7 cm high; these shoots are, in a dried condition, about  $\frac{1}{2}$ —1 cm broad near the base, when alive surely somewhat more, first undivided but from about their middle they become furcated several times, the lobes after each furcation becoming narrower in the way that the uppermost lobes reach a breadth of only 1—2 mm; the uppermost apices are broadly rounded.

This description shows that the form here mentioned differs much from that of KÜTZING quoted above; and it is also very different from the small form I have mentioned in Additions II, p. 22, fig. 7.

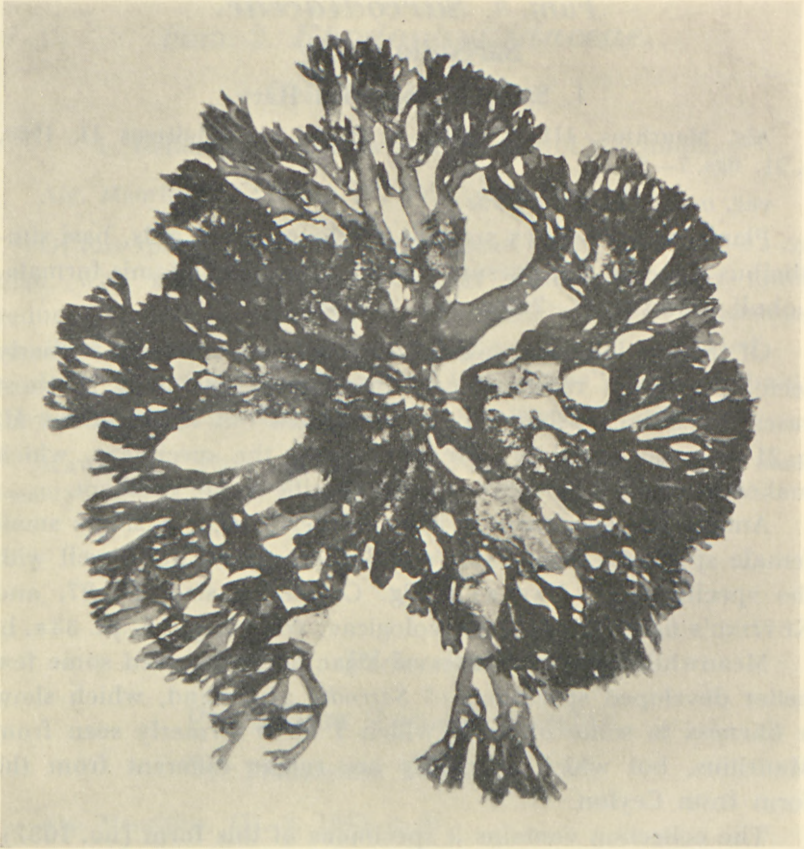


Fig. 13. *Sarcodia ceylanica* Harv. var. *mauritiana* nov. var. ( $\times$  about  $\frac{4}{5}$ ).

That there are upon the whole very deviating opinions about the species of this genus also appears from KYLIN's observations on *Sarcodia ceylanica*, l. c. p. 56, 1932. There is no doubt that several of the species of *Sarcodia* ought to be systematically worked through upon new and abundant material.

Accordingly I shall restrict myself to considering the specimens in question as belonging to a special variety, only calling them var. *mauriliana* as mentioned above.

As to the locality of the specimens it is said: "On reef exposed to strong surf."

Mauritius: Riambel near Souillac, 8-2-51, G. MORIN, no. 1037.

2. *Sarcodia multifida* nov. spec.

Frons ca. 10 cm alta, usque ad 1.5 mm crassa, carnosomembranacea, lubrice flexilis. Axis in parte basali distinctus, planus, segmentis marginalibus plus minus ramosis et proliferis instructus, sursum gradatim indistinctus, teres, ramellos et proliferationes undique gerens. Apices ramellorum obtusi.

Color plantae in sicco obscure ruber.

Tetrasporangis in superficie thalli formata, zonatim divisa.

Mauritius: Blue Bay, 8-5-51, R. E. V. no. 1120.

The habit of the few specimens of this plant (Fig. 14), which moreover all seem to originate from the same tuft (no basal discs were found) is so deviating from the specimens hitherto described of this genus, that, in spite of the defective material, I take them to be representatives of a new species of this genus.

When asking Miss L. M. NEWTON, British Museum (cf. Additions, IV, 1952, p. 30), for information about *Sarcodia Gathyae* (J. Ag.) Kylin I took the opportunity to send a specimen of the plant discussed here to her requesting her most kindly to compare it with specimens of *Sarcodia* found in the herbarium there. Miss NEWTON most kindly informed me that no specimens of *Sarcodia* in the Herbarium of the British Museum nor of *Dicurella* and *Trematocarpus* had any likeness to the specimen in question.

As my supposition to have to do with a new species thus was supported I shall now give a description of the plant based especially upon some fragments of it preserved in formol and seawater.

Most probably the plant forms a dense tuft, about 10 cm high, composed of a number of erect shoots issuing from a flat disc. In the lower part of these shoots a main stem is recognizable, in the upper parts none. This stem is flattened and in the largest specimens lowermost about 1 cm broad and about  $1\frac{1}{2}$  mm thick, a transverse section of it being elongated oblong; in the dried specimens it is only half this breadth. Upwards in the thallus the main stem becomes less broad and in the upper part it is not recognizable. Below, the branches and branchlets issue from the edges of the main stems, higher up, when the



Fig. 14. *Sarcodia multifida* nov. spec. ( $\times 1$ ).



stem becomes terete, in all directions. The uppermost branches and branchlets are about 1 mm thick only.

The ramification is very irregular and mostly very dense, branches and branchlets issuing without any order. The tips of the thallus are in a dried condition subacute, in the specimens preserved in formol obtuse.

The thallus is very flexible and slippery to judge from the fragments preserved in formol and seawater. The colour of the specimens preserved in the latter is dark red, that of the dried specimens nearly black brown.

Anatomically the present species agrees with the figure of a transverse section of the thallus of *Sarcodia ceylanica* in Part III, 2, 1943, p. 66. In the peripheral part of the thallus the contents of the cells are stellately contracted as is the case in several of the species of this genus.

The specimens are tetrasporic.

About the locality it is said: "on reef exposed to strong surf."

## Fam. 5. *Gracilariaceae*.

### *Gracilaria* Grev.

#### 1. *Gracilaria dura* (Ag.) J. Ag.

Alg. Mauritius, Additions III, 1951, p. 41, pl. VII.

In the paper quoted above I referred some specimens of *Gracilaria* to this species which are characteristic by the presence of unilaterally placed, short branchlets issuing here and there in short rows from the main branches. Some specimens, which are in good accordance with those of which a single one is reproduced in the paper quoted above, were found in a collection of algae received recently.

As to the locality it is said: "Sandy lagoon, exposed at low tide."

Mauritius: Ile aux Aigrettes, 14-1-52, G. MORIN, nos. 1205—1206.

## 2. *Gracilaria Millardetii* (Mont.) J. Ag.

Alg. Mauritius, III, 2, 1943, p. 72, figs. 36—40. Addit. II, 1950, p. 26, figs. 11—19.

Some surely loose-lying specimens of rather variable shape with broad or slender thalli of this very polymorphous species are contained in a collection of algae recently received from Mauritius. That they have been loose-lying upon the bottom and because of this have given out slender elongated proliferations from the old thallus, also appears from the information about the locality: "Lagoon, sandy bottom."

Mauritius: Near Mahébourg, 15-11-51, G. MORIN, no. 1175.

## 3. *Gracilaria multifurcata* nov. sp.

Thallus cartilagineus, caespitosus, ca. 4—5 cm altus (basis deest), compressus, ca. 2 mm latus et 0,5 mm crassus, repetitive furcatus, superne magis irregulariter ramosus, interdum unilateralis.



Fig. 15. *Gracilaria multifurcata* nov. spec. (Natural size).

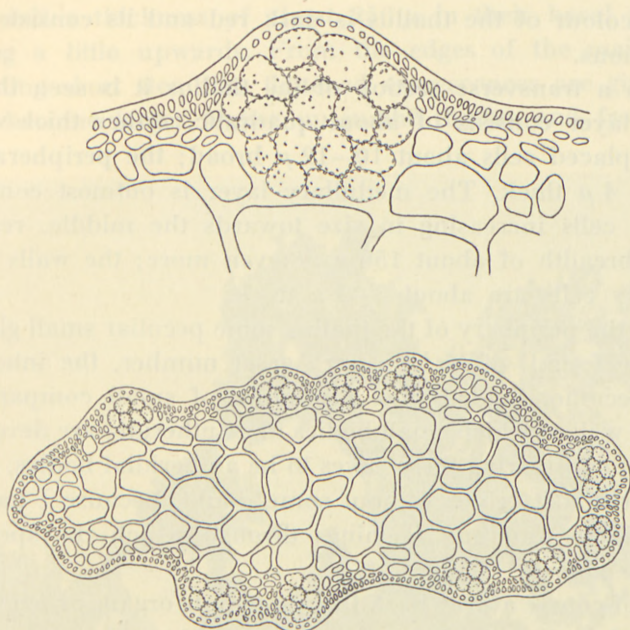


Fig. 16. *Gracilaria multifurcata* nov. spec. *a*, transverse section of a lobe of the thallus with antheridial caves. *b*, an antheridial cave more magnified ( $\times a = 60$ ,  $b = 165$ ).

Color thalli in sicco ruber.

Stratum corticale ex cellulis subaequalibus, subquadratis, ca.  $10-12 \mu$  latis, densissime collatis formatum; medulla in medio thalli ex cellulis subrotundatis, ad  $150 \mu$  latis composita.

Cystocarpia et tetrasporangia ignota. Antheridia cavernas subglobosas, ca.  $200 \mu$  latis, ad dimidium in thallum immersas, in cameras minutissimas parietibus tenuissimis divisas formantia.

Mauritius: Pointe aux Sables, 22-6-51, R. E. V. no. 1149.

This nice little *Gracilaria* (Fig. 15) forms extensive cushions about 4 cm high upon exposed rocks. The thallus is repeatedly irregularly furcated; it is flattened, about 1–2 mm broad and  $\frac{1}{2}$  mm thick. The angles of the furcations are nearly right. Uppermost in the thallus the ramifications are more irregular, often unilateral. The thallus keeps nearly the same breadth upwards, tapering gradually towards the tips.

The colour of the thallus is dark red and its consistency is cartilaginous.

Upon a transverse section of the thallus it is seen that the cortical layer consists of about quadratic, rather thick-walled, densely placed cells about 10–12  $\mu$  broad; the peripheral wall is about 4  $\mu$  thick. The medullary layer is outmost composed of small cells increasing in size towards the middle, reaching there a breadth of about 150  $\mu$  or even more; the walls of the medullary cells are about 3–4  $\mu$  thick.

Near the periphery of the thallus some peculiar small globular caves are found, often in a very great number, the interior of which become divided into a number of small compartments from the wall of which small bodies like antheridia are developed.

When considering these caves to be antheridial bodies, I must point out that it is not without some doubt, because I have not been able to find any openings through which the spermata might be able to escape.

It is of course a drawback that no female organs or tetraspores are found in the specimens.

Regarding the locality it is said: "Forms large cushions on rocks near shore in calm water."

## *Fam. 6. Phylloporaceae.*

### **Gymnogongrus** Mont.

#### 1. *Gymnogongrus* spec.

Two small fragments of a *Gymnogongrus* (Fig. 17) are found in a collection of algae received lately from Mauritius and because of the scarce material I prefer to let them remain unnamed, giving only a short description of them accompanied by a habit figure

As the base is lacking in the specimens any more exact description of the habit and its way of being fixed to the substratum is excluded, but most probably it has formed a low, about 5 cm high, dense tuft upon rocks fixed to them by a disc.

The thallus is flat, the main stems having a breadth of about

1 mm and a thickness of about  $250 \mu$  in their basal part decreasing a little upwards. From the edges of the main stems alternating short stem-like flattened excrescences are given out, which become larger higher up in the thallus and from these

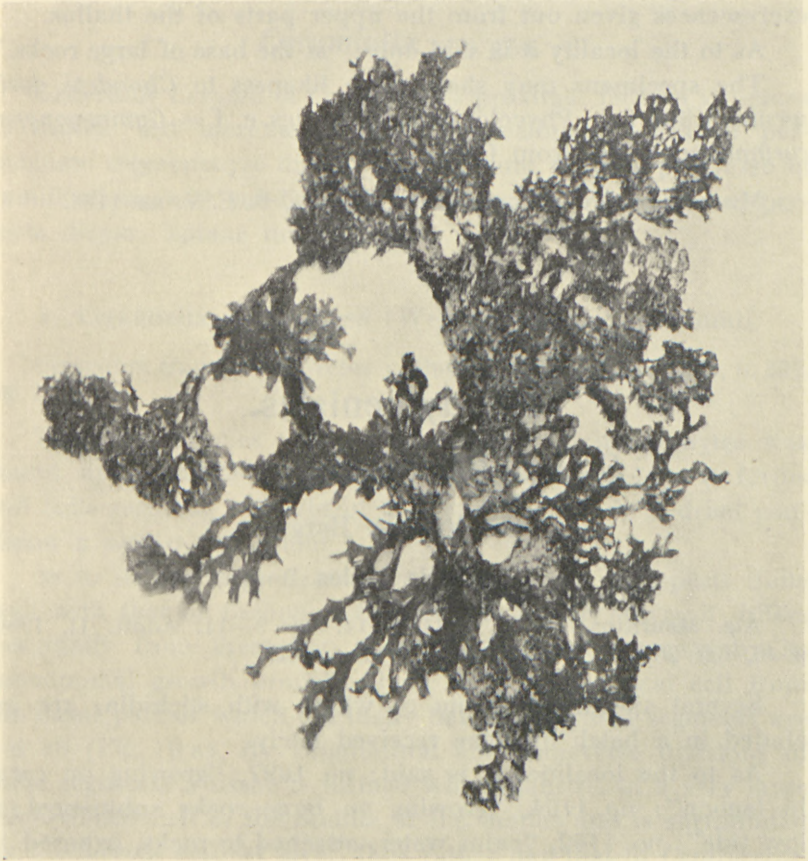


Fig. 17. *Gymnogongrus* spec. ( $\times 1\frac{1}{2}$ ).

again most irregularly shaped outgrowths and lobes issue; the result of this is that the uppermost parts of the thallus become irregularly shaped clumps composed of the densely packed and intertwined branchlets and proliferations.

A transverse section of the thallus shows that the cortical layer is composed of very densely packed small, square or more roundish cells, smallest at the periphery, innermost larger. The

medulla is formed by rather densely placed filaments, thinner near the periphery, thicker innermost, and woven irregularly together.

The specimens are tetrasporic; the cruciately divided sporangia are found in the cortical layer of the irregularly shaped excrescences given out from the upper parts of the thallus.

As to the locality it is said only: "at the base of large rocks."

The specimens may show some likeness to *Chondrus duriusculus* Kütz. Tab. Phycologicae, pl. 62, figs. e, f = *Gymnogongrus corymbosus* J. Ag. from Cape.

Mauritius: Pointe aux Sables, 22-6-51, R. E. V. no. 1148.

## Rhodymeniales.

### Fam. 1. *Rhodymeniaceae*.

#### *Coelothrix* Børgs.

##### 1. *Coelothrix indica* Børgs.

Alg. Mauritius, III, 3, 1944, p. 14, figs. 9—11. Addit. II, 1950, p. 40, figs. 20—21. Additions III, 1951, p. 42.

Several specimens, some of which with stichidia, are included in a batch of algae received lately.

As to the localities it is said: no. 1097, "growing on coral in lagoon"; no. 1104, "growing on large rocks submerged at low tide"; no. 1152, "calm water, attached to rocks, exposed at low tide."

Mauritius: Pointe aux Sables, 4-4-51, G. MORIN, no. 1097. Same locality, 26-4-51, G. MORIN, no. 1104. Same locality, 26-6-51, R. E. V. no. 1152.

## Ceramiales.

### Fam. 1. Ceramiaceae.

#### Subfam. 1. Ceramieae.

#### **Ceramiella** nov. gen.

Generibus *Ceramii* et *Centroceratis* proxima, facie et structura persimilis, sed incremento thalli per cellulam apicalem permagnam segmentaque disciformia deorsum formata progressu ut ramificatione non subdichotoma sed per ramos endogenes perfecta dispar. Spinae nullae.

#### 1. **Ceramiella Huysmansii** (Weber v. Bosse) nov. comb.

*Ceramium Huysmansii* Weber v. Bosse, Algues Siboga, 1923, p. 322, fig. 115.

This little species together with other small epiphytes was found upon fragments of *Digenea simplex* (Fig. 12). It forms soft tufts reaching a height of 2—3 cm and had in a dried condition a scarlet red colour.

As to its structure *Ceramiella* agrees in some respects quite well with that of *Ceramium-Centroceras*, but in others it differs essentially from these two very closely related genera by its monopodial growth brought about by a large apical cell from the basal part of which gradually flat, disc-formed segments are cut off (Fig. 19 a). By longitudinal and transverse divisions of these segments a tissue is formed which consists of a very large thick-walled cell in the middle of the thallus and is surrounded by a coherent cortical layer, thus rather like that of *Centroceras*.

The central cells are cylindrical or in older and fertile cells spindle-shaped, up to about 200  $\mu$  long and 70  $\mu$  broad, and connected with the adjoining cells through large pores. This central part is covered by a cortical layer composed of rectangular cells about 20  $\mu$  broad and 5—7  $\mu$  high, arranged mostly in rather regular transverse rows (compare Mme WEBER's fig. 115 b), but also more irregularly (Fig. 19 b)<sup>1</sup>.

<sup>1</sup> In some species, which surely are referable to *Ceramiella*, no coherent cortical layer is found.

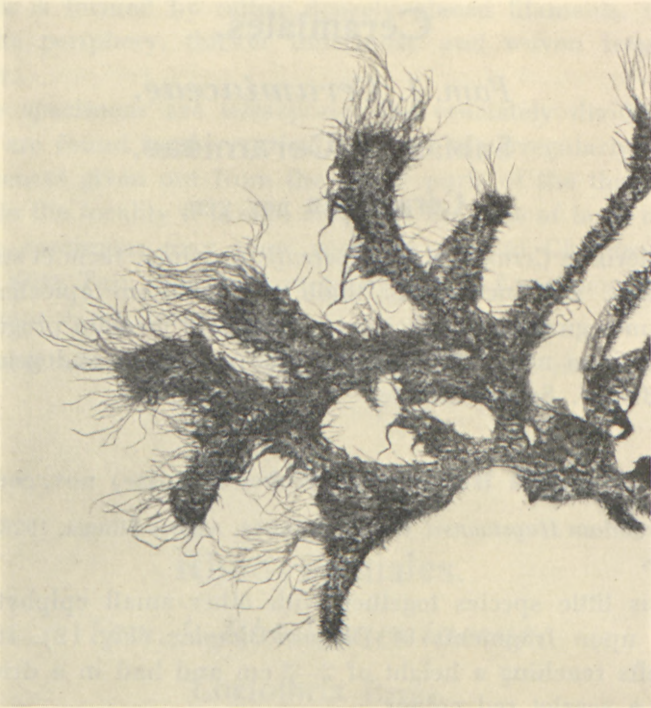


Fig. 18. *Ceramiella Huysmansii* (Weber v. Bosse) nov. comb. as an epiphyte upon *Digenea simplex* ( $\times 1$ ).

The scarce ramification is brought about by endogenous branches issuing here and there from the apical ends of the large central cells and grow into long shorts (Fig. 19 d).

As to the base I have found only decumbent filaments fixed to the substratum by means of rhizoids issuing in small tufts from the nodes; compare Mme WEBER's Fig. 115 a, *l. c.*

In the fertile filaments the joints of the thallus become more or less spindle-shaped. Only tetrasporangia are found (Fig. 19 c). These are as a rule developed at the nodes, but now and then also a single one may be found near the middle of the joints; 1—3 sometimes up to 5 sporangia may be found in a whirl at the nodes. The sporangia are globular or oblong, rather large, about  $50 \mu$  broad with thick walls.

They are tetrahedrally divided, sometimes also more irregularly. The fertile joints are often found in long rows in the specimens.



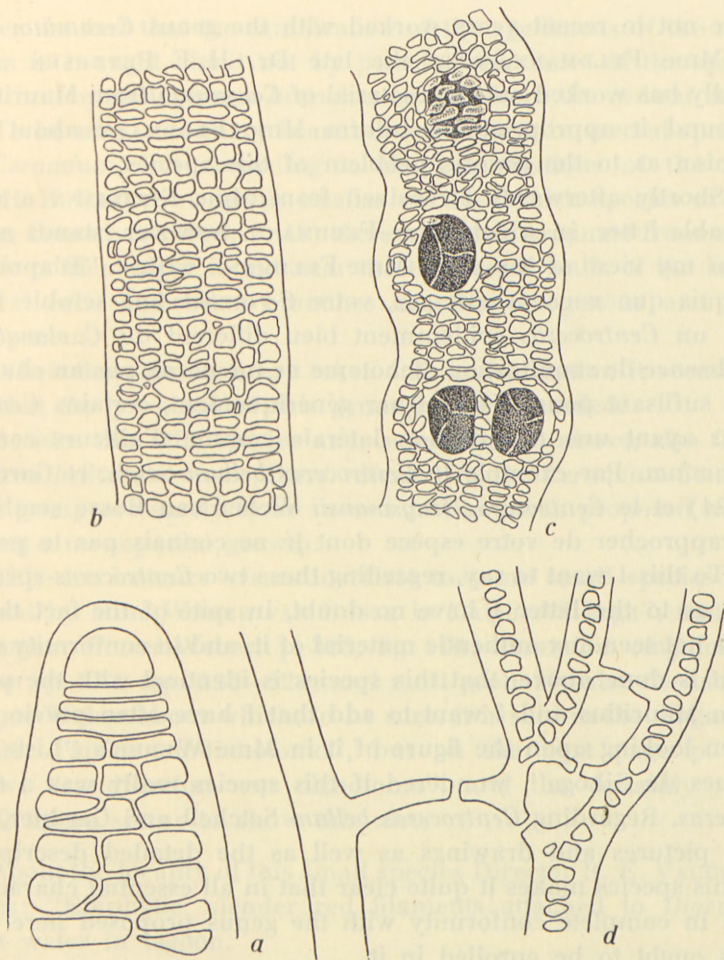


Fig. 19. *Ceramiella Huysmansii* (Web. v. Bosse) Borgs. *a*, apex of the thallus; *b*, part of the thallus; *c*, fragment of fertile thallus with sporangia; *d*, transverse section of the base of a branch (*a*,  $\times$  ca. 500; *b*, *c*,  $\times$  ca. 100; *d*,  $\times$  ca. 300).

As appears from this description the plant from Mauritius must be said to be in good accordance with that of Mme WEBER, even if I have not been able to compare it with authentic material.

On the other hand it must also be admitted that because of its monopodial growth and its endogenous ramification, it differs so much from the way in which these features are produced in the *Ceramium-Centroceras* group, that it seemed difficult for me to refer the plant to any of these genera. And because I

have not in recent years worked with the genus *Ceramium* and as Mme FELDMANN, after the late Dr. H. E. PETERSEN most kindly has worked out the material of *Ceramium* from Mauritius, I found it appropriate to inform Mme FELDMANN about my opinion as to the generic problem of this species.

Shortly afterwards I received from Mme FELDMANN a very amiable letter, in which Mme FELDMANN, however, stands aloof from my view of the alga. Mme FELDMANN writes: "D'après le croquis que vous m'adressez, votre *Ceramieae* me semble bien être un *Centroceras* évidemment bien différent du *C. clavatum*. L'absence de ramification dichotome ne me paraît pas un caractère suffisant pour le distinguer génériquement, certains *Centroceras* ayant une ramification latérale comme d'ailleurs certain *Ceramium*. Par exemple le *Centroceras bellum* Setch. et Gardner (1924) et le *Centroceras Huysmansii* Weber van Bosse semblent se rapprocher de votre espèce dont je ne connais pas le port."

To this I want to say, regarding these two *Centroceras*-species, that as to the latter I have no doubt, in spite of the fact that I have not seen any authentic material of it, and in conformity with what is done above, that this species is identical with the plant from Mauritius and I want to add that I have often previously, when looking upon the figure of it in Mme WEBER'S "Liste des Algues du Siboga", wondered if this species really was a *Centroceras*. Regarding *Centroceras bellum* Setchell and Gardner, the fine pictures and drawings as well as the detailed description of this species makes it quite clear that in all essential characters it is in complete conformity with the genus proposed here and thus ought to be enrolled in it.

In her letter Mme FELDMANN adds: "Chez le *C. clavatum* la dichotomie très régulière, ne doit pas être une dichotomie vraie due à la division longitudinale de la cellule apicale mais une fausse dichotomie comme chez les *Ceramium*; cette fausse dichotomie se fait tout près du sommet du filament donnant l'aspect d'une dichotomie vraie." To this I want to say that there is hardly any doubt that the division of the apical cell in *Centroceras* is like that of *Ceramium*.

But from what is the case there to that of *Ceramiella*, in which no longitudinal division of the apical cell at all takes place, is an essential difference and as a consequence of this

comes the fact that the ramification of the specimens of the new genus is brought about not by pseudodichotomies of the apical cells but by endogenous branches issuing from the central cells.

To be sure, secondary branches are present in several species of *Ceramium*, but according to the examinations of the late Dr. H. E. PETERSEN in his treatise on the Danish species of the genus *Ceramium* (1908, p. 48) these branches originate from cells in the cortical layer found near the transverse walls of the large central cells and these branches are thus exogenous and not endogenous.

When these features are taken into consideration it seems to me that the proposal of this genus is well founded.

Besides this little species and, as mentioned above, also *Centroceras bellum*, several others referred to the *Ceramium-Centroceras* group are surely to be moved to the genus proposed here, having a monopodial growth.

This for instance seems to relate to some small species described by Mme WEBER VAN BOSSE in "Algues Siboga", namely *Ceramium Howei* Weber, p. 323, fig. 116; *Ceramium cingulatum* Weber, p. 332, figs. 123—124; and most probably also *Ceramium Maryae* Weber about which, to be sure, it is said in the diagnosis p. 324: "apice subdichotomo", but on the next page p. 325 below: "ramification non dichotome", and the certainly very small figure seems to show this also.

About the locality of this small species Director R. E. VAUGHAN writes: "Epiphytic, slender red filaments attached to *Digenea*, quiet water in lagoon."

Mauritius: Flic-en-Flacq, 22-2-51, R. E. V. no. 1056.

## Centroceras Kütz.

### 1. *Centroceras clavulatum* (Ag.) Mont.

Alg. Mauritius, III, 4, 1945, p. 10.

Having formerly seen only small and poorly developed specimens of this species from the island I have in material received lately been able to examine some very good, even fertile specimens.

Mme GÉNEVIÈVE FELDMANN in her very valuable monographic examination of the Mediterranean *Ceramiaceae*, has given a detailed description of this species there. According to what is said here (p. 339), this species in the Mediterranean Sea propagates only vegetatively, while in the tropics it has tetrasporangia as well as sexual organs.

In the material from Mauritius I have found only tetrasporic specimens; in these, like those described and pictured by Mme FELDMANN upon specimens from the West Indies, the sporangia are annularly arranged round the nodes.

In some of the specimens the axial cells are much elongated, and likewise the cortical ones are more or less elongated. In one collection, no. 979, the specimens besides spines had long hairs, similar to those found in *Centroceras leptacanthum* Kütz. from the Mediterranean Sea; compare KÜTZING in Tab. Phycol., vol. 13, p. 7, pl. 18, fig. f. In a note about this form KÜTZING writes on p. 7: "Zwischen den schlanken Stacheln zeigt Fig. f auch feine Haare, welche den Spitzen ein zottiges Ansehen geben." KÜTZING has in this volume pictured a row of new species with references to these characters; they deserve surely to be taken up for a more detailed examination, when good material is to be had.

Mauritius: Pointe aux Cannoniers, 16-2-46, R. E. V. no. 523. Îlot Barkly, 18-3-46, G. MORIN, no. 550. Pointe aux Caves, 1-12-51, R. E. V. no. 1184. Without locality and dates, C. NEYROLES. Riambel near Souillac, 23-11-50, G. MORIN, no. 979.

## Subfam. 2. Spyridieae.

### *Spyridia* Harv.

#### 1. *Spyridia filamentosa* (Wulf.) Harv.

Alg. Mauritius, III, 4, 1945, p. 11; Additions, IV, 1952, p. 52.

A rather robust form with short ramuli in conformity with my fig. 234 in Mar. Alg. D. W. I., p. 234, was contained in a collection received lately.

Mauritius: Îlot Barkly, 30-10-51, G. MORIN, no. 1173.

### Subfam. 3. Griffithsieae.

#### *Griffithsia* C. Ag.

##### 1. *Griffithsia* Weber-van-Bosseae Børgs.

Alg. Mauritius, III, 1945, p. 17.

Of this little species several fine specimens were found in batches of algae received lately, but most regretably the material examined was sterile. In the material found originally only tetrasporic and antheridial specimens were found. The specimens reach a height of about 2 cm and the dried specimens have a fine rosy-red colour.

About the localities it is said: no. 1101, "3—4 feet of water at low-tide", and no. 1210: "shallow water near shore."

Mauritius: Pointe aux Sables, 24-4-51, G. MORIN, no. 1101. La Preneuse, 12-4-52, R. E. V. no. 1210.

##### 2. *Griffithsia* subcylindrica Okamura.

OKAMURA, K., On the Algae from the Island Hatidyo, 1930, p. 99, pl. VIII.

Some few specimens of a *Griffithsia* contained in a gathering of algae received from Mauritius I do not hesitate in referring to this species, even if the Mauritian specimens in some less essential characters differ somewhat from OKAMURA's description.

The Mauritian specimens form loosely built tufts about 2—3 cm high.

As to the base I have in a few cases found decumbent filaments from which issue unicellular, short rhizoids ending in an irregularly lobed disc, by which the plant was fixed to the substratum. From the upper side of these decumbent filaments erect ones are given out.

The upwards growing filaments are in their lower part ca. 200—300  $\mu$  broad and composed of subcylindrical cells, swelled somewhat at their upper ends and about 3 times as long. Upwards in the filaments the cells become gradually slender and less swelled, up to about 1 mm long.

The ramification is rather irregular, mostly alternate, but in some cases no branches are given out and in others two oppositely placed ones are present.

In the material examined I have found tetrasporic and male specimens.

The fertile organs are developed upon the broadly rounded apices of short unicellular branchlets. These are nearly pear-shaped with a broadly rounded, up to  $350\ \mu$  broad, apex, from the uppermost part of which the tetrasporangia are developed, often in a great number borne upon a small basal cell. The sporangia are protected by a whirl of curved short, robust ramuli, about 8 in number, given out from the upper edge of the mother branchlet.

The antheridial bodies are in a very similar way developed from the broad apex of the branchlets. They are composed of very thin, much divided branchlets in the apices of which the antheridial bodies are developed. As is the case of the sporangia the antheridial bodies are protected by a whirl of short, thick, curved branchlets.

While OKAMURA compares his new species with *Gr. Schousboei*, it must be said to show also much likeness to *Gr. japonica* Okamura described by OKAMURA at about the same time in *Icones Jap. Algae*, vol. VI, p. 28, pl. 270, 1929—32. I shall not, however, enter upon a more thorough comparison with this species, but only point out as a special difference among the species in question that while the fertile branchlets in *Gr. subcylindrica* do not show any further growth, the branchlets in *Gr. japonica*, often produce one or two more cells above the lowermost one.

About the locality Dr. VAUGHAN writes: "Epiphyte, on stems and leaves of *Cymodocea* spec."

Mauritius: Riambel, 8-12-50, R. E. V.

Geogr. Distr.: Hatidyo, Japan.

**Fam. 2. *Delesseriaceae*.****Subfam. 1. Nitophylleae.*****Martensia* Hering.****1. *Martensia elegans* Hering.**

Alg. Mauritius, III, 4, 1945, p. 27, Additions IV, 1952, p. 63.

In some specimens received lately (no. 1188) an examination has shown that they were female agreeing quite well with the fig. 31 of SVEDELIUS, 1908, l. c. Some other specimens (no. 1213) were tetrasporic.

The first-mentioned specimens were growing in "deep pools exposed to strong currents and waves"; the others were "growing on *Hydroclatrus* in pools".

Mauritius: Pointe aux Caves, 1-12-51, G. MORIN, no. 1188, Riambel, 24-7-52, G. MORIN, no. 1263.

**Fam. 3. *Rhodomelaceae*.****Subfam. 1. Laurencieae.*****Laurencia* Lamour.****1. *Laurencia flexilis* Setchell.**

Alg. Mauritius, III, 4, 1946, p. 56, figs. 31—33; Additions IV, 1952, p. 66, fig. 33.

Several well prepared specimens of this characteristic species were found in a batch of algae received recently from Mauritius.

As to the locality it is said: "Shallow water near shore. Dark green rather wiry filaments."

Mauritius: Souillac, 31-8-51, R. E. V. no. 1156.

## Subfam. 2. Condrieae.

### **Chondria** Harv.

#### **Chondria dasyphylla** (Woodw.) Ag.

Alg. Mauritius, III, 4, 1945, p. 62.

Some very fine specimens of this species were lately received from Mauritius. Tetrasporic and female specimens were present.

The specimens were growing upon "pieces of shell, coral, etc., in a lagoon".

Mauritius: Ile aux Aigrettes, 12-5-52, G. MORIN, no. 1221.

### **Acanthophora** Lamour.

#### 1. **Acanthophora spicifera** (Vahl) Borgs.

Alg. Mauritius, III, 4, 1915, p. 61.

Since this species was mentioned in the part quoted above a gathering containing several well prepared specimens has been received.

Mauritius: Cassis, 3-8-40, G. MORIN, no. 422.

*Genus incertae sedis.*

### **Endosiphonia** Zanardini.

#### 1. **Endosiphonia clavigera** (Wolny) Falkenberg.

FALKENBERG, P., Rhodomelaceen, 1901, p. 568, pl. 13, figs. 1—11.  
— *Veprecula clavigera* Wolny in Herb. Kiel. *Sphaerococcus horridus* Ag., Spec. Alg., 1821, p. 322. *Gigartina horrida* Grev. Alg. Brittanica, 1830, p. LIX. *Hypnea* (?) *horrida* (Ag.) J. Ag., Nya Alger fr. Mexico, 1847, p. 14. Spec. Alg., vol. II, p. 454; Epicrisis, p. 565. BØRGESSEN, F., Alg. Mauritius, 1943, p. 62, fig. 32; Additional List, II, 1950, p. 15, fig. 4; 1952, p. 28.

In a letter dated March 25, 1952, Miss LINDA M. NEWTON, British Museum, most kindly informed me that in a collection of some miscellaneous undetermined algae found in the Museum a specimen of *Endosiphonia clavigera* from Amber Island, Mauritius, was included. Being at that time occupied with other things I put the letter aside to return to it later.



This I have done now and after seeing FALKENBERG's description and figures of *Endosiphonia clavigera* it became immediately clear to me that *Hypnea* (?) *horrida* (Ag.) J. Ag. was identical to *Endosiphonia clavigera*.

Not only does FALKENBERG's habit figure of the thallus give a very good picture of the plant leaving no doubt about their identity, but also the anatomical structure of the thallus with its 4 pericentral cells round the central axis is the same in both. The peculiarity that the surrounding cells of the medulla are all of the same length as that of the cells of the central axis and of the pericentral cells is also in perfect agreement with the description given by FALKENBERG of the plant; compare my figures, Fig. 32, l. c. While sexual organs are not found in this species, FALKENBERG describes and pictures the stichidia. These are formed scattered or in small groups over the whole surface of the thallus.

An examination of specimens received lately has shown that some are tetrasporic. In contrast to the coarse, robust thallus the stichidia are comparatively small and this is the reason for the fact that they are easily overlooked. As described by FALKENBERG they have a short monosiphonous stipe. The rather large ball-shaped tetrasporangia make the stichidia irregularly spirally swelled. The stichidia are about 300  $\mu$  long and 70–100  $\mu$  broad, and the tetraspores have a diameter of about 50  $\mu$ .

I have not observed any sexual organs.

In case C. AGARDH's name of the species is older than WOLNY's, its specific name ought to be that of C. AGARDH.

Mauritius: Pointe aux Roches, 22-9-52, G. MORIN, no. 1294.

### Subfam. 3. Polysiphorieae.

#### Digenea Ag.

##### *Digenea simplex* (Wulf.) Ag.

Alg. Mauritius, III, 4, 1945, p. 39.

Having only once before met with this species, surely common in the island, I shall mention here that it was present in

a collection of algae received lately and gathered because as usual it is covered by small epiphytes. An examination has shown that the specimen is tetrasporic in very good agreement with my fig. 281 (Mar. Alg. D. W. I., vol. II, p. 281) with the exception that the sporangia were more oblong. In the same paper, p. 469, I have given a figure of the antheridial bodies of this species (Fig. 427).

Mauritius: Flic-en-Flacq, 29-2-51, R. E. V. no. 1056.

## Roschera Sonder.

### 1. *Roschera condensata* Weber v. Bosse.

WEBER VAN BOSSE, A., *Algues Siboga*, p. 359, pl. V, fig. 3.

A gathering received lately (no. 1179) has proved to be a *Roschera* which seems to be in good conformity with Mme WEBER'S description of *R. condensata* (Fig. 20).

The characteristic feature of this species is that the main branches are very densely covered by the likewise densely



Fig. 20. *Roschera condensata* Web. v. Bosse. A specimen ( $\times 1$ ).

branched short shoots; in the lower part of this tissue, the tips of the ramuli may here and there adhere to those of the neighbouring branchlets, forming in this way a very dense coat round the axis of the main branches. Above this the uppermost free, dome-like apices of the short-shoots protrude, giving the outline of the main branches a wavy appearance.

The specimens are tetrasporic; the sporangia are formed in the basal cells of the ramuli; as a rule only a single one is developed at the base of each ramulus. The sporangia are large, having a diameter of 75—80  $\mu$ .

Trichoblasts were not found in the specimens; they occurred numerously in a male specimen of *R. glomerulata* (Ag.) Web. v. Bosse gathered in the Arabian Sea near Dwarka in India; cf. BØRGESEN, "Some Indian Rhodophyceae", in Kew Bulletin, 1931, No. 1, p. 17, fig. 11.

The colour of the specimens is dark reddish-brown.

The plant is most probably found in an exposed locality, but as to the locality it is said only: "2—3 feet of water at low tide."

Mauritius: Pointe aux Caves, 1-12-51, G. MORIN, no. 1179.  
Geogr. Distrb.: Malayan Archipelago, New Caledonia.

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### List of Literature.

Additions to the lists in former parts.

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- OKAMURA, K., On the Algae from the Island Hatidyo. Records of Oceanographic Works in Japan. Vol. II, No. 2, 1920. Tokyo.
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- SAUVAGEAU, C., Note Préliminaire sur les Algues Marines du Golfe de Gascogne. Journal de Botanique. Paris 1897.
- TAYLOR, W. R., Pacific Marine Algae of the Allan Hancock Expeditions to the Galapagos Islands. Allan Hancock Pacific Expeditions. Vol. 12. Los Angeles, California 1945.
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together with some essential synonyms, the latter in italics.

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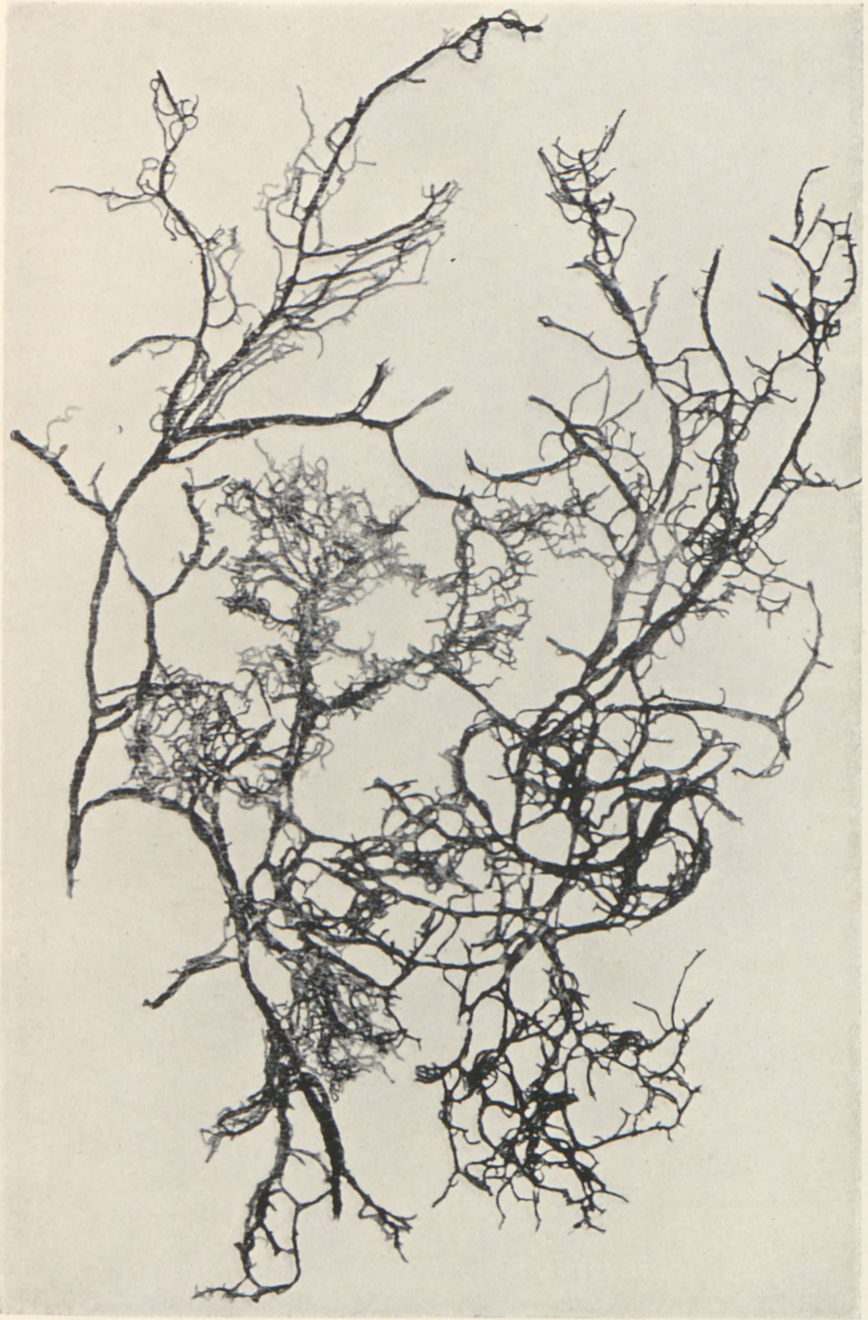
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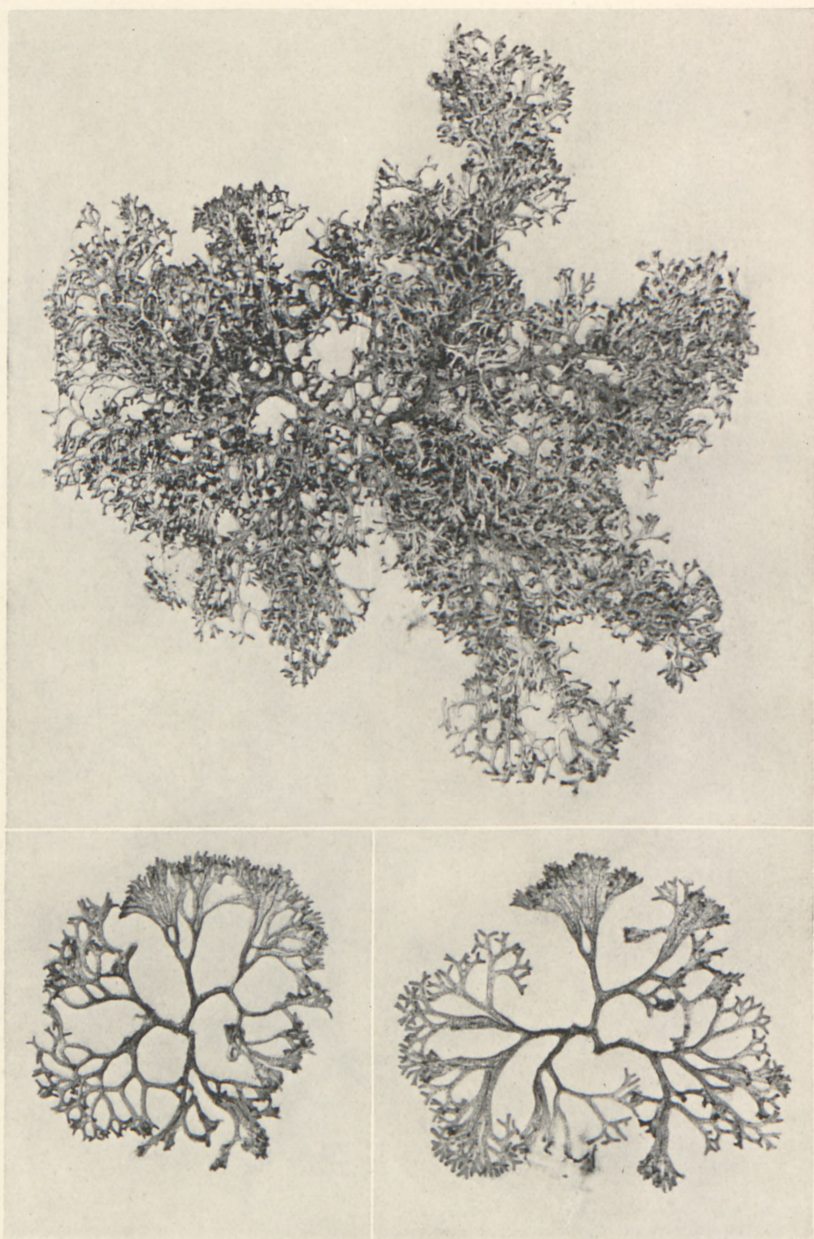
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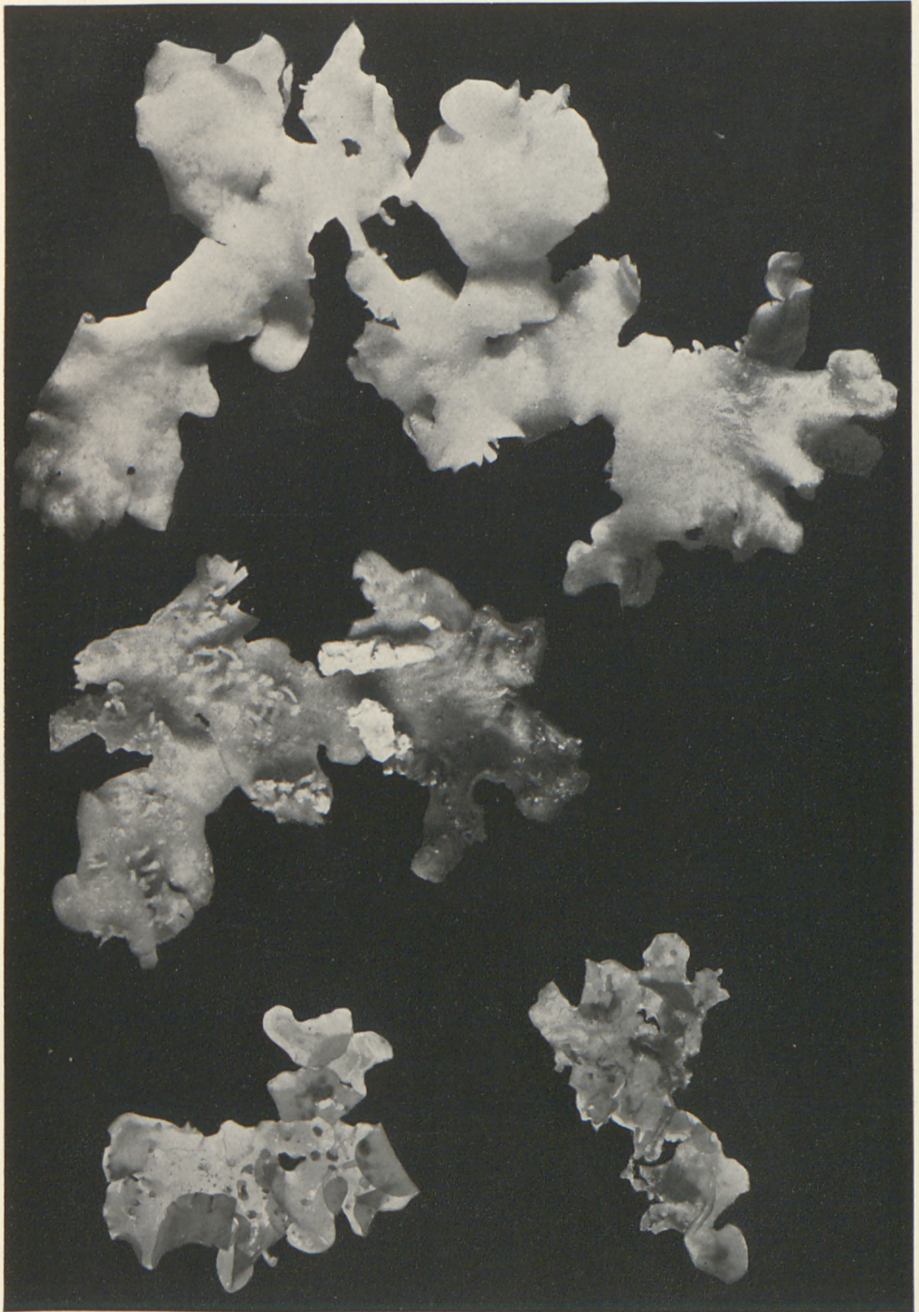
*Nemaecystus erythraeus* (J. Ag.) Sauv. Fragments of the thallus ( $\times 1$ ).

PLATE II



Above: A specimen of *Liagora valida* Harv.  
Below: Two fragments of *Liagora bella* nov. spec. ( $\times 1$ ).





Above: Two specimens of *Tenaciphyllum lobatum* nov. spec., the uppermost seen from above, that below showing the underside with the rootlike processes.  
Below: Two specimens of *Tenaciphyllum rotundilobum* nov. spec. ( $\times 1$ ).