DET KGL. DANSKE VIDENSKABERNES SELSKAB
BIOLOGISKE MEDDELELSER, BIND XIX, NR. 10

SOME MARINE ALGAE FROM MAURITIUS

III. RHODOPHYCEAE

PART 4

CERAMIALES

BY

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KØBENHAVN
I KOMMISSION HOS EJNAR MUNKSGAARD
1945

Printed in Denmark.
Bianco Lunos Bogtrykkeri A/S

In this last part of my paper: "Some Marine Algae from Mauritius" the species of the remaining order of the *Ceramiales* found in the collections are worked out.

As was the case in the former publications treating of the *Florideae*, the present part is based upon the late Dr. JARDIN's[1] collection in which the native DARUTY's gatherings are included and which belong to the Muséum National d'Histoire Naturelle, Paris, and further upon the collections of Dr. TH. MORTENSEN and Dr. R. E. VAUGHAN. And as was also the case in the former parts, some few species of algae from Réunion contained in Dr. JADIN's collection have been included in the list.

In the following list 48 species are enumerated, but later examinations will of course augment this number to a considerable degree.

As was already pointed out earlier the material is in most cases rather scarce, often a single specimen of each species; and some of it, especially that collected by DARUTY, is not always in the best condition, a circumstance which has made it impossible to determine several of the specimens.

That some later collections made by Dr. VAUGHAN have not reached me because of the war is of course a great drawback. These collections as far as I know are kept in the Kew Herbarium by Dr. COTTON.

I should also like to point out here that I have not been able to visit Lund to consult the herbarium of J. AGARDH. And likewise I wish to mention that since the outbreak of the war I have been out of touch with a great deal of my colleagues abroad and consequently without any knowledge of their publications,

[1] According to kind information Dr. FERNAND JADIN died in Montpellier on the 22. Febr. 1944.

and so also I do not know to what extent this disadvantage may affect my paper.

Though I have said above that the present part of this publication is the last, I should like nevertheless to mention that the *Chlorophyceae* and *Phaeophyceae* of Dr. JADIN's collection did not reach me until after the parts treating these groups had been published. Since at any rate the collection of *Chlorophyceae*, judging by a brief inspection, seems to contain many species of interest not mentioned in the former parts, it is not excluded that a supplementary part dealing with these groups may appear.

The algal flora of Mauritius and altogether of the Mascarene Islands seems to be very rich, a fact which indeed Dr. VAUGHAN has pointed out to me. No doubt is present that a thorough examination of the algal flora of the islands by a trained algologist will bring to light much of interest.

I am greatly indebted to Dr. HENNING E. PETERSEN who with his usual readiness has most kindly determined the few species of *Ceramium* found in the collection.

I also wish to thank Professor HARALD KYLIN of Lund University who with great kindness has given me valuable information about some few of the algae.

Copenhagen in February 1945.

VI. Ceramiales.

Fam. 1. Ceramiaceae.

Subfam. 1. Crouanieae.

Antithamnion Nägeli.

1. Antithamnion flagellatum nov. spec.

Frons pygmaea, ca. 3—4 mm. alta, caespitosa, mollissima, ex filamentis ramelliferis, in parte basali decumbentibus per haptera adfixis, sursum erectis composita.

Filamenta articulata, ex articulis in parte basali 50—80 μ lata, superne gradatim tenuioribus, diametro 3—4 plo longioribus formata.

Ramuli singuli, oppositi, verticillati, vel magis irregulariter infra apicem articulorum orti, 300—400 μ vel longiores, mollissimi et flabellati, erecti, 1—3 ies alterne ramosi, ex articulis 10—15 μ latis et 5—10 plo longioribus compositi.

Glandulae verisimiliter raro præsentes, subgloboso-depressae, in superiori latere cellulae singulae prope basem ramellorum præsentes.

Tetrasporangia oblonga, ca. 50 μ longa et 26 μ lata, cruciatim vel interdum triangule divisa, e cellulis basalibus ramulorum orta, plerumque singularia, raro bina praesentia.

Antheridia et gonimoblasti non observata.

Mauritius: Off Flat Island, dredged at a depth of 30 fathoms, 16. Oct. 1929, Th. M.

In Dr. Mortensen's collection a very little dried material occurred of a small, soft *Antithamnion*, which formed tufts about 3—4 mm. high upon a fragment of a larger alga.

The lowermost decumbent parts of the filaments are fixed to the substratum by means of hapters, the shorter ones composed of a single cell, the longer ones of several.

In the basal part of the filaments the cells are hourglass-shaped, about 50—80 μ broad and about twice as long; higher up the cells become cylindrical, about 40 μ thick and 3 to 4 times

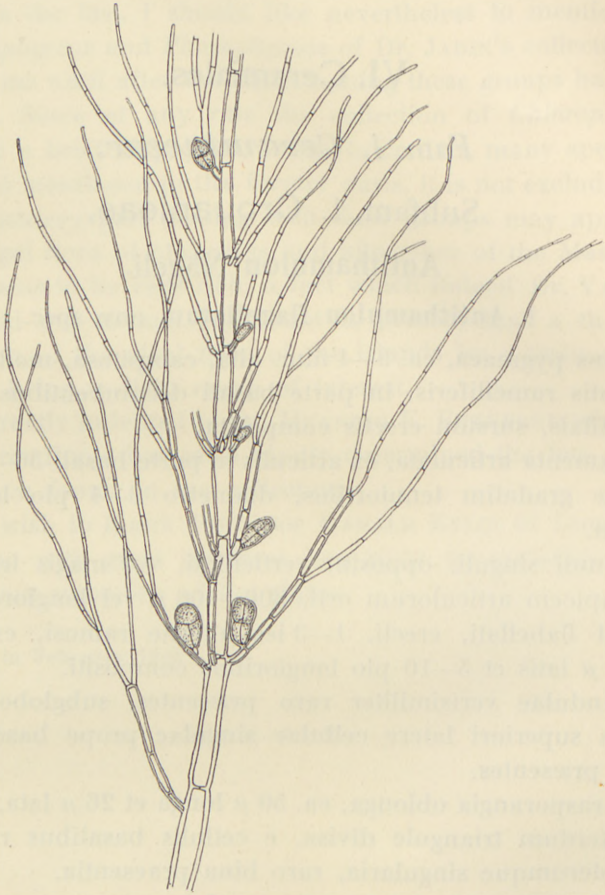

Fig. 1. *Antithamnion flagellatum* Børgs. Part of the thallus with tetrasporangia. (× about 120).

as long or longer. Near the base the cells have a thick wall, upwards this becomes gradually thinner.

From near the upper ends of the cells in the main filaments, a single or two branchlets, then but not always oppositely placed, often also three, are given off (Fig. 1); I have not seen 4 verticillate branchlets, but most probably they occur. A good many of the cells in the main filaments are without branchlets at all. Instead

of a branchlet now and then a branch is given out. The branchlets are 300—400 μ long or a little longer, slender and very flexible. Their base consists of a short cell, the next one is a little longer, whereupon the cells as a rule become about 5—10 times longer than the breadth, which is about 10—15 μ. Near the tips the filaments of the branchlets taper to about 2—3 μ only. The apical

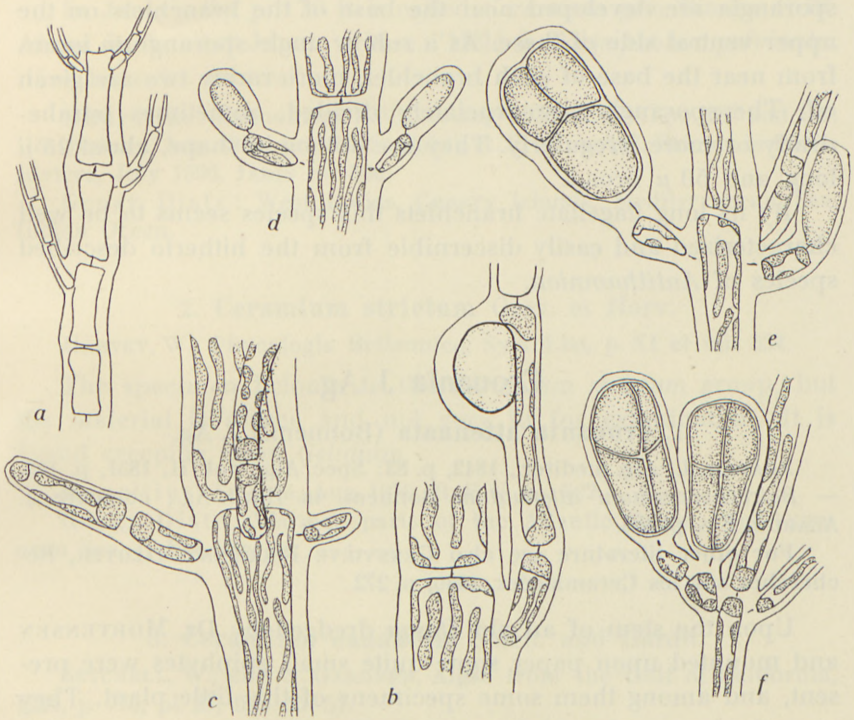

Fig. 2. *Antithamnion flagellatum* Børgs.
a, fragment of a main filament near the base; *b*, ramulus with a gland-cell; *c*, fragment of a filament with 3 ramuli; *d*, *e*, *f*, ramuli with young and ripe tetrasporangia. (*a* × 160; *b* × 350; *c*—*f* × 225).

cell is about 20 μ long with obtuse summit. The longer branchlets are subfurcated a few times near their base; the smaller ones give off a single ramulus or none at all.

Gland-cells are rather rare and in some of the specimens entirely absent. They are placed upon a cell in the lowermost parts of the branchlets on the upper side of these. They are oblong or nearly spherical; that pictured in Fig. 2*b* is 10 μ broad and 15 μ long. They have a yellowish, refractive content.

The chromatophores are irregularly ribbon-like, narrow in the older cells, broader in the young ones; in the branchlets at both ends of the cells the chromatophores in the dried condition form a dense layer, while in the middle of the cells they form broader ribbons.

Plants with tetrasporangia (Fig. 2 *d, e, f*) are found only. The sporangia are developed near the base of the branchlets on the upper ventral side of these. As a rule a single sporangium issues from near the base of each branchlet, more rarely two are given off. The sporangia are cruciately divided, sometimes tetrahedrally or more irregularly. They are oblong in shape, about 25 μ long and 50 μ broad.

By its long flagellate branchlets this species seems to be well characterized and easily discernible from the hitherto described species of *Antithamnion*.

Crouania J. Ag.

1. Crouania attenuata (Bonnem.) J. Ag.

Agardh, J., Alg. mediter., 1842, p. 83; Spec. Alg., vol. II, 1851, p. 105. — *Batrachospermum attenuatum* Bonnem. in Herb. Ag.; compare J. Agardh, l. c. p. 105.

For other literature see also Geneviève Feldmann-Mazoyer, Recherches sur les Ceramiacées, 1940, p. 272.

Upon the stem of an old *Dasya* dredged by Dr. Mortensen and mounted upon paper some quite small epiphytes were present, and among them some specimens of this little plant. They were dredged at the considerable depth of about 60 metres. The specimens were mostly tetrasporic, a single one was antheridial.

Otherwise I have not met with this species in the collections nor is it mentioned in Jadin's list.

Mauritius: Off Flat Island, Oct. 16., 1929, Th. M.

Geogr. Distr.: Most probably widespread in warm seas.

Ceramium (Roth) Lyngbye.

I am much indebted to Dr. H. E. Petersen for the determination of the species of this genus.

1. **Ceramium transversale** Collins et Hervey.

Collins, Fr., and A. B. Hervey, The Algae of Bermuda, 1917, p. 117, pl. V, figs. 29—31.

Several specimens of this species are found in the collections. Described in 1917 upon specimens from the Bermuda Island, this little species seems to be wide-spread.

In Jadin's list p. 170 it is called *Ceramium gracillimum* Griff. About its habitat Jadin writes: "Mêlé à *Polysiphonia pulvinata*, dans les eaux calmes".

Mauritius: Cannoniers Point, 5. Aug· 1933, R. E. V. no. 183 and 189. Ilôt Brocus, Aug. 1938, in "Reef pools", R. E. V. no. 198. Baie de la Petite Rivière, July 1890, Jadin no. 326.

Geogr. Distr.: West Indies, Canary Islands, Mediterranean Sea, Indian Ocean.

2. **Ceramium strictum** Grev. et Harv.

Harvey, W., Phycologia Britannica, Syst. List, p. XI et tab. 334.

The specimen belongs to the *Ceramium strictum* group, but the material is scarce and not very fit for examination. It is found creeping upon *Gelidium*.

Mauritius: Savinia, Aug. 1939, R. E. V. no. 302.

Geogr. Distr.: Warmer parts of the Atlantic Ocean, Mediterranean Sea, Indian Ocean.

3. **Ceramium caudatum** Setch. and Gardn.

Setchell, W., and N. Gardner, Algae from the Gulf of California, 1924, p. 776, pl. 27, figs. 55—57.

The specimens certainly come near to this species but any exact determination upon the rather poor material has not been possible. Some of the specimens have tetrasporangia.

The plant was twice, together with *Bornetia Binderiana* (Sond.) Zanard., found creeping between the filaments of the capitulum of *Chamaedoris Delphinii* (Har.) Feldm. et Børgs., and once imbedded more or less among the filaments of *Codium Vaughani* Boergs.

Mauritius: Gabriel Isl., March 8., 1871, Colonel Pike (Herb. Kew.). Ilôt Brocus, without dates, R. E. V. Off Flat Island, Oct. 1929, Th. M. no. 833.

Geogr. Distr.: California.

4. Ceramium elegans Ducluzeau.

Ducluzeau, J. A. P., Essai, 1805, p. 53. Agardh, J., Spec. Alg., II, p. 124; Epicr., p. 97.

A single specimen in Jadin's collection gathered by Daruty is most probably this species.

In Jadin's list p. 170 it is found as *Ceramium nodosum* Harv.

Mauritius: Without locality and date, gathered by Daruty 1892.
Geogr. Distr.: Mediterranean Sea, Cadiz.

5. Ceramium Johnstonii Setch. et Gard.

Settchel, W., and N. Gardner, Mar. Alg. Gulf of California, 1924, p. 774, pl. 76, 77.

Two specimens in Dr. Vaughan's collection are surely referable to this Californian species.

Mauritius: Black River Bay, July 9., 1939, R. E. V. no. 281. Savinia, Aug. 1939. R. E. V. no. 307.
Geogr. Distr.: California.

6. Ceramium rubrum (Huds.) Ag.

Agardh, C., Synops. alg. Scand., p. 60; Spec. alg., II, p. 146. — *Conferva rubra* Huds., Flora Angl., 1778, p. 600.

A rather large and fine specimen of this species is found in Jadin's collection.

Mauritius: Without locality and date, gathered by Daruty 1892.
Geogr. Distr.: Widespread.

Centroceras Kütz.

1. Centroceras clavulatum (Ag.) Mont.

Montagne, Exploration Scientif. de l'Algérie, Algues, p. 140, 1846. For more synonyms compare De-Toni, Syll. Alg., Vol. IV, 3, p. 1491.

Some small specimens or fragments only are found in the collections. The specimens have short spines more or less developed.

It is mentioned in Jadin's list p. 170; about its habitat he writes: "Dans les eaux calmes; à 20 centimètres au-dessous des eaux à marée basse".

Mauritius: Baie de la Grande Rivière, Oct. 1890, Jadin no. 395. Barkly Island, Aug. 1939, "in rock crevices or on rocks in exposed pla-

ces, usually incrusted with Diatoms", R. E. V. no. 337. Pointe aux Sables, Aug. 1939, "on rocks and barnacles, exposed situations", R. E. V. no. 340.

Geogr. Distr.: Warm seas.

Subfam. 3. Spyridieae.

Spyridia Harv.

1. Spyridia filamentosa (Wulf.) Harv.

Harvey, W. H., in Hooker, Brit. Flora, vol. II, 1833, p. 336. Phycologia Britannica, p. 46. J. Agardh, Spec. Alg., II, p, 340. Børgesen, Mar. alg. D. W. I., vol. II, p. 233, figs. 222–226. — *Fucus filamentosus* Wulfen, Crypt. aquat. in Roemer, Archiv f. die Botanik, III, p. 63.

The few specimens found in the collections are sterile and mostly poorly developed.

The specimens belong to the form with long thin ramuli; they have most probably been collected in sheltered localities; compare my figures 223*a* and 224 quoted above.

In Jadin's collection a single undetermined specimen gathered by Daruty is found, but in his list this species is not mentioned.

Mauritius: Grand Bay, 24. Oct. 1929, Th. M. Without locality, 1894, Daruty.

Geogr. Distr.: West Indies, warmer parts of the Atlantic Ocean, Mediterranean Sea, Red Sea, Indian Ocean, etc.

Subfam. 4. Spongoclonieae.

Haloplegma Montagne.

1. Haloplegma Duperreyi Mont.

Montagne in Ann. sci. nat., sér. 2, vol. 18, 1842, p. 258, tab. 7, fig. 1. Kützing, Spec. Alg., p. 672; Tab. Phycol., vol. XII, tab. 62. Agardh, J., Spec. Alg., II, p. 111. Weber, Alg. Siboga, p. 315. Børgesen, Some Ind. Rhodoph., I, 1931, p. 14, fig. 9.

Several specimens of this, as to anatomical structure variable, plant are present in the collections. Some of them are from shallow water and protected localities, some from more exposed ones, and in Dr. Mortensen's collection specimens dredged at a depth of 50—60 m. are also found. A comparison of these specimens has shown that the shape and development of the

assimilating branchlets and the size of the meshes in the net all vary very much. Some few figures taken from some of the specimens will show this.

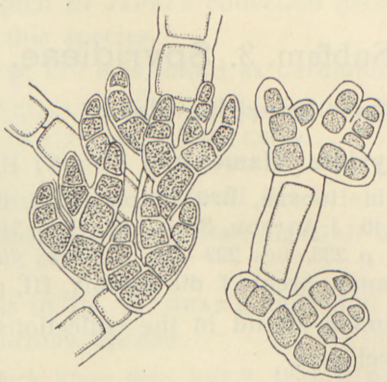

Fig. 3. *Haloplegma Duperreyi* Mont.
Fragments of the net with assimilating filaments. (× about 335).

Fig. 3 is from a specimen collected by Dr. MORTENSEN (no. 839) in shallow water; the assimilating branchlets are short and densely packed, forming small clumps about 40—50 μ long; and the meshes of the net are small for which reason the assimilating layer forms a dense tissue.

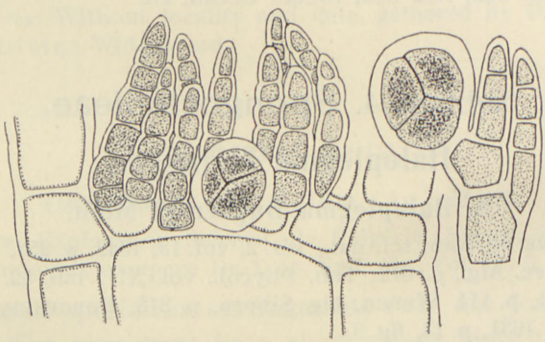

Fig. 4. *Haloplegma Duperreyi* Mont.
Fragments of the net with assimilating filaments and tetrasporangia. (× about 335).

Fig. 4 shows the assimilating filaments from another specimen found in Dr. JADIN's collection (no. 123); it is a washed up specimen gathered by DARUTY. The branchlets in this specimen are somewhat longer, up to about 100 μ long, than those of

the above-mentioned specimen but like this its branchlets are densely packed together. The meshes of the net are small. The

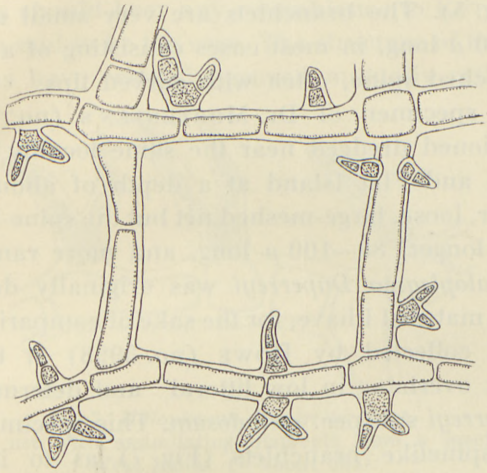

Fig. 5. *Haloplegma Duperreyi* Mont.
Fragment of the net with assimilating branchlets. (× about 335).

specimen is tetrasporic, the tetrasporangia being developed upon the branchlets. In JADIN's list p. 170 this specimen is referred to

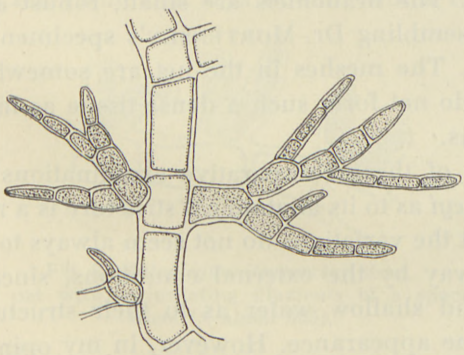

Fig. 6. *Haloplegma Duperreyi* Mont.
Fragment of the net with assimilating filaments. (× about 335).

Holoplegma Preissei Sonder; but by its long and curved assimilating branchlets, often comprising more than 20 joints and reaching a length of more than 200 μ, this Australian species is well separated from *Halop. Duperreyi.*

A plant from deep water in Dr. MORTENSEN's collection (no. 820) has a rather thin and loosely built thallus with large meshes (Fig. 5). The branchlets are very small and spine-like, about 35—40 μ long, in most cases consisting of a single, simple or two-branched spine, often with curved tips.

Another specimen of Dr. MORTENSEN's (no. 793), like the above mentioned dredged near the same locality between Gunner's Quoin and Flat Island at a depth of about 25 fathoms, had a similar, loose, large-meshed net but the spine-like branchlets were much longer, 80—100 μ long, and more ramified (Fig. 6).

Since *Haloplegma Duperreyi* was originally described upon West Indian material I have, for the sake of comparison, examined a specimen collected by HOWE (no. 3998) at the Bahamas: "under rock overhang in low littoral" and determined as *Haloplegma Duperreyi* subspec. *spinulosum*. This specimen has for the most part spinelike branchlets (Fig. 7) as to its anatomical structure reminding one of the above-mentioned plants from deep water (Figs. 5, 6).

In addition I have examined another specimen of *Haloplegma Duperreyi* dredged by HOWE at Porto Rico in 14 m. of water (no. 7637). Fig. 8 shows some few assimilating branchlets from this specimen. The branchlets are small, robust and not spine-like, much resembling Dr. MORTENSEN's specimen from shallow water (Fig. 3). The meshes in the net are somewhat larger and consequently do not form such a dense tissue as in the specimen from Mauritius.

The result of these comparative examinations is that *Haloplegma Duperreyi* as to its anatomical structure is a rather variable plant, and that the variations do not seem always to be influenced in the same way by the external conditions, since plants from deep water and shallow water as to their structure may have nearly the same appearance. However, in my opinion, the plant from Mauritius must be considered to be specifically the same as that from the West Indies; but it must of course be taken into consideration that the material upon which I have had to base this opinion was poor and consisted mostly of fragments of specimens only.

In Tabulae Phycologicae, vol. 12, pls. 62—63 KÜTZING besides *Halop. Duperreyi* and *H. Preissii* gives also some figures of the

structure of a plant he calls *Halop. africanum* from South Africa and it therefore seems natural to examine whether the specimens from Mauritius should bear any resemblance to KÜTZING's plant. This cannot be said to be the case. The structure of the specimens from Mauritius have certainly proved mutually rather variable

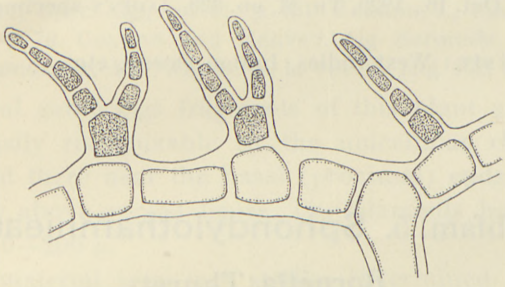

Fig. 7. *Haloplegma Duperreyi* Mont.
Fragment of the net with assimilating filaments from a specimen from the West Indies. (× about 335).

but on the other hand none of them presented any special similarity to KÜTZING's most probably rather schematic figure. Mme WEBER mentions in Algues Siboga, p. 316, that she has examined an authentic specimen of *Halop. africanum* in KÜTZING's Herbarium and arrives at the result that it is nothing but a form of *Halop.*

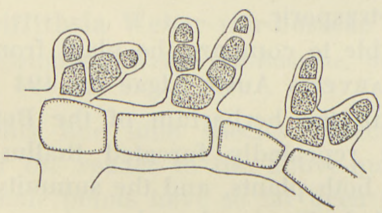

Fig. 8. *Haloplegma Duperreyi* Mont.
Fragment of the net with assimilating filaments of a specimen from Porto Rico. (× about 335).

Duperreyi; and I myself have in accordance with her statement referred a specimen from India (in Some Indian Rhodop., I, 1931, p. 14, fig. 9) showing some likeness to KÜTZING's figure to *Halop. Duperreyi.* In conformity with this I have also referred the specimens from Mauritius to *Halopl. Duperreyi*, as it seems to me that not only a renewed examination of KÜTZING's type-specimen but also an examination of good material from the

West Indies as well as from the Indian Ocean is required to settle the question.

About its habitat at Mauritius JADIN writes in his list pp. 169—170: "Mêlé à *Corallina polydactyla*; exposé à la lame forte".

Mauritius: Flat Island, Oct. 17., 1929, TH. M. no. 839. Off Flat Island, c. 30 fathoms, Oct. 16., 1929, TH. M. no. 820. JADIN's specimens are without dates.

Geogr. Distr.: West Indies, Indian Ocean, etc.

Subfam. 5. Sphondylothamnieae.

Bornetia Thuret.

Bornetia Binderiana (Sond.) Zanard.

ZANARDINI, G., Iconographia, vol. 2, 1865, p. 45, pl. 51, figs. 7, 8. J. AGARDH, Epicrisis, p. 613. — *Griffithsia Binderiana* Sonder, Nova Algarum genera etc., 1845, p. 52. J. AGARDH, Spec. Alg., II, p. 86. HARVEY, Phycologia Austral., tab. 52. KÜTZING, Tab. Phycol., vol. XII, tab. 25 a, b.

This species known so far from South-West Australia was found intermingled among the filaments of the capitulum of *Chamaedoris Delphinii* (Hariot) Feldm. et Børgs. The specimens were small but tetrasporic.

I have been able to compare the plant from Mauritius with a specimen of HARVEY's Austr. Algae no. 494 from Fremantle, W. Austr. found in the herbarium of the Botanical Museum, Copenhagen. The repeatedly furcated thallus has a breadth of about 450 μ in both plants, and the summits of the filaments are broadly rounded. The involucral rays are about 150—200 μ thick and about 300—400 μ long, being likewise broadly rounded above.

Mauritius: Off Flat Island, 17. Oct. 1929, TH. M.

Geogr. Distr.: South West Australia.

Subfam. 6. Griffithsieae.

Griffithsia C. Ag.

1. Griffithsia tenuis Ag.

Agardh, C., Spec. Alg., vol. II, p. 131. Agardh, J., Spec. Alg., vol. II, p. 81; Epicr., p. 70. Collins and Hervey, Alg. Bermuda, p. 135, pl. VI, figs. 38–39. Børgesen, Mar. Alg. D. W. I., vol. II, pag. 462, fig. 423.

In several gatherings fragments of this plant are met with; they are easily recognizable by the unicellular rhizoids given out here and there near the basal (proximal) ends of the cells; compare my above-quoted figure. The filaments had a diameter of about 150—200 μ.

All the material seen was sterile. Determined as *Griffithsia setacea* (Ellis) but referable to *Gr. tenuis* a large but sterile specimen collected by Colonel Pike is found in the collection of the Riksmuseum, Stockholm. In Dickie's list of algae from Mauritius, 1875, p. 197, it is called *Griffithsia secunda* Harv.

Mauritius: Barkley Island, Aug. 1939, R. E. V. nos. 330 and 338. Gr. River Bay, Dec. 22., 1869, Colon. Pike.

Geogr. Distr.: Widely distributed in warm seas.

2. Griffithsia Weber-van-Bosseae Børgs.

Børgesen, F., Griffithsia Weber-van-Bosseae, nov. spec. 1942, p. 15, figs. 1–3.

As regards this fine little species collected by Dr. R. E. Vaughan, I refer the reader to the above-quoted paper. Only tetrasporic and male plants have so far been found.

Mauritius: Black River Bay, July 9., 1939, R. E. V. no. 282.

Geogr. Distr.: Endemic.

In his list p. 169 Jadin mentions a *Griffithsia* spec. as occurring at Mauritius as well as at Réunion. From the last mentioned island I have seen a specimen (no. 169). An examination of it has shown that it is none of the two species mentioned above, but being sterile it is indeterminable. The plant has large oval cells about 1200 μ long and about half as broad. Of Kützing's figures in Tab. Phycol. it agrees best with that of *Gr. opuntioides* in vol. 12, tab. 27.

Subfam. 7. Wrangelieae.

Wrangelia C. Ag.

1. Wrangelia Argus Mont.

MONTAGNE, I., Sylloge gener. specierumque Cryptogamarum, Paris, 1856, p. 444. BØRGESEN, Mar. Alg. D. W. I., vol. II, 1916, p. 116, figs. 125, 126. — *Griffithsia Argus* Mont. in WEBB et BERTHELOT, Hist. nat. iles Canaries, vol. III, Sect. III, 1836–50, p. 176, tab. 8, fig. 4. *Wrangelia plebeja* J. Ag., Spec. Alg., vol. II, 3, 1863, p. 707; Epicr., 1876, p. 623.

Some small specimens of *Wrangelia* found in JADIN's collection and in his list, p. 163, determined as *Wrangelia plebeja* are partly this species, partly the following one. The material was not suitable for examination and a more detailed comparison with West Indian material has not therefore been made. Mme WEBER mentions this species in her "Liste", p. 220, as found in the Malayan Archipelago and says about her specimens that they are in good accordance with West Indian ones.

Tetrasporic plants were met with only; the sporangia have a diameter of about 60 μ, thus the same as in the West Indian plant.

Mauritius: Mahébourg, Sept. 1890, JADIN nos. 444, 449.

Geogr. Distr.: West Indies, Canary Island, Malayan Archipelago, India.

2. Wrangelia penicillata C. Ag.

AGARDH, C., Spec. Alg., II, p. 138. AGARDH, J., Spec. Alg., II, 3, p. 708; Epicr., p. 623. BØRGESEN, Alg. Mar. D. W. I., vol. II, p. 120, figs. 131–132, where the literature is quoted. KYLIN, H., Über *Wrangelia penicillata* und ihre systematische Stellung, 1928, p. 1, figs. 1–3. — *Griffithsia penicillata* Ag., Systema Alg., p. 143.

A single small specimen is present in JADIN's collection; in his list, p. 163, it is referred to *Wr. plebeja*. It is not very well suited for microscopical examination, but it seems to agree with West Indian material.

The specimen is tetrasporic.

About its habitat JADIN writes: "Croissant sur les récifs exposés aux grosses lames".

Mauritius: Mahébourg, Sept. 1890, JADIN no. 470.

Geogr. Distr.: Warmer parts of the Atlantic Ocean, Mediterranean Sea, Malayan Archipelago, Japan, Australia.

Subfam. 8. Callithamnieae.

Aglaothamnion Feldmann-Mazoyer.

1. Aglaothamnion monopodon nov. spec.

Frons exiguissima, usque ad 1 mm. alta, ecorticata, erecta, per cellulam basalem in cuticulam hospitis deorsum plus minus penetrantem adfixa.

E cellula basali filum singulum erectum gignit. Filum erectum inferne nudum, ex media parte sursum ramosum, ramis alternatim ortis aut magis irregulariter, superne subdichotomis.

Filum erectum, in parte basali ca. 20 μ latum, in media parte ca. 30 μ; dein ad apicem versus filamenta gradatim attenuata, superne ca. 7 μ lata.

Pili non observati.

Cellulae uninucleatae, chromatophora irregulariter vittaformia continentes.

Tetrasporangia sessilia, ovoidea, ca. 30—35 μ longa et 27—30 μ lata, solitaria aut 2—3 seriata, superne in latere superiore cellularum orta.

Corpuscula antheridiorum praecipue in superiore parte thalli discos oblongos formantia.

Gonimoblasti gemini, subglobosi, plus minus ovati aut magis irregulares, ca. 70 μ longi et 55 μ lati, in media parte thalli evoluti.

Mauritius: Flic-en-Flac, December 31., 1938, R. E. V. no. 249.

A small *Aglaothamnion* 600—700 μ high rarely up to 1 mm. occurred upon the thallus of a specimen of *Gracilaria lichenoides* preserved in formol.

The plant (Fig. 9) is attached to the host by means of a short basal cell of which the lower half is immersed in the thick peripheric layer of the host in much the same way as is the case for instance in *Acrochaetium unipes* Børgs. (Mar. Alg. D. W. I., vol. II, p. 35). From the upper end of the basal cell issues a single erect, in its lower part unbranched, main stem; lowermost in this stem the cells are short with thick walls but they soon become longer, often up to 20 times their own breadth, while at the same time the walls become gradually thinner. Near the base the main stem is about 20 μ and the lumen of the cells

reaches a breadth of 4—5 μ only; upwards the stem grows slowly thicker to about 30 μ below the first ramification. The surface of the wall in the lower part of the thallus is often unevenly

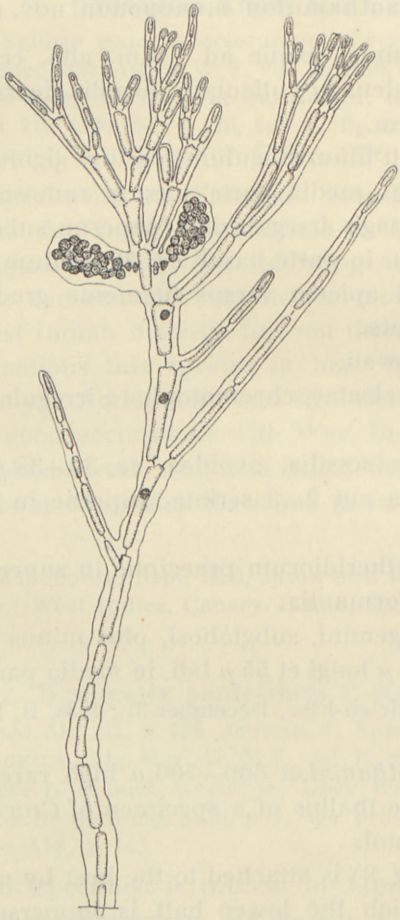

Fig. 9. *Aglaothamnion monopodon* Børgs. A young female plant. (× about 165).

wavy; at the joints a slight narrowing is more or less observable. No cortical layer formed by rhizoids is present.

The plant is alternately ramified, now and then also more irregularly; in the upper parts of the thallus the ramification is subdichotomous and the branches issue at acute angles.

In the female plant the unbranched basal part of the main

stem often becomes proportionally shorter than that of the male and tetrasporic plant, because several straight, obliquely upwards directed, and mostly unramified branches are given off from some of the segments below the first fertile segment (Fig. 9).

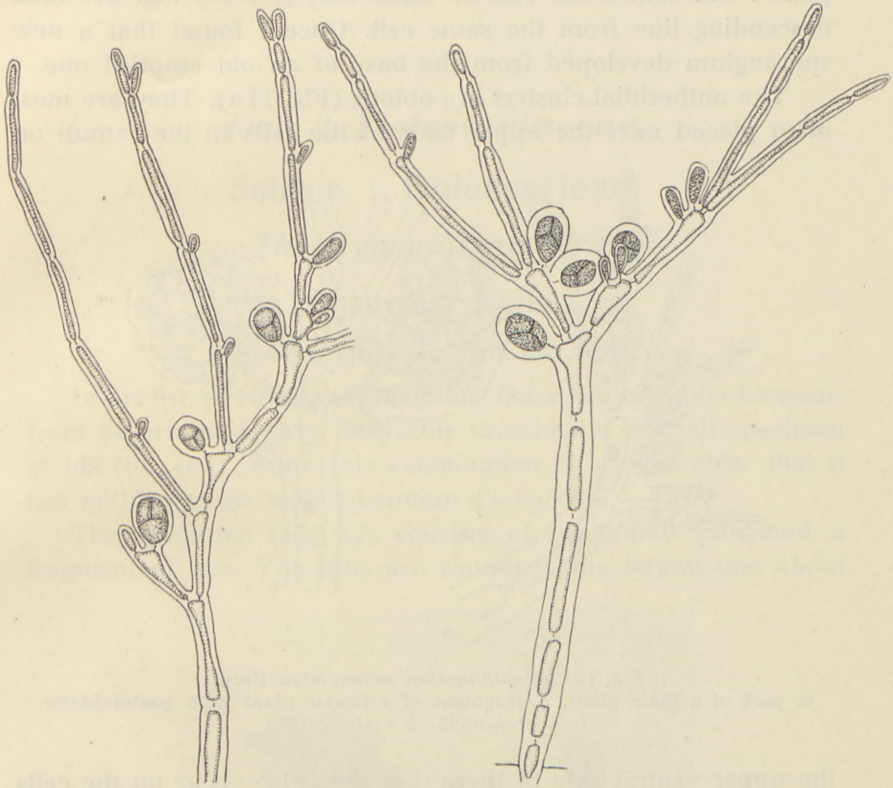

Fig. 10. *Aglaothamnion monopodon* Børgs. Specimens with tetrasporangia. (× about 165).

When the ramification begins the breadth of the filaments decreases slowly upwards to about 7 μ in the uppermost branchlets.

In the older cells the chromatophores are irregularly ribbon-like, in the younger ones short staff-like or more roundish and crowded together in a reticular manner.

The cells contain a single nucleus each; it is placed a little above the middle of the cell.

Tetrasporic as well as male and female specimens were found.

The tetrasporangia (Fig. 10) are formed near the summits of the cells on their upper ventral side; they are sessile, when young lanceolate, when ripe broadly oblong to ovate, about 30—35 μ long and 27—30 μ broad. They are mostly solitarily placed but sometimes two or three may develop together in a descending line from the same cell. Once I found that a new sporangium developed from the base of an old emptied one.

The antheridial clusters are oblong (Fig. 11 *a*). They are most often placed near the upper ends of the cells in the ramuli on

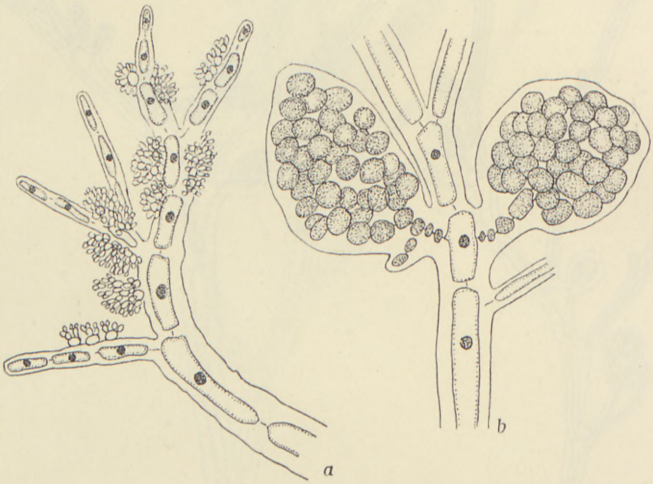

Fig. 11. *Aglaothamnion monopodon* Børgs.
a, part of a male plant. *b*, fragment of a female plant with gonimoblasts. (*a* × about 335; *b* × about 165).

the upper ventral side of these, but they also occur on the cells of the main filaments, and altogether rather irregularly, for instance also on the dorsal lower side of the ramuli.

In the female plants (Figs. 9 and 11 *b*) the gonimoblasts are developed in accordance with Oltmann's description of *Callithamnion corymbosum* (1898, p. 115) and Kylin's of *Callithamnion Furcellariae* (1923, p. 56). They are formed near the middle of the plant but two or three pairs may be developed above each other. Their shape is roundish-polygonal or more oblong; perfectly ripe fruits have not been observed.

In two cases a small basal gonimolobe was developed from the auxiliary cell; Kylin, l. c., p. 57, mentions a similar case in

Callithamnion Furcellariae; compare Fig. 11 *b*, the gonimoblast to the left.

Because of its small size and especially because of its peculiar base, this tiny species is easily distinguishable from the species hitherto known of *Aglaothamnion*.

Fam. 2. ***Delesseriaceae.***

Subfam. 1. Delesserieae.

a. *The Hypoglossum-Group.*

Chauvinia Kylin.

1. **Chauvinia Jadinii** nov. spec.

In his list, p. 167, JADIN mentions *Delesseria ruscifolia* Lamour. from Mauritius. I have been able to examine a small specimen of his (no. 465). From this examination it became clear that it has nothing to do with LAMOUROUX's species.

The specimen (Fig. 12) consists of two small tufts and a fragment of one. The tufts are roundish, the largest one about

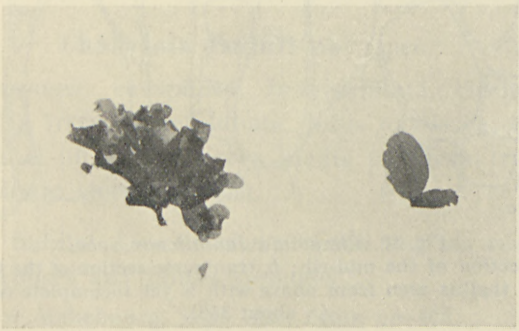

Fig. 12. *Chauvinia Jadinii* nov. spec. (×1).

$1^1/_2$ cm. high issuing from a quite short stipe from the upper ends of which numerous short leaflike lobes are given out. One of the largest lobes is oval, nearly 1 cm. long and half as broad, with broad apex, the margin is entire and does not seem to have been waved. A midrib is easily observable with the naked eye.

The colours of the plant is rosy-red. With some minor exceptions this description of the appearance of the plant may be said to correspond fairly well to that of a small specimen of *Delesseria ruscifolia*. But the anatomical structure shows immediately that we have quite another plant before us.

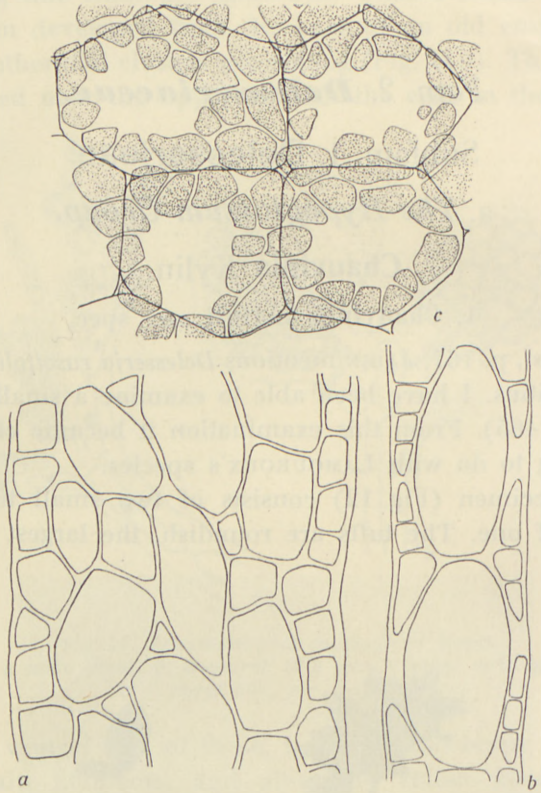

Fig. 13. *Chauvinia Jadinii* nov. spec.
a, transverse section of the mid-rib; *b*, transverse section of the thallus; *c*, fragment of the thallus seen from above with a yet incomplete cortical layer. (× about 350).

The leaflike thallus consists of a single layer of large cells covered more or less completely by a cortical layer of small cells on both sides (Fig. 13 *b*, *c*). A transverse section of the midrib shows that it is composed of several cells, upto 5—6, above each other (Fig. 13 *a*); rhizoids are present between the cells. Lateral microscopical veins are not found. The prolifications

are developed from the midrib. All the top-cells of the cell-rows of the 1—3 order reach the margin of the thallus and all the cells of the second order carry a side-branch; compare KYLIN's figure 52a of *Hypoglossum Woodwardii* (1923, p. 81) and of *Chauvinia coriifolia* (1924, p. 12, fig. 6a). From this description of the anatomical structure of the plant it becomes evident that it points very clearly in the direction of the group *Hypoglossum*.

Upon my inquiry whether any of the *Hypoglossum*-species could have a cortical layer Professor KYLIN who some years ago worked out the above quoted very valuable monograph on the *Delesseriaceae* (1924) has most kindly communicated to me that the species of the genus *Hypoglossum* have always a monostromatic thallus. The genus *Chauvinia* Kylin, also belonging to the *Hypoglossum*-group, with the only known species *coriifolia* (Harv.) Kylin (=*Delesseria coriifolia* Harv. Phyc. Austr., pl. 150) has, on the other hand more than three layers of cells in its thallus, and since the plant from Mauritius is otherwise built in complete conformity with that genus, it might be referred to it as a new species.

This new species I propose to name *Chauvinia* JADINII Børgs. in memory of the late Dr. FERNAND JADIN who by his collections of algae from the Mascarene Islands has contributed so very much to our knowledge to the algal flora of these islands.

Chauvinia Jadinii nov. spec.

Frons pygmaea, caespitosa, brevistipitata, circiter $1^1/_2$ cm. alta et ultra(?), irregulariter lobata, lobis ovatis ca. 1 cm. longis et $^1/_2$ cm. latis et ultra(?), e nerva media prolifera, tristromatica. Specimen unicum sterilem adest.

About its habitat JADIN writes: "Croit sur les récifs ou sur les rochers exposés aux lames violentes".

Mauritius: Mahébourg, Sept. 1890, JADIN no. 465.

b. *The Claudea-Group.*

Compare PAPENFUSS, 1937, p. 60.

Caloglossa (Harv.) J. Ag.

1. Caloglossa Leprieurii (Mont.) J. Ag.

var. *Hookeri* (Harv.) Post.

POST, E., Systemat. u. pflanzengeogr. Notizen zur *Bostrychia-Caloglossa*-Assoziation, 1935, p. 53. BØRGESEN, *Catenella Nipae* used as Food in Burma, 1938, p. 267, fig. 2. — *Caloglossa Hookeri* Hook. fil. & Harv., 1845, p. 270.

Well developed, tetrasporic material of this interesting variety is found in Dr. VAUGHAN's collection. Together with *Caloglossa* and attached to it is found a small alga; compare *Polysiphonia* spec. mentioned later p. 36.

In JADIN's collection I have further seen a small sterile specimen of this variety. In his list p. 167 it is called *Caloglossa amboinensis.*

It is found in a "Trou d'eau douce à Flacq". As to its interesting habitat JADIN points out that it grows in perfectly fresh water. I refer the reader to JADIN's detailed description and to Miss POST's remarks about it (1943, p. 203, the note).

In the collection of the Riksmuseum, Stockholm, a tetrasporic specimen is found. It was collected by Col. PIKE in "Mt. stream of Ponce", Jan. 26. 1870. In DICKIE's list, p. 193, it is mentioned as *Delesseria Leprieurii* Mont.

Mauritius: Ilôt Brocus, Aug. 1938, R. E. V. no. 192. Flacq, June 1890, JADIN no. 512.

Geogr. Distr.: Widely distributed in warm seas.

Vanvoorstia Harv.

1. Vanvoorstia spectabilis Harv.

HARVEY, W. H., Short characters etc., 1854, p. 144; Ceylon Alg. Exs. no. 3. KÜTZING, Tab. Phyc., vol. 19, tab. 56. WEBER v. BOSSE, Algues Siboga, p. 390, fig. 141. BØRGESEN, Contributions II, 1937, p. 344, fig. 15. PAPENFUSS, The Structure and Reproduction of *Claudea multifida, Vanvoorstia spectabilis* etc., 1937, p. 31.

Based upon well preserved material collected by SVEDELIUS during his stay in Ceylon in 1903 PAPENFUSS has in the above-

cited paper given a thorough description, accompanied by instructive figures, of the structure and development of this elegant alga and of its reproductive organs.

In JADIN's collection a single but well prepared female specimen is found. It is included in JADIN's list p. 168, being mentioned here for the first time as occurring at the Mascarene Islands.

About its habitat JADIN writes: "Abondant sur les parties verticales du récif qui reçoivent les courants des grosses lames venant se briser sur les coraux; toujours recouvert par le flot."

Mauritius: Mahébourg, Sept. 1890, JADIN no. 441.

Geogr. Distr.: Ceylon, Malayan Archipelago, Japan, South Africa, Mauritius.

Subfam. 2. Nitophylleae.

Martensia Hering.

1. **Martensia elegans** Hering.

HERING, Diagnoses Alg., 1841, p. 92. Flora, 1844, II, no. 47, p. 803, pl. VII. HARVEY, Nereis Australis, 1847, p. 73. pl. 43. SVEDELIUS, Martensia, 1908. For further literature comp. DE-TONI, Syll. Alg., vol. IV, p. 616.

Of this species, first described by HERING upon specimens from Port Natal, two quite small specimens are present in the collections. One of these was dredged at a depth of about 25 fathoms by Dr. MORTENSEN, the other one is found in Dr. JADIN's collection and mentioned in his list p. 167. About its habitat JADIN writes: "Un seul exemplaire recueillit dans un bassin aux eaux tranquilles dans les rochers."

Mauritius: Flacq, July 1890, JADIN no. 265. Between Gunners Quoin and Flat Island, 25 fathoms, Oct. 15., 1929, TH. M.

Geogr. Distr.: South Africa, Australia, Malayan Archipelago.

Fam. 3. ***Dasyaceae.***

Dasya C. Ag.

1. **Dasya scoparia** Harv.

HARVEY in J. AGARDH, Symbolae, 1841, p. 34. HARVEY, Nereis Austr., 1847, p. 62, tab. 21. KÜTZING, Tab. Phyc., vol. 14, tab. 65, fig. d, e. AGARDH, J., Spec., II, 3, p. 1221.

In JADIN's list p. 169 *Dasya arbuscula* Ag. is mentioned. Two specimens referred to this plant, one no. 122 from Réunion, the other no. 493 from Mauritius, are present in his collection; an examination of these has shown that the plant in question is *Dasya scoparia* Harv.

While that from Mauritius is sterile, the other one from Réunion is tetrasporic. The stichidia are sessile with only one sterile basal cell in the stichidium. I mention this because HARVEY in his description in Nereis says about the stichidia that they are "breve pedicellatis", and his figures 3 and 4 also show two rather long cells in the stalk of the stichidia.

About the habitat of this plant JADIN writes: "Cueilli sur des rochers exposés aux lames violentes."

Mauritius: Flacq, Sept. 1890, JADIN no. 493. Saint-Gilles, April 1890, JADIN no. 122.

Geogr. Distr.: South Africa, Japan.

2. **Dasya pedicellata** Ag.

AGARDH, C., Systema Alg., 1824, p. 211. COLLINS and HERVEY, Algae of Bermuda, 1913, p. 130. — *Dasya elegans* (Mart.) Ag., Spec. Alg., vol. II, 1828, p. 117. *Dasya villosa* Harvey, Algae of Tasmania, 1844, p. 433. For other synonyms compare DE-TONI, Syll. Alg., vol. IV. p. 1201.

JADIN in his list, p. 169, has both *Dasya pedicellata* and *D. villosa* as found at the island, and of both species I have seen specimens of his, that of *D. pedicellata* being cystocarpic while that of *D. villosa* has stichidia. And if these two forms are regarded as different species, JADIN's determinations are quite correct. However, my view of these species is that they can hardly be kept distinct.

What may point in the direction of the presence of two separate species, leaving out the geographical distribution, is that the thallus in *Dasya villosa* seems to be more robust and has a darker purple-violet colour, while the thallus of *Dasya pedicellata* is somewhat slender, more soft and has a more rose-red colour; but variations from this in the one or the other direction may be found in specimens from the Atlantic as well as in those from the Indian-Pacific Oceans.

Some few years ago the Chinese algologist C. K. TSENG, 1938,

p. 601, in connection with Yendo's statement, 1916, p. 262, after the examination of a large material, arrived at the result that some differences between the two species are to be found in the placing and shape of the stichidia; while these in *Dasya villosa* should be sessile and always have coordinate ramulets, those in *D. pedicellata* should always be stalked, not terminated with mucrons or filaments. And in the cystocarps similar differences should be found. But a comparison of the two specimens from Mauritius with material of *Dasya pedicellata* from the West Indies has not confirmed this. Thus the stichidia in the small specimen from Mauritius are very like those in the West Indian material, being sessile upon the pseudo-branchlets and adventitious branchlets in both plants (compare ROSENBERG, p. 50, fig. 15). And as to the cystocarps, when those of the specimen from Mauritius are compared with West Indian ones I have found them very much alike, the cystocarps in both specimens being placed on a pedicel having the length of about a third part of the length of the cystocarps.

To me the facts seem to correspond what is the case with *Asperagopsis Sanfordiana* Harv. from the Pacific-Indian Oceans and *Asparagopsis taxiformis* (Del.) Collins and Herv. from the Atlantic which until lately, mainly because of differences in the size and colour of the thallus in connection with the geographical distribution, have been considered as separate species, but about which Mme and Dr. JEAN FELDMANN (1942, p. 82) in their highly interesting paper on the alternation of generations of the *Bonnemaisoniaceae* with reference to earlier pronouncements and especially to that of LUCAS (1935, p. 222), have now established the fact that *Asparagopsis Sanfordiana* plainly is to be considered as a synonym only of *Aspar. taxiformis*.

JADIN in his list, p. 169, about the habitat of *Dasya villosa* says: "Cueilli sur des rochers."

Mauritius: Mahébourg, Sep. 1890, JADIN no. 485. The other specimen is without locality, gathered by DARUTY 1892.

Geogr. Distr.: Warmer parts of the Atlantic and Indian-Pacific Oceans.

Dictyurus Bory.

1. Dictyurus purpurascens Bory

in Belanger, Voyage Ind. orient., p. 170, tab. 1 (after De-Toni, Syll. Alg., IV, p. 1173). Agardh, J., Spec. Alg., II, 3, p. 1245. Falkenberg, Rhodomelaceen, p. 675, tab. 17, figs. 10–24.

A few specimens are found in Dr. Jadin's and Dr. Vaughan's collections.

About its occurrence at the islands Jadin writes p. 169: "Cueilli dans les bassins rocheux, à l'abri des grosses lames, mais recevant les eaux bouillonnantes et très aérées des vagues venant battre sur les rochers."

Mauritius: Ilôt Brocus, R. E. V. no. 196 (cast ashore). Flacq, Oct., 1890, Jadin no. 482.

Geogr. Distr.: Indian Ocean.

Fam. 4. ***Rhodomelaceae.***

Subfam. 1. Polysiponieae.

Polysiphonia Greville.

1. Polysiphonia mollis Hook. fil. et Harvey.

Harvey, W. H., Nereis Austr., 1847, p. 43. Agardh, J., Spec. Alg., vol. II, 3, 1863, p. 968.

On pieces of an indeterminable seagrass a small *Polysiphonia* is found in Dr. Mortensen's collection, growing sociably and forming roundish tufts about 4 cm. high. This plant I think is referable to *Polys. mollis* Hook. fil. et Harv.

This species which seems to be widespread in the Indian Ocean is described by Hooker and Harvey and next by J. Agardh who gives a somewhat more detailed description of it. Later it has been examined by various investigators, for instance Askenasy (1894, p. 13), Yendo (1916, p. 261), and Weber (1923, p. 356), but all have placed a ? after their determinations. In "Alg. Bombay", 1935, pp. 60—62 I have mentioned these earlier examinations at the same time adding some comparative remarks on Harvey's species and on *Polys. platycarpa* established by myself. Because of the new material from Mauritius I have

again taken up the question of the relationship of the two species and shall first give a description of the specimens from Mauritius which I presume to be referable to *P. mollis*.

These specimens have no cortical layer. They are attached to the host plant by means of a small disc (Fig. 14) which may be strengthened by means of hapters issuing from the lowermost cells in the erect main filaments (Fig. 14*a*). Near the base the filaments are about 200—300 μ thick and the segments from

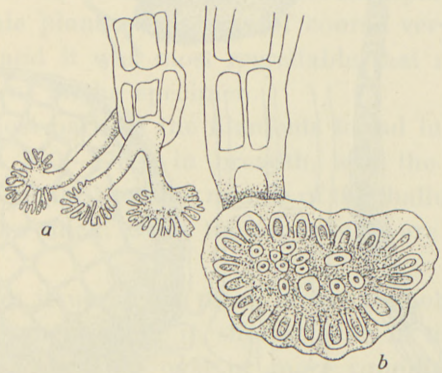

Fig. 14. *Polysiphonia mollis* Hook. fil. et Harvey.
Bases of two specimens. (× *a* about 50, *b* about 150).

somewhat shorter than the breadth up to a little longer than this. The peripheral wall in the cells near the base is thick, and the segments may be a little narrowed in the middle.

At some distance from the base the main axis becomes divided and gradually indistinct, and because the angles of the branches are nearly right angles the branches are spreading; higher up in the thallus the branches issue at acute angles and the filaments are therefore placed more closely together.

In the middle of the thallus the breadth of the filaments decreases to about 100 μ and the segments at the same time become about double as long as the breadth. Towards the tips the filaments gradually taper still more, the segments at the same time becoming shorter.

The trichoblasts are formed in a screw to the left with a $^1/_4$ divergence; now and then a branch is developed instead of a trichoblast.

Most of the specimens are tetrasporic, some are cystocarpic; of androphores I have seen only some loose lying ones adhering to other specimens. The tetrasporangia are developed in the upper branches and branchlets (Fig. 15*a*); in the lowermost fertile parts of the branches, the sporangia are often solitary or occur a few together interrupted by a few sterile segments; higher

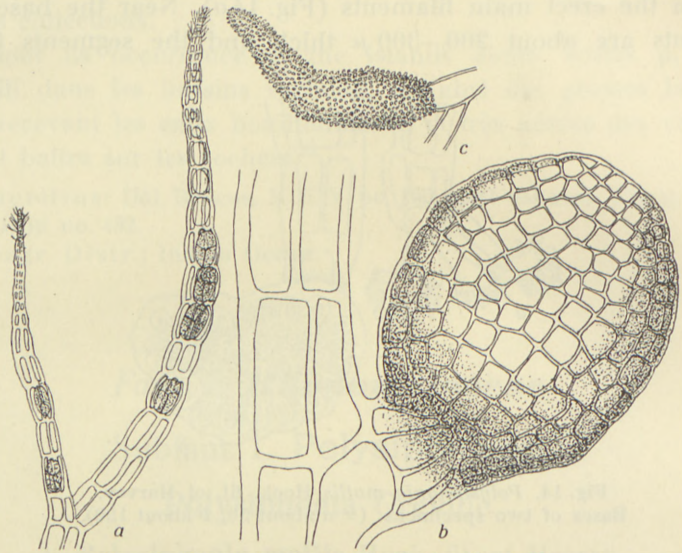

Fig. 15. *Polysiphonia mollis* Hook. fil. et Harvey.
a, fragment of the thallus with tetrasporangia. *b*, an antheridial body. *c*, a cystocarp. (*a* × about 50, *b* and *c* × 120).

up they are present in longer coherent rows placed more or less distinctly in a screw. The sporangia are oval c. 90—110 μ long and 70—90 μ broad.

The cystocarps (Fig. 15*b*) are urceolate with a small not especially marked ostiole above; they are about isodiametric, length and breadth about 330 μ, sometimes a little broader than long or the reverse.

The androphores (Fig. 15*c*) are elongated-subcylindrical, tapering gradually upwards; they are about 200—250 μ long, and about 50 μ broad near the base. The androphores are formed of the trichoblasts with the exception of two basal sterile cells, from the uppermost of which a sterile, several times forked, ramulus is given off on its right side. No sterile cell is present at the top of the androphores.

Because of its scutate base and the short basal segments in the primary erect filaments, I think this plant is referable to *Polys. mollis*; it is in good accordance with the descriptions of HARVEY and J. AGARDH. In connection with his description AGARDH refers to HARVEY's Australian Algae Exsicc. no. 168 from Fremantle, West Australia as being the type of the species. A single specimen of this is found in the Botanical Museum, Copenhagen, and from an examination of it I have found that the specimen contained not only pieces of tetrasporic but also of male and female plants. This was of course very valuable but on the other hand it was most regrettable that no base of the plant was present in the specimen.

The lowermost parts of the filaments found in this specimen measured from 200—275 μ in breadth, and the segments had about the same length. Near the middle of the thallus the filaments were about 100 μ thick, while the segments were about 3 times longer.

The branches issue at the place of the trichoblasts.

The tetrasporangia occur in shorter rows in the upper parts of the filaments; they are oval or more roundish, about 50—72 μ broad and about 85 μ long. The androphores are built entirely in conformity with those of the plant from Mauritius.

Of cystocarps I have seen only rather few and young ones; they are urceolate of shape about 240 μ broad and a little longer, thus a good deal smaller than those found in the specimens from Mauritius; but the cystocarps of a specimen of the same number of HARVEY I once examined in the Herbarium of the Kew Gardens was much larger, having a breadth of 460 μ and a length of 420 μ.

When the descriptions of the plant from Mauritius and of that of HARVEY are compared it must be admitted that they are in good conformity and that it is justifiable to refer the plant from Mauritius to *Polys. mollis*.

Finally if we compare it with *Polysiphonia platycarpa* Børgs., described upon specimens from Bombay, it cannot be denied that this species, when its base is left out of consideration, bears a great resemblance to *Polysiphonia mollis* with regard to the build of the thallus and its fruiting organs. On the other hand it must be said to be easily discernible from *Polys. mollis* by its

creeping basal filaments composed of segments about double as long as broad.

In JADIN's collection there are two small specimens no. 233 and 513 which I think are referable to this species. The specimens have a basal disc, being attached to a seagrass. They are tetrasporic. JADIN in his list, p. 169, refers them to *Polysiphonia pulvinata* Harv.

Mauritius: Cannoniers Point, Oct. 26., 1929, TH. M. Baie de la Petite Rivière, July 1890, JADIN no. 233. Mahébourg, Oct. 1890, JADIN no. 513.
Geogr. Distr.: Tasmania.

2. **Polysiphonia platycarpa** Børgs.

BØRGESEN, F., Some Indian Rhodophyceae, 1934, p. 23, figs. 15–17.

To this species described upon material from Bombay I have referred some few specimens found in Dr. JADIN's and Dr. VAUGHAN's collections.

The species very much resembles the above mentioned *Polys. mollis* but by its decumbent filaments it is decidedly distinct from it. In the sparse material specimens with tetrasporangia, cystocarps and androphores are found.

A small specimen in Dr. JADIN's collection in his list, p. 169, referred to *Polys. pulvinata* is, I think, this species.

Mauritius: Black River Bay, July 9., 1939, R. E. V. no. 282. Barkly Island, Aug. 1939, R. E. V. no. 333. Port-Louis, 1890, JADIN no. 371.
Geogr. Distr.: Indian Ocean.

3. **Polysiphonia ferulacea** Suhr, J. Ag.

SUHR in AGARDH, J., Spec. Alg., vol. II, 3, p. 980. BØRGESEN, Mar. Alg. D. W. I., vol. II, p. 277, figs. 277–279.

On a piece of *Turbinaria* preserved in alcohol there was a small specimen of a *Polysiphonia*, of which Fig. 15 shows a fragment.

The habit of the plant shows such a great similarity to a *Polysiphonia* from the West Indies which I have called *P. ferulacea* that I do not hesitate to refer it to this species. To be sure, the plant is somewhat smaller than the West Indian plant, thus the cystocarps are about 225 μ broad and 300 μ long and the

breadth of the thallus about 200 μ only, but it must be taken into consideration that the whole specimen was only some few millimetres long.

Mauritius: Flic-en-Flac, Jan. 2., 1939, R. E. W. no. 259.
Geogr. Distr.: West Indies, Mexico, Australia, Sandwich Islands etc.

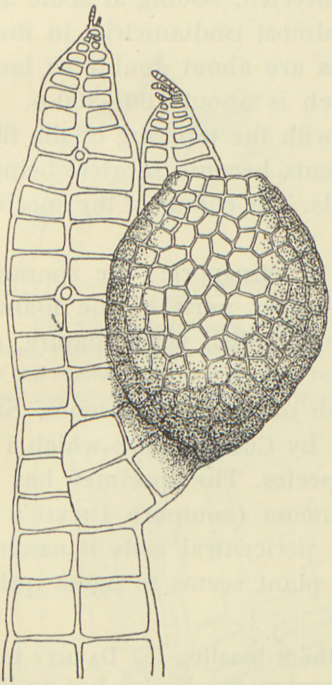

Fig. 16. *Polysiphonia ferulacea* Suhr, J. Ag.
Fragment of the thallus with a cystocarp. (× about 125).

4. **Polysiphonia variegata** (C. Ag.) Zan.

Zanardini, Synopsis Algarum, 1842, p. 162. Agardh, J., Spec. Alg., vol. II, p. 1030. Falkenberg, Rhodomelaceen, p. 119, tab. 21, fig. 30. Børgesen, Some Indian Rhodophyc., IV, 1934, p. 26, fig. 18.

A specimen in Jadin's collection in rather a bad condition gathered by Daruty seems to agree quite well with Falkenberg's description of this species and with Indian specimens referred by me to this species.

The specimen has 7 pericentral cells and no cortical layer; the trichoblasts are not much developed. The mutual arrangement

of the trichoblasts and branches is in accordance with the description of FALKENBERG. Near the base the filaments are about 400—500 μ thick, rather stiff, and the branches are given off at nearly right angles; higher up the filaments taper much, become very flabby and much ramified, while at the same time the branches become upwards directed, issuing at acute angles. Near the base the segments are almost isodiametric, in the middle of the filaments the segments are about double as long as the breadth of the filaments, which is about 100—200 μ.

In connection with the tapering of the filaments towards the summits the segments become shorter, being broader than long near the apical ends. The colour of the specimen is dark reddish-brown.

The specimen is tetrasporic; the sporangia occur in rather long rows in the upper parts of the filaments; they are oval when young, more roundish when mature, about 80 μ long and 70 μ broad.

In the collection of the Riksmuseum, Stockholm, there is a specimen collected by Colonel PIKE which I presume is likewise referable to this species. The specimen has been determined by DICKIE as *P. corymbosa* (compare DICKIE's list, p. 192) but as this species has 4 pericentral cells it cannot be referred to it. On the whole the plant seems to agree quite well with that in JADIN's collection.

Mauritius: Without locality, leg. DARUTY in Herb. JADIN. The specimen in the Riksmuseum, Stockholm, has no locality either.

Geogr. Distr.: Mediterranean Sea, European and North American Atlantic coasts, West Indies, Indian Ocean.

Polysiphonia spec.

The collection of Dr. VAUGHAN contains a small *Rhodomelaceae* reminiscent of *Lophosiphonia* in its way of growing while its ramification is like that of *Polysiphonia*, but because of its complete sterility I have preferred to let it remain undetermined. Owing to its peculiar occurrence, creeping upon the thallus of *Caloglossa Leprieurii* collected on mangrove-roots, and also because it might be the representative of a new genus I propose to give a short description of it accompanied by some figures.

The plant (Fig. 17) is radiate, has 4 pericentral cells and no cortical layer; no strongly pronounced dorsiventrality is present

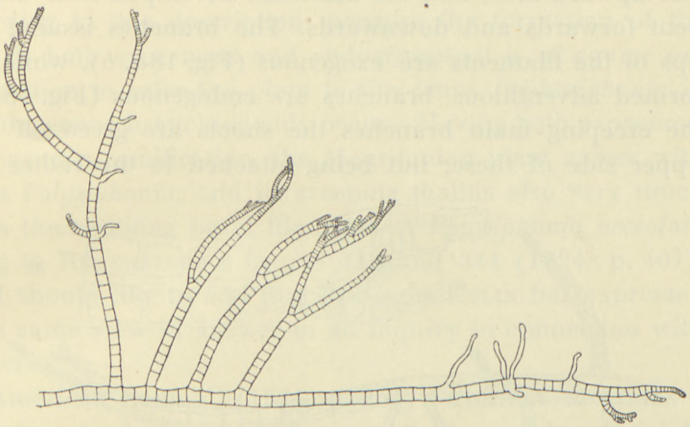

Fig. 17. *Polysiphonia* spec.
Habit of a piece of the plant. During the growth because of the movable substratum the foremost part of the thallus must be presumed to have been turned round so the former upperside has come downwards. (× 20).

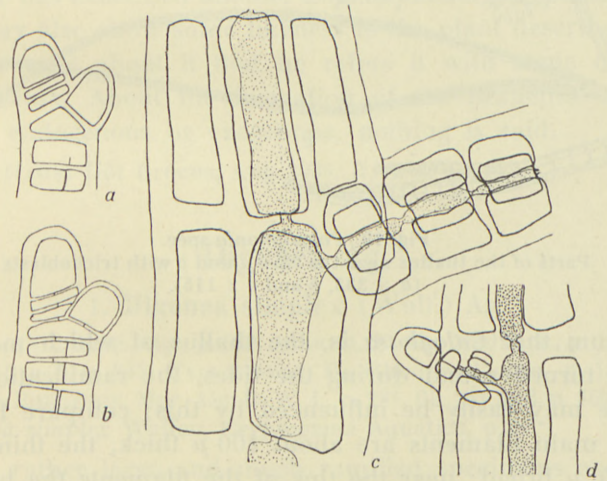

Fig. 18. *Polysiphonia* spec.
The figures show the different ways of branching found in the plant.
a, *b*, exogenous branching; *c*, *d*, endogenous branching; the central cells are dotted. (× 500).

nor any marked differentiation between long and short shoots, all the branches, when the proper conditions are present, being able to attach themselves to the substratum. The creeping filaments

are fastened by means of unicellular rhizoids given out from the pericentral cells. The tips of the creeping filaments are more or less upward-bent, and the branches developed near the tips are bent forwards and downwards. The branches issuing near the tips of the filaments are exogenous (Fig. 18*a*, *b*), while the later formed adventitious branches are endogenous (Fig. 18*c*, *d*). On the creeping main branches the shoots are given off from the upper side of these, but being attached to the rather movable

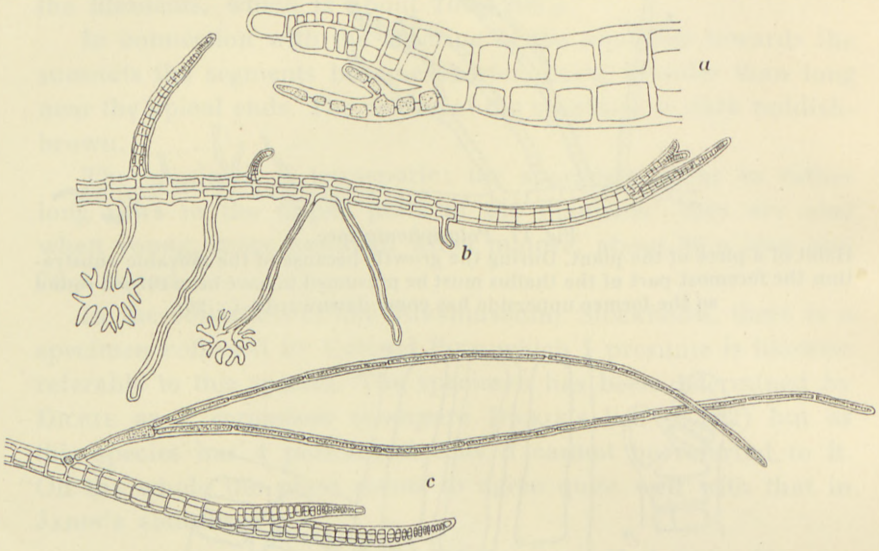

Fig. 19. *Polysiphonia* spec.
Parts of the thallus near the tips. *a* and *c* with trichoblasts.
(*a* × 335, *b* and *c* × 115).

substratum that *Caloglossa* is, the thallus of which may easily become turned round during the tides, the ramification of the epiphyte may easily be influenced by this; compare Fig. 17.

The main filaments are about 100 μ thick, the thinner ones about 70 μ broad; near the tips of the filaments the breadth is only 10 μ. The segments are mostly almost isodiametric; sometimes their length is up to about twice their breadth. In the main filaments the cells are more or less narrowed in their middle.

Trichoblasts (Fig. 19*a*, *c*) are rarely developed; in most cases they consist of a single long filament but one or two side-branches may be found. They grow very long, often more than 1 mm.,

and are often directed straight forward along the mother branch. The trichoblasts are composed of long cells, near their base they are about 15—16 μ broad, tapering upwards to about 4 μ.

According to this description, because the formation of the branches is both exogenous and endogenous, it is of course out of the question to refer the plant to the genus *Lophosiphonia* in which endogenous branching only occurs. Having both exogenous and endogenous ramification, the Mauritanian plant agrees with the genus *Polysiphonia*, and its creeping thallus also very much resembles the creeping basal filaments of *Polysiphonia urceolata* according to ROSENVINGE's figures 342 and 344 (1924, p. 407).

And I should like to add that Professor KYLIN has expressed much the same view in answer to an inquiry in connection with this matter.

In "American Samoa" (1924, p. 254) SETCHELL mentions a small *Lophosiphonia* spec. which seems to be nearly related to the plant from Mauritius.

And in "Tahitian Algae", 1926, p. 103, pl. 21, figs. 3 and 4 SETCHELL has described another *Lophosiphonia* (*L. sparsa* Setch.) which may also show some likeness to the plant described here. SETCHELL says about it that he refers it with some doubt to *Lophosiphonia*. About the formation of the branches, whether they are endogenous or exogenous, nothing is said.

Mauritius: Ilôt Brocus, Aug. 1938, R. E. V. no. 192.

Digenea Ag.

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

AGARDH, C., Spec. Alg., p. 389. AGARDH, J., Alg. Mediterr., p. 147; Spec. Alg., vol. II, p. 3, p. 845. FALKENBERG, P., Rhodomelaceen, p. 159, pl. 9, figs. 25—29. BØRGESEN, Mar. Alg. D. W. I., p. 281, fig. 281 and p. 469, fig. 427. — *Conferva simplex* Wulfen, Cryptogama Aquatica, p. 17.

Some rather large and much ramified specimens are found in the collections. Besides sterile and some few tetrasporic specimens a single antheridial and another cystocarpic one are present.

The antheridial bodies, compare my figure l. c., p. 469, fig. 427, as well as the cystocarps are formed near the tips of the branchlets.

Digenea simplex is mentioned by JADIN in his list, p. 169. As to its habitat he writes: "Croissant dans le sable, dans les eaux tranquilles".

Mauritius: Pointe aux Roches, Febr. 7., 1939, R. E. V. no. 265. Flic-en-Flac, without date, R. E. V. no. 251. Some specimens collected by DARUTY are without locality and date.

Geogr. Distr.: Widely distributed in warm seas.

Subfam. 2. Herposiphonieae.

Herposiphonia Nägl.

1. Herposiphonia tenella (Ag.) Ambr.

AMBRON, H., Bilateralität bei den Florideen, 1880, p. 197. FALKENBERG, P., Rhodomelaceen, p. 304. BØRGESEN, F., Mar. Alg. D. W. I., vol. II, p. 286, figs. 287—289, and p. 472, figs. 430—431. — *Hutchinsia tenella* Ag., Spec. Alg., vol. II, p. 105. *Polysiphonia tenella* J. Ag., Alg. Mediterr., p. 123; Spec. Alg., vol. II, 3, p. 919.

A single undetermined specimen in JADIN's collection has a ramification like the typical *Herposiphonia tenella*. The plant has mostly 7—8 pericentral cells, but 9 and 10 are also found, and in more poorly developed branchlets 6 only are present. The decumbent, creeping main filaments are from about 90 μ up to 170 μ thick and the segments about 140—220 μ long. The branchlets have a diameter of about 60 μ and the segments are about 100 μ long.

Unfortunately the specimen was sterile.

Mauritius: Without locality and date, collected by DARUTY, 1893, in Herb. JADIN.

Geogr. Distr.: Mediterranean Sea, Morocco, West Indies, Malayan Archipelago, Ceylon etc.

2. Herposiphonia secunda (Ag.) Ambr.

AMBRON, H., Ueber ein. Fällen von Bilateralität bei den Florideen, 1880, p. 197. FALKENBERG, Rhodomelaceen, 1901, p. 307, pl. 3, figs. 10—12. BØRGESEN, Mar. Alg. D. W. I., vol. II, p. 469, figs. 428—429. *Hutchinsia secunda* Ag., Systema Alg., 1824, p. 149. *Polysiphonia secunda* Zanard., Synops. Alg. Adriat., 1841, p. 64. J. AGARDH, Alg. Mediterr., p. 122; Spec. Alg., vol. II, 3, p. 921. For further literature comp. DE-TONI, Sylloge Alg., vol. IV, p. 1052.

Upon fragments of an old *Turbinaria* preserved in alcohol there occurred an *Herposiphonia* which instead of the normal ramification of *Herposiphonia secunda* had quite the same arrangement of long and short shoots as was found in a specimen from the West Indies described in my above-quoted paper and of which a diagrammatic figure is given on p. 472, fig. 429 above. The only difference from the West Indian plant was that the specimen from Mauritius as a rule had 4 naked segments together, and not 3 as was the case in the West Indian plant.

The specimen was sterile.

Mauritius: Flic-en-Flac, Jan. 1939, R. E. V. no. 259.
Geogr. Distr.: Widely distributed in warm seas.

Subfam. 3. Lophotalieae.

Murrayella Schmitz.

1. **Murrayella periclados** (Ag.) Schmitz.

Schmitz, Fr., Die Gattung *Lophothalia* J. Ag., p. 227. Falkenberg, P., Rhodomelaceen, p. 563, pl. 12, figs. 24–25. Børgesen, Mar. Alg. D. W. I., vol. II, p. 314, figs. 318–320. Post, Erica, *Bostrychia-Caloglossa*-Assoziation, 1936, p. 29. — *Hutchinsia periclados* Ag., Spec. Alg., vol. II, p. 101. For more synonyms compare Post, l. c.

Fine fruiting specimens are found in Dr. Vaughan's collection. Now and then the stichidia have side-branches as in my Fig. 320 l. c. In some stichidia an often long monosiphonous filament is found at their upper ends.

The plant was growing on Mangrove roots.

Mauritius: Ilôt Brocus, Aug. 1938, R. E. V. no. 191.
Geogr. Distr.: Widespread in warm seas.

Bostrychia Montagne.

1. **Bostrychia Moritziana** (Sond.) J. Ag.

Agardh, J., Spec. Alg., II, 3, p. 862. Analecta algolog., cont. IV, 1897, p. 77. Post, E., *Bostrychia-Caloglossa*-Assoziation, 1936, p. 10; Weitere Daten z. Verbreit. d. Bostrychietum, III, 1939. — *Polysiphonia Moritziana*

Sonder in KÜTZING, Spec. Alg., p. 838. For further literature comp. DE-TONI, Syll. Alg., vol. IV, p. 1158.

This species is mentioned by Miss POST (1939, p. 15) as found in a collection of mangrove algæ from Mauritius sent to her by Dr. VAUGHAN.

Mauritius: "Small island near Mauritius," R. E. V.
Geogr. Distr.: Widely distributed in warm seas.

2. **Bostrychia tenella** (Vahl) J. Ag.

AGARDH, J., Spec. Alg., vol. II, p. III, p. 869. FALKENBERG, P., Rhodomelaceen, p. 515. BØRGESEN, F., Mar. Alg. D. W. I., p. 300, figs. 299–303. POST, E., *Bostrychia-Caloglossa*-Assoziation, 1936, p. 25; Weitere Daten zur Verbreitung des Bostrychietum III, 1939, p. 22. — *Fucus tenellus* Vahl, Endeel kryptog. Planter fra St. Croix, 1802, p. 45.

In Dr. VAUGHAN's collection is found a small gathering containing this species. The monosiphonous branchlets in this specimen are very long, often composed of more than 50 cells. The specimen was sterile.

It was growing on mangrove roots.

Mauritius: Ilôt Brocus, Aug. 1938, R. E. V. no. 193. Miss POST (1939, p. 23) mentions the locality: "Small island near Mauritius."
Geogr. Distr.: Widespread in warm seas.

Subfam. 4. Polyzonieae.

Leveillea Decsne.

1. **Leveillea jungermannioides** (Mart. et Her.) Harv.

HARVEY, W. H., Mar. Bot. West Austr., 1855, p. 539. FALKENBERG, Rhodomelaceen, p. 392, pl. 6, figs. 1–13; pl. 14, figs. 18–27. — *Amansia jungermannioides* Martens et Hering, in Flora 1836, p. 481, figs. 1–4. *Polyzonia jungermannioides* (M. et Her.) J. Ag., Symbolae, 1841, p. 25.

Several specimens of this small, elegant alga are found in the collections. The specimens met with crept on various algae, for instance *Turbinaria*, *Sargassum* etc. JADIN in his list, p. 169, calls it *Polyzonia jungermannioides*; he found it on *Dasya arbuscula* and *Udotea flabellata*.

A specimen gathered in January had tetrasporangia.

As to its habitat JADIN writes: "Dans des bassins recevant l'eau fortement aerée".

Mauritius: Flic-en-Flac, Jan. 1939, R. E. V. no. 259. Mahébourg, Sept. 1890, JADIN no. 263.

Geogr Distr.: Red Sea, Indian Ocean, Australia.

Subfam. 5. Amansieae.

Amansia Lamour.

1. Amansia glomerata Ag.

AGARDH, C., Systema Alg., 1824, p. 247. AGARDH, J.. Spec. Alg., II, 3, p. 1111. FALKENBERG, P., Rhodomelaceen, p. 416, tab. 1, figs. 20—21, tab. 6, 14—29. — *Delesseria rhodantha* Harv., Alg. Mauritius, 1834, p. 151, tab. 126. *Amansia fasciculata* Kütz., Tab. Phyc., vol. XV, tab. 4, fig. a—d.

Several specimens of this species, known from the island from earlier investigations, are found in the collections. A specimen collected by Dr. VAUGHAN in August has tetrasporangia.

Besides *Amansia glomerata* JADIN in his list, p. 168, also mentions *Amansia multifida*, known from the tropical Atlantic Ocean, as occurring at Mauritius. I have been able to examine a specimen of his (determined as *Amansia multifida*) which was collected by DARUTY in 1892. It must be admitted that this specimen has a somewhat deviating appearance from the typical form of *A. glomerata* but nevertheless it seems to me to be nothing but a form of this species. In this specimen the flat main branches are somewhat narrower but especially longer than those in the normal form, and the characteristic arrangement of the branches in rosettes is less marked. Furthermore the marginal endogenous branchlets, the length of which, according to FALKENBERG, 1901, p. 416, when they are most vigorously developed, does not surpass the breadth of the flat main shoots, are still more developed, the longest ones attaining a length of about 4—6 mm., while the flat main shoots are only about 3 mm. broad, rarely more. These long marginal branchlets are given out in groups only here and there, most of them remaining short. This somewhat differing shape of the specimen is most probably due to the less favourable conditions of life to which it has been exposed, for instance a more quiet locality or at a greater depth. The specimen has also a lighter colour which may suggest this. In the Botanical Museum, Copenhagen, there is a rather similar specimen from

the Hawaiian Islands. It has been determined as *Amansia glomerata* by REINBOLD who remarks about it: "junge langgestreckte Exemplar an *A. Dietrichiana* erinnernd".

About the habitat of this species JADIN writes: "Croit en touffes roses sur les récifs exposés aux lames fortes."

Mauritius: Flacq, June 1890, JADIN no. 259. Cannoniers Point, Oct. 1929, TH. M. Pointe aux Sables, Aug. 1939, R. E. V. no. 346.

Geogr. Distr.: Pacific and Indian Oceans.

Vidalia Lamouroux.

1. **Vidalia fimbriata** (R. Br. mscr.) J. Ag., Falkenb. emend.

FALKENBERG, P., Rhodomelaceen, p. 433. J. AGARDH, Spec. Alg., II, 3, 1863, p. 1124. — *Fucus fimbriatus* R. Br. in TURNER, Fuci, vol. III, 1811, p. 87, tab. 170. *Amansia Melvilli* J. Ag., Till Algernes System, 4. afd., VII, Florideae, 1884, p. 110. *Vidalia Melvilli* (J. Ag.) Schmitz, Mar. Florideen von Deutsch-Ostafrika, 1895, p. 159–160.

The material contains some few and poorly developed specimens. In his list, p. 168, JADIN calls this species *Vidalia obtusifolia*, using the name BORNET (1885, p. 19) gave some specimens of this species from Madagascar. But, as is pointed out later by SCHMITZ (l. c., p. 159) who has examined BORNET's plant from Madagascar, this is identical with specimens from Dar es Salaam and like these referable to *Vidalia Melvilli*. However, FALKENBERG according to later examinations embodied in his monograph on the *Rhodomelaceae*, after a comparison of the East African plant with the Australian *Vidalia fimbriata* arrived at the conclusion that in reality they all belong together, being referable to *Vidalia fimbriata*.

In the sparse and fragmentary material I have had for examination the specimens showed some variations. Thus a specimen in JADIN's collection (no. 267) on the flat ca. 4 cm. broad shoots has two rows of well-separated small adventitious branchlets in conformity with FALKENBERG's figure 19, pl. 7 of *Vidalia fimbriata* var. *neocaledonica*. And another specimen with a narrower thallus (scarcely 3 mm. broad) had also adventitious branches from the surface of the flat shoots, but these were more irregularly placed and more vigorously developed; this specimen was tetrasporic.

On the other hand, some small specimens in Dr. VAUGHAN's

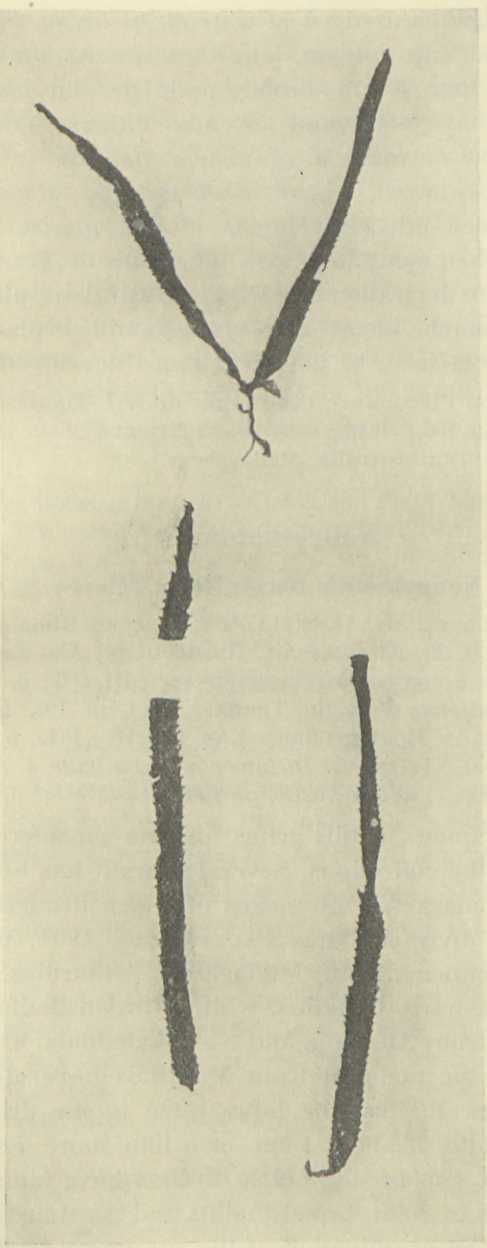

Fig. 20. *Vidalia fimbriata* (A. Br.) J. Ag.
Specimens with long, narrow and almost unramified thallus.
(× 1).

collection (Fig. 20) dredged at a depth of about 20—25 fathoms have very long (up to 8 cm. long) and almost unramified shoots a little more than 3 mm. broad; upon the flat surface of these specimens I have not found any adventitious shoots at all.

As we have no material of *Vidalia fimbriata* in the Botanical Museum, Copenhagen, I have not been able to make any comparison between other specimens of this species and those of Mauritius. When compared with the figure of TURNER the difference seems to be rather great, the Australian plant being for instance a much larger and more ramified plant, while the marginal shoots seem to be much more developed.

Mauritius: Flacq, July 1890, JADIN no. 267. Tombeau Bay, Dec. 8., 1932, R. E. V. no. 166, "dredged at 20—25 fathoms".

Geogr. Distr.: Australia, Madagascar.

Neurymenia J. Ag.

1. Neurymenia fraxinifolia (Mert.) J. Ag.

AGARDH, J., Spec. Alg., II, p. 1135. FALKENBERG, Rhodomelaceen, 1901, p. 444, tab. 7, figs. 20—29. OKAMURA, Illustrationes Alg. Jap., I, tab. XIII, 1901. BØRGESEN, Some Indian Rhodophyceae, III, 1933, p. 137, figs. 17—20. — *Fucus fraxinifolius* Mert. in TURNER, Fuci, pl. 193. *Epineuron fraxinifolium* Harv. in HOOKER Journal of Bot., IV, 1845, p. 532. KÜTZING, Tab. Phycol., vol. XIV, pl. 99. *Dictymenia fraxinifolia* J. Ag. in Linnæa, XV, p. 27. HARVEY, Phycol. Austr., pl. 124.

Some specimens of this genus hitherto considered monotypic are found in the collections. Several times it has been attempted to find some characters by means of which it might be possible to manage a division. Thus FALKENBERG, 1901, p. 444, points out that specimens from Madagascar, Mauritius, India, and Ceylon have a narrow thallus, while a broad thallus is peculiar to specimens from Australia and Nova Caledonia. The rather few specimens in the material from Mauritius have also a proportionally narrow thallus, the lobes often in the dried condition having a breadth of about 1 cm. or a little more, only some few lobes were $1^1/_2$ cm. broad; but in India I have found specimens with a more than 2 cm. broad thallus and, as stated in my paper (1933, p. 41), an examination of the specimens in the Kew Herbarium does not seem to speak in favour of a division based upon the dimensions of the thallus.

In the same paper quoted above I have pointed out that the shape of the stichidia seems to be rather different from the different localities; in specimens from Australia it was long and slender, while in specimens from South India the shape was broad and short; compare my figure p. 138, fig. 18. These characters might perhaps offer a possibility of division, if these differences hold good when sufficient material from various localities is examined.

It is to be regretted that the few specimens I have seen from Mauritius are not tetrasporic, most of them being sterile; a single one is cystocarpic. COTTON was the first to describe the cystocarps (Kew Bulletin, 1913, p. 254). In material from South India I have found a single androphore (l. c. fig. 20).

Dr. MORTENSEN has dredged this species at a depth of 25 fathoms.

Mauritius: Between Gunner's Quoin and Flat Island, 15. Oct., 1929, TH. M. no. 802. Without locality, DARUTY 1892 in herb. Jadin. R. E. W. no. 234 without locality.

Geogr. Distr.: Indian Ocean, Japan, Australia.

Subfam. 1. Laurencieae.

Laurencia Lamouroux.

1. Laurencia papillosa (Forssk.) Grev.

GREVILLE, Algae Brit., 1830, p. LII. BØRGESEN, A revision of Forsskåls Algae, 1932, p. 6. — *Fucus papillosus* Forssk., Fl. Ægypt. — Arab., p. 190.

Several specimens of this species are found in the collections. It is not mentioned in JADIN's list in spite of the fact that his collection contains typical specimens.

Mauritius: Flat Island, Oct. 1929, TH. M. Flic-en-Flac, Oct. 31., 1938, R. E. V., "common on coral debris in lagoon." Black River Bay, July 7., 1939, R. E. V. no. 282. JADIN, nos. 213, 216, 268, and 474, all without localities and dates.

Geogr. Distr.: Most warm seas.

2. Laurencia nidifica J. Ag.

AGARDH, J., Spec. Alg., vol. II, 3, p. 743. YAMADA, Y., Notes on *Laurencia*, 1931, p. 202.

JADIN's collection has two small specimens (nos. 79 and 112) from Réunion of a small elegant *Laurencia*; in his list, p. 168,

they are referred to *L. obtusa*. Very probably they are like HARVEY's *Laurencia obtusa*? var. *nana* (1834, p. 152) which DE-TONI in Sylloge Alg., vol. IV, p. 785, refers though with a note of

Fig. 21. *Laurencia nidifica* J. Ag. Specimens in natural size.

interrogation to *Laur. nidifica* J. Ag.; HARVEY's description also seems to agree fairly well with the specimens.

Unfortunately I have not been able to compare the specimens

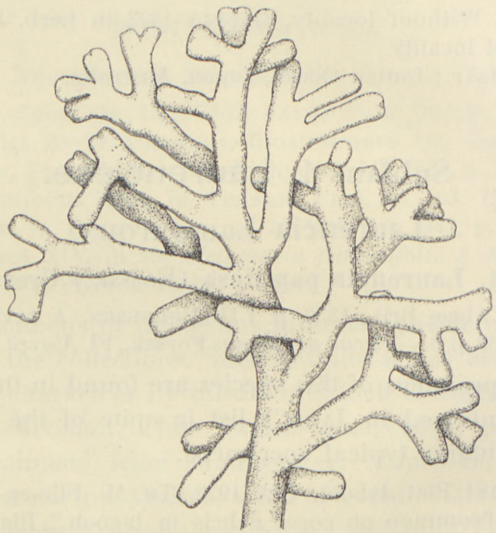

Fig. 22. *Laurencia nidifica* J. Ag. Fragment of the thallus. (× 8).

with original material but they seem to agree quite well with AGARDH's description.

As to the habit of the plant (Figs. 21 and 22) the thallus is terete, c. 600 μ thick, and irregularly ramified as the branchlets issue in all directions with a longer or shorter distance between them, sometimes several are given off at nearly the same height,

though without being opposite or verticillate. The branchlets are again provided with irregularly placed ramuli especially towards their tips.

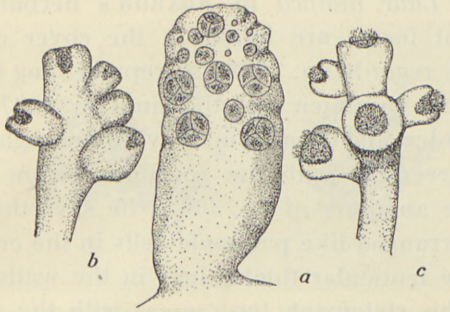

Fig. 23. *Laurencia nidifica* J. Ag.
Branchlets with tetrasporangia (*a*), cystocarps (*b*), and antheridial bodies (*c*). (× about 110).

In the tetrasporic plant the ramuli (Fig. 23*a*) are nearly cylindrical or taper a little towards their base, upwards with unevenly waved surface; in their upper half the tetrasporangia

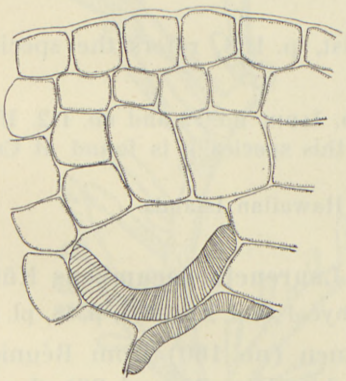

Fig. 24. *Laurencia nidifica* J. Ag.
Part of a transverse section of the thallus. (× about 225).

are developed. The latter are nearly globular with a diameter of about 100 μ or a little more.

The cystocarps (Fig. 23*b*) are developed in the upper half of short branchlets; they are urceolate or subcylindrical, tapering towards the base and summit.

The ramuli carrying the antheridial bodies (Fig. 23*c*) are

topshaped, like the cystocarps they issue several together from the upper half of short branchlets.

According to YAMADA (l. c., p. 202), who has examined the specimens of *Laur. nidifica* in AGARDH's herbarium in Lund, rather different forms are found in the cover comprising this species, but he regards no. 36628 as representing the type. About the habit of this specimen and the similar 36627 he writes that they are "slender and weak and having entangled bases"; this is in good agreement with the specimens from Réunion. And concerning the anatomy of no. 36628 he says that "the surface cells are not arranged like palissade cells in the cross-section and there are some lenticular thickenings in the walls of the medullary cells". This statement, too, agrees with the anatomy of the specimens from Réunion (Fig. 24). The peripheric cells in these specimens are almost isodiametric, c. 30 μ in diameter; the medulla consists of roundish not very large cells, some few in the middle of the thallus are provided with thickenings of the wall.

Apparently allied to this species is *Laurencia elegans* Lucas, 1935, p. 222, but this plant has no thickenings in the medullary layer.

JADIN in his list, p. 168, refers the specimens to *Laurencia obtusa*.

Réunion: Herb. JADIN no. 79 and no. 112. If HARVEY's *Laurencia obtusa* var. *nana* is this species it is found at Cap Malheureux, Mauritius.

Geogr. Distr.: Hawaiian Islands.

3. **Laurencia decumbens** Kütz.?

KÜTZING, Tab. Phycol., vol. XV, 1865, p. 18, pl. 51.

A small specimen (no. 160) from Réunion in JADIN's collection as to its habit (Figs. 25 and 26) shows much similarity to KÜTZING's above-quoted figure drawn from a plant collected in New Caledonia. YAMADA (1931, p. 195) has examined the unique specimen in KÜTZING's herbarium and points out that it has quite another anatomical structure than that of *Laurencia perforata* (Bory.) Mont. to which species J. AGARDH in Epicrisis, p. 649, believed it was related because of its very similar habit. While *Laur. perforata* has palissade-like epidermal cells KÜTZING's specimen has not such cells. But concerning the specific

value of KÜTZING's plant YAMADA adds: "But because KÜTZING's species is represented by only one sterile specimen, it is very difficult to obtain an exact idea of it."

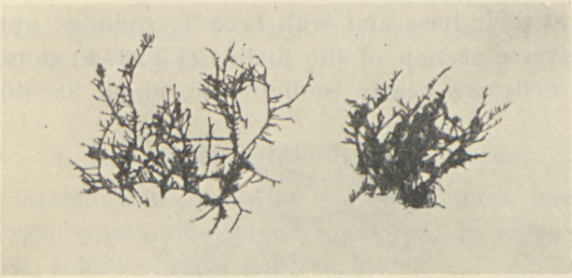

Fig. 25. *Laurencia decumbens* Kütz. Habit of the specimens. (× 1).

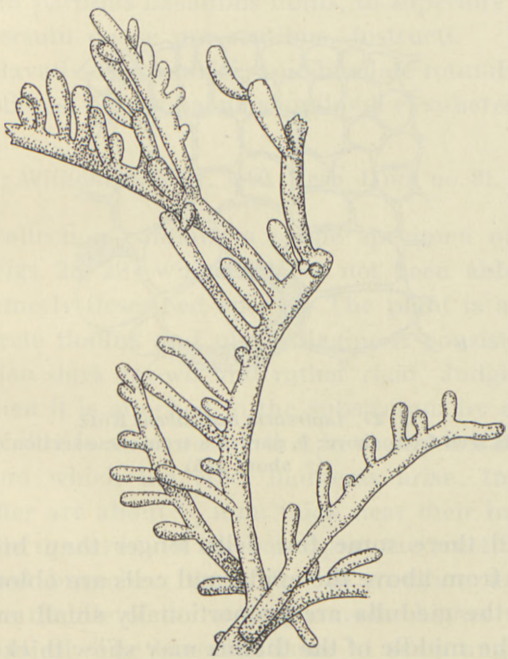

Fig. 26. *Laurencia decumbens* Kütz. Fragment of the thallus. (× about 6).

The specimen from Réunion forms small tufts about 2 cm. high, the thallus attaining a breadth of about $^1/_2$ mm. only. A characteristic feature of the plant is that the main branches are often much curved, and that the branchlets and ramuli issuing

from them are unilaterally placed upon their upper convex side. The branchlets are of variable size, shorter or longer; the shorter ones are most probably later developed, adventitious ones. The branchlets are upto about 2—3 mm. long and 400 μ broad, narrowed at their base and with broadly rounded apices.

A transverse section of the thallus (Fig. 27 *b*) shows that the epidermal cells are nearly isodiametric, about 35—40 μ broad,

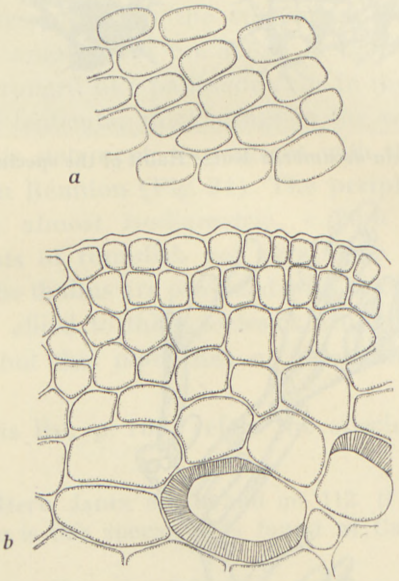

Fig. 27. *Laurencia decumbens* Kütz.
a, surface cells seen from above; *b*, part of a transverse section of the thallus. (× about 225).

but here and there some few cells longer than broad may be found. Seen from above the epidermal cells are oblong (Fig.27 *a*). The cells of the medulla are proportionally small and some few of these in the middle of the thallus may show thickenings of the wall (Fig. 27 *b*). YAMADA does not mention if such are present in KÜTZING's specimen.

That the specimen from Réunion, which like that of KÜTZING is sterile, shows a great similarity to that of KÜTZING, cannot be denied; but to arrive at an exact conclusion a comparison with KÜTZING's specimen is necessary. Since this is out of the question

at present and because of the distant locality of KÜTZING's plant I have placed a ? after the specific name.

JADIN in his list, p. 168, refers this plant to *Laur. perforata* (Bory) Mont.

Réunion: Saint-Gilles, Apr, 1890, JADIN no. 160.
Geogr. Distr.: New-Caledonia.

4. **Laurencia columellaris** nov. spec.

Frons caespitosa, usque ad 10 cm. alta et ultra, teres, in parte basali $^3/_4$ cm. crassa, irregulariter ramosa, in sicco subrigida, cartilaginea, colore obscure-rubro.

Rami subpauci, erecti, angulis acutis emissi, irregulariter egredientes, in partibus basalibus nudis, in superiore parte ramulis, quoqueversum dense praesentibus, instructi.

Ramuli clavati-subcylindrici, apicibus late rotundis, ad basem leniter angustiores, omnes paene aequilongi et suberecti, ca. $1^1/_2$—2 mm. longi.

Réunion: Without locality, 1890, Herb. JADIN no. 91.

JADIN's collection contains a single specimen of an elegant *Laurencia* (Figs. 28, 29) which I have not been able to identify with any formerly described species. The plant is about 10 cm. high with terete thallus and of cartilaginous consistency, in the dried condition dark brown and rather rigid. Judging from the single specimen it is attached to the substratum by a small disc, but the possibility is also present that in reality it has decumbent filaments from which the erect filaments arise. In dried condition the latter are about $^3/_4$ mm. thick near their base, tapering only very little upwards. In the basal part the erect filaments are naked, without branches; these, few in number, are given out from near the middle of the erect filaments; higher up there are few or none at all. The branches issue at acute angles being all straight and directed upwards. They are naked in their basal part, higher up ramuli issue in all directions. The ramuli are $1^1/_2$ to 2 mm. long, obliquely upward-directed, subclavate of shape, increasing slowly from the narrow base to the obtuse rounded apex.

The specimen is sterile.

In a transverse section of the thallus (Fig. 30) it is seen that the surface cells are mostly about quadratic, having a breadth of about 15—20 μ; some of them are, however, broader, others

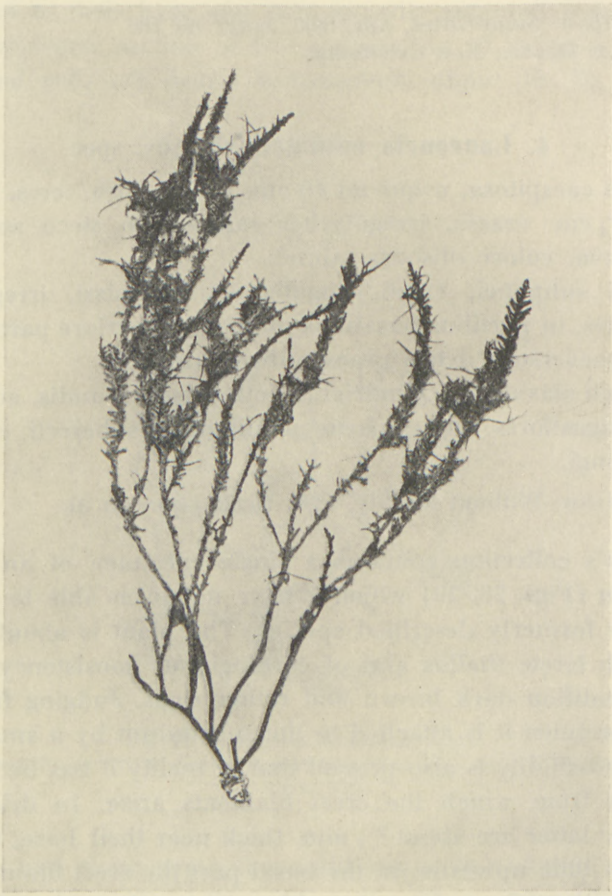

Fig. 28. *Laurencia columellaris* Børgs. Habit of the original specimen. (× 1).

narrower than these. The cells of the medulla are small, the largest have a breadth of about 40—50 μ. Their walls are proportionally thick, but any local thickenings of the wall are not met with. When the surface cells are viewed from above they are roundish and of variable size.

As to the arrangement of the ramuli this species may show some similarity to *Laurencia tropica* Yamada (1931, p. 233, fig. Q)

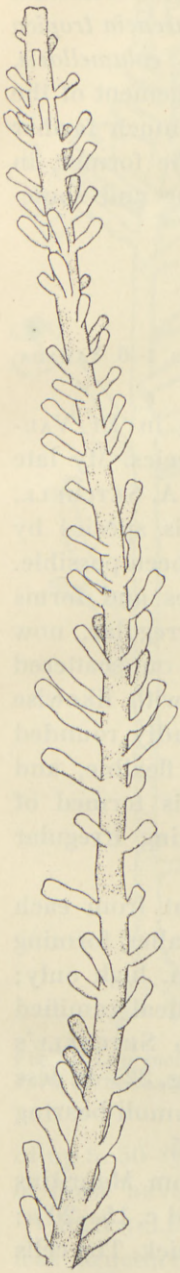

Fig. 29. *Laurencia columellaris* Børgs.
The upper end of an erect main filament with branchlets.
(× about 6).

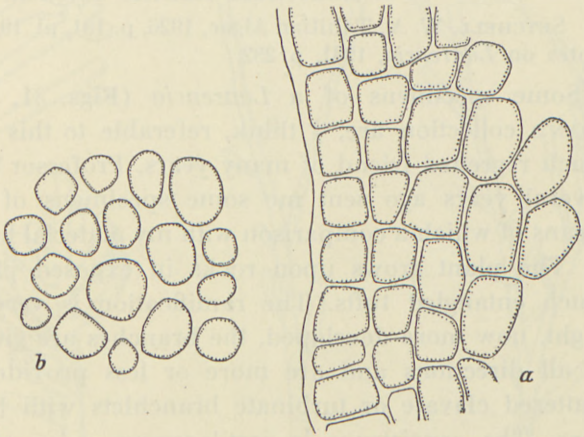

Fig. 30. *Laurencia columellaris* Børgs.
a, part of a transverse section of the thallus. *b*, surface cells seen from above. (× about 320).

but a more detailed comparison will soon show that essential differences are present. Thus the ramification of *Laurencia tropica* is very irregular and quite different from that of *L. columellaris*, and even if there is some resemblance in the arrangement of the ramuli, these are more densely placed and occur much farther down the filaments of the latter species than in the former, in which also the ramuli are of more variable shape and sometimes divided.

5. **Laurencia flexilis** Setchell.

Setchell, W. A., Tahitian Algae, 1926, p. 101, pl. 19, figs. 1–6. Yamada, Notes on *Laurencia*, 1931, p. 232.

Some specimens of a *Laurencia* (Figs. 31, 32) in Dr. Vaughan's collection are, I think, referable to this species. My late much regretted friend of many years, Professor W. A. Setchell, several years ago sent me some specimens of this species by means of which a comparison with my material has been possible.

The plant grows upon rocks in exposed places and forms much entangled tufts. The ramification is very irregular, now slight, now more developed, the branches are given out scattered in all directions and are more or less provided with likewise scattered clavate or turbinate branchlets with broadly rounded apex. The consistence is cartilagenous, wiry and flexible, and the colour is dark-red. The base of the thallus is formed of decumbent branches which gradually fuse, forming irregular discs or rather clumps.

The specimens from Mauritius differ somewhat from each other. Two of them (nos. 255 and 261, fig. 31) are smaller, forming tufts intermingled with *Corallinaceae* about 4—5 cm. high only; the erect filaments in these collections are a good deal ramified near their summits, showing much similarity to Setchell's figures 1 and 4. The other gathering (no. 348, fig. 32) is less ramified with often quite few and remotely placed ramuli bearing a greater resemblance to Setchell's figures 2, 3, 5.

As to the anatomical structure of the plant from Mauritius (Fig. 33), the surface cells are about as long as broad c. 15—20 μ; the peripheric walls and the walls on the whole are thick. The cells of the medulla are proportionally small, rarely attaining a diameter

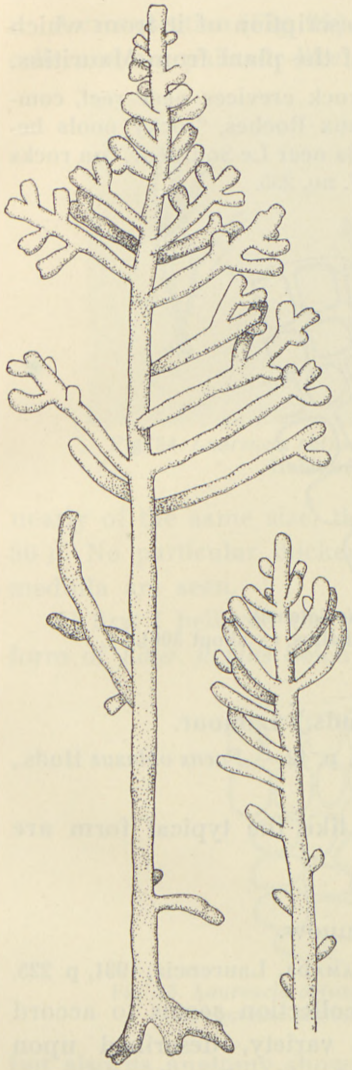

Fig. 31. *Laurencia flexilis* Setchell. Parts of the thallus (no. 261). (×8).

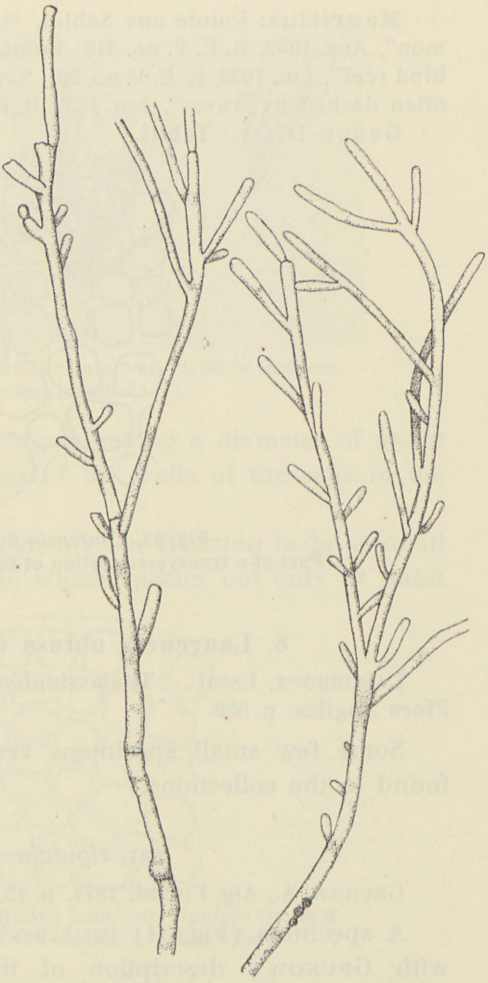

Fig. 32. *Laurencia flexilis* Setchell. Parts of erect filaments (no. 348). (× about 3).

of up to 50—60 μ; they have thick walls but no special thickenings of these have been found.

Setchell does not himself give any description of the anatomical structure of the plant, but Yamada (1931, p. 232) having examined the type specimen in the herbarium of the University

of California has published a short description of it from which it is evident that it is quite like that of the plant from Mauritius.

Mauritius: Pointe aux Sables, "in rock crevices near reef, common", Aug. 1939, R. E. V. no. 348. Pointe aux Roches, "rocky pools behind reef", Jan. 1939, R. E. V. no. 261. Savinia near Le Souffleur, "on rocks often dashed by waves", Jan. 1939, R. E. V. no. 255.

Geogr. Distr.: Tahiti.

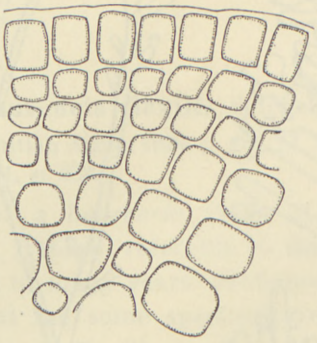

Fig. 33. *Laurencia flexilis* Setchell.
Part of a transverse section of the thallus. (× about 300).

6. **Laurencia obtusa** (Huds.) Lamour.

Lamouroux, Essai ... Thalassiophytes, p. 42. — *Fucus obtusus* Huds., Flora Anglica, p. 586.

Some few small specimens very like the typical form are found in the collections.

var. *rigidula* Grunow.

Grunow, A., Alg. Fidshi, 1874, p. 45. Yamada, Laurencia, 1931, p. 225.

A specimen (Fig. 34) in Jadin's collection seems to accord with Grunow's description of this variety, described upon specimens from the Samoa Islands. As is pointed out by Grunow, this variety looks rather like Kützing's figure of *Laurencia corymbifera* Kütz. in Tab. Phycol., vol. 15, pl. 56, from the West Indies, but like the plant from the Pacific Ocean the specimen from Réunion is more robust and the branchlets more broadly clavate. The thallus is rigid and dark-red and forms 2—3 cm. high dense tufts of erect filaments emerging from the basal disc-like filaments.

A cross section (Fig. 35) of the thallus shows that the epidermal cells are not palisade-like; those of the medulla are small, all

Fig. 34. *Laurencia obtusa* (Huds.) Lam. var. *rigidula* Grunow. Habit of the specimens. (× 1).

nearly of the same size, the largest having a diameter of about 50 μ. No particular thickenings of the walls of the cells in the medulla are seen.

At first I believed the specimen from Réunion to be a small form of *Laur. flexilis* Setch., to which species not only its habit

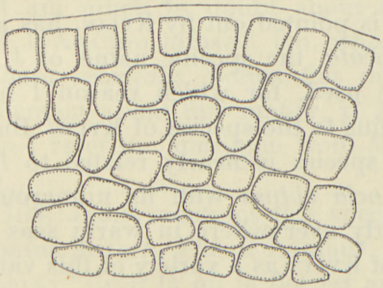

Fig. 35. *Laurencia obtusa* (Huds.) Lam. var. *rigidula* Grunow. Transverse section of the thallus. (× about 250).

but also its anatomy shows some similarity, but the ramuli are broader upwards and in this respect agree with *Laur. obtusa*. JADIN in his list, p. 168, calls it *Laurencia corymbifera* Kütz. and writes about its habitat: "Abondant sur les récifs et sur les rochers où la lame frappe violemment".

var. *natalensis* (Kylin) Børgs.

Laurencia natalensis Kylin, Rhodophyceen von Südafrika, 1938, p. 24, pl. 8, fig. 21.

Dr. MORTENSEN has collected some specimens of a small *Laurencia* which seem to agree quite well with KYLIN's description and figures of this plant originating from Durban and Port Elisabeth in South Africa.

The specimens from Mauritius are about 3—5 cm. high, of a rather soft consistency adhering strongly to the paper. They have an irregular raceme-like ramification; a main axis is as a rule rather clearly discernible.

The specimens being gathered in October, have tetrasporangia as well as cystocarps and androphores.

A transverse section shows that the surface cells are not palisade-like and no thickenings of the wall of the cells in the medulla are present.

At first I had named these specimens *Laurencia obtusa*, var. *divaricata* (J. Ag.) Yamada, Notes on Laurencia, 1931, p. 223, the *Laurencia divaricata* J. Ag. being described upon specimens from the Red Sea. According to KYLIN, who has been able to examine the specimens of *Laurencia divaricata* in the herbarium of J. AGARDH in Lund, his *Laurencia natalensis* differs only by its smaller size from AGARDH's specimens; but since SUHR in the year 1840, as is pointed out by KYLIN, has already described a *Laurencia divaricata*, the specific name of J. AGARDH for this species cannot be used, for which reason I have referred the plant from Mauritius to the species of KYLIN. But KYLIN does not conceal that this species is nearly related to *Laur. obtusa*, and seeing that *Laurencia obtusa* with its numerous varieties so to speak occurs nearly everywhere in warm seas I prefer to consider the species of KYLIN as a variety of this variable and widely distributed species.

Mauritius: Forms near the typical form: Flacq, July 1890, JADIN no. 256. Ilôt Brocus "in Reef pools", Aug. 1938, R. E. V. no. 198. Var. *natalensis* (Kylin) Børgs.: Flat Island, Oct. 16., 1929, TH. M.

Réunion: Var. *rigidula* Grunow: Saint-Gilles, 1890, JADIN no. 133.

Geogr. Distr.: Widely distributed in warm seas.

Subfam. 2. Chondrieae.

Acanthophora Lamour.

1. Acanthophora spicifera (Vahl) Børgs.

Børgesen, West Indian Florideae, II, 1610, p. 201, figs. 18–19. Mar. Alg. D. W. I., vol. II, 1915–20, p. 259, figs. 253–58. — *Fucus spiciferus* Vahl, Endeel kryptog. Planter fra St. Croix, 1802, p. 44. *Acanthophora Thierii* Lamour., Essai sur les genres . . . Thalassioph. non artic., 1813, p. 44. For further literature compare my above-quoted papers.

Several specimens are found in the collections but all are sterile except a tetrasporic specimen collected in December by Dr. Vaughan.

The stichidia are like my figures quoted above of specimens from the West Indies, especially those shown in Fig. 257 *C*, in which the sporangia are found in the upper cupola-like, bare apex of the branchlets, the spines first appearing below this fertile part; according to J. Agardh, Spec. Alg., II, p. 816, this feature should be characteristic of *Acanthophora orientalis* J. Ag.; compare also his definition of this species. But since I have found the stichidial branchlets to be of rather variable shape in West Indian material I am much in doubt about the distinction of these species, and J. Agardh himself, too, when describing (l. c. p. 821) *Acanthophora orientalis*, points this out; compare also Falkenberg's statement about this matter, p. 231.

For this reason I refer the specimen from Mauritius to *Acanthophora spicifera*.

In his list, p. 168, Jadin mentions this species using the formerly employed name *Acanth. Thierii* Lamour. About the habitat at the island he says: "Croit là où le flot est assez violent, mais pas sur les récifs, ni aux endroits où la vague est très forte".

Mauritius: Flacq, June 1890, Jadin no. 201. Port-Louis, Aug. 1890, Jadin no. 370. Grand Bay, Oct. 25., 1929, Th. M. Flic-en-Flacq, Dec. 31., 1938, R. E. V. no. 247.

Geogr. Distr.: Widely distributed in tropical seas.

Chondria Harv.

Subgenus 1. ***Euchondria*** *Falkenb.*

1. **Chondria tenuissima** (G. et W.) Ag.

Agardh, C., Spec. Alg., p. 352; Systema Alg., p. 205. Thuret et Bornet, Études phycolog., p. 88, tab. 43—48. Falkenberg, P., Rhodomelaceen, p. 195. — *Fucus tenuissimus* Good. et Woodw. in Transact. Linnean Soc., vol. III, 1797, p. 215, tab. 19. For further literature compare De-Toni, Sylloge, vol. IV, p. 834.

A well prepared female specimen of this species is found in Jadin's collection.

Mauritius: Without locality, collected by Daruty 1892.

Geogr. Distr.: Warmer parts of the Atlantic coasts of Europe and America, Mediterranean Sea, Malayan Archipelago, Japan, Australia.

Subgenus 2. ***Coelochondria*** *Falkenb.*

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

Agardh, C., Spec. Alg., p. 350; Systema Alg., p. 205. Falkenberg, P., Rhodomelaceen, p. 197, pl. 22, figs. 4—18. — *Fucus dasyphyllus* Woodw. in Transact. Linnean Soc., vol. II, 1794, p. 239, pl. 23, figs. 1—3. *Chondriopsis dasyphylla* J. Ag., Spec. Alg., II, p. 809. For further literature compare De-Toni, Sylloge, vol. IV, p. 834.

Upon pieces of a sea-grass several small fertile specimens were found intermingled with *Polysiphonia mollis* Hook. fil. et Harv.

Tetrasporic as well as female and male specimens were met with.

Mauritius: Cannoniers Point, Oct. 26., 1929, Th. M. Barkly Island, Aug. 1939, R. E. V. no. 330.

Geogr. Distr.: Warmer parts of the Atlantic coasts of Europe and America, Mediterranean Sea, Indian Ocean.

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with some few synonyms, the latter printed in italics.

Indleveret til Selskabet den 6. Marts 1945.
Færdig fra Trykkeriet den 28. September 1945.