



E.A. Batters del.  
R. Morgan lith.

West, Newman imp.

## NEW OR CRITICAL BRITISH MARINE ALGÆ.

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(PLATE 414.)

SEVERAL species, not previously noticed on the shores of the British Isles, have recently been added to our marine alga-flora. Most of them are inconspicuous plants, as was to be expected in a country whose shores have been industriously and successfully explored for the best part of a century in the search for marine algæ. In the present paper I propose to give a list, with descriptions of some undescribed forms, of the more important species that have recently come under my notice.

## MYXOPHYCÆ.

1. ONCOBYRSA MARINA Rabenh. Flor. eur. Alg. ii. p. 68 (1865). Attached to the fronds of *Lichina pygmæa*, Swanage, Sept. 1897; *E. M. Holmes*. Outwardly this plant has somewhat the appearance of *Brachytrichia Balani*, for which it was mistaken when gathered, but in structure and every other respect differs widely from it.

2. CHAMÆSIPHON MARINUS Wille in *Dijmphna-Sogt. zool. bot. Udb.* p. 4, tab. 13, fig. 1. On *Lyngbya lutea*, &c., Swanage, Sept. 1898; *E. A. B.* This minute species, the filaments of which scarcely reach 1  $\mu$  in diameter, is frequently found on the filaments of *Lyngbyæ*, various species of *Ulothrix*, &c., at Swanage, and, no doubt, at many other places on our coasts.

3. PLECTONEMA NORVEGICUM Gomont, *Bulletin de la Soc. bot. de France*, vol. xlvi. p. 34, Feb. 1899. Mixed with *Calothrix scopulorum* and other *Myxophyceæ* on rocks near high-water mark, Clacton, Feb. 1893, and Swanage, Aug. 1894; *E. A. B.*

4. P. BATTERSII Gom. *l. c.* p. 36. Mixed with *Prasiola stipitata*, &c., on rocks near high-water mark, Berwick-on-Tweed, Feb. 1887; *E. A. B.*

5. PHORMIDIUM ECTOCARPI Gom. *l. c.* p. 37, pl. 1, fig. 13. *P. persicinum* Batt. (non Gom.) pro parte. This species forms a pink film over *Ectocarpi* or on the surface of the mud at high-water mark. Cumbrae, Aug. 1891; *E. A. B.* Plymouth, June, 1896; *G. Brebner*.

6. SCHIZOTHRIX VAGINATA Gom. *Monographie des Oscillariées*, p. 40, pl. vii. figs. 1-4. Near the Picket Rock, Sidmouth, Aug. 1885; *E. A. B.* Cumbrae, Aug. 1899; *Mrs. Robertson*. I am indebted to Dr. Gomont for the identification of this and the three preceding species.

7. NOSTOC ENTOPHYTUM Bornet & Flahault, *Rev. des Nostocacées heterocystées* in *Annales d. Sc. Nat.* 7e ser. Bot. vii. p. 190. To this species I refer some specimens of a microscopic *Nostoc* which I found embedded in the thallus of *Rivularia Biasoletiana* at Cumbrae

\* See *Journ. Bot.* 1895, 274-6; 1896, 6-11, 384-390; 1897, 433-440.

in Aug. 1891. I saw no more specimens till last October, when I received from Mrs. Robertson some specimens of *R. nitida* from the same locality, and on examining them I found many specimens of this or a closely-allied species of *Nostoc*. Mrs. Robertson's plants are larger than those I found in 1891, frequently reaching 1-2 mm. in diameter, are more regularly ovate in form, and are often found growing on the surface of the *Rivularia*, and not imbedded in its thallus.

#### CHLOROPHYCEÆ.

8. PRASINOCLADUS LUBRICUS Kuckuck, Bemerk. zur mar. algen-veg. von Helgoland, i. p. 261, fig. 28, Feb. 1894. *Euglenopsis subsalsa* Davis in Ann. Bot. vol. viii. no. 32, p. 388, Dec. 1894. In the autumn of 1897 Mr. Arthur Church sent me specimens of this curious organism from the Marine Biological Association's Laboratory at Plymouth, where it had made its appearance in the glass culture-jars in which *Cutleria multifida* and other algæ from the Sound were growing. These specimens agreed well with the figures and description of *Euglenopsis subsalsa* given by Davis in the *Annals of Botany*, while the older films and those presumably grown under unfavourable conditions exactly resembled Kuckuck's figures of *Prasinocladus lubricus*. There can be little or no doubt that the two descriptions refer to one and the same organism, Kuckuck's *Prasinocladus* having the priority of publication by a few months. I do not feel equally confident, however, that the organism in question is really an alga, and not rather one of the flagellate protozoa.

9. CLADOPHORA (EGAGROPILA) CORYNARTHRA Kützing, Phyc. germ. p. 210; Id., Tab. Phyc. vol. iv. t. 72, fig. 2.

Var. SPINESCENS, n. var. Filaments densely packed together, forming a dark green, spongy, thorny layer 1-3 in. in width; branches numerous, stiff, irregularly placed—opposite, dichotomous or three or more in a whorl—branchlets, secund, bluntly pointed; cells 40-120  $\mu$  in diameter, two to five times longer than broad.

Lying loosely fixed amongst the roots of *Zostera*, on a rather muddy bottom in 3-4 fathom water. Roundstone Bay, Connemara, March, 1883, Dr. Painter; April, 1899, H. H. Hanna, Weymouth, April, 1890; E. M. Holmes.

This variety differs from the type in the shorter cells, bluntly pointed branchlets, more irregular branching, and somewhat more robust filaments.

10. C. CORYMBIFERA Kützing, Spec. Alg. p. 397; Id., Tab. Phyc. iv. tab. 8. In pools near low-water mark, Berwick, Oct. 1882; E. A. B. Perhaps only a form of *C. hamosa* Kütz., as Hauck believed it to be, but in any case a very pretty plant.

11. C. NEESIORUM Kütz. Spec. Alg. p. 396; Id., Tab. Phyc. iv. tab. 5. Var. *humilis* = *C. humilis* Kützing, Spec. Alg. p. 396; Id., Tab. Phyc. iv. tab. 4. In shallow, sandy-bottomed, sunny pools between tide-marks, Berwick, Aug. 1884, &c. Swanage, Aug. 1894; E. A. B. This species is closely related to *C. rupestris*, for dwarf specimens of which it might be mistaken, if not closely

examined. The tufts are usually dark green below, and yellowish or brown above. It appears to be a not uncommon species on our shores, and I have seen numerous British specimens, gathered by Mr. E. M. Holmes, but I have no note as to the exact locality or date of gathering.

12. *C. (SPONGOMORPHA) SONDERI* Kütz. Phyc. germ. p. 208; Id., Tab. Phyc. iv. tab. 79. Orkney; *J. H. Pollexfen*. In the herbarium of the late Dr. Pollexfen there are a couple of specimens of this species marked *C. arcta*. The filaments, which are very much more robust than in any other British species belonging to the subgenus *Spongomorpha*, are free, except at the base, where they are matted together by numerous rhizoids. The tufts have much the appearance of the var. *Vaucheriæformis* of *C. centralis*. The cells often reach 200  $\mu$  and more in diameter. The specimens were probably gathered about 1840, but are not dated; the locality being given as "Orkney," without further indication.

13. *C. PALLIDA* = *ACROSIPHONIA PALLIDA* Kjellman, Chlorophycé-slågtet *Acrosiphonia*, p. 88, tab. vii. figs. 11-21. On the leaves of *Zostera*, Bognor, May, 1885; *E. A. B.* Cumbrae, May, 1899; *Mrs. Robertson*. The widely spreading, compact, almost membranous, basal layer from which the erect filaments arise render the recognition of this species easy.

14. *C. STOLONIFERA* = *ACROSIPHONIA STOLONIFERA* Kjellman, *l. c.* p. 85, tab. vi. Berwick, Oct. 1882. Cumbrae, Aug. 1891; *E. A. B.*

#### PHÆOPHYCÆ.

15. *MYRIONEMA POLYCLADUM* Sauvageau in Ann. des Sciences naturelles, Bot. 8e ser. tome v. 1898, p. 73, fig. 13. On the blade of *Saccorhiza bulbosa*, Swanage, Sept. 1898; *E. A. B.*

16. *M. CORUNNÆ* Sauvageau, *l. c.* p. 77, fig. 14. On the blade of *Laminaria saccharina*, Cumbrae, Aug. 1891, and Swanage, Sept. 1898; *E. A. B.*

17. *M. PAPILLOSUM* Sauvageau, *l. c.* p. 82, figs. 15-17. On the blade of *L. saccharina* and *L. digitata*, Weymouth, Sept. 1892, and Swanage, Sept. 1898, *E. A. B.*

18. *MYRIONEMA ? SAXICOLA* Kuckuck, Bemerk. mar. algenvegetat von Helgoland, ii. p. 381, fig. 8. On rocks near high-water mark, and on limpet shells, in company with *Isactis plana*, Swanage, Sept. 1898; *E. A. B.*

19. *HECATONEMA MACULANS* Sauv. *l. c.* p. 88, figs. 18-22. On *Corallina officinalis*. Peveril Point, Swanage, Sept. 1888. On *Rhodymenia palmata* and *L. saccharina*, Swanage, Sept. 1897; *E. A. B.*

20. *CHILIONEMA NATHALIÆ* Sauv. *l. c.* p. 103, figs. 23-24. On *Rhodymenia palmata*, Swanage, Sept. 1898, *E. A. B.* This species is frequently found growing in company with *Chilionema ocellatum* Sauv. (= *Ascocyclus ocellatus* Reinke), to which it appears to be united by many intermediate forms. Many, if not all, of the specimens referred by Mrs. Griffiths and Harvey to *Myrionema*

*Lechlancherii*, which I have seen, really belong to this species; and it appears to me that this, and not the form of *M. strangulans* (= *M. vulgare* Thur.) with plurilocular sporangia, as supposed by Prof. Sauvageau, is the plant which Harvey called *M. Lechlancherii*. It is quite probable, however, that Harvey referred plants belonging to more than one species to his *M. Lechlancherii*. Chauvin's *Rivularia Lechlancherii* is, no doubt, *Myrionema strangulans* Greville = *M. vulgare* Thuret.

21. *C. REPTANS* SAUV. *l. c.* p. 108, fig. 25. *Ectocarpus reptans* Crouan, *Florule du Finistère*, p. 161, pl. 24, gen. 158, figs. 3 & 4. On *Fucus serratus*, Swanage, Sept. 1898; *E. A. B.* The *Ascocyclus reptans* of Mr. Holmes's and my Revised List is not referable to the present species, but to *Hecatonema reptans* Sauv.

22. *ASCOCYCLUS HISPANICUS* SAUV. *l. c.* p. 115, figs. 26-37. On *Saccorhiza bulbosa*, Swanage, Sept. 1898, *E. A. B.*

23. *A. SPHÆROPHORUS* SAUV. *l. c.* p. 120, figs. 28-29. On *Rhodymenia palmata*, Weymouth, Sept. 1892, and Swanage, Sept. 1898; *E. A. B.* A common and abundant species at Swanage, often covering a considerable portion of the upper part of a *Rhodymenia* frond, at first with numerous isolated individuals, but finally with an almost continuous brown layer made up of innumerable *Ascocyclus* plants growing side by side, and more or less overlapping each other.

24. *ECTOCARPUS* (?) *HELOPHORUS* ROSENVINGE, *Deuxième Mém. sur les Alg. mar. du Groenland*, p. 82, figs. 17-18. Endophytic in the frond of various species of *Cruoria* and *Petrocelis*, Berwick, Jan. 1887; *E. A. B.* Cumbrae, Nov. 1892; *G. Brebner*.

25. *ENDODICTYON INFESTANS* GRAN, *Kristianiafjordens Algeflore*, i. p. 47, tab. i. figs. 12-17. Parasitic in species of *Alcyonidium*, Southsea, Nov. 1897; *E. A. B.* The resemblance between this plant and Kuckuck's *Phæostroma Bertholdi*, as Herr Gran has himself pointed out, is very great; indeed, the parasitic habit and the fact that the branching spreads in all directions through the substance of the host, while *Phæostroma* is epiphytic and its growth dorsiventral, are almost the only marks by which the two plants can be separated.

26. *PUNCTARIA CRISPATA* = *PHYCOLAPATHUM CRISPATUM* KÜTZ. *Phyc. germ.* p. 299 (1843); *Id.*, *Tab. Phyc.* vi. t. 49. *Punctaria laminarioides* Crouan, *Fl. Finistère*, p. 167 (1867). Fronds deep brown, 3-20 in. long and about as broad, shortly stipitate; stipe cylindrical, slender, inconspicuous, 2 or 3 lines long, suddenly expanding into an oblong, orbicular or irregularly shaped lacerate-erose frond, with strongly crisped margins. Lamina 150-200  $\mu$  thick, formed of 6-8 layers of cells. Internal cells large and colourless; superficial cells small and coloured. Substance firm and coriaceous. Unilocular sporangia scattered, immersed, formed from the superficial cells. Clusters of hairs absent (or not observed?).

On *Zostera*, Scilly Islands, June, 1899; *E. George*.

The above description applies to some very curious and interesting specimens sent to me last year by Mr. Edward George from

the Scilly Islands, where he was spending his summer holiday. Except in size, they agree well with Kützing's figures and description of *Phycolapathum crispatum*, an imperfectly known species which seems to me identical with *P. laminarioides* Crn., described twenty-four years later. This species must not be confounded with the form of *P. latifolia* which Mr. Holmes and I have called var. *laminarioides* (Holmes & Batters in *Annals of Botany*, vol. v. p. 523), specimens of which are sometimes 18 in. long and 6 in. wide, but which in all other respects agree with the ordinary form of the species. The structure of the frond, which, as Prof. J. G. Agardh has pointed out (*J. Ag. Analecta Algol. Cont.* iii. p. 7), is more like that of an *Asperococcus* than a *Punctaria*; the dark colour, thick substance, strongly crisped margins of the frond, the absence of clusters of hair, and the slight differentiation of the sporangia, which are with difficulty distinguished from the superficial cells, render *P. crispata* readily distinguishable from *P. latifolia*. Perhaps *P. crispata* may be regarded as the type of a subgenus for which the name *Phycolapathum* might be retained.

27. *PHÆOSACCION COLLINSII* Farlow, Notes on New England Algæ, Bull. Torr. Botan. Club. vol. ix. 1882, p. 65; Rosenvinge, Groenlands Havalfer, p. 874, tab. i. fig. 5 & fig. 20 on p. 875. On the leaves of *Zostera marina*, Cumbrae, March, 1894; Mrs. Robertson. This very interesting species, which had previously only been recorded from North-Eastern America and Greenland, was added to our marine flora by Mrs. David Robertson in 1894. She has since found it on several occasions at Cumbrae. It makes its appearance early in spring, and by the end of April has entirely disappeared. The Cumbrae specimens agree well with the specimens distributed in Hauck & Richter's *Phykotheke universalis*, no. 12, and with the excellent figures given by Rosenvinge. The plant when fresh is of a yellowish brown colour, but is very apt to turn green when dried.

#### RHODOPHYCEÆ.—1. BANGIACEÆ.

28. *Neevea*, gen. nov. Thallus microscopic, endozoic, filamentous, procumbent, creeping in the substance of *Flustra foliacea*, composed of violet or rosy purple cells arranged in a single or two or more parallel rows within a gelatinous sheath; filaments irregularly branched, in the older parts of the thallus united into a compact pseudoparenchymatous layer one or more cells in thickness. Cells at first oval, becoming angular and very irregular in shape by mutual pressure. Reproduction effected by the escape of the cells from the gelatinous sheath, and their subsequent development into new individuals?

*N. repens*, sp. unica. Fronds from .25–1.5 mm. in diameter; filaments from 12–36  $\mu$  in breadth, in some parts containing but a single row of cells, in others 2–8 rows; cells 6–15  $\mu$  long, 4–9  $\mu$  broad. Tab. 414, figs. 18–22. Endozoic in *Flustra foliacea*, Deal; J. T. Neeve.

In the spring of the present year Mr. John T. Neeve found on the shore at Deal some specimens of *Flustra foliacea* with hardly

perceptible pink stains on them; these he very kindly sent to me for identification. On examining the stains with the microscope I found that they were caused by the innumerable pink discs of an *Erythropeltis*. In studying this I made many sections of the *Flustra*, and it was then that I found in the interior of the Bryozoan the plant above described. The patches are of a clear violet or rosy pink colour, but can only be seen by the naked eye when the semitransparent *Flustra* is held against the light. The filaments radiate from the openings through which the tentacles of the living Bryozoan are protruded. In the central portion of the thallus they are always fused into a compact pseudoparenchymatous layer one or more cells in thickness, and it is only at the edges of the expansion that they are free. In many cases, however, the thallus is entirely composed of a membranous layer, the filamentous nature of the various branches by the union of which it is formed being very difficult to trace. The procumbent habit, parasitic mode of life, and the union of the filaments into a membranous layer distinguish this genus from *Goniotrichum*, the irregular form of the layer from *Erythropeltis*. The genus is named after Mr. J. T. Neeve, who, it may be remembered, is also the original discoverer of *Gonimophyllum Buffhami*, described in this Journal for 1892 (p. 65, t. 319).

29. ERYTHROTRICHIA CILIARIS Batt. (non Thuret nec Berthold nec aliorum) = BANGIA CILIARIS Carm. in Hook. Br. Fl. ii. p. 316. Fronds dark purple, 500–800  $\mu$  long, 10–30  $\mu$  broad (in specimens from Arbroath 1–2 mm. long and 10–200  $\mu$  broad), several arising from a monostromatic cellular disc; discs roundish, 50–200  $\mu$  in diameter; cells roundish-polygonal, 15–24  $\mu$  in diameter. Spores about 18  $\mu$  in diameter. Appin, about 1820; *Capt. Carmichael*. Arbroath, Sept. 1890; *E. M. Holmes*. Scilly Islands, June, 1899; *E. George*.

Hitherto botanists have not been agreed as to the identity of Carmichael's *Bangia ciliaris*. Kützing thought it was a variety of *Erythrotrichia carnea* (= *Goniotrichum ceramicola* Kütz.). Thuret, on the other hand, recognized in *Porphyra Boryana* Mont. the true *B. ciliaris*, while still more recently Berthold, not unnaturally, mistook a plant I propose to call *E. Bertholdii* for Carmichael's species. Crouan, Hauck, and most other recent writers unhesitatingly follow Thuret in uniting *E. Boryana* with *B. ciliaris*, which they regard as a species of *Porphyra*. I am uncertain what the *B. ciliaris* of the Nereis Boreali-Americana really is, but the specimens from Bridgeport, Connecticut, distributed by Collins in the *Phykotheke universalis* no. 655, appear to me to be referable rather to *E. investiens* than to *B. ciliaris*. Nothing but an inspection of Carmichael's original specimens preserved in the Hookerian Herbarium at Kew could clear up the matter, and I am much indebted to Sir William Thiselton Dyer for permission to examine them. To the naked eye the *Bangia* forms a hardly perceptible dark border to the *Zostera* leaves on which it grows; but on the fragment of the host plant examined I found it fairly abundant, although mixed with species of *Ectocarpus* and *Chantransia*. Harvey's

figure (Phyc. Brit. pl. 322), though the colouring should have been purple, is, so far as it goes, a correct representation of the erect fronds, the grouping of them even suggesting that they arise from a common basal disc; but none is figured, nor is the nature of the attachment mentioned in the description. I found the short purple filaments described by Carmichael and Hooker always sprung from a well-developed monostromatic cellular basal disc, but I also found many apparently quite mature discs which bore no erect filaments, and which in every way resembled Berthold's figure of the discs of his *Erythrotrichia discigera*. The only other British specimens that I have seen that I can certainly refer to the same species are some gathered by Mr. E. M. Holmes on *Corallina officinalis* at Arbroath in September, 1890, and some others on *Zostera* sent to me last year from the Scilly Islands by Mr. E. George.

The specimens from Appin and Scilly are similar in all respects; those from Arbroath are longer and broader than the others. It is evident that Carmichael's plant cannot be referred either to *Erythrotrichia Boryana* Berth. or *E. ciliaris* Berth., but is, on the other hand, very closely related to *E. discigera* Berth. In *Die Natürlichen Pflanzenfamilien* of Engler and Prantl the late Prof. F. Schmitz has made *E. discigera* the type of a new genus—*Erythropeltis*—characterized by the horizontally expanded frond and marginal growth. In the diagnosis of the genus he makes no mention of erect filaments, and states that cell-division is confined to the marginal cells, and does not take place in any other cells of the thallus. Berthold, on the other hand, describes his *E. discigera* as very like *E. ciliaris*, but the filaments slightly more slender, not half as long, and arising in groups from a monostromatic disc, which is sometimes alone present. If Schmitz did not intend to exclude from his genus *Erythropeltis* plants which bore erect filaments, although only occasionally, it is difficult to see why he has excluded *E. obscura*, in which the disc is often all that is present. ("Aufrechte Thallom, höchstens 3 mm. lang, gewöhnlich kürzer, oder auch fehlend (in Sommer vielfach)," Berthold, Bang. p. 26.) I am inclined to think that Schmitz overlooked the fact that erect filaments are present in *E. discigera* Berth., and was consequently mistaken in supposing the specimens on which he founded the genus *Erythropeltis* belonged to the same species as Berthold's plant, though resembling it in many particulars. There can, I think, be no doubt that either *E. discigera* Berth. or *E. obscura* Berth. (which is said to differ from it by the darker colour, relatively larger cells, and occasional branching) rather than *E. ciliaris* Berth. is the plant described by Carmichael fifty years before, under the name *Bangia ciliaris*.

30. *E. BERTHOLDII* Batt. = *E. CILIARIS* Berth. *Bangiaceæ*, p. 25 (non *Bangia ciliaris* Carm.). On *Zostera*, Scilly Isles, June, 1899; *E. George*. Amongst the plants sent to me last summer from the Scilly Isles by Mr. Edw. George were some leaves of *Zostera marina* covered with an *Erythrotrichia* which in every way agrees with Berthold's description of *E. ciliaris*. The cylindrical filaments are very slender below, gradually tapering from 10–12  $\mu$  at the base to a width of 60–70  $\mu$  in the widest part. A transverse section of the

upper part of the frond shows 4-8 cells radially arranged. Each individual filament is attached singly to the *Zostera* leaf by its slightly expanded basal cell. In many respects the plant resembles a *Bangia*, but the spores are formed exactly as in the other species of *Erythrotrichia*. As has been shown above, Berthold is wrong in referring the plant to *Bangia ciliaris* Carm. (for which the name *Erythrotrichia ciliaris* must be retained). I have been compelled in consequence to give it a new name, and have called it after the botanist who first clearly described it.

31. *E. BORYANA* Berth. Bang. p. 25. Var. *CRISPA*, nov. var. Fronds pale purple, 10-20 mm. long, very slender below and formed of a single cell-row 10-15  $\mu$  broad, which by longitudinal and transverse division of the cells gradually expands into a very thin, flat, monostromatic frond 200-800  $\mu$  broad; margins crenate, more or less crisped and curled. On *Zostera*, in company with *E. Bertholdii*, &c., St. Mary's, Scilly, June, 1899; *E. George*.

I found this very pretty variety of *E. Boryana* growing in company with the preceding, on *Zostera* leaves sent from the Scilly Isles by Mr. George. The fronds are very much longer and broader than those of any other British specimens of the species that I have seen; and the margins, instead of being quite entire ("margini integerrima"), are notched and crisped, sometimes so much so that the frond appears spirally twisted.

32. *ERYTHROPELTIS DISCIGERA* Schmitz in Engler & Prantl, Pflanzenfamilien, Theil 1, Abtheilung 2, p. 313. Var. *FLUSTRÆ*, nov. var. Fronds rose-coloured, horizontally expanded, orbicular, becoming confluent and irregular in outline; discs 50-150  $\mu$  and more in diameter; cells rounded-polygonal, oblong or irregular in outline, 6-9  $\mu$  long by 3-6  $\mu$  broad; spores globose, about 9  $\mu$  in diameter. On *Flustra foliacea*, Deal, Nov. 1899; *J. T. Neeve*.

In a former part of this paper I have mentioned that Mr. J. T. Neeve, of Deal, sent me some *Flustræ* marked with hardly visible pink stains caused by the fronds of an *Erythropeltis*. Since last November he has kept me constantly supplied with fresh material. I have examined probably many hundred discs, but on none of them have I found any trace of erect fronds. The spores are formed in an exactly similar manner to those of *Erythrotrichia*. On several occasions I found that they had germinated, and begun to divide on the surface of the frond, just above the mother-cell from which they had been discharged, giving to it the appearance of containing several spores. I have little or no doubt that this plant is really a form of Schmitz's *Erythropeltis discigera*; but I cannot think it the same as *Erythrotrichia discigera* Berthold, although the fronds in many respects resemble the discs of that species when no erect fronds are produced.

## II.—FLORIDÆ.

33. *CHANTRANSIA ENDOZOICA* Darbish. in Bericht. der Deutsch. Bot. Gesellsch. 1899, Band xvii. p. 13, taf. 1. On *Alcyonidium gelatinosum* L., Valencia, Co. Kerry, Ireland; *Prof. F. E. Weiss*. On *A. hirsutum*, Alnmouth; *Dr. G. S. Brady*. This interesting

species has recently been found growing in company with a number of other minute algæ on *A. hirsutum* at Alnmouth by Dr. G. S. Brady, F.R.S. So abundant were the parasitic plants that the creature itself was quite masked by its deep red investment.

34. *HALYMENIA LATIFOLIA* Crn. Florule du Finist. p. 142, pl. 14, gen. 96. Blackhead, Antrim, Ireland; *Dr. Dickie*. In the National Herbarium at the British Museum there are two specimens of this species mounted on the same sheet and marked in the handwriting of the late Prof. G. Dickie, "Schizymenia Dubyi. Blackhead." The resemblance to *S. Dubyi* is of course only superficial; reference to the structure of the frond at once shows to what genus the plant belongs. The simple, quite undivided obovate frond distinguishes this species at sight from *Halarachnion ligulatum*.

35. *HELMINTHOCLADIA HUDSONI* J. Ag. Sp. Alg. ii. p. 413; iii. p. 506. Tab. nost. figs. 15-16. Cullercoats, July, 1853; *Miss Dickinson*. On examining some small specimens of this species, scarcely more than an inch long, gathered at Cullercoats many years ago by Miss Dickinson, of Norham, I found that they bore cruciate tetraspores in abundance on the peripheral filaments. I am not aware that tetraspores have ever been observed previously in the genus *Helminthocladia*. It is worthy of note that the tetrasporic plants are very small and slender, compared with those bearing cystocarps, and it appears to me not improbable that the tetraspores (of *Nemalion*, *Helminthora*, &c.) may be found on similarly dwarfed specimens.

**Rhodophysema**, gen. nov. Fronds gregarious, minute, dark red, hemispherical, globose or pear-shaped, sometimes more or less plicate-rugose, composed of a medullary stratum of large, roundish-angular, colourless cells, becoming smaller towards the periphery, and a cortical portion formed of a few layers of small, coloured, closely packed cells, each containing several small disc-shaped chromatophores; tetraspores cruciate, borne in external convex sori, accompanied by slender, rigid, falcate, few-celled paraphyses. Cystocarps and antheridia unknown.

36. **R. Georgii**, sp. unica. Fronds purplish red, 100  $\mu$ -1 mm. in diameter, clustered in dense masses, more or less confluent, smooth, somewhat lubricous; cortical cells seen from above roundish polygonal, about 6  $\mu$  in diameter; sori 50-300  $\mu$  broad; tetraspores oblong, sessile, 20-36  $\mu$  long, 14-18  $\mu$  broad; paraphyses 3-4-celled, falcate, somewhat clavate, cells 6-9  $\mu$  long, 3-4  $\mu$  broad; antheridia and cystocarps unknown. Tab. nost. figs. 8-13.

On *Zostera*, fringing the margins of the leaves with an almost continuous purplish-red border. Scilly Islands, June, 1899, and May, 1900; *E. George*.

I detected this very curious and interesting alga on some leaves of *Zostera marina* sent to me from the Scilly Islands last year by Mr. George. Very few specimens, and those small and scattered at long intervals along the margin of the *Zostera* leaves, were found last year; but in the spring of the present year Mr. George has found the plant in abundance, forming an almost unbroken border

to the *Zostera* leaves, and in most cases accompanied by *Punctaria latifolia* and species of *Erythrotrichia* and *Ectocarpus*. The fronds at first appear as minute convex protuberances on the margin, or more rarely on the surface, of the *Zostera* leaf; but they soon swell into globose or pear-shaped fronds, occasionally solitary, but much more commonly clustered in dense masses for a distance of several inches along the edge of the upper portion of the leaf. The sori are borne on fronds of all ages, and greatly resemble those of *Rhododermis*. The systematic position of the genus is doubtful.

I have dedicated the species to my friend Mr. George, an indefatigable collector, to whom, as this paper proves, I am deeply indebted not only for beautiful specimens of the present plant, but for other rare seaweeds from the Scilly Islands and elsewhere. Mr. George's fine collection of marine algæ, with its sets of magnificent specimens, the reward of assiduous collecting continued for many successive years, is but little known to botanists; but it is in vain that I have repeatedly urged my friend to publish his notes.

**Erythrodermis**, gen. nov. Fronds membranaceous, horizontally expanded, orbicular or indefinite in outline, adhering closely to the substratum, monostromatic or composed of very few layers of polygonal cells arranged in dichotomous rows, flabellately radiating from several points. Chromatophores small, disc-shaped, several in each cell; tetraspores cruciate, arranged in moniliform, simple or forked filaments, which are packed together in external convex nemathecium. Antheridia and cystocarps unknown.

37. **E. Alleni**, sp. unica. Characters those of the genus. Fronds 6-7 mm. in diameter, and about 15  $\mu$  in thickness; cells 6-12  $\mu$  long, 6-9  $\mu$  broad; nemathecium slightly elevated, about 1 mm. in diameter; nemathecium filaments simple or branched, each formed of 4-6 tetraspores, 9-12  $\mu$  in diameter. Tab. nost. figs. 3-7.

On pieces of broken earthenware dredged from 4-6 fathom water, Queen's Ground, Plymouth, March, 1900.

I found this interesting and beautiful little plant on some bits of broken earthenware sent to me, amongst some shells, stones, &c., with algæ attached to them, from the Plymouth Laboratory. The fronds resemble those of *Rhododermis elegans* in size, colour, and structure, but the tetraspores are borne in true nemathecium, not unlike those of *Phyllophora membranifolia*. I do not know of any other incrusting alga with similar nemathecium. Until the cystocarps are discovered, the systematic position of the genus must remain doubtful, like that of *Rhododermis*. I have dedicated the species to Mr. E. J. Allen, the able Director of the Plymouth Laboratory.

38. **DERMATOLITHON HAPALIDIODES** Foslie = **MELOBESIA HAPALIDIODES** Crn. Fl. Finist. p. 150. Berwick-on-Tweed, Jan. 1887; *E. A. B.* West coast of Ireland; *Foslie*.

39. **MELOBESIA ZONALIS** Foslie = **HAPALIDIUM ZONALE** Crn. Fl. Finist. p. 149. Plymouth, April, 1897; *E. A. B.*

40. **LITHOPHYLLUM CROUANI** Foslie, "Some new or critical Lithothamnium," p. 17. Berwick, Feb. 1889; *E. A. B.*

I take this opportunity of illustrating, together with the new genera described in this paper, some algæ recently described by me in this Journal, but of which no figures were given at the time of publication.

EXPLANATION OF PLATE 414.

Figs. 1-2. *Porphyrodiscus simulans* Batt.:—1. Transverse section of frond through a sorus  $\times 50$ . 2. Portion of same,  $\times 500$ .

Figs. 3-7. *Erythrodermis Alleni*:—3. Transverse section of frond with nemathecium,  $\times 200$ . 4-5. Simple and branched nemathecium filaments,  $\times 500$ . 6. Transverse section through edge of sorus,  $\times 500$ . 7. Surface cells,  $\times 300$ .

Figs. 8-13. *Rhodophysema Georgii*:—8. Plant, nat. size, on *Zostera* leaf. 9. Cluster of fronds,  $\times 10$ . 10. Section of frond,  $\times 50$ . 11. Ditto of young frond,  $\times 50$ . 12. Tetraspores and paraphyses,  $\times 500$ . 13. Surface cells,  $\times 200$ .

Fig. 14. *Trailliella intricata* Batt.:—14. Branch with tetraspores,  $\times 100$ .

Figs. 15 & 16. *Helminthocladia Hudsoni* J. Ag.:—15. Tetrasporic plant, nat. size. 16. Peripheral filaments with tetraspores,  $\times 600$ .

Fig. 17. *Rhodochorton Brebneri* Batt.:—17. Tetrasporic branch,  $\times 300$ .

Figs. 18-22. *Neevea repens*:—18. Plant *in situ*,  $\times 10$ . 19. Portion of same,  $\times 300$ . 20. Part of frond after the escape of the spores,  $\times 300$ . 21. Germinating spores,  $\times 300$ . 22. Young frond,  $\times 300$ .

RANUNCULUS ACER L.

BY FREDERICK TOWNSEND, M.A., F.L.S.

IN the *Journal of Botany* for 1889, p. 140, I published a short paper giving the late Prof. Kerner's views of the specific characters and forms of *Ranunculus Steveni* and *R. acer* L.\* He recognized these as two species, one with and one without a creeping root, and described three forms of the latter, one of which—viz. *R. Friesianus* Jord.—he considered identical with *R. Steveni* Andrz., whereas other botanists believe them to be distinct and to represent two subspecies.

Dr. Boswell Syme, in the third edition of *English Botany*, seems to have recognized three forms or subspecies, though he corrects his naming in his Report of the Lond. Bot. Exch. Club, reprinted in *Journ. Bot.* 1869, p. 137. The third subspecies alluded to is *R. Friesianus* Jord. *Engl. Bot.* ed. iii. vol. i. p. 39, the first two being *R. Boræanus* Jord. and *R. Steveni* Andrz. Messrs. Rouy and Foucaud, in their *Flore de France* now in course of publication, also recognise the same three subspecies, and their arrangement of these and of several forms seems to be worthy of notice by our English botanists. The three subspecies are *R. Boræanus* Jord., *R. Steveni* Andrz., and *R. Friesianus* Jord.

Under Subspecies I., *R. Boræanus*, Messrs. Rouy and Foucaud describe four forms, viz.:—(1) *R. Boræanus* Jord. (pro specie), with one var.,  $\beta$  *tomophyllus* Jord. (pro specie); (2) *R. rectus* Bor. (pro specie), with one subvar., *pumilus*; (3) *R. stipatus* Jord. (pro specie); and (4) *R. pascuicolus* Jord. (pro specie).

\* A clerical error in that paper may here be noticed and corrected: line 18 from the top, for "Linneus" read "Fries."