

branches outer spathe-valves. A very distinct species. The flowers are milky white, with a tinge of blue and violet.

60. *Urginea virens*, sp. n. Gracilis, erecta, 10–20 cm. alta; bulbo ovoideo, 2–3 cm. longo; foliis sub anthesi nullis vel jam emarceidibus, linearibus carnosulis, glabris, scapo brevioribus, c. 2·5 mm. longis; scapo stricto vel plus minus flexuoso, glaberrimo nudo; spica subcorymboso-abbreviata pluriflora; bracteis minutis lanceolato-deltaideis patulis, dimidio inferiore calcare deflexo filiformi, c. 2·5 mm. longo ornatis; pedicellis inæquilongis filiformibus, glabris, usque ad 1·5 cm. longis; perianthio 0·4–0·5 cm. longo, 5-foliato, foliolis oblongis obtusis, 1-nerviis, 0·2 cm. latis; staminibus suberectis, filamentis, anguste linearibus, apicem versus attenuatis, glabris, basi foliolorum insertis, 0·2 cm. longis, antheris circuitu subquadrato-rotundatis, basi apiceque excisis, 1·5 mm. longis; ovario ovoideo-glabro; stylo subfiliformi apicem perigonii attingente.

In regione austro-occidentali: In collibus carrooideis montis "Packhuisberg," in ditone Clanwilliam, "satis frequens," alt. c. 2000 ped., Jan. 1897; *L. C. Leipoldt*. In arenosis montium pone Tweefontein, in terra Konde Bokkeveld, alt. c. 5500 ped., 24 Jan. 1897; *R. Schlechter*, No. 10127.

My own specimens are not yet so well developed as Mr. Leipoldt's, but bear now and then a withered leaf or two at the base, thus enabling me to give a better description than would have been possible with either of them alone. The subumbellate inflorescence and long pedicels are a good mark of our species. The whitish flowers have a green nerve, and are tinged with green outside.

NEW OR CRITICAL BRITISH MARINE ALGÆ.

By E. A. L. BATTERS, B.A., LL.B., F.L.S.*

DURING the last twelve months the British marine algal Flora has been enriched by the addition of several new species, the most important of which are recorded below. In the *Bulletin de l'Herbier Boissier* for August, M. Chodat has described two new perforating algæ from the Isle of Man. Some new species are to be found in the recently published fasciculus ix. of Mr. Holmes's important *Algæ Britannicæ rariores exsiccata*. From Mr. Geo. Brebner I have received some very interesting specimens, amongst them several undescribed species. A few more species must be added to this list as the result of my own collecting.

MYXOPHYCÆ.

1. *APHANOTHECE PALLIDA* Rabenh. *Flor. Europ. Alg.* vol. ii. p. 64. Specimens of this species, collected at Weymouth, have been distributed by Mr. Holmes in his *Algæ exsiccata*.

* See *Journ. Bot.* 1895, 274–6; 1896, 6–11, 384–390.

2. *HYELLA VOLUTICOLA* Chodat in *Bull. de l'Herb. Boissier* t. v. No. 8 (August, 1897), p. 716.

This species, which was found by M. Chodat on the coast of the Isle of Man, is said to differ from *Hyella caspitosa* Born. et Fl. in its pinkish-purple colour, a slight difference in the structure of the sheath, the shorter branches, and the absence of true sporangia. From M. Chodat's account of it there can be little or no doubt that it is the same plant that I have called *Hyella caspitosa* var. *nitida* (vide *Journ. Bot.* 1896, p. 385). More fortunate, however, than M. Chodat, I observed on my specimens several true sporangia very similar to those of *Hyella caspitosa*. With regard to the other characters, the normal blue-green or greyish-purple colour of many of the *Myxophyceæ* under certain circumstances becomes rose-purple, as in the variety *purpurea* of *Calothrix confervicola*. The length of the branches in true *Hyella caspitosa* is very variable, and no reliance can be placed on the shortness of the branches as a specific character. As to the differences in the structure of the sheath they are at most but slight. Although, as I have already stated (*Journ. Bot. l.c.*), I am not prepared to say that *H. voluticola* may not be specifically distinct from *H. caspitosa*, I prefer, in the present state of our knowledge, to regard it as a well-marked variety of the earlier described species.

3. *SPIRULINA VERSICOLOR* Cohn in Rabenh. *Fl. Eur. Alg.* vol. ii. p. 292. First noticed by Mr. Brebner on the walls of tanks in the Plymouth Marine Laboratory, but subsequently found by him on the shores of the Barn Pool, forming thin layers on the surface of the mud. Prof. Phillips informs me that he too has found the same species at Bangor.

4. *PLECTONEMA NOSTOCORUM* Bornet in Born. et Thur. *Notes Algologiques* fasc. ii. p. 137. Endophytic in the gelatinous fronds of *Rivularia bullata*, Torquay, *E. A. B.*

CHLOROPHYCÆ.

5. *ULVELLA FUCICOLA* ROSENIV. var. *GLOBOSA*, nov. var. Fronds minute, 90-400 μ in diameter, scattered, solitary or in groups of twos or threes, globose or hemispherical, firm, smooth. Thallus at first monostromatic, finally composed of three, four, or more layers of cells. Cells 15-45 μ long by 7-9 μ wide. Chromatophores and sporangia as in the typical form. Hab.: Epiphytic on the filaments of *Sphaclaria racemosa*, Berwick, *E. A. B.*

At first the fronds of this pretty little epiphyte are disc-shaped and monostromatic, and so like those of *Pringsheimia scutata* that it is not always easy to say to which species a specimen belongs. The centre of the disc, however, soon becomes polystromatic, and the fronds assume a more or less globular form, which is a marked characteristic of the mature plant. These globose, bright grass-green fronds are either solitary or collected into groups of three or four individuals, and are either attached laterally to the filaments of the host-plant, or entirely surround them. The variety differs from the typical form in the thicker, more globular frond, slightly

larger cells, and in the basal cells showing no tendency to penetrate between the cells of the host-plant.

6. *EPICLADIA FLUSTRÆ* Reinke var. *PHILLIPSII*, nov. var. Fronds dark grass-green, endozooic in the gelatinous outer coating of *Aleyonidium gelatinosum*. Patches indefinite in outline, confluent, eventually covering the entire surface of the host. Cells of the free filaments cylindrical, much longer than broad, usually 6–18 μ long by 3–9 μ wide, those of the central pseudo-parenchymatous portion of the layer polygonal and nearly isodiametric, 3–12 μ in diameter. Hab.: Bangor, March, 1896, *Prof. R. W. Phillips*.

In this variety the cells of the free filaments are much longer and more slender than in the typical form of the species, and the patches, instead of being small and isolated, are more or less extensive and confluent, finally covering the surface of the host, to the exclusion of everything else, with its dark green fronds. The variety is always either entirely or to a very large extent endozooic, growing immersed in the gelatinous outer coatings of the host. It may be well to say that the typical form is by no means always epizooic, as was at one time supposed, but frequently grows more or less deeply immersed in the substance of the host.

7. *GOMONTIA MANXIANA* Chodat in *Bull. de l'Herb. Boissier* t. v. p. 715. This species, which was found by Dr. Chodat in the exterior layer of shells gathered last year near Castletown, in the Isle of Man, is said to have fronds like those of *Siphonocladus voluticola* Hariot, *i. e.* the branches are not separated from the cells, from which they arise by a basal septum. The characters which separate this species from *Gomontia polyrhiza* Born. et Fl. are the more slender habit, the acute apices of the branches, the swollen joints, and the more slender differently shaped sporangia.

I have frequently gathered at Cumbræ and elsewhere specimens of a *Gomontia* which agrees well with M. Chodat's description of *G. manxiana*, indeed this is the form commonly met with on the west coast of Britain. The shape and size of the sporangia and the form of the apical cells of *Gomontia polyrhiza* are, however, liable to so great variation that they cannot be safely relied on as specific marks, and I am, therefore, inclined to think that *G. manxiana* may, after all, turn out to be nothing more than a form of the very variable *G. polyrhiza*.

FUCOIDEÆ.

8. *PILEOSTROMA ÆQUALE* Kuck. *Bemerk. zur Marin. Algeveg. von Helgoland* ii. p. 385 (*aus Wissenschaftliche Meeresuntersuchungen, herausgegeben von der Kommission zur Untersuchung der Deutschen Meere, &c., Neue Folge, Band ii. Heft 1*). *Streblonema æquale* Oltm. The late Mr. T. H. Buffham was the first to notice this plant, which he described as the plurilocular sporangia of *Chorda filum*; it is only justice to his memory, however, to say that his preparations did not show the endophytic filaments of the parasite, and were in other respects defective, so that his mistake cannot be wondered at. Dr. Oltmann first recognized the plant as a true

parasite, and gave to it the name *Streblonema æquale*. Dr. Kuckuck has recently removed it on account of the peculiar form of the plurilocular sporangia to his genus *Phæostroma*. Specimens of this species are contained in fasc. ix. of Mr. Holmes's *Alg. Easicc.*

9. *PHÆOSTROMA PROSTRATUM* Kuck. in *Bot. Zeit.* 1895, p. 185. (*Phæocladia prostrata* Gran. *Algeveg. Tönsbergfjorden.*) I refer to this species a few specimens of a *Phæostroma* which I gathered at Cumbrae in 1891. The fronds are not nearly so much branched as in *P. pustulosum*, and form a much more open layer. The plurilocular sporangia, which are formed, as in *P. pustulosum*, from cells in the continuity of the filaments, are hardly larger than the vegetative cells, and consequently are only very slightly raised above the surface of the layer; they are frequently very numerous, all the cells of a branch being not unfrequently transformed into sporangia.

10. *MIKROSYPHAR PORPHYRÆ* Kuck. *Bemerk. zur Mar. Algeveg. von Helgoland* ii. *l.c.* p. 381. Folkestone, June, 1896, *E. A. B.* This minute species forms yellowish brown stains, which to the naked eye are not unlike the young fronds of *Myrionema strangulans* on old fronds of *Porphyra laciniata*. The thallus is composed of slender, densely branched, creeping filaments, which are entirely immersed in the substance of the host-plant. The plurilocular sporangia, which differ but little in form and size from the vegetative cells, push their way to the surface of the host-plant, rising slightly above it.

11. *MIKROSYPHAR POLYSIPHONÆ* Kuck. *l.c.* p. 381. Berwick, June, 1895, *E. A. B.* This species, which differs but little, except in the size of the cells, from *M. Porphyræ*, is frequently found in the cell-walls of *P. urceolata* and *C. polyspermum*; in general appearance it resembles *Endoderma viridis*, except in colour and, of course, in fructification.

12. *Ectocarpus Microspongium*, nov. spec. Fronds minute, forming yellowish-brown, compact, hemispherical, cushion-like patches about 1 mm. in diameter on the fronds of *Ralfsia*. Filaments much branched, irregularly nodose and inextricably matted together below, cylindrical and free above. Branching irregularly dichotomous and spreading below, secund and erect above. Cells 9–15 μ in diameter and 9–12 μ long. Plurilocular sporangia often very numerous, arranged secundly on the upper free branches, oblong-lanceolate in form, 70–105 μ long by 12–15 μ wide, sessile, or borne on very short one- or two-celled stalks. Long colourless hairs present on the upper branches. Hab.: Redding Point and Drake's Island, Plymouth, September, 1896, *Geo. Brebner*.

This interesting species appears to be quite distinct from any described *Ectocarpus*. The minute cushion-like fronds are either isolated or collected into groups, one frond pressing closely against another, but never losing its hemispherical form. To the naked eye the plant exactly resembles *Microspongium gelatinosum*, or very minute specimens of *Petrospongium Berkeleyi*. Sections made through one of these cushions so greatly resemble those of *P.*

Berkeleyi that, were it not for the entire absence of any investing gelatinous substance, one might feel tempted to consider the plant the form of that species bearing plurilocular sporangia. The filaments in the lower portion of the cushion are inextricably interlaced in a manner very similar to that of *Petrospongium*; the cells of the free filaments, however, are cylindrical, not swollen in the middle as in that genus. Hyaline hairs are scattered amongst the erect free filaments. The ultimate ramuli are always secund, and usually more or less closely pressed against the branch from which they arise. The plurilocular sporangia are somewhat like those of *E. confervoides*, but longer, and always terminate in an obtuse point. Like the ultimate ramuli they are very erect, and form a very acute angle with the branch on which they are borne; they are frequently very numerous, most of the ultimate ramuli each bearing three or four sporangia, secundly arranged, and springing from cells contiguous to each other.

13. *SPHACELLA SUBTILISSIMA* Reinke, in *Berichten der Deutschen Botanischen Gesellschaft*, Band viii. Heft. 7 (1890), p. 206, var. *ANGLICA*, nov. var. Fronds forming minute tufts on *Ralfsia* and *Hildenbrandtia*, between the cells of which the lower portion of the filaments penetrate. Vegetative characters like those of the typical form. Unilocular and plurilocular sporangia borne on the same individuals. Plurilocular sporangia cylindrical, slender, terminal or intercalary, hardly broader than the filaments, from which they are formed. Unilocular sporangia as in the typical form. Hab.: Drake's Island, Plymouth, January, 1897, *Geo. Brebner*.

Mr. Brebner's specimens of this plant agree well with Prof. Reinke's description and figures, with the single exception that both plurilocular and unilocular sporangia are borne on the same individuals. In form the plurilocular sporangia, which, I believe, have never before been observed, are very like those of *Leptonema*, and but slightly differentiated from the vegetative cells. After the discharge of the spores, the supporting branch continues its growth through the empty sporangium; this happens in the case both of unilocular and plurilocular sporangia. Mr. Brebner was of opinion that his specimens should be referred to the genus *Ectocarpus* as a new species, but spirit-material, especially the sporangia, show a slight temporary blackening when treated with eau de Javelle, which never happens in the case of any true *Ectocarpus*. This temporary blackening under the influence of eau de Javelle, and the apical growth, point to the plant being one of the *Sphacellariaceæ*, and I am unable to find any character by which it can be specifically separated from Reinke's *Sphacella subtilissima*.

FLORIDÆ.

14. *Rhodochorton Brebneri*, nov. spec. Primary filaments decumbent, stragglingly branched, the branches usually widely separated from one another, irregularly nodose, about $9\ \mu$ in diameter, sunk in the substance of *Glaucosiphonia capillaris*; hairs and fertile branches erect, projecting slightly above the surface. Erect branches much and irregularly branched, forming dense

tufts, usually more or less widely separated from each other. Cells from 9–60 μ in length. Tetraspores terminal or lateral, in the latter case borne on short stalks, large in proportion to the size of the plant, solitary or clustered, oval or oblong, from 18–30 μ long, and from 20–30 μ broad. Hab.: Rennie Rocks, Plymouth, June, 1896, *Geo. Brebner*.

This very interesting species gives little outward indication of its presence. It does not appear to injure the host-plant in any way, as the specimens of *Glaucosiphonia*, in the fronds of which it was found, were perfectly healthy, and bore antheridia and cystocarps in abundance. The habit of the plant bears a striking resemblance to that of a *Streblonema*. The tetraspores are very large and conspicuous, and clearly cruciately divided. I have dedicated the species to its discoverer, Mr. Geo. Brebner, who has done excellent service to British algology.

15. HARVEYELLA PACHYDERMA (*Choreocolax pachydermus* Reinsch, *Contrib. ad Algol. et Fungol.* tab. 50). In the recently issued fasciculus of his *Algæ exsiccata*, Mr. Holmes has distributed specimens of a *Harveyella* collected at Gosport in December of last year by Mr. H. N. Sturch. These specimens were supposed, both by Mr. Holmes and myself, to belong to Kuckuck's *Choreocolax albus*, which, however, turns out to be only the tetrasporic form of *Harveyella mirabilis*. Mr. Sturch's specimens, which bear both cystocarps and tetraspores, appear to be referable to Reinsch's *Choreocolax pachydermus*, which was also found parasitic on the fronds of *Gracilaria confervoides*, rather than to his *C. mirabilis*.

16. CORALLINA VIRGATA Zan. *Sagg. di Class. Nat. d. Ficee*, p. 42. Bangor, Ireland. Mrs. Barwell Carter, a daughter of the late Dr. Geo. Johnston, of Berwick-on-Tweed, recently very kindly presented me with a small collection of "British Lithophytes" which had belonged to her father; amongst them were two specimens of the present species from "Bangor, Ireland," marked in Dr. Johnston's writing "*Corallina officinalis*, var."

17. MELOBESIA MYRIOCARPA Crouan, *Flor. du Finist.* p. 150. Plymouth, *E. A. B.*; Weymouth, *E. M. Holmes*. Specimens of this species have been distributed by Mr. Holmes in his *Algæ exsiccata*. I first detected this species on pieces of glass, &c., dredged from 5 to 8 fathom water in Plymouth Sound. My specimens agree well with Crouan's description, as do those distributed by Mr. Holmes, but it is quite possible that the plant may have previously been described under some other name, as it is almost impossible to recognize some of Kutzing's species from his descriptions.

18. HILDENBRANDTIA CROUANI J. Ag. *Spec. Alg.* vol. ii. p. 495. (*Hildenbrandtia rosea* Crouan, *Fl. Finist.* p. 148, tab. 19, gen. 126.) Teignmouth, *T. H. Buffham*; Berwick, *E. A. B.* Prof. J. G. Agardh divides the genus *Hildenbrandtia* into three sections or sub-genera, the first—*Hildenbrandtia* proper—is characterized by the irregularly divided tetraspores, which vary in form from regularly cruciate to regularly zonate; the second sub-genus—*Hæmatophlæa*—is characterized by the regularly zonate tetraspores; the third

subgenus—*Erythroclathrus*—is said to be distinguished by the presence of paraphyses, but probably empty sporangia have been mistaken for these organs. The present species belongs to the second subgenus, and is distinguished by its thin, brownish fronds and slender, spindle-shaped, regularly zonate tetraspores. Under the name *H. rubra*, the brothers Crouan sent specimens belonging to more than one undescribed species to Prof. J. Agardh, who named and described them. The Crouans, however, seem to have failed to recognize the plants from Agardh's descriptions, and much confusion has arisen owing to their having applied the Agardhian names to species which Agardh did not intend to indicate by them. That I might not add to the confusion, I sent specimens and microscopic preparations to Prof. Agardh, and requested him to compare them with his type specimens; this he has most kindly done. Dr. Bornet has also been good enough to compare British specimens of *Hæmatophlæa Crouani* Crn. (non J. Ag.) with authentic specimens. I am therefore in a position to clear away some of the doubts surrounding this species. *Hildenbrandtia (Hæmatophlæa) Crouani* J. Ag. is identical with *H. rosea* Crn. *Fl. Finist.* p. 148, tab. 19, gen. 126, while *Hæmatophlæa Crouani* Crn. *Ann. Sc. Nat.* 4 ser. Bot. vol. ix. pl. 3, fig. 6, *a b c*, is *Hæmatocelis rubens* J. Ag. *Spec. Alg.* vol. ii. p. 497, which is thus recorded under two different names in the *Florule du Finistère*. It may be useful to point out that Hauck's description (*Meeresalg.* p. 38) of the tetraspores of *H. prototypus* Nardo was most probably drawn up from a specimen of *H. Crouani*, Hauck having mistaken the true (irregularly divided) tetraspores of *H. prototypus* for carpospores. The late Dr. F. Schmitz informed me, in conversation, that Dr. Hauck had no authority for saying that he (Dr. S.) had seen the cystocarps of any species of *Hildenbrandtia*, which so far as he knew were quite unknown.

Porphyrodiscus, nov. gen. Fronds crustaceous, forming smooth, firm, cartilaginous, roundish expansions, closely adhering to the substratum by the entire under surface. Cells small, of nearly the same size in all parts of the frond, firmly united into a pseudo-parenchymatous layer. Tetraspores regularly zonate, formed in external, hemispherical or flat wart-like protuberances (nemathecia). Paraphyses wanting or not observed. Cystocarps unknown.

19. P. simulans, nov. spec. Fronds dark shining purplish-red, roundish, about 1 inch in diameter, and from 150–300 μ thick. Cells small, about as long as broad, 4–6 μ wide. Nemathecia hemispherical or flat, from 150–300 μ in breadth. Tetraspores slender, spindle-shaped, regularly zonate, 20–25 μ long by 5–8 μ wide. Hab.: On rocks near low-water mark, Berwick, February, 1889, *E. A. B.*

To the naked eye this species resembles dark-coloured specimens of *Hildenbrandtia prototypus*; but the tetraspores, instead of being contained in cavities sunk beneath the surface of the frond and entirely enclosed, with the exception of a minute pore communicating with the surface, as in the genus *Hildenbrandtia*, are formed in external hemispherical or flat nemathecia, surrounded by a more

or less evident, clear, hyaline, gelatinous substance. These nemathecium, which are sometimes of considerable size, seem to contain only tetraspores, which are formed from the apical cells of the thallus-filaments. It is possible that after the discharge of the spores, a fresh sporangium is formed within the old empty one. Sporangia of all ages occur in the same nemathecium; the young undivided, and the empty sporangia somewhat resembling unicellular paraphyses. The genus *Porphyrodiscus* forms a link between the genera *Hildenbrandtia* and *Hæmatocelis*; from the former it is distinguished by the external nemathecium, and from the latter by the absence of paraphyses, and the much more prominent nemathecium. In *Hæmatocelis*, indeed, the tetraspores may be said to be imbedded in the superficial layer of the frond rather than in external nemathecium. They are, moreover, always accompanied by multicellular filaments (paraphyses or unaltered thallus-filaments).

I cannot close this note without referring to the lamented death of my friend Mr. George William Traill, of Edinburgh, which took place at his residence in Joppa, Midlothian, on Wednesday, the 7th of April of the present year. By his death a blank is left in the ranks of British algologists which it will be hard to fill. Really good collectors are now so scarce that we can ill afford to lose such an accurate and painstaking observer as Mr. Traill. For more than twenty years much of his spare time was devoted to collecting and classifying the British marine algæ, more especially those of Orkney, his native place, and of the Firth of Forth, on the shores of which he had so long resided. Always ready to assist other workers in the same field, much of Mr. Traill's collecting was undertaken to supply the wants of algologists living at a distance from the sea, and but a small proportion of the specimens he gathered are now contained in his herbarium. Never strong for years before his death, he had to contend with chronic ill-health, and it is marvellous how he managed to do so much and such useful work. The following is a list of the published papers on algological subjects written by Mr. Traill:—

1. An Alphabetical List of the Parasitic Algæ of the Firth of Forth (*Proc. Royal Dublin Soc.* 1882).
2. The Marine Algæ of Joppa (*Trans. Bot. Soc. Ed.* 1886).
3. A Monograph of the Algæ of the Firth of Forth. 1885.
4. The Marine Algæ of Elie (*Trans. Bot. Soc. Ed.* 1888).
5. The Marine Algæ of the Orkney Islands (*l. c.* 1890).
6. Notes on New and Rare Algæ (*l. c.* 1888).
7. The Marine Algæ of the Dunbar Coast (*l. c.* 1890).
8. On the Fructification of *Sphacelaria radicans* (*l. c.* 1888).
9. Supplementary Notes on the Marine Algæ of the Orkney Islands (*l. c.* 1892).
10. Supplementary Notes on the Marine Algæ of the Orkney Islands: (2) Island of N. Ronaldsay (*l. c.* 1895).

Most of these papers were illustrated with herbarium specimens of the rarer species.