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GLEANINGS OF BRITISH ALGÆ;

BEING

AN APPENDIX

TO

THE SUPPLEMENT

TO

ENGLISH BOTANY.

BY

THE REV. M. J. BERKELEY, A.M.

There did he feel his faith,
There he beheld the writing; all things there
Breath'd immortality, revolving life
And greatness still revolving: infinite;
There littleness was not; the least of things
Seem'd infinite.

WORDSWORTH.

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NOTICE.

THE drawings from which the present engravings have been executed, were prepared with a view to publication in the Supplement to Dr. Greville's Scottish Cryptogamic Flora; but in consequence of the discontinuance of that most excellent work, there was no prospect of making them known except by giving them in a separate form, which the Author is now enabled to do through the kindness and liberality of Mr. C. E. Sowerby. He is well aware that they must lose much of the interest and power of instruction they would have possessed, if accompanied by Dr. Greville's learned remarks, and illustrated by means of an extensive correspondence with the first continental Algologists, and a possession of authentic specimens of most of their published species; but he is unwilling that the opportunity should be lost of recording and figuring as British, some new and curious objects in a field in which there are comparatively few labourers; though by reason of the difficulty of access to the several treatises scattered up and down in the many journals of the day, consequent on a country residence, he can make no pretensions to such a complete acquaintance with the most recent sources of information as would have enabled him with greater confidence to offer the present small contribution to the large list of British Algæ.

Margate, July 1832.

M. J. B.



BRITISH ALGÆ.

CHÆTOPHORA pisiformis. *Tab. 1. fig. 1.*

Pea-shaped Chætophora.

GEN. CHAR. *Fronde* gelatinous, filled with simple or branched confervoid threads, radiating from a common base.

SPEC. CHAR. Frond globose, soft but compact, green; branches subdichotomous; branchlets very numerous and close, the ultimate ones subfasciculate.

SYN. *Chætophora pisiformis. Agardh, Syst. Alg. p. 27. Conferva globosa gelatinosa. Haller, Stirp. Nov. Helv. 2110.*

Tremella globulosa. Hedw. Theor. pl. 36. fig. 1—6.

Rivularia pisiformis. Roth (fide Agardh).

Batrachospermum intricatum. Vauch. t. 12. fig. 2. 3.

Chætophora elegans. Lyngb. tab. 65 D. Grev. Sc. Crypt. Fl. t. 150.

FROND globose, 1—2 lines broad, soft but compact, of a pleasant green, attached to the leaves and stems of aquatic plants. Filaments fastigate, below subdichotomous; branchlets very numerous, towards the apices presenting a more or less fasciculated appearance, very close and intricate. Articulations of various lengths, four times as long as broad, decreasing upwards, not exactly cylindrical, pellucid at each end, pale green in the centre, where the granules contained in the joints are collected together into one mass. The ultimate ramifications very fine and diaphanous, so that the plant when in the water appears finely downy. Towards

the bases of the fascicles are sessile, globose, green capsules with a pellucid border, much broader than the threads to which they are attached laterally.

There is much difficulty in distinguishing accurately between *Chætophora pisiformis* and *Chæt. elegans* (*Engl. Bot. t. 1797*); Agardh's character "ramis adpressis" certainly does not answer to the figures quoted by him. And in *Riv. tuberculosa* (*E. B. 2366*), given by him as a variety of *Chæt. pisiformis*, the branches are also divaricate. It is, however, possible that the character may have regard to the ultimate ramuli only, which are very numerous, so as to make the outer portion very intricate. The extremes, e.g. *Ricularia elegans*, *E. B.*, and *Chætophora elegans*, Grev., are indeed very different; but almost all intermediate states may be found, both in respect of substance, and manner of ramification. The former, which is exactly represented in the figure, is sometimes so loose and lengthened out as to assume the appearance of small tufts of *Draparnaldia glomerata* (*Conferva mutabilis*, *E. B. 1740*), while the latter is quite firm and compact. Again, the ultimate branchlets of the former are remarkably fasciculate, the latter scarcely so at all. The figure *Fl. Dan. 1956*, fig. 1. might be assigned to either. Most probably, therefore, it will at length be deemed advisable to unite the two species, as Sprengel has in his *Syst. Veget.* Meanwhile the present figure will be acceptable as giving a representation of the true fruit, which I am not aware is described elsewhere. The heaps of granules represented in Dr. Greville's plate are doubtless little sori of calcareous particles, in which opinion he is himself inclined to concur. I must not, however, omit to state that Agardh speaks of hard and crystalline corpuscles in *Chæt. pisiformis*, like particles of sand, which are at length separated from the mother plant, and from which new threads arise. Notwithstanding which observation, it is still possible that, after all, they might be calcareous, and only form a nidus for the development of the young plant. The specimens represented in the Plate were gathered in the summer of 1824 in a small lake, on grass, and the

leaves and stems of *Lobelia Dortmanna*, between Dunolly and Dunstaffnage, N. B.

In a note to Carus's interesting paper in the *Nov. Ac. Leop. Nat. Cur. vol. xi. part 2, p. 504*, on the history of a plant which grew out of the larva of *Salamandra terrestris*, putrefying in water, Nees v. Esenbeck points out how the formation of ultimate fine pellucid threads in the species *Chætophora* is illustrated by the elongation of the filaments in *Leptomitus*, when the vegetative power is not sufficient to form a new capsular lateral shoot, but is still strong enough to continue the thread in a straight line,—thus lengthening it out into long, extremely attenuated hairs.

Fig. 1. *a*, plant natural size; *b*, a small portion highly magnified; *c*, The same still more highly magnified.

CHÆTOPHORA Berkeleyi. *Tab. 1. fig. 2.*

Brown Marine Chætophora.

SPEC. CHAR. Frond depressed, brown, subhemispherical; main branches somewhat anastomosing, ultimate fasciculate.

SYN. *Chætophora Berkeleyi. Grev. in loc. cit.*

FROND depressed, brown; spongy, subhemispherical or irregular from two or more individuals becoming confluent. Filaments very closely packed, branched, and somewhat anastomosing below; the upper ramuli darker and fasciculate, some of the lateral ones being very much drawn out and diaphanous. Articulations not exactly cylindrical, in the main branches about three times as long as broad, greenish in the centre, diaphanous at the two extremities; in the upper fasciculate branches scarcely so long as broad, and entirely filled with dull greenish granules.

This is a very distinct species of *Chætophora*, to which genus it certainly belongs, though, as far as I am aware, the

only species so coloured; for *Chætophora marina*, Lyngb. (*Riccardia tuberiformis*, E. B. 1956), the figure in the former work being very incorrect, belongs either to the genus *Messogloia*, according to the observations of Captain Carmichael, or forms itself the new genus *Corynephora*.

At first sight it looks like a portion of the root of some larger *Alga* which has been torn off by the waves; but its real nature is very clear upon closer examination. In its depressed mode of growth it approaches *Chætophora plana* and *pellita*; and the filaments are so closely compacted as to make the plant but very slightly, though decidedly, gelatinous,—thus receding from the typical form of the genus, as it also does in the slight anastomosing of the branches, which indicates some affinity to *Riccardia tuberiformis*. I have found it only on the marble rocks at Torquay in the summer of 1825, where they are almost polished by the action of the waves. It preserves its form and consistence exceedingly well when preserved in spirit, and adheres firmly to paper in drying.

Fig. 2. *a*, plant natural size; *b*, a vertical section of a single plant; *c*, a small portion highly magnified.

CHÆTOPHORA *pellita*. Tab. 1. fig. 3.

Purple Chætophora.

SPEC. CHAR. Frond thin, effused, atrosanguineous.

SYN. *Chætophora pellita*. Lyngb. *Hyd. Dan. t. 66 B.*

Fl. Dan. 1728. fig. 1. Agardh, Syst. Alg. p. 28.

FROND forming a thin, coriaceous, suborbicular stratum on smooth stones, about half a line in thickness, dark purple, sometimes inclining to brown, so closely adhering to the substance on which it grows that it requires a knife to secure specimens. The whole is composed of moniliform filaments, simple in my individuals, arranged in a star-like manner,

but so as to form an infinite number of more or less circular or conical little prominences, the summit of each little bundle of filaments being truncate. Filaments equal throughout, rose-coloured, with moniliform joints rather longer than broad.

The present plant seems constructed on a different principle from *Chætophora*, the filaments radiating to, rather than from a common centre: but as all agree in placing it in that genus, and I have not been so fortunate as to meet with the fructification figured in Lyngbye and *Fl. Danica*, I cannot venture to form a new genus for it. The little stellate heaps of filaments are very remarkable; in general the summits are nearly in the same plane, but sometimes a number of the little heaps are collected together, so as to form a small prominence, which resembles very much the surface of the female amentum of *Artocarpus integrifolia*. The present specimens were gathered in the summer of 1824, at Oban, Argyleshire. It adheres slightly to paper in drying, and revives perfectly when moistened. I believe it was some analogy with this plant which induced Captain Carmichael to consider the spongy warts of *Polyides rotundus* (as mentioned in Greville's *Br. Algæ*, p. 69,) a parasitic *Alga*.*

Fig. 3. *a*, plant natural size; *b*, usual appearance of the plant with the apices of the little cones in the same plane; *c*, occasional appearance with the apices in different planes; *d*, three of the separate heaps of filaments magnified; *e*, a few filaments more highly magnified.

* There is a production very similar in external appearance to *Chætophora pellita*, which frequently occurs on smooth stones at Margate, and which without close examination might be easily mistaken for it; but it is far more coriaceous, and is by no means filamentous. I am not aware that the real plant occurs in the South of England.

RIVULARIA bullata. *Tab. 2. fig. 1.**Bladder-like Rivularia.*

GEN. CHAR. *Fronde* subglobose, gelatinous, composed of radiating threads proceeding from a common centre, each seated on a globule, within filled with green matter disposed in annular discs.

SPEC. CHAR. *Fronde* soft, within irregular, dark æruginous green, of many more or less rounded, puckered, or inflated lobes; filaments so attached as to appear branched.

SYN. *Ulva bullata. Decand. Fl. Fr. v. 6. p. 1. Poir. Encyc. 8. p. 175.*

Alcyonidium bullatum. Lamouroux, Ann. Mus. 20. p. 286.

Rivularia nitida. Agardh, Syst. Alg. p. 25.?

FRONDE irregular, of many more or less rounded lobes, soft, and more gelatinous within, dark æruginous green, growing in great quantities together on marine rocks, more or less puckered or inflated, composed of radiating filaments. Each filament is much attenuated and seated on a round diaphanous globule, which is of about the same diameter as the base of the thread. The filaments appear branched, though not so in reality, but the globules are attached to the filaments laterally, and at the point of attachment the filament is bent back each way from the globule; this sometimes takes place twice in the same filament, the ultimate filaments being nearly straight. They are green, gradually growing paler to the very attenuated apex, divided very distinctly into portions about equal in length and breadth.

This plant occurred very plentifully at Torquay and Weymouth in the autumn of 1825 and 1826, and does not seem to have been noticed by any British author, which is remarkable, as it is a very conspicuous plant. I cannot be

certain whether it be Agardh's *Riv. nitida*: in respect of consistence it differs so widely, that I have thought it better to describe it under the name of *Rivularia bullata*, assuming DeCandolle's plant to be the same as mine. The following description from the *Flore Française* is such as almost to set the point beyond all doubt. "Elle présente une masse d'un vert foncé entièrement composée de bulles irrégulières à peu près sphériques, aggrégées, exactement fermées de toute part; l'intérieur de ces bulles est plein d'air qui s'échappe avec bruit lorsqu'on comprime la bulle; leur consistance est mince membraneuse, un peu visqueuse à l'extérieur comme dans les Rivulaires. J'ai trouvé cette espèce tapissant les rochers sousmarins, aux sables d'Olonne et à Piriac. Lorsqu'à la basse-mer on marche sur les tapis de cette ulve, on en est averti par les pétilllements auxquels la rupture des vesicles donne lieu." In the dark green colour totally destitute of any olivaceous tint, the softness of its consistence, the approach to ramification in the disposition of the filaments, it recedes from the typical form of *Rivularia*, and reminds us of the neighbouring genus *Chætophora*.

RIVULARIA Pisum. *Tab. 2. fig. 2.*

Pea-shaped Rivularia.

SPEC. CHAR. Frond globose, firm but not hard, very slightly olivaceous, shining; globules of the filaments elliptic, green.

SYN. *Rivularia* Pisum. *Agardh, Syst. Alg. p. 25. incl. β. dura. Agardh, l. c.*

Rivularia dura. Fl. Dan. t. 1488. f. 1. (excl. Syn.)

FROND globose, growing in fresh water on the dead leaves, stems, and roots of aquatic plants, of a slightly olivaceous green, inclining to the pure green of *Chætophora*

pisiformis, not near so firm as *Rivularia atra*, clothed with the fine attenuated points of the filaments, which give it a slimy opal-like appearance. Filaments divided conspicuously into portions about twice as broad as long, regularly radiating from the centre, quite straight, of a much paler colour than the elliptic bodies on which they are seated.

Nearly allied to the common marine *Rivularia atra*, from which it differs in being more globose, softer, and of a lighter colour, as also in its place of growth. At first sight it bears much resemblance to *Chætophora pisiformis*, but is of a firmer substance and more olivaceous hue, besides possessing the peculiar structure of the genus *Rivularia*.

I think there can be no doubt that this is the same plant as Agardh's, though there is some little difference between my character and his. But it is evident from the characters he attributes to the two varieties that it is a variable plant. Mine will scarcely agree with either, though it does with the two descriptions taken together; and the figure in *Fl. Dan.* where the plant is described as "*amœne viridis*," is an exact representation of it. Possibly the limits of the varieties do not admit of very accurate definition. I have not quoted Lyngbye's figure, as it seems to me somewhat doubtful; his character "*articulis inconspicuis*" does not at all agree with the present individuals: *Linkia dura* γ . *crustacea* is most probably *Rivularia calcarea*, E. B. 1799. The specimens figured were found in the summer of 1827 at Whittlesea Mere, Hunts, a place abounding no less with rare plants than insects. *Andromeda polifolia*, *Liparis Læselii*, and *Hypnum trifarium* are of the number. I have also gathered it in Scotland with *Chætophora pisiformis*.

Fig. 2. *a*, plant natural size; *b*, a small portion magnified.

SPHÆROPLEA *crispa*. Tab. 3. fig. 1.*Crisp Sphæroplea.*

GEN. CHAR. *Threads* at first articulated, at length filled with sporaceous globes which move freely in them.

SPEC. CHAR. *Threads* erect, short, green, mucous, crisp, simple, at first with articulations as broad as long, filled with minute distinct granules, then with parallel rings which at length become globular, and escape in moniliform threads.

GROWING on stones, aquatic plants, and the boards of sluices in early spring, forming a tuft of small crisped somewhat intricate bundles of filaments, of a beautiful deep green. Filaments at first of a uniform green, either dotted without any appearance of joints, or divided by dark lines into articulations scarcely so long as broad, which contain a few granules larger than the rest. A few threads have them scarcely broader than in some *Oscillatoria*; but as these are colourless they are probably abortive. The sporaceous mass at length assumes the form of annular discs, which are sometimes dark, sometimes light in the centre, and the articulations are invisible. This is the most usual appearance; but occasionally the ring is formed in the centre of the joint, and there becomes globular without any rupture or absorption of the dissepiment. In general the globes float freely in the tube, and at length escape in moniliform filaments. Sometimes the articulations are not exactly rectangular, so that the thread is uneven.

Of this most beautiful and Proteus-like *Alga*, which is not uncommon, I can find no certain synonym. It belongs clearly to Agardh's genus *Sphæroplea*; but it does not sufficiently agree with the figure of Bory, *Arthrod. f. 14*, to assert that it is the same. *Tiresias crispa*, fig. 13 b. agrees much better with it, especially with that state of the plant in which the dissepiments remain whole; but as Agardh had doubtless good reasons for quoting that figure under *Con-*

ferva capillaris, I cannot but consider my plant as new, and assign it such a name as will prevent future confusion. As, however, *Tiresias crista* is one of those plants to whose fruit Bory has given the name of *Zoocarpes*, from their apparently animal motion when separated from the mother plant, it can hardly belong to the simple genus *Conferva*. I have found the plant at Cambridge and in Northamptonshire. In habit it is not much unlike *Draparnaldia plumosa* to the naked eye: it adheres but imperfectly to paper in drying.

Fig. 1. *a*, plant natural size; *b*, magnified; *c*, more magnified.

SPHÆROPLEA punctalis. Tab. 3. fig. 2.

Spider-web Sphæroplea.

SPEC. CHAR. Floating, pale green; threads very slender, mucous, flexuous; articulations about as broad as long, containing a dotted sporaceous mass.

SYN. *Conferva punctalis*. Mull. Act. Petrop. 1785. *vide Dillw. t. 51.*

FLOATING in crisped masses on the surface of small fresh-water pools, here and there inflated with air-bubbles. Threads extremely slender, mucous, flexuous, of a light but pleasant green. Articulations about as broad as long, containing a square dotted sporaceous mass, about the same breadth as the pellucid interstices; this at length becomes more compact, at last globular, when the colour is confined principally to the circumference, and the globes move freely within the tube.

There is but one difference between the *Conferva punctalis* of Dillwyn, as figured by him, and the present plant; viz. that the interstices are in his plate divided into two by a dark line. But it is very possible that a more than usual degree of transparence in my specimens may have prevented me verifying this character. The plant of Dillwyn seems

to have been considered doubtful, as well as the *Conferva punctalis* of Müller on which it is founded. Of the former Agardh says, "*Conf. punctalis*, Dillw. t. 51, Lyngb. t. 46, est *Zygnematis* species, materie sporacea collapsâ," which opinion appears most strange on an examination of Dillwyn's plate, and, if I am right in considering my plant the same, will be seen to be unfounded when the different states of the plant are taken into consideration. The figure of *Cadmus sericea*, Bory, *Arthrod. f.* 14, does not agree sufficiently to allow me to consider this as Agardh's *Sphæroplea sericea*, and the short character in the *Systema Algarum*, "globulis viridibus," does not afford any assistance; under which circumstances I have thought it better to retain the name of *punctalis* than run the risk of creating confusion by giving a wrong synonym. It is a most beautiful and delicate object under the microscope, much more so than *Conferva floccosa*, to which at first it bears some resemblance. Dillwyn speaks of it as not uncommon; I have met with it only once.

Fig. 1. a, plant natural size; *b*, filaments magnified; *c*, filament in its first state before the globules are perfected, more magnified.

FRUSTULIA lanceolata. *Tab. 4. fig. 1.*

Lanceolate Frustulia.

GEN. CHAR. Short, simple, acicular, linear or wedge-shaped hyaline bodies, imbedded variously in mucus.

SPEC. CHAR. Yellowish brown, forming a thin stratum; individuals lanceolate, acute at both ends, self-coloured, or with one or two darker fasciæ.

FORMING a thin yellowish brown mucous stratum on stones in a small shallow brook. Frustules lanceolate, acute at both ends, of the same colour only very subdued,

self-coloured, or with one or two deeper fasciæ. When dry, the colour of the mass is more green, and the frustules nearly colourless, except one or two yellowish spots which are generally at the extremities. When moistened again, the green is deeper, without any tint of brown.

This should seem to come very near to *Frustulia minor* of Agardh; but since under his plate of *Micromega corniculatum*, *Ic. Alg. n. 4*, he says that no species of *Frustulia* is found like the included granules of that plant, and the present production very closely resembles them, (except that the fascia is not constantly central,) it will be well to figure it under a distinct name, which when a figure of *Frustulia minor* is published may be altered, should it be found identical with it; for from description only, without correct figures, objects like these cannot be accurately distinguished.

Fig. 1. a, appearance to naked eye, when fresh; *b* and *c*, granules; *d*, plant when preserved in the herbarium; *e*, granules.

FRUSTULIA obtusa. *Tab. 4. fig. 2.*

Blunt Frustulia.

SPEC. CHAR. Frustules linear, obtuse or truncate, sometimes elliptic.

SYN. *Frustulia obtusa. Agardh, Syst. Alg. p. 1.*

Echinella obtusa. Lyngb. t. 69. F.

THE present specimens were found forming a thin stratum on wet rabbit dung, along with *Palmella Grevillii*.

Frustules either cylindrical and truncate, simple or two together placed laterally, or elliptic with rather obtuse apices, hyaline, with about two yellowish fasciæ. Revives completely after it has been in the herbarium above three years.

I do not think the above synonyms doubtful, though the habitat is so very different; Agardh's plant being found in rivulets. The figure in Lyngbye agrees very well.

MONEMA prostratum. *Tab. 4. fig. 3.**Prostrate Monema.*

GEN. CHAR. *Threads* simple or branched, continuous, tubular, containing oblong or subelliptical granules.

SPEC. CHAR. *Threads* brown, procumbent, simple, flexuous, obtuse, containing a single row of granules, which are either simple, subelliptic, with one margin more curved; or cylindrical, with obtuse ends; or double of two cylindrical portions.

FORMING a very thin brown mucous stratum on the boards of a sluice. The filaments are simple, obtuse, flexuous, colourless, extremely fine, containing a single row of granules, which are of two kinds; either simple, in which case they are subelliptic with one of the sides more curved than the other, so as to appear almost like the segment of a circle; or double and cylindric with very rounded apices. Both are pellucid, marked in the middle with a tawny spot, which has a paler accurately defined band in the centre. Sometimes the single ones are cylindrical. Adheres imperfectly to talc, and is greenish when dry.

This is a most curious plant, which I have not been able to find any description of, and which enters without much violence into Dr. Greville's excellent genus *Monema*, being very distinct as a species, in habit and in the nature of its granules. These, if they were found separate, would most certainly come under the genus *Frustulia*, and indeed are not very unlike *Frustulia obtusa*. This circumstance will be quite sufficient warrant for considering it as an *Alga*, though its appearance, especially if it were larger, would excite suspicion that it was of animal origin.

Fig. 3. a, plant natural size; *b*, filaments magnified; *c*, do. more highly magnified; *d*, granules highly magnified.

PALMELLA Grevillei. *Tab. 5. fig. 1.**Minute gelatinous Palmella.*

GEN. CHAR. *Fronde* gelatinous, more or less globose or diffuse, filled with globular or elliptic granules.

SPEC. CHAR. Minute; fronds densely crowded, globose, or somewhat lobed, green, decidedly gelatinous.

SYN. *a.* granules elliptic.

Palmella Botryoides. *Grev. Scott. Crypt. Fl. t. 243. fig. 2.*

b. granules globose.

Palmella Botryoides. *Lyngb. Hyd. Dan.*

FRONDS minute, densely crowded, globose, green; composed of pale green jelly, in which are numerous darker granules, elliptic in var. *a.*; in var. *b.* globose, and accompanied with smaller globose granules collected more or less into little round heaps, the largest of which are of the size of the larger granules. After it has been dried, the jelly is nearly colourless, and the granules are scattered, and all of the same size.

In the *Icones Algarum Europæarum* Agardh has published a plant under the name of *Palmella Botryoides*, which differs from the plant of Lyngbye and Dr. Greville in being scarcely of a gelatinous nature. Lyngbye's expression is indeed "substantia subgelatinosa carnosâ," which might render his synonym rather doubtful. But the latter word would scarcely agree with Agardh's plant, which he describes as follows: "Ainsi quand on écrase la fronde, les globules ne cohèrent plus, mais ils tombent épars et repandus au fond de la goutte d'eau où l'on l'avoit plongée."

As it is possible, after all, that Lyngbye's plant may be the same as Agardh's, I have thought it best to take Dr. Greville's plant as the type of a species distinct from Agardh's, and to consider mine, which differs in having the granules globose, as a variety. Dr. Greville, indeed, does

not seem to have observed two kinds of granules. Whether the smaller were contained in the larger, or not, I cannot venture to assert; though I am inclined to think so, not only because I have seen some which appeared to be internal, but because they are generally more or less collected together into little heaps, none of which exceed in size the larger globules; and this opinion is confirmed by the following subject, which, in spite of some differences, I consider as another variety. The present specimens were found on wet rabbit-dung upon a grassy ant-hill, together with *Frustulia obtusa*, at Wansford, Northamptonshire.

Fig. 1. a, plant, natural size; *b*, magnified; *c*, a portion examined fresh; *d*, the same, examined after having been preserved in the herbarium.

PALMELLA Grevillei*, *var. c.* *Tab. 5. fig. 2.*

FRONDS growing upon old decayed stems of *Asparagus officinalis*, in a hotbed, collected two or three together, globose, very minute, having, under the microscope, much the appearance of the capsule of a *Vaucheria* with its pellucid margin, and mass of green granules. Granules globose, nearly twice as large as in the preceding variety; when fresh, all of the same size; but in specimens that have been preserved in the herbarium, the pellucid jelly is found to contain sori of granules, or simple scattered granules, which are about twice the size of the minuter granules in the preceding plant.

Differs from the last in its more hyaline jelly when fresh, and larger granules. At first sight it has the appearance of a green *Hæmatococcus*, but the structure is precisely that of true *Palmellæ*. The peculiar place of growth of the present plant may perhaps be sufficient to account for

* The preceding subject ought to be headed PALMELLA Grevillei, *var. b.*

its differences; but though we have no data for the determination of such points, I see no advantage to be gained in giving a plant presenting such slight differences as a distinct species.

Fig. 2. *a*, plant, natural size; *b*, the same, magnified; *c*, a portion examined when fresh; *d*, a portion which had been preserved in the herbarium.

PALMELLA furfuracea. *Tab. 5. Fig. 3.*

Bran-like Palmella.

GEN. CHAR. *Fronde* gelatinous, more or less globose or diffuse, filled with globular or elliptic granules.

SPEC. CHAR. Fronds diffuse, irregular, granulated, scarcely gelatinous, composed of minute globose or somewhat angular granules.

FORMING a thin mealy stratum of a light yellowish green on the walls of a large frame at Milton, Northamptonshire. Fronds aggregate, diffuse, irregular, granulated, rather rigid, under the knife falling down into a mass of minute more or less rounded granules, with scarcely any appearance of jelly.

This is another aberrant form of *Palmella*, which is extremely interesting as bearing a near relation to Agardh's *Palmella botryoides*, from which, however, it is clearly distinct. I am not aware that it is described anywhere, nor have I met with it more than once.

Fig. 3. *a*, plant, natural size; *b*, a small portion, magnified; *c*, granules.

PALMELLA depressa. *Tab. 5. fig. 4.**Depressed Palmella.*

GEN. CHAR. *Fronde* gelatinous, more or less globose or diffuse, filled with globular or elliptic granules.

SPEC. CHAR. Fronds subhemispherical, depressed, green; granules globose or irregular.

GROWING on an old pump at Cotterstock, Northamptonshire, constantly moistened with the drippings from the spout. Fronds bright yellow green, gelatinous, subhemispherical, depressed, crowded together, filled with more or less globose or angular very minute granules.

I have met with this plant also only once; but it is sufficiently well characterized to leave no doubt of its being a very distinct species, and, as far as I can find, hitherto undescribed. *Palmella adnata* differs from it in colour, though it has the same depressed mode of growth. The granules are by no means regular, being sometimes oblong and angular, as those of Agardh's *Palmella terminalis*, of which mention will be made again in a future Number. I have no doubt, however, that that has no claim to a place amongst vegetables. The present species adheres firmly to paper, and has retained its colour for five years.

Fig. 4. a, plant, natural size; *b*, a small portion, magnified; *c*, granules.

PALMELLA granosa. *Tab. 5. fig. 5.**Compound Palmella.*

GEN. CHAR. *Fronde* gelatinous, more or less globose or diffuse, filled with globular or elliptic granules.

SPEC. CHAR. Compound, pale green, irregular; the granules distinct, elliptic, contained in the hyaline,

subelliptic, jelly-like globules of which the whole plant is composed.

PALE green, or when preserved in the herbarium with a pale brownish tint. Growing in large masses of no certain or distinct form, but broken into many angular faces, having a very granulated appearance, and crumbling beneath the fingers. The whole plant is made up of innumerable subelliptic, hyaline, colourless, jelly-like bags, containing from two to four, green, elliptic granules, which in some lights appear as if surrounded with a pellucid border.

Nothing can be more similar in structure than the present plant and *Hæmatococcus sanguineus* (*Palmella sanguinea*, Agardh, Syst. Alg.). The only difference is in colour, the granules in that species being deep red. The genus *Hæmatococcus* is not characterized in the *Syst. Alg.*; and if the species figured under that name in the *Ic. Alg. Eur.* are all to be included, I do not see how a sufficiently clear distinction can be made between it and *Palmella*, except indeed all the species be found to consist of jelly-like bags containing granules, instead of granules simply immersed in gelatine. *Palmella rupestris* will also probably come into the same genus, if indeed this be not the very plant; for, except in its place of growth, and the character, "granulis globosis per quaterna connatis," given by Agardh, and represented in Lyngbye, there seems little difference between them; for though the fresh plant has a green tint, the dry plant is decidedly brown. It was found growing in great abundance on sub-immersed *Hypnum stellatum* in the bogs bordering on Whittlesea Mere, in summer.

Fig. 5. *a*, plant, natural size; *b*, the same, preserved in herbarium; *c*, a small portion, magnified; *d*, jelly-like bags, magnified.

DIATOMA elongatum. Tab. 6.

Long-jointed Diatoma.

GEN. CHAR. Hyaline, rigid, simple, flat, jointed threads, sometimes coupled longitudinally, the joints at length adhering alternately by one of their angles.

SPEC. CHAR. Joints ten times as long as broad.

SYN. *Diatoma tenue*, γ *elongatum*. *Lyngb. t.* 61. *E. f.* 1, 2.

Diatoma elongatum. *Agardh, Syst. Alg. p.* 4.

THE present species is at once distinguishable from *tenue* by its still more slender threads and greatly longer joints. It is besides of a much paler hue, and occurs in early summer, forming ochraceous masses with other *Diatomeæ*, or scattered amongst various *Confervæ*, as, in the present instance, *Mougeotia genuflexa* and some species of *Vaucheria*. A curious transformation of the joints in *Diatoma tenue* is given in Dr. Greville's Cryptogamic Flora, from drawings made at the same time with this. There is an indication of the same sort of change in another species of this genus given in Plate 28 of Dillwyn's British *Confervæ*, if indeed some of the figures are not rather referable to *Diatoma tenue* than *Diatoma flocculosum*; and also in Lyngbye's figure of *Diatoma flocculosum*, f. 4., and Bory's *Arthr.* fig. 4. I have added a highly magnified figure of a joint of *Diatoma tenue* in its more usual state (fig. h.), and also figures of the transformed joints (c, d, e, f, g), as the lines dividing the swollen joints into two, which show their origin from the two portions of the original articulation, are not given in Dr. Greville's figure. It is observable that in *Diatoma elongatum* the division of these is longitudinal,—in *Diatoma tenue* transverse: or in other words, *D. elongatum* is composed of threads coupled longitudinally; *D. tenue* of a single thread.

Fig. a, plant, natural size; *b*, the same, magnified; and *fig. c, d, e, f, g, h*, transformation of *Diatoma tenue*.

EXILARIA minutissima. *Tab. 7. fig. 1.**Smallest Exilaria.*

GEN. CHAR. Hyaline, rigid, sublinear *corpuscula*, arranged in a flabelliform manner, fixed to a simple or branched receptacle, at length deciduous.

SPEC. CHAR. *Corpuscula* binate, wedge-shaped, fixed on an extremely slender forked receptacle.

SYN. *Gomphonema minutissimum*. *Grev. Crypt. Fl. p. 244.*

PLANT forming tawny masses upon sticks, grass, stones, &c. in fresh water, in spring and early summer, of various degrees of thickness. Threads excessively slender, forked, having at their apices two wedge-shaped hyaline bodies, which are either entirely ochraceous, or pellucid at the broader part. Sometimes the two grow separately, in which case the receptacle is divided so as to bear each body distinct.

I think there can be no doubt that this is the same plant as Dr. Greville's; for nothing can be more variable than its mode of growth; and if so, there can be as little that it is a species of his excellent genus *Exilaria*. I can see no essential difference in structure whatever, and it will at least take the plant out of a very suspicious neighbourhood, as *Gomphonema geminatum* bears every appearance of being an animal production. Even were it not so, I see not what should prevent the latter being an *Exilaria*, except the cuneiform bodies being tubular.

My plant does not appear in the figure so much branched as Dr. Greville's; but this arises from the extreme difficulty of seeing the ramification accurately in a large intricate mass, whereas the specimens figured in the *Crypt. Flora* were thinner and more scattered, so as to render them very favourable for observation. I have however a specimen from Dr. Greville of his plant, which presents

one difference, viz. that it is of a dirty white in drying : mine is of a rather lively green. It adheres to paper very firmly.

Fig. 1. a, plant, natural size ; *b*, appearance of same when dry ; *c, d*, a small portion, magnified.

PETALONEMA *alatum*. *Tab. 7. fig. 2.*

Winged Petalonema.

GEN. CHAR. Flat, branched *threads*, the margins membranous and striate, containing in the centre annular parallel discs.

SYN. *Oscillatoria alata*. *Grev. Crypt. Fl. p. 222.*

FORMING a brownish stratum upon perpendicular cliffs over which water trickles. Threads linear, more or less obtuse, spreading from a common centre in various directions, each more or less branched, somewhat after the manner of *Delesseria hypoglossum*. These are flat, obtuse, membranous at the margin, with the centre thicker, as it were, forming a midrib, and giving out laterally on each side parallel patent veins, so that the whole thread is most beautifully striate ; the centre of the midrib, both in the main and lateral branches, is occupied by a row of darker parallel annular discs, which in the main branches reach to the very summit. Not so in the young lateral ones. The colour of the threads is a beautiful golden brown, the central line being most deeply coloured.

The present specimens were gathered at Oban, Argyleshire, along with others exactly like those represented in Dr. Greville's Plate, so that there can be no doubt that they are only a more highly developed state of the same plant, and form amongst the obscure *Algæ* a most interesting subject, whose relation to those *Florideæ* which it somewhat resembles in outward form is rather one of

analogy than of affinity. It is, I think, impossible to keep it any longer in the genus *Oscillatoria*; and with *Scytonema* there is almost equal difficulty, though it is certainly allied to that genus. I have therefore thought it imperative to form a new genus, though at present it is the only known species.

Fig. 2. a, plant, natural size; *b*, magnified; *c*, end of an old branch; *d*, end of a new branch.

VAUCHERIA *submarina*. *Tab. 8.*

Submarine Vaucheria.

GEN. CHAR. *Threads* tubular, continuous; membrane hyaline, coloured within with green granular dust. *Fruit* homogeneous coniocystæ.

SPEC. CHAR. Forked fastigiate threads; coniocystæ numerous, lanceolate and ovate, confined to the upper branches.

SYN. *Vaucheria dichotoma*, β *submarina*. *Agardh, Syst. Alg. p. 171. Spec. Alg. vol. i. p. 460. Lyngb. tab. 20 A. Grev. Brit. Algæ, p. 190.*

PLANT growing in dense, erect, fastigiate masses in muddy spots covered by the sea every tide. Threads far slenderer than in *Vaucheria dichotoma*, stained below by the mud, above dark green, forked; the branchlets generally somewhat strangulated just above their insertion; the main stem clothed, above the part where the branchlet is given off, with numerous, almost sessile, more or less ovate or lanceolate coniocystæ, which are pointed, at first entirely green, but eventually with a pellucid border. One single instance occurred in which the *fruit* consisted of two placed end to end.

The present plant is so exceedingly unlike the large bristly *Vaucheria dichotoma*, with its scattered, globose

coniocystæ, that I cannot understand the propriety of considering it merely a variety. The plant is shorter, slenderer, less branched, rooted deeply in the mud so that it is difficult to gather good specimens, tufted, never diffuse, and above all, the fruit is much more numerous, of a quite different figure, and confined to the apices of the older stems. It would require many intermediate states to unite the two plants. At any rate, a figure from such perfect specimens as these will be acceptable. Its nearest affinity I should conceive to be with *V. marina*; but in that the coniocystæ are more erect and obtuse, not horizontal and acute. The specimen figured was gathered in the summer of 1826, at Weymouth, immediately under Sandown Castle.

VAUCHERIA terrestris. *Tab. 9.*

Pedicellated Ground Vaucheria.

GEN. CHAR. *Threads* tubular, continuous; membrane hyaline, coloured within with green granular dust. *Fruit* homogeneous vesicles (coniocystæ).

SPEC. CHAR. Fronds branched, decumbent; vesicles lateral, hemispherical, on a horn-shaped receptacle.

SYN. *Vaucheria terrestris.* *Agardh, Spec. Alg. vol. i. p. 465.*

V. terrestris, } *Agardh, Syst. Alg. p. 173.*
V. frigida. }

V. terrestris. *Lyngb. t. 21 A.*

Ectosperma terrestris. *Vauch. Pl. 2. f. 3.*

Vaucheria terrestris. *Grev. Brit. Alg. p. 191.*

FORMING a somewhat loose but little interwoven, bristly, decumbent stratum on mouldering earth, of a beautiful light green. Branches green, variegated here and there with

paler bands. Short lateral branches are given off nearly at right angles from the main stem, which bear at their apices a lateral, more or less hemispherical capsule, which has a curved hyaline appendage, sometimes recurved, sometimes embracing the capsule. Occasionally the appendage is double, or even absent altogether.

The present plant answers better, perhaps, to Agardh's *V. terrestris* than to *V. frigida*; but as it appears that the characters derived from the incurvation or recurvation of the appendage are not constant, but variable in the same individual, I have thought it right to include both, as in the *Species Algarum*, under one species, *V. terrestris*. It will be seen in the Plate, that when the capsules are seated towards the apices, the hyaline appendage is a continuation of the branchlet. On the contrary, when they are not so terminal, there is no appendage at all. The plant is extremely common in loose mouldering soil, such as turnip fields in spring.

I would take this opportunity of observing that although *Vaucheria sessilis* of *Engl. Bot.* is quoted by Agardh under his *V. sessilis* doubtfully, I find specimens most exactly answering to the figure there given, and to his description.

VAUCHERIA clavata. Tab. 10.

Club-shaped Vaucheria.

GEN. CHAR. *Threads* tubular, continuous; membrane hyaline, coloured within with green granular dust. *Fruit* homogeneous vesicles (coniocystæ).

SPEC. CHAR. Cæspitose, branched, fastigate, the extremities of the branches club-shaped, including an ovate or globular reproductive green mass which bursts through the coat and moves about like an animal.

- SYN. *Vaucheria clavata*. *Agardh, Syst. Alg. p. 172.*
Spec. Alg. p. 462. Decand. Fl. Fr. 64.
Ectosperma clavata. Vauch. p. 34. Pl. 3. f. 10.
Unger, Act. Leop. vol. xiii. p. 2. p. 791. cum Tab.
Nees v. Esenbeck, l. c.

PLANT forming round tufts; not an inch high, of a beautiful green, composed of slender mucous threads, dotted and variegated with lighter bands, variously branched; the upper branches generally horizontal; the lower either horizontal or erect. The apices are dilated, more or less club-shaped, containing a dark sporaceous mass. Sometimes, according to Unger, the coniocystæ are lateral and reflexed, or terminal and much swollen, containing one or more dark brown or reddish grains. These states are *Conferva dilatata* β *clavata*, Roth, and γ *bursata*, *V. bursata*, Agardh. These observations will go far to include also the plant of Lyngbye, *t. 21 D. and Fl. Dan. 1725. f. 2.*

The specimens figured were gathered at Yarwell, Northamptonshire.

In the place above cited is a most interesting paper on the development of this plant, by Franz Unger, of which a short but very instructive account is given in the early part of Loudon's Magazine of Natural History. He observed narrowly one of the apices, saw the globule burst through the membrane, (which act occupied 30 seconds,) and move about like an animal. He observed further, in a number of such globules, that the apparently spontaneous motion generally ceased in about an hour, and that in from eight to eleven days a perfect plant was reproduced.

The whole is too accurately detailed to doubt its veracity, even if the observation stood alone; nor is it possible that the polypus peculiar to *Vaucheriæ* could have been confounded with the real fructification, which in other inquiries tending towards the same point might have been the case. Indeed repeated investigations of different Algæ by the most intelligent Algologists are in perfect accordance with it; so that Bory de St. Vincent has called the globu-

lar fructification of certain plants "Lancomex." And, further, as regards the motion of the same granules, in the same journal, is a paper on a species of *Leptanthes* growing out of the sand near of a new Island, by Grenada, in which the motion of the inclined granules is described as very lively. Such is also the case in the *Tetrastylis univira*, Agardh, *It. Alg.* p. 15, where the sinuous course taken by the granules is marked on the Plate.

Without having recourse to the notion of any metamorphosis, according to the theories of many continental Algeologists, or denying the accuracy of their observations, perhaps the multiplication of such observations may tend to instruct us more completely as to that most interesting question of vegetable physiology, whether plants do indeed partake in any degree of real animal as well as vegetable life; or, in other words, whether they possess irritability and sensation* as well as mere excitability. It is well known how extremely difficult it is to assign accurately the limits between these two orders of organized beings; inasmuch that there are many objects of which it is impossible, at present, to say whether they be animal or vegetable; and, reasoning from analogy, it is exactly at such osculating points, where one order of created beings passes into another, that the most extraordinary, and often the most instructive phenomena are expected. The higher animals and vegetables will exhibit more eminently the phenomena of their own peculiar attributes,—of sensation and irritability on the one hand, and excitability on the other; but as the two orders approach each other closely, there will be various anomalous appearances; and it need not excite incredulity, that in the same being the peculiar phenomena of animal and vegetable life should be exhibited, as in the present case, apparently, the spontaneous motion of animal life (if it be not a phenomenon of irritability rather than of sensation,) preceding and then giving place to the comparative inertia of vegetable life; or, more than this, an alternation of

* I use these terms according to the meaning assigned them in DeCandolle's *Physiologie Végétale*, tom. i. p. 21.

these phænomena, animal life subsiding into vegetable, and vegetable giving (as it were) origin to animal. Accurate observations of the development of various Zoophytes, may furnish many curious facts to throw further light upon the subject.

The granules in question are too large to admit of any supposition of their motion being caused by evaporation, or action of the surrounding air, as might perhaps be sufficient to account, in some cases, for very irregular motion of very minute bodies, though there is every reason to suppose that that of the "active molecules" of authors is independent of any such extraneous appreciable cause. As far as I am aware, no traces of any internal organs which might be supposed digestive have been observed in any of the bodies in question. With regard to *Palmella terminalis*, Agardh, *Ic. Alg. t. 14*, it is I think most doubtful whether it has any claim to be regarded as a vegetable production, as I have found what I believe to be the same substance, with the animalcula when contracted exactly as figured in his Plate, but when expanded, furnished with a distinct digestive sac, and the margin of it, or mouth, furnished with ciliæ constantly in motion, and the live animals when detached forming quickly a new mass. The death of such animals would never make an animal substance void of life a living vegetable, though the granules of *Vaucheria clavata* might during a certain stage of their existence give signs of animal life, and then elongate into a new individual with the proper indications of vegetable life. In the former the *dead* animal gives origin to the living vegetable (for that is the real state of the question): in the latter (at the very furthest,) the living seed moving either spontaneously or through irritability, as the case may be, gives origin to the living vegetable frond, in which there are traces neither of sensation nor irritability, but only of mere excitability; but in passing from the one form to the other, death has never taken place. I conceive such view to be far more consistent with sound philosophy than the theory of metamorphosis, which seems to assume that

animal and vegetable life cannot exist in the same being, which is contrary to certain facts in the higher animals, in which there is something of mere excitability as well as of the more peculiar properties of animal existence. In the one case we shall have fresh reason to admire the wonders, and at the same time the unity and simplicity, of Creative Power; in the other, we shall be lost in the mazes and inconsistencies of materialism.

LEPTOMITUS *pisidicola*. *Tab. 11. fig. 1.*

Fastigate Leptomitius.

GEN. CHAR. Hyaline or faintly coloured, arachnoid, obsoletely articulated *threads*, free, erect, affixed but not interwoven.

SPEC. CHAR. Threads short, fasciculate, fastigate; branches horizontal or even; the apices swollen and containing a denser mass of granules than the rest of the plant.

GROWING in small fastigate tufts on the putrefying body of *Pisidium amnicum*, very pale ochraceous. The threads are hyaline, somewhat rigid, with a pale ochraceous central line from the included granules, giving off a single branch, which is very patent, sometimes deflexed. The apices both of the main stem and branches are gently swollen so as to be clavate, and contain a denser mass of granules.

The present distinct species of *Leptomitius* grew on some specimens of *Pisidium amnicum* which had been left a few days in a glass of water. I did not observe the development; but the figure of (*Hydroneima*) *Leptomitius prolifer* in Carus's paper in *Act. Leop. vol. xi. p. 2. 1823, t. 58*, on the dead larvæ of *Salamandra terrestris*, is so complete, and the whole account of the evolution of the plant so clear and minute, that there can be no suspicion that the present plant is only his imperfectly developed, as he supposes to

be the case with Shrank's *Mucor imperceptibilis* and *speciosus*. For even though further observations might have shown that the present plant becomes more compound, the mode of ramification would still be quite distinct.

In the last Number, *Vaucheria clavata*, it was mentioned that Unger had observed perfect fructifying individuals produced from the active globules in eight days. Carus, in the above-cited paper, records that his plant attained its maximum of development, with four successive fructifying ramuli, in ten days, and had borne perfectly fructifying branches, and scattered its granules, in seven. *Leptomitus clavatus* growing on dead flies, is a very different plant from the present. Other species will most probably be discovered in this country. I have seen one on a dead roach, but had no opportunity of examining it. The present individuals occurred at Stibbington, Hunts, May 5, 1828.

MELOSEIRA discigera. Tab. 11. fig. 2.

I TAKE the present opportunity of giving a representation of *Conferva nummuloides* of Dillwyn, *Meloseira discigera*, Agardh, *Syst. Alg.*, though there is already a figure, at t. 2287, of a plant considered as synonymous with Dillwyn's. There can be no doubt that this at least is the same as Dillwyn's; and it is not difficult to account for any differences between the above-cited Plate and the present. The appearance of the joints is at first as in Dillwyn's Plate; but on close inspection each is found to contain two globes wearing the appearance of two contiguous single pulleys with a cord passed round them. It is quoted by Agardh doubtfully under his *Meloseira nummuloides*, which is probably distinct, and the present species will be characterized,—*M. discigera*: threads flexuous; articulations twice as long as broad, each containing two globes which exactly fill the joint. My individuals were found forming an ochraceous mass with *Monema Dillwynii* in slightly brackish water, Jan. 24, 1832, at Pegwell Bay.

ZYGNEMA *ordinarium*. Tab. 12. fig. 1.*Single-rowed Zygnema.*

GEN. CHAR. *Threads* articulated, at length connected by transverse tubes, containing granules disposed in stars or spirals (or in a simple row), and bearing distinct globose or elliptic capsules.

SPEC. CHAR. Articulations 4 to 6 times as long as broad, filled with sporaceous matter, through the centre of which runs a single series of granules; seeds globose in the transverse tubes.

THE filaments are quite unattached, and float in a rather dull green mass at the top of the water, which (at least in a state of fructification,) is but little mucous, adhering imperfectly to paper in drying. But as the plant has only been once met with, and it is well known that other species of *Zygnema* are much less mucous in a state of fructification, it is uncertain whether this is peculiar at all to the species. Articulations 4 to 6 times as long as broad, at first filled with a yellowish green sporaceous mass, without any marked pellucid border, with a single row in the centre of from 5 to 7 larger granules. The mass at length contracts, and the row of granules is no longer visible. Short tubes are thrown out from the centre of the joints, by which the filaments are at length connected into a more or less intricate mass; and in the tubes a globular seed is formed, which swells them, and is furnished with a pellucid border. In general the sporaceous matter of only one articulation passes into the tube to form the seed; nor in such case does the joint, of which the contents still appear unaltered, throw out another tube.

Found at Glapthorn, Northamptonshire, in the spring of 1826, in watery spots of an exposed ill-drained field. There are two species only, as far as I am aware, that form the fruit in the transverse tube, viz. *Zygnema decussatum* and

Zygnema pectinatum, both which belong to the division *Bipunctata*. The former indeed has ultimately the same intricate mode of growth, and has not the spots very distinctly marked; but as there is no such appearance here, and besides there is a row of granules in the centre of each articulation, it would be too hazardous to presume that they were the same.

ZYGNEMA elongatum. *Tab. 12. fig. 2.*

Long-jointed Zygnema.

SPEC. CHAR. Threads equal, slender; articulations ten times as long as broad; spires very loose, (fruit elliptic).

SYN. *Zygnema longatum.* *Agardh, Syst. Alg. p. 80.*
Conjugata elongata. *Vauch. Hist. des Conf. Pl. 6.*
f. 1. 6.

THREADS far slenderer than in *Zygnema decimum*, which is again not half the thickness of *Zygnema nitidum*, mucous, joints very long, pellucid, hyaline, with about two spires disposed very loosely, at length conjugated (and having elliptic fruit).

The present specimens were found mixed up with *Zygnema decimum*; but it is a much slenderer and more delicate species, and differs especially in the small number of spires. I have not met with it in complete fructification, but there can be no doubt that the Syn. of Vaucher is correct. Dillwyn's synonym is not quite certain, therefore I have forborne quoting it; and indeed his description is at variance at least with the present plant, as it attributes to *Z. decimum* longer joints.

ZYGNEMA gracile. *Tab. 12. fig. 3.**Pale Zygnema.*

SPEC. CHAR. Dirty white or yellowish green; threads extremely slender, joints 4 to 5 times as long as broad; globules two, round.

SYN. *Zygnema gracile.* *Agardh.*

PALE dirty yellowish green, mucous; threads extremely fine, like *Conf. bombycina*, hyaline; articulations not at all constant in length, 4 to 8 times as long as broad, marked in the centre with two approximate roundish globules. Slender filaments occur in the same mass, with joints longer in proportion, the green mass not divided into two distinct portions. I have not seen it conjugated.

On the face of a dripping rock at Oban, Argyleshire, in the summer of 1824. There is some difficulty in saying whether this belongs to *Zygnema gracile* or *Zygnema Vaucheriai*. With the latter it agrees in the length of its joints, but that is described as of a full green, whereas the present plant was of a pale dirty yellowish hue. Other slenderer filaments were intermixed which had not the sporaceous mass bipartite, and in which the articulations were more than five times as long as broad; it does not seem very likely that they are a state of the same plant; but if not, I know not to what species to refer them.

 CONFERVA clandestina. *Tab. 13. fig. 1.*
Obscure Conferva.

GEN. CHAR. *Threads* articulated, free, distinct, uniform, bearing reproductive granules within the joints.

SPEC. CHAR. Threads adnate, erect, simple, mucous, flexuous; to the naked eye, opaque, white; articulations three times as long as broad, dotted with distinct granules.

THE genus *Leptomitus* is so loosely defined as it stands in the *Syst. Alg.*, that I do not like to put the present obscure plant in it, though I believe it very nearly related to some of the species of Agardh's first series. I cannot be certain that it arises from decayed organized matter, though its peculiar situation on the under side of stones in mud highly impregnated with putrefying marine substances leads me to suspect that such is the case. At the least it will make a very natural transition from the more distinctly articulated *Leptomiti* growing on decaying vegetables to the real *Confervæ*. Though a minute and obscure plant, the structure is very discernible.

The filaments at first appear of an opaque white upon the dark mud-stained stone, and are gelatinous and flexuous nearly equal throughout. Under the lens they are hyaline, and are furnished with joints about thrice as long as broad, with very evident and rather broad dissepiment and distinct granules. Sometimes the granules are wanting, probably through age.

Found at Weymouth in 1826, in the beginning of autumn.

CONFERVA subimmersa. *Tab. 13. fig. 2.*

Bog Conferva.

SPEC. CHAR. Threads simple, crisped; articulations three times as long as broad; joints pale with a few scattered darker dots.

THIS very distinct species I have observed several years successively in moist spongy ground at the roots of different *Junci*, at Cotterstock, Northamptonshire, but not immersed

in the water itself, though like a sponge always saturated with it. It forms crisped prostrate masses of rather a pale green, not mucous, of the fineness of wool. Under the lens they are of a very pale green, the articulations about three times as long as broad, with a few scattered granules; the dissepiments marked only by a darker line. When dry they are alternately contracted, the uncontracted joints being swollen.

There is no species of the tribe *Conferva capillaris* (Agardh, *Syst. Alg.*) to which this can be at all referred; its greatest affinity seems to be with *Conf. capillaris* itself, though the two are clearly distinct. Its habit is so peculiar, and indeed its appearance under the glass, that there can be no difficulty in recognising it.

CONFERVA arenicola. *Tab. 13. fig. 3.*

Sand Conferva.

SPEC. CHAR. Threads soft, simple, extremely fine, matted, somewhat crisped, at first uniform pale green, at length distinctly jointed; articulations $1\frac{1}{2}$ as long as broad, dotted; interstices pellucid.

CREeping on the sandy margins of pools in a salt marsh periodically flooded, forming a thin, soft, delicate, crisped web of a pale yellow green. Threads extremely slender, flexuous, at first self-coloured with a few scattered dots, then with manifest dissepiments, and finally the granules contract and form a distinctly defined mass of a darker green in the centre, with pellucid interstices. Articulation $1\frac{1}{2}$ as long as broad. When dry the articulations are alternately contracted.

This species in character approaches very near to *Conferva implexa*; but the plant of *E. B.* and Lyngbye is evidently much coarser and of a full green. Neither can it be the var. of *Conf. tortuosa*, growing on sand, in Lyngbye.

Should future observations show that it has its origin in the salt water itself, and is left on the sand by the retreat of the water, it may prove to be *Conferva nebulosa*, Agardh, with which it agrees well in characters; but it would be hazardous to assume this, as it is well known in how short a space of time such plants are produced and vanish.

CONFERVA fontinalis. Tab. 14. fig. 1.

Fountain Conferva.

SPEC. CHAR. Threads short, straight, simple, adnate, rather obtuse, subfasciculate; articulations 3—5, as long as broad, the green masses lighter in the middle.

SYN. *Conferva fontinalis.* Agardh, *Syst. Alg.* p. 94.

THIS minute *Conferva* covers rushes, grass, &c. with a short, downy, green coat, which is very conspicuous in spring and summer. The present specimens were gathered at Thornhaugh, Northamptonshire, in a fish-pond, Feb. 26, 1828; but I have others, and a drawing exactly agreeing with mine, found in precisely the same kind of situation by Mr. William Backhouse at Walworth near Darlington, June 1807; but the species was considered as too doubtful to be inserted in *English Botany*. It agrees exactly with *Conferva fontinalis* of Agardh's *Syst. Alg.*, who says that it is the *C. fontinalis* of Linnæus. I have in vain looked for a specimen in the Linnæan Herbarium, and it is scarcely possible to say whether or no his references indicate the present plant, or that figured under the name in *E. B.* 2054. That, however, is certainly an *Oscillatoria*, and therefore there can be no difficulty about the name, nor any prospect of needless confusion. According to Mr. Sowerby's observations, it is a thousandth part of an inch in diameter.

a, plant, natural size; *b*, a few filaments magnified.

CONFERVA schroliana. *Tab. 14. fig. 2.**White and Yellow Conferva.*

SP. CHAR. Threads fragile, extremely slender, flexuous, shining; articulations ten times as long as broad, filled in the centre with an ochraceous mass, the extremities pellucid.

This elegant species is very common in summer, covering the leaves and stems of aquatic plants, in company with *Fragilaria pectinata*, with a loose towy crust. It belongs to the same tribe as *Conferva lycanalis*, but is evidently distinct from the three species enumerated by Agardh. Gathered at Salisbury, Hants, July 21. 1827.

a, plant, natural size; b, some threads magnified.

CONFERVA sutoria. *Tab. 14. fig. 3.**Seizing-thread Conferva.*

SP. CHAR. Threads setaceous, extremely long, flexuous, equal, dark green; articulations $1\frac{1}{2}$ as long as broad; interstices pellucid.

FLOATING in dense masses like *Conferva Linnæi*, *E. B. t. 2363*, and *Conferva crassa*, (*Conferva capillaris*), *Dillw. British Conferva, t. 9*, in ditches and pools subject to the influence of the tide; from both which, however, it differs in being a much more slender plant, and of a closer habit, and by no means variegated. In structure it comes very near to the latter, being, like that, of a dark green hue, (judging from the figure,) and having the joints by no means swollen. In the description, Dillwyn's plant is said to be of a "pale yellowish green:" but it is probable that he confounded the true *Conferva Linnæi* with the species

figured in his Plate. Here and there two joints are seen together of only half the usual size. Gathered at Wisbeach, together with *Conferva Linum*, April 11, 1827.

a, plant, natural size ; *b*, *c*, a thread magnified.

ACHNANTHES unipunctata. *Tab. 15. fig. 1.*

Single-spotted Achnanthes.

GEN. CHAR. Plane, jointed, stipitate, standard-shaped or thread-like minute bodies, separating at the articulations.

SPEC. CHAR. Joints numerous, transversely striate at the margin, marked in the centre with a coloured spot.

SYN. Achnanthes unipunctata. *Grev. Scot. Crypt. Fl. t. 287.*

Diatoma unipunctatum. Agardh, Syst. Alg. p. 6.

Fragillaria unipunctata. Lyngb. Hyd. Dan. p. 183. t. 62 C.

GROWING on marine Algæ, in little pools which are never dry at low water. Filaments long (for the genus), flat, attached at one corner by a short, thick, pellucid pedicle, sometimes equal, occasionally considerably attenuated at the base, closely striate, separating into joints attached alternately after the manner of a *Diatoma*: joints sometimes narrow, sometimes square, more frequently longer than broad, sometimes completely filled with a yellow mass of granules; sometimes the margins are pellucid, and in general the centre also is pellucid.

There can be no doubt that the above synonyms are correct, though the plant is evidently more variable than the figures represent it. But this depends most likely very much upon the time of year. These were gathered at

Margate, March 18, 1829. The plant is then by no means so fragile as it is described by Dr. Greville, and as I have myself seen it at Appin in specimens gathered by Captain Carmichael. Notwithstanding the considerable elongation of the filament, the plant cannot without violence be placed out of the genus *Achnanthes*.

PALMELLA adnata. *Tab. 15. fig. 2.*

Maritime Palmella.

GEN. CHAR. *Ut supra*, p. 16.

SPEC. CHAR. Fronds depressed, moderately firm, irregular, confluent, shining, yellow-brown, consisting of globose pellucid colourless vesicles immersed in gelatine, and containing one or more elliptic tawny granules.

SYN. *Palmella adnata. Agardh, Syst. Alg. p. 14. Lyngb. Hyd. Dan. p. 205. t. 69 A.*

FORMING a thin yellow-brown, suborbicular, depressed stratum, on chalk cliffs about high-water mark. The individual plants, which are from 1 to 6 lines in diameter, are but very little thicker in the centre than at the margin. The surface is rugulose and shining; substance firm, between gelatinous and coriaceous. In age the plant gradually becomes more tawny, but at all times under the microscope presents a pale ochraceous jelly filled with darker granules. Under a moderate magnifier the granules appear globose, but under a lens with $\frac{1}{2}$ th of an inch focus, pellucid, globose, colourless vesicles are seen to contain the darker granules, and these are found to be elliptic. Sometimes the vesicles contain only a little tawny colouring matter, as though the sporules were broken down; and frequently the sporules burst through the coat of the vesicle in which they are contained, and lie free in the general mass. I have no doubt that this is the same plant as

Lyngbye's, the differences being such as arise from the use of a good single lens; for under a low magnifier, or the highest power of a common compound microscope, the structure appears exactly as is represented in his Plate. He considers it to be the *Tremella adnata* of Hudson. Occurs at Margate throughout the year.

a, plant, natural size; *b, b*, portions magnified.

MESOGLOIA multifida. *Tab. 16. fig. 1.*

Dichotomous purple Mesogloia.

GEN. CHAR. *Fronde* filiform, cylindrical, gelatinous, composed of submoniliform, capsuliferous branchlets radiating from a compound axis.

SPEC. CHAR. Brownish purple, dichotomous; joints of the moniliform threads equal; sporidia tuberculated.

SYN. *Mesogloia multifida*. *Agardh, Syst. Alg. p. 50.*

M. opercularis. *Carmichael MSS.*

Rivularia multifida. *Web. and M. It. t. 3. fig. 1. a, b, c.*

Roth, Cat. Bot. 3. p. 335.

Chordaria multifida. *Lyngb. Hyd. Dan. p. 51.*

Chætophora multifida. *Hook. Fl. Scot. p. 76.*

(*excl. syn. E. B. t. 1627.*)

Chæt. rubra. *Agardh, (not Ulva rubra, Hudson.)*

FRONDS solitary or in small clusters, connate at the base, 2—3 inches long, dichotomously branched, of a brownish purple, and extremely flaccid. Radiating filaments issuing from the medullary cord, dichotomous, moniliform; branchlets cylindrical, straight, the joints equal. Sporidia tuberculated as if made up of a group of smaller globules.

With the help of specimens from the late Captain Carmichael, and drawings made by that gentleman from the

living plants, most liberally communicated by Dr. Hooker, I am enabled to give figures of three species of *Mesogloia*, in addition to that of *M. vermiculata*, E. B. 1818, and venture to propose a fourth as altogether new, gathered by myself at Oban.

The genus *Mesogloia* is well distinguished from *Chaetophora* by its axillary thread giving origin to the moniliform filaments; and if the genus *Corynephora*, which agrees with *Mesogloia* in fruit and external structure, be preserved, though originally established upon an incorrect analysis, as Mr. W. H. Harvey proposes in a forthcoming arrangement of the articulated British Algæ, grounding it upon difference of habit and punctiform axis, none can be more natural. The species abound on the western coast of Scotland, though on some parts of the coast of Great Britain very rare.

Mesogloia multifida occurs in autumn on the large bowlders along the shore, fixed invariably, according to Captain Carmichael's observations, on the shell of *Balanus Balanoides*; in consequence of which it was called by him, judging it undescribed, at various times in his unpublished manuscripts, *M. opercularis*, *M. Balani*, and *M. Balanicola*. Finally he referred it to *M. multifida*, and it agrees with an authentic specimen of that plant in Dr. Hooker's Herbarium, according to Mr. Harvey, as far as dry specimens would enable him to judge. The type of the species, however, is characterized by Agardh as having *axillæ rotundatæ*, in which respect the present specimens evidently differ. That should seem however in his judgement to be an unimportant character, as his var. β is characterized by *axillæ acutiores*. The dissection is taken from a good dried specimen, which revived perfectly on being moistened. When fresh, the moniliform filaments and sporidia are much darker and browner.

a, plant, natural size; *b*, excentric filaments and sporidia, magnified.

MESOGLOIA affinis. *Tab. 16. fig. 2.**Tawny Mesogloia.*

SPEC. CHAR. Frond much branched; all the principal branches horizontal, yellow-olive, moniliform; threads simple, curved, equal.

FROND solitary, very soft, of a yellow-olive, not changing in drying, about four inches long, much branched, the main branches growing at right angles to the stem and parallel. The ultimate ramuli obtuse, often curved. Moniliform threads simple, curved at the extremities, equal.

Though the present species is very nearly allied to the last, its ramification is so peculiar that it is almost impossible to consider it a mere variety, especially as it does not show the least tendency to assume a green tint in drying. It is the most gelatinous of the brown *Mesogloia*, and has very much the habit of a *Batrachospermum*. I have never found it in fruit, but its moniliform filaments are similar to those of *Mesogloia virescens*. It occurred in small pools left by the tide at Oban, Argyleshire, 1824.

MESOGLOIA gracilis. *Tab. 17. fig. 1.**Slender Mesogloia.*

SPEC. CHAR. Frond irregularly branched, slender, dark-olive; moniliform threads branched, curved, upper joints largest; sporidia smooth.

SYN. *Mesogloia gracilis*. *Carmichael MSS.*

FRONDS mostly solitary, 6—12 inches long, extremely slender, irregularly branched, most of them very short and divaricate. Colour dark olive, retained in drying. Radiating filaments dichotomous; moniliform branchlets mostly

compound, curved, the articulations gradually increasing in breadth. Sporidia smooth. On *Zostera* and stumps of Algæ in summer, Appin, Argyleshire.

This plant is very different in habit from *Mesogloia vermiculata*, to which species it is most nearly allied; but is easily distinguished by the branched external filaments, which are also much more slender.

a, plant, natural size; *b*, excentric filaments and sporidia, magnified.

MESOGLOIA virescens. *Tab. 17. fig. 2.*

Pale olive Mesogloia.

SPEC. CHAR. Frond very much and irregularly branched, pale olive; moniliform threads slender, curved, equal; sporidia smooth.

SYN. *Mesogloia virescens.* *Carmichael MSS.*

FRONDS solitary or gregarious, 6—18 inches long, extremely variable in their ramification, of a pale olive-brown. Radiating filaments dichotomous; moniliform branchlets rather long, slightly tapering, and curved. Sporidia smooth. It changes to a pretty vivid green in drying, and shrinks to a mere flat line on the paper.

On the leaves and stumps of *Zostera* very common. Summer, Appin. Also sent from Devonshire by Mrs. Griffith. Mr. Harvey.

Most clearly distinct as a species from *M. vermiculata* and *M. gracilis* by its slender, slightly attenuated, moniliform branchlets. Mr. Sowerby has in his possession a slender variety from Scarborough, gathered by Mr. Bland in 1808, which approaches more nearly to the second species; and though preserved so many years, still retains its peculiar green hue.

a, plant, natural size; *b*, filaments and sporidia, magnified.

GLOIOSIPHONIA capillaris. *Tab. 17. fig. 3.**Banded Gloiosiphonia.*

GEN. CHAR. *Fronde* filiform, branched, fleshy, tubular, continuous; its external surface composed of moniliform radiating dichotomous threads, to which are attached the subglobose sporidia.

SYN. *Gloiosiphonia capillaris.* *Carmichael MSS.*

Mesogloia capillaris. *Agardh, Syst. Alg. p. 51.*

Fucus capillaris. *Huds. Fl. Angl. p. 591. Turner, Hist. Fuc. t. 31. E. B. t. 2191.*

Gigartina lubrica. *Lyngb. Hyd. Dan. p. 45. t. 12 A.*

FRONDS in small tufts, 3–6 inches long, scarcely a line broad in the most highly developed specimens, attenuated at the base, tubular, carnosogelatinous, slightly compressed, of a pale rose colour: branches mostly opposite, sometimes, however, quite irregular, sometimes three or more from the same point; ramuli numerous, mostly alternate, spreading, terminal ones straight, fusiform. Excentric filaments dichotomous, obtuse, forming the whole external substance of the frond; those of the ramuli being arranged in denser and looser bands alternately, give them a fasciated appearance. Sporidia large, subglobose, buried among the moniliform filaments.

The above description is taken principally from a manuscript of the late Captain Carmichael, and the dissection copied from his drawing. A figure has already been given in *English Botany* at *t. 2191*; but as the structure is not well made out, and there has been some uncertainty as regards the genus to which it belongs, it appears desirable to record the additional information afforded by Carmichael's observations. By these, Agardh's suspicion that it is of a genus distinct from *Mesogloia* is confirmed; the axis being tubular, not solid. Captain Carmichael's plant is much more regular in its growth than those figured in *E. B.* and Tur-

ner's *Fuci*. But the species is evidently very variable, for there is no doubt as to the correctness of the citation of Lyngbye's figure by Agardh. Found at Appin, but very rarely, in summer, on pebbles about the ordinary ebb level. Mr. J. D. C. Sowerby has received it from the late Mr. Bland, who gathered it on the shores of Anglesea.

a, one of the ramuli and part of a terminal branch, magnified; *b*, excentric filaments with one of the sporidia.

MONORMIA* intricata. Tab. 18.

Intricate Monormia.

GEN. CHAR. *Fronde* branched, composed of a single moniliform thread following the ramifications, immersed in gelatine.

FORMING small roundish gelatinous masses floating amongst different species of *Lemna* in fresh water, but probably within the influence of the tide, and also amongst *Enteromorpha intestinalis*, and even within the frond in brackish water. The plant is at first of an olive-yellow, gradually assuming a greener tint, and when dried, of a deep verdigris. Very gelatinous, delicately branched; the branches very flaccid. Under a high magnifier, the whole plant is evidently composed of gelatine, in the centre of which runs a single moniliform filament following the ramifications, and in its progress curling to and fro repeatedly across the thread; the joints being nearly globular. The specimens from the interior of *Enteromorpha intestinalis* are paler, and have often longer joints amongst the globular ones.

This plant occurred at Gravesend in the ditches of the marsh to the south of the Frindsbury canal, in great abundance in June 1832. It is evidently most closely allied to

* From *μονος*, single, and *ορμος*, a necklace.

Nostoc, having nearly the habit of *Nostoc Flos aquæ*, but differs essentially in the singular character of its moniliform thread. I have not had an opportunity of examining any species of *Hydrurus*, but Agardh's remark that the genus is most nearly allied to *Schizonema*, and the inspection of figures, confirm me in the opinion that it is altogether distinct from the present genus.

a, plant, natural size; *b*, do. in *Enteromorpha intestinalis*; *c*, a portion slightly magnified; *d*, *e*, *f*, threads magnified; *g*, a thread from the interior of the *Enteromorpha*, magnified.

SCYTONEMA byssoideum. Tab. 19. fig. 1.

Byssoid Scytonema.

GEN. CHAR. *Threads* continuous, coriaceous, not mucous, filled with disciform or polymorphous transverse parallel sporangia.

SPEC. CHAR. *Threads* simple, erect, very short, flexuous, compacted into a black stratum.

SYN. *Scytonema byssoideum.* Agardh, *Syst. Alg.* p. 39. (*excl. syn. Dillenii.*)

Collema velutinum. Acharius, *Syn. Meth. Lich.* p. 329.

C. pannosum. *Lichenographia Univ.* p. 660.

Parmelia pannosa. Ach. ap. Web. in *Beytr. zur Naturk.* 2. p. 15. t. 3. f. 1. a, f.

FORMING a thin, dense, black stratum, consisting of very short flexuous, obtuse, olive, unequal threads, which have a tendency to be fasciculated, being, as it were, glued by two or three together; each thread in the several fasciculi often taking exactly the same curve. Under a powerful lens they are seen to be furnished with a very narrow pel-

lucid margin, and to be filled with parallel transverse sporangia nearly as long as broad, but very faintly marked; here and there causing little prominences in the thread,—sometimes, as in many species of *Oscillatoria*, the green substance within the thread presents two convex surfaces, like those formed by quicksilver in a tube where the connexion of the thread has been broken. *Lichen exilis* of Lightfoot is quoted by Acharius as a synonym of his *Collema velutinum*; but the description in the *Flora Scotica*, though agreeing in some points, seems to belong to some larger plant. The figure of Dillenius, quoted by Agardh, belongs to *Chroolepus ebeneus* (*Byssus nigra*, E. B. t. 702.)

a, plant, natural size; *b, c, d*, do. magnified.

NOSTOC pruniforme. *Tab. 19. fig. 2.*

Plum-shaped Nostoc.

GEN. CHAR. *Fronde* gelatinous, expanded and plicate or globose, filled with flexuous moniliform filaments.

SPEC. CHAR. *Fronde* globose, solitary, soft within, quite even.

SYN. *Ulva pruniformis*. *Linn. Fl. Suec.* 1159. *Huds. Fl. Angl.* p. 572.

Linckia pruniformis. *Roth Beit. Th.* 1. p. 301.
Roth Cat. Bot. fasc. 3. p. 343.

Nostoc pruniforme. *Agardh, Syst. Alg.* p. 20.
Lyngb. t. 68. A.

THIS plant was pointed out to me at Appin by Captain Carmichael in small pools of fresh water upon exposed rocks on the sea-shore, either attached or floating. It is more or less globose, quite smooth, soft within, and in drying, adheres firmly to paper, shrinking to a thin film.

The threads are much crisped, with either globose or somewhat oval joints.

This is a very different plant from the *Rivularia pruniformis*, E. B., to which the first two of the above synonyms are quoted by Sir James Smith. There is no specimen in the Linnæan herbarium to determine what plant Linnæus had in view; but by common consent of continental algologists, it has been considered the *Nostoc pruniforme*, and not the plant which now bears the name of *Rivularia natans*. As Hudson's synonym seems to be correct, I have judged it advisable to give a figure, though it is necessarily taken from a dried specimen revived by immersion in water.

a, plant, natural size; *b*, filaments, magnified.

ELAIONEMA villosum. Tab. 19. fig. 3.

AT p. 41 of Greville's *Algæ Britannicæ*, under the genus *Sporochnus*, there is the following remark. "It is by no means improbable that at some future time the species with fructification in the form of naked sessile warts will form a distinct genus. The exotic species *S. inermis* and *Cabrera* may also be eventually separated; and perhaps even *S. villosus*" (*Conferva villosa*, E. B. t. 546.) "also, when the fructification shall be discovered." I had the good fortune to meet with the fructification of the last at Weymouth in September, 1832: this proves so different from that of other *Sporochnoideæ*, that with the sanction of Dr. Greville, to whom I sent a sketch, I venture to propose a new genus, which will be thus characterized:—

ELAIONEMA. *Fronde* filiform, cylindrical, minutely nodose, with whorls of delicate filaments arising from the knobs. *Fructification*, pedicellated jointed pods, springing from the filaments.

The name refers to the curious property observed by Mr. Hassell. "The fresh specimens, when spread upon paper, rendered it transparent, as if it had been touched with oil."

CERAMIUM Rothii. *Tab. 20.*

THOUGH there is already a figure in *E. B.* of *Ceramium Rothii* (*Conferva Rothii*, *t.* 1702.), as no notice has yet been taken of its fructification, it will not be considered superfluous, if a representation be given of the plant in fruit. The fruit is abundantly produced at Margate in winter; and I understand from Mr. W. H. Harvey that it has been discovered by Captain Carmichael at Appin. It consists of small oval pedicellated capsules, clustered at the apices of the branches, accompanied by several barren pedicles. A complete figure is given of the plant as it occurs at Margate, that there may be no confusion or uncertainty.

a, plant when moist; *b*, do. when dry; *c*, *d*, filaments, magnified.

THE END.

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ERRATA.

- Page 5, line 7, insert *of after* species
— 5 — 20, for *loc. cit.* read *literis*
— 6, — 4, for *Messogloia* read *Mesogloia*
— 7, — 10, omit *Lynbye* and
— 8, — 7, place the comma after *within*
— 30, — 15, after *even* insert *deflexed*
— 35, — 21, for *dissepiment* read *dissepiments*

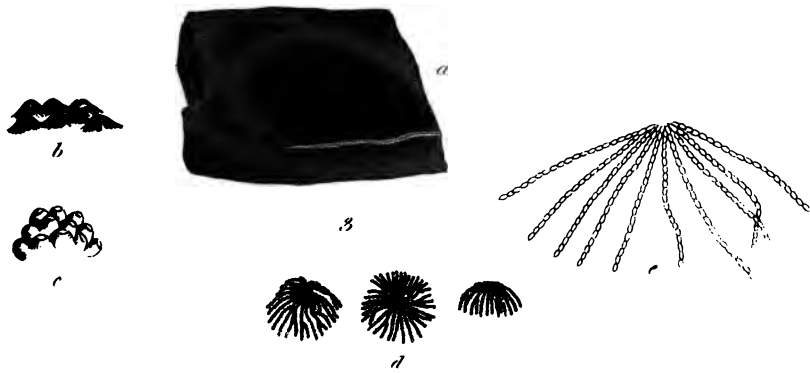
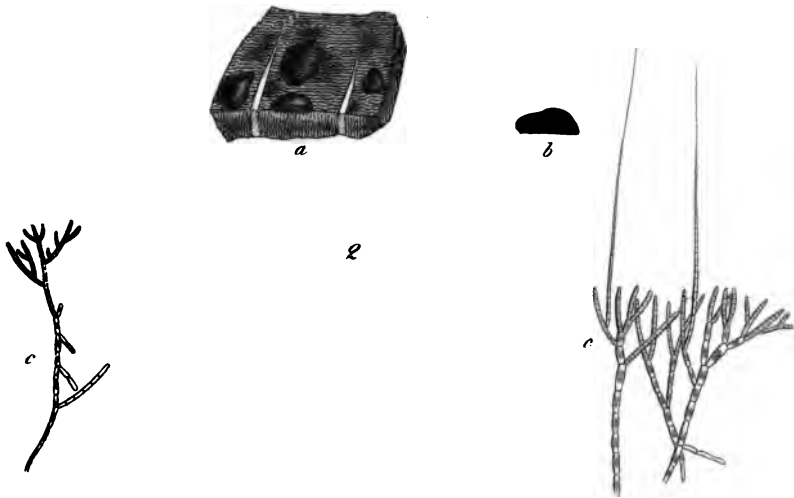
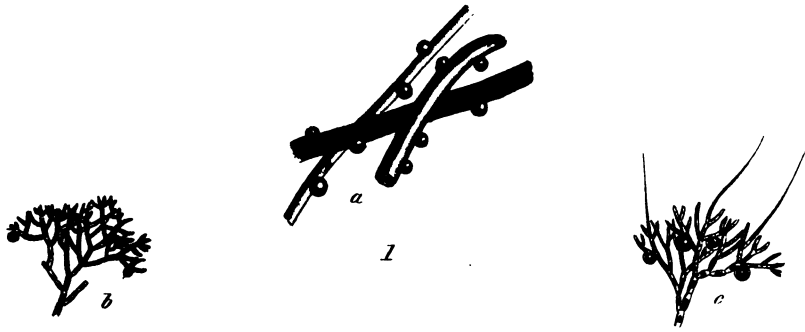
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The Synonyms are printed in Italics.

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— <i>tenuis</i>	<i>ib.</i>	6 c—h.		Scytonema byssoideum	47	19	1
— <i>tenuis, γ elongatum</i>	<i>ib.</i>			Sphaeroplea crispa	11	3	1
— <i>unipunctatum</i>	39			— <i>punctalis</i>	12	3	2
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— <i>obtusa</i>	14	4	2	— <i>frigida</i>	25		
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July 7th 1859



July 1st 1892





2



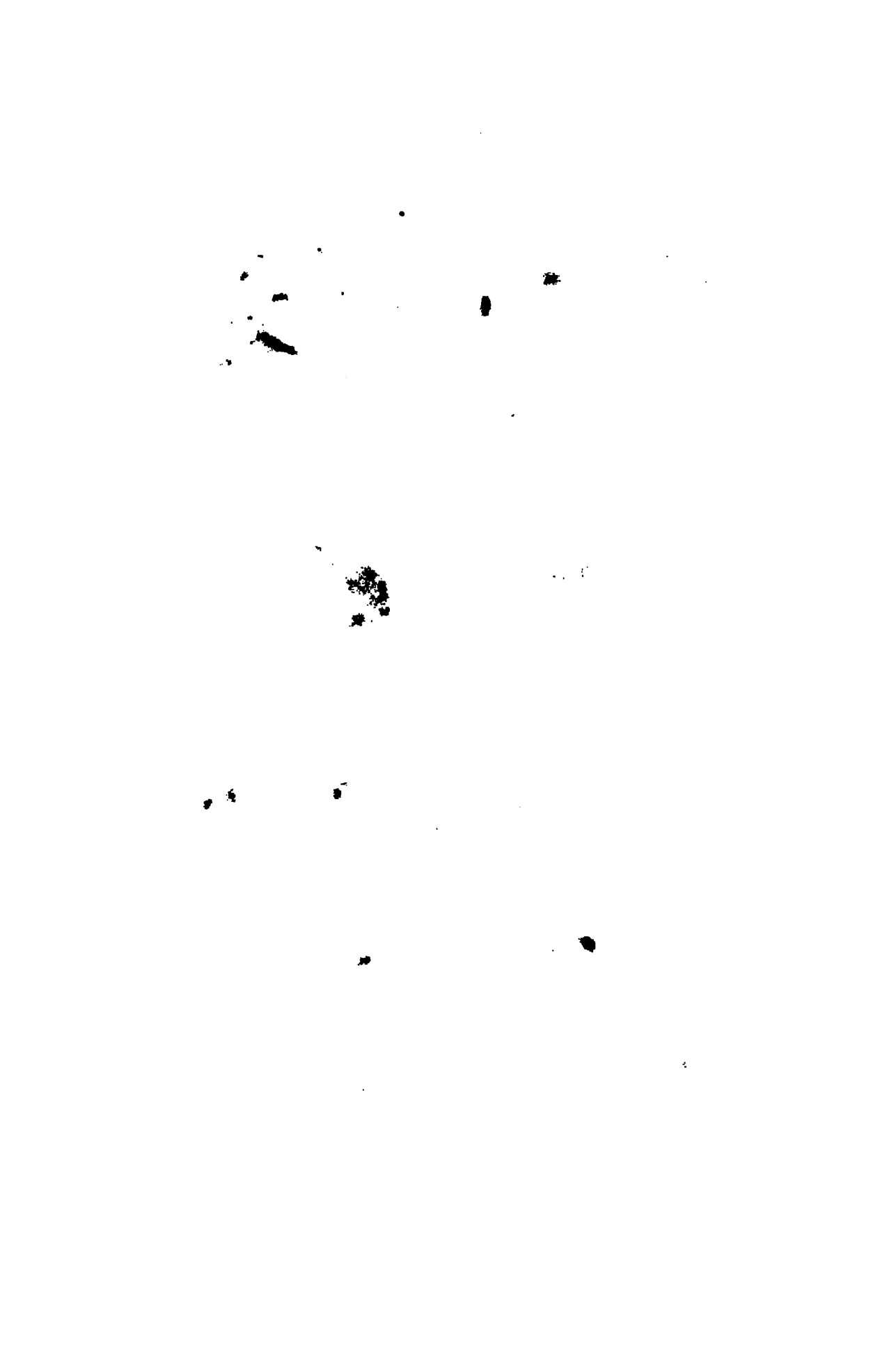
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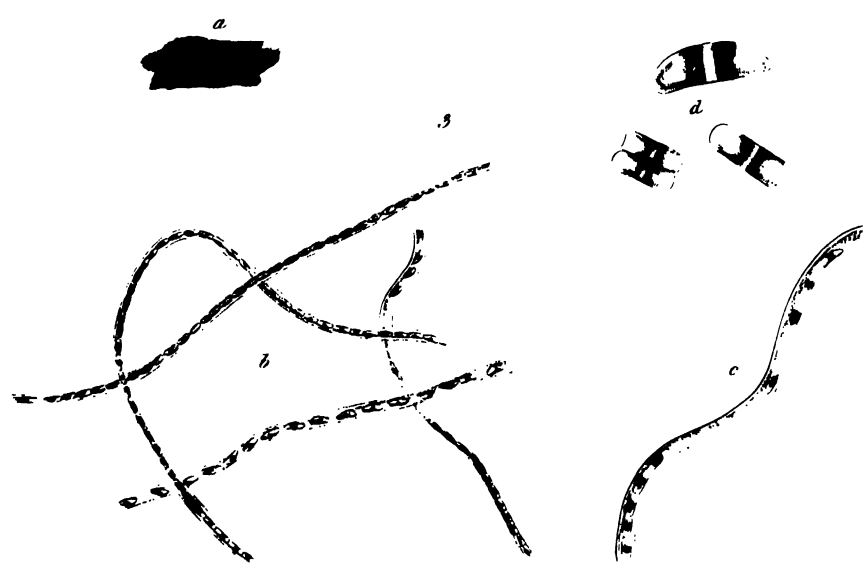
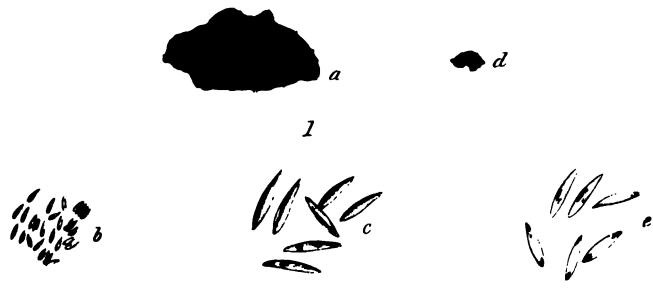


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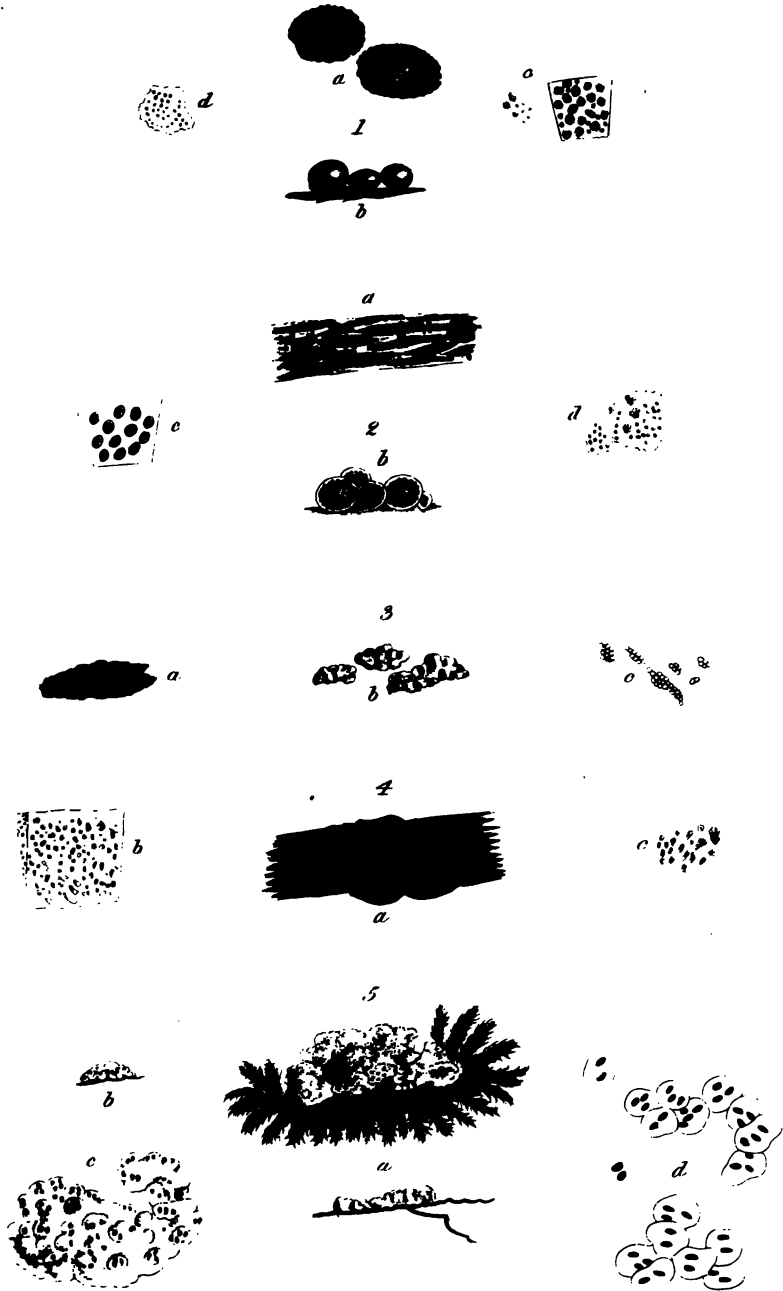


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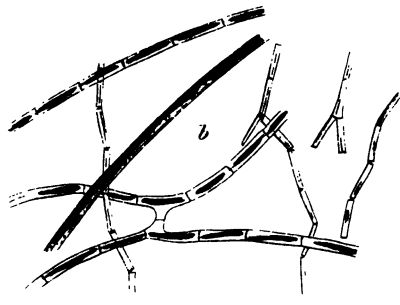


July 7th 1898.





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d



f



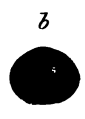
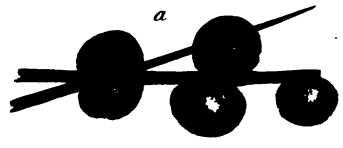
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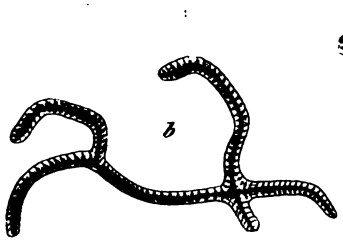
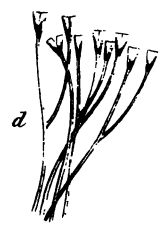
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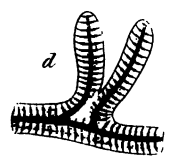
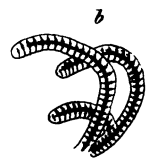
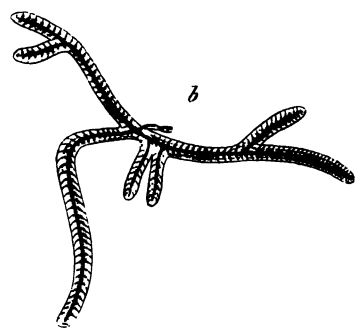
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Sept. 1st 1830.



November 1st 1852.





November 1st 1852.

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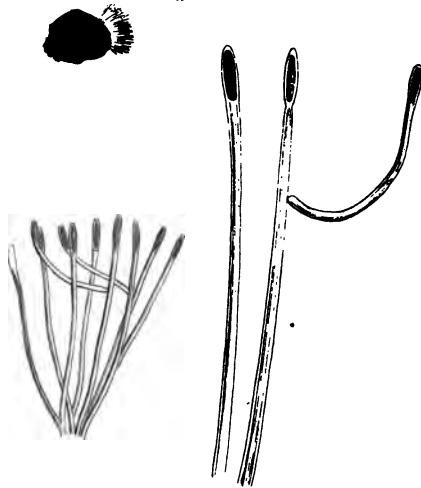
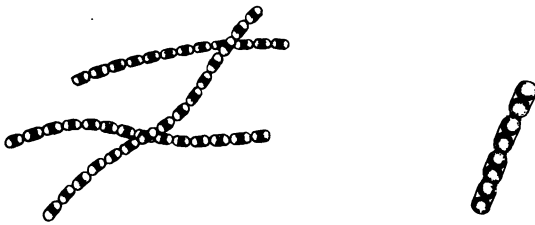


Fig. 2.



November 1st 1832



Fig. 1.



Fig. 2.

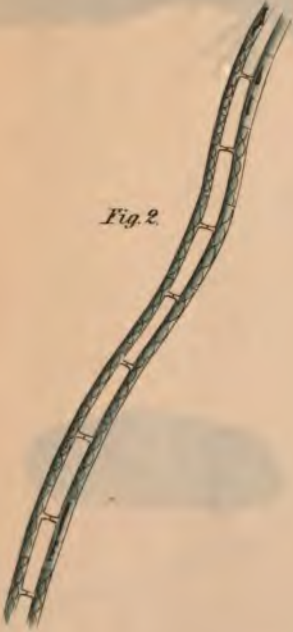
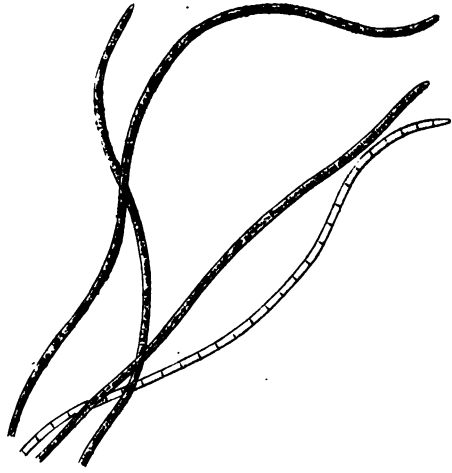


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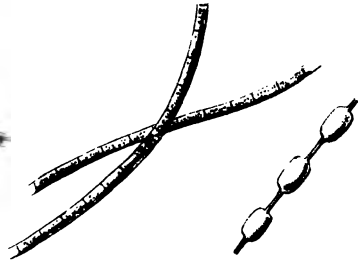




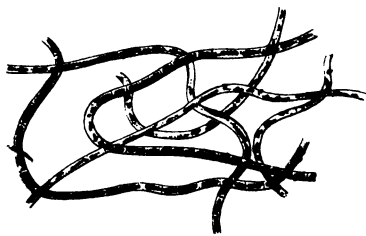
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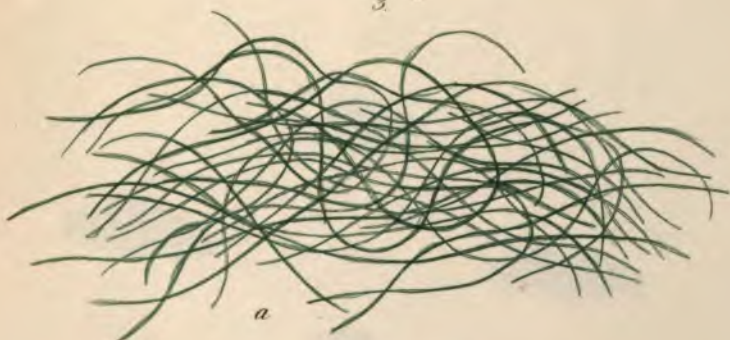
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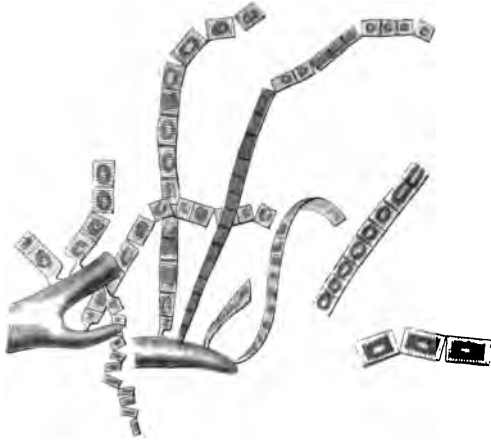


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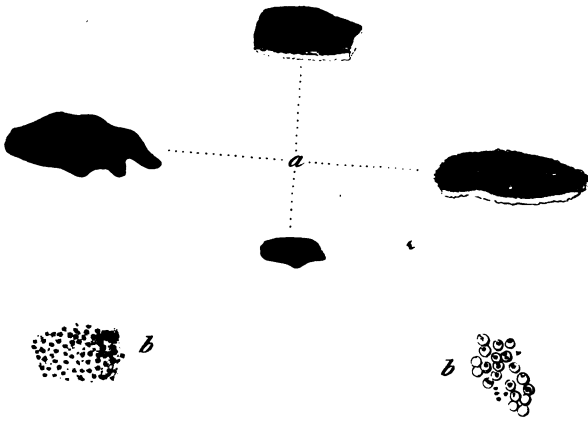


Jan 7 1835

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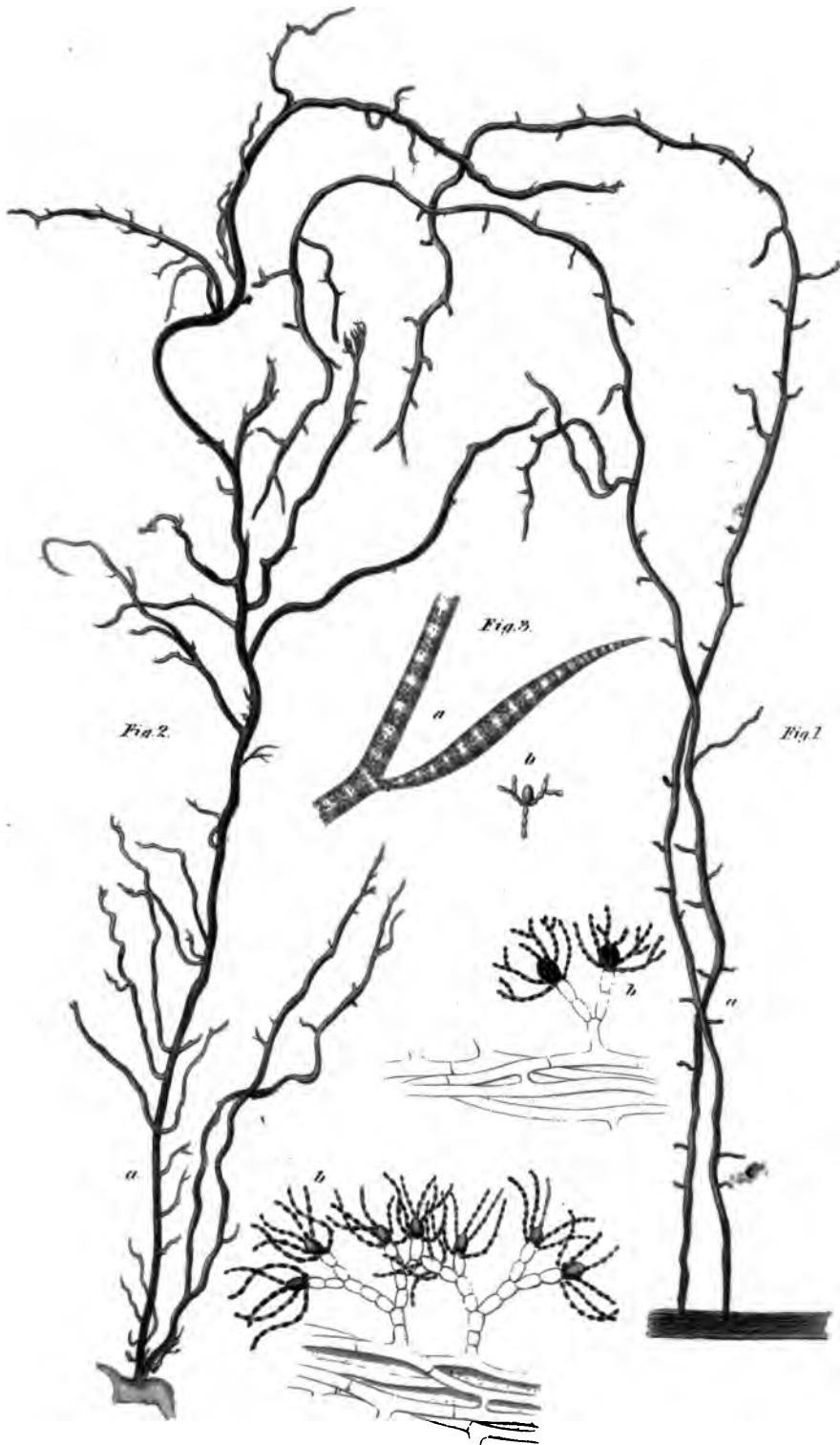
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Jan 1st 1833.

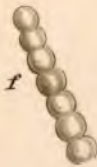
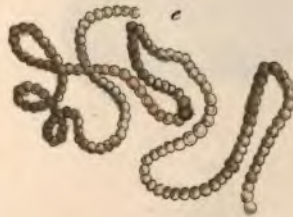


Jan 7 1883



March 27. 1866.





March 2^d 1833



Fig. 3.

March 1st 1835.



March 1st 1833



