VIII.—*A Contribution to the Freshwater Algæ of the South of England.*

By W. WEST, F.L.S., and G. S. WEST, A.R.C.S.

Communicated by A. W. BENNETT, F.L.S., F.R.M.S.

With Appendix by A. W. BENNETT, F.L.S., F.R.M.S.

(Read Oct. 20th, 1897.)

PLATES VI. AND VII.

ALTHOUGH much has already been done towards our knowledge of the distribution of these interesting plants in this part of the country, and this paper is intended to supply a further addition to this knowledge, yet many large districts still remain from which careful collecting is required. The chief workers in this field during recent years have been Mr. W. Joshua, Mr. A. W. Bennett, and Mr. E. D. Marquand; and the districts included in their researches are portions of Surrey, Hampshire, Wiltshire, Devonshire, and Cornwall. The following is a list of the more important papers dealing with Freshwater Algæ from the South of England since the publication of Hassall's 'British Freshwater Algæ' in 1845, and Ralfs' 'British Desmids' in 1848:

1. JOSHUA, W. Notes on British Desmidiæ. Journ. Bot., xx. (1882) p. 300.
2. MARQUAND, E. D. The Desmids and Diatoms of West Cornwall. Trans. Penzance Nat. Hist. & Antiq. Soc., i. (1882-3) pt. 3.
3. JOSHUA, W. Notes on British Desmidiæ. Journ. Bot., xxi. (1883) p. 290.
4. MARQUAND, E. D. Freshwater Algæ of the Land's End District. Trans. Penzance Nat. Hist. & Antiq. Soc., 1885.
5. BENNETT, A. W. Freshwater Algæ of North Cornwall. Journ. Roy. Micr. Soc., Feb. 1887.
6. " " Freshwater Algæ and Schizophyceæ of Hampshire and Devonshire. Journ. Roy. Micr. Soc., Feb. 1890.
7. ROY, J. Freshwater Algæ of Enbridge Lake and Vicinity, Hampshire. Journ. Bot., xxviii. (Nov. 1890).
8. BENNETT, A. W. Freshwater Algæ and Schizophyceæ of South-west Surrey. Journ. Roy. Micr. Soc., Feb. 1892.

Also in part the two following papers:—

9. WEST, W. and G. S. New British Freshwater Algæ. Journ. Roy. Micr. Soc., Dec. 1893.
10. " " On some New and Interesting Freshwater Algæ. Journ. Roy. Micr. Soc., April 1896.

EXPLANATION OF PLATES

(see pp. 468, 469).

The results here set forth have been obtained by the gradual examination for many years of a large and extensive series of algæ-gatherings ranging over many of the counties of the south and south-west of England. A more detailed account of the collections (which were for the most part made by the authors) will be found below.

All the species recorded for Frensham, the New Forest, and Dartmoor, are additional to those found at these respective localities by Mr. Bennett.

In these gatherings no less than 52 species of Desmids have been observed with zygospores, many of them for the first time in that state.

As might be expected, the more alpine and "wet-rock" species (such as *Cosmarium anceps*, *C. Holmiense*, *C. nasutum*, *Staurastrum Meriani*, *S. Kjellmani*, &c.) are, as far as we have observed, absent from all the eastern counties of the South of England.

As it is impossible to accurately identify, from sterile specimens, the majority of plants belonging to the families *Ædogoniaceæ* and *Zygnemaceæ*, no species of these orders are recorded in this paper unless they were seen in abundant fruit, with the exception of *Ædogonium undulatum*, which even in its barren state is unmistakable.

The classification set forth in this paper is the one which we think to be the most natural, after taking into consideration all the

PLATE VI.
(Explicatio iconum.)

- a, a'* = front view (a basi visa).
b = vertical view (a vertice visa).
c = side view (a latere visa).
d = basal view of semi-cell (a basi visa).

- Fig. 1, 2.—*Closterium Siliqua* sp. n. × 520.
" 3. " *lanceolatum* Kütz. var. *parvum* var. n. × 520.
" 4. " *Pritchardianum* Arch. Apex of semi-cell, × 520.
" 5. " " Zygospor formed by the conjugation of three cells. × 120.
" 6.—*Sphærozozma Wallichii* Jacobs var. *anglicum* var. n. *a* et *d*, × 520; *a'*, × 830.
" 7. " *vertebratum* (Bréb.) Ralfs var. *latius* var. n. × 520.
" 8, 9.—*Penium subtile* sp. n. 8, × 520; 9, × 660.
" 10.—*Cosmarium Blyttii* Wille var. *Novæ Sylvæ* var. n. × 520.
" 11. " *fastidiosum* sp. n. × 520.
" 12. " *ocellatum* B. Eichl. and Gutw. var. *incrassatum* var. n. × 520.
" 13, 14. " *sphagnicolum* sp. n. × 520.
" 15.—*Xanthidium concinnum* Arch. × 740.
" 16.—*Arthrodesmus octocornis* Ehrenb. Zygospor × 520.
" 17.—*Cosmarium bioculatum* Bréb. Zygospor × 520.
" 18.—*Staurastrum rostellum* Roy and Biss. var. *erostellum* var. n. × 660.
" 19.—*Cosmarium subpunctulatum* Nordst. × 520.
" 20. " *subbroomei* Schmidle, forma. × 520.
" 21. " *Ungerianum* (Näg.) De Bary var. *subtriplicatum* var. n. × 520.
" 22.—*Staurastrum trachytithophorum* sp. n. × 520.
" 23. " *nodosum* sp. n. × 660.
" 24.—*Cosmarium bioculatum* Bréb. var. *hians* var. n. × 520.
" 25.—*Staurastrum tetracerum* Ralfs var. *validum* var. n. × 520.
" 26.—*Cosmarium Cucurbita* Bréb. Zygospor × 520.
" 27.—*Staurastrum gracile* Ralfs. Zygospor × 520.

G. S. West, ad nat. del.

FRESHWATER ALGÆ.

G. S. WEST ad nat. del.

FRESHWATER ALGÆ.

recent work at this group of plants. For the filamentous Myxophyceæ (Cyanophyceæ), i.e. the Nostochaceæ Heterocystæ and Nostochaceæ Homocystæ, we follow the classification and also the nomenclature of Bornet and Flahault's 'Revision des Nostocacées Hétérocystées' and Gomont's 'Monographie des Oscillariées.'

The following is a more detailed account of the collections. To save space, contractions are used (throughout the paper) for the localities.

I. *Essex*.—The only part investigated was Epping Forest, in which gatherings were made from ditches, bogs, squeezings of *Sphagnum* and *Hypnum* from several ponds, and washings of *Myriophyllum* and *Potamogeton* from a deep fish-pond.

Ep. = Epping Forest.

II. *Middlesex*.—Mostly collections from ponds and ditches in various parts of the county.

Bg. = Bow Green.	No. = Northwood.
Ha. = Harefield.	Pi. = Pinner.
Hy. = Hyde Park.	Ru. = Ruislip Reservoir.
Ki. = Kingsbury.	U. = Uxbridge Common.
Kg. = Kingsbury Green.	Wh. = Welsh Harp.

III. *Surrey*.—By far the most numerous and varied gatherings were made in this county, during several years and at all seasons of the year. In the northern portion of the county, Esher West-end Common, Chobham Common, and Bisley Common, were much more productive than any of the other surrounding commons. In the south-east corner of the county a few very interesting species were obtained from some large ponds north of Felbridge, one locality quoted as "Mill-pond E. of Chapel Wood" being very rich. In the south-west corner, the Frensham district was fairly productive, but Thursley and Puttenham Commons were much the best. On the

PLATE VII.

- Fig. 1, 2.—*Scenedesmus granulatus* sp. n. × 520.
 „ 3.—*Cosmarium truncatellum* Perty. × 520.
 „ 4, 5.—*Tetraëdron horridum* sp. n. × 520.
 „ 6, 7.—*Edogonium macrospermum* sp. n. × 520.
 „ 8.—*Rhaphidium polymorphum* Fresen. var. *tumidum* var. n. × 520.
 „ 9-13. „ „ var. *mirabile* var. n. × 520. z, moving corpuscle.
 „ 14.—*Staurastrum margaritaceum* (Ehrenb.) Menegh. var. *robustum* var. n. × 520.
 „ 15-17. „ „ var. *subcontortum* var. n. × 520.
 „ 18.—*Dactylococcus bicaudatus* A. Br. var. *exilis* var. n. × 520.
 „ 19. „ *dispar* sp. n. × 520.
 „ 20.—*Arthrodesmus Incus* (Bréb.) Hass. var. *subquadratus* var. n. × 520.
 „ 21-23.—*Tetraëdron minimum* (A. Br.) Hansg. × 520.
 „ 24.—*Cosmarium adoxum* sp. n. × 740.
 „ 25-28.—*Ammatoidea Normanti* gen. et sp. n. × 520.

former is a fine bog in which *Rhynchospora fusca* is plentiful, along with abundance of submerged and floating *Sphagnum contortum*, *Hypnum scorpioides*, and better still, *Utricularia minor* coated with a brownish-green slime of almost pure Desmids. Squeezings of *Sphagnum* and *Utricularia minor* from General's Pond, Puttenham Common, also yielded some uncommon species.

B. = Barnes Common.	Fl. = Frensham Little Pond.
Bh. = Blindley Heath (S.E.).	Hk. = Hackbridge.
Bi. = Bisley Common.	M. = Mitcham Common.
Bo. = Bolder Mere.	Mi. = Mitcham Grove.
Br. = Brockham Green (to Betchworth).	Mp. = Mill-pond E. of Chapel Wood (S.E.).
C. = Chobham Common.	Pt. = Putney Heath (nr. Pt. = Roehampton Lane).
Co. = Near Cobham Common.	Pu. = Puttenham Common.
Cr. = Crowhurst (S.E.).	Ra. = Ranmore Com. (pond).
Di. = Ditton Marsh.	Rp. = Richmond Park.
Dj. = Devil's Jumps, Frensham.	Th. = Thursley Common.
Do. = Dorking.	Wa. = Wandsworth Common.
E. = Esher Common.	We. = Bog by R. Wey, Frensham.
Ea. = Earlswood Common.	Wi. = Wimbledon Common.
Ew. = Esher West-end Common.	Wk. = Canal at Woking.
F. = Felbridge.	Wo. = Whitemoor Common, Worplesdon.
Fg. = Frensham Great Pond.	Wt. = Witley Common.
Fh. = Frogit Heath (S.E.).	

IV. *Kent*.—Collections were made from a few small ponds on Hayes Common, and also from two large ponds, as well as from a small bog, on Keston Common. These ponds were crowded with *Potamogeton*, *Scirpus*, &c., and yielded many good species.

Bm. = Bromley.	Hc. = Hayes Common.
Cb. = Cobham.	Ks. = Keston Common.

V. *Oxfordshire*.—Collections were kindly made by Mr. S. Wood from a few small ponds in the south-east of the county.

Go. = About 2½ miles N.E. of Goring.

VI. *Hampshire*.—The gatherings in this county were limited to a few ponds and some very rich bogs in the New Forest. Mr. W. West, jun., collected some rich gatherings of Desmids from *Utricularia minor* in Ashurst Bog, near Lyndhurst Road.

N. = New Forest.

VII. *Devonshire*.—The best gatherings made in this county were from some fine bogs in the neighbourhood of Hey Tor, Dartmoor. The Lea on Slapton Sands also yielded some good material.

D. = Dartmoor (Hey Tor).	S. = Slapton Sands.
Dl. = Dawlish.	Tq. = Torquay.
Gp. = Grimspound, Dartmoor.	

VIII. *Cornwall*.—These gatherings were obligingly made at our request by Mr. R. V. Tellam, of Bodmin. Some of them were very rich, and all were more or less productive of good things. A small collection was also made by Mr. Ll. J. Cocks from Tremethick Moor.

G. = Gunwen Moor.	P. = Penhargurd Wood.
H. = Halgavor Moor.	R. = Roughter Moor.
HL. = Helmentor Moor.	T. = Tintagel.
K. = Kynance Valley.	Tm. = Tremethick Moor.
L. = Lanlivery Moor.	W. = Withiel.

Those species (about 60) not previously recorded for the British Isles are prefixed by an asterisk.

We have noted a very large number of Diatoms, but, as much of the material has not as yet been examined with regard to this class of plants, we leave them for future publication.

CLASS FLORIDEÆ.

Fam. *Batrachospermæ*.

Genus *Batrachospermum* Roth.

1. *B. moniliforme* Roth. II. In canal, Ha. IV. Ks. VI. N. VII. D.
Var. *confusum* (Hass.) Cooke. IV. Cæsar's Well, Ks.
2. *R. vagum* (Roth) Ag. III. In pond, Dj. In bogpool, Th.

CLASS CHLOROPHYCEÆ.

Ord. *Confervoidæ Heterogamæ*.

Fam. *Coleochætaceæ*.

Genus *Coleochæte* Bréb.

1. *C. scutata* Bréb. I. Ep. II. Wh. III. Ew., Fg., Wo. V. Go. VI. N.
2. *C. soluta* Prings. I. Ep. III. Bi., Fg.
3. *C. orbicularis* Prings. III. Cr.

Fam. *Ædogoniaceæ*.

Genus *Bulbochæte* Ag.

1. *B. polyandra* Cleve. VIII. W.
2. *B. setigera* (Roth) Ag. III. Mp., Rp. IV. Ks.
- *3. *B. nana* Wittr. V. Go.
4. *B. mirabilis* Wittr. III. Th.
5. *B. rectangularis* Wittr. III. Ew., Mp.

Genus *Ædogonium* Link.

1. *Æ. Petri* Wittr. III. Ew. VI. N.
2. *Æ. cryptoporum* Wittr. var. *vulgare* Wittr. II. Wh.

*3. *Æ. obsoletum* Wittr. V. Go.

*4. *Æ. zig-zag* Cleve.

Vegetative cells slightly thicker and spermogonia bicellular.

Crass. cell. veget. 19-23 μ ; altit. 24-4-plo major;

„ oogon. 53-57 μ ; „ 50-55 μ ;

„ cell. spermogon. 19 μ ; „ 6-7.5 μ .

II. Ha.

*5. *Æ. nobile* Wittr. II. Ha.

6. *Æ. paludosum* (Hass.) Wittr. III. C.

*7. *Æ. oblongum* Wittr. II. Wh.

8. *Æ. platygynum* Wittr. VIII. L.

*9. *Æ. obtruncatum* Wittr.

Æ. dioicum, nannandrium; oogoniis 4-continuis, globoso-ellipsoideis, oosporis oogonia complentibus; nannandribus oblongo-pyriformibus, curvatis, unicellularibus, in oogoniis sedentibus.

Crass. cell. veget. 17-20 μ ; altit. 4-5-plo major;

„ oogon. 48-53 μ ; „ 48-53 μ ;

„ oospor. 47-52 μ ; „ 47-51 μ ;

„ cell. suffult. 26 μ ;

„ nannandr. 9.5-14 μ .

II. Wh.

This plant comes nearest to the partially described *Æ. obtruncatum*, agreeing with it in all those characters mentioned by Wittrock. We therefore describe the additional characters observed in the specimens.

10. *Æ. undulatum* (Bréb.) A. Br. VIII. W.

*11. *Æ. cyathigerum* Wittr. II. Ha.

12. *Æ. Braunii* (Kütz.) Prings. II. Ha.

13. *Æ. MACROSPERMUM* sp. n. (Pl. VII. figs. 6, 7.)

Æ. dioicum, nannandrium, oogoniis singulis, magnis, subdepresso-globosis, circumscissilibus cum rima angustissima submediana; oosporis subdepresso-globosis, oogonia complentibus, membrana glabra; cellulis suffultoriis eadem forma ac cellulis vegetativis ceteris: nannandribus in cellulis suffultoriis sedentibus, paullo curvatis, bicellularibus (?)

Crass. cell. veget. 13-13.5 μ ; altit. 4-5-plo major;

„ oogon. 44-46 μ ; „ 39-40 μ ;

„ nannandr. 11.5 μ ; „ 33 μ .

II. Ha.

The nearest species to this is *Æ. propinquum* Wittr., from which it is distinguished by its slightly greater thickness and proportionately longer cells, its much larger oogonia and oospores, which are depressed, and the circumscissile oogonia.

14. *Æ. macrandrum* Wittr. I. Ep.

15. *Æ. cardiacum* (Hass.) Wittr., var. *carbonicum* Wittr. III. M.

- *16. *Æ. lautumnarium* Wittr. The spermogonia were about 8-celled, and the supporting cells of the oogonia a little inflated.
II. Wh.

Ord. *Siphonææ*.

Fam. *Vaucheriaceæ*.

Genus *Vaucheria* DC.

1. *V. sericea* Lyngb. II. Ki.
2. *V. aversa* Hass. II. Ru.
3. *V. sessilis* (Vauch.) DC. II. Ki. III. M. VI. N.
4. *V. geminata* (Vauch.) DC. III. C. IV. Ks.
Var. *racemosa* Walz. III. B., F.
5. *V. hamata* (Vauch.) Lyngb. II. Ki., Ru.
6. *V. terrestris* Lyngb. IV. Bm.

Fam. *Hydrogastraceæ*.

Genus *Botrydium* Wallr.

1. *B. granulatum* (L.) Grev. III. Ew., July 1893; also Oct. 1893, abundant. M. (L. A. Boodle; 1892).

Ord. *Confervoidæ Isogamæ*.

Fam. *Ulvaceæ*.

Genus *Monostroma* Thur.

1. *M. bullosa* (Roth) Wittr. III. M. (L. A. Boodle; 1891).

Genus *Prasiola* Ag.

1. *P. crispa* (Lightf.) Ag. II. Bg., U. III. Kingston. IV. Hc.

Fam. *Ulotrichaceæ*.

Sub-fam. *ULOTRICHEÆ*.

Genus *Hormidium* Kütz.

1. *H. murale* (Lyngb.) Kütz. (*Ulothrix radicans* Kütz.). I. Ep. III. Wi.
2. *H. parietinum* (Vauch.) Kütz. (*Ulothrix parietina* Kütz.). I. Ep. II. Pi. III. Esher. Frensham, Kingston, Wi. IV. Bm.

Genus *Hormiscia* Fries; Aresch.

- *1. *H. subtilis* (Kütz.) De Toni. IV. Hc.
Var. *variabilis* (Kütz.) Kirchn. (*Ulothrix variabilis* Kütz.). I. Ep. II. Hy. III. Dj., E., Ew., Mp., Wi. IV. Cb., Ks. V. Go.
Var. *tenerrima* (Kütz.) Kirchn. (*Ulothrix tenerrima* Kütz.). I. Ep. II. Ru. III. E., Rp., Wi.

2. *H. æqualis* (Kütz.) Rabenh. var. *catæniiformis* (Kütz.) Rabenh. I. Ep. II. Wh. III. B. IV. Ks.
3. *H. moniliformis* (Kütz.) Rabenh. I. Ep. II. Ha. V. Go.
4. *H. zonata* (Web. et Mohr.) Aresch. II. Canal, Ha.

Genus *Hormospora* Bréb.

1. *H. mutabilis* Bréb. VI. N. VII. D. VIII. W.
2. *H. plena* Bréb. VIII. L.

Sub-fam. CHÆTOPHOREÆ.

Genus *Herposteiron* Næg.

1. *H. repens* (A. Br.) Wittr. (*Aphanochæte repens* A. Br.). I. Ep. II. Ha., Hy., No., Wh. III. Bh., C., Th. V. Go.

Var. *GRACILIS* var. n.Var. *cellulis* minoribus, diametro 2-3-plo longioribus, setis tenuioribus et distincte articulatis.Long. cell. 7-15 μ ; lat. cell. 4-7 μ . II. U., on *Oedogonium* sp.Genus *Nordstedtia* Borzi.

1. *N. globosa* (Nordst.) Borzi. III. E., Fg., M., Th. V. Go. VI. N. VIII. T., W.

Var. *depressa* nob. (*Aphanochæte globosa* var. *depressa* West). III. Mp. VI. N.Genus *Chætophora* Schrank.

1. *C. pisiformis* (Roth) Ag. II. Ru. III. Ew., Mp.
2. *C. elegans* (Roth) Ag. I. Ep. III. Fg., Canal at Woking. VII. S.
3. *C. Cornu Damæ* (Roth) Ag. (*C. endivæfolia* auct.). III. M. VII. S.
4. *C. tuberculosa* (Roth) Ag. IV. Ks.

Genus *Draparnaudia* Bory.

1. *D. glomerata* (Vauch.) Ag. III. M. IV. Ks. VI. N.

Obtained with spores from Mitcham Common, Surrey, and Keston Common, Kent. Spores thick-walled; walls rusty brown and rough; chlorophyll parietal.

Var. *distans* (Kütz.) —. III. Ew.

2. *D. plumosa* (Vauch.) Ag. I. Ep. II. Ru. III. Ew., Pu. VII. D. VIII. G. H.

Genus *Stigeoclonium* Kütz.

1. *S. tenue* (Ag.) Rabenh. III. Do., E. IV. Hc.
2. *S. protensum* (Dillw.) Kütz. III. Th. VII. D.
3. *S. fastigiatum* Kütz. III. M.

Sub-fam. CONFERVEÆ.

Genus *Conferva* L.; em. Lagerh.

1. *C. bombycina* Ag. Generally distributed and abundant.
Forma *minor* Wille. General and abundant.
2. *C. Raciborskii* Gutw. VI. N.

Genus *Microspora* Thur.; em. Lagerh.

1. *M. floccosa* (Vauch.) Thur. I. Ep. II. Ha., Pi.
2. *M. Wittrockii* (Wille) Lagerh. III. C.
3. *M. abbreviata* (Rabenh.) Lagerh. II. Pi.
4. *M. fontinalis* (Berk.) De Toni. VII. Street.

Fam. Chroolepidaceæ.

Genus *Microthamnion* Näg.

1. *M. strictissimum* Rabenh. 1863. (*M. vexator* Cooke 1882).
I. Ep. III. B., Br., Di., Ew., M., Pt., Wi. VI. N.

There is no doubt that Cooke gave the name *M. vexator* to the plant previously described by Rabenhorst as *M. strictissimum*. Dr. Nordstedt (in K. Sv. Vet.-Akad. Handl., Bd. xxii. No. 8, p. 15) suggests that they are identical. Cooke (Brit. Freshw. Alg., p. 188) states that his species is "very much more slender than *M. strictissimum*," and gives as the diameter .003 mm. Nordstedt's measurements of *M. vexator* are 3-4 μ (diam.) Rabenhorst's measurements of *M. strictissimum* are 1/700-1/600 of a Paris line (= 3-4 μ); therefore Cooke, in giving the above statement, must have made a mistake in converting Rabenhorst's measurements to mm.

- *2. *M. Kützingianum* Näg. I. Ep. III. E., Pa., Rp. IV. Cb.
V. Go.

Fam. Cladophoraceæ.

Genus *Cladophora* Kütz.

1. *C. flavescens* Ag. II. Wh. III. Cr., Ra.
2. *C. crispata* (Roth) Kütz. II. No. III. Bh.
3. *C. glomerata* (L.) Kütz. II. Ha., Hy. VI. N.

Ord. *Conjugatæ*.

Fam. Zygnemaceæ.

Sub-fam. MESOCARPEÆ.

Genus *Mougeotia* Ag.

1. *M. scalaris* Hass. III. Ew.
2. *M. recurva* (Hass.) De Toni. VI. N.
3. *M. parvula* Hass. I. Ep. III. Ew., Wi. VIII. T.
4. *M. genuflexa* (Dillw.) Ag. II. No., U. III. Ew., Wi.
VI. N.

- *5. *M. calcarea* Wittr. VI. N.
- 6. *M. capucina*. III. Ew. VI. N.
- 7. *M. quadrangulata* Hass. III. Dj.
- 8. *M. viridis* (Kütz.) Wittr. I. Ep. III. Ew., Pu., Th., We.
- 9. *M. gracillima* (Hass.) Wittr. I. Ep. III. C., Ew., Wi.

Genus *Gonatonema* Wittr.

- 1. *G. BOODLEI* sp. n.

G. cellulis vegetativis diametro 12-15-plo longioribus; aplanosporis maturis c fronte et e latere visis ellipticis, apicibus late acuteve rotundatis, membrana distincte punctata, lutescente.

Crass. fil. veget. $5-5.5\ \mu$; long. aplanospor. $17-23\ \mu$ (plerumque $21\ \mu$); lat. aplanospor. $13-17\ \mu$ (plerumque $15\ \mu$). III. M.

This interesting genus has been but once previously found in this country, when Hassall (1845) described from Notting Hill a plant which he named *Mesocarpus notabilis*, and which has since been placed by Wittrock (1878) under *Gonatonema* as *G. notabile* (Hass.) Wittr. *G. Boodlei* differs from *G. ventricosum* Wittr. in being slightly smaller, and in having elliptical aplanospores when seen from either the front or side; these aplanospores are never oblique, the apices are never truncate, and the spore-membrane is punctate. It was found in abundance mixed with *Spirogyra* sp. in a gathering made by Mr. L. A. Boodle in 1894 in a ditch on Mitcham Common, Surrey.

Sub-fam. ZYGNEMEE.

Genus *Debarya* Wittr.

- 1. *D. glyptosperma* (De Bary) Wittr. VI. N. (very fine, April 1897).
- 2. *D. lævis* (Kütz.) nob. [*Mougeotia lævis* (Kütz.) Arch.]. III. M.

Crass. fil. veget. $25\ \mu$; spor. $42-50 \times 28-32\ \mu$.

There seems to be no doubt whatever that this plant is a true *Debarya*, as the whole of the contents of the conjugating cells unites to form a true zygospore. The adult zygospores are dark coloured, with thick walls, and are ornamented with large scrobiculations.

Genus *Zygnema* Ag.; em. De Bary.

- 1. *Z. anomalum* (Hass.) Cooke. IV. Ks.
- 2. *Z. leiospermum* De Bary. III. Ew. VIII. T.
- 3. *Z. atrocæruleum* sp. n.

Z. cellulis vegetativis diametro $2\frac{1}{2}$ -5-plo longioribus; zygosporis globosis vel subglobosis, membrana lævis, homo-

genea, et atrocœrulea, in una cellularum conjugatarum inclusis ;
cellulis fructiferis valde inflatis circa zygosporas.

Crass. fil. veget. $14\cdot5$ – $17\ \mu$ (plerumque 15 – $16\ \mu$) ;
diam. zygosp. 23 – $26\ \mu$ (usque ad $29\ \mu$ long.).
V. N.

This species comes nearest to *Z. melanospermum* Lagerh. and *Z. cyanospermum* Cleve. It differs from the former in its narrower filaments, in its subglobose zygosporas, and in having the fructiferous cells much inflated round the zygosporas ; from the latter, in its narrower filaments and much smaller zygosporas, which are not situated in the conjugating tube between the filaments.

4. *Z. ericetorum* (Kütz.) Hansg. I. Ep. III. Pu., Th., Wi.
5. *Z. pectinatum* (Vauch.) Ag. VI. N.

Genus *Spirogyra* Link.

1. *S. tenuissima* (Hass.) Kütz. II. Ha., U., Wh. III. M.
2. *S. inflata* (Vauch.) Rabenh. III. Ew., M.
- *3. *S. Sprœiana* Rabenh. III. Ew.
4. *S. Weberi* Kütz. II. Ru. III. Ra.
- *5. *S. calospora* Cleve.

The cells are 4 to 7 times longer than broad ; sporiferous cells very slightly inflated to accommodate the zygosporas, which is a little broader than the vegetative cells. The zygosporas were usually oblong-elliptic, and only $1\frac{1}{2}$ times longer than broad although occasionally twice as long. The median spore-membrane is covered so densely with large somewhat angular scrobiculations of variable size, that its surface view appears a mere reticulation. Petit's figure (*Spirogyræ des envir.* Paris, pl. ii. f. 13) of an enlarged portion of the zygosporas of this species is very incorrect.

Crass. cell. veget. 31 – $36\cdot5\ \mu$; crass. cell. fruct. 41 – $52\ \mu$;
long. zygosp. 75 – $87\ \mu$; lat. zygosp. 40 – $50\ \mu$. II. Ru.

6. *S. gracilis* (Hass.) Kütz. var. *flavescens* (Hass.) Rabenh.
II. Ru.

7. *S. cateniformis* (Hass.) Kütz. III. M. VI. N.
8. *S. affinis* (Hass.) Petit. III. E., M.
9. *S. varians* (Hass.) Kütz. II. Ru. III. B. VII. Street.
10. *S. porticalis* (Müll.) Cleve. IV. Hc.
11. *S. decimina* (Müll.) Kütz. III. Fl.

Var. *CYLINDROSPERMA* var. n.

Var. zygosporis exacte cylindricis, diametro 2 – $3\frac{1}{2}$ -
plo longioribus, apicibus late rotundatis, cellulas
fructiferas pæne complentibus.

Crass. cell. veget. 40 – $44\ \mu$; long. zygosp. 92 – $140\ \mu$;
lat. zygosp. 39 – $43\ \mu$. III. Fl.

12. *S. nitida* (Dillw.) Link. II. Ha. III. Fl., Wi.

13. *S. setiformis* (Roth) Kütz. III. Fl.
14. *S. bellis* (Hass.) Cleve. II. Ki., U., Wh.
15. *S. crassa* Kütz. III. Cr. IV. Hc.

Fam. Desmidiaceæ.

Genus *Gonatozygon* De Bary.

1. *G. Ralfsii* De Bary. III. Ew., M. VI. N. VII. D.
2. *G. Brebissonii* De Bary. III. Ew., Fg., Rp., Th. IV. Ks. VI. N. VIII. H.
3. *G. minutum* West. III. Ew. VI. N. VIII. H.
4. *G. læve* Hilse. I. Ep.
5. *G. Kinahani* (Arch.) Rabenh. III. Rp., Wi.

Genus *Spirotænia* Bréb.

1. *S. condensata* Bréb. III. Th. VII. D. VIII. H., Hl., L., W.
2. *S. obscura* Ralfs. III. Ew., Wi.

Very abundant from Wimbledon Common, Surrey, Oct. 1892,
and from Esher West-end Common, Oct. 1893.

Genus *Mesotænium* Näg.

1. *M. De Greyi* W. B. Turn. III. Pu. VIII. T.
2. *M. violascens* De Bary. III. Dj.
- *3. *M. Endlicherianum* Näg. var. *grande* Nordst. I. Ep.

Genus *Cylindrocystis* Menegh.

1. *C. diplospora* Lund. I. Ep. III. C., Th. VIII. T.
2. *C. crassa* De Bary. I. Ep. III. B., Bi., C., E., Th., Wi. VIII. H., Hl., T., W.

— Pure gatherings from Chobham, Surrey.

3. *C. Brebissonii* Menegh. III. Bo., C., Rp., Th. (with zygospores), Wi., Wo. IV. Ks. VII. Gp. VIII. R., T., W.

Genus *Penium* Bréb.

1. *P. margaritaceum* (Ehrenb.) Bréb. III. E. VI. N. VII. D. VIII. G., H.

Var. *punctatum* Ralfs. VII. D.

2. *P. cylindrus* (Ehrenb.) Bréb. III. Pu., Th. (with zygospores).
3. *P. cuticulare* West & G. S. West. III. Th. (with zygospores).
4. *P. exiguum* West forma *Lewisii* West & G. S. West (*Penium Lewisii* W. B. Turner). III. Bi., E. VIII. W.
5. *P. spirostriolatum* Barker. III. Pu. VIII. H., T.
6. *P. digitus* (Ehrenb.) Bréb. (inclus. *P. lamellosum* Bréb.).

I. Ep. III. Bi., C., E., Ew., Pu., Th. IV. Ks. VII. D. VIII. G., H., Hl., T., W.

Var. *constrictum* West. VI. N.

7. *P. interruptum* Bréb. III. Pu.

8. *P. Nägelii* Bréb. III. Th. VI. N.

Long. $115\ \mu$; lat. $25\ \mu$.

9. *P. libellula* (Focke) Nordst. (*P. closterioides* Ralfs). III. C., Th., Wo. VII. D. VIII. H.

Forma *interrupta* West. III. C.

10. *P. Navicula* Bréb. I. Ep. III. E., Ew., Fh., Th. IV. Ks. VI. N. VII. D. VIII. H., L.

11. *P. rufescens* Cleve (*P. rufopellitum* Roy). III. Bi.

12. *P. curtum* Bréb. III. Pu., Th. VII. Gp.

Forma *major* Wille. III. Mp.

Long. $59\ \mu$; lat. $30-32\ \mu$.

13. *P. suboctangulare* West. VI. N. (with zygosporos).

14. *P. subtilis* sp. n. (Pl. VI. figs. 8, 9.)

P. minutissimum, pene $1\frac{1}{2}$ -plo longius quam latum, ellipticum, apicibus subtruncatis, medio cum sutura mediana delicatissima (levissime constrictum); a vertice visum exakte circulare; membrana achroa, delicatissime et indistincte punctulata, punctulis sparsis circiter 12 in semicellula unaquaque.

Long. $14-15\ \mu$; lat. $10-11\ \mu$. III. Th.

This minute species was in abundance and was perfectly constant in its characters. The widest part of the cell is always *in the middle*, and the apices are always flattened.

It can be compared with *Disphinctium sparsipunctatum* Schmidle (in Oesterr. botan. Zeitschrift, 1895, No. 7, p. 14 (sep.) t. xv. f. 1-6), from the unconstricted form of which it differs in the form of its cells, its much more delicate punctulations, and its circular vertical view.

15. *P. truncatum* Bréb. VII. D. VIII. T., W.

16. *P. polymorphum* Perty. III. C. VIII. P.

17. *P. inconspicuum* West. III. Pu. IV. Ks.

18. *P. cruciferum* (De Bary) Wittr. I. Ep. III. Wi.

19. *P. cucurbitinum* Bissett. I. Ep. III. Th.

20. *P. minutum* (Ralfs.) Cleve. III. C., Pu., Th. VI. N. VII. D. VIII. R., W.

Genus *Roya* West & G. S. West.

1. *R. obtusa* (Bréb.) West & G. S. West var. *montana* West & G. S. West. I. Ep. III. Ew.

Genus *Closterium* Nitzsch.

1. *C. abruptum* West. III. Pu., Wi. VI. N. VII. D.

2. *C. didymotocum* Corda. III. C., Th. VII. D. VIII. H., P.

Some slender forms of this species were observed from the New Forest (long. 405–418 μ ; lat. 28–34 μ), with rather more attenuate and slightly recurved apices; some of these were distinctly but minutely asperulate, being covered with somewhat irregular and depressed granules.

3. *C. turgidum* Ehrenb. I. Ep. III. Th. VI. N. VIII. L.
4. *C. praelongum* Bréb. III. Mp.
Forma *brevior* West. I. Ep. II. Ru. (with zygospores).
III. Fl.
5. *C. Pritchardianum* Arch. VIII. Tm. (with zygospores).
Long. 440–590 μ ; lat. 35–46 μ ; lat. apic. 7–8 μ ; diam.
zygosp. 83–108 μ .

This species was observed with zygospores in quantity. The cells were of the same proportions as those described by Archer, but the apices were generally a little narrower. The cell-membrane was of a uniform golden-brown colour, and the fine striolations, which consisted of a series of fine puncta, were arranged subspirally as in forma *crassa* Gutw. (in *Rosprawy Akad. Umiej. Kratow. Wydzial. mat-przyr.*, t. xxiii. (1896) p. 38, t. v. f. 13). Towards the apices, however, these puncta became irregular (cf. Pl. I. fig. 4). One zygospore was noticed which had been produced by the conjugation of three individual cells (Pl. VI. fig. 5).

6. *C. SILIQUA* sp. n. (Pl. VI. figs. 1, 2.)

C. submediocre, cellulis diametro circiter 10-plo longioribus, leviter curvatis, dorso modice curvato, in medio subrecto, et prope apices levissime concavo, ventre levissime concavo, parte mediana cellularum cum lateribus subparallelis, apices versus gradatim attenuatis, apicibus subangustatis, levissime recurvatis subrotundatisque; membrana achroa glabra; pyrenoidibus in serie singula subirregulariter dispositis, in semicellula unaquaque 7 vel 8; locellis apicalibus terminalibus et corpuscula oblonga singula includentibus.

Long. 217–250 μ ; lat. 21–24 μ ; lat. apic. 4 μ .
III. Ew.

This species is distinguished from *C. Pritchardianum* Arch. by its much smaller size, its much more tapering and narrower extremities, as well as by its smooth and colourless membrane. From *C. littorale* Gay it differs in being a little longer, in the absence of the slight ventral inflation, and in the blunter and slightly recurved apices. It may also be compared with *C. subangulatum* Gutw., from which it differs in the subparallel median portion of the cells, in the absence of the ventral inflation, in the more convex dorsal margin, as well as in the recurved apices. From all the above, the living examples are distinguished by the terminal locellus possessing but one oblong movable corpuscle.

- *7. *C. littorale* Gay. II. Kg. VIII. Tm.
- 8. *C. acerosum* (Schränk) Ehrenb. General; zygospores from Kingsbury, Middlesex.
- 9. *C. lanceolatum* Kütz. I. Ep. (with zygospores). II. Ki., Wh. III. B., Do, Fh. IV. Hc.
 Var. *PARVUM* var. n. (Pl. VI. fig. 3).
 Var. *duplo minor*. Long. 183 μ ; lat. 21 μ .
 III. Do., in ditch amongst *Spirogyra* sp.
- 10. *C. lunula* (Müll.) Nitzsch. I. Ep. III. B., E., Ew., Pu., Th. IV. Ks. VIII. G., H., L.
- 11. *C. Ehrenbergii* Menegh. I. Ep. II. Ha. III. B., C., Ew., Fh., Pt., Wi. (with zygospores). IV. Cb.

A pure gathering was obtained from a ditch in Roehampton Lane, Putney Heath, Surrey.

- 12. *C. Malinvernianum* De Not. III. Ew., Fh.

Forms were observed with rather more attenuate apices, which were obliquely subtruncate. Long. 284–359 μ ; lat. 41–48 μ ; lat. apic. 7 μ . VIII. Tm.

- 13. *C. moniliferum* (Bory) Ehrenb. General and abundant.
- 14. *C. Leibleinii* Kütz. I. Ep. II. Ha., No., Wh. III. Cr., Ew., M., Mp., Ra., Rp., Wi., Wt. V. Go. (with zygospores). VI. N. VII. S.
- 15. *C. Dianæ* Ehrenb. I. Ep. III. C., D., Ew., Mp., Wi. VIII. H., L., T., Tm., W.
- 16. *C. pseudodianæ* Roy. III. Th.
- 17. *C. parvulum* Näg. General; zygospores from Esher West-end and Mitcham Commons, Surrey.
- 18. *C. calosporum* Wittr. forma *major* West & G. S. West. V. Go. (with zygospores).
- 19. *C. Venus* Kütz. I. Ep. III. Ew. (very abundant in April 1895), Mp., Pu. VI. N. VIII. G., L.
- 20. *C. trochiscosporum* West & G. S. West. V. Go. (abundant with zygospores).
- 21. *C. Jenneri* Ralfs. III. Bi., Mp., Pu., Th. VI. N. VIII. T., Tm.
- 22. *C. Cynthia* De Not. III. Pu. VI. N.
- 23. *C. Archerianum* Cleve. VI. N. VIII. G.
- 24. *C. costatum* Corda. I. Ep. II. Ru. III. E., Ew., Pu., Th. IV. Ks. V. Go. VI. N. VIII. G., H., Hl., T., Tm.
- 25. *C. regulare* Bréb. III. Pu., not uncommon. Small forms; long. 226–232 μ ; lat. 24–26 μ .
- 26. *C. striolatum* Ehrenb. General; pure gathering from a pool on Wimbledon Common, Surrey.
 Var. *orthonotum* Roy. III. Dj., E., Fh., Pt., Wi. IV. Ks. VI. N. VII. D. VIII. H., T.

27. *C. intermedium* Ralfs. III. Bi., E., Th., We., Wi. VII. D., Gp. VIII. H.
Var. *hibernicum* West. III. Mp.
 28. *C. directum* Arch. III. E., Mp.
 29. *C. angustatum* Kütz. III. Th. VI. N. VIII. G., R., W.
 30. *C. juncidum* Ralfs. I. Ep. III. Bi., Ew., Pu. VIII. G., H., T. (with zygospores).
 31. *C. lineatum* Ehrenb. I. Ep. III. Ew. IV. Ks. VI. N. (with zygospores). VIII. H.
 32. *C. Ralfsii* Bréb. IV. Ks.
Var. *hybridum* Rabenh. III. Pu., Th.
 33. *C. attenuatum* Ehrenb. I. Ep. III. Ew., M., Pu., Th. VI. N. VIII. Tm.
 34. *C. rostratum* Ehrenb. General and abundant. Zygospores from Epping Forest, Essex; Esher West-end, Mitcham, Puttenham and Wimbledon Commons, Richmond Park and Frensham, Surrey.
Var. *brevirostratum* West. III. Ew., Wi. (with zygospores).
 35. *C. setaceum* Ehrenb. III. Pu., Th. (with zygospores). VIII. G.
 36. *C. Kützingii* Bréb. I. Ep. III. Ew., Fl., M., Mp., Ra., Rp. V. Go. (with zygospores). VI. N. VIII. L.
 37. *C. Cornu* Ehrenb. I. Ep. II. Ru. III. M. IV. Ks. V. Go. VIII. G., H., L., T.
 38. *C. gracile* Bréb. I. Ep. III. E., Ew., Pu., Th. V. Go. (with zygospores). VI. N. (with zygospores). VII. D. VIII. G.
 39. *C. pronum* Bréb. I. Ep. VI. N. VIII. K.
- A form of this was noticed with the membrane colourless and without any trace of striation. There were ten pyrenoids in each semi-cell. Long. 375 μ ; lat. 9 μ . III. Rp.
40. *C. acutum* (Lyngb.) Bréb. I. Ep. II. Ru. III. Fh., M., Wa., Wi. V. Go. (with zygospores). VIII. W.
 41. *C. linea* Perty. I. Ep. III. Bi., Dj., E., Ew., M., Mp., Rp., Th. IV. Ks. VIII. W.
 42. *C. Ceratium* Perty. III. E., Wi.

Genus *Docidium* Bréb.

1. *D. baculum* Bréb. VI. N.

Genus *Pleurotænium* Näg.

1. *P. coronatum* (Bréb.) Rabenh. III. Th. VI. N.
Var. *nodulosum* (Bréb.) West. III. E., Th. VI. N. VIII. W.

2. *P. Ehrenbergii* (Bréb.) De Bary. I. Ep. III. C., Ew., Mp., Pu., Th. (with zygospores), Wa., Wi., Wo. IV. Hc., Ks. V. Go. VII. D. VIII. G., H., L., T., Tm., W.
Diam. zygosp. 70 μ .
3. *P. Trabecula* (Ehrenb.) Näg. (*P. maximum* (Reinsch) Lund. var. *occidentale* West). I. Ep. III. Fg., Mp., Ra., Rp., Th., Wi. VI. N. VII. D.
4. *P. truncatum* (Bréb.) Näg. III. B., C., Di., Ew., M., Mp., Wi.

Genus *Tetmemorus* Ralfs.

1. *T. Brébissonii* (Menegh.) Ralfs. III. C., E., Th. VII. D., Gp. VIII. H.
2. *T. granulatus* (Bréb.) Ralfs. I. Ep. III. Bi., C., E., Th., Wa. IV. Ks. VII. D., Gp. VIII. G., H., L., T. (with zygospores), W.
3. *T. lævis* (Kütz.) Ralfs. I. Ep. III. Bi., C., E., Pu., Th., Wi. IV. Ks. VII. D., Gp. VIII. G., H., Hl., T.

Genus *Euastrum* Ehrenb.

1. *E. verrucosum* Ehrenb. III. Mp., Pu. IV. Ks. VI. N. VIII. G., Tm.
2. *E. oblongum* (Grev.) Ralfs. I. Ep. III. Ew., Mp., Pu. IV. Ks. VII. D., Gp. VIII. G., H., Tm.
3. *E. crassum* (Bréb.) Kütz. III. C., Th. VII. D. VIII. H., W.
Var. *scrobiculatum* Lund. VI. N.
4. *E. ventricosum* Lund. III. Th.
5. *E. humerosum* Ralfs. VIII. H.
6. *E. affine* Ralfs. III. C.
7. *E. ampullaceum* Ralfs. III. C., Dj., Th. VII. D.
8. *E. insigne* Hass. III. C. VII. D.
9. *E. didelta* (Turp.) Ralfs. III. Bi., C., E., Pt., Th. IV. Ks. VI. N. VII. D., Gp. VIII. H.
Forma *scrobiculata* Nordst. VI. N.
10. *E. cuneatum* Jenner. III. Th.
11. *E. ansatum* Ehrenb. I. Ep. III. Bi., E., Pu., Th. IV. Ks. VII. Gp. VIII. G., H., L., T., W.
12. *E. sinuosum* Lenorm. III. Th. VI. N. VII. D.
13. *E. pectinatum* Bréb. I. Ep. III. Bi., Mp., Th. (with zygospores). IV. Ks. VI. N. VII. D. VIII. G. (with zygospores), H., L., T., Tm., W.
14. *E. gemmatum* (Bréb.) Ralfs. VII. D. VIII. H.
15. *E. rostratum* Ralfs. VII. D. VIII. G.
16. *E. elegans* (Bréb.) Kütz. I. Ep. III. Bi., Pu., Th. IV. Ks. VI. N. (with zygospores). VII. D., Gp. VIII. G., H.
Var. *bidentatum* (Näg.) Jacobs. III. Ew., Mp., Pu. V. Go. VI. N. VII. Gp. VIII. L.

17. *E. inerme* (Ralfs) Lund. III. Th. VII. D.
18. *E. erosum* Lund. var. *notabile* West. I. Ep. III. Bi. VIII. L.
19. *E. pyramidatum* West. III. Th. VIII. W.
20. *E. insulare* (Wittr.) Roy. VI. N.
21. *E. binale* (Turp.) Ehrenb. I. Ep. III. Bi., C., E., M., Mp., Pu., Th. IV. Ks. VI. N. (with zygospores). VII. D., Gp. VIII. G., H., Hl., K., L., R., W.
 Forma minor West. III. Pu.
 Var. elobatum Lund. III. Ew.
22. *E. denticulatum* (Kirchn.) Gay. III. Bi., C., E., Ew., Mp., Th. IV. Ks. VI. N. VII. D. VIII. L.

Genus *Micrasterias* Ag.

1. *M. mucronata* (Rabenh.) III. C., Th.
2. *M. americana* (Ehrenb.) Ralfs. III. Mp.
3. *M. angulosa* Hantzsch. III. Th. VI. N.
4. *M. denticulata* Bréb. III. C., E., Ew., Th. (with zygospores). IV. Ks. VII. D. VIII. H. (with zygospores), Hl., R., Tm., W.
5. *M. rotata* (Grev.) Ralfs. III. Pu. IV. Ks. VII. D., Gp. VIII. L., R., Tm.
6. *M. Thomasiana* Arch. III. C., Th.
7. *M. radiosa* Ralfs. III. Mp.
8. *M. papillifera* (Bréb.) III. Th. VII. D. VIII. L.
9. *M. truncata* (Corda) Bréb. III. Bi., C., E., Th. VII. D. VIII. G., Hl., W.
 Var. Bahusiensis Wittr. VI. N.
10. *M. Jenneri* Ralfs. III. Th. VI. N.
 Var. simplex West. VI. N.

Genus *Xanthidium* Ehrenb.

1. *X. armatum* (Bréb.) Rabenh. III. C., E., Th. VII. D. VIII. H., R., W.
2. *X. fasciculatum* Ehrenb. III. Ew., Mp. VIII. H.
3. *X. cristatum* Bréb. VI. N. VIII. G., H.
4. *X. antilopæum* (Bréb.) Kütz. I. Ep. III. Mp., Th. (with zygospores). VI. N. VII. D. VIII. G., H.
5. *X. Smithii* Arch. var. *variabile* Nordst. III. Dj. (with zygospores), E., Th.
6. *X. concinnum* Arch. (*Arthrodesmus hexagonus* Boldt).

The typical form is rather more deeply constricted than the var. *Boldtianum*; there are two small mucros at the apical angles, but only one at the lateral angles, this character being well seen in vertical view. (Pl. VI. fig. 15.)

Long. 9–9.5 μ ; lat. s. mucr. 9.5–10.5 μ ; lat. isthm. 2.5–3 μ ; crass. 7 μ . III. Pu., Th.

Var. Boldtianum West (*Arthrodesmus hexagonus* Boldt forma Boldt). III. Th.

Genus *Cosmarium* Corda.

1. *C. quadratum* Ralfs. I. Ep. III. Bh., Mp., Pu., Th., Wi. IV. Ks. V. Go. VI. N. VIII. G., T., W.
2. *C. Nymannianum* Grun. III. Th.
3. *C. Hammeri* Reinsch. VIII. G.
4. *C. granatum* Bréb. I. Ep. III. Fg., Rp. IV. Ks. VI. N. VII. D. VIII. K.
Var. *subgranatum* Nordst. I. Ep. III. Rp. VII. S.
5. *C. trilobulatum* Reinsch. VI. N.
6. *C. tetragonum* (Näg.) Arch. I. Ep.
7. *C. Cucumis* Corda. I. Ep. III. Ea., Mp., Pu. V. Go. VIII. H., P.
- *8. *C. subcucumis* Schmidle (in Berichte der Naturf. Gesellsch. Freiburg, Bd. vii., Heft 1, p. 98, t. iv. f. 20-22).

The forms seen were relatively longer and the sinus was rather more open. There were two large pyrenoids in each semi-cell. The relative proportion of breadth to length in Schmidle's specimens was 1:1.42; that of ours was 1:1.79.

Long. 64-77 μ ; lat. 38-44 μ ; lat. isthm. 13.5-18 μ ;
crass. 25-27 μ . III. Ew. (abundant Feb. 1894), Wi.

9. *C. Ralfsii* Bréb. III. C. VII. D.
10. *C. pachydermum* Lund. III. M., Mp. VIII. Tm.
11. *C. canaliculatum* West & G. S. West. V. Go.
12. *C. pyramidatum* Bréb. III. Bi., C., Rp., Th. VII. D., Gp. VIII. G.
13. *C. pseudopyramidatum* Lund. III. Th. VII. S.
14. *C. variolatum* Lund. III. Th. IV. N.
- *15. *C. ocellatum* B. Eichl. & Gutw. (in Rospr. Akad. Umiej. Krakow. Wydz. matem.-prz., ser. ii. tom. viii. vol. xxviii. (1895) p. 164, t. iv. f. 7.

Var. *INCASSATUM* var. n. (Pl. VI. fig. 12.)

Var. sinu semper aperto; semicellulis apicibus subtruncatis, in centro incrassatis et luteo-fuscis, cum scrobiculis parvis 3-6; a latere visis circularibus; a vertice visis ellipticis, incrassatis, et leviter tumidis, ad medium utrobique.

Long. 28-30 μ ; lat. 24-26 μ ; lat. isthm. 5.5-6.5 μ ;
crass. 14.5-15 μ . III. Th. VI. N.

The thickened area in the centre of the semi-cells is always more or less coloured, and possesses a central larger scrobiculation surrounded by a variable number of somewhat smaller ones.

16. *C. nitidulum* De Not. III. Th.
17. *C. subtumidum* Nordst. III. Dj. IV. Ks. VIII. H.
- *18. *C. Klebsii* Gutw. VI. N.

19. *C. Phaseolus* Bréb. II. Wh. III. Bi., Dj., E., Fg., Mp., Th. VII. S. VIII. G., T.
Forma minor.
 Long. $21\ \mu$; lat. $18\ \mu$; lat. isthm. $5.5\ \mu$; crass. $10\ \mu$; VII. Gp.
20. *C. fontigenum* Nordst. III. Pu.
 Long. $22\ \mu$; lat. $25\ \mu$; lat. isthm. $6\ \mu$; crass. $11.5\ \mu$.
21. *C. tetrachondrum* Lund. III. Mp.
22. *C. Scenedesmus* Delp. I. Ep. III. Th.
23. *C. pseudoprotuberans* Kirchn. I. Ep. III. Th. (with zygospores). VI. N.
24. *C. rectangulare* Grun. III. C., Dj., E.
25. *C. inconspicuum* West & G. S. West. III. M. (with zygospores).
26. *C. bioculatum* Bréb. II. U. III. Bi., E., Ew., Mp., Pu. (with zygospores), Th., Wi. VIII. W.
 Diam. zygosp. s. spin. $17-19\ \mu$; c. spin. $26-28\ \mu$. (Pl. VI. fig. 17.)
 Var. *depressum* Schaar. I. Ep. IV. Ks.
 Var. *HIANS* var. n. (Pl. VI. fig. 24.)
 Var. *sinu apertiori extrorsum*, marginibus inferioribus semicellularum convexis, apicibus rectis vel levissime retusis; membrana distincte punctata.
 Long. $17-19\ \mu$; lat. $15-18\ \mu$; lat. isthm. $3.5-4\ \mu$; crass. $7.5-8.5\ \mu$. III. Pu., Th.

This comes nearest to *C. bioculatum* var. *excavatum* Gutw., but is proportionately shorter; the apex of the sinus is subacute; the apices of the cells are straight or very slightly retuse; and the membrane is punctate.

- *27. *C. aspherosporum* Nordst., var. *strigosum* Nordst. III. Pu.
 Long. $10.5-11\ \mu$; lat. $9.5\ \mu$; lat. isthm. $3.5\ \mu$; crass. $5\ \mu$.
28. *C. tinctum* Ralfs. I. Ep. III. Di., E., Ew., Pu., Th., Wi. IV. Ks. VI. N. VII. D., Gp. VIII. G., H., T.
29. *C. succisum* West. III. Pu.
30. *C. abbreviatum* Racib. I. Ep. II. U.
31. *C. pygmaeum* Arch. III. Mp.
32. *C. truncatellum* Perty. III. C.
 Long. $9.5-10.5\ \mu$; lat. $12.5-14.5\ \mu$; lat. isthm. $5.5\ \mu$; crass. $5\ \mu$. (Pl. VII. fig. 3.)
- *33. *C. geometricum* West & G. S. West. III. Pu.
- *34. *C. hexangulare* Nordst. III. Th.
- *35. *C. Heimerlii* West & G. S. West. (*C. minutissimum* Heimerl non Arch.) III. Mp., Th. IV. Ks.
36. *C. SPHAGNICOLUM* sp. n. (Pl. VI. figs. 13, 14.)
C. minutissimum, paullo latius quam longum, modice con-

strictum, sinu brevi et aperto; semicellulæ subtrapeziformes, angulis superioribus oblique truncatis, lateribus divergentibus sursum, apicibus latis, rectis vel levissime retusis; a latere visæ subcirculares; a vertice visæ elliptico-oblongæ, polis subacutis, medio utrobique leviter tumidæ, polos versus utrobique papilla instructæ; pyrenoidibus singulis.

Long. $10\cdot5$ – $11\cdot5\ \mu$; lat. 11 – $13\cdot5\ \mu$; lat. isthm. 5 – $5\cdot5\ \mu$; crass. $6\cdot5\ \mu$. III. Th.

We also have this minute species in immense quantity among *Sphagnum* from Mossdale Moor, Widdale Fell, N. Yorks. It is most nearly related to some forms of *C. Heimerlii* in vertical view, but the front view is quite distinct. The figures are all taken from Yorkshire specimens.

37. *C. Regnellii* Wille. I. Ep. II. Ha. III. Bi. VII. S.
38. *C. impressulum* Elfv. I. Ep. II. U. III. Fg., Mp. VII. S. VIII. Tm.
39. *C. venustum* (Bréb.) Arch. VI. N. VII. D. VIII. G., K., L.
Var. *majus* Wittr. III. Th. VI. N.
40. *C. læve* Rabenh. I. Ep. IV. Hc. VIII. T.
Var. *septentrionale* Wille. I. Ep. II. Wh. III. Pu.
41. *C. Meneghinii* Bréb. General.
Forma *octangularis* Wille. II. Wh. III. B., Di., M., Mp., Wi. IV. Ks. V. Go. VIII. G., P., T.
Var. *Wollei* Lagerh. VII. D.
- *42. *C. difficile* Lütken. III. Th. VI. N. VIII. T.
*Var. *sublæve* Lütken. VIII. T., W.
- *43. *C. umbilicatum* Lütken. II. Wh., abundant.
44. *C. concinnum* (Rabenh.) Reinsch. III. Pu., Th.
45. *C. obliquum* Nordst. III. C.
46. *C. Regnesii* Reinsch. III. Th. (with zygospores), Pu., abundant. VI. N.
47. *C. montanum* Schmidle (*C. Pseudoregnesii* West & G. S. West). I. Ep.
- *48. *C. Novæ Semliæ* Wille var. *sibiricum* Boldt. VI. N., very abundant, June 1897.
49. *C. cymatonotophorum* West. III. Th. VI. N.
- *50. *C. Sinostegos* Schaarsm. var. *obtusius* Gutw. III. Pu.
51. *C. ADOXUM* sp. n. (Pl. VII. fig. 24.)

C. minutissimum, paullo longius quam latum, profunde constrictum, sinu lineari; semicellulæ late pyramidato-trapeziformes, angulis basalibus oblique rotundo-truncatis et leviter divergentibus, lateribus (superioribus) subrectis vel levissime retusis, apicibus late truncatis rectisque; a vertice visæ ellip-

ticæ, polis rotundatis, cum papilla prominente ad medium utrobique.

Long. 10–11 μ ; lat. 9.5 μ ; lat. isthm. 3 μ ; crass. 5 μ . VI. N.

This minute species is nearest to *C. Sinostegos* Schaars. var. *obtusius* Gutw., but differs in being proportionately longer, in the more rounded and more rectangular basal angles, and in the rounded poles of the vertical view. It is very distinct from typical *C. Sinostegos*.

52. *C. substriatum* Nordst. III. Dj., Fg., Fl., Mp., Rp. V. Go. VI. N. VII. S. VIII. H.

53. *C. notabile* Bréb. VIII. T., W.

**Forma media* Gutw. VI. N.

Long. 25 μ ; lat. 16 μ ; lat. isthm. 9 μ .

54. *C. crenatum* Ralfs. III. Di., Ra., Wi. VIII. H., P., T.

55. *C. subcrenatum* Hantzsch. I. Ep. II. Wh. III. Wt.

56. *C. hexalobum* Nordst. var. *minus* Roy et Biss. I. Ep.

57. *C. undulatum* Corda. III. Di., Ew.

58. *C. cymatopleurum* Nordst. var. *tyrolicum* Nordst. VIII. Tm.

59. *C. tetraophthalmum* (Kütz.) Menegh. III. B., Th. IV. Ks. VI. N. VIII. G., T.

Var. *Lundellii* Wittr. I. Ep. III. Fg., Rp. VIII. G., T.

60. *C. ovale* Ralfs. VI. N.

*Var. *subglabrum* West & G. S. West. VI. N.

61. *C. Brebissonii* Menegh. III. Th. IV. Ks. VII. D. VIII. H., R., W.

Forma erosa West. III. Ew. VIII. T., W.

62. *C. latum* Bréb. II. Wh.

63. *C. margaritatum* (Lund.) Roy et Biss. III. Fg., Th., very abundant. VI. N.

64. *C. conspersum* Ralfs. IV. Ks. VIII. T.

65. *C. margaritifera* (Turp.) Menegh. II. Ki. III. C., Rp., Wi. IV. Ks. VII. D. VIII. T.

66. *C. reniforme* (Ralfs) Arch. III. Mp., Th. IV. Ks. V. Go. VIII. K., T.

67. *C. Portianum* Arch. III. Mp., Pu., Th. VII. D. VIII. G.

*Var. *orthostichum* Schmidle. III. Pu.

68. *C. amœnum* Bréb. III. Th. VIII. H., L.

69. *C. Logiense* Biss. I. Rp. VII. S.

70. *C. punctulatum* Bréb. II. U., Wh. III. C., Pu., Wi. IV. Ks. VII. D., S. VIII. T.

71. *C. subpunctulatum* Nordst. III. Rp., Th. VI. N. VIII. H., T.

Numerous specimens of this species were observed from the New Forest, all of which had rather more prominent central granules than the original examples from New Zealand. (Pl. VI. fig. 19.)

Long. 33 μ ; lat. 31 μ ; lat. isthm. 9 μ ; crass. 18 μ .

Var. *Börgesenii* West. III. Fl., Mp.

C. trachypleurum Lund. var. *minus* Racib. forma Borge (in Bih. till K. Sv. Vet.-Akad. Handl., Bd. 19, Afd. iii. p. 28, t. ii. fig. 30) is *C. subpunctulatum* var. *Börjesenii*, and not a form of *C. trachypleurum*.

72. *C. sphalerostichum* Nordst. III. Th. VII. Gp. VIII. T., W.

73. *C. abruptum* Lund. VIII. H.

74. *C. Blyttii* Wille. III. Bi., Th.

Var. *NOVÆ SYLVÆ* var. n. (Pl. VI. fig. 10.)

Var. paullo major, oblongo-subrectangularis, crenis lateralibus prominentibus et truncatis, serie singula granulorum (10) intra margines, in centro semicellularum cum annulo granulorum 5, eo superiori maximo.

Long. $22\ \mu$; lat. $17\cdot5\ \mu$; lat. isthm. $5\cdot5\ \mu$; crass. $10\ \mu$. VI. N.

This variety was in abundance, and is nearest to *C. Blyttii* subsp. *Hoffii* Börjesen, from which it differs in being proportionately longer, in its more pronounced lateral crenations, and in the central granules of the semi-cells. In comparing our variety with Börjesen's, we have taken his figure, which is almost as broad as long; his measurements indicate that it is $1\frac{1}{3}$ times longer than broad, and are evidently incorrect. His figure is also under a wrongly stated magnification.

75. *C. Bæckii* Wille. III. Mp., Rp., Wi. IV. Hc. VI. N. VIII. H.

76. *C. subcostatum* Nordst. I. Ep. II. Ha., U. III. M. (very abundant), 1894, Mp., Pu., Th. IV. Hc.

77. *C. FASTIDIOSUM* sp. n. (Pl. VI. fig. 11.)

C. parvum, paullo longius quam latum, profunde constrictum, sinu angusto lineari extremo ampliato; semicellulæ angulari-semicirculares, angulis basalibus rotundatis, apicibus late truncatis, in margine laterali unoquoque granulis 7 (vel 8), apicibus glabris, granulis minutis paucis intra margines subconcentrice ordinatis, in centro granulis majoribus depressis 3-4; a latere visæ globosæ; a vertice visæ ellipticæ; ad medium utrobique cum granulis latis depressis tribus, polis granulatis cum granulis minutis in seriebus transversis ordinatis, in centro glabro; pyrenoidibus singulis magnis.

Long. $37-38\cdot5\ \mu$; lat. $33-36\ \mu$; lat. isthm. $11\ \mu$; crass. $21\ \mu$. V. Go., frequent.

This species approaches *C. subreniforme* Nordst., *C. subcostatum* Nordst., and *C. Bæckii* Wille, but differs sufficiently from all of them.

*78. *C. alatum* Kirchn. VII. S.

79. *C. Gregorii* Roy et Biss. III. Pu. VII. S.

80. *C. Kjellmani* Wille subsp. *grande* Wille. III. Ra.

- *81. *C. Nathorstii* Boldt. III. Mp.
 82. *D. formosulum* Hoff. II. Ha., Ru., Wh. III. Ew, Pu., Ra., Wt. IV. Hc.
 83. *C. quinarium* Lund. III. Mp. VI. N.
 84. *C. præmorsum* Bréb. II. Wh. III. Ew. IV. Ks. VII. S. VIII. T.
 85. *C. Botrytis* (Bory) Menegh. General and abundant; zygo-spores from Harefield, Middlesex; Frensham Great Pond, and Mill-pond E. of Chapel Wood, Surrey.
 Var. *mediolæve* West. III. Ew. IV. Hc.
 Var. *tumidum* Wolle. I. Ep. V. Go. (with zygosporos in abundance).

This variety does not differ from the type sufficiently to warrant its being placed as a species (*C. subbotrytis* Schmidle). Moreover, the zygosporos are precisely similar to those of the typical form.

86. *C. Turpinii* Bréb. (Inclus. *C. Turpinii* var. *Lundellii* Gutw.). III. Mp., Ra., Rp. VII. S.
 87. *C. eboracense* West. III. Rp.
 88. *C. Quasillus* Lund. III. Ew., Wi.
 89. *C. Corbula* Bréb. I. Ep. III. C., Ew., abundant.
 90. *C. Sportella* Bréb. I. Ep.
 91. *C. biretum* Bréb. II. Wh., pure gathering. III. Di., Ew., Wk.
 92. *C. Broomei* Thwaites. III. Mp.
 *93. *C. subbroomei* Schmidle. III. Mp.
 Long. 42 μ ; lat. 38 μ ; lat. isthm. 12 μ ; crass. 23 μ .
 (Pl. VI. fig. 20.)

We are a little uncertain exactly where to place this plant; it is certainly not *C. Broomei* Thwaites, nor is it *C. pseudobroomei* Wolle, and is a species we have not previously observed. It appears to be nearer to Schmidle's species (in Ber. d. Nat. Gesellsch. Freiburg, Bd. vii. Heft i. p. 104, t. v. f. 22-24) than any other, but the granules are more numerous, and those in the centre of the semi-cells do not project so prominently when seen in vertical view.

94. *C. confusum* Cooke var. *regularius* Nordst. III. Bi., Mp., Pu., Th. (with zygosporos). VI. N. VII. D. VIII. G., H.
 Subsp. *ambiguum* West. III. Pu., Th.
 95. *C. oechthodes* Nordst. I. Ep. III. Ew., Mp., Wi. V. Go. VIII. G., H., Tm.
 96. *C. orthostichum* Lund. III. Th. VI. N.
 *97. *C. Ungerianum* (Näg.) De Bary var. *SUBTRIPLICATUM* var. n. (Pl. VI. fig. 21.)
 Var. *semicellulis oblongo-rectangularibus, angulis superioribus rotundatis*.
 Long. 67 μ ; lat. 54 μ ; lat. isthm. 22 μ ; crass. 36 μ .
 III. Mp., frequent.

This variety is of the same dimensions as the typical form, and has the same arrangement of granules, but the outward form of the semi-cells is characteristically subrectangular. At first we considered it might be a large variety of *C. triplicatum* Wolle; but on comparison with specimens of that species, we found that, although the form was the same, yet the English plant was of larger size, and the arrangement of the granules was quite different (but like that in *C. Ungeria-num*).

98. *C. caelatum* Ralfs. I. Ep. IV. Ks. VII. Gp.

99. *C. commissurale* Bréb. II. Ha.

100. *C. ornatum* Ralfs. III. Mp., Th. (with zygospores). VI. N. (with zygospores). VII. D. VIII. G., H., L.

101. *C. cristatum* Ralfs. III. Th.

102. *C. speciosum* Lund. I. Ep.

103. *C. isthmium* West. III. Pu.

104. *C. orbiculatum* Ralfs. III. Bi. VI. N.

105. *C. contractum* Kirchn. III. Pu.

106. *C. ellipsoideum* Elfv. III. Th.

*Var. *minus* Racib. III. Th.

Long. $18\ \mu$; lat. $13\cdot5\ \mu$.

107. *C. arcuatum* Nordst. VI. N.

A small and rather irregular form. Long. $14\ \mu$; lat. $19\cdot5\ \mu$; lat. isthm. $7\ \mu$; crass. $7\cdot5\ \mu$.

108. *C. pseudarcuatum* Nordst. III. Ew.

*109. *C. subarcuatum* (Lagerh.) Racib. III. Ew.

Long. $15\text{--}17\ \mu$; lat. $13\cdot5\ \mu$; lat. isthm. $8\cdot5\ \mu$; crass. $8\cdot5\ \mu$.

110. *C. globosum* Buln. VII. D., abundant.

*Var. *minus* Hansg. I. Ep.

This was in great abundance, and most nearly approaches the form figured by Nordstedt in Ofvers. K. Vet.-Akad. Förh., 1872, No. 6, t. vii. f. 25; and as Hansgirg includes Nordstedt's form in his variety, we place it under this variety. It is smaller than the typical form, with depressed apices similar to those of *C. pseudarcuatum*, but the constriction is different from that in the latter species, and the vertical view is elliptical.

Long. $17\text{--}20\ \mu$; lat. $13\text{--}14\cdot5\ \mu$; lat. isthm. $9\cdot5\ \mu$; crass. $9\ \mu$.

111. *C. moniliforme* (Turp.) Ralfs. III. B., E., Th. VII. D. VIII. G., R., W.

A form of this was observed from the New Forest with obovate semi-cells and subtruncate apices; long. $41\ \mu$; lat. $20\ \mu$; lat. isthm. $7\ \mu$. Many examples were seen, and they constantly retained the same characters.

Forma *panduriformis* Heimerl. III. Th. VIII. W.

112. *C. connatum* Bréb. III. Pu., Th. VI. N.
 113. *C. pseudconnatum* Nordst. VI. N.
 *114. *C. gonioides* West and G. S. West. III. Th.

The specimens were rather smaller than those originally described, and the vertical view was not perfectly circular.

Long. 14·5–15·5 μ ; lat. 7·5 μ .

115. *C. Cucurbita* Bréb. III. Bi., C., E., Th. (with zygospores).
 IV. Ks. VII. D., Gp. VIII. Hl., R., T.
 Diam. zygosp. 30–32 μ . (Pl. VI. fig. 26.)
 116. *C. obcuneatum* West. VII. D., abundant.
 117. *C. Thwaitesii* Ralfs. II. Ru. III. Mp.
 118. *C. annulatum* (Näg.) De Bary. VIII. T.
 119. *C. elegantissimum* Lund. III. Th. VI. N.

Genus *Cosmocladium* Bréb.

1. *C. saxonicum* De Bary. III. Th.

This is referred with hesitation to this species; it always occurred in twos or in fours within a very firm gelatinous investment, and the cells were not arranged in one plane. No trace of connecting filaments could be observed in preserved specimens. It is rather smaller than the published dimensions of this species, but the cells were elliptic-reniform, and it otherwise seemed to agree.

Long. 15–17 μ ; lat. 13·5–14·5 μ ; lat. isthm. 4·5 μ ;
 crass. 8–9 μ .

Genus *Spondylosium* Bréb.

1. *S. pulchellum* Arch. VIII. G.

Genus *Staurostrum* Meyen.

1. *S. connatum* (Lund.) Roy et Biss. VII. D. VIII. G.
 2. *S. dejectum* Bréb. I. Ep. III. Bi., C., E., Pu., Th. VI. N.
 VII. D. VIII. G., H., R., T., W. Subsp. *Tellamii* West.
 VIII. G.
 3. *S. apiculatum* Bréb. III. C., Th. (with zygospores). VIII. T.
 4. *S. mucronatum* Ralfs. IV. Ks.
 5. *S. Dickiei* Ralfs. III. E., Fg., Pu. (with zygospores), Th.
 IV. Ks. VI. N. (with zygospores).
 Forma *punctata* West. III. Th.
 Var. *semicirculare* W. B. Turner. III. Th.
 6. *S. glabrum* (Ehrenb.) Ralfs. III. Bi.
 7. *S. brevispinum* Bréb. III. Th. VI. N.
 8. *S. cuspidatum* Bréb. I. Ep. III. M., Pu., Th. IV. Ks.
 V. Go. VI. N. (with zygospores). VII. D.

- Var. *divergens* Nordst. IV. Ks. (with zygospores).
 Var. *maximum* West. I. Ep.
 9. *S. O'Mearii* Arch. III. Pu., Th. VIII. H.
 10. *S. sibiricum* Borge, forma *trigona* West and G. S. West. III. Dj.
 11. *S. lanceolatum* Arch. III. Th., abundant. VI. N., abundant (with zygospores). VIII. H.
 Var. *compressum* West. VI. N.
 12. *S. corniculatum* Lund. III. Th. (with zygospores). VI. N.
 13. *S. TRACHYTITHOPHORUM* sp. n. (Pl. VI. fig. 22.)
S. parvum, tam longum quam latum, profunde constrictum, sinu aperto et subrectangulari; semicellulæ late ellipticæ, polis mamillatis et seorsum curvatis, annulis duobus granulorum minutorum circa polum unumquemque; a vertice visæ triangulares, lateribus subrectis (levissime convexis), angulis leviter productis, cum annulis duobus granulorum minutorum.
 Long. 30–34 μ ; lat. 29–32.5 μ ; lat. isthm. 10.5–11.5 μ . III. Th.

This species seems to be quite distinct from any other.

14. *S. lunatum* Ralfs. I., Ep. V. Go. VI. N.
 Var. *subarmatum* West. I. Ep.
 *15. *S. tunguscanum* Boldt. III. Pu.
 16. *S. denticulatum* (Näg.) Arch. I. Ep.
 17. *S. Avicula* Bréb. VII. D. VIII. G.
 Var. *subarcuatum* (Wolle) West. I. Ep. VI. N.
 18. *S. furcatum* (Ehrenb.) Bréb. (*S. spinosum* Ralfs). III. Th. VIII. H.
 Var. *subsenarium* W. VII. D.
 19. *S. armigerum* Bréb. (*S. pseudofurcigerum* Reinsch). III. Bi., Pu., We. VI. N. VII. D., Gp.
 20. *S. arcuatum* Nordst. I. Ep. VI. N. VIII. G.
 21. *S. Reinschii* Roy. III. C., Dj., E., Th. VIII. R.
 22. *S. rostellum* Roy et Biss. VI. N.
 Var. *EROSTELLUM* var. n. (Pl. VI. fig. 18.)
 Var. *minor*, profundius constricta, spina magna prope constrictionem nulla; a vertice visum triangulare, angulis rotundatioribus.
 Long. s. spin. 19.5 μ ; lat. s. spin. 19.5 μ ; lat. isthm. 6.5 μ . III. Th.

Although the character giving the name to this species is absent, still the number, size, and arrangement of the spines is exactly the same; the form of the semi-cells also would be just the same if the constriction were less deep.

23. *S. Hystrix* Ralfs. III. Di., Dj., Th.
 24. *S. teliferum* Ralfs. III. Bi., Pu., Th. VII. D., Gp. VIII. G., H., L., W.

25. *S. gladiusum* W. B. Turn. VIII. G.
Long. s. spin. $41\ \mu$; c. spin. $51\ \mu$; lat. s. spin. $37\cdot5\ \mu$;
c. spin. $48\ \mu$; lat. isthm. $12\ \mu$.
26. *S. polytrichum* Perty (*S. Pringsheimii* Reinsch). III. Ew.,
Pu., Th. VI. N.
27. *S. saxonicum* Buln. VI. N.
28. *S. pilosum* (Näg.) Arch. I. Ep. III. Bi., C., Ew., Mp.,
Th., Vi. IV. Ks. V. Go. VI. N. VII. D. VIII. H.,
R., T., W.
29. *S. hirsutum* (Ehrenb.) Bréb. I. Ep. III. Dj., Ew., We,
Wi. IV. Ks. VII. D.
30. *S. muticum* Bréb. I. Ep. III. Th., Wi. VII. S. VIII. G.
*Var. *minus* Wolle. VI. N.
Long. $17\cdot5\ \mu$; lat. $16\cdot5\ \mu$; lat. isthm. $4\cdot5\ \mu$.
31. *S. orbiculare* (Ehrenb.) Ralfs. III. Bi., C., Ew., Th. VI.
N. VII. D., Gp. VIII. G., H., L., T.
Var. *depressum* Roy et Biss. III. C., Wt. VI. N.
32. *S. cosmarioides* Nordst. VI. N.
33. *S. Bieneanum* Rabenh. I. Ep. V. Go. (with zygospores).
VI. N.

Some of the New Forest examples had from two to three apiculi on each semi-cell, sometimes near the angles and sometimes between them.

- Var. *ellipticum* Wille. III. Pu. IV. Ks. VI. N.
34. *S. pachyrhynchum* Nordst. III. Th., frequent. VI. N.,
June 1897, frequent.
Long. $38\text{--}41\ \mu$; lat. $35\text{--}39\ \mu$; lat. isthm. $9\cdot5\text{--}10\cdot5\ \mu$.
35. *S. punctulatum* Bréb. Frequent; zygospores from "Devil's
Jumps" near Frensham.
36. *S. pygmæum* Bréb. III. Bi., C., M., Mp. VII. S. VIII.
H., P., T.
37. *S. turgescens* De Not. III. Wi.
38. *S. muricatum* Bréb. I. Ep. III. C., Dj., Wi. VI. N.
39. *S. pyramidatum* West. IV. Ks.
40. *S. spongiosum* Bréb. III. M., Mp., Th. VII. D. VIII. H.
Var. *perbifidum* West. III. Th. (3- and 4-ended).
41. *S. Meriani* Reinsch. VIII. T.
42. *S. alternans* Bréb. I. Ep. III. Th. (with zygospores).
IV. Ks. V. Go. VII. D., S. VIII. W.
43. *S. dilatatum* Ehrenb. III. Bi. VI. N. VII. D. VIII.
H., L.
Var. *obtusilobum* De Not. III. Pu. V. Go.
44. *S. subpygmæum* West. III. Th., frequent.
45. *S. tumidum* Bréb. III. Th. VI. N. VII. D. VIII. W.
46. *S. brachiatum* Ralfs. III. Dj., E., Pu., Th. (with zygospores).
VII. D. VIII. R., W.
47. *S. læve* Ralfs. III. Th., very abundant.

48. *S. inconspicuum* Nordst. III. Dj., Th. VI. N. VII. D. VIII. R.

49. *S. nodosum* sp. n. (Pl. VI. fig. 23.)

S. minutum, circiter tam longum quam latum (cum processibus), profunde constrictum, sinu aperto lateribus subrectis et apice acuto; semicellulæ late rectangulari-oblongæ, angulis superioribus in processus breves uninodulosos divergentes truncatos productis, angulis inferioribus subrectangularibus, apicibus concavis; a vertice visæ triangulares, lateribus concavis, processibus truncatis binodulosis; membrana glabra.

Long. s. proc. 11 μ , c. proc. 21 μ ; lat. c. proc. 19 μ ; lat. isthm. 5 μ . III. Th.

This differs from *S. inconspicuum* Nordst. in its marked and deep constriction, and in its triradiate vertical view with much smaller body.

50. *S. micron* West & G. S. West. III. Pu., abundant.

51. *S. rotatum* Wolle. III. Pu.

52. *S. tetracerum* Ralfs. III. Pu., Th. IV. Ks. VI. N. VII. D. VIII. G., H., W.

Forma *trigona*. III. Th. VI. N. VII. D. VIII. W.

Forma *tetragona*. VIII. R.

Var. *VALIDUM* var. n. (Pl. VI. fig. 25.)

Var. corpore longiori, processibus validioribus non attenuatis et 5-nodulosis.

Long. s. proc. 18 μ , c. proc. 42 μ ; lat. s. proc. 13 μ , c. proc. 37 μ ; lat. isthm. 5 μ . III. Mp.

53. *S. hexacerum* (Ehrenb.) Wittr. (*S. tricorne* Ralfs). II. U. III. C., Di., Dj., Ew., Fg., M., Mp., Ra. IV. Ks. VI. N. VII. S. VIII. G., L.

Var. β Ralfs. VIII. H., K.

54. *S. cyrtocerum* Bréb. III. Ew., M., Mp., Th. VI. N. VII. D. VIII. G., L.

55. *S. inflexum* Bréb. I. Ep. III. Bi., C., Ew., Mp., Rp., Th., Wi. IV. Ks. VI. N. VII. D.

56. *S. polymorphum* Bréb. I. Ep. III. C., E., Th., Wi. VIII. H., Tm.

57. *S. crenulatum* (Näg.) Delp. II. U. III. Th. IV. Ks. V. Go.

*58. *S. Heimerlianum* Lütke. var. *spinulosum* Lütke. III. Th.

59. *S. gracile* Ralfs. I. Ep. III. Ew., Th. (with zygospores). V. Go. VI. N. VII. D., S.

Zygospora globosa, spinis obsessa; spinis dilatatis ad basin et dichotome furcatis ad apicem.

Diam. zygosp. s. spin. 32 μ , c. spin. 60 μ . (Pl. VI. fig. 27.)

Var. *nanum* Wille. III. Bi., Mp. V. Go. VI. N.

60. *S. paradoxum* Meyen. III. Bi., E., Th. V. Go. VI. N. VIII. G., Hl.
 Forma parva West. III. Th. IV. Ks. VI. N.
 61. *S. oxyacanthum* Arch. III. Th.
 62. *S. controversum* Bréb. III. Bi., Pu. VI. N. VIII. H.
 63. *S. aculeatum* (Ehrenb.) Menegh. III. Th. VI. N. VIII. W.
 64. *S. vestitum* Ralfs. III. Th. VI. N.
 Var. semivestitum West. III. Pu. VIII. G.
 65. *S. anatinum* Cooke & Wills. VI. N.
 66. *S. pseudosebaldi* Wille. III. Th.
 67. *S. Arachne* Ralfs. III. Th. VI. N.
 68. *S. proboscideum* (Bréb.) Arch. I. Ep. III. Mp.
 69. *S. asperum* Bréb. III. Th. VI. N. VII. D.
 70. *S. subscabrum* Nordst. VI. N.
 71. *S. seacostatum* Bréb. III. Ew.
 Subsp. productum West. VI. N.
 72. *S. margaritaceum* (Ehrenb.) Menegh. I. Ep. III. Bi., C., Dj. (up to 9-ended; with zygospores), Ea., Th., Wo. VI. N. VII. Gp. VIII. R.
 Var. SUBCONTORTUM var. n. (Pl. VII. figs. 15-17.)
 Var. cellulis a vertice visis 6-7 radiatis, processibus truncatis et curvatis ut in S. cyrtocero.
 Long. $26\ \mu$; lat. $25-27\ \mu$; lat. isthm. $9\ \mu$. III. Dj.
 Var. ROBUSTUM var. n. (Pl. VII. fig. 14.)
 Var. validior, semicellulis late ellipticis (sine proc.), ad basin processuum non contractis; a vertice visis quinquerradiatis, cum verruca parva emarginata ad basin processuum utrobique.
 Long. $25.5\ \mu$; lat. $27\ \mu$; lat. isthm. $8\ \mu$. II. U.

This variety approaches *S. ornatum* (Boldt) W. B. Turn. (*S. margaritaceum* var. *ornatum* Boldt), but has much shorter and stouter processes. It may be also compared with *S. foliatum* W. B. Turn., but Turner's figure is too indistinct to admit of a detailed comparison.

73. *S. furcigerum* Bréb. I. Ep. III. M. VI. N.
 74. *S. eustephanum* (Ehrenb.) Ralfs. VI. N.

Genus *Arthrodemus* Ehrenb.

1. *A. bifidus* Bréb. III. Pu., Th. VIII. R.
 Var. truncatus West. III. Th. IV. Ks.
 2. *A. octocornis* Ehrenb. III. E., Rw., Pu. (with zygospores), Th. VI. N. VIII. H.
 Diam. zygosp. s. spin. $15\ \mu$, c. spin. $28\ \mu$. (Pl. I. fig. 16.)
 3. *A. Incus* (Bréb.) Hass. III. C. (with zygospores), Dj., E. (with zygospores), Th. VII. D. VIII. H., L., R., W.
 Var. SUBQUADRATUS var. n. (Pl. VII. fig. 20.)

Var. minus constricta, semicellulis subquadratis.

Long. s. spin. 15–17 μ ; lat. s. spin. 11 μ ; long. spin. 5·5–7 μ ; lat. isthm. 7·5 μ ; crass. 8 μ . III. C.

4. *A. Ralfsii* West. I. Ep. III. Bi., Ew., Pu., Wi.

5. *A. convergens* Ehrenb. III. Mp., Th. VI. N.

Genus *Onychonema* Wallich.

1. *O. filiforme* (Ehrenb.) Roy et Biss. VIII. G.

Genus *Sphærozozma* Corda.

1. *S. vertebratum* (Bréb.) Ralfs. III. M.

Var. LATIUS var. n. (Pl. VI. fig. 7.)

Var. cellulis latoribus ($1\frac{2}{3}$ -plo latoribus quam longis), sinu angustiori profundiorique, dorso convexiori.

Long. 15–16 μ ; lat. 25–27 μ ; lat. isth. 5·5–7·5 μ . III. Ew.

2. *S. excavatum* Ralfs. I. Ep. III. C., E., Pu. (with zygospores), Th. (with zygospores), Wi. VI. N. (with zygospores). VII. D., Gp. VIII. T., W.

3. *S. granulatum* Roy et Biss. I. Ep. III. Mp., Pu.

*4. *S. Wallichii* Jacobs. var. ANGLICUM var. n. (Pl. VI. fig. 6.)

Var. apicibus semicellularum subarctis, sinu minore, granulis 2 vel 3 ad margines laterales semicellarum, cum granulis sparsis trans semicellulas irregulariter ordinatis.

Long. 10–11·5 μ ; lat. 10·5–11 μ ; lat. isthm. 6 μ ; crass. 5·5 μ . VI. N. abundant, July 1897.

Genus *Desmidiium* Ag.

1. *D. cylindricum* Grev. III. Th. VI. N.

2. *D. Swartzii* Ag. III. Mp., Th. VIII. H., W.

Genus *Gymnozyga* Ehrenb.

1. *G. moniliformis* Ehrenb. III. Bi., C., Th. VI. N. VIII. H., R.

Genus *Hyalotheca* Kütz.

1. *H. mucosa* (Dillw.) Ehrenb. III. C. Th. VIII. G. W.

2. *H. dissiliens* (Sm.) Bréb. Frequent; zygospores from Bisley, Chobham, Esher West-end, and Thursley Commons, Surrey; Keston Common, Kent; Roughton Moor, Cornwall.

Forma *tridentula* Nordst. III. Ew. VIII. H., L.

Var. *hians* Wolle. III. Ew. (pure gathering, April 1895).

*3. *H. neglecta* Racib. III. Th. VI. N. (with zygospores).

Long. cell. 28–34·5 μ ; lat. cell. 11·5–13 μ .

This species was in great abundance from Thursley Common, Surrey, and from the New Forest, Hants. It occurs in long filaments,

which are easily overlooked on account of their resemblance to some confervaceous algæ; the filaments have a very wide gelatinous sheath (up to $54\ \mu$ diam.).

There is an almost imperceptible constriction at the middle of the cells, and on each side of it a very minute inflation, often causing the widest part of the cell to be in the middle. In a gathering made in August 1897, from a bog in the New Forest, it was obtained with zygospores.

Zygosporæ globosæ, glabræ, nonnunquam mamillatæ ad polos oppositos. Diam. zygosp. $23-28\ \mu$.

Some filaments showed the formation of aplanospores, breaking up into separate cells during their formation. These spores were elliptical or oblong-elliptical, with acutely rounded poles, and when mature had a strong yellowish punctate membrane. Long. aplanosp. $20-31\ \mu$; lat. $9.5-11\ \mu$.

Ord. *Protococcoideæ*.

Fam. **Volvocineæ**.

Genus *Volvox* Ehrenb.

1. *V. globator* (L.) Ehrenb. I. Ep. II. U.

Genus *Eudorina* Ehrenb.

1. *E. elegans* Ehrenb. II. Ki. III., Ew., M., Mp., Pu., Wo. V. Go.

Genus *Pandorina* Bory.

1. *P. morum* (Müll.) Bory. General.

Genus *Gonium* Müller.

1. *G. pectorale* Müller. I. Ep. III. B., Ew., Mp., Ra., W., Wt. V. Go.

Genus *Tetragonium* West & G. S. West.

1. *T. lacustre* West & G. S. West. III. E.

Genus *Chlamydomonas* Ehrenb.

- *1. *C. Kleinii* Schmidle. II. U. III. B., C., E., Wi.

Fam. **Palmellaceæ**.

Sub-fam. CENOBIEÆ.

Genus *Hydrodictyon* Roth.

1. *H. reticulatum* (L.) Lagerh. I. River Lea (J. H. Vanstone, 1893).

Genus *Cœlastrum* Näg.

1. *C. sphaericum* Näg. Very frequent.
2. *C. microporum* Näg. III. C., Ra., Rp. IV. Hc.
3. *C. cambricum* Arch. IV. Ks.
4. *C. cubicum* Näg. IV. Ks.
5. *C. verrucosum* Reinsch. III. E.

Genus *Sorastrum* Kütz.

1. *S. spinulosum* Näg. VI. N. VIII. H..
- *2. *S. (?) simplex* Wille. VIII. K.

Genus *Pediastrum* Meyen.

1. *P. Boryanum* (Turp.) Menegh. Common.
Var. *granulatum* (Kütz.) A. Br. I. Ep. III. Fg., Mp.
IV. Ks. VII. S.
2. *P. glanduliferum* Bennett. III. Bi.
Arms delicate, faintly rough, converging and often crossing
one another; diam. cell. peripher. 22-27 μ .
3. *P. constrictum* Hass. II. U. III. Ra., Rp.
4. *P. duplex* Meyen (*P. pertusum* Kütz.). II. Ha., Wh. III.
Bi., C., Fl., M., Pu., Ra., Rp., Wt. IV. Ks.
5. *P. integrum* Näg. III. Fg., Pu.
6. *P. angulosum* (Ehrenb.) Menegh. III. Ra., Wt.
7. *P. tetras* (Ehrenb.) Ralfs. I. Ep. II. U. III. Bi., Fl., Mp.,
Pu., Ra. IV. Hc. Ks. V. Go. VI. N. VII. D., S.
VIII. G.

Genus *Crucigenia* Morren.

1. *C. rectangularis* (Näg.) A. Br. III. Bi., Mp., Ra. V. Go.
VII. S. VIII. H., K., L.

This was noticed from Frensham, Surrey, with families of 128 cells.

Sub-fam. PSEUDOCENOBIÆÆ.

Genus *Sciadium* A. Br.

1. *S. Arbuscula* A. Br. I. Ep. II. Ha. III. B., M., Wi.
IV. Hc., Ks.

Abundant on Wimbledon Common, Surrey, in the autumn of 1892, and again in the autumn of 1894. Also exceptionally fine from a pond on Hayes Common, Kent.

Genus *Ophiocytium* Näg.

1. *O. cochleare* (Eich.) A. Br. General.
2. *O. majus* Näg. III. E., Mp.

Genus *Mischococcus* Näg.

1. *M. confervicola* Näg. II. Ru.

Sub-fam. RHAPHIDIEÆ.

Genus *Dactylococcus* Näg.

1. *D. Debaryanus* Reinsch. II. Ki.
2. *D. bicaudatus* A. Br. var. *EXILIS* var. n. (Pl. VII. fig. 18.)
 Var. cellulis multo minoribus angustioribusque, apicibus in cornibus longioribus et tenuioribus productis; contentus chlorophyllosus cellularum cum granulis numerosis parvis.
 Long. c. corn. 17–36 μ ; long. corn. 9·5–15 μ ; lat. 3·5–5 μ . I. Ep., in ditches.
3. *D. DISPAR* sp. n. (Pl. VII. fig. 19.)
 D. cellulis parvis, diametro triplo quadruplo longioribus, fusiformibus, obliquis et sæpe sublunatis, apice altero acuto, apice altero acutissimo vel producto; contentus chlorophyllous cellularum homogeneus (rare cum granulis magnis paucis).
 Long. 8·5–21 μ ; lat. 2–5·7 μ . III. Do. On old wood.

The form of the cells at once distinguishes this species from *D. infusionum* Näg. and *D. obtusus* Lagerh. The nearest species is probably *D. raphidioides* Hansg.

Genus *Scenedesmus* Meyen.

1. *S. bijugatus* (Turp.) Kütz. (*S. obtusus* Meyen). I. Ep. III. Ew., Ra., Rp., Wi. IV. Ks.
 2. *S. alternans* Reinsch. II. Th. IV. Ks. VIII. T.
 Var. *apiculatus* West. VI. N.
 3. *S. GRANULATUS* sp. n. (Pl. VII. figs. 1, 2.)
 S. cellulis plerumque quaternis, oblongis, diametro circiter 3-plo longioribus, polis conicis, in seriem rectam conjunctis; membrana cellularum granulata, granulis minutis in seriebus tribus longitudinaliter ordinatis.
 Long. cell. 20–21 μ ; lat. cell. 6–6·5 μ . III. Rp.
- Compare with *S. Hystrix* Lagerh. and *S. aculeolatus* Reinsch.
4. *S. denticulatus* Lagerh. I. Ep.
 Var. *linearis* Hansg. II. U. III. Ew., Fg., M., Mp., Pu. IV. Ks. V. Go.
 5. *S. quadricauda* (Turp.) Bréb. General and abundant.
 Var. *abundans* Kirchn. II. U. III. Mp., Pu., Ra. IV. Ks. VI. N.
 6. *S. antennatus* Bréb. III. Pu. IV. Ks.
 7. *S. obliquus* (Turp.) Kütz. (*S. acutus* Meyen). Frequent.
 Var. *dimorphus* (Kütz.) Rabenh. II. U. III. E., Fh., Pu.

Genus *Rhaphidium* Kütz.

1. *R. polymorphum* Fresen. var. *falcatum* (Corda) Rabenh. General and abundant.
 Var. *aciculare* (A. Br.) Rabenh. General.

Var. *duplex* (Kütz.) Rabenh. III. Fh.

Var. *TUMIDUM* var. n. (Pl. VII. fig. 8.)

Var. *cellulis solitariis vel subsolitariis, curvatis, in medio inflatis, apicibus acutissimis.*

Long. 61–73 μ ; lat. 4·5–6·5 μ . III. Pu., abundant.

Var. *MIRABILE* var. n. (Pl. VII. figs. 9–13.)

Var. *cellulis semper solitariis, longissimis, variabiliter curvatis (nonnunquam sigmoideis), apicibus acutissimis.* Long. usque 117 μ ; lat. 2–3·5 μ .

III. Wi.; in a pond amongst *Conferva*, July 1894; in same pond, Jan. 1895.

The regularly curved forms of this variety are with difficulty distinguished from a minute *Closterium*. At or near the middle of the cells is a clear space, the chromatophores being *completely* interrupted, and towards the apices there is often present a clear space containing one minute moving corpuscle, *but beyond this clear space there is sometimes a portion of the green cell-contents.* The cell-contents are very irregular, and frequently much vacuolated. In a remark concerning the moving granules present towards the apices of the cells in the genus *Closterium*, Archer states (Quart. Journ. Micr. Sc., ii. 1862, pp. 257–8) that “In *Ankistrodesmus* there are no such granules.” The latter genus is synonymous with *Rhaphidium*, and this plant was undoubtedly a *Rhaphidium*, and one which possessed these moving granules.

2. *R. convolutum* (Corda) Rabenh. III. Rp.

Genus *Selenastrum* Reinsch.

1. *S. Bibraeunum* Reinsch. IV. Ks.

*2. *S. gracile* Reinsch. III. Pu.

Genus *Lagerheimia* (De Toni) Chodat.

*1. *L. genevensis* Chodat. III. Mp.

Genus *Tetraëdron* Kütz.

1. *T. minimum* (A. Br.) Hansg. III. Fg., Mp., Th. IV. Ks.

This was in large quantity from a pond on Keston Common, Kent. Many specimens showed the reproduction as described and figured by Lagerheim (Stud. Arktisc. Cryptog. I., *Tetraëdron* u. *Euastropsis*, Tromsø Mus. Aarsh. 17, 1894). Cf. Pl. VII. figs. 21–23.

2. *T. trigonum* (Näg.) Hansg. I. Ep. III. Bi., Mp.

3. *T. tetragonum* (Näg.) Hansg. III. Di.

4. *T. caudatum* (Corda) Hansg. (*Polyedrium pentagonum* Reinsch). III. Fg.

Forma *incisa* Lagerh. II. U. III. Ra. IV. Ks.

5. *T. regulare* Kütz. (*Polyedrium tetraëdricum* Näg.). III. Mp., Pu., Th.
6. *T. enorme* (Ralfs) Hansg. I. Ep. III. Fg. VI. N.
7. *T. HORRIDUM* sp. n. (Pl. VII. figs. 4, 5.)

T. magnum, irregulariter tetragonum, pentagonum, hexagonum, vel suboblongatum, compressum, angulis acutis vel rotundatis (rare submamillatis); membrana firma, ad angulos incrassata et spinis validis rectis curvatisque (nonnunquam bi- vel trifurcatis) singulis vel geminatis vel pluribus præditis, etiam spinis brevibus paucis inter angulos dispositis; a latere visum ellipticum vel oblongum.

Diam. s. spin. 27–42 μ , c. spin. 33–61 μ ; crass. 19–21 μ . I. Ep. III. Pt.

This species differs from *T. irregulare* (Reinsch) De Toni in being more irregular, in not having the angles produced, and in the irregular nature and disposition of the spines.

Sub-fam. CHARACIÆ.

Genus *Characium* A. Br.

- *1. *C. Nägelii* A. Br. II. Wh.
- *2. *C. Pringsheimii* A. Br. III. B., M. VIII. G.
3. *C. Siebaldii* A. Br. VI. N.
4. *C. heteromorphum* (Reinsch) (*Hydrianum heteromorphum* Reinsch). Common.
5. *C. ornithocephalum* A. Br. III. Fg.
- *6. *C. longipes* Rabenh. II. U.

Sub-fam. TETRASPOREÆ.

Genus *Schizochlamys* A. Br.

1. *S. gelatinosa* A. Br. I. Ep. III. C.
2. *S. delicatula* West. III. Bi., Ew., Mp. VII. D.

Genus *Palmodactylon* Näg.

1. *P. subramosum* Näg. I. Ep. III. Ew. V. Go.
2. *P. varium* Näg. II. Ha.

Genus *Apiocystis* Näg.

1. *A. Brauniana* Näg. II. Ha. III. Ew., M., Wt. VII. S.

Genus *Tetraspora* Link.

1. *T. gelatinosa* (Vauch.) Desv. III. B., Ew.
2. *T. lubrica* (Roth) Ag. IV. Ks. VIII. near Bodmin.

Genus *Palmella* Lyngb.

1. *P. mucosa* Kütz. II. Wh. III. E.
2. *P. hyalina* Bréb. IV. Ks.

Sub-fam. *DICTYOSPHERIÆ*.

Genus *Dimorphococcus* A. Br.

1. *D. lunatus* A. Br. III. Th., very rare.

Genus *Tetracoccus* West.

1. *T. botryoides* West. I. Ep. III. Ra., VII. L.

Genus *Botryococcus* Kütz.

1. *B. Braunii* Kütz. I. Ep. III. Bi., C., Mp., Pu., Th. IV. Ks. V. Go. VII. D., Gp. VIII. W.

INEFFIGIATA gen. n.

Cellulæ submagnæ, irregulariformæ, angulari-oblongæ, angulari-ellipticæ vel subtrapezicæ, familias valde irregulares libere natantes cellularum 2-8 formantes; cellulæ cum processibus brevibus irregularibus et spinis paucis valde variabilibus, irregulariter curvatis et irregulariter dispositis; contentus chlorophyllosus cellularum viridissimus et granulas multas includens.

1. *I. NEGLECTA* sp. unica.

Character idem ac generis.

Diam. cell. sine spin. et proc. 21-40 μ ; long. spin. et proc. 5.5-19 μ ; diam. fam. 76-115 μ . III. Ew., Mp., Pu., Th. V. Go.

We have long had this alga under observation as something which required investigating. The cells are rather large with very irregular outlines, and each possesses a few irregularly disposed processes or spines. These spines are straight or curved, of very variable length, and are often somewhat subcapitate or otherwise irregular; they are also the chief agents in uniting the cells into irregular families. The exact structure of the cells and families is exceedingly difficult to observe, owing to their extreme irregularity and the opacity of the densely packed granulose chlorophyll.

It is more or less abundant throughout the British Islands and the United States of America, and often occurs in quantity in tanks, water-barrels, &c. We find it frequently in gatherings of the smaller algæ, and can find no mention of anything approaching it.

It may be regarded as nearest to *Botryococcus* Kütz.

The name was suggested by its indefinite misshapen form and its evident neglect by algologists.

Genus *Dictyosphaerium* Näg.

1. *D. Ehrenbergianum* Näg. I. Ep. II. Wh. III. E., M., Mp., Ra., Rp., Wi. IV. Hc. V. Go. VI. N. VIII. L.
2. *D. reniforme* Buln. I. Ep.

Sub-fam. GLÆOCYSTIDÆ.

Genus *Nephrocystium* Näg.

1. *N. Agardhianum* Näg. IV. Ks.
2. *N. Nägelii* Grun. III. Ea., M.
3. *N. ecdysiscepanum* West & G. S. West. V. Go.
4. *N. lunatum* West. III. Th.

Genus *Oocystis* Näg.

1. *O. solitaria* Wittr. I. Ep. III. Bi., E., Ew., Fg., Rp., Th.
IV. Ks. VI. N. VII. S. VIII. G., T., W.
Forma major Wille. III. Th.
2. *O. crassa* Wittr. III. Mp. VIII. L.
3. *O. gigas* Arch. var. *incrassata* West. VIII. G.
4. *O. Novæ Semliæ* Wille. V. Go.
Forma major Wille. VI. N.
Var. maxima West. VI. N.
5. *O. elliptica* West. III. Mp.
6. *O. asymmetrica* West. III. Bi., C., Mp.
7. *O. panduriformis* West. VIII. G.

Genus *Glæocystis* Näg.

1. *G. gigas* (Kütz.) Lagerh. [*Chlorococcum gigas* (Kütz.) Grun.;
Glæocystis ampla (Kütz.) Rabenh.] I. Ep. II. Ha., No.,
Wh. III. B., M., Mp. IV. Ks. V. Go. VIII. G., L.,
R., W.
Var. maxima West. III. E.
2. *G. vesiculosa* Näg. I. Ep. II. Ha., Ki., Ru. III. Ea., M.,
Mp., Rp., Th., Wi. IV. Hc., Ks. VI. N. VIII. P.
3. *G. infusionum* (Schränk). [*Chlorococcum infusionum* (Schränk)
Menegh.] III. B., Ew., Wi. VII. D.
4. *G. regularis* nob. (*Chlorococcum regulare* West). I. Ep.
III. Bi., Ew., Th. VII. D. VIII. Hl., L.

Genus *Kirchneriella* Schmidle.

1. *K. obesa* (West) Schmidle (*Selenastrum obesum* West). III.
Bi., Fg., Mp., Pu.

Genus *Urococcus* Kütz.

1. *U. insignis* (Hass.) Kütz. III. Bi., C., E., Th. VII. S.
VIII. T.

Sub-fam. PROTOCOCCACEÆ.

Genus *Stichococcus* Näg.

1. *S. bacillaris* Näg. II. Ki., Pi. III. Nr. Pt., Wi., Boxhill.
2. *S. flaccidus* (Kütz.) Gay. III. B., Rp.
- *3. *S. dissectus* Gay. III. Damp walls about London.

Genus *Eremosphæra* De Bary.

1. *E. viridis* De Bary. I. Ep. III. Bi., C., E., Th. IV. Ks. VII. D., Gp. VIII. R.

Genus *Pleurococcus* Menegh.

1. *P. vulgaris* Menegh. Everywhere abundant.
2. *P. nimbatus* Wildem. [*Tetracoccus nimbatus* (Wildem.) Schmidle]. IV. Ks.

Genus *Trochiscia* Kütz.

1. *T. aciculifera* (Lagerh.) Hansg. VI. N.
- *2. *T. aspera* (Reinsch) Hansg. III. Wi.
- *3. *T. stagnalis* Hansg. III. C.
- *4. *T. reticularis* (Reinsch) Hansg. IV. Ks.

Genus *Protococcus* Ag.

1. *P. viridis* Ag. II. No. III. Esher, Dorking.

CLASS MYXOPHYCEÆ.

Ord. *Hormogonææ*.

Sub-ord. *HETEROCYSTÆÆ*.

Fam. *Rivulariaceæ*.

Genus *Gloiotrichia* J. Ag.

1. *G. Pisum* (Ag.) Thur. III. Th. V. Go.

Fam. *Sirosiphoniaceæ*.

Genus *Hapalosiphon* Näg.

1. *H. hibernicus* West & G. S. West. VI. N.
- *2. *H. intricatus* West. III. Pu.

Genus *Stigonema* Ag.

1. *S. ocellatum* (Dillw.) Thur. VI. N. VIII. T.

Fam. *Scytonemaceæ*.

Genus *Scytonema* Ag.

1. *S. cincinnatum* (Kütz.) Thur. VI. On stones in stream near Lyndhurst, New Forest (G. Massee).
Crass. fil. 20-23 μ ; crass. trich. 14-16 μ .
2. *S. figuratum* Ag. III. Ew.

Genus *Tolypothrix* Kütz.

1. *T. tenuis* Kütz. I. Ep. III. Fg.
2. *T. lanata* (Desv.) Wartm. III. Fg.

Fam. Nostocæ.

Genus *Nostoc* Vauch.

1. *N. microscopicum* Carm. III. M., Mp. V. Go.

Genus *Anabæna* Bory.

1. *A. inæqualis* (Kütz.) Born. et Flah. I. Ep. (spores up to 5-seriate).
2. *A. oscillarioides* Bory. V. Go.

Genus *Aphanizomenon* Morren.

1. *A. flos-aquæ* (L.) Ralfs. III. M.

Genus *Cylindrospermum* Kütz.

1. *C. stagnale* (Kütz.) Born. et Flah. III. Pu.

Sub-ord. HOMOCYSTÆ.

Fam. Camptotrichæ.

AMMATOIDEA gen. n.

Plantæ filamentosæ et epiphyticæ; fila longa e serie regulari singula cellularum formata, haud ramosa, prope medium subito et acute genuflexa circa ramos hospitis, extremitates ambas versus gradatim et gradatim attenuata, flexuosa et vaginata; vagina firma, arcta, et lamellosa, achroa vel luteo-fusca in partibus vetustis; trichomata ad extremitates ambas in pilum longum attenuata, ad dissepimenta constricta; cellulæ subquadratæ (vel diametro breviores) prope medium filamentorum, extremitates versus gradatim longiores (diametro usque ad 6-plo longiores); protoplasma ærugineum, granulosum; fila secundaria ubi genuflexa, in filis primariis sedentes et iis similes.

1. *A. NORMANII* sp. unica. (Pl. VII. figs. 25-28.)

Character idem ac generis.

Crass. fil. ad med. $5.5-12.5 \mu$; crass. trich. $3.5-5.5 \mu$.

VII. Dartmoor (coll. T. Norman), epiphytic on *Batrachospermum moniliforme*.

The long attenuation of both extremities of the filaments readily distinguishes this genus from all others and places this plant in the Camptotrichæ. The filaments are very different from those of the only other genus (*Camptothrix*) of this order, and at first sight much resemble those of a *Calothrix*. The false ramification is most peculiar, the geniculate flexure of one filament being merely applied to the inner lamellæ of the sheath of another, and included in the outer lamellæ of the sheath. The plant is attached to its host by the medium acute flexure of the filaments around either one of the strands of the axis or one of the small lateral branches (*vide* fig. 25).

The discovery of this genus necessitates the modification of the Fam. *Camptotrichæ* as follows:—

Fam. CAMPTOTRICHEÆ. Fila epiphytica et aquatica, brevia vel longa, vaginata, haud ramosa, irregulariter flexuosa, extremitates ambas versus attenuata, serie singula cellularum intra vaginam unamquamque formata, vaginis delicatis vel firmis, achrois vel luteo-fuscis.

Gen. 1. *Camptothrix*. Fila brevissima, e serie singula cellularum irregularium formata, extremitates versus paullo attenuata, submoniliformia; vagina delicata et hyalina; protoplasma cellularum homogenum.

Gen. 2. *Ammatoidea*. Fila longa, e serie singula cellularum regularium formata, subito genuflexa, in medio et extremitates versus longissime attenuata; vagina firma et sæpe luteo-fusca; protoplasma cellularum granulosum.

Fam. Vaginarieæ.

Genus *Schizothrix* Kütz.

- 1*. *S. vaginata* (Näg.) Gomont.

Articuli sæpius diametro trichomatis paullo longiores. Crass. trich. $2\frac{1}{2}$ –3 μ . VI. N.

Genus *Dasyglæa* Thwaites.

1. *D. amorpha* Berkeley. III. Th. (a form with thinner trichomes). VI. N.

Fam. Lyngbyeæ.

Sub-fam. LYNGBYOIDEÆ.

Genus *Lyngbya* Ag.

- *1. *L. putealis* Montagne. III. Rp.
- 2. *L. Martensiana* Menegh. III. Dj.
- *3. *L. ærugineo-cærulea* (Kütz.) Gomont. III. Kingston to Esher.
- *4. *L. versicolor* (Wartm.) Gomont. III. Dorking.
- 5. *L. ochracea* (Kütz.) Thur. III. Cr.

Sub-fam. OSCILLATORIOIDEÆ.

Genus *Phormidium* Kütz.

- *1. *P. molle* (Kütz.) Gomont. III. Rp. (on *Myriophyllum*).
- *2. *P. foveolarum* (Mont.) Gomont. III. In chalk pit, Dorking.
- *3. *P. tenue* (Menegh.) Gomont. II. Pi. III. Bi., Fg., Wi. IV. Hc.
- 4. *P. autumnale* (Ag.) Gomont. III. Wi. Esher, Thames Ditton, Kingston.

Genus *Oscillatoria* Vauch.

- *1. *O. prolifica* (Grev.) Gomont. III. Ra.
- 2. *O. princeps* Vauch. III. Th. IV. Ks. VIII. H.
- 3. *O. limosa* Ag. (*Frælichii* Kütz.) Frequent.
- 4. *O. irrigua* Kütz. III. Ew., Th. IV. Ks.
- *5. *O. simplicissima* Gomont. III. Wi.
- 6. *O. tenuis* Ag. II. Wh. VI. N.
- 7. *O. amphibia* Ag. (*O. tenerrima* Kütz.) II. Wh. III. E., Th., Wi.
- *8. *O. angustissima* West and G. S. West. III. Wi.
- 9. *O. splendida* Grev. IV. Ks.
Var. *attenuata* West and G. S. West. II. No.
- *10. *O. formosa* Bory. IV. Ks.

Genus *Spirulina* Turp.

- 1. *S. major* (Kütz. (*S. oscillarioides* Kütz.)) I. Ep. II. Ra. III. Pu. VIII. H., W.

Ord. *Chroococcoides*.Fam. *Chroococcaceæ*.Genus *Glæothece* Näg.

- 1. *G. confluens* Näg. III. Th.
- 2. *G. linearis* Näg. III. Th. VI. N. VII. D. VIII. T.
- 3. *G. cystifera* (Hass.) Rabenh. III. Mp.

Genus *Aphanothece* Näg.

- 1. *A. microscopica* Näg. III. Fg., Th. IV. Ks. VII. D. VIII. W.
- 2. *A. saxicola* Näg. III. Fg., Th. VII. S. VIII. W.
Var. *violacea* West. VI. N.
- 3. *A. prasina* A. Br. III. Fg., Th., Wt.

Genus *Synechococcus* Näg.

- 1. *S. major* Schroet. (*S. crassus* Arch.) I. Ep. IV. Ks.
- 2. *S. æruginosus* Näg. VI. N. VII. D. VIII. T.

Genus *Glaucocystis* Itzigsh.

- 1. *G. Nostochinearum* Itzigsh. I. Ep. III. Fg., Th. IV. Ks. VII. D. VIII. L.

Genus *Merismopedia* Meyen.

- 1. *M. glauca* (Ehrenb.) Näg. III. C., E., Ra., Rp., Th., Wt. VII. D., Tq. VIII. H., L., T., W.
- 2. *M. violacea* (Bréb.) Kütz. II. U. III. F. VIII. K.
- 3. *M. æruginea* Bréb. V. Go.

Genus *Tetrapedia* Reinsch.

1. *T. Reinschiana* Arch. I. Ep. II. Wh. III. M., Mp., Rp., Th. V. Go.

Genus *Gomphosphæria* Kütz.

1. *G. aponina* Kütz. III. Fg., Th. IV. Ks. V. Go.

Genus *Clathrocystis* Henfrey.

1. *C. æruginosa* (Kütz.) Henfrey. III. Fg.

Genus *Polycystis* Kütz.

1. *P. marginata* (Menegh.) Richter. II. U. III. Mp.
- *2. *P. elabens* (Bréb.) Kütz. VI. N.
- *3. *P. flos-aquæ* Wittr. III. Th. VI. N.

Genus *Aphanocapsa* Näg.

1. *A. pulchra* (Kütz.) Rabenh. III. Th.

Genus *Porphyridium* Näg.

1. *P. cruentum* (Ag.) Näg. III. Clapham, Esher.

Genus *Chroococcus* Näg.

1. *C. minor* (Kütz.) Näg. III. C., Th. IV. Ks. VII. D. VIII. L., W.
2. *C. cohærens* (Bréb.) Näg. III. Dj. VI. N. VIII. H.
3. *C. turgidus* (Kütz.) Näg. I. Ep. III. C., Ew., Th. IV. Ks. VIII. K., T.
4. *C. pallidus* Näg. III. Th.
5. *C. rufescens* (Bréb.) Näg. VIII. W.

SUMMARY.

	GENERA.	SPECIES.*
CLASS FLORIDEÆ.		
Fam. <i>Batrachospermæ</i>	1	2
CLASS CHLOROPHYCEÆ.		
Ord. <i>Confervoidæ</i> <i>Heterogamæ</i> .		
Fam. <i>Coleochætaceæ</i>	1	3
Fam. <i>Edogoniaceæ</i>	2	21
Ord. <i>Siphonæ</i> .		
Fam. <i>Vaucheriaceæ</i>	1	6
Fam. <i>Hydrogastraceæ</i>	1	1

* Excluding varieties and forms.

	GENERA.	SPECIES.
Ord. Confervaceæ Isogamæ.		
Fam. <i>Ulvaceæ</i>	2	2
Fam. <i>Ulotrichaceæ</i> .		
Sub-fam. <i>Ulotricheæ</i>	3	8
Sub-fam. <i>Chætophoreæ</i>	5	11
Sub-fam. <i>Confervææ</i>	2	6
Fam. <i>Chroolepidaceæ</i>	1	2
Fam. <i>Cladophoraceæ</i>	1	3
Ord. Conjugatæ.		
Fam. <i>Zygnemaceæ</i> .		
Sub-fam. <i>Mesocarpeæ</i>	2	10
Sub-fam. <i>Zygnemeæ</i>	3	22
Fam. <i>Desmidiaceæ</i>	23	333
Ord. Protococcoidæ.		
Fam. <i>Volvocinææ</i>	6	6
Fam. <i>Palmellaceæ</i> .		
Sub-fam. <i>Cœnobieæ</i>	5	16
Sub-fam. <i>Pseudocœnobieæ</i>	3	4
Sub-fam. <i>Rhaphidiææ</i>	6	22
Sub-fam. <i>Characiææ</i>	1	6
Sub-fam. <i>Tetrasporeæ</i>	5	9
Sub-fam. <i>Dictyosphæriææ</i>	5	6
Sub-fam. <i>Gloëocystidææ</i>	6	17
Sub-fam. <i>Protococcaceææ</i>	5	11
CLASS MYXOPHYCEÆ.		
Ord. Hormogonææ.		
Sub-ord. HETEROCYSTÆÆ.		
Fam. <i>Rivulariaceæ</i>	1	1
Fam. <i>Sirospioniaceæ</i>	2	3
Fam. <i>Scytonemaceæ</i>	2	4
Fam. <i>Nostocææ</i>	4	5
Sub-ord. HOMOCYSTÆÆ.		
Fam. <i>Camptotrichææ</i>	1	1
Fam. <i>Vaginariææ</i>	2	2
Fam. <i>Lyngbyeææ</i> .		
Sub-fam. <i>Lyngbyoidææ</i>	1	5
Sub-fam. <i>Oscillatorioidææ</i>	3	15
Ord. Chroococcoidææ.		
Fam. <i>Chroococcaceææ</i>	12	25
Total	118	588

APPENDIX.

The following notes of localities for Freshwater Algæ in Middlesex (M.) and Surrey (S.) were made with the idea of preparing an 'Algologia Metropolitana,' a scheme which circumstances have compelled me to abandon. This short list may, however, be of use in stimulating others to note the forms of life which may be found close to their own doors. It is, as far as I am aware, almost the first record of Freshwater Algæ gathered within the limits of London itself.

ALFRED W. BENNETT.

- Coleochaete scutata* Bréb. S. Kew Gardens.
Vaucheria sessilis DC. M. Botanic Gardens, Regent's Park;
 S. Kew Gardens.
 Var. *cæspitosa* Vauch. S. Brown's Millpond, Waddon.
Sphæroplea annulina Ag. S. Kew Gardens, occasional.
Microspora vulgaris Rabh. M. Regent's Canal, Camden Town.
Cladophora flavescens Ag. M. Botanic Gardens, Regent's Park.
 „ *fracta* Ktz. M. Regent's Canal, Camden Town.
Spirogyra nitida Lk. M. Regent's Canal, Camden Town. S.
 Brown's Millpond, Waddon.
Penium digitus Bréb. S. Brown's Millpond, Waddon.
Closterium lunula Nitzsch. M. Regent's Canal, Camden Town.
 „ *Leibleinii* Ktz. S. Kew Gardens.
Docidium clavatum Ktz. S. Kew Gardens.
Euastrum didelta Rlfs. S. Brown's Millpond, Waddon.
Tetmemorus granulatus Rlfs. S. Brown's Millpond, Waddon.
Micrasterias denticulata Bréb. S. Brown's Millpond, Waddon.
Arthrodesmus Incus Hass. M. Regent's Canal, Camden Town.
Eudorina elegans Ehrb. S. Brown's Millpond, Waddon.
Hydrodictyon reticulatum Lag. S. Tank, Kew Gardens; abundant in some years.
Pediastrum Boryanum Men. M. Regent's Canal, Camden Town.
 S. In the Wandle, Beddington.
 „ *tetras* Rlfs. M. Regent's Canal, Camden Town.
 „ sp. *Cænobe* quite compact; cells deep green, about the size of those of *P. tetras*, each with a single central conspicuous pyrenoid; marginal cells very variable in shape, each with two colourless horns proceeding from the margin, or from an angle very near the margin; tips of horns slightly thickened, but not bidentate. M. Regent's Canal, Camden Town.
Scenedesmus obliquus Ktz. M. Regent's Park.
 „ *quadricauda* Bréb. M. Regent's Canal, Camden Town.
Tetraëdron longispinum Perty. S. Kew Gardens.
Protococcus viridis Ag. M. Regent's Canal, Camden Town.
Anabæna oscillarioides Bor. var. *elongata*. M. Regent's Park.
Oscillatoria limosa Ag. M. Botanic Gardens, Regent's Park.
 S. Wandle, Beddington.
 „ *tenuis* Ag. M. Botanic Gardens, Regent's Park. S.
 Wandle, Beddington.
Chroococcus cohærens Näg. M. Botanic Gardens, Regent's Park.
Microcystis protogenita Rbh. M. Regent's Canal, Camden Town.