II.

A COMPARATIVE STUDY OF THE PLANKTON OF SOME IRISH LAKES.

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(PLATES VI.–XI.)

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I. Introduction.

In 1902 we contributed to these Transactions a Paper on the Freshwater Algæ of the North of Ireland, which included an account of the phytoplankton of Lough Neagh and Lough Beg.* Since that date, by means of a grant from the Fauna and Flora Committee of the Royal Irish Academy, we have been able to further investigate the Alga-flora of Ireland.

The present Paper deals only with the plankton of some of the most important lakes in the west and south-west of the country, and we have contrasted the phytoplankton with that known from Lough Neagh and Lough Beg, and also with the Scottish phytoplankton. A large number of collections were made in Mayo, Galway, and Kerry,† and although Algæ were obtained from all available situations, the collection of plankton was made a special feature of the investigation. Some of the material was

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† From the latter in May, 1904, and from the two former counties in August and September, 1904.

rich in variety of species, and we have thought it advisable to publish the results of the plankton investigations separately. Many of the pelagic organisms were of great interest, and some of them have never before been observed in the British Islands. Several we have had to regard as entirely new species.

With the exception of Lough Acorrymore in Achill Island, Mayo, almost all the lakes examined were very little above the sea-level.

We have to thank Mr. E. Lemmermann, of Bremen, for his kindness and courtesy in examining some of the Peridinieæ, Rotifers, and Entomostraca, and also for giving us his valuable opinion on a few of the Algæ.

We hope, in a future contribution, to give an account of the remainder of the collections of Algæ, exclusive of the plankton.

II. Detailed Account of the Plankton of the Loughs investigated.

Plankton has been collected and examined from sixteen of the Irish loughs, the following brief notes giving the principal features of each lough, with mention of any peculiarities exhibited by the plankton, and the dominant forms contained therein. The dates indicate the days on which the material was collected.

1. *Lough Conn, Mayo*, Aug. 31st, 1904.—This lough is about 8 miles in length and averages about $2\frac{1}{2}$ miles in width. The shores are mostly rocky, and the plankton was obtained in a high wind with large waves on the lough. The collections contained numerous Entomostraca, and the Rotifers *Notholca longispina* Kellicot, and *Anuræa cochlearis* Gosse were very common. Of the phytoplankton, *Asterionella formosa* Hass. and *Melosira varians* Ag. were present in large quantity. *Ceratium hirundinella* O. F. M. was also abundant. Fragmentary colonies of *Glœocapsa magna* (Bréb.) Kütz. occurred in the material, but these had most probably been torn from the rocks at the shores by the violence of the waves.

2. *Lough Cullin, Mayo*, Aug. 31st, 1904.—This lough lies to the south of Lough Conn, but is connected with that lake by a wide channel across which is a pontoon bridge. It is about 3 miles in length and $2\frac{1}{2}$ miles in

width, and, like the adjacent lough, its shores are very rocky. The plankton had a very different appearance from that collected in Lough Conn on the same day. The material was of a dark-green colour, due to a large quantity of floating masses of the spores of *Anabæna Lemmermanni* Richter. Another feature of this plankton was the presence of large contorted filaments of *Anabæna circinalis* (Kütz.) Rabenh., and there was also a great profusion of *Asterionella formosa* Hass. The Entomostraca consisted mostly of a small species of *Bosmina*. The Rotifers *Notholca longispina* Kellicot, *Anuræa cochlearis* Gosse, and *Polyarthra platyptera* Ehrenb. were general, and *Ceratium hirundinella* O. F. M. and *Mallomonas acaroides* Perty were abundant.

3. *Lough Keel, Achill Island, Mayo*, Aug. 28th, 1904.—This is an uninteresting lough about a mile in length and half a mile wide at its broadest part. It is only separated from the sea by a flat belt of land about half a mile in width, and the water is very shallow. The plankton, which was collected close to the eastern shore, contained large numbers of *Cyclops*, all of which were thickly coated with *Characium Debaryanum* (Reinsch) De Toni. The Rotifers *Notholca longispina* Kellicot and *Anuræa cochlearis* Gosse occurred in small quantity, and a few specimens of *Ceratium hirundinella* O. F. M. were observed. The principal constituents of the phytoplankton were *Pediastrum Boryanum* (Turp.) Menegh., *Eunotia pectinalis* (Kütz.) Rabenh. in long ribbons, *Chroococcus limneticus* Lemm., and a small form of *Staurastrum gracile* Ralfs.

4. *Lough Acorrymore, Achill Island, Mayo*, Aug. 28th, 1904.—This is a small lough, not more than half a mile in length, and situated about 700 ft. above sea-level in a deep hollow of Croaghaun. Its margins are rocky, and the plankton was obtained from near its outlet. The only Entomostracan observed was *Bosmina longirostris* O. F. M., and the three Rotifers *Notholca longispina* Kellicot, *Anuræa cochlearis* Gosse, and *Polyarthra platyptera* Ehrenb. occurred plentifully. *Ceratium hirundinella* O. F. M was also frequent. Long filaments of *Sphærozosma Aubertianum* West were abundant, and likewise matted filaments of *Microspora amœna* (Kütz.) Rabenh. var. *irregularis* nob. and *Eunotia pectinalis* (Kütz.) Rabenh.

5, 6, and 7. *Small lakes between Clifden and Roundstone, Galway*, Sept. 5th,

1904.—There is an area between Clifden and Roundstone, occupying about 30 square miles, and across the northern part of which a road has been constructed, which presents one of those rocky bog-lands which are a feature of western Sutherland and the Outer Hebrides. The bogs are practically impassable, and the entire area is studded with small lakes. Many of these lakes possess rocky shores, and the bogs themselves are rocky. It is possible to step from a solid mass of granitic rocks into knee-deep bog, and it is quite impossible to reach the margins of some of the lakes. The bogs and lakes contain quantities of *Eriocaulon septangulare* With. and *Utricularia minor* L., and the district is one of the richest in Ireland for freshwater Algæ. We obtained plankton from three of these lakes, one of which was certainly more than a mile in length. The material contained numerous Entomostraca and Nauplii, and a great abundance of *Ceratium hirundinella* O. F. M., many of the latter being of a rather remarkable shape. The Rotifers *Notholca longispina* Kellicot, *Anuræa cochlearis* Gosse, and *Polyarthra platyptera* Ehrenb., were scarce. The plankton of these lakes more nearly resembled that of the small lakes in the west and north-west of Scotland (especially the Outer Hebrides) than any other we have collected in Ireland. The Desmids in particular were very similar, and with few exceptions most of the characteristic species of the Scottish plankton were present. One of the lakes contained a large quantity of floating *Stigonema minutum* Hass., a species which occurred in similar abundance in the lakes of north-west Scotland. The occurrence of *Peridinium limbatum* (Stokes) Lemm. is of great interest.

8. *Lough Mawmeen, west of Roundstone, Galway*, Sept. 5th, 1904.—This lake is about $4\frac{1}{2}$ miles due west of Roundstone, and is one of the largest and most southerly of the lakes of the area between Clifden and Roundstone described above. Numerous Entomostraca occurred, of which the most abundant was *Sida crystallina* O. F. M. The plankton was remarkable for the great abundance of *Eudorina elegans* Ehrenb., *Ceratium hirundinella* O. F. M., *Cœlosphærium Kützingianum* Näg., and *Anabæna circinalis* (Kütz.) Rab. var. *tenuis*. Long filaments of *Gonatozygon Kinahani* (Arch.) Rabenh. were by no means uncommon. The three Rotifers *Notholca longispina* Kellicot, *Anuræa cochlearis* Gosse, and *Polyarthra platyptera* Ehrenb. were very scarce.

9. *Lough Corrib, Galway*, Sept. 7th, 1904.—This is one of the largest lakes in the British Islands, and much the largest in the west of Ireland. It is about 20 miles in length, and varies in breadth from half a mile to 7 miles. The southern end of the lake, which is about 4 miles across, is very shallow; but the northern and larger part of the lake is much deeper. The plankton was obtained from among the islands which stud the lake to the north-east of Oughterard, and the material was collected in a strong wind. The dominant feature of the plankton was the abundance of *Gomphosphæria lacustris* Chodat, *Asterionella formosa* Hass., *Synedra Lemmermanni* sp. n., and certain Desmids. *Cyclotella Schroeteri* Lemm. was also abundant, forming chains, the individuals being remote from each other and held in position by a thick cylinder of mucus. The Rotifers *Notholca longispina* Kell., *Anuræa cochlearis* Gosse, and *Polyarthra platyptera* Ehrenb. were fairly numerous, and also two forms of *Ceratium hirundinella* O. F. M. *Mallomonas acaroides* Perty was not uncommon.

10. *Lough Caragh, Kerry*, May 24th, 1904.—This lough is about 4 miles in length, and varies in width from one-quarter to three-quarters of a mile. It is about 4 miles south-west of Killorglin, and is situated close to the sea. Entomostraca were very numerous, large specimens of *Bosmina cornuta* Jur., *Holopedium gibberum* Zaddach, *Polyphemus pediculus* de Geer, and numerous Nauplii being the most conspicuous. *Mallomonas caudata* Iwanoff, and a form of *Ceratium hirundinella* O. F. M. were not uncommon. *Notholca longispina* Kell. and *Anuræa cochlearis* Gosse were fairly numerous. *Sphærocystis Schroeteri* Chodat was in great abundance, and also many Desmids, but of the latter no single species was conspicuously in excess.

11. *Lough Currane, Kerry*, May 25th, 1904.—This lough is quite close to the sea in Ballinskelligs Bay, the town of Waterville being situated at its outlet. It is about $2\frac{1}{2}$ miles long by $2\frac{1}{4}$ miles wide. The plankton contained numerous *Bosmina longirostris* O. F. M. and Nauplii. *Notholca longispina* Kell. and *Anuræa cochlearis* Gosse occurred in quantity, but *Polyarthra platyptera* Ehrenb. was very scarce. *Mallomonas acaroides* Perty was abundant, and a form of *Ceratium hirundinella* O. F. M. was not uncommon. Apart from the Entomostraca and Rotifers, the most conspicuous features of the plankton were the profusion of *Tabellaria*

fenestrata (Lyngb.) Kütz., in long zigzag chains, the abundance of *Sphærocystis Schroeteri* Chodat, and the presence of numerous Desmids.

12. *Lough Derriana, Kerry*, May 26th, 1904.—This lough is about 7 miles north-east of Waterville on the right of the road to Killorglin. It is about 2 miles in length and three-quarters of a mile in width. The dominant features of the plankton were quantities of zigzag chains of *Tabellaria fenestrata* (Lyngb.) Kütz., and large numbers of *Staurastrum jaculiferum* West, *St. cuspidatum* Bréb. var. *maximum* West, and *St. paradoxum* Meyen. *Anuræa cochlearis* Gosse occurred only in small quantity, and *Ceratium hirundinella* O. F. M. was very scarce.

13. *Lough Guitane, Kerry*, May 23rd, 1904.—This is one of the lakes in the Killarney district, and is situated east-south-east of Lough Leane. It is about $1\frac{1}{2}$ miles in length and 1 mile in width. The principal features of the plankton were large numbers of Nauplii, quantities of *Anabæna circinalis* (Kütz.) Rabenh., and a great abundance of *Staurastrum jaculiferum* West and *St. curvatum* West. *Notholca longispina* Kell., *Anuræa cochlearis* Gosse, and *Polyarthra platyptera* Ehrenb. were common, but *Ceratium hirundinella* O. F. M. was scarce.

14. *Lough Leane (or the Lower Lake of Killarney), Kerry*, May 22nd, 1904.—This lake is about 5 miles in length and about $2\frac{1}{2}$ miles broad at its widest part. The dominant features of the plankton were long ribbons of *Fragilaria capucina* Desmaz. and a great abundance of *Tabellaria fenestrata* (Lyngb.) Kütz. var. *asterionelloides* Grun. *Bosmina longirostris* O. F. M., *B. cornuta* Jur., *Polyphemus pediculus* de Geer, and numerous Nauplii were present. The Rotifers *Notholca longispina* Kell., *Anuræa cochlearis* Gosse, and *Triarthra longiseta* Ehrenb. were fairly abundant, as were also *Ceratium hirundinella* O. F. M. and *Mallomonas acaroides* Perty. *Closteriopsis longissima* Lemm. was not uncommon, and the presence of the Protozoan *Tintinnidium fluviatile* Stein was very interesting.

15. *Lough Neagh.*—The plankton-collections were made during May, 1900, and July, 1901, and have been partially reported upon in the Trans. Roy. Irish Acad., vol. xxxii., part i., 1902, pp. 5–10. Since this account was published much time has been spent at further work on the material, and many additions have been noted. The original list (including the

plankton of the Lower River Bann at the outlet of Lough Neagh), with the additions, is inserted in the general table of phytoplankton for comparison with the lakes of the west and south-west. Lough Neagh is the largest lake in the British Islands, being from 14 to 18 miles in length and averaging about 10 miles in width. It is a shallow lake, the average depth being about 45 feet, the deepest sounding in the north-west corner being only 96 feet. The plankton was chiefly remarkable for the great abundance of *Tabellaria fenestrata* (Lyngb.) Kütz. var. *asterionelloides* Grun. and *Staurastrum paradoxum* Meyen var. *longipes* Nordst., both of which occurred in prodigious quantities. *Pediastrum duplex* Meyen and *Gomphosphæria lacustris* Chodat were also present in abundance. The three Rotifers *Anuræa cochlearis* Gosse, *A. aculeata* Ehrenb., and *Notholca longispina* Kell. were general. *Bosmina longirostris* O. F. M. and *Cyclops* sp. occurred sparingly. *Ceratium hirundinella* O. F. M., *Peridinium cinctum* Ehrenb., and *P. tabulatum* (Ehrenb.) Clap. et Lach. were abundant.

16. *Lough Beg, Londonderry*, July, 1901.—After leaving Lough Neagh, the Lower River Bann expands into Lough Beg, a very shallow lake, averaging only about 5 feet in depth. It is about $3\frac{1}{2}$ miles in length by about a mile in average breadth, and the plankton presents a great similarity to that of Lough Neagh. The collections were partially reported upon in 1902, along with the report upon the plankton of Lough Neagh. Since then many additions have been found, and the entire list is tabulated along with the other lists of phytoplankton. *Anuræa cochlearis* Gosse and *A. aculeata* Ehrenb. were not uncommon, and *Ceratium hirundinella* O. F. M., *Peridinium cinctum* Ehrenb., and *P. tabulatum* (Ehrenb.) Clap. et Lach. were fairly common. Again, the leading feature was the enormous abundance of *Tabellaria fenestrata* (Lyngb.) Kütz. var. *asterionelloides* Grun.

17. The column numbered 17 in the table of phytoplankton is inserted so that a direct comparison can be made between the species occurring in the plankton of the west of Scotland, and those occurring in the plankton of the western and south-western lakes of Ireland. It does not include all the forms observed in the Scottish freshwater plankton, but only those known from the Irish plankton which likewise occur in Scotland.

TABLE OF PHYTOPLANKTON.

The Algæ noted as occurring in the various collections have been tabulated to facilitate comparison. The relative frequency of a species is indicated by the letters "ccc" = very abundant, "cc" = common, "c" = fairly common, "r" = infrequent, "rr" = rare, and "rrr" = very rare. The × in column No. 17 indicates that the particular form in question is known to occur in the freshwater plankton of the west of Scotland.

Species.	Mayo.				Galway.					Kerry.							
	Lough Conn.	Lough Cullin.	Lough Keel, Achill Island.	Lough Acorrymore, Achill Island.	Small lakes between Clifden and Roundstone. I.	II.	III.	Lough Mawmeen.	Lough Corrib.	Lough Caragh.	Lough Currane.	Lough Derriana.	Lough Guitane.	Lough Leane.	Lough Neagh.	Lough Beg, Londonderry.	West of Scotland.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Phæophyceæ.																	
Phæococcus planctonicus, W. & G. S. West,	..	..	..	..	..	..	..	..	..	r	rr	..	..	..	..	..	×
Dinobryon cylindricum, Imhof,	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..	..	×
,, ,, var. divergens (Imhof), Lemm.,	r	c	..	..	c	cc	..	c	..	c	ccc	rr	..	r	c	r	×
,, ,, var. palustre, Lemm.,	..	..	..	..	r	..	..	r	..	..	..	..	..	..	..	..	×
,, ,, var. Schauinslandii, Lemm.,	..	..	..	..	..	..	..	..	..	..	r	..	..	..	..	..	×
,, sociale, Ehrenb.,	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	×
,, Sertularia, Ehrenb., var. thrysoideum (Chod.) Lemm.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	×
,, protuberans, Lemm.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	×
,, elongatum, Imhof,	..	..	..	..	r	rr	..	..	rr	rr	..	..	..	..	..	..	×
,, ,, var. undulatum, Lemm.,	..	..	..	..	..	..	..	..	r	..	rr	..	..	..	..	..	×
,, bavaricum, Imhof,	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	×
Chlorophyceæ.																	
Œdogonium, spp. (sterile),	..	..	..	..	cc	cc	r	cc	c	..	..	rr	rrr	..	rr	r	×
Ulothrix subtilis, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	×
,, ,, var. variabilis (Kütz.), Kirchn.,	..	..	..	c	..	..	..	..	..	..	..	..	..	..	..	..	×
Geminella interrupta, Turp.,	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	×
Myxonema subsecundum (Kütz.), Hazen,	..	..	..	..	..	..	..	c	..	..	..	..	..	..	..	..	×
,, tenue (Ag.), Rabenh.,	..	..	..	..	..	..	..	..	..	r	..	..	..	..	r	..	×
Microspora amœna (Kütz.), Rabenh.,	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
,, ,, var. irregularis, var. n.,	..	..	rr	c	..	..	..	..	..	..	..	..	..	..	..	..	×
Mougeotia, spp. (sterile),	cc	r	r	c	cc	cc	ccc	cc	cc	rr	rr	r	rr	r	r	r	×
Zygnema, spp. (sterile),	..	..	..	..	..	..	..	rr	rr	..	..	rr	..	..	..	..	×
Spirogyra, spp. (sterile),	rrr	..	..	..	r	c	..	r	rrr	rrr	rr	..	rrr	c	..	..	×
Gonatozygon monotœnium, De Bary,	r	..	..	..	r	c	c	rr	..	r	rr	..	..	..	..	..	×
,, ,, var. piloseilum, Nordst.,	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	..	×
,, Kinahani (Arch.), Rabenh.,	..	..	..	..	..	..	..	c	..	..	..	..	..	..	..	..	×
,, aculeatum, Hastings,	..	..	..	..	..	rrr	..	..	..	..	..	..	..	..	..	..	×
Mesotœnium macrococcum (Kütz.), Roy & Biss.,	..	..	..	..	rrr	r	..	..	..	..	..	..	..	..	..	..	×
Netrium Digitus (Ehrenb.), Itzigsh. & Rothe,	r	..	..	..	rr	..	..	..	..	..	..	..	rrr	..	..	..	×
Penium Libellula (Focke), Nordst.,	..	..	..	..	rrr	..	..	..	..	..	..	..	..	..	..	..	×

,, minutum (Ralfs), Cleve,	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..	..	×
Closterium Pseudodianæ, Roy,	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..
,, parvulum, Näg.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	×
,, Leibleinii, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..	..
,, acerosum, (Schr.), Ehrenb. var. minus Hantzsch,	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..	×
,, decorum, Bréb.,	..	..	..	..	rrr	..	..	..	..	..	..	..	..	..	..	..	..
,, acutum, Bréb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	×
,, Ceratium, Perty,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, pronum, Bréb.,	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	×
,, aciculare, T. West var. subpronum W. & G. S. West,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	r	..	×
,, Kützingii, Bréb.,	..	..	..	..	..	..	..	..	..	r	rr	rr	r	r	..	..	×
,, ,, var. onychosporum W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	..	rr	r	..	..	..	×
Pleurotænium Ehrenbergii (Ralfs), De Bary,	..	..	..	..	rr	..	..	rr	..	..	..	..	..	..	..	..	×
Tetmemorus granulatus (Bréb.), Ralfs,	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	×
Euastrum ansatum Ralfs,	rr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
,, elegans (Bréb.), Kütz.,	rr	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	×
,, bidentatum Näg.,	..	..	..	..	r	..	..	..	..	..	rr	..	..	..	..	..	×
,, denticulatum (Kirchn.), Gay,	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..
,, verrucosum Ehrenb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	×
,, ,, var. reductum Nordst.,	..	..	rr	..	..	..	..	..	..	rr	rr	..	..	..	..	..	×
Micrasterias truncata (Corda), Bréb.,	..	..	..	..	rrr	..	rr	..	..	..	..	..	..	..	..	..	×
,, papillifera Bréb.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	×
,, Sol (Ehrenb.) Kütz.,	..	..	..	..	rr	rr	r	..	..	..	rr	..	..	..	..	..	×
,, ,, var. ornata Nordst.,	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..	..	×
,, denticulata Bréb.,	..	..	..	..	r	r	..	..	..	..	..	..	..	..	..	..	×
,, radiata Hass.,	..	..	..	..	..	rr	rrr	..	..	..	..	..	..	..	..	..	×
Cosmarium subtumidum Nordst. var. Klebsii (Gutw.) W. & G. S. West,	rr	rr	..	..	..	..	..	..	c	..	..	..	..	..	rr	rr	×
,, depressum (Näg.), Lund.,	..	..	..	..	c	r	r	rr	cc	..	rr	..	..	..	r	..	×
,, bioculatum Bréb.,	..	..	..	..	..	..	..	..	..	c	..	r	rr	..	..	..	×
,, subarctoum (Lagerh.), Racib.,	..	..	..	..	..	..	..	..	..	c	cc	..	cc	..	..	..	..
,, Corribense sp. n.,	..	..	..	..	..	..	..	..	c	..	..	..	..	..	..	..	..
,, contractum Kirchn.,	..	..	..	..	c	r	c	..	..	rr	rr	..	r	..	..	..	×
,, ,, var. ellipsoideum (Elfv.), W. & G. S. West,	..	..	..	..	..	cc	..	..	..	..	..	..	rr	..	..	..	×
,, granatum Bréb.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	×
,, ,, var. subgranatum Nordst.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, Meneghinii Bréb. forma octangularis Wille,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	×
,, difficile Lütkem. var. sublæve Lütkem.,	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..	..	..	×
,, capitulum Roy & Biss. var. grœnlandicum Börges.,	..	..	..	..	..	..	rr	..	..	rr	..	..	..	..	..	..	×
,, abbreviatum Racib. var. planctonicum W. & G. S. West,	rr	..	..	..	..	..	..	..	r	c	c	rr	..	rr	rr	..	×
,, moniliforme (Turp.) Ralfs,	..	..	..	..	cc	c	cc	r	c	..	..	..	..	..	..	..	×
,, connatum Bréb.,	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	×
,, humile Gay,	..	..	rr	..	rr	..	..	..	..	..	..	..	..	..	rr	..	×
,, punctulatum Bréb.,	..	..	..	..	rr	..	rr	r	r	..	..	..	..	..	..	..	×
,, margaritiferum (Turp.), Menegh.,	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	×
,, reniforme (Ralfs), Arch.,	..	..	..	..	..	..	..	..	rrr	..	..	..	rrr	..	..	..	×
,, Botrytis (Bory), Menegh.,	..	r	..	..	..	..	..	..	rrr	..	..	..	..	r	r	..	×
,, ,, var. depressum W. & G. S. West,	..	..	..	..	..	..	..	..	rr	rrr	..	..	..	..	..	..	×
,, tetraophthalmum Bréb.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	×
,, Brébissonii, Menegh.,	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..	..
,, ovale, Ralfs,	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	..	..	×
,, Turpinii, Bréb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	r	rr	×
,, ornatum, Ralfs,	..	..	..	..	rr	..	..	..	..	..	rrr	..	..	..	..	..	×
Cosmocladium Saxonicum, De Bary,	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	..
Xanthidium antilopæum (Bréb.), Kütz.,	..	..	..	..	r	c	c	r	rr	r	..	..	..	..	rr	..	×
,, ,, var. depauperatum, W. & G. S. West,	..	..	..	..	..	..	..	..	r	rr	..	..	..	rr	..	..	×
,, ,, var. Hebridarum, W. & G. S. West,	..	..	..	..	c	cc	r	..	..	..	..	..	..	..	..	..	×
,, subhastiferum, West,	..	..	..	..	r	..	..	..	..	c	cc	rr	c	r	..	..	×
,, cristatum, Bréb.,	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	×
,, armatum (Bréb.), Rabenh.,	..	..	..	..	rrr	rrr	..	..	rrr	..	..	..	..	..	..	..	×
Arthrodesmus Incus (Bréb.), Hass.,	..	..	..	..	r	r	c	..	rrr	r	r	..	..	..	..	..	×
,, triangularis, Lagerh.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, ,, var. subtriangularis (Borge), W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	×
Arthrodesmus crassus, W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	×

TABLE OF PHYTOPLANKTON—*continued.*

Species.	Mayo.				Galway.					Kerry.							
					Small lakes between Clifden and Roundstone.												
	Lough Conn.	Lough Cullin.	Lough Keel, Achill Island.	Lough Acorrymore, Achill Island.	I.	II.	III.	Lough Mawmeen.	Lough Corrib.	Lough Caragh.	Lough Currane.	Lough Derriana.	Lough Guitane.	Lough Leane.	Lough Neagh.	Lough Beg, Londonderry.	West of Scotland.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Chlorophyceæ—*continued.*																	
Staurastrum apiculatum, Bréb.,	..	..	..	..	..	..	..	..	rrr	..	rr	..	..	..	rr	..	..
,, dejectum, Bréb.,	..	..	rr	..	..	..	r	rr	..	..	r	..	..	..	r	r	..
,, var. inflatum, West,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	r	rr	..
,, Dickiei, Ralfs,	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..
,, curvatum, West,	r	rr	..	..	..	rr	c	r	rr	c	c	..	cc	rr	..	..	..
,, jaculiferum, West,	..	..	rrr	..	..	..	..	..	..	r	cc	cc	ccc	r	..	..	..
,, ,, var. excavatum, W. & G. S. West.	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..
,, megacanthum, Lund.,	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	..	..	..
,, cuspidatum Bréb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, ,, var. maximum, West,	..	..	r	..	..	..	..	..	..	r	cc	c	r	..	r	..	..
,, longispinum (Bail.), Arch.,	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..
,, Brasiliense Nordst. var. Lundellii, W. & G. S. West,	..	..	..	..	r	r	..	..	..	..	rr	..	..	..	..	..	..
,, grande, Buln.,	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	rr	..	..
,, muticum, Bréb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, subpygmæum, West,	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..
,, brevispinum, Bréb.,	rr	..	..	..	..	..	rr	rr	c	..	r	..	..	c	c	c	..
,, ,, var. altum, W. & G. S. West,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..
,, aversum, Lund.,	..	..	..	..	r	rr	..	..	rrr	..	..	..	..	..	..	..	..
,, lunatum, Ralfs, var. planctonicum, W. & G. S. West,	..	..	..	..	..	rrr	..	..	c	rr	cc	r	cc	c	..	..	..
,, Avicula, Bréb., var. subarcuatum (Wolle), West,	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..
,, denticulatum (Näg.), Arch.,	r	..	..	..	..	..	..	..	..	c	..	c	..	..	..	..	..
,, granulosum (Ehrenb.), Ralfs,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	rr	..
,, Bieneanum, Rabenh.,	..	..	..	..	..	..	..	..	..	rr	rr	..	..	..	..	..	..
,, brachiatum, Ralfs,	..	..	..	..	c	..	..	..	..	rrr	r	..	..	..	..	..	..
,, dilatatum, Ehrenb., var. obtusilobum, De Not.,	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..	..
,, Maamense, Arch.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	..
,, hexacerum (Ehrenb.), Wittr.,	..	..	..	..	..	..	..	..	..	..	..	rrr	..	rrr	..	..	..
,, pelagicum, W. & G. S. West,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	c	r	..
,, pseudopelagicum, W. & G. S. West,	..	..	..	..	..	..	..	..	..	c	rr	rr	..	..	..	..	..
,, paradoxum, Meyen,	..	rr	rr	c	..	..	..	..	r	cc	..	cc	..	cc	..	r	..
,, ,, var. longipes, Nordst.,	c	r	..	..	r	c	c	..	c	rr	r	r	c	rr	cc	c	..
,, ,, var. cingulum, W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..
,, gracile, Ralfs,	..	..	c	c	r	c	..	rr	..	r	r	c	rr	r	r	rr	..
,, ,, var. cyathiforme, W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..
,, dorsidentiferum, sp. n.,	c	c	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..
,, anatinum, Cook & Wills,	..	..	..	..	c	cc	c	..	rr	r	c	r	rr	r	r	rr	..
,, ,, var. truncatum, West,	..	..	..	..	..	..	..	..	..	..	c	..	c	..	r	rr	..
,, ,, var. pelagicum, W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	r	..
,, Sebaldi, Reinsch, var. productum, W. & G. S. West,	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..
,, ,, var. ornatum, Nordst.,	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	rrr	..	..
,, Manfeldtii, Delp.,	..	..	..	r	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Arachne, Ralfs.	..	..	..	..	..	rrr	..	..	..	..	..	..	..	..	..	..	..
,, Tohopekaligense, Wolle, var. trifurcatum, W. & G. S. West,	..	..	..	..	rr	..	rrr	r	..	..	..	..	..	..	..	..	..

,, furcigerum, Bréb.,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	rr	rr	×
,, ,, var. reductum, var. n.,	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..
,, sexangulare (Buln.), Rabenh.,	..	..	..	..	..	r	r	..	..	..	rr	..	..	..	..	..	×
,, Arctiscon (Ehrenb.), Lund.,	..	..	..	..	r	..	..	..	..	..	rr	c	r	rr	..	..	×
Spondylosium pulchrum (Bail.), Arch., var. planum, Wolle,	rr	..	..	..	..	..	..	..	rr	cc	c	rr	cc	rr	..	..	×
Sphærozosma vertebratum, Ralfs,	rr	rr	..	..	c	..	..	..	rr	..	..	..	c	..	..	..	×
,, Aubertianum, West,	..	..	..	ccc	..	..	..	..	..	..	..	..	..	..	..	..	×
,, excavatum, Ralfs,	..	..	..	..	..	rr	..	..	c	..	..	..	..	..	..	..	..
Desmidium Pseudostreptonema, W. & G. S. West,	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	..	..
Gymnozyga moniliformis, Ehrenb.,	..	..	..	..	..	c	..	..	..	..	..	..	rr	..	..	..	•×
Hyalotheca dissiliens (Sm.), Bréb.,	..	..	..	..	..	r	r	..	..	rr	..	..	..	..	..	..	..
,, Indica, Turn.,	..	..	..	..	r	rr	..	..	..	..	..	..	..	..	..	..	×
,, mucosa, Ehrenb.,	rr	..	..	..	c	rr	r	r	..	..	..	..	r	..	..	..	×
,, neglecta, Racib.,	..	..	..	..	..	r	rr	..	..	..	..	..	..	..	..	..	×
,, undulata, Nordst.,	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..	×
Volvox aureus, Ehrenb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..
Eudorina elegans, Ehrenb.,	rrr	rr	..	..	r	c	..	ccc	c	..	..	..	..	..	r	r	×
Chlamydomonas pulvisculus, Ehrenb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
Characium Debaryanum (Reinsch), De Toni,	..	..	ccc	rr	..	..	..	..	..	rr	..	..	..	..	..	..	..
Pediastrum Boryanum (Turp.), Menegh.,	c	r	c	..	c	..	r	..	rrr	..	rrr	r	rr	c	c	cc	×
,, ,, var. granulatum, Ralfs,	r	..	..	..	..	..	..	..	..	..	..	..	..	r	c	c	..
,, ,, var. longicorne, Reinsch,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	..
,, ,, var. brevicorne, A. Br.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	..
,, constrictum, Hass.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, duplex, Meyen,	..	..	..	..	..	..	..	..	c	..	..	..	..	..	c	c	×
,, ,, var. asperum, A. Br.,	..	..	..	..	..	..	..	..	r	..	..	..	..	..	rr	rr	..
,, ,, var. clathratum, A. Br.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	c	c	..
,, Tetras (Ehrenb.), Ralfs,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	rrr	×
Cœlastrum cambricum, Arch.,	..	rr	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	×
,, microporum, Näg.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
,, sphæricum, Näg.,	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	×
,, reticulatum (Dang.), Senn,	..	r	..	..	..	..	..	..	..	..	..	..	..	rr	rrr	rr	..
Crucigenia quadrata, Morren,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
,, rectangularis (Näg.), Gay,	r	c	..	..	..	..	rr	c	cc	..	..	..	..	..	..	..	×
,, Tetrapedia (Kirchn.), W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	rrr	..
Scenedesmus bijugatus (Turp.), Kütz.,	rrr	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	×
,, ,, forma arcuatus (Lemm.), nob.,	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..
,, quadricauda (Turp.), Bréb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	rr	..	×
,, ,, var. abundans, Kirchn.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
,, ,, var. horridus, Kirchn.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
,, obliquus (Turp.), Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
✓ Ankistrodesmus falcatus (Corda), Ralfs,	..	..	..	..	c	..	..	..	..	r	..	..	..	rrr	rr	r	×
,, ,, var. acicularis, (A. Br.), G. S. West,	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	rr	..	×
,, ,, var. mirabilis, G. S. West,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
,, ,, var. spiralis (Turn.), G. S. West,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, Pfitzeri (Schröder), G. S. West,	..	..	..	..	..	..	..	r	rr	..	..	..	rrr	..	..	..	×
,, biplex (Reinsch), G. S. West,	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..
Selenastrum gracile, Reinsch,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
Kirchneriella obesa (West), Schmidle,	..	rr	r	..	..	..	..	..	..	..	..	..	..	..	rr	rr	×
Closteriopsis longissima, Lemm.,	..	..	..	..	..	..	..	rr	rr	..	..	r	..	r	rr	..	..
Oocystis solitaria, Wittr.,	..	..	..	..	..	rr	..	rr	..	..	..	..	..	..	rrr	rr	×
,, parva, W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, Marssonii, Lemm.,	..	..	..	..	..	..	..	rr	r	..	..	..	..	..	rr	..	×
,, lacustris, Chodat,	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	..
Nephrocytium Agardhianum, Näg.,	..	rr	..	..	..	rr	..	..	..	..	..	..	rrr	..	rr	rr	×
,, lunatum, West,	..	..	..	..	..	..	..	..	rrr	..	..	..	c	..	..	..	×
Tetraëdron enorme (Ralfs), Hansg.,	..	..	..	..	rrr	..	..	..	..	..	..	..	..	..	..	..	..
,, minimum (A. Br.), Hansg.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
Golenkinia paucispinosa, W. & G. S. West,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
Richteriella botryoides (Schmidle), Lemm. forma quadriseta (Lemm.) Chodat,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..
Dictyosphærium pulchellum, Wood,	..	..	rr	..	..	..	..	..	rr	c	r	rr	r	..	r	rr	×
Botryococcus Braunii, Kütz.,	..	..	..	..	..	..	c	r	c	c	rr	r	c	rrr	c	r	×
Ineffigiata neglecta, W. & G. S. West,	..	..	..	..	r	..	rr	rr	rr	..	rrr	rr	..	..	r	rr	×

TABLE OF PHYTOPLANKTON—*continued.*

Species.	Mayo.				Galway.					Kerry.							
	Lough Conn.	Lough Cullin.	Lough Keel, Achill Island.	Lough Acorrymore, Achill Island.	Small lakes between Clifden and Roundstone.			Lough Mawmeen.	Lough Corrib.	Lough Caragh.	Lough Currane.	Lough Derriana.	Lough Guitane.	Lough Leane.	Lough Neagh.	Lough Beg, Londonderry.	West of Scotland.
					I.	II.	III.										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Chlorophyceæ—*continued.*																	
Sphærocystis Schroeteri, Chodat,	rr	..	c	..	..	..	..	r	c	ccc	ccc	rrr	rr	c	c	..	××
Gloeocystis gigas (Kütz.), Lagerh.,	..	..	..	..	cc	..	c	..	..	rr	rr	..	r	..	r	rr	××
,, ,, var. planctonicus, var. n.,	..	..	..	..	..	r	..	..	..	..	..	..	..	..	..	..	
,, vesiculosa, Näg.,	..	..	..	..	c	..	..	..	..	..	..	..	..	..	..	..	××
,, infusionum (Schrank), W. & G. S. West,	rr	..	..	..	..	r	..	..	..	..	..	..	..	..	..	..	
Heterokontæ.																	
Askenasyella conferta, nob.,	..	..	..	..	..	..	rr	..	..	rrr	r	..	..	..	r	..	××
Oodesmus Doederleinii, Schmidle,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	
Chlorobotrys regularis (West), Bohlin,	..	..	..	..	..	..	..	..	rrr	..	..	rr	..	..	rr	..	×
Ophiocytium parvulum (Perty), A. Br.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	
Bacillarieæ.																	
Melosira varians, Ag.	cc	..	..	..	..	..	..	..	r	..	..	..	..	..	r	r	..
,, arenaria, Moore,	..	c	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..
,, granulata (Ehrenb.), Ralfs,	r	..	..	..	..	..	..	..	..	..	..	..	..	r	rr	..	×
,, crenulata, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	rr	
,, ,, var. tenuis (Kütz.), Grun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	
Cyclotella compta, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	c	cc	rr	..	×
,, ,, var. affinis, Grun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	
,, operculata, Kütz.,	..	..	..	..	..	..	..	..	..	c	c	..	..	..	..	..	×
,, Meneghiniana, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	×
,, Kützingiana, Chauvin,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	
,, Schroeteri, Lemm.,	..	..	..	..	..	..	..	..	c	..	..	..	..	..	..	..	
Coscinodiscus lacustris, Grun.,	rr	r	..	..	..	..	..	..	r	..	..	..	..	..	cc	c	
Stephanodiscus Astræa (Ehrenb.), Grun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	
,, Hantzschii, Grun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	
Rhizosolenia longiseta, Zach.,	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	
,, morsa, sp. n.,	..	..	..	..	..	..	..	..	..	c	c	..	cc	..	..	..	×
Tetracyclus lacustris, Ralfs,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	
Tabellaria fenestrata (Lyngb.), Kütz.,	c	cc	..	rr	..	..	..	..	..	cc	ccc	ccc	r	rr	..	..	××
,, ,, var. asterionelloides, Grun.,	..	..	..	..	r	..	c	..	rrr	..	r	rr	r	ccc	ccc	ccc	
,, flocculosa (Roth), Kütz.,	..	..	c	r	c	..	..	..	r	r	..	r	rr	r	..	..	×
Denticula tenuis, Kütz.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	rr	
Meridion circulare (Grev.), Ag.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	
Diatoma elongatum, Ag.,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	r	..	×
,, ,, var. tenuis (Ag.), V.H.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	

Fragilaria capucina, *Desmaz.*,	..	..	..	..	..	..	..	..	rr	rrr	..	..	..	cc	r	rr	..
,, Crotonensis (A. M. Edw.), Kitton,	c	c	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	×
,, construens (Ehrenb.), Grun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	rrr	..
Synedra Ulna (Nitzsch.), Ehrenb.,	..	..	rr	..	..	..	..	..	..	..	..	..	..	..	r	..	×
,, ,, var. longissima (W. Sm.), Brun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
,, ,, var. splendens (Kütz.), Brun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, pulchella, Kütz.,	..	..	..	..	..	..	..	..	..	rr	..	..	..	r	..	..	×
,, Acus (Kütz.), Grun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	×
,, ,, var. angustissima, Grun.,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..
,, ,, var. delicatissima (W. Sm.), V.H.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, radians (Kütz.), Grun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, revaliensis, Lemm.,	r	r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, Lemmermanni, sp. n.,	c	r	..	..	..	..	..	..	c	..	..	..	..	..	..	..	..
Asterionella formosa, Hass.,	ccc	ccc	r	..	..	..	..	..	cc	c	..	..	..	ccc	c	r	×
,, gracillima, Heib.,	c	..	..	..	..	..	..	..	c	..	cc	..	c	..	rr	..	×
Eunotia lunaris (Ehrenb.), Grun.,	..	..	..	rr	rr	..	..	rr	..	..	..	rr	..	..	..	..	×
,, pectinalis (Kütz.), Rabenh.,	..	..	c	c	rr	..	..	..	..	..	..	..	..	..	..	..	×
Achnanthes flexella (Kütz.), Bréb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
Cocconeis Placentula, Ehrenb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	..
,, Pediculus, Ehrenb.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
Navicula major, Kütz.,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	×
,, viridis, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	×
,, radiosa, Kütz.,	..	..	c	..	..	rr	r	..	rr	rrr	..	..	..	..	..	..	×
,, exilis, Grun.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..	..
Vanheurckia rhomboides (Ehrenb.), Bréb., var Saxonica (Rabenh.), G. S. West	r	..	..	..	..	..	c	..	r	..	..	r	rr	..	..	..	×
Amphipleura pellucida, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	×
Gyrosigma attenuatum (Kütz.), Rabenh.,	rr	r	..	..	..	..	..	..	r	..	..	..	..	..	rrr	rrr	..
,, Spencerii (Queck.), O. K.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	rr	..
Gomphonema geminatum (Lyngb.), Ag.,	rr	..	..	..	..	..	..	..	rr	rr	..	..	..	r	..	..	×
,, intricatum, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	×
Cocconema lanceolatum, Ehrenb.,	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	×
,, cymbiforme, Ehrenb.,	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	×
,, cæspitosum (Kütz.), G. S. West,	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..
Amphora ovalis, Kütz.,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	rrr	×
Epithemia turgida (Ehrenb.), Kutz.,	rrr	..	..	..	..	..	..	..	rr	..	..	..	..	..	r	rr	×
,, gibba, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..
Nitzschia sigmoidea (Ehrenb.), W. Sm.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	rrr	rr	×
,, linearis (Ag.), W. Sm.,	..	..	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	×
,, Palea (Kütz.), W. Sm.,	rr	..	..	..	r	..	..	..	r	rr	..	r	..	..	r	..	×
,, dissipata (Kütz.), Grun., var. acuta, V. H.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
,, acicularis, W. Sm.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	rr	..	..
Surirella biseriata, Bréb.,	ccc	r	..	..	rr	..	..	..	c	..	..	..	..	rrr	c	c	×
,, robusta, Ehrenb.,	rr	..	..	..	..	..	..	..	r	..	..	..	..	..	..	..	×
,, ,, var. splendida (Ehrenb.), V. H.,	r	rr	..	..	r	..	..	..	c	..	rr	..	..	rr	..	c	×
,, spiralis, Kütz.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
,, turgida, W. Sm.,	r	rr	..	..	..	..	..	..	..	..	..	..	..	..	r	..	..
,, ovalis, Bréb., var. ovata (Kütz.), V. H.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rrr	..
Cymatopleura Solea (Bréb.), W. Sm.,	r	rr	..	..	..	..	..	..	c	..	..	..	..	..	r	..	×
,, elliptica (Bréb.), W. Sm.,	c	r	..	..	..	..	..	..	c	..	..	..	..	..	r	..	×
,, ,, var. Hibernica (W. Sm.), V. H.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	r	..
,, ,, var. rhomboides, Grun.,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..
Campylodiscus Hibernicus, Ehrenb.,	rr	..	..	..	.	..	..	..	rrr	..	..	..	..	..	rrr	rrr	..
Myxophyceæ.																	
Stigonema minutum, Hass.,	..	..	..	..	..	cc	c	..	..	..	..	..	..	..	..	..	×
Anabæna circinalis (Kütz.), Rabenh.,	r	c	..	..	..	..	..	..	r	..	..	..	..	..	..	..	×
,, ,, var. tenuis, var. n.,	..	..	..	..	..	..	..	cc	..	..	..	..	..	..	..	..	..
,, Flos-aquæ (Lyngb.), Bréb.,	rr	..	..	..	c	..	c	..	..	r	r	rrr	c	..	c	r	×
,, Lemmermanni, Richter,	..	ccc	..	..	..	..	..	..	..	..	..	..	..	..	c	..	..
Lyngbya Martensiana, Menegh.,	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	..	..

TABLE OF PHYTOPLANKTON—*continued.*

Species.	Mayo.				Galway.					Kerry.							
	Lough Conn.	Lough Cullin.	Lough Keel, Achill Island.	Lough Acorrymore, Achill Island.	Small lakes between Clifden and Roundstone. I.	Small lakes between Clifden and Roundstone. II.	Small lakes between Clifden and Roundstone. III.	Lough Mawmeen.	Lough Corrib.	Lough Carragh.	Lough Currane.	Lough Derriana.	Lough Guitane.	Lough Leane.	Lough Neagh.	Lough Bog, Londonderry.	West of Scotland.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Myxophyceæ—*continued.*																	
Lyngbya limnetica, Lemm.,	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	rr	..	×
,, Kützingii, Schmidle, var. distincta (Nordst.), Lemm.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
Phormidium tenue (Menegh.), Gomont,	..	..	..	rr	..	..	..	..	r	..	..	..	..	..	r	..	..
Oscillatoria tenuis, Ag.,	c	r	..	..	..	..	..	..	..	..	..	..	..	r	r	..	×
,, limosa, Ag.,	..	..	..	..	..	..	..	rr	..	..	r	..	..	..	..	r	..
,, Agardhii, Gomont,	r	..	..	..	..	..	..	..	c	..	..	..	..	cc	..	..	..
Aphanothece saxicola, Näg.,	..	..	..	..	..	..	..	..	rrr	..	..	..	..	..	..	..	..
,, clathrata, sp. n.,	..	..	..	..	..	..	..	..	r	..	..	..	..	..	c	..	..
Gloeothece linearis, Näg.,	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	×
Dactylococcopsis rhaphidioides, Hansg.,	..	..	..	..	..	..	..	..	..	rrr	..	rr	rr	..	rr	..	..
Merismopedia glauca (Ehrenb.), Näg.,	r	..	..	..	r	..	..	..	r	r	..	..	r	..	..	..	×
,, æruginea, Bréb.,	..	..	..	..	..	..	..	..	..	..	r	..	..	..	..	..	×
,, tenuissima, Lemm.,	..	..	..	..	rr	..	..	..	..	..	rr	..	..	..	rrr	..	..
Gomphosphæria aponina, Kütz.,	..	..	r	..	..	..	..	..	c	..	..	..	..	..	rrr	rr	..
,, lacustris, Chodat,	r	rr	..	..	c	rr	..	r	ccc	..	c	..	..	..	cc	c	×
Cœlosphaerium Kützingianum, Näg.,	cc	c	..	..	..	..	..	c	r	rr	r	rrr	..	c	cc	r	×
,, Nägelianum, Unger,	..	..	..	..	..	..	..	c	r	..	rr	rrr	r	..	r	..	×
,, minutissimum, Lemm.,	..	..	..	..	..	..	r	..		..	..	..	r	..	rr	rr	×
,, natans, Lemm.,	rr	..	..	..	..	..	..	..	r	rr	..	..	rr	..	..	..	×
Microcystis incerta, Lemm.,	..	..	r	..	c	..	..	..	..	..	..	..	rrr	..	..	..	×
,, prasina (Wittr.), Lemm.,	..	rr	..	..	..	rr	..	..	..	..	..	rr	..	..	rr	rrr	×
,, stagnalis, Lemm.,	..	rr	..	..	..	..	..	..	r	..	..	..	..	..	c	rr	×
,, æruginosa (Kütz.), G. S. West,	..	r	..	..	..	..	..	..	..	..	..	..	..	..	c	r	..
,, roseo-persicinus (Kütz.), G. S. West,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	rr	..	..
Chroococcus limneticus, Lemm.,	r	r	c	..	..	..	..	rrr	rrr	..	..	..	..	..	r	c	×
,, ,, var. subsalsus, Lemm.,	..	..	..	..	..	..	..	..	c	..	..	..	..	..	..	..	..
,, cohærens (Bréb.), Näg.,	..	..	..	..	..	..	..	..	rr	..	..	..	..	..	..	..	×
,, helveticus, Näg.,	..	c	..	..	..	..	..	..	c	..	..	..	..	..	..	..	..
,, minimus (v. Keissler), Lemm.,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	..
,, turgidus (Kütz.), Näg.,	..	..	..	..	..	..	..	..	..	..	..	rr	..	..	..	..	..

Note.—The *Volvox aureus* Ehrenb. of the above list was originally recorded as *V. globator* Ehrenb. (*vide* Trans. Roy. Irish Acad., vol. xxxii., sect. B, part. i., 1902, p. 8); *Oocystis Marssonii* Lemm. was recorded as *O. crassa* Wittr. (l. c. p. 9); *Closteriopsis longissima* Lemm. was erroneously placed as *Rhaphidium longissimum* Schröder (l. c. p. 9); *Aphanothece clathrata* sp. n. was recorded as *A. nidulans* Richter (l. c. p. 9); and *Chroococcus minimus* (v. Keissler) Lemm. was recorded as *Chr. minor* (Kütz.) Näg. (l. c. p. 9).

PERIDINIALES.

In the determination of these organisms, which are abundant in some of the Irish loughs, we have to express our indebtedness to Mr. E. Lemmermann, of Bremen. He very kindly examined material from nine of the loughs, and reported upon the Peridiniales which he observed. One of them is a new variety which he has named *Gymnodinium paradoxum* Schill. var. *major*.

As in the Scottish plankton the most abundant of the Peridinieæ is *Ceratium hirundinella* O. F. M., and this organism is subject to more variation in the west of Ireland than has been recorded from elsewhere. This we have illustrated by a number of figures.

The table on p. 92 represents the species observed.

The following species are of special interest:—

1. GYMNODINIUM PARADOXUM Schilling in Flora, 1891, p. 59 (sep.), t. 3, f. 13.

Var. MAJOR Lemm., var. n.

Cellulæ ovales, 66–75μ longæ et 61–67μ latæ.

Hab.—Lough Currane, Kerry.

The typical form is nearly globular in shape, and averages about 34·5μ by 36·8μ.

2. GYMNODINIUM sp.

The specimens had been preserved in 3 per cent. formalin, but were useless for purposes of determination. The cells were embedded in a very wide gelatinous envelope such as occurs in *G. fuscum* (Ehrenb.) Stein and *G. Zachariasi* Lemm.

Hab.—Loughs Caragh and Derriana, Kerry.

Species.	Mayo.				Galway.						Kerry.								
					Small Lakes between Clifden and Roundstone.														
					I.	II.	III.												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
	Lough Conn.	Lough Cullin.	Lough Keel, Achill Island.	Lough Acorrymore, Achill Island.				Lough Mawmeen.	Lough Corrib.	Lough Caragh.	Lough Currane.	Lough Derriana.	Lough Guitane.	Lough Leane.	Lough Neagh.	Lough Beg, Londonderry.	West of Scotland.		
Gymnodiniese.																			
Gymnodinium paradoxum, Schill., var. major, Lemm.,				×				×		×									
,, sp., ...											×	×							
Peridiniese.																			
Glenodinium pulvisculus (Ehrenb.), Stein, .				×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Ceratium cornutum (Ehrenb.), Clap. et Lachm., .				×				×		×									
,, hirundinella, O. F. Müller, . .				×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Peridinium bipes, Stein, ...								×		×					×	×			
,, cinctum, Ehrenb., ...																			
,, tabulatum (Ehrenb.), Clap. et Lachm., .				×															
,, Willei, Huitfeldt-Kaas, . . .																			
,, alatum, Garbini, ...																			
,, limbatum (Stokes), Lemm., . .																			

3. PERIDINIUM LIMBATUM (Stokes) Lemm. in Hedwigia, 1900, xxxix., p. 120. *Protoperidinium limbatum* Stokes in Proc. Trenton Nat. Hist. Soc. 1888, p. 14 1, t. 4, f. 1.

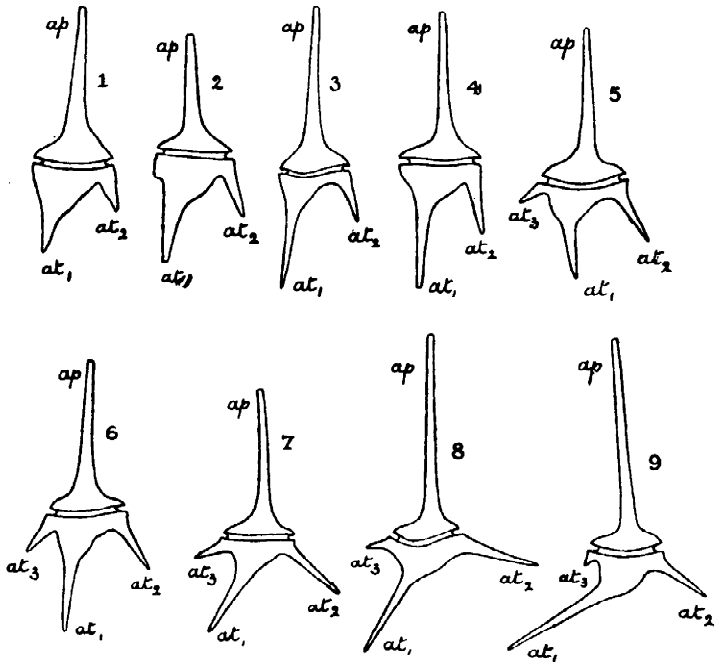
Length (with short horns), 90μ; breadth, 65μ.

Hab.—Small lake between Clifden and Roundstone, Galway.

This species is of particular interest, as there are no other records since its original discovery in the United States.

4. CERATIUM HIRUNDINELLA O. F. Müller.

The abundance and variation of this organism is one of the most striking features of the freshwater plankton of British and Irish lakes. We have noticed greater diversity of form in the Irish specimens than occurred amongst those of the west of Scotland or those of the Orkneys and Shetlands. The principal variations are in the length of the horns and the amount of their divergence; and it is not uncommon to have two, or even three, distinct forms in the plankton of one lake. Lemmermann figured a large number of different forms from the plankton of the Swedish lakes (*vide* Lemm. in Archiv. f. Bot. utgifv. af K. Sv. Vet.—Akad. Bd. 2, 1904, no. 2, t. 2, f. 1–49) and we figured four of the most widely divergent forms from the Scottish plankton (*vide* W. & G. S. West in Trans. Roy. Soc. Edinb., vol. xli., part iii., 1905, p. 494 cum fig. xylogr. 1).



FIGS. 1–9. *Ceratium hirundinella* O.F.M. All × 200.

1, from Lough Neagh; 2, from Lough Corrib; 3, from Lough Caragh; 4, from Lough Currane; 5, from Lough Acorrymore; 6, from small lake between Clifden and Roundstone (I.); 7, from small lake between Clifden and Roundstone (III.); 8 and 9, from small lake between Clifden and Roundstone (II.) *ap.* apical horn; at_1, at_2, and at_3, the three antapical horns.

Lemmermann has compiled the following Table of measurements :—

Locality.	Length of Apical Horn.	Length of 1st Antapical Horn.	Length of 2nd Antapical Horn.	Length of 3rd Antapical Horn.	Total Length of Body.
Lough Cullin, . . .	120–131·2 μ	86·2–112·5 μ	48·7–101·2 μ	·9–18·7 μ	214·2–237·7 μ
Small lake (I), between Clifden and Roundstone, . . .	127·5–138·7 μ	90–93·7 μ	56·2–60 μ	22·5–37·5 μ	219–233·9 μ
Lough Mawmeen, . .	97·5–116·2 μ	67·5–108·7 μ	41·2–67·5 μ	11·2–37·2 μ	169–222·5 μ
Lough Corrib, . . .	48·7–93·7 μ	63 7–75 μ	30–45 μ	0	144–162·7 μ
	112·5–113·7 μ	93·7–97·5 μ	52·5–63·7 μ	15–48·7 μ	207·5–219 μ
Lough Caragh, . .	131–150 μ	90–109 μ	37·5–52·5 μ	0	222·5–260·5 μ
Lough Currane, . .	127·5–187·5 μ	82–108·5 μ	32·5–52·5 μ	0	211–286·5 μ
Lough Derriana, . .	142·5–146·2 μ	101·2–105 μ	45–48·7 μ	0	245·2–252·7 μ
Lough Larne, . . .	120–131·2 μ	78·7–90 μ	37·5–48·7 μ	15–22·5 μ	207·7–222·7 μ
	120–131·2 μ	82·5–86 μ	41·2–48·7 μ	0	207·5–215·2 μ
Lough Neagh, . . .	101·2–131·2 μ	75–101·2 μ	41·2–45 μ	7·5–22·5μ	177·7–234 μ
	127·5–135 μ	75–82·5 μ	37·5–41·2 μ	0	204–219 μ

In many of the forms the third antapical horn is absent (figs. 1–4), and the variability in the amount of divergence of the antapical horns is well shown in figs. 4–9.

Fig. 9 exhibits a bending to one side of the first antapical horn which we have not observed from any other locality.

Protozoa, Rotifera, and Crustacea.

The following list of animals found in the plankton of the Irish lakes must be regarded as very incomplete, largely because the material was not examined in the living state. For the determination and verification of most of these records we have to thank Mr. E. Lemmermann, of Bremen.

Species.	Small Lakes between Clifden and Roundstone. I.	Small Lakes between Clifden and Roundstone. II.	Lough Cullin.	Lough Mawmeen.	Lough Corrib.	Lough Caragh.	Lough Currane.	Lough Derriana.	Lough Guitane.	Lough Leane.	Lough Neagh.
Flagellata.											
Bicœca lacustris, J. Cl., var. longipes, Zach.,			×		×	×	×	×			
Diplosigopsis frequentissima (Zach.), Lemm.,			×		×	×	×				
Mallomonas acaroides, Perty,			×		×		×			×	
,, caudata, Iwanoff,						×	×				
,, producta (Zach.), Iwanoff,	×					×	×				
Cryptomonas erosa, Ehrenb.,											×
Lepocinclis ovum (Ehrenb.), Lemm., var. punctato-striatum, Lemm.,											×
Euglena viridis, Ehrenb.,											×
Ciliata.											
Vorticella, sp.,			×	×	×						
Tintinnidium fluviatile, Stein,										×	
Rhizopoda.											
Arcella vulgaris, Ehrenb.,		×	×		×				×		
,, discoides, Ehrenb.,					×						
Nebela flabellulum, Leidy,		×									
Cyphoderia ampulla (Ehrenb.), Leidy,					×						
Rotifera.											
Conochilus unicornis, Rouss.,					×	×		×		×	
Asplanchna priodonta, Gosse,										×	×
Polyarthra platyptera, Ehrenb.,	×	×	×	×	×	×	×		×	×	
Triarthra longiseta, Ehrenb.,										×	
Pompholyx sulcata, Hudson,				×	×						
Anuræa aculeata, Ehrenb.,											×
,, cochlearis, Gosse,	×	×	×	×	×	×	×	×	×	×	×
Notholca longispina, Kellicot,	×	×	×	×	×	×	×	×	×	×	×
Cladocera.											
Daphnia galeata, Sars,										×	
Diaphanosoma brachyurum (Liév.), Sars,	×					×					×
Sida crystallina, O. F. M.,				×							
Holopedium gibberum, Zaddach,					×	×					
Polyphemus pediculus, de Geer,						×				×	
Ceriodaphnia pulchella, Sars,						×					
Bosmina longirostris, O. F. M.,			×			×	×	×		×	×
,, cornuta, Jur.,			×			×				×	×
Chydorus sphæricus, O. F. M.,											×
Copepoda.											
Diaptomus graciloides, Sars,	×				×	×				×	×
Cyclops, sp.,							×			×	×
Nauplii,					×	×			×	×	

III. SYSTEMATIC ACCOUNT OF THE MORE IMPORTANT ALGÆ OF THE PLANKTON.

This section deals specifically with those Algæ of the plankton deserving of special mention, either for their abundance or rarity, or for some peculiarity which has hitherto escaped observation. The five following species we consider to be new; and they are here described for the first time:—*Cosmarium Corribense*, *Staurastrum dorsidentiferum*, *Rhizosolenia morsa*, *Synedra Lemmermanni*, and *Aphanothece clathrata*.

The small parasitic fungus which occurs in *Pleurotœnium Ehrenbergii* (Ralfs) De Bary is of very great interest, and the curious forms of *Eudorina elegans* Ehrenb. described from Lough Mawmeen, Galway, may assist in throwing some light on the true nature of the supposed genus *Pleodorina*. Three previously undescribed varieties are *Microspora amœna* (Kütz.) Rabenh. var. *irregularis*, *Staurastrum furcigerum* Bréb. var. *reductum*, and *Glœocystis gigas* (Kütz.) Lagerh. var. *planctonicus*.

Class CHLOROPHYCEÆ.

Order **Microsporales**.

Family MICROSPORACEÆ.

Genus *Microspora* Thur., 1850; em. Lagerh., 1888.

1. MICROSPORA AMŒNA (Kütz.) Rabenh. Flor. Europ. Algar. III., 1868, p. 321; Lagerh. in Berichte Deutsch. Bot. Gesellsch. v., 1887, p. 417; Hazen in Mem. Torr. Bot. Club, xi., 1902, p. 170, t. 23, f. 1. *Conferva amœna* Kütz. Spec. Algar. 1849, p. 372.

Var. IRREGULARIS var. n. (Pl. x., figs. 5–6).

Var. membrana cellularum multe crassiori, filis externe corrugatis et irregulariter lamellosis. Crass. fil. 24–30μ; crass. membr. cell. 4–7μ.

Hab.—Loughs Keel and Acorrymore, Achill Is., Mayo.

This variety is distinguished from typical *Microspora amœna* by the slightly greater diameter of the filaments, and by the increased thickness and greater irregularity of the cell-walls. The latter are evidently lamellose, but the lamellæ are very irregular, in consequence of which the exterior of the filament exhibits a corrugated and sometimes a frayed appearance, being strikingly reminiscent of the "ocreate" character of the sheaths of some species of *Scytonema*. We have observed this variety in quantity from the Scottish plankton, and have also collected it in a number of widely separated localities in the British Islands, notably in abundance from near Lerwick, Shetland Is., and from the New Forest, Hants. The irregularity of the cell-wall is somewhat variable, and in some filaments the cell-walls are intermediate in character between those of typical *M. amœna* and those of var. *irregularis*. In its dimensions, and also in the shortness of its cells, the var. *irregularis* more nearly agrees with *M. crassior* (Hansg.) Hazen; but we think that Wille was quite right in regarding the latter as *M. amœna* forma *crassior*.

Order **Chætophorales**.

Family CHÆTOPHORACEÆ.

Genus *Myxonema* Fries, 1825.

2. MYXONEMA SUBSECUNDUM (Kütz.) Hazen in Mem. Torr. Bot. Club, 1902, vol. xi., no. 2, p. 207. *Conferva subsecunda* Kütz., 1836. *Stigeoclonium subsecundum* Kütz. Phycolog. Gener. 1843, p. 253; Rabenh. Flor. Europ. Algar. III., 1868, p. 376.

The following is a short description of the plants observed from Ireland. In none of the branches were there any short cells noticed; otherwise the species agrees with the published descriptions, and with the dimensions, of *M. subsecundum*.

Filaments free-floating and elongated, 12–16μ in diameter, very sparsely branched; branches never opposite, elongated and gradually attenuated towards the apex; cells cylindrical, $2\frac{1}{2}$–10 times longer than

their diameter; cells of main filaments from which branches are given off frequently tumid, cells of branches generally longer than those of the principal filaments, 3·5–7μ in diameter.

One or two short branches were noticed which were unseptate and therefore unicellular (*vide* Pl. x., fig. 3). From many of the cells of the basal and older parts of the plants zoogonidia had escaped (Pl. x., fig. 4).

Hab.—Lough Mawmeen, between Clifden and Roundstone, Galway.

Order **Conjugatæ.**

Family DESMIDIACEÆ.

Genus *Gonatozygon* De Bary.

3. GONATOZYGON KINAHANI (Arch.) Rabenh. Flor. Europ. Algar. III., 1868, p. 156; W. & G. S. West, Brit. Desm. I., 1904, p. 35, t. 2, f. 1–3.

Long. cell. usque ad 450μ; lat. cell. 12–14μ.

Hab.—Lough Mawmeen, between Clifden and Roundstone, Galway.

The specimens observed were among the best we have seen, and the cells were attached to form long filaments.

4. GONATOZYGON ACULEATUM Hastings in Amer. Month. Micr. Journ., 1892, p. 29; Johns. in Bull. Torr. Bot. Club, 1895, vol. xxii., no. 7, p. 291, t. 239, f. 9. *G. aculeatum* forma *minor* W. & G. S. West in Trans. Linn. Soc. Bot. ser. 2, v., 1896, p. 230, t. 12, figs. 1, 2.

Lat. cell. in med. sine acul. 11μ, ad apic. 12·5μ; long. acul. 7–8μ.

Hab.—Small lake between Clifden and Roundstone, Galway.

We have also observed this rare species from the Scottish plankton (*vide* W. & G. S. West in Trans. Roy. Soc. Edin., vol. xli., part iii., 1905, p. 498, t. 6, f. 2).

Genus *Pleurotænium* Näg.

5. PLEUROTÆNIUM EHRENBERGII (Bréb.) De Bary, Conj. 1858, p. 75; W. & G. S. West, Brit. Desm. I., 1904, p. 205, t. 29, f. 9–11; t. 30, f. 1.

In a collection of plankton from one of the small lakes between Clifden and Roundstone, Galway, we observed a specimen of *Pleurotænium Ehrenbergii* which had been attacked by a parasitic fungus. We have observed the same parasite on a previous occasion in an individual of the same species of *Pleurotœnium*. This was from the plankton of Loch Fadaghoda, Lewis, Outer Hebrides. The parasite is of great interest, as it was this very fungus, in, moreover, the same species of Desmid, which caused Archer (Quart. Journ. Micr. Sci. viii., 1860, pp. 227–234, t. 11, f. 1–4) to publish an account of what he supposed was zoospore-formation in the Desmidiaceæ. The fungus belongs to the Chytridiaceæ, and the tubular projection through which the gonidia are discharged, appears always to push its way to the exterior in the region of the isthmus at the junction of the two semicells. Archer noticed as many as three of these tubular extensions; but he was certainly in error when he wrote that "the tubular extensions are produced directly from an addition to the original cell-wall itself, and with which they are in absolute continuation." We have only seen two specimens of the parasite, both of which were preserved in formalin; and in each case the gonidia were clustered round the orifice of the tubular, neck-like extension. These gonidia were destitute of colour, and the cilia could not be detected. The parasite itself occupied both semicells of the host, the contents of which had disappeared except for a number of dark-brown granular masses of small size, which were attached to the outer surface of the cell-wall of the fungus. The tubular extension which passes out to the exterior, is a branch which is first closely adpressed to the main portion of the parasite, and which suddenly bends at right angles as it emerges at the isthmus. At the point of origin of this branch a septum was noticed dividing the endophytic fungus into two portions (Pl. xi., fig. 9).

Genus *Cosmarium* Corda, 1834.

6. COSMARIUM SUBARCTOUM (Lagerh.) Racib. in Rozpraw Wydz. matem.-przy. Akad. Umiej. Krakow. xxii., 1892, p. 385, t. 6, f. 24. *C. globosum* Buln. subsp. *subarctoum* Lagerh. in Wittr. & Nordst. Alg. Exsic. 1883, no. 567; Nordst. in Öfvers. af K. Vet.-Akad. Förh. 1885, no. 3, p. 9, t. 7, f. 5.

Long. 20–21·5μ; lat. 16–17μ; lat. isthm. 11–11·5μ.

Hab.—Loughs Caragh, Currane, and Guitane, Kerry.

This minute species occurred in considerable quantity in the plankton of the above-mentioned loughs. It is recognized by its relatively shallow constriction and its slightly flattened apices, these features distinguishing it from *C. bioculatum* Bréb. The specimens observed from the south-west of Ireland were very similar to those recorded from the Shetland Is., but the cell-wall was smooth.

7. COSMARIUM CORRIBENSE sp. n. (Pl. XI., figs. 20, 21).

C. parvum, circiter tam longum quam latum, subprofunde constrictum, sinu late aperto obtusangulo; semicellulæ cuneatæ, apice truncato pæne recto, angulis superioribus rotundatis, lateribus leviter convexis; a latere visæ subrotundatæ; a vertice visæ ellipticæ, polis obtuse conicis; membrana glabra; pyrenoidibus singulis.

Long. 22–24μ; lat. 19–24μ; lat. isthm. 11·5–12μ; crass. 12μ.

Hab.—Lough Corrib, Galway.

This species approaches very closely to *C. bicuneatum* (Gay) Nordst, but it is much larger, the angles of the semicells are more rounded, and the thickness is much greater. Another Desmid which is almost identical with *C. bicuneatum* in the form of its front view is *C. arctoum* Nordst. var. *tatricum* Racib. (in Pamietnik Wydz. Akad. Umiej. w Krakow. 1885, x., p. 78, t. 11, f. 6); but in side and vertical views it is much thicker. *C. Corribense* differs from Raciborski's variety in its much greater size, its deeper constriction, and the rounded angles of the semicells.

It should also be compared with *C. subaversum* Borge and *C. subarctoum* (Lagerh.) Racib.

8. COSMARIUM SUBTUMIDUM Nordst. in Wittr. & Nordst. Alg. Exsic. 1878, no. 172; 1889, fasc. 21, p. 44 cum fig. xylogr.

Var. KLEBSII (Gutw.) W. & G. S. West, Brit. Desm. II., 1905, p. 193, t. 63, f. 21–23. *C. Klebsii* Gutw., 1892.

Forma depressa, paullo latior quam longa (Pl. XI., fig. 22).

Long. 22–23μ; lat. 25–27μ; lat. isthm. 8–9μ; crass. 11·5μ.

Hab.—Lough Corrib, Galway.

Genus *Cosmocladium* Bréb., 1856.

9. COSMOCLADIUM SAXONICUM De Bary in Flora, 1865, pp. 321–329, t. 4, f. 1–3; Schröder in Berichte Deutsch. Botan. Gesellsch., 1900, xviii., pp. 15–23, t. 1.

Long. 25–27μ; lat. 19–20μ; lat. isthm. 6·5–7μ; crass. 13–15μ.

Hab.—Small lake, between Clifden and Roundstone, Galway.

This Desmid has been very well investigated by Schröder, and the Irish plants agreed with his figures in the method of attachment of the cells. The gelatinous threads were attached above and below the isthmus, and almost invariably on the broader face (front view) of the cells, so that the cells in a branched colony were generally presented for observation in the side view.

Genus *Xanthidium* Ehrenb., 1834.

10. XANTHIDIUM SUBHASTIFERUM West, in Journ. Linn. Soc., Bot. xxix., 1892, p. 166, t. 22, f. 4; l.c. xxxv., 1903, p. 540, t. 16, f. 4, 5.

This species occurred in all the loughs examined in Kerry, and was particularly abundant from Loughs Caragh, Currane, and Guitane. Some of them exhibit irregularities in the spines, such as the presence of a third incipient spine between the two lateral ones. Three of these abnormal individuals are figured on Pl. XI., figs. 13–15.

Long. 43–47μ; lat. sine spin. 44–49μ, cum spin. 64–71μ; lat. isthm. 13–14μ.

Genus *Staurastrum* Meyen, 1829.

11. STAURASTRUM DEJECTUM Bréb. in Menegh. Synops. Desm. 1840, p. 227; Ralfs, Brit. Desm. 1848, p. 121, t. 20, f. 5*a*.

Forma major, spinis validioribus. (Pl. XI., fig. 16).

Long. sine spin. 42μ; lat. sine spin. 48μ, cum spin. 80–85μ; lat. isthm. 11μ.

Hab.—Lough Corrib, Galway.

12. STAURASTRUM JACULIFERUM West in Journ. Linn. Soc., Bot. xxix., 1892, p. 172, t. 22, f. 14; l.c. xxxv, 1903, p. 543, t. 17, f. 1–4.

The forms of this species observed possessed very long spines. The direction of the spines was variable, and tri- and quadri-radiate semicells were often combined in the same plant (Pl. XI., figs. 17–19).

Long. sine spin. 20–22μ; lat. sine spin. 15–16μ; lat. cum spin. 60–78μ; lat. isthm. 6μ.

13. STAURASTRUM LUNATUM Ralfs, Brit. Desm. 1848, p. 124, t. 34, f. 12.

Var. PLANCTONICUM W. & G. S. West in Journ. Linn. Soc., Bot. xxxv., 1903, p. 546, t. 16, f. 11, 12.

This Desmid was general in most of the Irish lakes. It bears considerable resemblance to *St. lunatum* Ralfs forma *alpestris* Schmidle (in Oesterr. botan. Zeitschr. 1895–6, p. 24, t. 16, f. 27), but differs in the more attenuated angles of the semicells, which run directly into the spines, as well as in its uniform covering of granules.

14. STAURASTRUM DENTICULATUM (Näg.) Arch. in Pritch. Infus., 1861, p. 738. *Phycastrum denticulatum* Näg. Gatt. einz. Alg., 1849, p. 128, t. 8C, f. 3.

Long. 28–35μ; lat. 36–40μ; lat. isthm. 11.5–14μ. (Pl. XI., fig. 11).

Hab.—Lough Conn, Mayo. Loughs Caragh and Derriana, Kerry.

This species differs from *St. Avicula* Bréb. var. *subarcuatum* (Wolle) West in its proportionately greater breadth, in the two denticulations at the angles, and in the few regular rows of minute denticulations round the angles.

15. STAURASTRUM DORSIDENTIFERUM sp. n. (Pl. XI., fig. 10).

St. magnum, circiter $1\frac{1}{2}$–plo latius quam longum (cum processibus), modice constrictum, sinu aperto et obtuso; semicellulæ cyathiformes et glabræ, apice plerumque recto et levissime sinuato, angulis in processus longos validos et subhorizontaliter dispositos productis, apicibus processuum quadridentatis, margine inferiori processus uniuscujusque crenulato, margine superiori crenulato et crenis medianis 3–6 (plerumque 5) acute dentatis; a vertice visæ triangulares, lateribus leviter convexis, angulis in processus longus productis, marginibus processuum undulatis.

Long. (max.) 75–79μ; lat. sine proc. circ. 48μ; lat. cum. proc. 108–120μ; lat. isthm. 18μ.

Hab.—Loughs Conn and Cullin, Mayo. Lough Corrib, Galway.

The direction of the processes in the front view is somewhat variable. In some specimens they are slightly upwardly divergent, but in the majority they are horizontally disposed. The number of teeth affixed to the crenations of the upper margin of the processes is also variable, even on the processes of the same plant.

It should be compared with *St. gracile* Ralfs and *St. Sebaldi* Reinsch.

16. STAURASTRUM FURCIGERUM Bréb. in Menegh. Synops. Desm., 1840, p. 226. *Didymocladon furcigerum* Ralfs, Brit. Desm., 1848, p. 144, t. 33, f. 12.

Var. REDUCTUM var. n. (Pl. XI., fig. 12).

Var. processibus multe brevioribus, processibus superioribus brevissimis; semicellulæ a vertice visæ triangulares, lateribus pæne rectis vel levissime convexis.

Long. 43μ; lat. cum proc. 54μ; lat. isthm. 21μ.

Hab.—Lough Corrib, Galway.

This variety is principally distinguished by the great reduction of the superior processes. We have noticed one semicell in which they were altogether suppressed.

Genus *Desmidium* Ag., 1824.

17. DESMIDIUM PSEUDOSTREPTONEMA W. & G. S. West in Trans. Linn. Soc., Bot., ser. 2, vi., 1902, p. 193, t. 22, f. 35–37.

Long. cell. 17–20μ; lat. 33–35μ; lat. isthm. 20–22μ; lat. apic. 14–15·5μ. (Pl. XI., fig. 23).

Hab.—Small lake, between Clifden and Roundstone, Galway.

This species has only previously been recorded from Ceylon, in which country both two-lobed and triangular forms occur. The Irish specimens were two-lobed in vertical view, and except for a slight increase in the breadth of the isthmus, they were exactly similar to those from Ceylon.

Order **Protococcoideæ**.

Family VOLVOCACEÆ.

Genus *Eudorina* Ehrenb., 1832.

18. EUDORINA ELEGANS Ehrenb., 1831; Cooke, Brit. Freshw. Alg., p. 65, t. 26.

We figure two rather interesting cœnobia of this Alga. (Pl. x., figs. 7 and 8), which were observed among an immense number of individuals in the plankton of Lough Mawmeen, Galway.

Some of the cells had remained relatively small, whereas others had reached the maximum size attainable by the vegetative cells of this organism. The arrangement of large and small cells appeared to be indiscriminate, one size of cell not being restricted to a definite part of the cœnobium. In one of the cœnobia several of the cells had more or less disintegrated. These two examples appear to lend support to Chodat's view that the species of *Pleodorina* Shaw should only be regarded as forms of *Eudorina elegans.*

Family CHARACIEÆ.

Genus *Characium* A. Br., 1849.

19. CHARACIUM DEBARYANUM (Reinsch) De Toni. *Dactylococcus Debaryanus* Reinsch.

Long. cell. 12–18μ; lat. cell. 7–9·5μ.

Hab.—Attached to *Cyclops* sp. in Lough Keel, Achill Is., Mayo.

This Alga is not uncommon, but we have never before seen it in such quantity, *all* the *Cyclops* in the collection being covered with it. The first divisions of the cell-contents prior to the formation of zoogonidia are curiously oblique, and not unlike the divisions which occur in *Dactylococcus* during the formation of autospores. Three other species of this genus occur attached to Entomostraca:—*Ch. groenlandicum* Richter, *Ch. limneticum* Lemm., and *Ch. Hookeri* (Reinsch) Hansg.

Family PROTOCOCCACEÆ.

Genus *Scenedesmus* Meyen, 1829.

20. SCENEDESMUS BIJUGATUS (Turp.) Kütz.

Forma ARCUATUS (Lemm.) nob. *Scenedesmus arcuatus* Lemm. in Plöner Forschungsberichten, vii., 1899, p. 17, t. 1, f. 2–4.

Long. cœnob. 32–44μ; long. cell. 14–18μ; lat. cell. 7–9·5μ (Pl. x., figs. 12–14).

Hab.—Lough Corrib, Galway.

We do not think there is sufficient justification for the separation of this form as a distinct species.

Genus *Closteriopsis* Lemm., 1899.

21. CLOSTERIOPSIS LONGISSIMA Lemm. 'Das Phytoplankton sächs. Teiche,' Plöner Forschungsberichten, vii., 1899, p. 29, t. 2, f. 36–38. *Closterium pronum* Bréb. var. *longissimum* Lemm.

Long. 370–527μ; lat. 5–6μ (Pl. x., figs. 17–19).

Hab.—Lough Neagh. Loughs Mawmeen and Corrib, Galway. Loughs Derriana and Leane, Kerry.

Numerous specimens of this interesting Alga were observed, and in the material from Lough Leane three or four individuals were often attached to form a group. Most of the specimens were quite straight, but a few were much bent.

The Alga we recorded from the plankton of Lough Neagh under the erroneous name of "*Rhaphidium longissimum* Schröder" (*vide* Trans. Roy. Irish Acad. xxxii., sect. B., 1902, p. 65, t. 1, f. 19), is a form of *Closteriopsis longissima*. The Alga is also known from the Orkney Is., and a variety of it—var. *tropicum* W. & G. S. West—from the Shetland Is.

Closteriopsis longissima approaches very near to some of the long and narrow species of *Closterium*, especially to *Cl. aciculare* T. West var. *subpronum* W. & G. S. West. It only differs from this Desmid in the slightly narrower extremities and in the uninterrupted chloroplast. The latter is not subdivided in the median part of the cell, and it generally extends, occasionally with slight interruptions, well into the elongated extremities of the cell. The chloroplasts do not extend into the narrow extremities of *Closterium aciculare* var. *subpronum*, the elongated terminal parts being clear and transparent, and in the living plant containing a single moving corpuscle. This *Closterium* occurs principally in large ponds and ditches, and is not infrequently found in the plankton of lakes. May not *Closteriopsis longissima* be a degenerate form of it?

Genus *Oocystis* Näg., 1845.

22. OOCYSTIS LACUSTRIS Chodat in Bull. de l'Herbier Boissier, 1897, p. 296; Algues Vertes de la Suisse, 1902, p. 190.

Long. colon. 43–60μ; long. cell. 14–22μ; lat. cell. 8–15μ.

Hab.—Lough Corrib, Galway.

We are not quite certain of the identification of this species. It was quite common, and the colonies were very variable in size, containing from 2 to 8 cells. The cells were elliptical and very faintly apiculate at the poles. Each cell contained one or two chloroplasts. It seems scarcely possible to separate *O. Marssonii* Lemm. (1899) from *O lacustris* Chod. (1897), as in each the cells possess one or two chloroplasts and are very slightly thickened at the poles. Both are near *O. crassa* Wittr. (1880), but the latter, so far as we have recognized the species, possesses from six to eight chloroplasts in each cell. Ostenfeld has apparently had the same difficulty in identifying a species of *Oocystis* from a lake in Iceland (*vide* Botanisk Tidsskrift, Bd. 26, 1904, p. 235).

Family PALMELLACEÆ.

Genus *Glœocystis* Näg., 1849.

23. GLŒOCYSTIS GIGAS (Kütz.) Lagerh.

Var. PLANCTONICUS var. n. (Pl. x., figs. 15, 16).

Var. cellulis tetraëdrice dispositis in coloniis mucosis libere natantibus.

Diam. cell. 7·5–12μ; diam. colon. 120–135μ.

Hab.—Small lake between Clifden and Roundstone, Galway.

Quite a number of colonies of this Alga were observed from the above locality, and the regular tetrahedral disposition of the cells was a very remarkable feature. In *Glœocystis gigas* the four daughter-cells which arise from one mother-cell are generally disposed in a tetrahedral manner, but we have never before seen this disposition maintained throughout the entire colony.

Class HETEROKONTÆ.

Order **Confervales.**

Family CHLOROTHECIACEÆ.

Genus *Askenasyella* Schmidle, 1902.

24. ASKENASYELLA CONFERTA nob. *Actinobotrys conferta* W. & G. S. West in Trans. Roy. Soc. Edin. xli, 1905, p. 508, t. 6, f. 17–19.

The genus we described as "*Actinobotrys*" (1905) must be regarded as synonymous with one described by Schmidle as *Askenasyella* (*vide* Hedwigia, 1902, pp. 154–157, cum fig. 1–3). The plants agree in the mucous, free-floating colonies, and in the radiating disposition of the cells, which possess parietal chromatophores without pyrenoids.

A. conferta nob. differs from *A. chlamydopus* Schmidle in the form of the cells (which are oblong, ellipsoid, or globose, and never pyriform), and in the more radiating character of the colonies. The cells are also more crowded, and they exhibit a reduction in size from the centre outwards. *A. conferta* is abundant in some of the Scottish plankton; and in the Irish plankton we have noticed it from a small lake between Clifden and Roundstone, Galway, from Loughs Caragh and Currane, Kerry, and from Lough Neagh.

Class BACILLARIEÆ.

Order **Centricæ.**

Family COSCINODISCACEÆ.

Genus *Cyclotella* Kütz., 1833.

25. CYCLOTELLA SCHRÖTERI Lemm. in Berichte Deutsch. Botan. Gesellsch. xviii., 1900, p. 30. *C. compta* (Ehrenb.) Kütz. var. *quadrijuncta* Schröter.

Hab.—Lough Corrib, Galway.

The cells were distantly held together in mucous tubes, forming colonies containing as many as twelve cells.

Family RHIZOSOLENIACEÆ.

Genus *Rhizosolenia* Ehrenb., 1858; em. Peragallo, 1892.

26. RHIZOSOLENIA LONGISETA Zach., 1897; Schröder in Berichte Deutsch. Botan. Gesselsch. xv., 1897, t. xvii., f. 2; t. xxv., f. 2.

This Diatom occurred sparingly in the plankton of Lough Corrib, Galway. It is known to occur in the Scottish plankton (Pl. xi., fig. 8).

27. RHIZOSOLENIA MORSA sp. n. (Pl. xi., figs. 5–7).

Rh. Eriensis H. L. Smith var. *morsa* W. & G. S. West in Trans. Roy. Soc. Edin. xli., part iii., 1905, p. 509, t. 6, f. 23.

Cellula ut visa aspectu valvulari anguste elliptica; ut visa aspectu cingulato (aspectu normali) elongata, lateribus rectis et parallelis, polis subito et oblique angustatis, marginibus partium angustatarum concavis, calyptra late conica cum lateribus concavis, seta subtile et longissima prædita.

Long. sine setis 100–165μ; lat. 12–22μ (a latere visa 4·6μ); long. set. 50–60μ.

Hab.—Loughs Caragh, Currane, and Guitane, Kerry.

This species occurred in abundance in the plankton of Loch Shiel, Inverness. It is distinguished from *Rh. Eriensis* H. L. Smith (*vide* Le Diatomiste, 1892, p. 109, t. 1, f. 19) by the angular extremities, the lateral margins of which are concave, and by the much thinner and longer setæ. This is now the fourth freshwater species of the genus.

Order **Pennatæ**.

Family FRAGILARIACEÆ.

Genus *Synedra* Ehrenb., 1831.

28. SYNEDRA LEMMERMANNI sp. n. (Pl. xi., figs. 1, 2).

Cellula ut visa aspectu valvulari linearis, angustissima et longissima, gradatim et gradatim angustior apices versus, apicibus levissime sed distincte inflatis; ut visa aspectu cingulato angustissime linearis, marginibus parallelis, polis truncatis. Striæ 10 in 10·3μ. Cellulæ libere natantes.

Long. 430–440μ; lat. ad med. (aspect. valv.) 3·3μ.

Hab.—Loughs Conn and Cullin, Mayo. Lough Corrib, Galway.

This species was frequent in the material from Lough Conn and Lough Corrib. It is distinguished from *S. Acus* (Kütz.) Grun., *S. Acus* var. *delicatissima* (W. Sm.) Grun., and *S. Acus* var. *angustissima* Grun. by its relatively much greater length and slightly coarser striæ. *S. Acus* var. *angustissima* occurred mixed with it in the material from L. Corrib, and is very much shorter, has much narrower apices, and a rather slight inflation in the middle. We give a figure of this variety for comparison (Pl. XI., figs. 3 and 4).

S. Ulna (Nitzsch) Ehrenb. var. *longissima* (W. Sm.) Brun. is a much stronger and coarser *Synedra*, with strongly capitate poles.

29. SYNEDRA REVALIENSIS Lemm. MSS.

Hab.—Loughs Conn and Cullin, Mayo.

This species occurs in radiating clusters and belongs to Lemmermann's subgenus *Belonastrum* (*vide* Berichte Deutsch. Botan. Gesellsch. xviii., 1900, p. 31). The valves are very narrow and about 170–180μ in length. Lemmermann has described the species as occurring in plankton from Russia, and an account of this plankton is soon to be published by Dr. G. Schneider of Helsingfors.

Class MYXOPHYCEÆ.

Order **Hormogoneæ.**

Family NOSTOCACEÆ.

Genus *Anabæna* Bory, 1822.

30. ANABÆNA CIRCINALIS (Kütz.) Rabenh., 1852; Born. et Flah. Revis. Nostoc. Hétérocyst., p. 230.

Cylindrospermum circinale Kütz., 1845. *Cyl. Hassallii* Kütz., 1849. *Anabæna Hassallii* (Kütz.) Wittr. in Wittr. & Nordst. Alg. Exsic. fasc. 21, p. 56.

Crass. cell. veget. 8–9·5μ. (Pl. VIII., no. vi. 1).

Hab.—Loughs Conn and Cullin, Mayo. Lough Corrib, Galway.

Var. TENUIS var. n. (Pl. VII., no. vi. 2).

Crass. cell. veget. 5·5–6μ.

Hab.—Lough Mawmeen, Galway.

The distinctions between *A. circinalis* and its var. *tenuis* are well shown by the two photographs, Pl. VII., no. vi. 2 and Pl. VIII., no. vi. 1.

31. ANABÆNA LEMMERMANNI Richter in Lemm. 'Das Phytoplankton einiger Ploner Seen,' Forschungsbericht aus der Biol. Station zu Plön, x. 1903, p. 153.

Hab.—Lough Cullin, Mayo.

The enormous abundance of the spores of this species, which occurred in floating masses, caused the plankton to assume a very dark green colour.

Family OSCILLATORIACEÆ.

Genus *Oscillatoria* Vauch., 1803.

32. OSCILLATORIA AGARDHII Gomont, Monogr. des Oscillariées, 1893, p. 225.

Crass. trich. 5·3–6μ. (Pl. XI., fig. 28–30).

Hab.—Lough Conn, Mayo. Lough Corrib, Galway. Lough Leane, Kerry.

We take this opportunity of figuring this interesting species (Pl. XI., figs. 28–30).

Order Coccogoneæ.

Family CHROOCOCCACEÆ.

Genus *Aphanothece* Näg., 1849.

33. APHANOTHECE CLATHRATA sp. n. (Pl. X., figs. 9–11).

A. thallo minuto, irregulari, libere natante inter algas varias planctonicas, conspicue et irregulariter clathrato; cellulis minutissimis, læte æruginosis, bacillariformibus, rectis vel leviter subcurvatis, confertissimis.

Diam. thall. 40–150μ; long. thall. 300–355μ; diam. cell. 0·6–0·7μ; long. cell. 3·7–4·5μ.

Hab.—Lough Neagh. Lough Corrib, Galway.

The only species approaching *A. clathrata* is *A. nidulans* Richter (in Wittr. & Nordst. Alg. Exsic. no. 694, 1884; in Hedwigia v, 1884), from

which it is distinguished by the well-defined and clathrate thallus, and by the smaller diameter of the cells, which are both longer and narrower.

We recorded this Alga from the plankton of Lough Neagh (*vide* Trans. Roy. Irish Acad., 1902, xxxii., pp. 9 and 76) under the name of *A. nidulans*, Richter; but we are now convinced of its specific distinctness.

Genus *Gomphosphæria* Kütz., 1836.

34. GOMPHOSPHÆRIA LACUSTRIS Chodat in Bull. de l'Herb. Bossier, vi., 1898, pp. 180–182, cum fig. 1.

Diam. colon. 28–76μ; diam. cell. 2–2·2μ. (Pl. XI., figs. 24–27).

Hab.—Loughs Conn and Cullin, Mayo. Small lakes between Clifden and Roundstone, and Loughs Mawmeen and Corrib, Galway. Lough Currane, Kerry. Lough Neagh. Lough Beg, Londonderry.

This Alga occurred in prodigious quantity in Lough Corrib, being the dominant feature of the plankton. In damaged colonies the radiating structure of the internal mucus can be readily observed (fig. 26), and not infrequently all the cells have become lost, and this mass of mucus is floating by itself (fig. 27).

Genus *Chroococcus* Näg., 1849.

35. CHROOCOCCUS LIMNETICUS Lemm. in Bot. Centralbl., 1898, Bd. 76, p. 153; Forschungsber. der Biol. Stat. Plön, vii., t. 1, f. 22, 23.

Var. SUBSALSUS Lemm. Forschungsber. der Biol. Stat. Plön, viii., p. 84; Archiv für Botan. utgifv. af. K. Sv. Vet.—Akad. Bd. 2, no. 2, 1904, p. 101, t. 1, f. 9.

Hab.—Lough Corrib, Galway.

36. CHROOCOCCUS MINIMUS (v. Keissler) Lemm. l. c. p. 102. *Ch. minutus* var. *minimus* v. Keissler in Verhandl. der zool.-bot. Gesellsch. Wien, 1901, p. 394, f. 1, 2.

Hab.—Lough Neagh.

We have previously recorded this species under the name of "*Ch. minor* (Kütz.) Näg.," a blue green Alga which most probably should be relegated to the genus *Aphanocapsa*.

EXPLANATION OF PLATES.

PLATE VI.

Photomicrographs of plankton from Lough Neagh. All × 100.

I. 1, *Anurœa cochlearis*; 2, *Pediastrum duplex*; 3, *Surirella biseriata*; 4, Fragment of *Ceratium hirundinella.*

II. 1 and 2, *Pediastrum duplex*; 3, *Closterium aciculare* var. *subpronum*; 4, *Surirella robusta* var. *splendida*; 5, *Gomphosphæria lacustris*; 6, *Peridinium cinctum.*

III. 1 and 2, *Anurœa cochlearis*; 8 and 11, *Peridinium cinctum*; 4, *Staurastrum paradoxum* var. *longipes*; 5, *Pediastrum duplex*; 6, *Gomphosphæria lacustris*; 7 and 8, *Tabellaria fenestrata* var. *asterionelloides*; 9, *Coscinodiscus lacustris*; 10, *Surirella robusta* var. *splendida.*

IV. 1, *Peridinium cinctum*; 2, *Staurastrum pelagicum*; 3, *St. brevispinum*; 4, *Cosmarium abbreviatum* var. *planctonicum*; 5, *Pediastrum Boryanum*; 6, *Tabellaria fenestrata* var. *asterionelloides*; 7, *Asterionella formosa.*

V. 1, *Oocystis lacustris*; 2, *Pediastrum duplex*; 3, *Cosmarium abbreviatum* var. *planctonicum*; 4, *Tabellaria fenestrata* var. *asterionelloides.*

VI. 1, *Pediastrum Boryanum*; 2, *Staurastrum pelagicum*; 3, *Tabellaria fenestrata* var. *asterionelloides*; 4, *Campylodiscus Hibernicus*; 5, *Cymatopleura elliptica* var.; 6, *Surirella robusta* var. *splendida.*

PLATE VII.

Photomicrographs of plankton; I.–III. from Lough Leane, Kerry; IV., from Lough Guitane, Kerry; V. and VI., from Lough Mawmeen, Galway. All × 100.

I. 1, *Ceratium hirundinella*; 2, *Fragilaria capucina*; 3, *Peridinium alatum*; 4, *Oscillatoria Agardhii*; 5, *Melosira crenulata.*

II. 1, *Peridinium alatum*; 2, *Cœlosphærium Kützingianum*; 3, *Cymatopleura elliptica*; 4, *Synedra Ulna*; 5, *Asterionella formosa*; 6, *Tabellaria fenestrata* var. *asterionelloides*; 7, *Oscillatoria Agardhii*; 8, *Cyclotella compta.*

III. 1, *Anuræa cochlearis*; 2, *Notholca longispina*; 3, *Staurastrum Arctiscon*; 4, *Oscillatoria Agardhii*; 5, *Peridinium alatum*; 6, *Fragilaria capucina*; 7, *Melosira crenulata*; 8, *Asterionella formosa*; 9, *Tabellaria fenestrata* var. *asterionelloides.*

IV. 1, *Nauplius larva*; 2, *Anuræa cochlearis*; 3, *Staurastrum jaculiferum*; 4, *St. paradoxum* var. *longipes*; 5, *Anabæna flos-aquæ.*

V. 1 *and* 2, *Eudorina elegans*; 3, *Ceratium hirundinella.*

VI. 1, *Cœlosphærium Kützingianum*; 2, *Anabæna circinalis* var. *tenuis*; 3, *Ceratium hirundinella*; 4, *Peridinium alatum.*

PLATE VIII.

Photomicrographs of plankton; I.–IV. from Lough Conn, Mayo; V. and VI., Lough Cullin, Mayo. All × 100.

I. 1, *Ceratium hirundinella*; 2, *Sphærocystis Schræteri*; 3, *Cœlosphærium Kützingianum*; 4, *Melosira varians*; 5, *Surirella biseriata*; 6, *Tabellaria fenestrata*; 7, *Asterionella gracillima.*

II. 1, *Oscillatoria Agardhii*; 2, *Surirella biseriata*; 3, *S. robusta* var. *splendens*; 4, *Coscinodiscus lacustris*; 5, *Asterionella gracillima.*

III. 1, *Anuræa cochlearis*; 2, *Surirella biseriata*; 3, *S. robusta* var. *splendens*; 4, *Asterionella gracillima*; 5, *Anabæna flos-aquæ*; 6, *Ceratium hirundinella.*

IV. 1, *Sphærocystis Schröteri*; 2, *Cœlosphærium Kützingianum*; 3, *Cymatopleura elliptica* var.; 4, *Asterionella gracillima*; 5, *Ceratium hirundinella.*

V. 1, Spores of *Anabæna Lemmermanni*; 2, *Anabæna circinalis* (fragment); 3, *Cœlosphærium Kützingianum*; 4, *Asterionella formosa*; 5, *Bosmina longirostris.*

VI. 1, *Anabæna circinalis*; 2, Spores of *A. Lemmermanni*, in masses; 3, *Asterionella gracillima*; 4, *Fragilaria Crotonensis.*

PLATE IX.

Photomicrographs of plankton from Lough Corrib, Galway: I. and II. × 100; III.–VI. × 200.

I. 1, *Anuræa cochlearis*; 2, *Staurastrum paradoxum* var. *longipes*; 3, *Cymatopleura Solea*; 4, *Cym. elliptica* var.; 5, *Surirella biseriata*; 6, *Gomphosphæria lacustris*; 7, *Ceratium hirundinella*; 8, *Asterionella gracillima.*

II. 1, *Eudorina elegans*; 2, *Staurastrum paradoxum*; 3, *Chroococcus limneticus* var. *subsalsus*; 4, *Gomphosphæria lacustris*; 5, *Cyclotella Schræteri*; 6, *Asterionella gracillima*; 7, *Ceratium hirundinella.*

III. 1, *Asterionella formosa*; 2, *Cyclotella Schræteri*; 3, *Asterionella gracillima.*

IV. 1, *Cosmarium depressum*; 2, *Gomphosphæria lacustris*; 3, *Tabellaria fenestrata*; 4, *Ceratium hirundinella.*

V. 1, *Pediastrum duplex*; 2, *Staurastrum furcigerum* var. *reductum*; 3, *Gomphosphæria lacustris*; 4, *Asterionella formosa*; *Chroococcus limneticus* var. *subsalsus.*

VI. 1, *Staurastrum brevispinum*; 2 and 3, *Surirella biseriata*; 4, *Gomphosphæria lacustris*; 5, *G. aponina.*

PLATE X.

1–4. *Myxonema subsecundum* (Kütz.) Hazen. × 500. 4, filament from which zoogonidia have escaped.

5, 6. *Microspora amœna* (Kütz.) Rabenh. var. *irregularis* var. n. × 500.

7, 8. *Eudorina elegans* Ehrenb. Two curious forms. × 500.

9–11. *Aphanothece clathrata* sp. n. 9 and 10, outlines of colonies, × 200; 11, some of the cells, × 600.

12–14. *Scenedesmus bijugatus* (Turp.) Kütz. forma *arcuatus* (Lemm.) nob. × 500.

15, 16. *Glœocystis gigas* (Kütz.) Lagerh. var. *planctonicus* var. n. × 500.

17–19. *Closteriopsis longissima* Lemm.

PLATE XI.

1, 2. *Synedra Lemmermanni* sp. n. × 500. The markings are not indicated.

3, 4. ,, *Acus* (Kütz.) Grun. var. *angustissima* Grun. × 500. The markings are not depicted.

5–7. *Rhizosolenia morsa* sp. n. × 500. The setæ as reproduced are rather too stout.

8. ,, *longiseta* Zach. × 500.

9. *Pleurotænium Ehrenbergii* (Bréb.) De Bary. × 500. With parasitic fungus.

10. *Staurastrum dorsidentiferum* sp. n. × 520.

11. ,, *denticulatum* (Näg.) Arch. × 500.

12. ,, *furcigerum* Bréb. var. *reductum* var. n. × 500.

13–15. *Xanthidium subhastiferum* West. × 500. Three abnormal forms.

16. *Staurastrum dejectum* Bréb. forma. × 500.

17–19. *Staurastrum jaculiferum* West. × 500.

20, 21. *Cosmarium Corribense* sp. n. × 500.

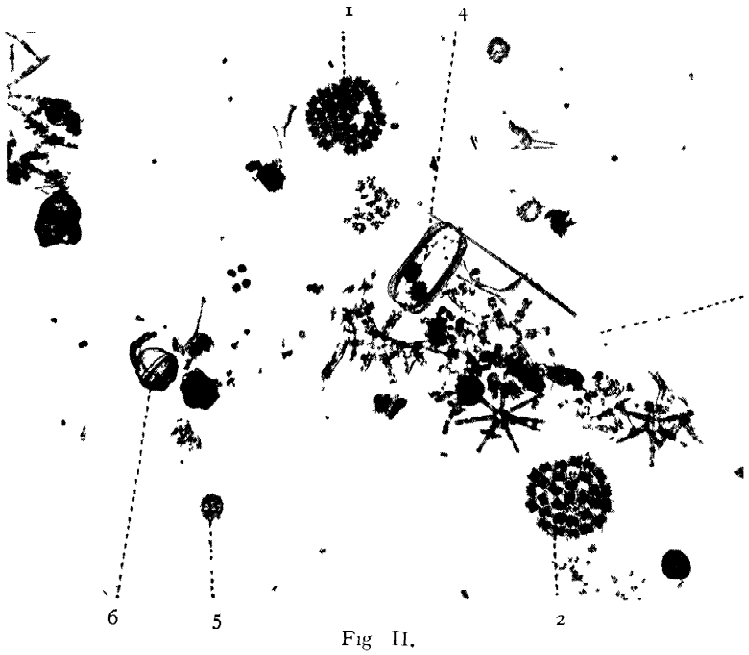
22. ,, *subtumidum* Nordst. var. *Klebsii* (Gutw.) W. & G. S. West forma. × 500.

23. *Desmidium Pseudostreptonema* W. & G. S. West. × 500.

24–27. *Gomphosphæria lacustris* Chodat. × 500. 26, partially disorganized; 27, radiating mucus after the cells have been removed.

28–30. *Oscillatoria Agardhii* Gomont. × 600.

Fig I.



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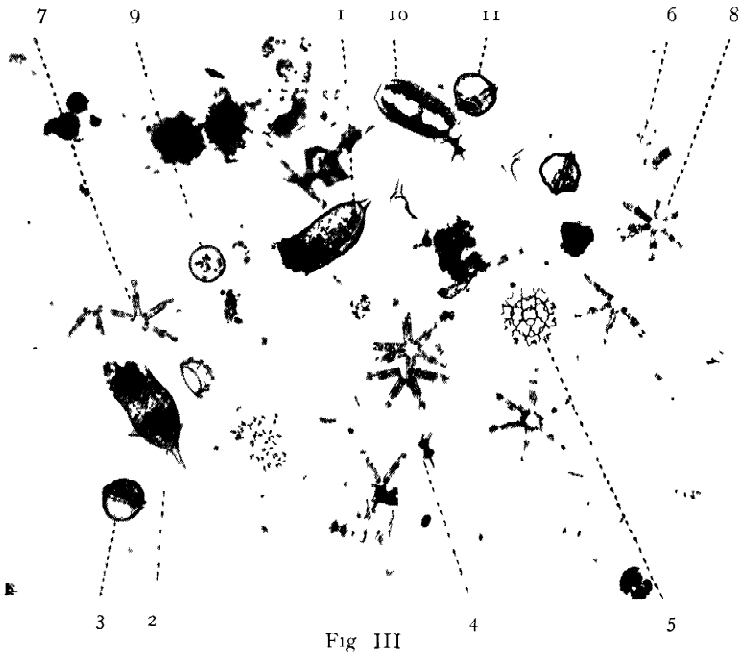

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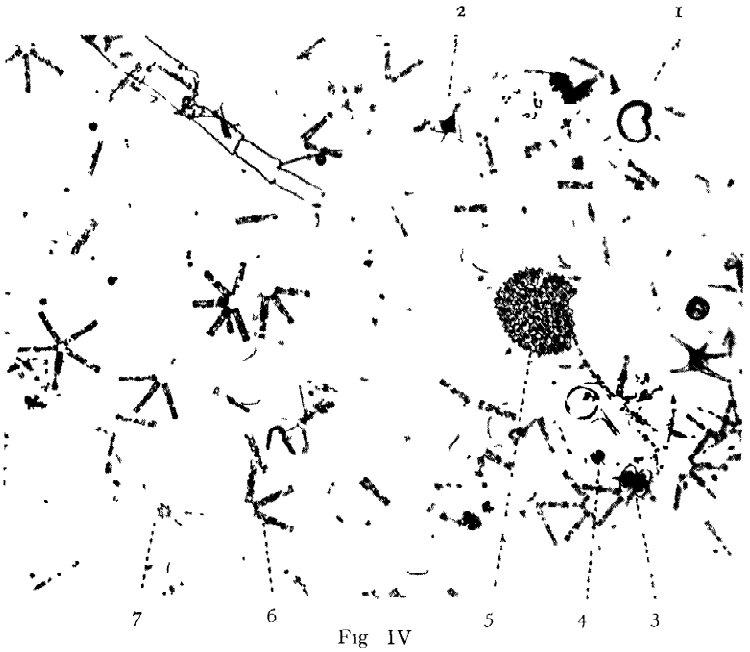

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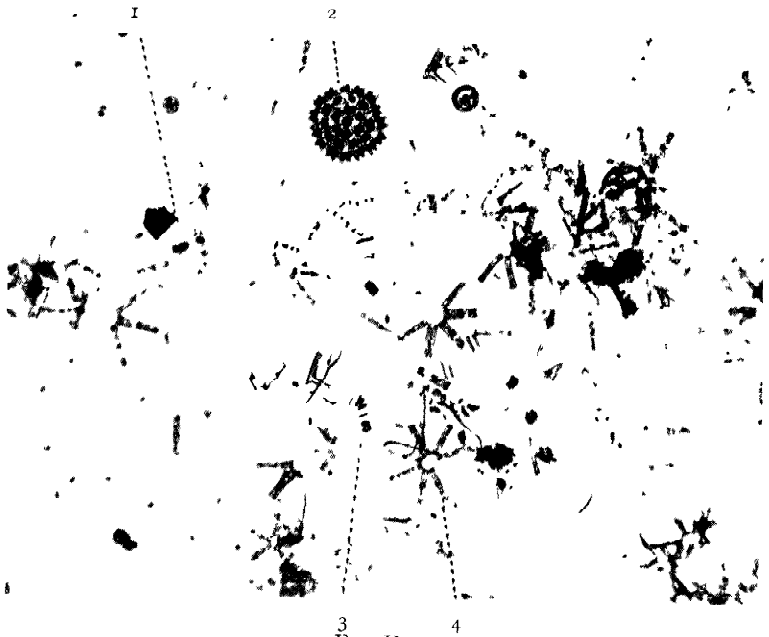

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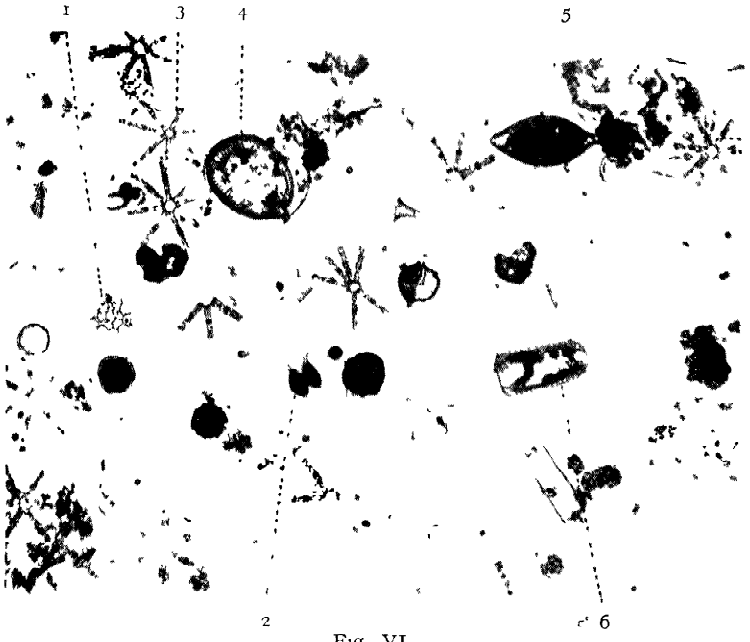
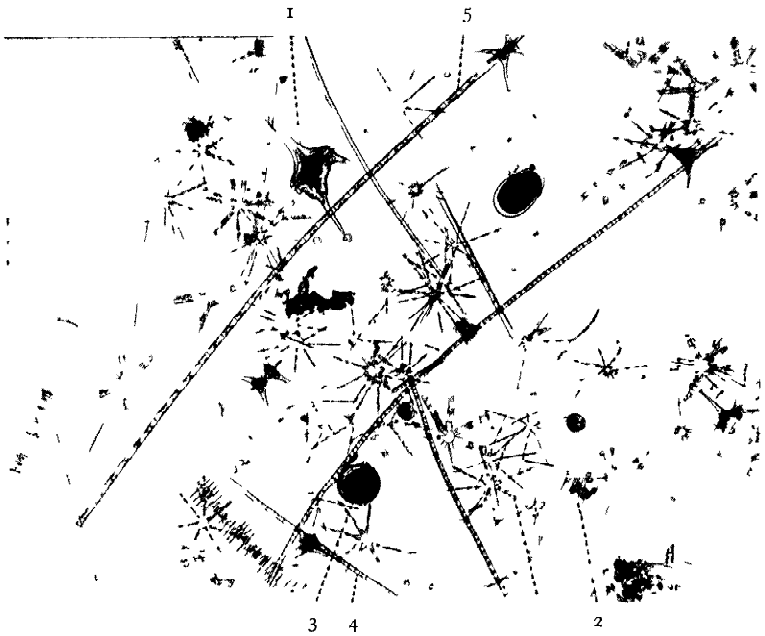


Fig VI

IRISH PLANKTON

G. S. West, Photomicrogr



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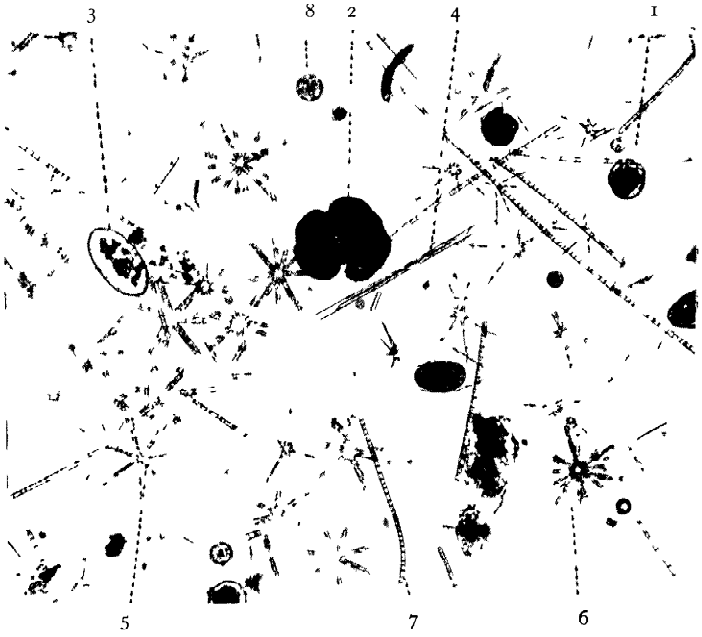

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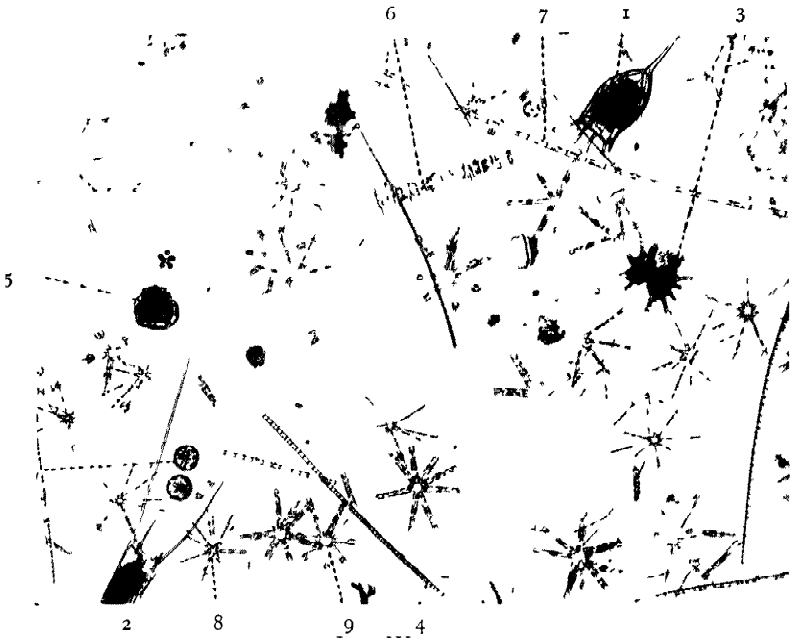

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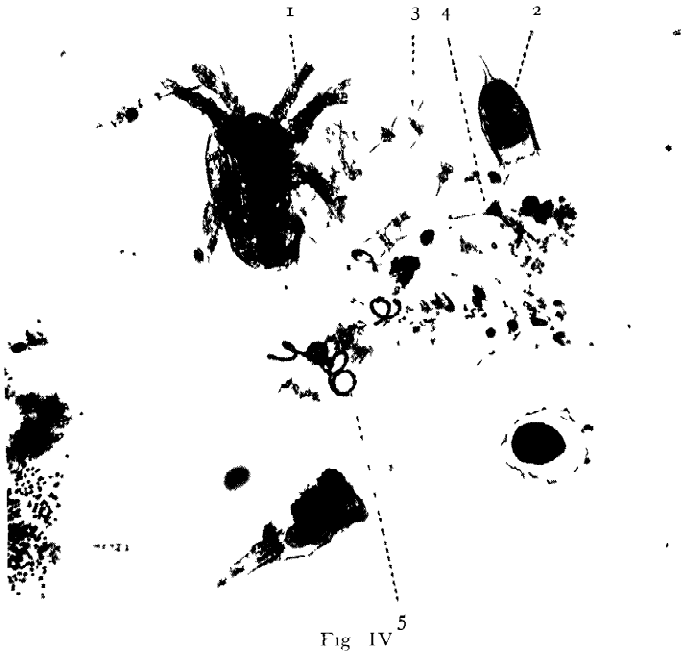


Fig IV

Fig V

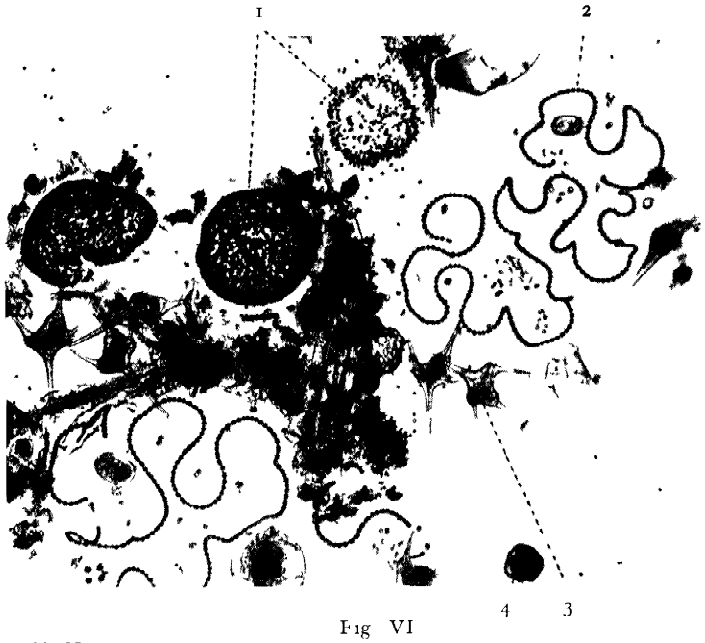
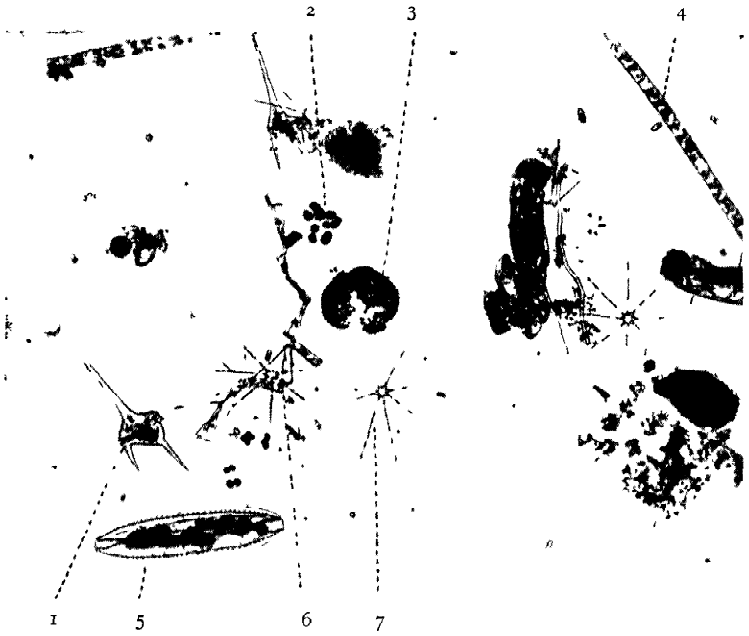


Fig VI

IRISH PLANKTON

G S West Photomicrogr



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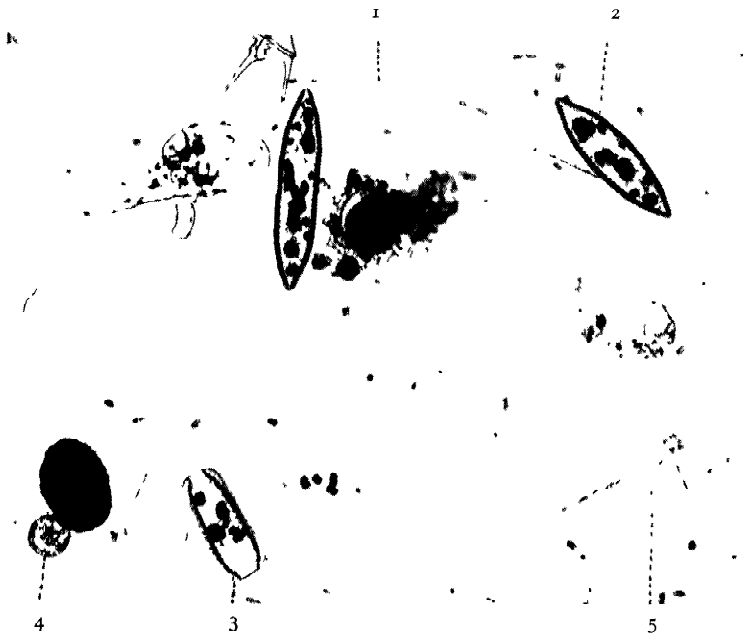
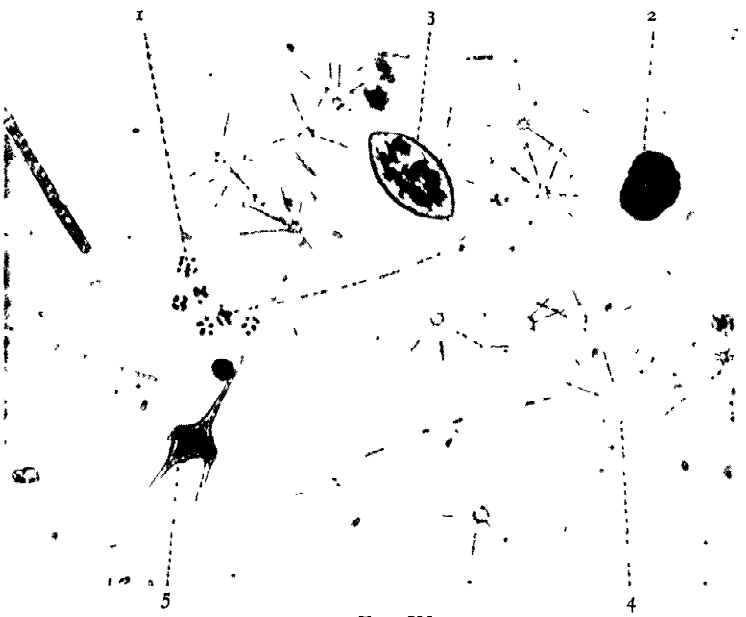


Fig II

Fig III



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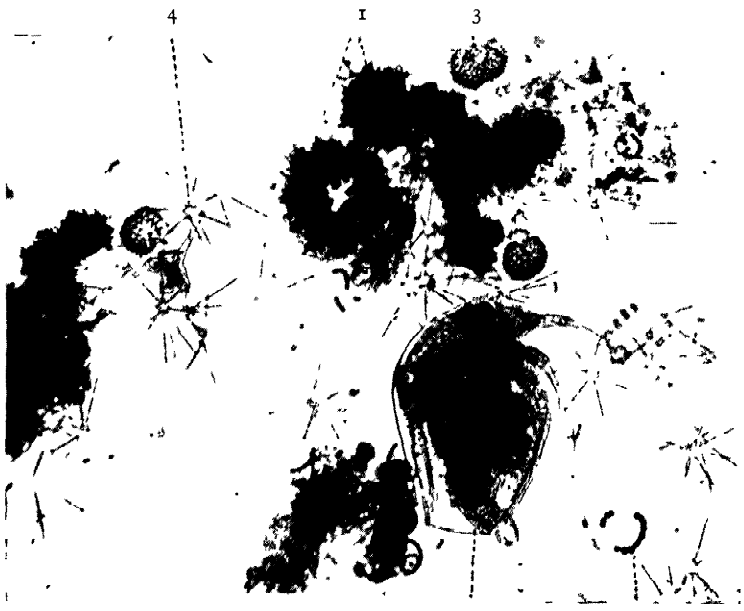

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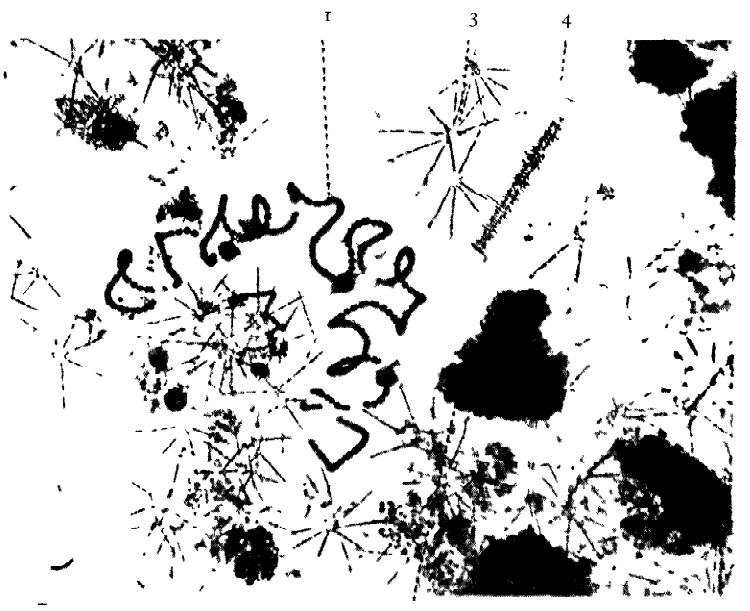
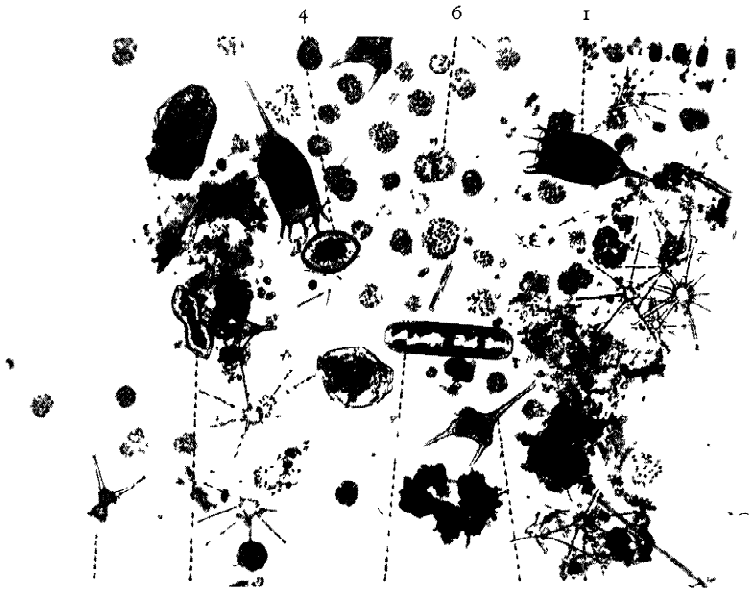


Fig VI

IRISH PLANKTON

G S West, Photomicrogr



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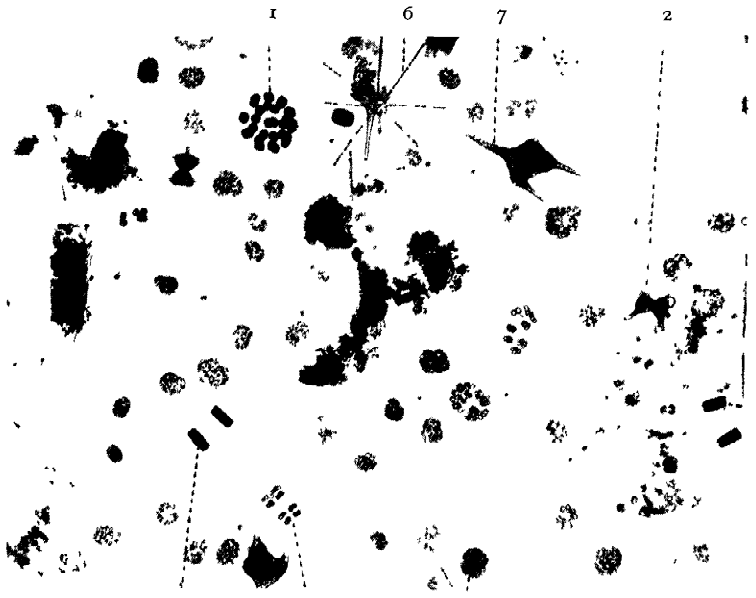

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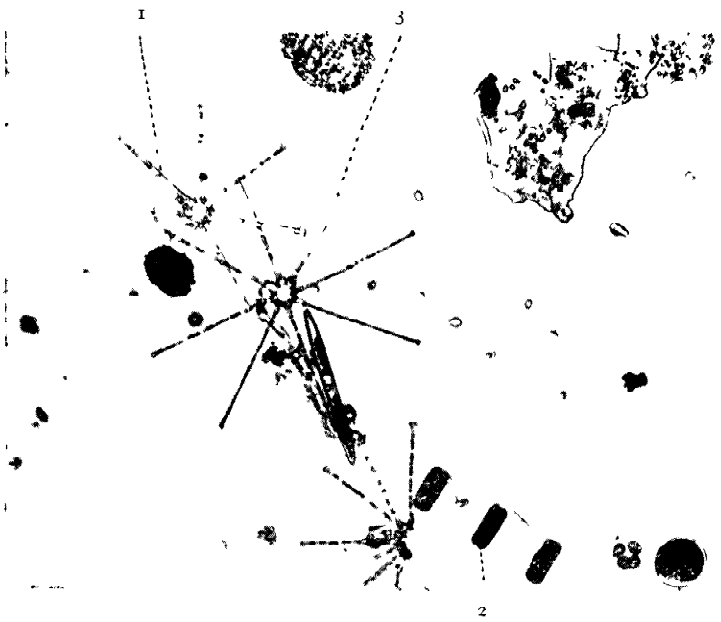

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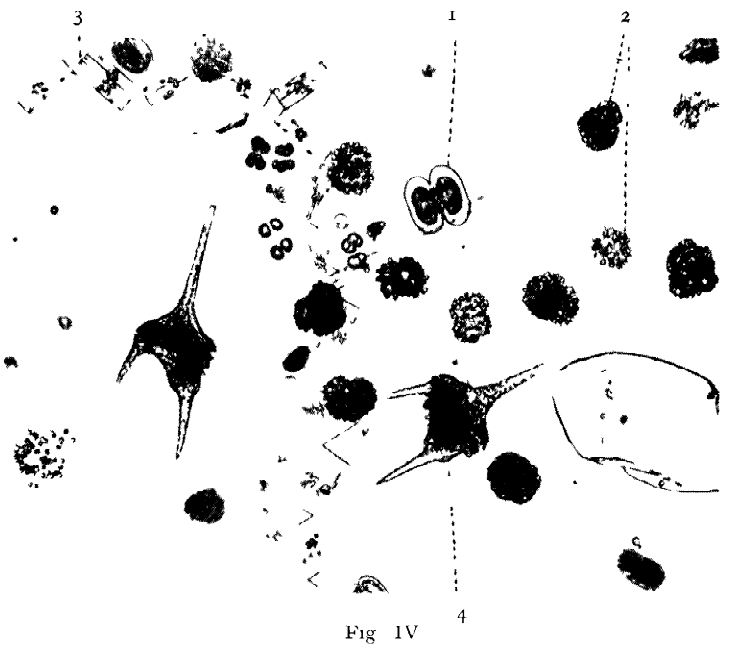

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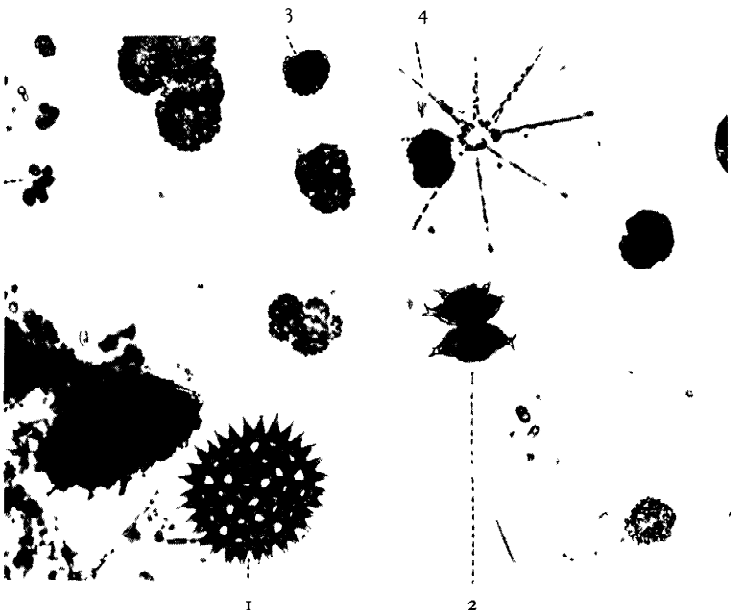

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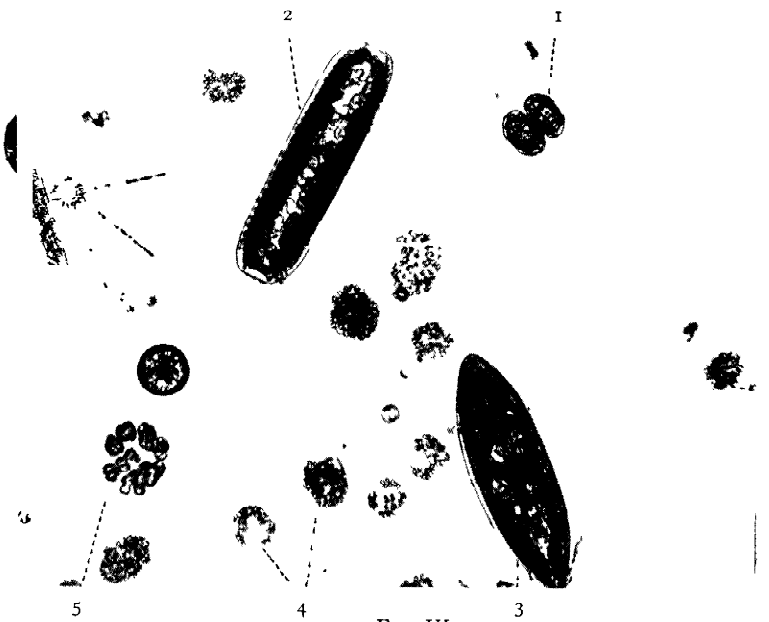

Fig VI

IRISH PLANKTON.

G. S. West, Photomicrogr

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IRISH PLANKTON

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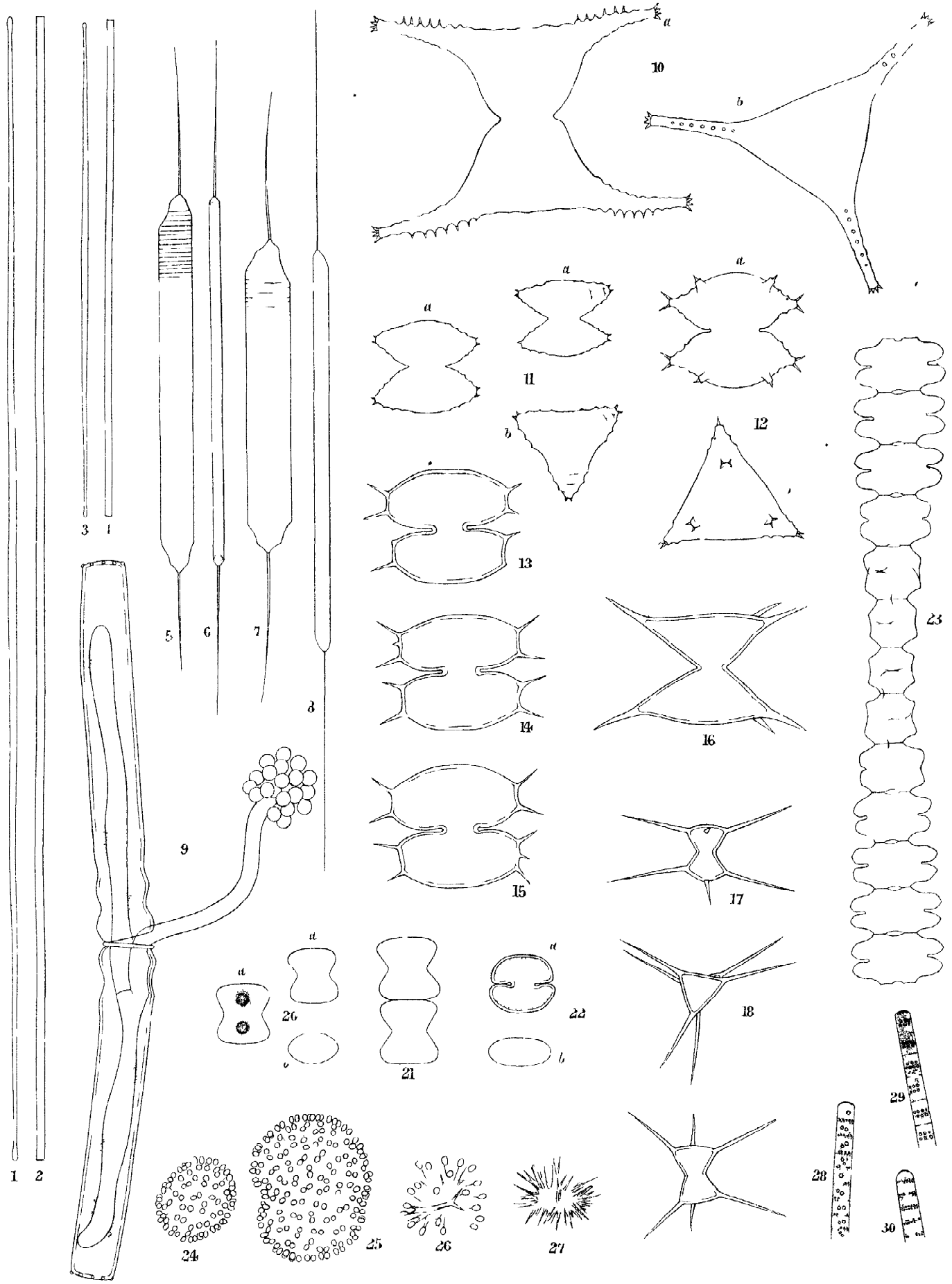

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IRISH PLANKTON