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Francis Drouet

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# A PRELIMINARY STUDY OF THE ALGAE OF NORTHWESTERN MINNESOTA

FRANCIS DROUET

*Cryptogamic Herbarium, Chicago Natural History Museum*

It was my good fortune to spend five weeks during June and July, 1954, at the Lake Itasca Biological Station of the University of Minnesota. While there, Mr. Kung Chu Fan, Dr. Thomas Morley, Miss Filomena O. Fortich, Mr. John Rowley, and I collected a considerable number of herbarium specimens of algae from Itasca state park and vicinity and from other parts of northwestern Minnesota. Other members of the faculty and student body of the Station contributed various specimens. In the past I have studied plankton collections from lakes in the region made by Dr. Samuel Eddy and by Dr. Charles B. Reif. During several seasons, Mr. Donald Richards collected algae about Big Thunder lake, 9 miles south of Remer. More recently were received the collections of Dr. M. F. Buell from Itasca state park; among these are presumably the unnamed algae reported by H. F. Buell (1940). All of these specimens are to be found in the Herbarium of the University of Minnesota at Minneapolis, in the Cryptogamic Herbarium of Chicago Natural History Museum, or in my personal herbarium; those of Mr. Fan and Miss Fortich are also represented in their personal herbaria.

The species found and the specimens which constitute their material bases are here enumerated as a beginning for the systematic study of the algae of the region. Numerous species in the flagellate and protococcoid groups, not recorded here, were observed in the collections; but their numbers were too scant to permit permanent preservation and other than debatable identification. Likewise, where mature spores are required for specific determination, as in Anabaena, the Oedogoniaceae, and the Zygnemataceae, many species seen in the vegetative condition are not listed. The diatoms and certain groups of desmids have been omitted; it is trusted that the large numbers of specimens of these on hand can be treated by specialists in the future.

## Myxophyceae

The nomenclature employed here is that of Drouet & Daily (1952), Bornet & Flahault (1886-88), and Gomont (1892), unless otherwise indicated.

I am especially grateful to Dr. A. Orville Dahl and Dr. Thomas Morley for their personal efforts to make this project successful, to Dr. Thorvald Schantz-Hansen for his forbearance and generous approbation of such work at the Biological Station, to Dr. William H. Marshall and Dr. Pershing Hofslund for the privilege of accompanying the Institute of Biology Teachers on trips to Red and Mud lakes, and to the Minnesota Academy of Science (and its editor, Dr. John W. Hall) for publishing this manuscript in its *Proceedings*. Part of the cost of publishing this article has been defrayed by a grant from the Hayden Fund, Department of Botany, University of Minnesota.

<sup>2</sup>Reference should be made to a list of algae collected in the vicinity of the former Gull Lake Biological Station in Cass county by Tilden (1894), the specimens for which have not been found.

ANACYSTIS CYANEA (Kütz.) Dr. & Daily. In the plankton of ponds and lakes, often developing as water-blooms in the late summer. Specimens seen: Cass county: Cass lake, *Eddy*, 10 Sept. 1946. Clearwater county: Lake Itasca, *Eddy*, 29 Aug. 1935 *Fortich 1*, 18 June 1954, *Fan 10159*, 20 June 1954; De Soto lake, Itasca state park, *Eddy*, 20 Aug. 1940. Itasca county: Bowstring lake, *Reif*, 29 July 1936. Ottertail county: Crystal, Little Pelican, Sand, Sauer, Sear, Spirit and Wimer lakes, *Eddy*, July-Aug. 1940; Ottertail lake, *Reif*, 13 Sept. 1936.

ANACYSTIS DIMIDIATA (Kütz.) Dr. & Daily. In shallow water and permanently wet places. One specimen, Clearwater county: pond east of Burt's Cabins on the north boundary of Itasca state park, *Fan 10395*, 29 June 1954.

ANACYSTIS MONTANA (Lightf.) Dr. & Daily. *F. montana* grows usually on rocks, wood, bark, and soil wet only by rains or by seepage; occasionally it is found in shallow water and even in the plankton. *F. minor* (Wille) Dr. & Daily is found in permanent bodies of water. Specimens seen: Clearwater county: at old dock, north arm of Lake Itasca, *Buell 462*, 9 July 1946; in seepage on concrete under the Highway 92 bridge across Sucker creek one mile west of Lake Itasca post office, *Drouet, Morley & Fan 11900, Fan 10075*, 17 June 1954. Hubbard county: (*f. minor*) in pond east of Deming pond and Lakes trail, Itasca state park, *Fan 10267*, 25 June 1954; in a pond on west side of Highway 71 about six miles south of the east entrance to Itasca state park, *Drouet 12199*, 9 July 1954.

ANACYSTIS THERMALIS (Menegh.) Dr. & Daily. In seepage and in shallow water. One specimen, Clearwater county: in dripping water on the wooden conduit of Elk spring, Itasca state park, *Drouet 12185*, 6 July 1954.

COCOCHLORIS STAGNINA Spreng. Terrestrial, in seepage, or in shallow or deep water. Specimens seen: Clearwater county: bottom (40 feet deep) of East Twin lake, Itasca state park, *Robert Staub*, 5 July 1954; in a path at the boat landing, public camp ground, Itasca state park, *Drouet & Fan 11878*, 15 June 1954; wet barren ground in the lane at the iron spring near Sucker creek one mile west of Lake Itasca post office, *Drouet, Morley & Fan 11896*, 17 June 1954; barren ground in the old gravel pit east of the Biological Station, Itasca state park, *Drouet 12074*, 26 June 1954. Hubbard County: in shallow water, north shore of Mary lake, Itasca state park, *Drouet 12045, Fan 10255*, 25 June 1954.

GOMPHOSPHAERIA LACUSTRIS Chod. In shallow water and in plankton of lakes. Specimens seen: Clearwater county: Lake Itasca, *Eddy*, 18 Aug. 1933; north arm of Lake Itasca, *Fortich 18, 22*, 1 July 1954. Hubbard county: in a pond on east side of Highway 71 about 8 miles south of the east entrance to Itasca state park, *Drouet 12204*, 9 July 1954. Ottertail county: Lida lake, *Eddy*, 5 Aug. 1940.

GOMPHOSPHAERIA WICHURAE (Hilse) Dr. & Daily. In the plankton, and often developing into water-blooms in late summer. Specimens seen: Cass county: Cass lake, *Reif*, 11 Sept. 1936. Clearwater county: Lake Itasca, *Eddy*, 20 Aug. 1935; along shore north of boathouse, north

arm of Lake Itasca, *Fortich* 7, 21 June 1954; north end of Squaw lake, Itasca state park, *Fortich & Fan*, 29 June 1954. Hubbard county: Mary lake, Itasca state park, *Fortich & J. Munn*, 25 June 1954. Ottertail county: Little Pelican and Sear lakes, *Eddy*, July, Aug. 1940.

MERISMOPEDIA TRANQUILLA (Ehrenb.) Dr. & Daily. In shallow water and on mud. Marshall county: on mud beside Mud lake dike just south of the spoilbank across Mud lake, two miles northwest of Headquarters, Mud Lake Wildlife Refuge, *Drouet* 12092, 28 June 1954.

ENTOPHYSALIS BREBISSEONII (Menegh.) Dr. & Daily. On larger plants in streams and in permanent bodies of water. Specimens seen: Clearwater county: on *Cladophora crispata*, northwest shore of Mary lake, Itasca state park, *Drouet* 12172, 6 July 1954. Hubbard county: on moss in La Salle creek, Itasca state park, *Fan* 10146, 19 June 1954.

ENTOPHYSALIS RIVULARIS (Kütz.) Dr. On rocks, wood, etc. in flowing water. Specimens seen: Clearwater county: on sheet iron of the culvert through which the Mississippi river headwaters flow, Itasca state park, *Drouet* 11974, *Fan* 10160, 21 June 1954; on stones in Sucker creek about one mile west of Lake Itasca post office, *Drouet*, *Morley & Fan* 11901, 17 June 1954.

FISCHERELLA AMBIGUA (Kütz.) Gom. *Scytonema ambium* Kütz. In barren ground which remains dry during much of the year. One specimen, Cass county: north shore of Big Thunder lake, *Richards* 1048, 27 Aug. 1940.

HAPALOSIPHON FONTINALIS (Ag.) Born., Bull. Soc. Bot. France 36: 156. 1889. *H. pumilus* (Kütz.) Kirchn. On larger plants and other objects in shallow, chiefly acid, waters. Specimens seen: Clearwater county: pond 0.5 mile north of Middlewest cabin on east side of Middle-west trail, Itasca state park, *Fan* 10341, 29 June 1954. Hubbard county: Typha bog on south side of Park road near the east entrance, Itasca state park, *Fan* 10179, 22 June 1954; pond 0.3 miles south from north boundary, west of Highway 92, Itasca state park, *Fan* 10535, 10537, 13 July 1954; in ponds beside Highway 71, 0.8, 1.2, and 6 miles south of the east entrance to Itasca state park, *Drouet* 12197, 12213, 12219, *Fan* 10501, 10509, 9 July 1954.

STIGONEMA OCELLATUM (Dillw.) Thur. In shallow acid waters of bogs and lakes. Specimens seen: Hubbard county: pond east of Deming lake and Lakes trail, Itasca state park, *Fan* 10272, 25 June 1954; in Darling pond, on west side of Highway 92 about 0.3 miles south of the north boundary, Itasca state park, *Drouet* 12228, 13 July 1954.

ANABAENA FLOS-AQUAE (Lyngb.) Bréb. In the plankton of lakes and ponds, developing as water-blooms in late summer. Specimens seen: Clearwater county: along shore of Schoolcraft island in north arm of Lake Itasca, *Fortich* 11, 24 June 1954. Hubbard county: Mary lake, Itasca state park, *Fortich & J. Munn*, 25 June 1954.

ANABAENA OSCILLARIOIDES Bory. In shallow permanent or semi-permanent bodies of water. Specimens seen: Clearwater county: in a Typha

swamp east of the Biological Station, Itasca state park, *Drouet, Morley & Fan 11884*, 17 June 1954; in a pond beside Park road halfway between the Biological Station and park headquarters, Itasca state park, *Drouet 11918*, 18 June 1954; in a pond 0.5 mile north of Middlewest cabin on east side of Middlewest trail, Itasca state park, *Fan 10343*, 29 June 1954; in a pond beside (west of) Middlewest trail halfway between Squaw and Elk lakes, Itasca state park, *Drouet 12153*, 29 June 1954; in a pond beside Middlewest trail 0.25 mile south of the north boundary, Itasca state park, *Drouet 12144*, 29 June 1954. Hubbard county: in a Typha bog on the north side of Park road near the east entrance, Itasca state park, *Fan 10196*, 22 June 1954.

*ANABAENA VARIABILIS* Kütz. In seepage and on drying margins of pools, lakes, and streams. Specimens seen: Clay county: Buffalo river in Buffalo Park, *Fan 10295*, 27 June 1954. Clearwater county: along Sucker creek about one mile west of Lake Itasca post office, *Drouet, Morley & Fan 11906, 11908*, 17 June 1954.

*APHANIZOMENON FLOS-AQUAE* (L.) Ralfs. In the plankton of lakes and ponds, developing as water-blooms, often early in the summer. Specimens seen: Clearwater county: middle of north arm of Lake Itasca, *Fortich 17*, 27 June 1954. Marshall county: ditch beside headquarters, and Mud lake and Mud Lake pool, one, two, and three miles north of headquarters along Mud Lake dike, *Fan 10332, 10335, 10338, Drouet 12102, 12104*, 28 June 1954. Ottertail county: East Silent lake, *Eddy*, 26 Aug. 1940.

*CYLINDROSPERMUM CATENATUM* Ralfs. In shallow water and on emergent margins of pools and streams. One specimen, Clearwater county: in a pond beside the road east of Squaw lake, Itasca state park, *Drouet 12127*, 29 June 1954.

*CYLINDROSPERMUM LICHENIFORME* (Bory) Kütz. On wet and drying ground and in seepage. Specimens seen: Cass county: along shore at southeast end of Big Thunder lake, *Richards 1414*, 24 Aug. 1942. Clearwater county: on a cut road-bank at the entrance to the public camp ground, Itasca state park, *Drouet & Fan 11868, Fan 10030*, 16 June 1954. Marshall county: on wet ground at the headquarters and in the pothole area beside CCC dike and trail seven miles northeast of the headquarters, Mud Lake Wildlife Refuge, *Drouet 12081, 12109, Fan 10339*, 28 June 1954.

*CYLINDROSPERMUM MAJUS* Kütz. On mud and in shallow water. Specimens seen: Cass county: along stream and along southeast shore of Big Thunder lake, *Richards 1415, 1416*, 24 Aug. 1942. Clearwater county: pond 0.5 mile east of Elk spring on south side of the road, Itasca state park, *Fan 10475*, 6 July 1954.

*CYLINDROSPERMUM MUSCICOLA* Kütz. On emergent mud about pools, lakes, and streams. Specimens seen: Clearwater county: Typha bog on the way from the museum to the Indian mounds, Itasca state park *Fan 10171*, 21 June 1954; along Sucker creek about one mile west of Lake Itasca post office, *Drouet, Morley & Fan 11899, 11909*, 17 June 1954.

NODULARIA SPHAEROCARPA Born. & Flah. In shallow water and on mud. One specimen seen, without spores: Hubbard county: La Salle creek below La Salle spring, *Fan 10130*, 19 June 1954.

NOSTOC ELLIPSOSPORUM (Desmaz.) Rabenh. In shallow water, on mud, and in seepage. Specimens seen: Beltrami county: on the shore of Red lake east of the fish-packing plant, Redby, *Drouet 12021*, 23 June 1954. Clearwater county: on *Utricularia* in a roadside pool, Itasca state park, *R. Evans*, Aug. 1952; in drying pools in the old gravel pits east of the Biological Station, Itasca state park, *Drouet 12070*, *Fan 10112*, June 1954.

NOSTOC MICROSCOPICUM Carm. In seepage and on wet rocks and soil, usually among mosses. One specimen, Cass county: northeast shore of Big Thunder lake, *Richards 1018*, 25 Aug. 1940.

NOSTOC MUSCORUM Ag. In drying rain-pools and on emergent margins of pools, lakes, and streams. Specimens seen: Beltrami county: mud on a log on the shore of Red lake west of the fish-packing plant, Redby, *Drouet 12018*, 22 June 1954. Clearwater county: drying pools in the old gravel pits west of the Biological Station, Itasca state park, *Fan 10106*, *Drouet 11924*, 18 June 1954; banks of Sucker creek and Mississippi river west of Lake Itasca post office, *Drouet, Morley & Fan 11904*, *11912*, *Fan 10071*, 17 June 1954; in a swale beside the lane to the Indian mounds, Itasca state park, *Drouet, Fan & Rowley 11980*, 21 June 1954; on a cut bank and in paths, public camp ground, Itasca state park, *Drouet & Fan 11870*, *11879*, 16 June 1954. Marshall county: on moist ground at headquarters, Mud Lake Wildlife Refuge, *Drouet 12082*, 28 June 1954.

AMPHITRIX JANTHINA (Mont.) Born. & Flah. On stones, wood, etc. in moving water. Specimens seen: Clearwater county: on a log below the culvert below the source of the Mississippi river, Itasca state park, *Drouet, Fan & Rowley 11971*, 21 June 1954. Hubbard county: in La Salle creek below La Salle spring, Itasca state park, *Drouet & Fan 11954*, *Fan 10148*, 19 June 1954.

CALOTHRIX PARIETINA (Näg.) Thur. On wet rocks, wood, etc.; also on these substrata in shallow water. Specimens seen: Beltrami county: on a log in lower Red lake west of the fish-packing plant, Redby, *Drouet 12019*, 23 June 1954. Clearwater county: shore of Lake Itasca south of the Biological Station, *Fan 10005*, 15 June 1954; Lake Itasca at the public camp ground, *Drouet & Fan 11881*, 16 June 1954; north shore of Elk lake, Itasca state park, *Drouet 12131*, 29 June 1954; in the Mississippi river at its headwaters and at Park drive, Itasca state park, *Drouet 12242*, *12243*, *Fan 10531*, 13 July 1954; in a drying pool in the gravel pits east of the Biological Station, Itasca state park, *Drouet 11925*, 18 June 1954. Hubbard county: La Salle creek, Itasca state park, *Fan 10142*, 19 June 1954.

DICHOTHRIX BAUERIANA (Grun.) Born. & Flah. On rocks and wood in shallow water of lakes and ponds. Specimens seen: Clearwater county: old dock, north arm of Lake Itasca, *Buell 462*, 9 July 1946; north shore of

Squaw lake, Itasca state park, *Drouet 12138*, 29 June 1954. Hubbard county: north shore of Mary lake, Itasca state park, *Drouet 12040, 12046*, 25 June 1954; in Deming lake, Itasca state park, *Drouet 12069*, 25 June 1954.

*DICHOTRIX HOSFORDII* (Wolle) Born. ex Setch., *Erythea* 4: 190. 1896. On rocks and wood in shallow water of lakes. Specimens seen: Clearwater county: shore of Lake Itasca south of the Biological Station and at the public camp ground, *Fan 10011, Drouet & Fan 11882*, June 1954.

*GLOEOTRICHIA ECHINULATA* (Sm. & Sowerb.) Richt., *Forschungsber. Biol. Sta. Plön* 2: 32. 1894. In the plankton of lakes, forming water-blooms in the summer. One specimen, Clearwater county: north arm of Lake Itasca, *Fortich 25*, 4 July 1954.

*GLOEOTRICHIA PISUM* (Ag.) Thur. On larger aquatic plants in ponds, lakes and streams. The specimens seen are without spores: Clearwater county: in ditch along the road beside Squaw lake, Itasca state park, *Fan 10381*, 29 June 1954; north arm of Lake Itasca near the Biological Station, *Fan 10522*, 11 July 1954.

*RIVULARIA DURA* Roth. On wood and larger plants in lakes and ponds. Specimens seen: Clearwater county: north shore of Squaw lake, Itasca state park, *Drouet 12141*, 29 June 1954; near the boathouse in Lake Itasca at the Biological Station, *Drouet, Fortich & Fan 12162*, 4 July 1954.

*RIVULARIA MINUTULA* (Kütz.) Born. & Flah. On wood, rocks, etc. in shallow water of lakes and ponds, also in seepage. Specimens seen: Cass county: in Big Thunder lake and on the dam of its outlet, *Richards 1077, 1105*, 29 Aug., 2 Sept. 1940. Hubbard county: Mary lake, Itasca state park, *Fan 10253, 10254*, 25 June 1954.

*FREMYELLA TENERA* (Thur.) J. de Toni, *Noterelle di Nomencl. Algol.* 8: (4). 1936. *Microchaete tenera* Thur. On larger algae and other plants in ponds and pools. One specimen, Marshall county: on *Cladophora crispata* in Mud River pool beside CCC dike about 8.5 miles northeast of headquarters, Mud Lake Wildlife Refuge, *Drouet 12114*, 28 June 1954.

*SCYTONEMA CRISPUM* (Ag.) Born., *Bull. Soc. Bot. France* 36: 156. 1889. *S. cinnamatum* (Kütz.) Thur. In shallow water of ponds and lakes. One specimen, Clearwater county: along northwest shore of Mary lake, Itasca state park, *Drouet 12171*, 6 July 1954.

*SCYTONEMA CRUSTACEUM* Ag. On barren ground wet by rains or seepage. One specimen, Cass county: north shore of Big Thunder lake, *Richards 1044, 1046*, 27 Aug. 1940.

*SCYTONEMA MIRABILE* (Dillw.) Born., *Bull. Soc. Bot. France* 36: 155. 1889. *S. figuratum* Ag. In seepage and on wet ground and rocks. Specimens seen: Cass county: north and northeast shores of Big Thunder lake, *Richards 1018, 1047*, Aug. 1940. Clearwater county: in the gravel pits east of the Biological Station, Itasca state park, *Drouet 12077*, 26 June 1954.

-SCYTONEMA HOFMANNII Ag. Found here only on sunny barren ground in paths, lanes, fallow fields, and cut banks. Specimens seen: Clearwater county: one mile north of Lake Itasca post office, *Drouet & Morley* 12160, 1 July 1954; west of the administration building of the Biological Station, beside Park road south of the north entrance, and in an old field west of the park headquarters, Itasca state park, *Drouet* 11920, *Drouet & Fan* 12159, 12171, June, July 1954. Hubbard county: in a lane and a gravel pit southwest of La Salle spring, Itasca state park, *Drouet & Fan* 11967, 11969, *Fan* 10121, 19 June 1954.

SCYTONEMA OCELLATUM Lyngb. In barren ground wet only by rains. Specimens seen: Clearwater county: in the old gravel pits east of the Biological Station, Itasca state park, *Fan* 10118, 18 June 1954, *Drouet* 12073, 26 June 1954.

TOLYPOTHRIX LANATA (Desv.) Wartm. On larger plants, living and dead, in shallow water of lakes and ponds. Specimens seen: Clearwater county: Elk lake, Itasca state park, *Eddy*, 1941; in Lake Itasca at the Biological Station, *Fan* 10439, 10440, 4 July 1954. Hubbard county: La Salle creek, Itasca state park, *Fan* 10145, 19 June 1954; pond west of Highway 71 south of the road to Beauty Nest, Itasca state park, *Drouet* 12051, *Fan* 10250, 25 June 1954; in ponds beside Highway 71, 0.8, 1.2, 6, and 8 miles south of the east entrance to Itasca state park, *Drouet* 12201, 12215, *Fan* 10493, 10500, 10503, 10508, 9 July 1954.

TOLYPOTHRIX TENUIS Kütz. On larger plants, wood, and stones in shallow water of lakes, ponds, and swales. Specimens seen: Clearwater county: pond beside north boundary road west of Bert's Cabins, Itasca state park, *Drouet* 12150, 29 June 1954; drying pool in the woods east of the public camp ground, Itasca state park, *Drouet & Fan* 11869, 18 June 1954. Hubbard county: bog on south side of Park road halfway between Douglas Lodge and the east entrance, Itasca state park, *Drouet* 11991, 11991a, 22 June 1954; pond 0.3 mile south of the north boundary west of Highway 92, Itasca state park, *Fan* 10537, 13 July 1954; Twin lakes, Itasca state park, *Fan* 10284, 25 June 1954; pond 6 miles south of the east entrance of Itasca state park, on west side of Highway 71, *Fan* 10514, 9 July 1954.

ARTHROSPIRA JENNERI (Hass.) Stizenb. Developing on mud in water often several feet deep and floating to the surface. Specimens seen: Clearwater county: in a pond of the south side of Highway 92 about 1 mile southeast of Lake Itasca post office, *Drouet* 12237, *Fan* 10526, 13 July 1954; pond beside Middlewest trail halfway between Squaw and Elk lakes, Itasca state park, *Drouet* 12152, 29 June 1954.

LYNGBYA AESTUARI (Mert.) Liebm. On soil, in drying temporary pools, and seldom in shallow permanent bodies of water. Specimens seen: Cass county: path, northeast shore of Big Thunder lake, *Richards* 1401, 23 Aug. 1942. Clearwater county: floating, north arm of Lake Itasca, *Buell* 461, 9 July 1946; in the gravel pits east of the Biological Station, Itasca state park, *Fan* 10061, 10062, *Drouet, Morley & Fan* 11893, *Drouet* 11926, June 1954; pond beside Sucker creek west of Lake Itasca post



office, *Fan 10215*, 22 June 1954; in a bottle in Mississippi river below the first culvert, Itasca state park, *Drouet, Fan & Rowley 11977*, 21 June 1954. Hubbard county: La Salle creek, Itasca state park, *Fan 10149*, 19 June 1954. Marshall county: in Mud lake beside Mud Lake dike 1.5 miles northwest of headquarters, and in pothole area on CCC dike 7 miles northeast of headquarters, Mud Lake Wildlife Refuge, *Drouet 12088, Fan 10318*, 28 June 1954.

LYNGBYA BIRGEI G. M. Smith, Bull. Torr. Club 43: 482. 1916. In the plankton of lakes, and developing as water-blooms during the summer. Specimens seen: Chippewa national forest: Black Duck and Big lakes, *Reif*, 24 Aug. 1936. Clearwater county: north arm of Lake Itasca, *Fortich 3*, 18 June 1954. Itasca county: Cass lake, *Eddy*, 10 Sept. 1936. Ottertail county: Pelican, Spirit, Wimer, Crystal, Sauer, Little Pelican, and Lizzie lakes, *Eddy*, July, Aug. 1940.

LYNGBYA DIGUETH Gom. in Hariot, Journ. de Bot. 9: 169. 1896. On larger algae in permanent streams, ponds, and lakes. Specimens seen: Clearwater county: on *Cladophora glomerata* in the headwaters of the Mississippi river, Itasca state park, *Fan 10529, Drouet 12244*, 13 July 1954.

LYNGBYA OCHRACEA (Kütz.) Thur. In seepage and in Springy places. Specimens seen: Cass county: stream at outlet of Big Thunder lake, *Richards 322, 1111*, 2 Sept. 1939, 1940.

LYNGBYA VERSICOLOR Wartm. On rocks, wood, and other plants in shallow permanent bodies of water. One specimen, Clearwater county: north shore of Squaw lake, Itasca state park, *Drouet 12139*, 29 June 1954.

MICROCOLEUS PALUDOSUS (Kütz.) Gom. In barren ground. Specimens seen: Clearwater county: in the gravel pits east of the Biological Station, Itasca state park, *Drouet 12075*, 26 June 1954; in an old field west of the headquarters, Itasca state park, *Drouet & Fan 12169, Fan 10445*, 4 July 1954.

MICROCOLEUS RUPICOLA (Tild.) Dr., Field Mus. Bot. Ser. 20: 167. 1943. In barren, often denuded and wet, ground. Specimens seen: Clearwater county: Squaw lake, Itasca state park, *Fan 10347*, 29 June 1954; beside the pond 1 mile southeast of Lake Itasca post office and west of Highway 92, *Fan 10527*, 13 July 1954; at the large iron spring 1 mile west of Lake Itasca post-office, *Fan 10191*, 22 June 1954; in old gravel pits east of the Biological Station, Itasca state park, *Drouet 12079*, 26 June 1954; in an old field west of the headquarters, Itasca state park, *Drouet & Fan 12164, 12165*, 4 July 1954. Hubbard county: on a cut bank beside Highway 71, 0.8 mile south of the east entrance to Itasca state park, *Drouet 12222, Fan 10485*, 9 July 1954.

MICROCOLEUS VAGINATUS (Vauch.) Gom. The commonest soil alga of the region. Specimens come from paths, lanes, old fields, road cuts and embankments, barrens in woods and about buildings, gravel pits and other denuded areas, also from the margins of lakes and streams. Among the numerous sheets on hand, the following are representative: Cass

county: in woods on the northeast shore of Big Thunder lake, *Richards* 321, 1 Sept. 1939. Clay county: bank of Buffalo river, Buffalo Park, *Fan* 10311, 27 June 1954. Clearwater county: gravel pits east of the Biological Station, Itasca state park, *Drouet* 12078, 26 June 1954. Hubbard county: in woods above La Salle spring, Itasca state park, *Drouet* 12239a, 13 July 1954.

OSCILLATORIA AMOENA (Kütz.) Gom. In ponds. One specimen, Hubbard county: in small pond on Lakes trail 0.25 mile from Highway 71, Itasca state park, *Morley*, 1 July 1954.

OSCILLATORIA AMPHIBIA Ag. In ponds. One specimen, as above, with *O. amoena*.

OSCILLATORIA ARTICULATA Gardn., Mem. New York Bot. Gard. 7: 34. 1927. *O. Grunowiana* var. *articulata* (Gardn.) Dr., Amer. Jour. Bot. 24: 608. 1937. In ponds and ditches. One specimen, Clay county: in the small lake, Buffalo Park, *Fan* 10310, 27 June 1954.

OSCILLATORIA CHLORINA Kütz. In ponds and ditches. Specimens seen, Clearwater county: pond beside the road east of Squaw lake, Itasca state park, *Drouet* 12126, 29 June 1954; pond east of Burt's Cabins on north side of the north boundary of Itasca state park, *Drouet* 12120, 29 June 1954; in a bottle in the Mississippi river near the headwaters, *Drouet, Fan & Rowley* 11978, 21 June 1954. Hubbard county: pond on east side of Highway 71, 1.8 miles south of the east entrance, Itasca state park, *Drouet* 12211, 9 July 1954.

OSCILLATORIA CURVICEPS Ag. In shallow water of lakes and streams. One specimen, Clearwater county: Squaw lake, Itasca state park, *Fan* 10374, 29 June 1954.

OSCILLATORIA GRANULATA Gardn., Mem. New York Bot. Gard. 7: 37. 1927. In shallow water. One specimen, Cass county: in a small bay, Big Thunder lake, *Richards* 1045, 27 Aug. 1940.

OSCILLATORIA GRUNOWIANA Gom. In ponds and ditches. Specimens seen, Clearwater county: in a pond beside the road east of Squaw lake, Itasca state park, *Drouet* 12125, 12129, 29 June 1954.

OSCILLATORIA LIMOSA Ag. In shallow quiet water. Specimens seen, Beltrami county: in a pool on the shore of upper Red lake, Ponemah point, *Drouet* 12037, 23 June 1954. Clearwater county: in Chambers creek, Itasca state park, *Drouet* 12132, 29 June 1954; in Mississippi river west of Lake Itasca post office, *Drouet, Morley & Fan* 11914, 17 June 1954; in a pond on the south side of Lind saddle trail 0.5 mile east of Elk spring, Itasca state park, *Fan* 10473, *Drouet* 12183, 6 July 1954.

OSCILLATORIA PRINCEPS Vauch. In shallow quiet water. Specimens seen: Clearwater county: pond east of Burt's cabins on the north boundary of Itasca state park, *Fan* 10316, 29 June 1954. Hubbard county: springy pool in the outlet of Mary lake, Itasca state park, *Drouet* 12050, 25 June 1954; Deming lake, Itasca state park, *Fan* 10279, 25 June 1954.

*OSCILLATORIA SANCTA* Kütz. In shallow water and on adjacent mud. One specimen, Clearwater county: floating in east arm of Lake Itasca, Buell 4610, 17 Aug. 1946.

*OSCILLATORIA SPLENDIDA* Grev. In shallow water of lakes, ponds, and streams. Specimens seen: Clearwater county: ditch along road near Squaw lake, Itasca state park, Fan 10378, 29 June 1954; pond 0.75 mile west of Mary Lake, Fan 10471, 10472, 6 July 1954; in Lake Itasca near the Biological Station, Fan 10454, 5 July 1954. Hubbard county: in an abandoned ice-house in a pond beside Highway 71 about 8 miles south of the east entrance to Itasca State park, Drouet 12207, 9 July 1954; west shore of pond north east of Deming lake, Itasca state park, Fan 10263, 10271, Drouet 12058, 25 June 1954.

*OSCILLATORIA TENUIS* Ag. The var. *tenuis*, var. *natans* (Kütz.) Gom., and var. *tergestina* (Kütz.) Rabenh. grow in ponds, lakes, and other quiet waters of considerable permanence. Specimens seen: Beltrami county: with *O. limosa* in a pool on the shore of upper Red Lake at Ponemah point, Drouet 12037, 23 June 1954. Clearwater county: pond beside Sucker creek 1 mile west of Lake Itasca post office, Fan 10213, 22 June 1954; pond east of Burt's cabins on north boundary of Itasca state park, Fan 10385, 10389, 29 June 1954; ditch beside the road near Squaw lake, Itasca state park, Fan 10380, 29 June 1954; pond on south side of Highway 92 about 1 mile southeast of Lake Itasca post office, Drouet 12237, 13 July 1954. Hubbard county: in the hanging bog at east edge of West Twin lake, Itasca state park, Drouet 12056, Fan 10287, 25 June 1954; Darling pond, west of Highway 92 and south of the north boundary of Itasca state park, Fan & M. Boudrye, 13 July 1954; pond east of Highway 71, 1.2 miles south of the east entrance, Itasca state park, Drouet 12210, 9 July 1954. Marshall county: in pothole area 7 miles northeast of headquarters on CCC dike, Mud Lake Wildlife Refuge, Fan 10318, 28 June 1954.

*PHORMIDIUM AMBIGUUM* Gom. In shallow water. One specimen, Hubbard county: in Darling pond, west of Highway 92 about 0.3 mile south of the north boundary, Itasca state park, Drouet 12227, 13 July 1954.

*PHORMIDIUM AUTUMNALE* (Ag.) Gom. On wet, inundated, or springy ground. Specimens seen: Clearwater county: beside Lake Itasca north of Bear Paw point, Drouet 11860, 15 June 1954; in gravel pit east of the Biological Station, Itasca state park, Fan 10063, 17 June 1954; Mississippi headwaters, Fan 10161, 21 June 1954. Hubbard county: Typha bog south of Park road near the east entrance, Itasca state park, Fan 10183, 22 June 1954. Marshall county: at headquarters, Mud Lake Wildlife Refuge, Drouet 12080, 28 July 1954.

*PHORMIDIUM TENUE* (Menegh.) Gom. In shallow water, especially in springy places. Specimens seen: Clearwater county: in a large iron spring near, and in a swamp-hole beside, Sucker creek about 1 mile west of Lake Itasca post office, Drouet, Morley & Fan 11895, Drouet 12001, June 1954; Mississippi headwaters, Fan 10164, 21 June 1954.

**PHORMIDIUM UNCINATUM** (Ag.) Gom. In flowing water of springs and streams. Specimens seen: Clearwater county: spring beside Elk lake near Chambers creek, Itasca state park, *Fan* 10398, 10405, 29 June 1954; Elk spring, Itasca state park, *Drouet* 12184, *Fan* 10463, 10464, 6 July 1954; shore of Lake Itasca south of Bear Paw point, *Drouet* 11861, *Fan* 10001, 10002, 15 June 1954; in Mississippi river headwaters, *Fan* 10532, 10534, *Drouet*, *Fan & Rowley* 11973, June 1954; in the large iron spring near Sucker creek about 1 mile west of Lake Itasca post office, *Fan* 10186, *Drouet*, *Morley & Fan* 11897, *Drouet* 11985, June 1954; springs beside Sucker creek west of Lake Itasca post office, *Drouet* 12002, *Fan* 10204, 22 June 1954. Hubbard county: in La Salle creek below La Salle spring, Itasca state park, *Drouet & Fan* 11952, 19 June 1954. Marshall county: dam spillway, Judicial ditch no. 11, Mud Lake Wildlife Refuge, *Rowley* 70, 6 July 1954.

**PLECTONEMA NOSTOCORUM** Born. In shallow water and on mud, often infesting the gelatinous matrices of other algae. Specimens seen: Cass county: northeast shore of Big Thunder lake, *Richards* 1020, 25 Aug. 1940. Clay county: Buffalo river, Buffalo park, *Fan* 10297, 27 June 1954. Clearwater county: in old gravel pits east of the Biological Station, Itasca state park, *Drouet*, *Morley & Fan* 11892, 17 June 1954; in the outlet of Squaw lake, Itasca state park, *Drouet* 12119, 29 June 1954. Hubbard county: north shore of Mary lake, Itasca state park, *Drouet* 12054, 25 June 1954. Marshall county: in Mud lake beside Mud lake dike 1.5 miles northwest of headquarters, Mud Lake Wildlife Refuge, *Drouet* 12086, 12089, 28 June 1954.

**PLECTONEMA TEREBRANS** Born. & Flah. In calcareous shells and stones in clear shallow water. Specimens seen: Clearwater county: shore of Lake Itasca north of Bear Paw point, *Drouet* 11859, *Fan* 10027, 15 June 1954; in the Mississippi river below its headwaters, *Drouet*, *Fan & Rowley* 11976, *Fan* 10164, 21 June 1954. Hubbard county: north shore of Mary lake, Itasca state park, *Drouet* 12039, 25 June 1954.

**SCHIZOTRUX LACUSTRIS** A. Br. On wet wood and stones in streams and in the margins of lakes. Specimens seen: Clearwater county: northwest shore of Mary lake, Itasca state park, *Drouet* 12174, 6 July 1954; in the headwaters of the Mississippi river, *Fan* 10528, *Drouet* 12245, 13 July 1954.

**SCHIZOTRUX LARDACEA** (Ces.) Gom. In seepage. One specimen, Cass county: on bare marshy land, northeast shore of Big Thunder lake, *Richards* 1098, 1 Sept. 1940.

**SCHIZOTRUX LATERITIA** (Kütz.) Gom. On continuously wet rocks and wood, often submersed. Specimen seen: Clearwater county: rocks of old dock in the north arm of Lake Itasca, *Buell* 462, 9 July 1946. Hubbard county: on a log in water, north shore of Mary lake, Itasca state park, *Drouet* 12041, 25 June 1954.

**SCHIZOTRUX STRICKLANDII** Dr., Amer. Midl. Nat. 29: 51. 1943. In barren ground in paths, lanes, fallow fields, etc. Specimens seen: Cass county: path on northeast shore of Big Thunder lake, *Richards* 1401, 23

Aug. 1942. Clearwater county: at large iron spring 1 mile west of Lake Itasca post office, *Fan 10188*, 22 June 1954; in an old field west of the headquarters of Itasca state park, *Drouet & Fan 12167, 12168*, 4 July 1954; public camp ground by Lake Itasca, *Fan 10046*, 16 June 1954; in gravel pits east of the Biological Station, Itasca state park, *Drouet 12072*, 26 June 1954; in a lane on north shore of Squaw lake, Itasca state park, *Drouet 12137, Fan 10348*, 29 June 1954. Hubbard county: in gravel pits northwest of La Salle spring, Itasca State park, *Drouet 11966, Fan 10127, 10128*, 19 June 1954; on a cut bank beside Highway 71, 0.8 mile south of the east entrance, Itasca state park, *Drouet 12221*, 9 July 1954.

SPIRULINA MAJOR Kütz. In shallow water of ponds, lakes, and streams. Specimens seen: Cass county: in a small bay, Big Thunder lake, *Richards 1045a*, 27 Aug. 1940. Clearwater county: in Lake Itasca, near the Biological Station, *Fan 10455*, 5 July 1954.

SPIRULINA PRINCEPS W. & G. S. West, Trans. Linn. Soc., Ser. 2, Bot. 6: 205. 1902. In shallow water of ponds. Specimens seen: Clearwater county: in a pond south of Highway 92 about 1 mile southeast of Lake Itasca post office, *Drouet 12236*, 13 July 1954; pond beside Middle-west trail halfway between Squaw and Elk lakes, Itasca state park, *Fan 10344, Drouet 12152*, 29 June 1954.

SYMPLOCA DUBIA (Näg.) Gom. On wet rocks etc. in water. One specimen, Clearwater county: shore of Lake Itasca south of the Biological Station, *Fan 10007*, 15 June 1954.

SYMPLOCA KIENERI Dr., Amer. Midl. Nat. 29: 53. 1943. In barren ground. One specimen, Hubbard county: on a cut bank beside Highway 71, 0.8 mile south of the east entrance, Itasca state park, *Drouet 12222*, 9 July 1954.

SYMPLOCA MURALIS Kütz. On bare, often shady, ground. One specimen, Cass county: beside a house, northeast shore of Big Thunder lake, *Richards 1019, 1439*, Aug. 1940, 1942.

SYMPLOCA MUSCORUM (Ag.) Gom. In seepage, on wet ground, and in drying pools. Specimens seen: Clearwater county: pond north of Lind saddle trail 0.75 mile west of Mary lake, Itasca state park, *Drouet 12176*, 6 July 1954; northwest shore of Mary lake, Itasca state park, *Drouet 12175*, 6 July 1954; pond east of Burt's cabins, north of the north boundary of Itasca state park, *Drouet 12124*, 29 June 1954; in the old gravel pits east of the Biological Station, Itasca state park, *Drouet 11923*, 18 June 1954.

#### Rhodophyceae

BATRACHOSPERMUM MONILIFORME Roth, Tent. Fl. Germ. 3(1): 480. 1800. In ponds and streams. Specimens seen: Hubbard county: pond east of Highway 71, 1.2 miles south of the east entrance, Itasca state park, *Drouet 12212, Fan 10521*, 9 July 1954.

#### Chrysophyceae

The nomenclature in this group is that employed by Smith (1920).

CHRYSOPHAERELLA LONGISPINA Lauterb. In the plankton of lakes. One specimen: Itasca county: Cass lake, *Eddy*, 10 Sept. 1926.

DINOBYRON SERTULARIA Ehrenb. In the plankton of lakes. Specimens seen: Clearwater county: Lake Itasca, *Eddy*, 30 May 1934, *Fortich 15, 21, 26* June, 1 July 1954. Hubbard county: Deming lake, Itasca state park, *G. W. Comita*, 16 June 1954, *Fortich & J. Munn*, 25 June 1954.

### Heterokontae

Nomenclature here is that used by Collins (1905-09) and Hazen (1902), unless otherwise indicated.

CHARACIOPSIS SUBULATA (A. Br.) Borzi, Stud. Algol. 2: 152. 1895. Epiphytic on larger aquatic plants. Specimens seen: Hubbard county: in Darling pond, west of Highway 92, 0.3 mile south of the north boundary of Itasca state park, *Drouet 12231*, 12 July 1954; in bog 0.25 mile north of east Twin lake, Itasca state park, *Drouet & Morley 11944*, 18 June 1954.

OPHIOCYTIUM COCHLEARE (Eichw.) A. Br. With species of *Tribonema* in swales and ponds. Specimens seen: Clearwater county: in a pond by Middlewest trail halfway between Squaw and Elk lakes, Itasca state park, *Drouet 12157*, 29 June 1954; in a pond by Park road halfway between the entrance to the Biological Station and Park Headquarters, Itasca state park, *Fan 10116, Drouet 11919*, 18 June 1954; in a pond north of Lind saddle trail 0.75 mile west of Mary lake, Itasca state park, *Drouet 12178*, 6 July 1954. Hubbard county: bog south of Park road halfway between Douglas Lodge and the east entrance, Itasca state park, *Drouet 11944*, 22 June 1954.

OPHIOCYTIUM PARVULUM (Perty) A. Br. With *Tribonema* spp. in ponds and swales. One specimen, Clearwater county: pond beside Middlewest trail 0.25 mile south of the north boundary, Itasca state park, *Drouet 12147*, 29 June 1954.

TRIBONEMA BOMBYCINUM (Ag.) Derb. & Sol. The most conspicuous alga in shallow waters during the early summer, developing profusely in swales, temporary streams, and semi-permanent rain-pools. *F. tenue* Haz. is usually present with the f. *bombycinum*. Among the many sheets at hand, the following are representative: Clearwater county: pool in the gravel pits east of the Biological Station, Itasca state park, *Drouet, Morley & Fan 11894*, 17 June 1954; pond halfway between Squaw and Elk lakes, Itasca state park, *Drouet 12156* (f. *tenue*), 29 June 1954. Hubbard county: swale north of Park road halfway between Douglas Lodge and the east entrance, Itasca state park, *Drouet 11990*, 22 June 1954. Marshall county: in Mud River pool 8 and 8.5 miles northeast of headquarters on CCC dike, Mud Lake Wildlife Refuge, *Drouet 12111, Fan 10326*, 28 June 1954.

TRIBONEMA UTRICULOSUM (Kütz.) Haz. In the same habitats as, and often with, *T. bombycinum*. Specimens seen: Clearwater county: in Typha swamps near the entrance to the Biological Station, Itasca state park, *Fan 10117, 10194, Drouet 11872*, June 1954; in the gravel pits east of the Biological Station, Itasca state park, *Fan 10111, Drouet*

11930, 18 June 1954. Hubbard county: in the creek and bog-holes about La Salle spring, Itasca state park, *Drouet & Fan 11945, 11961*, 19 June 1954.

*VAUCHERIA GEMINATA* (Vauch.) DC. In seepage and springy places. Specimens seen: Clearwater county: in a Typha swamp east of the Biological Station, Itasca state park, *Drouet 11939, Fan 10092*, 18 June 1954.

*VAUCHERIA ORTHOCARPA* Reinsch. In ditches and shallow ponds. One specimen: Marshall county: ditch south of the highway at headquarters, Mud Lake Wildlife Refuge, *Drouet 12084*, 28 June 1954.

*VAUCHERIA SESSILIS* (Vauch.) DC. In springy places and swales. Specimens seen: Clearwater county: in a Typha swamp east of the Biological Station, Itasca state park, *Drouet, Morley & Fan 11883, Drouet 11935*, June 1954; in the large iron spring near Sucker creek about 1 mile west of Lake Itasca post office, *Fan 10190, Drouet 11988*, 22 June 1954. Hubbard county: in the creek and bog-holes near LaSalle spring, Itasca state park, *Drouet & Fan 11946, 11960, Fan 10144*, 19 June 1954. Marshall county: Mud River pool beside CCC dike 8.5 miles northeast of headquarters, Mud Lake Wildlife Refuge, *Fan 10324*, 28 June 1954.

*VAUCHERIA TERRESTRIS* (Vauch.) DC. On wet ground along the margins of streams and lakes. Specimens seen: Clay county: in a small hole, Buffalo Park, *Fan 10310*, 27 June 1954. Clearwater county: bank of Sucker creek west of Lake Itasca post office, *Drouet, Morley & Fan 11902*, 17 June 1954; Mississippi river headwaters, *Fan 10207*, 22 June 1954. Hubbard county: in a Typha bog south of Park road at the east entrance, Itasca state park, *Fan 10204*, 22 June 1954. Marshall county: in the pothole area by CCC dike 7 miles northeast of headquarters, Mud Lake Wildlife Refuge, *Drouet 12107*, 28 June 1954.

#### Euglenophyceae

Nomenclature here is that used by Walton (1915).

*EUGLENA PROXIMA* Dang. This and other species, not preserved, are found in ponds and pools. One specimen, Clearwater county: pond east of Burt's cabins, north of the north boundary of Itasca state park, *Drouet 12123*, 29 June 1954.

*PHACUS PLEURONECTES* (Müll.) Duj. Among other algae in shallow water. Specimens seen: Clearwater county: in Squaw lake and in a pond 0.5 mile north of Middlewest Cabin, Itasca state park, *Fan 10345, 10357*, 29 June 1954.

#### Dinophyceae

The nomenclature here is that employed by Eddy (1930).

*CERATIUM HIRUNDINELLA* (Müll.) Schr. In plankton of lakes and ponds. Specimens seen: Clearwater county: in Lake Itasca, *Fortich 10, Fan 10259*, June 1954; pond south of Highway 92 west of Lake Itasca post office, *Fortich & J. McLaughlin*, 22 June 1954. Hubbard county: pond beside Highway 71 south of the road to Beauty Nest, Itasca state park, *Fortich & J. Munn*, 25 June 1954.

GLENODINIUM sp. In ponds and lakes. One specimen, Clearwater county: woodland pond east of Elk lake, Itasca state park, *Eddy*, 8 July 1954.

PERIDINIUM CINCTUM (Müll.) Ehrenb. In the plankton of lakes. One specimen, Clearwater county: north arm of Lake Itasca, *Fortich 6*, 21 June 1954.

### Chlorophyceae

The nomenclature employed below is that found in Hazen (1902), Collins (1905-09), and Smith (1920, 1924), with certain exceptions as noted.

EUDORINA ELEGANS Ehrenb. In shallow ponds and in the plankton of lakes. Specimens seen: Clearwater county: in north arm of Lake Itasca, *Fortich 14*, 25 June 1954; in a pond beside north boundary east of Burt's Cabins, Itasca state park, *Fortich & Fan*, 29 June 1954.

GLOEOCYSTIS GREVILLEI (Berk.) Dr. & Daily, *Lloydia* 11: 79. 1848. *G. vesiculosa* Näg. On wet ground, wood, etc., especially among mosses. Specimens seen: Clearwater county: on the iron culvert of the Mississippi river at Park drive, Itasca state park, *Drouet 12241*, 13 July 1954. Hubbard county: Deming lake, Itasca state park, *Fan 10282*, 25 June 1954; bank of La Salle creek, and barren ground in a gravel pit near La Salle spring, *Drouet & Fan 11968*, *Drouet 12239*, June, July 1954.

SPHAEROCYSTIS SCHROETERI Chod. In the plankton of lakes. Specimens seen: Clearwater county: Long lake, *R. Staub*, 1 July 1954; north arm of Lake Itasca, *Fortich 5*, 18, June 1954.

TETRASPORA GELATINOSA (Vauch.) Desv. Attached to other plants, stones, wood, and debris in streams, ponds, and lakes. Specimens seen: Beltrami county: in the creek beside the fish-packing plant, Redby, *Drouet 12035*, 23 June 1954. Clearwater county: pond 0.5 mile north of Middlewest Cabin on Middlewest trail, Itasca state park, *Fan 10342*, 29 June 1954. Hubbard county: in La Salle creek near La Salle spring, Itasca state park, *Drouet & Fan 11948*, *Fan 10140*, 19 June 1954; pond west of Highway 71 south of the road to Beauty Nest, Itasca state park, *Drouet 12052*, *Fan 10252*, 25 June 1954. Marshall county: in Mud Lake pool beside Mud Lake dike 3 miles northwest of headquarters, Mud Lake Wildlife Refuge, *Drouet 12101*, 26 June 1954.

ANKISTRODESMUS FALCATUS (Corda) Ralfs. On soil, in seepage, in shallow ponds, and in the plankton of lakes. Specimens seen: Beltrami county: pool on the shore of Red lake west of the fish-packing plant, Redby, *Drouet 12024*, 23 June 1954. Clearwater county: pond north of Lind Saddle trail 0.5 mile west of Mary lake, Itasca state park, *Drouet 12190*, 6 July 1954; pond south of Highway 92 about 1 mile southeast of Lake Itasca post office, *Drouet 12238*, 13 July 1954. Hubbard county: pond west of Highway 71 south of the road to Beauty Nest, Itasca state park, *Fan 10251*, 25 June 1954; pond northeast of Deming lake, Itasca state park, *Drouet 12068*, 25 June 1954. Marshall county: in Mud Lake



pool beside Mud Lake dike 2 miles northwest of headquarters, Mud Lake Wildlife Refuge, *Drouet 12095*, 28 June 1954.

CLOSTERIOPSIS LONGISSIMA Lemm. In shallow water of ponds. One specimen, Hubbard county: pond northeast of Deming lake, Itasca state park, *Drouet 12068*, 25 June 1954.

COELASTRUM CAMBRICUM Arch. In temporary pools and in ponds. One specimen, Clearwater county: in the old gravel pits east of the Biological Station, Itasca state park, *Drouet 12071*, 26 June 1954.

CRUCIGENIA IRREGULARIS Wille. In shallow water and plankton of ponds and lakes. One specimen, Hubbard county: East Twin lake, Itasca state park, *R. Staub*, 5 July 1954.

DICYTOSPHAERIUM PULCHELLUM Wood. In plankton of lakes. One specimen, Clearwater county: north arm of Lake Itasca, *Fortich 20*; 1 July 1954.

GLAUCOCYSTIS NOSTOCHINEARUM Itzigs. In boggy pools. Specimens seen, Hubbard county: pond northeast of Deming lake, Itasca state park, *Drouet 12066*, 25 June 1954; pond west of Highway 92 about 0.3 mile south of the north boundary, Itasca state park, *Drouet 12226*, 13 July 1954.

HYDRODICTYON RETICULATUM (L.) Lagerh. In quiet water of streams and ponds. One specimen, Clearwater county: in a large slough-area along Mississippi river about 1 mile below its source, *P. H. Monson*, 13 July 1954.

OOCYSTIS LACUSTRIS Chod. In plankton of lakes. One specimen, Clearwater county: north arm of Lake Itasca, *Fortich 19*, 1 July 1954.

OOPHILLA AMBLYSTOMATIS Lamb. ex Printz in Engl. & Prantl, *Natürl. Pflanzenfam.*, 2 Aufl., 3: 94. 1927. In the gelatin surrounding the eggs of aquatic animals. One specimen, Clearwater county: pond south of Highway 92 about 1 mile southeast of Lake Itasca post office, *M. Boudrye*, 13 July 1954.

PEDIASTRUM BORYANUM (Turp.) Menegh. In pools, ponds, and lakes. One specimen, Clearwater county: in a pond south of Highway 92 west of Lake Itasca post office, *Drouet 12006*, 22 June 1954.

PEDIASTRUM DUPLEX Meyen. In shallow pools, in ponds, and in the plankton of lakes. Specimens seen: Clearwater county: north arm of Lake Itasca, *Fortich 8*, 22 June 1954. Marshall county: in Mud lake beside Mud Lake dike 1.5, 2.5, and 3 miles northwest of headquarters, Mud Lake Wildlife Refuge, *Fan 10334, 10336, 10337, Drouet 12090*, 28 June 1954.

PHYTOCONIS BOTRYOIDES (L.) Bory, *Mém. sur les Genres Conferva et Byssus*, p. 54. 1795. *Pleurococcus vulgaris* Menegh. This, the "Proto-coccus viridis" of many authors, has been observed in the area only near the bases of birch trees. Specimens seen, Clearwater county: at the Biological Station, Itasca state park, *Drouet & Morley 12224, Fan 10525*, 12 July 1954.

SCENEDESMUS ARMATUS (Chod.) G. M. Smith. In pools and ponds. Specimens seen: Beltrami county: shore of upper Red lake at Ponemah point, *Drouet* 12038, 23 June 1954. Clearwater county: in ponds south of Highway 92, west of Lake Itasca post office, and 1 mile southeast of the post office, *Drouet* 12005, 12238, June, July 1954. Hubbard county: Typha bog north of Park road at the east entrance, Itasca state park, *Fan* 10195, 22 June 1954.

SCENEDESMUS BIJUGA (Turp.) Lagerh. In shallow water. One specimen, Clearwater county: pond north of Lind saddle trail 0.5 mile west of Mary lake, Itasca state park, *Drouet* 12188, 6 July 1954.

SCENEDESMUS QUADRICAUDA (Turp.) Bréb. In pools and ponds and in the plankton of lakes. Specimens seen: Clearwater county: in the old gravel pits east of the Biological Station, Itasca state park, *Drouet & Fan* 12161, 3 July 1954. Marshall county: beside Mud Lake dike 2 miles northwest of headquarters, Mud Lake Wildlife Refuge, *Drouet* 12094, 28 June 1954.

TETRAEDRON MINIMUM (A. Br.) Hansg. In ponds and pools. One specimen, Clearwater county: pond north of Lind saddle trail 0.5 mile west of Mary lake, Itasca state park, *Drouet* 12189, 6 July 1954.

ZOOCHLORELLA CONDUCTRIX Brandt. Growing within the bodies of *Stentor* sp. Specimens seen: Hubbard county: in pond northeast of Deming lake, Itasca state park, *J. Rowley*, 25 June 1954. Polk county: south-east shore of Maple lake, south of Mentor, *Morley*, 11 July 1954.

ZOOCHLORELLA PARASITICA Brandt. In the bodies of sponges and *Ophrydium* sp. Specimens seen: Clearwater county: in Squaw and Elk lakes, Itasca state park, *Fan* 10370, 10478, June, July 1954; pond north of Lind saddle trail 0.5 mile west of Mary lake, Itasca state park, *Drouet* 12191, 6 July 1954; in Mississippi river west of Lake Itasca post office, *Drouet, Morley & Fan* 11915, 17 June 1954. Hubbard county: in ponds east of Highway 71, 0.8 and 1.2 miles south of the east entrance, Itasca state park, *Drouet* 12209, *Fan* 10494, 9 July 1954; in the pond northeast of Deming lake, Itasca state park, *Drouet* 12059, 25 June 1954.

MICROSPORA AMOENA (Kütz.) Rabenh. In ponds or streams. One specimen, Hubbard county: pond east of Highway 71, 0.8 mile south of the east entrance, Itasca state park, *Drouet* 12217, 9 July 1954.

MICROSPORA STAGNORUM (Kütz.) Lagerh. In pools, streams, and ponds. Specimens seen: Clearwater county: in swales near the entrance to the Biological Station, Itasca state park, *Drouet, Morley & Fan* 11890, *Fan* 10054, *Drouet* 11922, 11937, June 1954; in Mississippi river below its source, *Drouet, Fan & Rowley* 11975, 21 June 1954.

MICROSPORA WITTRICKII (Wille) Lagerh. In pools and ponds. One specimen, Hubbard county: pond east of Highway 71, 0.8 mile south of the east entrance, Itasca state park, *Fan* 10488, 9 July 1954.

STICHOCOCCUS BACILLARIS Näg. On damp wood, soil, etc. One specimen, Clearwater county: north shore of Squaw lake, Itasca state park, *Drouet* 12140, 29 June 1954.

STICHOCOCCUS SUBTILIS (Kütz.) Klerck. On wet (or repeatedly wetted) wood, stones, etc., and often found in the protococcoid or palmelloid condition. Specimens seen: Beltrami county: on a wet bank west of the fish-packing plant, Redby, *Drouet 12016*, 23 June 1954. Clearwater county: on wood about buildings, Biological Station, Itasca state park, *Fan 10524*, *Drouet 12163*, July 1954. Hubbard county: in Typha bog south of Park road at east entrance, Itasca state park, *Fan 10177*, 22 June 1954; log in pond northeast of Deming lake, Itasca state park, *Drouet 12061*, 25 June 1954. Marshall county: on damp ground, headquarters, Mud Lake Wildlife Refuge, *Drouet 12083*, 28 June 1954.

APHANOCHAETE REPENS A. Br. On larger algae in ponds and pools. One specimen, Marshall county: on *Cladophora crispata* in Mud River pool beside CCC dike 8.5 miles northeast of headquarters, Mud Lake Wildlife Refuge, *Drouet 12115*, 28 June 1954.

CHAETOPHORA ELEGANS (Roth) Ag. Common in shallow water of pools, streams, ponds, and lakes. Among the numerous specimens, the following are representative: Clearwater county: in a Typha swale beside Park road southeast of the Biological station, Itasca state park, *Drouet 11873*, 16 June 1954. Hubbard county: in La Salle creek below La Salle spring, Itasca state park, *Drouet & Fan 11955*; 19 June 1954. Marshall county: in Mud River pool along CCC dike 8.5 miles northeast of headquarters, Mud Lake Wildlife Refuge, *Fan 10328*, 28 June 1954.

CHAETOPHORA INCRASSATA (Huds.) Haz. Abundant everywhere in streams, lakes, and ponds. The following are representative of the many specimens at hand: Clearwater county: in pond south of Lind saddle trail 0.5 mile east of Elk Spring, Itasca state park, *Drouet 12180*, 6 July 1954. Hubbard county: in pond beside Highway 71 about 8 miles south of the east entrance to Itasca state park, *Fan 10499*, 9 July 1954. Marshall county: in the pothole area beside CCC dike 7 miles northeast of headquarters, Mud Lake Wildlife Refuge, *Drouet 12106*, 28 June 1954.

CYLINDROCAPSA GENINELLA Wolle. On larger algae in ponds and pools. One specimen, Hubbard county: in pond west of Highway 71 about 6 miles south of the east entrance to Itasca state park, *Drouet 12198*, 9 July 1954.

DRAPARNALDIA PLUMOSA (Vauch.) Ag. In ponds and streams. One specimen: Hubbard county: in a Typha bog north of Park road at the east entrance, Itasca state park, *Fan 10193*, 22 June 1954.

ENTOCLADIA POLYMORPHA (G. S. West) G. M. Smith, Fresh-w. Alg. U. S., p. 400. 1933. *Endoderma polymorphum* G. S. West. On larger plants in ponds and streams. One specimen: Hubbard Co.: on mosses in La Salle creek, Itasca state park, *Fan 10131*, 19 June 1954.

GONGROSIRA DEBARYANA Rabenh. On wood, stones, etc. in flowing water. Specimens seen: Clearwater county: in Elk spring, Itasca state park, *Drouet 12187*, 6 July 1954; on the first culvert through which the Mississippi river headwaters flow. *Drouet, Fan & Rowley 11970*, 21 June 1954.

*STIGEOCLONIUM LUBRICUM* (Dillw.) Kütz. In streams and along the margins of lakes. Specimens seen: Beltrami county: on stones in Red lake near the fish-packing plant, Redby, *Drouet 12017*, 23 June 1954. Clearwater county: on the culvert through which the Mississippi river headwaters flow, *Drouet, Fan & Rowley 11972*, 21 June 1954.

*COLEOCHAETE ORBICULARIS* Pringsh. On larger plants in ponds and lakes. One specimen, Hubbard county: in the pond west of highway 92 about 0.3 mile south of the north boundary, Itasca state park, *Drouet 12230*, 13 July 1954.

*COLEOCHAETE SCUTATA* Bréb. On larger plants in ponds and lakes. One specimen, Clearwater county: in Lake Itasca at Bear Paw point, *Drouet 11856*, 15 June 1954.

*BASICLADIA CHELONUM* (Coll.) Hoffm. & Tild., Bot. Gaz. 89: 382. 1930. *Chaetomorpha Chelonum* Coll. On the backs of snapping turtles. One specimen, Clearwater county: near Elk lake, Itasca state park, *R. Galati*, June 1954.

*CLADOPHORA CRISPATA* (Roth) Kütz. Forming the most conspicuous masses of floating algae in many lakes, ponds, and streams. The following are representative of the many specimens seen: Cass county: Big Thunder lake, *Richards 1043, 1081*, Aug. 1940. Beltrami county: in Red lake at the fish-packing plant, Redby, *Drouet 12010*, 23 June 1954. Clay county: hole near Buffalo river, Buffalo park, *Fan 10296*, 27 June 1954. Clearwater county: in Chambers creek, Itasca state park, *Drouet 12133*, 29 June 1954. Hubbard county: in Lake George, *Morley*, 8 July 1954. Marshall county: in Mud lake beside CCC dike 1 mile northeast of headquarters, Mud Lake Wildlife Refuge, *Drouet 12103*, 28 June 1954. Polk county: in Badger and Oak lakes, near Erskine, *Morley*, 11 July 1954.

*CLADOPHORA GLOMERATA* (L.) Kütz. On stones, etc. in streams and in the margins of lakes. Specimens seen: Beltrami county: in Red lake east of the fish-packing plant, Redby, *Drouet 12015*, 23 June 1954. Clay county: in Buffalo river, Buffalo Park, *Fan 10300*, 27 June 1954. Clearwater county: in Lake Itasca and Elk lake, *Drouet 11858, Fan 10014, 10026, 10080, 10399*, June 1954; in Mississippi river headwaters, *Fan 10162, 10533*, June, July 1954. Polk county: in north end of Maple lake near Mentor, *Morley*, 11 July 1954.

*RHIZOCLONIUM HIEROGLYPHICUM* (Ag.) Kütz. In quiet water in streams, ponds, and lakes. Specimens seen: Beltrami county: in the mouth of the creek entering Red lake beside the fish-packing plant, Redby, *Drouet 12012*, 23 June 1954. Cass county: in stream at outlet of Big Thunder lake, *Richards 1107*, 2 Sept. 1940. Marshall county: beside Mud Lake dike 1.5 and 2 miles northwest of headquarters, and in pothole area 7 miles northeast of headquarters, Mud Lake Wildlife Refuge, *Drouet 12091, 12096, 12108*, 28 June 1954.

*DICHOTOMOSIPHON TUBEROSUS* (A. Br.) Ernst. In ponds and lakes, often on their spring margins. Specimens seen: Hubbard county: in Deming and Mary lakes, and in the outlet of the latter, Itasca state park, *Fan 10259, 10277, Drouet 12049*, 25 June 1954.

*BULBOCHAETE NORDSTEDTII* Wittr., det. L. H. Tiffany. On larger aquatic plants. One specimen, Clearwater county: pond north of Lind saddle trail 0.75 mile west of Mary lake, Itasca state park, *Drouet 12179*, 6 July 1954.

*OEDOGONIUM COMPLETUM* (Hirn) Tiff., det. L. H. Tiffany. On larger aquatic plants. One specimen: Clearwater county: with *O. pusillum* in a *Typha* swamp north of the public camp ground, Itasca state park, *Drouet & Fan 11877*, 18 June 1954.

*OEDOGONIUM CRISPUM* (Hass.) Wittr., det. L. H. Tiffany. On larger aquatic plants. Specimens seen: Clearwater county: with *Bulbochaete Nordstedtii* in *Drouet 12179* cited above. Polk county: in a pond northwest of Oak lake near Erskine, *Morley*, 11 July 1954.

*OEDOGONIUM LONGICOLLE* Nordst., det. L. H. Tiffany. On larger aquatic plants. One specimen, Clearwater county: with *Bulbochaete Nordstedtii* in *Drouet 12179* cited above.

*OEDOGONIUM PUSILLUM* Kirchn., det. L. H. Tiffany. On larger aquatic plants. One specimen, Clearwater county: in a *Typha* swamp north of the public camp ground, Itasca state park, *Drouet & Fan 11877*, 18 June 1954.

*OEDOGONIUM WABASHENSE* Tiff., det. L. H. Tiffany. On larger aquatic plants. One specimen, Clearwater county: with *Bulbochaete Nordstedtii* in *Drouet 12179* cited above.

*OEDOGONIUM VAUCHERI* (Le Cl.) A. Br., det. L. H. Tiffany. On larger aquatic plants. One specimen, Clearwater county: in a *Typha* swamp east of the Biological Station, Itasca state park, *Drouet 11936*, 18 June 1954.

*MOUGEOTIA CAPUCINA* (Bory) Ag. In shallow water in ponds. Specimens seen: Hubbard county: in a pond east of Highway 71, 0.8 mile south of the east entrance, Itasca state park, *Drouet 12214*, *12216*, 9 July 1954.

*MOUGEOTIA LAETEVIRENS* (A. Br.) Wittr. In ponds and swales. One specimen, Clearwater county: pond beside north boundary road west of Burt's Cabins, Itasca state park, *Drouet 12147a*, 29 June 1954.

*MOUGEOTIA SCALARIS* Hass. In ponds and swales. One specimen, Hubbard county: in pond west of Highway 92 about 0.3 mile south of the north boundary, Itasca state park, *Drouet 12234*, 13 July 1954.

*SPIROGYRA DECIMINA* (Müll.) Kütz. In swales, ponds, and bogs. Specimens seen, Hubbard county: pond south of Park road at the east entrance, Itasca state park, *Drouet 11998*, 22 June 1954; in the hanging bog at the east edge of West Twin lake, Itasca state park, *Drouet 12057*, 25 June 1954.

*SPIROGYRA PUNCTATA* Cleve. In ponds and swales. Specimens seen: Hubbard county: in pond west of Highway 92 about 0.3 mile south of the north boundary, Itasca state park, *Drouet 12233*, 13 July 1954; in a

pond west of Highway 71 about 6 miles south of the east entrance to Itasca state park, *Drouet 12202*, 9 July 1954.

CLOSTERIUM and COSMARIUM spp. Numerous specimens from ponds, lakes and streams in the area await determination by a specialist.

COSMOCLADIUM SAXONICUM de Bary. In the plankton of lakes. Specimens seen: Clearwater county: in the north arm of Lake Itasca, *Fortich 16, 24*, June, July 1954.

CYLINDROCYSTIS CYLINDROSPORA (Bréb.) Dr. & Daily, *Leaf. Acadian Biol.* 1: 16. 1953. *C. Brebissonii* Menegh. In seepage and shallow pools. One specimen, Clearwater county: at the large iron spring about 1 mile west of Lake Itasca post office, *Fan 10065*, 17 June 1954.

DESMIDIUM BAILEYI (Ralfs) Nordst. In pools and ponds. One specimen, Clearwater county: in a pond west of Burt's Cabins, beside north boundary road, Itasca state park, *Drouet 12149*, 29 June 1954.

DESMIDIUM GREVILLEI (Kütz.) de Bary. In ponds and boggy pools. Specimens seen: Hubbard county: bog south of Park road halfway between Douglas Lodge and the east entrance, Itasca state park, *Drouet 11993*, 22 June 1954; pond northeast of Deming lake, Itasca state park, *Drouet 12062*, 25 June 1954; pond east of Highway 71, 0.8 mile south of the east entrance, Itasca state park, *Drouet 12220*, 9 July 1954.

DESMIDIUM SWARTZII Ag. In ponds and boggy pools. One specimen, Hubbard county: in the pond northeast of Deming lake, Itasca state park, *Drouet 12064*, 25 June 1954.

EUASTRUM SINUOSUM Lenorm. In ponds and pools. One specimen, Hubbard county: in the pond west of Highway 92 about 0.3 mile south of the north boundary, Itasca state park, *Drouet 12232*, 13 July 1954.

GYMNOZYGA MONILIFORMIS Ehrenb. In shallow water of ponds. Specimens seen, Hubbard county: in the pond northeast of Deming lake, Itasca state park, *Drouet 12065*, 25 June 1954; in a pond east of Highway 71, 0.8 mile south of the east entrance, Itasca state park, *Drouet 12218*; 9 July 1954.

HYALOTHECA DISSILIENS (Sm. & Sowerb.) Bréb. In ponds and bogs. Specimens seen: Hubbard county: bog south of Park road halfway between Douglas Lodge and the east entrance, Itasca state park, *Drouet 11992*, 22 June 1954; in the pond northeast of Deming lake, Itasca state park, *Drouet 12067*, 25 June 1954.

HYALOTHECA MUCOSA (Dillw.) Ehrenb. In ponds. One specimen, Hubbard county: in a pond beside Highway 71 about 6 miles south of the east entrance to Itasca state park, *Fan*, 9 July 1954.

MESOTAENIUM rubescens (Bréb.) Drouet & W. A. Daily, comb. nov. *Palmella rubescens* Bréb.<sup>3</sup> in Bréb. & Godey, *Mém. Soc. Acad. Sci.*

<sup>3</sup> The type specimen of this, labeled "Falaise, *A. de Brébisson*," in the Rijksherbarium at Leiden and isotypes in the Istituto Botanico at Florence and in the Conservatoire Botanique at Geneva are in all respects the same as the type of *Palmogloea macrococca* Kütz., labeled "Oberharz," in the F. T. Kützing collection in the Leiden herbarium.

Arts & Belles-Lettres Falaise 1835: 256. 1836. *Microcystis rubescens* Menegh., Mem. R. Accad. Sci. Torino, Ser. 2, 5 (Sci. Fis. & Math.): 47, 86. 1843. *Bichatia rubescens* Trevis., Nomencl. Alg. 1: 62. 1945. *Palmogloea rubescens* Kütz., Tab. Phyc. 1: 19. 1846. *Cagniardia Brebissonii* Trevis., Sagg. Monogr. Alg. Coccot., p. 49. 1848. *Palmogloea macrococca* Kütz., Phyc. Germ., p. 153. 1845. *Mesotaenium Braunii* de Bary, Unters. ü. d. Fam. Conjugaten, p. 74. 1858. *M. macrococcum* Kütz. ex Roy (& Bisset), Ann. Scott. Nat. Hist. 1894: 253. 1894. In seepage and on barren ground, often among mosses. One specimen, Cass county: in woods on northeast shore of Big Thunder lake, *Richards 323*, 2 Sept. 1939.

*MICRASTERIAS APICULATA* (Ehrenb.) Menegh. In ponds and boggy pools. Specimens seen: Hubbard county: in the pond northeast of Deming lake, Itasca state park, *Drouet 12060*, *Fortich & J. Munn*, 25 June 1954.

*NETRIUM DIGITUS* (Ehrenb.) Itzigs. & Rothe. In ponds and pools. Specimens seen: Hubbard county: in a Typha bog south of Park road at the east entrance, Itasca state park, *Fan 10184*, 22 June 1954; pond east of highway 71, 0.8 mile south of the east entrance, Itasca state park, *Fan 10482*, *10490*, 9 July 1954.

*PLEUROTAENIUM CORONATUM* (Bréb.) Rabenh. In ponds and boggy pools. One specimen, Hubbard county: in the pond northeast of Deming lake, Itasca state park, *Drouet 12063*, 25 June 1954.

*STAUSTRUM ANATINUM* Cooke & Wils. The var. *longibrachiatum* W. & G. S. West is found in the plankton of lakes. One specimen, Clearwater county: north arm of Lake Itasca, *Fortich 9*, 23 June 1954.

*CHARA ASPERA* var. *MACOUNII* Allen, det. Fay K. Daily. In shallow water of lakes. Specimens seen: Clearwater county: in Lake Itasca north of Bear Paw point, *Drouet 12192*, 7 July 1954; northwest shore of Mary lake, Itasca state park, *Drouet 12173*, 6 July 1954. Hubbard county: north shore of Mary lake, Itasca state park, *Fan 10256*, *Drouet 12048*, 25 June 1954. Polk county: east side of Oak lake, between Erskine and McIntosh, *Morley*, 11 July 1954.

*CHARA CONTRARIA* A. Br., det. Fay K. Daily. In ponds and streams. Specimens seen, Clearwater county: in the Mississippi river west of Lake Itasca post office, *Drouet*, *Morley & Fan 11911*, *Fan 10079*, 17 June 1954. Hubbard county: south shore of Lake George, *Morley*, 8 July 1954.

*CHARA GLOBULARIS* Thuill., det. Fay K. Daily. In lakes and ponds. Specimens seen: Clearwater county: north arm of Lake Itasca near the Biological Station, *Fan 10523*, 11 July 1954. Hubbard county: pond west of Highway 71 about 8 miles south of the east entrance to Itasca state park, *Drouet 12196*, *Fan 10498*, 9 July 1954.

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