

been published of islands in Hudson Bay and Strait; although most of the relevant information was gathered together and the data revised in my work already cited, much of significance has been added since.

On Southampton Island we have H. M. Raup's "Pteridophyta and Spermatophyta of Southampton Island" (*Memoirs of the Carnegie Museum*, vol. 12, part 3, pp. 17-30 1936), the present writer's "The flora of Southampton Island, Hudson Bay" (*Journal of Botany*, vol. 76, pp. 93-103, 1938) and "Additions to the floras of Southampton and Mansel Islands, Hudson Bay" (*Contributions from the Gray Herbarium of Harvard University*, No. 165, pp. 94-105, 1947), and W. J. Cody's "Additions and annotations to the flora of Southampton Island, Northwest Territories, Canada" (*Canadian Field-Naturalist*, vol. 65, pp. 140-3, 1951); on Mansel

Island, we have the present author's "Vascular plants from Mansel (Mansfield) Island, N.W.T." (*ibid.*, vol. 52, pp. 5-9, 1938) as well as his "Additions" cited above; on Salisbury Island, we have the present writer's "On some plants from Salisbury Island, collected by Major L. T. Burwash in 1924 and by the Hon. J. N. S. Buchan in 1938" (*ibid.*, vol. 54, pp. 9-10, 1940), and on Akpatok Island we have his earlier "The flora of Akpatok Island, Hudson Strait" (*Journal of Botany*, vol. 72, pp. 197-204, 1934).

Besides the gentlemen mentioned above to whom is owed this opportunity to offer a preliminary florula of Mill Island, it is a pleasure to thank the John Simon Guggenheim Memorial Foundation for a research fellowship and Harvard University for a renewed honorary appointment to help me continue my various studies in arctic botany and ecology.

PHYTOPLANKTON OF SOME MARITIME LAKES¹

ELWYN O. HUGHES²

IN an earlier paper (Hughes, 1950) the author has reviewed the literature on the fresh-water algae of the Maritime Provinces. Since most of the species reported in that paper were found in collections taken from the littoral regions of lakes, ponds, and streams, the strictly limnetic phytoplankton is not adequately described. Professor C. W. Lowe's list of algae from Lake Jesse, Nova Scotia, (M. W. Smith, 1938) appears to be the only previous record of freshwater phytoplankton from the Maritime Provinces.

From Dr. M. W. Smith of the Atlantic Biological station, the author has received 22 collections³ of phytoplankton taken over a period of several years from eight small lakes in Charlotte County, N.B. The algae were collected by towing a No. 20 bolting silk net to a depth of one metre. Names of the lakes and dates on which collections were made are:

Bonaparte Lake—July, 1948.

Crecy Lake—Aug. and Sept. 1942; June 1948.

Gibson Lake—Sept. and Oct. 1947; June, Aug. and Sept. 1948.

Kerr Lake (North Lake)—July 1948.

Limeburner Lake—June 1948.

Potter's Lake—May, June, July, Sept. and Oct. 1938.

St. Patrick Lake—July 1948.

Welch Lake—Aug. and Sept. 1942; July 1948.

The limnology of seven of these lakes (excluding Potter's) is described in detail by M. W. Smith (1952). In general it may be stated that they all lie in a Devonian granite region and that their waters are stained to varying degrees by bog drainage. The lakes are low in carbonates (mean value of bound CO₂, 3.3 ml. per l.) with a surface pH of 6.8-7.0. Calcium content is low (2.4-4.3 p.p.m.) and total phosphorus content averages about 0.015 p.p.m. Physical and chemical characteristics of the lakes are similar to the soft-water lakes of northern Michigan and Wisconsin (Prescott, 1951).

The primary concern of the author has been the specific identification of the algae present in the Charlotte County lakes. It was evident that dominance in the collections was restricted primarily to six genera (excluding diatoms). These genera were *Anabaena*, *Microcystis*, *Ceratium*, *Dinobryon*, *Botryococcus* and *Staurastrum*. The same six

¹ Manuscript received March 11, 1952.

² Division of Applied Biology, National Research Laboratories, Ottawa, Ontario.

³ Species identified from eight of these collections are also being reported by Smith (1952).

genera were also the most widespread, each of them occurring in at least five of the lakes examined. Over half of the species identified were desmids, the long-armed species of *Staurostrum* being especially numerous.

The sparsity of Chlorococcales (excepting *Botryococcus* which may not belong in this order) and the great variety of the desmid flora leads one to assign the phytoplankton to the Caledonian type (G. M. Smith, 1950). This interpretation is in keeping with the low pH and calcium content of the waters, and with the geology of the region.

Further examination of some of the author's collections from a small lake in Nova Scotia has revealed the presence of several previously unidentified dinophyceans. For the sake of the record, these species (identified by Dr. R. H. Thompson of the University of Kansas) are included in the appended catalogue.

All genera in the taxonomic list are described in G. M. Smith's "Fresh-water Algae of the United States", in which are also contained useful references for identification of species. Most of the species are illustrated by Smith (1920, 1924), Irénée-Marie (1939), or Prescott (1951). Additional references where necessary are cited in the catalogue of species.

The list includes 119 species and varieties of algae, 45 of which are new records for the Maritime Provinces, six new to Nova Scotia, and 74 new to New Brunswick. Distribution is indicated by the initial letter of the name of the lake or lakes in which each species has been found.

CATALOGUE OF SPECIES

* New to New Brunswick

** New to the Maritime Provinces

Myxophyceae

** *Anabaena flos-aquae* (Lyngb.) Bréb. (B,G,K,W)

** *Aphanocapsa elachista* W. & G. S. West (S,L)

** *A. elachista* var. *planctonica* G. M. Smith (L)

* *A. delicatissima* W. & G. S. West (G)

** *Aphanothece clathrata* W. & G. S. West (S)
A. stagnina (Sprengel) A. Braun (G)

* *Chroococcus limneticus* Lemm. (G)

Coelosphaerium naegelianum Ung. (L,P)

** *Gomphosphaeria aponina* Kütz. (L)

Microcystis aeruginosa Kütz. (B,G,L,K,S,W)

Reasons for the retention of the name

Microcystis rather than *Polycystis* are given by Prescott (1951).

** *M. incerta* Lemm. (G,W)

** *Rhabdoderma sigmoidea* Carter (W)

Dinophyceae

All dinophyceans reported as new records from the Maritime Provinces (**) were collected from a small artificial lake near Charleston, Queen's County, Nova Scotia. *Peridinium cinctum* (O. F. M.) Ehrenb. (?) listed by Smith (1952) from St. Patrick Lake should be excluded.

* *Ceratium carolinianum* (Bailey) Jorgensen (W)

Ceratium hirundinella (O. F. M.) Schrank (B,G,K,S,W)

C. hirundinella fa. *robustum* Amberg (W)

** *Cystodinium iners* Geitler

** *Glenodinium penardiforme* (Lind.) Schiller

** *G. palustre* (Lemm.) Schiller

** *Peridinium centenniale* (Playf.) Lefev.

P. limbatum (Stokes) Lemm. (P)

** *P. umbonatum* Stein

** *Raciborskia bicornis* Wolosz.

Chrysophyceae

* *Chrysosphaerella longispina* Laut. (W,P)

** *Dinobryon bavaricum* Imhof (B,C,G,K,S,W)

D. cylindricum Imhof (L,S)

* *D. divergens* Imhof (B,G,K,L,S)

D. sertularia Ehrenb. (P,S,W)

Mallomonas caudata Iwanoff (P,S)

Synura uvella Ehrenb. (P,S)

Bacillariophyceae 4

Asterionella formosa Hass. (B,G,L,K,P,S)

Cyclotella compta (Ehrenb.) Kütz. (S)

Diatoma elongatum (Lyngb.) Agardh (G)

Eunotia pectinalis (Kütz.) Rabenh. (L)

Eu. robusta Ralfs (S)

Fragillaria crotonensis Kitton (G)

Melosira granulata (Ehrenb.) Ralfs (G,P)

Tabellaria fenestrata (Lyngb.) Kütz. (L,S)

T. flocculosa (Roth) Kütz. (G)

Chlorophyceae

Volvocales

** *Eudorina elegans* Ehrenb. (S,W)

* *Pandorina morum* Bory (S,W)

Chlorococcales

Botryococcus braunii Kütz. (G,K,L,S,W)

* *Coelastrum cambricum* Archer (G)

Crucigenia irregularis Wille (P)

Dictyosphaerium pulchellum Wood (G,S)

* *Dimorphococcus lunatus* A. Br. (L)

4 Identified by Ivan L. Ophel.

Kirchneriella lunaris (Kirch.) Moeb. (G,S)

** *Oocystis borgei* Snow (G)

** *O. lacustre* Chodat (G)

Pediastrum araneosum Racib. (G,S)

P. araneosum var. *rugulosum* (G. S. West)

G. M. Smith (G,K)

P. boryanum (Turp.) Menegh. (G,P)

** *P. duplex* var. *clathratum* (A. Br.) Lagerh. (L)

Scenedesmus armatus (Chod.) G. M. Smith (G)

Scenedesmus quadricauda (Turp.) Bréb. (S)

Selenastrum bibraianum Reinsch (G)

S. bibraianum var. *gracile* (Reinsch) Ahl. & Tiff. (G)

Sorastrum americanum (Bohl.) Schmidle (G)

** *Westella botryoides* (W. West) de Wildm. (G,L)

Tetrasporales

** *Gloeocystis gigas* (Kütz.) Lagerh. (C,G,S)

** *Tetraspora lacustris* Lemm. (?) (L)

This material is distributed throughout the collection but because of partial disintegration the identification is uncertain.

Desmidiaceae

All the following species of *Arthrodesmus* and one of the *Staurostrum* species (*St. cuspidatum* Bréb.) have been transferred by Teiling (1948) to the genus *Staurodesmus*. There is sound argument for the recognition of this genus, created to contain the monosporous species of *Arthrodesmus* and *Staurostrum*. The name has not been adopted in this paper chiefly because extensive nomenclatural changes would be involved if the author did not choose to follow the infra-specific concepts introduced by Teiling.

* *Arthrodesmus incus* (Bréb.) Hass. (B)

A. incus fa. *minor* W. & G. S. West (S)

* *A. incus* var. *extensus* Andersson (C)

** *A. ralfsii* var. *brebissonii* (Racib.) G. M. Smith fa. *limnophilus* (Teil.) comb. nov. (C)

syn. *Staurodesmus glabrus* (Ehrenb.) Teil. subsp. *brebissonii* (Racib.) Teil. fa.

limnophilus Teiling 1948

** *A. subulatus* Kütz. (W)

** *A. triangularis* Lagerh. var. *inflatus* W. & G. S. West fa. *robustus* W. & G. S. West (K)

A. triangularis var. *rotundatus* (Racib.) G. M. Smith (P)

* *A. triangularis* var. *subtriangularis* (Borge) W. & G. S. West (W)

Differs from previously published des-

criptions by a slight convergence of the spines.

Closterium archerianum Cleve (P)

Cl. costatum Corda (P)

Cl. costatum var. *westii* Cush. (P)

Cl. kuetszingii Bréb. (P)

Cl. moniliferum (Bory) Ehrenb. (P)

Cosmarium contractum Kirch. (P)

** *C. moniliforme* (Turp.) Ralfs (W)

** *C. moniliforme* fa. *punctata* Lagerh. (C,W)

C. monomazon var. *polymazum* Nordst. (P)

C. panamense Prescott var. *smithii* Hughes (P)

* *Desmidium grevillii* (Kütz.) de Bary (C)

Euastrum didelta (Turp.) Ralfs (P)

Eu. elegans (Bréb.) Kütz. (P)

Eu. humerosum Ralfs var. *parallelum* Krieg. (P)

Eu. verrucosum Ehrenb. (P)

Hyalotheca dissiliens (J. E. Smith) Bréb. (K,W)

* *H. mucosa* (Dillw.) Ehrenb. (W)

* *H. neglecta* Racib. (W)

** *Micrasterias fimbriata* Ralfs (G)

M. mahabuleshwariensis Hobs. var. *ringens* (Bail.) Krieg. (P,W)

* *M. muricata* (Bail.) Ralfs (C)

M. radiata Hass. (C,S)

* *Onychonema filiforme* (Ehrenb.) Roy & Biss. (W)

Pleurotaenium ehrenbergii (Bréb.) de Bary (P)

* *Sphaeroszoma excavatum* Ralfs (C,G,K)

** *Sph. exiguum* Turner (S)

Spondylosium planum (Wolle) W. & G. S. West (P,W)

Staurostrum anatinum Cooke & Wills (G,P)

** *St. anatinum* var. *curtum* G. M. Smith (G)

** *St. anatinum* var. *denticulatum* G. M. Smith (K)

* *St. ankyroides* Wolle (C,K,S,W)

* *St. ankyroides* var. *pentacladum* G. M. Smith (W)

St. arctiscon (Ehrenb.) Lund. (C,P)

** *St. avicula* Bréb. (G)

* *St. brachiatum* Ralfs (S,W)

** *St. brasiliense* Nordst. var. *lundellii* W. & G. S. West (W)

** *St. breviaculeatum* Bréb. (G)

* *St. brevispinum* Bréb. fa. *majus* W. West (K)

* *St. cerastes* Lundell (W)

* *St. cuspidatum* Bréb. (C,G,S)

** *St. furcatum* (Ehrenb.) Bréb. (W)

** *St. grillatorium* Nordst. var. *forcipigerum* Lag. (W)

St. johnsonii W. & G. S. West (P,W)

- ** *St. johnsonii* var. *depauperatum* G. M. Smith. (C)

Processes more divergent than in Smith's (1924) or Irénée-Marie's (1939) drawings.

- ** *St. johnsonii* fa. *parvum* G. M. Smith (G)

- ** *St. lacustre* G. M. Smith (G,K)

- * *St. leptacanthum* Nordst. (W)

- * *St. leptocladum* Nordst. (K,S,W)

- * *St. leptocladum* var. *denticulatum* G. M. Smith (G,K)

- ** *St. leptocladum* var. *insigne* W. & G. S. West (C,G)

- ** *St. leptocladum* var. *sinuatum* Wolle (B)
A specimen of this variety was found with one semi-cell identical to G. M. Smith's forma *planum*.

- ** *St. longipes* (Nordst.) Teiling (1946) (S)
(syn. *St. paradoxum* Meyen var. *longipes* Nordst.)

- * *St. megacanthum* Lund. (B,G)

- * *St. paradoxum* Meyen (C,G,S)

- * *St. pentacerum* (Wolle) G. M. Smith (B, G)

St. pseudopelagicum W. & G. S. West (P)

St. rotula Nordst. (P,S,W)

- ** *St. subnudibrachiatum* W. & G. S. West var. *incisum* G. M. Smith (G,W)

- ** *St. tohopekaligense* Wolle var. *brevispinum* G. M. Smith (G)

- ** *St. wolleanum* Butler var. *kissimmense* Wolle (P)

This species was listed and described as *Staurostrum* sp. by Hughes (1950).

Xanthidium antilopaeum (Bréb.) Kütz. (S)

- * *X. antilopaeum* var. *polymazum* Nordst. (C,G,W)

Netrium digitus (Ehrenb.) Itz. & Rothe (P)

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NOTES ON FISHES COLLECTED FROM LAKE WINNIPEG REGION¹

J. J. KELEHER

Central Fisheries Research Station, Winnipeg, Manitoba

THE MOST RECENT CHECKLIST of Manitoban fishes is Hinks (1943). It is based partly on literature records, some of which are disputed (Hubbs, 1945). The distribution of many species is generalized which tends to conceal our ignorance of their precise occurrence. The cautious presentation

of Manitoban distributional records in Dymond (1947) reveals the paucity of collected material. For these reasons, collecting fishes from this region is worthwhile.

Field studies for a research project of the Central Fisheries Research Station, Winnipeg, provided the opportunity for collecting specimens. The majority of the fish were

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