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Additions and Confirmations to the Algal Flora of Itasca State Park. I. Desmids and Diatoms from North Deming Pond

HUAN NGO*, GERALD W. PRESCOTT**, and DAVID B. CZARNECKI***

ABSTRACT — The summer desmid and diatom flora of North Deming Pond in Lake Itasca State Park is presented. One hundred sixty desmid taxa representing 23 genera are recorded. Of these, 15 taxa appear to be park records and 82 are apparently Minnesota records. The desmid genera, *Closterium*, *Cosmarium*, *Euastrum*, *Micrasterias*, *Pleurotaenium*, and *Staurastrum* display the most taxa. The 136 diatom taxa recorded represent 27 genera. More than half of the taxa are assignable to the genera *Eunotia*, *Navicula*, *Neidium*, and *Pinnularia*. Given the brief and cursory nature of this study, the taxonomic representation of these algae indicates high species richness and diversity in the Itasca Park area and suggests the need for further taxonomic inventory.

Introduction

The nature of the algal flora of Itasca State Park has been alluded to (1, 2, 3, 4) and the occurrence of certain taxa has been well documented (5, 6, 7).

The most diverse group of algae recorded has been the desmids. Of the 428 taxa of Chlorophytes reported by Meyer and Brook (1), nearly half, 213, are assignable to the Saccoderm and Placoderm desmids. Unfortunately, this floristic list was unaccompanied by references to either voucher collections or specimens, or to the literature used in ultimate taxonomic assignments.

Diatom distribution elsewhere in northern Minnesota has received some scrutiny (e.g., 8), but taxonomic reports on the present flora of the park are conspicuously absent from the literature. Since diatoms have recently gained attention as potential indicators of acid rain-induced pH trends (9), they may have practical application in water quality assessment of the park and adjacent areas.

This paper presents the results of a short term taxonomic investigation of one small aquatic component of Itasca State Park. It is hoped that it will stimulate further algal floristic studies.

Materials and Methods

North Deming Pond is a shallow (less than 2m) brown water, presumably spring-fed pond (limnocrone) with a surface area of approximately 1.5 ha. It is located east by northeast of and across Park Drive from Deming Lake (SW ¼, Sec. 30, T 143 N, R 35 W, Hubbard Co.) within the boundaries of Itasca State Park in Minnesota. The pond exhibits extensive aquatic macrophyte growth dominated by submergent *Utricularia* (bladderwort) and *Potamogeton* (pondweed) and several

large floating mats dominated by *Carex* (sedge) and *Sphagnum* (peat moss). The pH of the open water approximates neutrality (6.8-7.2) in midday sun and the specific conductance of this water generally ranges from 60 to 100 microsiemens (μS or μmhos). Thus, the open water areas may be considered minerotrophic to weakly minerotrophic while the waters in the floating mats may, based on macrophyte inhabitants, be considered ombrotrophic (water supplied by precipitation) or perhaps occasionally solitrophic (water supplied by percolation) (10, 11).

During the period from mid-June to early August 1985, 60 collections from various locations and communities within the pond were processed for the desmid-diatom algal inventory. The locations sampled, types of collections, and collection dates are listed in Table 1. Plankton collections were obtained and concentrated using a standard (no. 20 mesh) plankton net; each net plankton sample consisted of about 50 L of pondwater concentrated to a final volume of about 175 ml. Sediment (epipelon) to a depth of about 1 cm, tycho-plankton and epidendric collections were obtained with a suction cylinder affixed to a rubber bulb; samples consisted of about 100 ml extended with pondwater to a final volume of about 175 ml. Collections from vegetation were obtained by hand squeezing the dominant macrophytes until a sample volume of about 100 ml accumulated. This volume was extended with adjacent pondwater to a final volume of about 175 ml. The majority of samples from vegetation collections contained a fair amount of macrophyte fragments. In the one instance where an algal mat was collected (collection 38), a portion of the mat, about 20 ml, was suspended in about 150 ml. All collections were temporarily stored in 6-oz whirl-pak polyethylene bags.

After thorough mixing, collection volumes were divided into two equal volumes; one volume was retained for observation of live material, the other further divided into two equal volumes for fixation-preservation and cleaning, respectively. The fixative-preservative solution was based on Meyer's M3 iodine solution (12) modified to include 0.1 g KI/ml glacial

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acetic acid. This was added to the sample volume in a 2:80 (v/v) concentration. The peroxide-dichromate oxidation cleaning technique (13) was used to remove organic matter from the diatom frustules. Subsequent aliquots were mounted in Hyrax (14) for microscopic observation.

Table 1. North Deming Pond Collection Data,
June 17-August 3, 1985

Collection	Date	Description
01	6-17-85	Plankton tow, west shore
02	6-17-85	Plankton tow, off west shore mat
05	6-21-85	Plankton tow, west shore
06	6-21-85	Plankton tow, off west shore mat
10	6-23-85	Plankton tow, west shore
11	6-24-85	Plankton tow, off west shore mat
12	6-24-85	Plankton tow, northwest shore
13	6-24-85	Sediment surface, west shore
14	6-24-85	Bottom vegetation, west shore
21	6-30-85	Plankton tow, west shore
22	6-30-85	Bottom vegetation, west shore
23	6-30-85	Plankton tow, northwest shore
24	7-2-85	Plankton tow, west shore
25	7-2-85	Sediment & vegetation, west shore
26	7-2-85	Sedgemat vegetation, west mat
27	7-2-85	Sedgemat tychoplankton, west mat
28	7-7-85	Plankton tow, west shore
29	7-7-85	Sediment & vegetation, west shore
30	7-7-85	Plankton tow, off west mat
31	7-7-85	Sedgemat vegetation, west mat
34	7-10-85	Plankton tow, west shore
35	7-10-85	Bottom vegetation, west shore
36	7-10-85	Sedgemat vegetation, west mat
37	7-10-85	Sedgemat vegetation, west mat
38	7-10-85	Floating bluegreen mat, west shore
39	7-10-85	Sedgemat composite, west mat
40	7-15-85	Bottom vegetation, east shore
41	7-15-85	Bottom vegetation, east shore
42	7-15-85	Submerged log, east shore
43	7-15-85	Sedgemat vegetation, northeast mat
44	7-15-85	Sedgemat vegetation, southeast mat
45	7-15-85	Moss on floating log, southeast
46	7-15-85	Sedgemat vegetation, southeast mat
47	7-15-85	Plankton tow off, southeast mat
48	7-15-85	Bottom vegetation, east shore
49	7-15-85	Bottom vegetation, east shore
50	7-15-85	Sedgemat vegetation, southeast mat
51	7-15-85	Tychoplankton, south mat
52	7-15-85	Sedgemat vegetation, southeast mat
53	7-15-85	Tychoplankton, southeast
54	7-24-85	Sedgemat vegetation, southeast mat
55	7-24-85	Bottom vegetation, east shore
56	7-24-85	Sedgemat vegetation, northeast mat
57	7-24-85	Sedgemat vegetation, middle mat
58	7-24-85	Sedgemat vegetation, west mat
59	7-27-85	Sedgemat vegetation, southeast mat
60	7-27-85	Bottom vegetation, east shore
61	7-27-85	Sedgemat vegetation, northeast mat
62	7-27-85	Sedgemat vegetation, middle mat
63	7-27-85	Sedgemat vegetation, west mat
64	7-31-85	Sedgemat vegetation, southeast mat
65	7-31-85	Bottom vegetation, east shore
66	7-31-85	Sedgemat vegetation, northeast mat
67	7-31-85	Sedgemat vegetation, middle mat
68	7-31-85	Sedgemat vegetation, west mat
69	8-3-85	Sedgemat vegetation, southeast mat
70	8-3-85	Bottom vegetation, east shore
71	8-3-85	Sedgemat vegetation, northeast mat
72	8-3-85	Sedgemat vegetation, middle mat
73	8-3-85	Sedgemat vegetation, west mat

Living desmids were observed microscopically using brightfield and phase contrast techniques. Measurements and most critical determinations were made using a 100X oil immersion objective (NA = 1.3). In most cases, sample aliquots for identification were mixed with glycerol at an initial concentration of 5% (v/v) to facilitate turning of specimens and prevent dehydration of slide mounts. No attempt was made to quantify taxonomic representation, and once a novel specimen was recorded from a particular sample, no attempt was made to record its appearance in additional collection material. Samples were kept under refrigeration during storage. Cleaned diatom frustules were observed microscopically using brightfield, phase contrast and differential interference contrast techniques. Measurements and critical determinations were made using either a 100X (NA = 1.3) or 63X (NA = 1.4) oil immersion objective. Only novel diatom taxa were recorded from each slide, although relative frequency was estimated for each voucher slide.

Fixed-preserved sample aliquots for use as desmid voucher collections were placed in labeled 6-dram vials and have been deposited in the Department of Botany Herbarium, University of Minnesota, St. Paul. Collection numbers on these vials, corresponding to those listed in Table 1, are preceded by the letter "D" to designate North Deming Pond. Voucher aliquots are also available from the collection of one of the authors (D. Czarnecki). Slides used for diatom identification have been deposited in the general collection of the Diatom Herbarium at the Academy of Natural Sciences, Philadelphia. Corresponding collection numbers on these slides are preceded by the letters "LI" to designate Lake Itasca State Park. Aliquots of cleaned material are also available from the collection of one of the authors (D. Czarnecki).

Results and Discussion

Of the 160 taxa of desmids recorded in Appendix 1, 50 were previously reported as occurring in the Park (1) and 13 are considered widely distributed taxa but have not been specifically recorded from Minnesota. Eighty-two appear to be new Minnesota records and 15, although known to occur in the state, have not been previously recorded from the Park.

As is usually the case in desmid floristics, taxa assignable to the genera *Closterium*, *Cosmarium*, *Euastrum*, *Micrasterias*, *Pleurotaenium*, and *Staurastrum* are well represented and comprise 60% of the taxa identified. Five genera *Cylindrocystis*, *Gonatozygon*, *Docidium*, *Groenbladia*, and *Triploceras* were not previously reported from the Park. Although Meyer and Brook (1) included the genus *Stauroidesmus* Teiling in their report, we prefer to follow the nomenclature of Prescott *et al.* (15) in rejecting what appears to be a superfluous generic name for the monospecific taxa of *Arthrodesmus* and *Staurastrum*.

The richness of desmid taxa represented appears remarkable when one considers the short duration of the study, the small geographical area from which collections were made, and the nonexhaustive analysis of the collections.

A total of 136 diatom taxa representing 27 genera were identified from North Deming Pond (Appendix 2). More than half of the taxa were assignable to the genera *Eunotia*, *Navicula*, *Neidium*, and *Pinnularia*. These taxa are generally associated with aquatic habitats similar to those available in North Deming Pond. This taxonomic representation compares well with other floristic studies of both acidic to neutral pH streams (e.g., 8, 16, 17) and the Red Lake peatland (9). Although no attempt was made to quantify the density of individual taxa when they were first encountered, those which comprised

5-10% of any one collection were considered common and those comprising 10% or greater were considered abundant. Considering the ubiquity of diatom taxa and the lack of previously verifiable distribution data, designation of any one taxon's presence as a new state or park distribution record seems inappropriate.

Ecological inferences that require quantitative evidence should not be drawn from the data presented; this study was designed to provide qualitative taxonomic information. However, the obvious implication of this study is that the nature of the algal flora within the confines of Itasca State Park warrants further investigation.

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Author's note: In a recently published article entitled "The Conjugatophyceae from Itasca State Park, Minnesota, USA" (1986: Nova Hedwigia, Beih. 56:23-42), R.L. Meyer has recorded additional desmid taxa. Of these, only eight are included in the present paper as new distributional records.

Appendix 1. Desmids from North Deming Pond

a			
Status	Taxon	Voucher	Identification reference
SACCODERM DESMIDS			
CYLINDROCYSTIS Meneghini			
*	<u>brebissonii</u> Meneghini	(D-30)	(18): pp. 20-21, Pl. II, figs. 1-5
GONATOZYGON de Bary			
**	<u>aculeatum</u> Hastings	(D-22)	(18): pp. 33-34, Pl. VIII, figs 13-15
*	<u>brebissonii</u> de Bary	(D-13)	(18): p. 34, Pl. VIII, figs. 1-3, 11
*	<u>pisolum</u> Wolle	(D-11)	(18): pp. 36-37, Pl. VII, figs. 14-17
NETRIUM (Nägeli) Itzigson & Rothe emend. Lutkemuller			
++	<u>digitus</u> var. <u>digitus</u> (Ehr.) Itzigson & Rothe in Rabh.	(D-22)	(18): p. 24, Pl. IV, figs. 14-16, 21
*	<u>digitus</u> var. <u>naegelii</u> (Breb.) Krieger	(D-11)	(18): p. 26, Pl. V, figs. 3-4
**	<u>digitus</u> var. <u>parvum</u> Borge	(D-11)	(18): p. 26, Pl. IV fig. 24
**	<u>digitus</u> var. <u>rectum</u> (Turner) Krieger	(D-14)	(18): pp. 26-27, Pl. IV, fig. 22
**	<u>digitus</u> var. <u>rhomboideum</u> Grönblad	(D-04)	(18): p. 27, Pl. IV, figs. 19-20
**	<u>digitus</u> var. <u>scottii</u> Prescott, Croasdale & Vinyard	(D-13)	(18): p. 27, Pl. V, fig. 7
**	<u>interruptum</u> var. <u>sectum</u> West & West	(D-73)	(18): p. 28, Pl. V, fig. 20
**	<u>minus</u> Prescott in Prescott et al.	(D-52)	(18): pp. 28-29, Pl. V, fig. 9
**	<u>oblongum</u> var. <u>brevis</u> West	(D-35)	(18): p. 29, Pl. V, fig. 12
SPIROTAENIA de Brébisson in Ralfs			
++	<u>condensata</u> Bréb. in Ralfs	(D-13)	(18): pp. 15-16, Pl. III, figs. 18-21
PLACODERM DESMIDS			
ACTINOTAENIUM (Nägeli) Teiling			
**	<u>capax</u> var. <u>minus</u> (Schmidle) Teiling ex Růžička & Pouzar	(D-14)	(19): p. 6, Pl. CLVI, fig. 9
*	<u>colpopelta</u> (Bréb. ex Archer) Compere	(D-22)	(19): p. 6, Pl. CLIV, figs. 27-30
ARTHRODESMUS Ehrenberg			
++	<u>bulnheimii</u> Racib.	(D-02)	(15): pp. 8-9, Pl. 300, fig. 5; Pl. 301, figs. 3, 6, 8, 11
++	<u>convergens</u> Ehr. ex Ralfs	(D-01)	(15): pp. 10-11, Pl. 304, figs. 2-4, 6
**	<u>maximus</u> Borge	(D-01)	(15): p. 23, Pl. 305, figs. 1-5, 7
**	<u>subulatus</u> var. <u>subaequalis</u> West & West	(D-40)	(15): p. 32, Pl. 308, figs. 2-10
++	<u>subulatus</u> var. <u>subulatus</u> Kütz.	(D-22)	(15): pp. 31-32, Pl. 307, figs. 2-3; Pl. 308, figs. 3-4, 6, 9, 11-14
**	<u>triangularis</u> var. <u>inflatus</u> Hirano	(D-13)	(15): pp. 34-35, Pl. 298, fig. 8
**	<u>validus</u> (West & West) Scott & Grönblad	(D-73)	(15): p. 37, Pl. 301, figs 10, 12-13
CLOSTERIUM Nitzsch			
**	<u>acerosum</u> var. <u>minus</u> Hantzsch	(D-14)	(20): p. 28, Pl. XIII, figs. 4, 8

Desmids from North Deming Pond
Appendix 1 continued

* <u>acutum</u> var. <u>variabile</u> (Lemm.) Krieger	(D-09)	(20): p. 31, Pl. XVI, figs. 8-10
** <u>archerianum</u> f. <u>compressum</u> Klebs	(D-31)	(20): p. 34, Pl. XXXIV, figs. 1-2
** <u>arcuarium</u> Hughes	(D-22)	(20): pp. 34-35, Pl. XIX, fig. 4
+ <u>gracile</u> Bréb. in Chevalier	(D-22)	(20): p. 52, Pl. XVI, figs. 2, 15-16
** <u>littorale</u> Gay	(D-30)	(20): pp. 64-65, Pl. XIX, figs. 5, 10, 16
** <u>juncidum</u> Ralfs	(D-31)	(20): pp. 56-57, Pl. XXXII, figs. 13, 16-17
++ <u>Kuetzingii</u> Bréb.	(D-28)	(20): pp. 57-58, Pl. XXXI, figs. 6-7, 15
** <u>lunula</u> var. <u>intermedium</u> Gutwinski	(D-14)	(20): p. 67, Pl. XIV, figs. 6-8
+ <u>parvulum</u> Nägeli	(D-02)	(20): p. 73, Pl. XXIV, figs. 18-20
** <u>striqosum</u> var. <u>elegans</u> (G. S. West) Krieger	(D-09)	(20): p. 87, Pl. XV, figs. 1-2, 9-9a
** <u>striolatum</u> var. <u>subpunctatum</u> Hirano	(D-31)	(20): p. 89, Pl. XXVII, fig. 7; Pl. XXVIII, figs. 5-6
** <u>venus</u> f. <u>minor</u> Roll	(D-13)	(20): p. 96, Pl. XXIV, fig. 16
<u>COSMARIUM</u> Corda ex Ralfs		
** <u>abbreviatum</u> var. <u>minus</u> (West & West) Krieger & Gerloff	(D-52)	(19): p. 60, Pl. CCXI, fig. 7
** <u>amoenum</u> var. <u>mediolaeve</u> Nordst.	(D-01)	(19): p. 65, Pl. CCLXXXVII, figs. 3, 11
++ <u>angulosum</u> Bréb.	(D-22)	(19): p. 70, Pl. CCXII, figs. 1-4
** <u>bisphaericum</u> Printz	(D-53)	(19): p. 85, Pl. CCXLIII, fig. 10
+ <u>canadianum</u> Delponte	(D-01)	(19): p. 96, Pl. CLVIII, figs. 3-4
* <u>conspersum</u> var. <u>retusum</u> Wolle	(D-35)	(19): p. 105, Pl. CCLXXIX, fig. 9
** <u>dorsitruncatum</u> (Nordst.) G. S. West	(D-22)	(19): p. 130, Pl. CLXXXI, fig. 10
** <u>hammeri</u> var. <u>protuberans</u> West & West	(D-30)	(19): p. 151, Pl. CLXXXII, figs. 9-11
++ <u>impressulum</u> var. <u>impressulum</u> Elfving	(D-14)	(19): p. 159, Pl. CCXV, fig. 5
** <u>impressulum</u> var. <u>suborthogonum</u> (West & West) Taft	(D-35)	(19): p. 160, Pl. CCXV, figs. 2, 4
** <u>lobatum</u> var. <u>elliptica</u> f. <u>minus</u> (Smith) Croasdale in Prescott et al.	(D-22)	(19): p. 176, Pl. CLXXVIII, fig. 5
++ <u>margaritatum</u> (Lund.) Roy & Bissett	(D-22)	(19): pp. 181-182, Pl. CCXXXI, fig. 10
** <u>montrealense</u> Croasdale in Prescott et al.	(D-30)	(19): p. 195, Pl. CLXXI, figs. 13-14
** <u>norimbergense</u> Reinsch	(D-30)	(19): pp. 198-199, Pl. CCVII, figs. 10, figs. 12-13
** <u>ocellatum</u> Eichler & Gutwinski	(D-52)	(19): pp. 205-206, Pl. CLXIII, figs. 6-7
++ <u>portianum</u> Archer	(D-22)	(19): p. 229, Pl. CCLIV, figs. 8-9
** <u>psudamoenum</u> Wille	(D-04)	(19): pp. 234-235, Pl. CCLXXXVIII, figs. 2-4
++ <u>punctulatum</u> Bréb.	(D-14)	(19): p. 253, Pl. CCXXXV, figs. 5-6
** <u>rectosporum</u> Turner	(D-40)	(19): p. 271, Pl. CLXXXIX, figs. 8-10
* <u>regnellii</u> var. <u>minimum</u> Eichler & Gutwinski	(D-14)	(19): p. 274, Pl. CCXIX, figs. 6-7, 10-11
** <u>subimpressulum</u> Borge	(D-31)	(19): pp. 305-306, Pl. CXCIX, figs. 14-16
** <u>taxichondrum</u> var. <u>ellipticum</u> Forster	(D-31)	(19): p. 322, Pl. CCXLI, fig. 2
** <u>taxichondrum</u> var. <u>mauritanum</u> Irénée-Marie	(D-50)	(19): p. 322, Pl. CCXLII, fig. 7
** <u>tenue</u> Archer	(D-73)	(19): p. 324, Pl. CLXXIII, figs. 18-22
* <u>transitorium</u> (Heimerl) Duce'llier	(D-22)	(19): p. 331, Pl. CLXIII, figs. 1-3
** <u>trilobatum</u> f. <u>retusum</u> Gutwinski	(D-14)	(19): p. 332, Pl. CLXXXIII, figs. 15-17
+ <u>tumidum</u> Lundell	(D-01)	(19): p. 336, Pl. CLXXII, figs. 1-2
** <u>undulatum</u> var. <u>minutum</u> Wittrock	(D-22)	(19): p. 341, Pl. CLXVII, figs. 7-9
<u>COSMOCLADIUM</u> de Brebisson emend. Heimans		
** <u>pusillum</u> Hilse	(D-04)	(19): pp. 355-356, Pl. CCLXXXIX, figs. 7-9; Pl. CCXCI, figs. 3-4
** <u>tuberculatum</u> Prescott in Prescott & Magnotta	(D-30)	(19): pp. 356-357, Pl. CCXCI, fig. 5; Pl. CCXCII, figs. 1, 5

Desmids from North Deming Pond
Appendix 1 continued

<u>DESMIDIUM</u> C. A. Agardh		
++	<u>aptoгонium</u> Bréb. <i>in</i> Bréb. & Godet	(D-09) (21): p. 39, Pl. 463, figs. 7-8
++	<u>baileyi</u> (Ralfs) Nordst.	(D-01) (21): p. 41, Pl. 464, figs. 8-9
++	<u>grevillii</u> (Kütz.) de Bary	(D-35) (21): p. 45, Pl. 465, figs. 11-14
**	<u>longatum</u> Wolle	(D-01) (21): p. 46, Pl. 466, figs. 8-10
**	<u>swartzii</u> f. <u>punctata</u> Irénée-Marie	(D-35) (21): p. 49, Pl. 468, fig. 4
++	<u>swartzii</u> f. <u>swartzii</u> (Ag.) Ag. <i>ex</i> Ralfs	(D-04) (21): pp. 48-49, Pl. 467, fig. 9; Pl. 468, figs. 1-2
<u>DOCIDIUM</u> de Brébisson <i>emend.</i> Lundell		
**	<u>baculum</u> f. <u>attenuatum</u> Scott & Croasdale <i>in</i> Prescott <i>et al.</i>	(D-50) (20): p. 102, Pl. XXXVII, fig. 5
*	<u>baculum</u> f. <u>baculum</u> Bréb. <i>emend.</i> Lundell	(D-30) (20): p. 102, Pl. XXXVII, figs. 1-4
<u>EUASTRUM</u> Ehrenberg <i>ex</i> Ralfs		
**	<u>abruptum</u> Nordst.	(D-35) (22): pp. 9-10, Pl. LXXVIII, figs. 3-5b
**	<u>ansatum</u> var. <u>pyxidatum</u> Delponte	(D-22) (22): p. 18, Pl. LVIII, figs. 11-11b
**	<u>ansatum</u> var. <u>rhomboidale</u> Duce'llier	(D-14) (22): pp. 18-19, Pl. LIX, figs. 17-17a
**	<u>attenuatum</u> var. <u>splendens</u> f. <u>foensteri</u> Prescott <i>in</i> Prescott <i>et al.</i>	(D-40) (22): pp. 21-22, Pl. LXIX, figs. 4-4a
++	<u>bidentatum</u> Nägeli	(D-22) (22): p. 22, Pl. LXXVII, figs. 5-6
**	<u>ciastonii</u> Raciborski	(D-52) (22): p. 31, Pl. LXXVIII, figs. 6-6a
**	<u>cornubiense</u> var. <u>medianum</u> f. <u>subgranulatum</u> Prescott <i>in</i> Prescott <i>et al.</i>	(D-01) (22): p. 33, Pl. LXXIV, figs. 16-16a
**	<u>denticulatum</u> var. <u>denticulatum</u> (Kirchn.) Gay	(D-73) (22): pp. 39-40, Pl. LXXV, figs. 1, 2f; Pl. LXXVIII, fig. 7
**	<u>denticulatum</u> var. <u>quadrifarium</u> Kreiger	(D-73) (22): p. 42, Pl. LXXV, fig. 9
++	<u>didelta</u> (Turp.) Ralfs	(D-41) (22): p. 43, Pl. LXIV, figs. 1-1a
++	<u>elegans</u> var. <u>elegans</u> (Bréb.) Ralfs	(D-38) (22): p. 50, Pl. LXXVI, figs. 3-3b
**	<u>elegans</u> var. <u>ornatum</u> West	(D-30) (22): p. 52, Pl. LXXVI, fig. 10
++	<u>evolutum</u> var. <u>integrius</u> West & West	(D-35) (22): p. 56, Pl. LXXIX, figs. 8-8b; Pl. LXXXV, fig. 8
+	<u>gemmatum</u> (Bréb.) Ralfs	(D-14) (22): pp. 61-62, Pl. LXXXII, figs. 1-2
+	<u>oblongum</u> (Grev.) Ralfs	(D-22) (22): pp. 84-85, Pl. LXV, fig. 4
<u>GROENBLADIA</u> Teilung		
**	<u>undulata</u> var. <u>Kriegeri</u> Forster	(D-10) (21): p. 35, Pl. 462, fig. 19
<u>HYALOTHECA</u> Ehrenberg		
++	<u>dissiliens</u> (Smith) Bréb. <i>ex</i> Ralfs	(D-01) (21): p. 28, Pl. 460, figs. 6-12
++	<u>mucosa</u> (Mertens) Ehr. <i>ex</i> Ralfs	(D-01) (21): p. 30, Pl. 461, figs. 6-8
<u>MICRASTERIAS</u> C. A. Agardh <i>ex</i> Ralfs		
+	<u>apiculata</u> var. <u>fimbriata</u> f. <u>spinosa</u> (Bissett) West & West	(D-50) (22): p. 143, Pl. CXXI, figs. 4-5
**	<u>crux-melitensis</u> (Ehr.) Ralfs	(D-53) (22): pp. 148-149, Pl. CXIII, figs. 1-3
++	<u>foliacea</u> Bailey <i>ex</i> Ralfs	(D-50) (22): p. 158, Pl. CXXXIX, figs. 3-8
++	<u>laticeps</u> Nordst.	(D-34) (22): pp. 162-163, Pl. LXXXVIII, figs. 1-4
**	<u>nordstedtiana</u> Wolle	(D-45) (22): p. 169, Pl. CXLVII, figs. 1, 4-6
**	<u>novae-terrae</u> var. <u>speciosa</u> (Wolle) Krieger & Bourrelly	(D-14) (22): p. 170, Pl. CXXV, fig. 7; Pl. CXXXVI, figs. 1-2, 4
++	<u>papillifera</u> Bréb. <i>ex</i> Ralfs	(D-73) (22): p. 171, Pl. CXXXVI, figs. 3, 5-6
++	<u>pinnatifida</u> (Kütz.) Ralfs	(D-14) (22): p. 173, Pl. LXXXIX, figs. 6-8; Pl. XC, figs. 1-8

Desmids from North Deming Pond
Appendix 1 continued

++	<u>radiata</u> Hass.	(D-50)	(22): p. 177, Pl. CXVI, figs. 3-8
+	<u>thomasi</u> var. <u>notata</u> (Nordst.) Grönblad	(D-35)	(22): p. 191, Pl. CXXXVII, figs. 4-6
*	<u>truncata</u> f. <u>neodamensis</u> (A. Br.) Dick	(D-35)	(22): pp. 195-196, Pl. XCVI, figs. 1-7
<u>ONYCHONEMA</u> Wallich			
+	<u>filiforme</u> (Ehr.) Roy & Bissett	(D-01)	(21): p. 13, Pl. 452, figs. 1-5
++	<u>laeve</u> var. <u>latum</u> West & West	(D-28)	(21): p. 14, Pl. 453, figs. 1-6
++	<u>laeve</u> var. <u>micracanthum</u> Nordst.	(D-22)	(21): p. 14, Pl. 453, figs. 7-9
<u>PENIUM</u> de Brébisson			
**	<u>exiquum</u> West	(D-14)	(20): p. 9, Pl. X, figs. 8-12
**	<u>marqaritaceum</u> var. <u>elongatum</u> Klebs	(D-35)	(20): p. 10, Pl. IX, fig. 15
<u>PLEUROTAEINIUM</u> Nägeli			
+	<u>coronatum</u> (Bréb.) Rabh.	(D-34)	(20): pp. 111-112, Pl. XLVI, figs. 9-11
++	<u>ehrenbergii</u> var. <u>ehrenbergii</u> f. <u>ehrenbergii</u> (Bréb.) de Bary	(D-14)	(20): pp. 114-115, Pl. XLV, figs. 1-5
**	<u>ehrenbergii</u> var. <u>ehrenbergii</u> f. <u>rectum</u> Irénee-Marie	(D-53)	(20): p. 115, Pl. XLV, figs. 6-7
**	<u>ehrenbergii</u> var. <u>elongatum</u> f. <u>minus</u> Irénee-Marie	(D-14)	(20): p. 117, Pl. XLVI, fig. 4
*	<u>minutum</u> var. <u>latum</u> Kaiser	(D-30)	(20): p. 124, Pl. XXXIX, figs. 15-16
*	<u>minutum</u> var. <u>minutum</u> (Ralfs) Delponte	(D-04)	(20): p. 121, Pl. XXXVIII, figs. 9-12
**	<u>nodulosum</u> (Bréb.) de Bary	(D-41)	(20): pp. 126-27, Pl. XLVII, figs. 6, 8-11
**	<u>raciborskii</u> (Raciborski) Croasdale in Prescott et al.	(D-30)	(20): p. 128, Pl. XLII, fig. 1
**	<u>subcoronulatum</u> (Turner) West & West	(D-35)	(20): p. 132, Pl. XLIX, figs. 2-4, 10-11
++	<u>trabecula</u> var. <u>trabecula</u> (Ehr.) Naeg.	(D-58)	(20): p. 133, Pl. XL, figs. 1-5
**	<u>trabecula</u> var. <u>hutchinsonii</u> (Turner) Croasdale in Prescott et al.	(D-53)	(20): p. 135, Pl. XL, fig. 6
<u>SPONDYLIOSIUM</u> de Brébisson			
++	<u>planum</u> (Wolle) West & West	(D-34)	(21): pp. 21-22, Pl. 456, figs. 6-6a, 7
**	<u>pulchellum</u> Archer	(D-30)	(21): pp. 22-23, Pl. 459, figs. 10-14
+	<u>pulchrum</u> (Bailey) Archer	(D-31)	(21): pp. 23-24, Pl. 454, figs. 4-8; Pl. 455, figs. 1-6
<u>STAUSTRUM</u> Meyen emend. Ralfs			
++	<u>arctiscon</u> (Ehr.) Lundell	(D-14)	(15): p. 129, Pl. 410, fig. 6
**	<u>arcuatum</u> Nordst.	(D-22)	(15): p. 130, Pl. 374, figs. 6-8
++	<u>bicorne</u> Haupt.	(D-01)	(15): p. 139, Pl. 394, fig. 2; Pl. 395, fig. 1
++	<u>bieneanum</u> Rabh.	(D-73)	(15): pp. 141-142, Pl. 333, figs. 7-9
**	<u>brachioprominens</u> Borgesen	(D-73)	(15): p. 146, Pl. 399, figs. 3,5
**	<u>brevispinum</u> var. <u>canadense</u> Taft	(D-01)	(15): pp. 151-152, Pl. 332, fig. 12
*	<u>claviferum</u> West & West	(D-41)	(15): pp. 158-159, Pl. 371, fig. 6
**	<u>coarctatum</u> var. <u>subcurtum</u> Nordst.	(D-22)	(15): pp. 161, Pl. 334, fig. 6
++	<u>cornutum</u> Archer	(D-73)	(15): p. 167, Pl. 344, figs. 1-5
**	<u>curvatum</u> f. <u>brevispinum</u> Nygaard	(D-14)	(15): pp. 171-172, Pl. 354, fig. 5
++	<u>cuspidatum</u> (Bréb.) Ralfs	(D-38)	(15): p. 173, Pl. 347, figs. 1, 3
++	<u>dejectum</u> (Bréb.) Ralfs	(D-38)	(15): p. 179, Pl. 355, figs. 9-10, 14-16
++	<u>dickei</u> var. <u>circulare</u> Turner	(D-14)	(15): p. 186, Pl. 347, fig. 10
++	<u>dilatatum</u> (Ehr.) Ralfs	(D-73)	(15): pp. 187-188, Pl. 338, figs. 2-4
**	<u>excavatum</u> var. <u>minimum</u> Bernard	(D-22)	(15): p. 197, Pl. 404, figs. 1-2
++	<u>gracile</u> var. <u>gracile</u> Ralfs ex Ralfs	(D-53)	(15): p. 212, Pl. 412, figs. 8-10; Pl. 413, figs. 1-2

**Desmids from North Deming Pond
Appendix 1 continued**

++	<u>gracile</u> var. <u>nanum</u> Wille	(D-14)	(15): p. 213, Pl. 413, figs. 9-10
**	<u>johnsonii</u> var. <u>depauperatum</u> G. M. Smith	(D-53)	(15): p. 228, Pl. 393, figs. 1,8
**	<u>leptocladum</u> var. <u>cornutum</u> Willie	(D-22)	(15): p. 235, Pl. 406, fig. 5
**	<u>nucronatum</u> Ralfs	(D-13)	(15): p. 256, Pl. 367, figs. 7-9
++	<u>ophiura</u> Lundell	(D-73)	(15): p. 266, Pl. 418, figs. 1, 4-5; Pl. 419, figs. 6-8
+	<u>orbiculare</u> var. <u>depressum</u> Roy & Bisset	(D-22)	(15): p. 268, Pl. 331, fig. 3
**	<u>quadrangulare</u> var. <u>armatum</u> West & West	(D-35)	(15): p. 295, Pl. 357, fig. 1
++	<u>quebecense</u> Irénée-Marie	(D-45)	(15): p. 297, Pl. 408, fig. 6
++	<u>ravenellii</u> var. <u>spinulosum</u> Irénée-Marie	(D-38)	(15): p. 299, Pl. 344, fig. 10; Pl. 357, fig. 7
++	<u>trifidum</u> var. <u>inflexum</u> West & West	(D-22)	(15): p. 336, Pl. 366, fig. 5
**	<u>wolleanum</u> var. <u>intermedium</u> West & West	(D-22)	(15): pp. 344-345, Pl. 389, fig. 7
*	<u>xiphidiophorum</u> Wolle	(D-35)	(15): p. 345, Pl. 346, fig. 5
<u>TEILINGIA</u> Bourrelly			
+	<u>excavata</u> var. <u>excavata</u> (Ralfs) Bour.	(D-30)	(21): pp. 7-8, Pl. 450, figs. 1-5
**	<u>excavata</u> var. <u>subquadrata</u> (West & West) Stein	(D-52)	(21): p. 8, Pl. 450, figs. 6-10
**	<u>exigua</u> (Turner) Bour.	(D-04)	(21): p. 9, Pl. 451, figs. 1-2
++	<u>granulata</u> (Roy & Bissett) Bour.	(D-06)	(21): p. 9, Pl. 451, figs. 3-5
<u>TRIPLOCERAS</u> J. W. Bailey			
**	<u>gracile</u> var. <u>bidentatum</u> Nordst.	(D-22)	(20): p. 143, Pl. LI, fig. 15
<u>XANTHIDIUM</u> Ehrenberg			
**	<u>antilopaeum</u> var. <u>antilopaeum</u> f. <u>javanicum</u> Nordst.	(D-22)	(15): pp. 47-48, Pl. 314, fig. 2
++	<u>antilopaeum</u> var. <u>herbridarum</u> West & West	(D-22)	(15): p. 51, Pl. 313, fig. 5
++	<u>antilopaeum</u> var. <u>oligocanthum</u> Schmidle	(D-73)	(15): p. 54, Pl. 314, fig. 5
++	<u>antilopaeum</u> var. <u>polymazum</u> Nordst.	(D-14)	(15): pp. 54-55, Pl. 315, fig. 1
++	<u>cristatum</u> Bréb. in Ralfs	(D-22)	(15): pp. 63-64, Pl. 319, figs. 3, 9

a/

** = considered a Minnesota record

* = reported from Minnesota but not by Meyer & Brook (1) and therefore considered to be a Park Record

++ = previously reported by Meyer & Brook (1) for Itasca State Park

+ = considered to be widely distributed, but not specifically reported from Minnesota

Appendix 2. Diatoms from North Deming Pond

a	Status	Taxon	Voucher	Identification reference
CENTRIC DIATOMS				
		<u>AULACOSIRA</u> Thwaites		
		<u>italica</u> (Ehr.) Simons. [= <u>Melosira italica</u> (Ehr.) Kütz.]	LI.47	(23): pp. 257-260; figs. 109c-d (24): p. 60
		<u>CYCLOTELLA</u> Kütz.		
		<u>meneghiniana</u> Kütz.	LI.36	(25): pp. 341-342, fig. 174
		<u>MELOSIRA</u> Ag. <u>str. s.</u> , fide Simonsen		
		<u>varians</u> Ag.	LI.36	(23): pp. 240-242, fig. 100
PENNATE DIATOMS				
		<u>ACHNANTHES</u> Bory		
		<u>lanceolata</u> Bréb. ex Kütz. var. <u>lanceolata</u>	LI.36	(26): pp. 269-270, Pl. 18, figs. 1-10
		<u>lanceolata</u> var. <u>dubia</u> Grun.	LI.5	(26): p. 271, Pl. 18, figs. 11-15
	*	<u>linearis</u> var. <u>pusilla</u> Grun.	LI.6	(26): pp. 252-253, Pl. 16, figs. 5-6
	**	<u>microcephala</u> (Kütz.) Grun.	LI.2	(26): pp. 250-251, Pl. 16, figs. 1-2
		<u>AMPHORA</u> Ehr. ex Kütz.		
		<u>libyca</u> Ehr. [= <u>A. ovalis</u> var. <u>affinis</u> (Kütz.) V. H. ex DeT.]	LI.66	(27): p. 69, Pl. 13, figs. 3-4 (28): pp. 209, figs. 4, 14-20
		<u>ANOMOEONEIS</u> Pfitzer		
	*	<u>vitrea</u> (Grun.) Ross	LI.22	(28): pp. 380-381, Pl. 33, figs. 12-13
		<u>CALONEIS</u> Cl.		
		<u>bacillum</u> (Grun.) Cl.	LI.58	(26): pp. 586-587, Pl. 54, fig. 8
		<u>ventricosa</u> (Ehr.) Meist.	LI.38	(26): p. 583, Pl. 54, fig. 3
		<u>COCCONEIS</u> Ehr.		
		<u>diminuta</u> Pant.	LI.5	(29): pp. 190-191, fig. 265
		<u>CYMBELLA</u> Ag.		
		<u>cistula</u> (Ehr.) Kirchn.	LI.5	(27): pp. 62-63, Pl. 11, figs. 3-4
		<u>cuspidata</u> Kütz.	LI.30	(27): pp. 39-40, Pl. 6, figs. 2-3
	**	<u>lunata</u> W. Sm.	LI.23	(27): pp. 46-47, Pl. 7, figs. 11-14
		<u>microcephala</u> Grun.	LI.2	(27): pp. 33-34, Pl. 4, figs. 12a-13b.
	*	<u>minuta</u> Hilse ex Rabh. var. <u>minuta</u> [= <u>C. ventricosa</u> Kütz.]	LI.25	(27): pp. 47-48, Pl. 8, figs. 1a-4b
		<u>minuta</u> var. <u>pseudogracilis</u> (Choln.) Reim.	LI.50	(27): p. 50, Pl. 9, figs. 1a-2b
	*	<u>minuta</u> var. <u>silesiaca</u> (Bleisch ex Rabh.) Reim.	LI.22	(27): pp. 49-50, Pl. 8, figs. 7a-10b

Diatoms from North Deming Pond
Appendix 2 continued

<u>muelleri</u> f. <u>ventricosa</u> (Temp. & Perag.)		
Reim.	LI.5	(27): p. 44, Pl. 7, figs. 3a-4
<u>naviculiformis</u> Aversw. ex Heib.	LI.43	(27): pp. 31-32, Pl. 4, fig. 9
<u>tumida</u> (Bréb. ex Kütz.) V. H.	LI.42	(27): p. 58, Pl. 10, fig. 8
<u>DIATOMA</u> Bory		
<u>vulgare</u> Bory	LI.5	(26): pp. 109-110, P. 2, fig. 9
<u>EPITHEMIA</u> Bréb.		
<u>turqida</u> (Ehr.) Kütz.	LI.5	(27): pp. 182-183, Pl. 25, figs. 1a-b
<u>EUNOTIA</u> Ehr.		
<u>arcus</u> var. <u>bidens</u> Grun.	LI.11	(26): p. 213, Pl. 13, fig. 12
* <u>curvata</u> (Kütz.) Lagerst.	LI.11	(26): p. 189, Pl. 10, fig. 4
<u>diodon</u> Ehr.	LI.68	(26): p. 204, Pl. 12, fig. 7
* <u>elegans</u> Østr.	LI.22	(26): pp. 211-212, Pl. 13, fig. 9
<u>exigua</u> (Bréb. ex Kütz.) Rabh.	LI.55	(26): p. 215, Pl. 13, figs. 17-18
* <u>flexulosa</u> Bréb. var. <u>flexulosa</u>	LI.41	(26): pp. 187-188, Pl. 10, fig. 1
<u>flexulosa</u> var. <u>eurycephala</u> Grun.	LI.47	(26): p. 188, Pl. 10, fig. 2
<u>hexaglyphis</u> Ehr.	LI.64	(26): pp. 203-204, Pl. 12, fig. 6
* <u>incisa</u> W. Sm. ex Greg.	LI.40	(26): pp. 208-209, Pl. 13, fig. 4
<u>indica</u> Grun.	LI.38	(26): pp. 195-196, Pl. 11, fig. 2
<u>lapponica</u> Grun. ex A. Cl.	LI.68	(26): p. 192, Pl. 10, fig. 10
* <u>maior</u> (W. Sm.) Rabh. var. <u>maior</u>	LI.56	(26): pp. 196-197, Pl. 11, fig. 5
<u>maior</u> var. <u>ventricosa</u> A. Cl.	LI.59	(26): p. 197, Pl. 11, fig. 4
* <u>monodon</u> Ehr.	LI.11	(26): p. 198, Pl. 11, fig. 6
<u>naegelii</u> Migula	LI.40	(26): p. 190, Pl. 10, fig. 6
<u>paludosa</u> Grun.	LI.55	(29): p. 178, fig. 228
* <u>parallela</u> Ehr.	LI.26	(26): p. 193, Pl. 10, fig. 12
* <u>pectinalis</u> (Kütz.) Rabh. var. <u>pectinalis</u>	LI.31	(26): pp. 204-205, Pl. 12, figs. 8, 10
* <u>pectinalis</u> var. <u>minor</u> (Kütz.) Rabh.	LI.26	(26): p. 207, Pl. 12, figs. 13-14
<u>pectinalis</u> var. <u>rostrata</u> Germain	LI.55	(30): p. 96, Pl. 33, figs. 8-15
<u>pectinalis</u> var. <u>ventricosa</u> Grun.	LI.71	(26): p. 205, Pl. 12, fig. 9
* <u>serra</u> var. <u>diadema</u> (Ehr.) Patr.	LI.22	(26): pp. 201-202, Pl. 12, fig. 3
<u>sudetica</u> O. Müll.	LI.64	(26): p. 208, Pl. 13, fig. 3
<u>vanheurckii</u> Patr.	LI.31	(26): pp. 210-211, Pl. 13, fig. 7
<u>FRAGILARIA</u> Rabh.		
<u>capucina</u> Desm.	LI.47	(26): p. 118, Pl. 3, fig. 5
* <u>crotonensis</u> Kitton	LI.13	(26): p. 121, Pl. 3, figs. 11-12
<u>FRUSTULIA</u> Rabh.		
* <u>rhomboides</u> var. <u>capitata</u> (A. Mayer) Patr.	LI.11	(26): p. 307, Pl. 21, fig. 8
* <u>rhomboides</u> var. <u>crassinervia</u> (Bréb. ex W. Sm.) Ross	LI.40	(26): pp. 307-308, Pl. 22, fig. 1
<u>GOMPHONEMA</u> Ehr.		
* <u>acuminatum</u> Ehr.	LI.5	(27): pp. 112-113, Pl. 15, figs. 2, 4, 7
* <u>angustatum</u> (Kütz.) Rabh. var. <u>angustatum</u>	LI.5	(27): p. 125, Pl. 17, figs. 17-19
<u>angustatum</u> var. <u>intermedia</u> Grun.	LI.5	(27): p. 126, Pl. 17, fig. 20
<u>bohemicum</u> Reichelt & Fricke	LI.25	(30): p. 310, Pl. 114, fig. 22
<u>dichotomum</u> Kütz.	LI.5	(27): pp. 135-136, Pl. 18, figs. 2-3
* <u>gracile</u> Ehr. emend. V. H.	LI.2	(27): pp. 131-132, Pl. 17, figs. 1-3
<u>parvulum</u> Kütz.	LI.31	(27): pp. 122-123, Pl. 17, figs. 7-12
<u>subtile</u> Ehr.	LI.25	(27): pp. 117-118, Pl. 16, fig. 1
<u>truncatum</u> Ehr. var. <u>truncatum</u>	LI.6	(27): pp. 118-119, Pl. 16, fig. 3

Diatoms from North Deming Pond
Appendix 2 continued

* <i>truncatum</i> var. <i>turgidum</i> (Ehr.) Patr.	LI.13	(27): p. 120, Pl. 16, fig. 5
HANTZSCHIA Grun.		
<i>amphioxys</i> f. <i>capitata</i> O. Müll.	LI.21	(29): p. 394, fig. 748
<i>amphioxys</i> var. <i>maior</i> Grun.	LI.43	(29): p. 394, fig. 749
<i>elongata</i> (Hantzsch) Grun.	LI.38	(29): p. 395, fig. 751
MERIDION Ag.		
<i>circulare</i> (Grev.) Ag.	LI.36	(26): p. 113, Pl. 2, fig. 15
NAVICULA Bory		
* <i>americana</i> Ehr.	LI.13	(26): pp. 493-494, Pl. 47, fig. 3
<i>bacillum</i> Ehr.	LI.6	(26): pp. 494-495, Pl. 47, figs. 4-5
<i>cryptocephala</i> Kütz.	LI.24	(26): pp. 503-504, Pl. 48, fig. 3
* <i>cuspidata</i> (Kütz.) Kütz.	LI.22	(26): p. 464, Pl. 43, figs. 9-10
<i>hassiacra</i> Krasske	LI.47	(26): p. 480, Pl. 45, fig. 17
<i>insociabilis</i> Krasske	LI.54	(31): p. 181, figs. 1315a-h
<i>laevissima</i> Kütz.	LI.57	(26): pp. 497-498, Pl. 47, fig. 13
<i>mutica</i> Kütz. var. <i>mutica</i>	LI.28	(26): p. 454, Pl. 42, fig. 2
<i>mutica</i> var. <i>stigma</i> Patr.	LI.5	(26): p. 455, Pl. 42, fig. 5
<i>oblonga</i> (Kütz.) Kütz.	LI.5	(26): p. 534, Pl. 51, fig. 6
<i>pupula</i> Kütz. var. <i>pupula</i>	LI.67	(26): pp. 495-496, Pl. 47, fig. 7
* <i>pupula</i> var. <i>rectangularis</i> (Greg.) Grun.	LI.27	(26): p. 497, Pl. 47, fig. 12
** <i>radiosa</i> Kütz. var. <i>radiosa</i>	LI.2	(26): p. 509, Pl. 48, fig. 15
* <i>radiosa</i> var. <i>parva</i> Wallace	LI.1	(26): p. 510, Pl. 48, fig. 17
<i>seminulum</i> var. <i>hustedtii</i> Patr.	LI.47	(26): pp. 489-490, Pl. 46, fig. 20
* <i>subtillissima</i> Cl.	LI.44	(26): pp. 483-484, Pl. 46, fig. 4
<i>tripunctata</i> (O. Müll.) Bory	LI.5	(26): pp. 513-514, Pl. 49, fig. 3
<i>viridula</i> (Kütz.) Kütz. <i>emend.</i> V. H.	LI.30	(26): p. 506, Pl. 48, fig. 9
NEIDIUM Pfitzer		
* <i>affine</i> (Ehr.) Pfitz. var. <i>affine</i>	LI.34	(26): p. 390, Pl. 35, fig. 2
* <i>affine</i> var. <i>amphirhynchus</i> (Ehr.) Cl.	LI.26	(26): p. 391, Pl. 35, fig. 3
<i>affine</i> var. <i>ceylonicum</i> (Skv.) Reim.	LI.38	(26): pp. 391-392, Pl. 35, fig. 6
* <i>affine</i> var. <i>humerus</i> Reim.	LI.11	(26): pp. 392-393, Pl. 35, fig. 5
* <i>bisulcatum</i> (Lagerst.) Cl. var. <i>bisulcatum</i>	LI.28	(26): p. 397, Pl. 36, fig. 5
<i>bisulcatum</i> var. <i>subundulatum</i> (Grun.) Reim.	LI.11	(26): p. 398, Pl. 36, figs. 7-8
<i>bisulcatum</i> var. <i>nipponicum</i> Skv.	LI.43	(26): p. 398, Pl. 36, fig. 13
* <i>iridis</i> (Ehr.) Cl. var. <i>iridis</i> f. <i>iridis</i>	LI.56	(26): p. 386-387, Pl. 34, fig. 1
<i>iridis</i> var. <i>iridis</i> f. <i>vernalis</i> Reichelt	LI.43	(29): p. 245, fig. 380
* <i>iridis</i> var. <i>amphigomphus</i> (Ehr.) A. Mayer	LI.40	(26): pp. 387-388, Pl. 34, fig. 2
<i>iridis</i> var. <i>ampliatum</i> (Ehr.) Cl.	LI.38	(26): p. 388, Pl. 34, fig. 5
* <i>productum</i> (W. Sm.) Cl. var. <i>productum</i>	LI.27	(26): pp. 389-390, Pl. 35, fig. 1
<i>productum</i> var. <i>triundulatum</i> Hust.	LI.43	(32): p. 118, fig. 1171f
<i>sacoense</i> Reim.	LI.59	(26): pp. 402-403, Pl. 37, fig. 3
NITZSCHIA Hass.		
* <i>alpina</i> Hust. <i>emend.</i> Lange-Bertalot	LI.71	(33): pp. 42-43, figs. 54-62
<i>brevissima</i> (Grun.) Kalinsky	LI.47	(29): pp. 421-422, fig. 816
* <i>fruticosa</i> Hust.	LI.44	(34): pp. 27-28, figs. 265-267
<i>gracilis</i> Hantzsch	LI.28	(29): pp. 416-417, fig. 794
* <i>ignorata</i> Krasske	LI.52	(29): pp. 422-423, figs. 819a-b
<i>palea</i> (Kütz.) W. Sm.	LI.47	(29): p. 416, fig. 801

Diatoms from North Deming Pond
Appendix 2 continued

<u>PINNULARIA</u> Ehr.		
* <u>abaujensis</u> (Pant.) Ross	LI.11	(26): pp. 612-613, Pl. 58, figs. 1-2
<u>acrosphaeria</u> W. Sm.	LI.72	(26): pp. 623-624, Pl. 60, figs. 2-3
* <u>biceps</u> Greg.	LI.50	(26): p. 599, Pl. 55, figs. 14-15
<u>borealis</u> Ehr. var. <u>borealis</u>	LI.57	(26): p. 618, Pl. 58, fig. 13
<u>borealis</u> var. <u>rectangularis</u> Carlson	LI.13	(26): p. 619, Pl. 58, fig. 14
* <u>braunii</u> (Grun.) Cl.	LI.23	(26): p. 594, Pl. 55, fig. 3
<u>formica</u> (Ehr.) Patr.	LI.28	(26): p. 627, Pl. 61, figs. 1-2
<u>gentilis</u> Donk.	LI.25	(26): p. 637, Pl. 64, fig. 1
* <u>gibba</u> Ehr.	LI.11	(30): pp. 252-253, Pl. 91, figs. 4-16
<u>intermedia</u> (Lagerst.) Cl.	LI.47	(26): p. 617, Pl. 58, fig. 9
<u>interrupta</u> f. <u>minutissima</u> Hust.	LI.65	(29): p. 317, fig. 574
<u>interrupta</u> var. <u>sinica</u> Skv.	LI.56	(35): p. 324, Pl. V, fig. 20
* <u>maior</u> (Kütz.) Rabh. var. <u>maior</u>	LI.38	(26): p. 629, Pl. 61, fig. 4
<u>maior</u> var. <u>pulchella</u> Boyer	LI.41	(26): pp. 629-630, Pl. 61, fig. 5
* <u>mesolepta</u> (Ehr.) W. Sm.	LI.31	(26): pp. 601-602, Pl. 55, figs. 17-18
<u>pulchra</u> Østr.	LI.61	(32): p. 27, figs. 1025a-d
<u>socialis</u> (T. C. Palmer) Hust.	LI.35	(26): pp. 633-634, Pl. 63, fig. 2
* <u>stomatophora</u> Grun.	LI.22	(26): pp. 609-610, Pl. 57, fig. 5
<u>streptoraphe</u> Cl.	LI.62	(26): p. 639, Pl. 64, fig. 4
<u>termitina</u> (Ehr.) Patr.	LI.5	(26): pp. 595-596, Pl. 55, fig. 6
<u>viridis</u> (Nitz.) Ehr. var. <u>viridis</u>	LI.66	(26): pp. 639-640, Pl. 64, fig. 5
<u>viridis</u> var. <u>commutata</u> (Grun.) Cl.	LI.22	(26): p. 640, Pl. 64, fig. 6
 <u>RHOPALODIA</u> O. Müll.		
<u>gibba</u> (Ehr.) O. Müll.	LI.12	(27): pp. 189-190, Pl. 28, fig. 1
 <u>STAURONEIS</u> Ehr.		
<u>anceps</u> Ehr. var. <u>anceps</u> f. <u>anceps</u>	LI.65	(26): p. 361, Pl. 30, fig. 1
* <u>anceps</u> f. <u>gracilis</u> Rabh.	LI.11	(26): p. 361, Pl. 30, fig. 2
* <u>phoenicenteron</u> f. <u>gracilis</u> (Ehr.) Hust.	LI.2	(26): pp. 359-360, Pl. 29, figs. 3-4
 <u>STENOPTEROBIA</u> Bréb.		
<u>intermedia</u> (Lewis) V. H.	LI.44	(30): p. 376, Pl. 144, figs. 4-5
 <u>SURIRELLA</u> Turpin		
<u>delicatissima</u> Lewis	LI.41	(30): p. 384, Pl. 148, figs. 4-6
 <u>SYNEDRA</u> Ehr.		
<u>delicatissima</u> W. Sm.	LI.10	(26): p. 136, Pl. 5, fig. 2
<u>radians</u> Kütz.	LI.2	(26): p. 137, Pl. 15, fig. 4
<u>ulna</u> (Nitz.) Ehr.	LI.36	(26): pp. 148-149, Pl. 7, figs. 1-2
 <u>TABELLARIA</u> Ehr.		
** <u>flocculosa</u> (Roth.) Kütz.	LI.11	(26): pp. 104-105, Pl. 1, figs. 4-5

a/

** = considered abundant on corresponding voucher slide

* = considered common on corresponding voucher slide