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Notes on Iowa Diatoms. VI I. Rare and Little Known Diatoms from lowa

E. F. Stoermer
Iowa State University

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Stoermer: Notes on Iowa Diatoms. VI I. Rare and Little Known Diatoms from I

that is not passed to daughter cells. This type of deformity is seemingly produced by some mechanism other than simple mechanical distortion and is probably related to the continuous light condition. Desmids are similarly deformed by continuous light (3).

Apparently little or no cell division occurred in any of the diatom cultures while exposed to continuous light. The raphe canal deformities may be associated with abortive cell divisions. It is not known if the aberrant raphe canals were functional. When transferred to fresh media and removed from continuous light, normal cell division was resumed and the resultant populations were typical rather than abnormal.

Samples of the material are deposited in the Diatom collection of the Academy of Natural Sciences of Philadelphia.

ACKNOWLEDGEMENTS

I wish to express thanks to Dr. J. D. Dodd for critically reading the manuscript.

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Notes on Iowa Diatoms. VII. Rare and Little Known Diatoms from Iowa[1]

E. F. STOERMER[2]

Abstract. This paper reports the occurrence and known distribution of 44 rare taxa of diatoms in Iowa. Illustrations of the entities cited are furnished.

During the past few years a number of diatom taxa have been found in Iowa that are of particular interest because of their reported rarity or disjunct distribution (1). Several entities generally considered rare have been found to be dominant in some Iowa lakes. Certain species reported previously from marine habitats are found in considerable quantity in our lakes and rivers. Some species, originally described as fossils, have been found in the modern flora. This paper reports a number of these. Illustrations of the entities considered and literature citations are included in the hope that they will be of use to the

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[2] Department of Botany and Plant Pathology, Iowa State University, Ames, Iowa.

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nonspecialist. The collection sites listed probably do not reflect the total state distribution of the taxa cited, since our efforts so far have been concentrated in central and northwestern Iowa. The diatom floras of Clear Lake and Lake West Okoboji (2) have been collected extensively, and investigation of the Des Moines River flora is underway. No records from either far eastern or western Iowa are included.

Systematic Section

Anomoenoneis Pfitzer

Anomoeoneis costata (Kütz) Hust. plate 2, fig. 4.
Hustedt, F. 1959, *in*: Rabenhorst, Kryptogamen Flora, vol. 7, Teil 2, Lieferung 6, p. 744, fig. 745.

Occurrence: This species has been found in only a few levels of core material from Lake West Okoboji.

According to Hustedt (3) this species is cosmopolitan in salt water. Its occurrence in fresh water is somewhat surprising.

Caloneis Cleve

Caloneis lewisii Patr. plate 2, fig. 8
Patrick, R. 1945. Farlowia 2(2):172, pl. 2, fig. 4.

Occurrence: Occasional; specimens of this entity have been found in numerous localities: East Okoboji, West Okoboji, Clear Lake, Mill Creek, Little Sioux River, Des Moines River, Skunk River.

Cyclotella Kütz

Cyclotella bodanica Eulenstein. plate 1, fig. 4.
Eulenstein, T. 1878. *in*: O. Schneider, Naturwissenschaftliche Beitrage zur Kenntniss der Kaukasusländer. p. 126.

Occurrence: This species is common in core material from West Okoboji. It has not been found in the recent flora of the lake or from other localities in the state.

According to Hustedt (4), this species is common in subalpine lakes in Europe. Its absence in the modern flora of West Okoboji may be indicative of eutrophication.

Cymatopleura Wm. Smith

Cymatopleura cochlea J. Brun plate 5, fig. 3.
Brun, J. 1891. Mem. Soc. Phys. et Hist. Nat. Geneve 31:25, pl. 22, fig. 5.

Occurrence. This species is widely distributed in the state: East Okoboji, West Okoboji, Clear Lake, Lost Island Lake, Little Wall Lake, Little Sioux River, Des Moines River, Skunk River, numerous springs and creeks.

This entity is distinguished from the other members of the genus by the rather acute torsion of the frustule.

Cymbella Agardh

Cymbella acuta (A. Schmidt) Cleve plate 4, fig. 12.

Cleve, P. T. 1894. Kongl. Sven. Vet.-Akad. Handl., ser. 2, 26(2):164.

Occurrence: This species has been found in Iowa only in Lake West Okoboji.

C. mexicana (Ehr.) Cleve plate 4, fig. 13.

Cleve, P. T. 1894. Kongl. Sven. Vet.-Akad. Handl., ser. 2, 26(2):177.

Occurrence: This species has been found in East Okoboji, West Okoboji, Spirit Lake, and Clear Lake.

C. ruttneri Hust. plate 4, fig. 9.

Hustedt, F. 1935. Archiv f. Hydrobiol., supp. 14(1):164, pl. 5, fig. 33.

Occurrence: This species has been recorded only from Lake West Okoboji.

C. triangulatum (Ehr.) Cleve plate 4, figs. 10, 11.

Cleve, P. T. 1894. Kongl. Sven. Vet.-Akad. Handl., ser. 2, 26(2):168.

Occurrence: This species is apparently widely distributed in the state: West Okoboji, East Okoboji, Spirit Lake, Mill Creek, Des Moines River.

Cymbellonitzschia Hustedt

Cymbellonitzschia diluviana Hust. plate 5, fig. 5.

Hustedt, F. 1954. Abh. Naturw. Ver. Bremen 33(3):453, fig. 23-24.

Occurrence: This species has been found in the recent flora and in sediments from Lake West Okoboji.

This entity was originally described from Pleistocene deposits (5). It has since been reported in the recent flora from several localities in Europe.

Gomphonema Agardh

Gomphonema constrictum var. *elongata* Herib. and Per. plate 4, fig. 1. Heribaud, J. 1893. Les Diatomees d'Auvergne, p. 53.

Occurrence: This taxon has been found only in Lake West Okoboji.

G. mexicanum Grun. plate 4, fig. 3.

Grunow, A. 1880. *in*: Van Heurck, Synopsis des Diatomees de Belgique, pl. 24, fig. 3(2).

Occurrence: This species is very common in East Okoboji. It has also been recorded from West Okoboji and Little Wall Lake.

G. sphaerophorum Ehr. plate 4, fig. 2.

Ehrenberg, C. G. 1845, Verh. Akad. Wiss. Berlin, p. 78.

Occurrence: This species has been recorded from East and West Okoboji, Clear Lake, and Little Wall Lake.

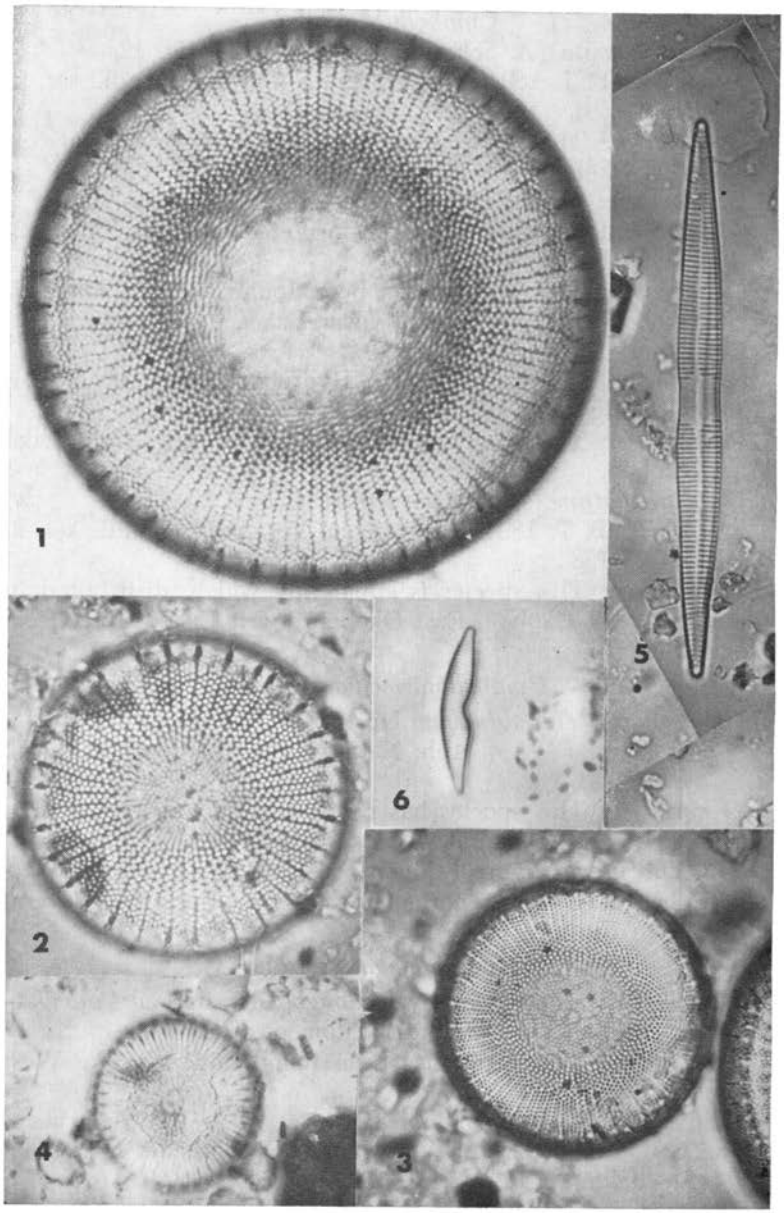

Plate I

Figures 1-2. *Stephanodiscus niagareae* var. *magnifica* Fricke.; 3. S. *niagarae;* 4. *Cyclotella bodanica* Eulenstein; 5. *Synedra goulardi* Breb.; 6. S. *incisa* Boyer. All figures 890X.

Gomphoneis Cleve

This genus is of questionable validity. It is distinguished from *Gomphonema* by having doubly punctate striae and a "line" or

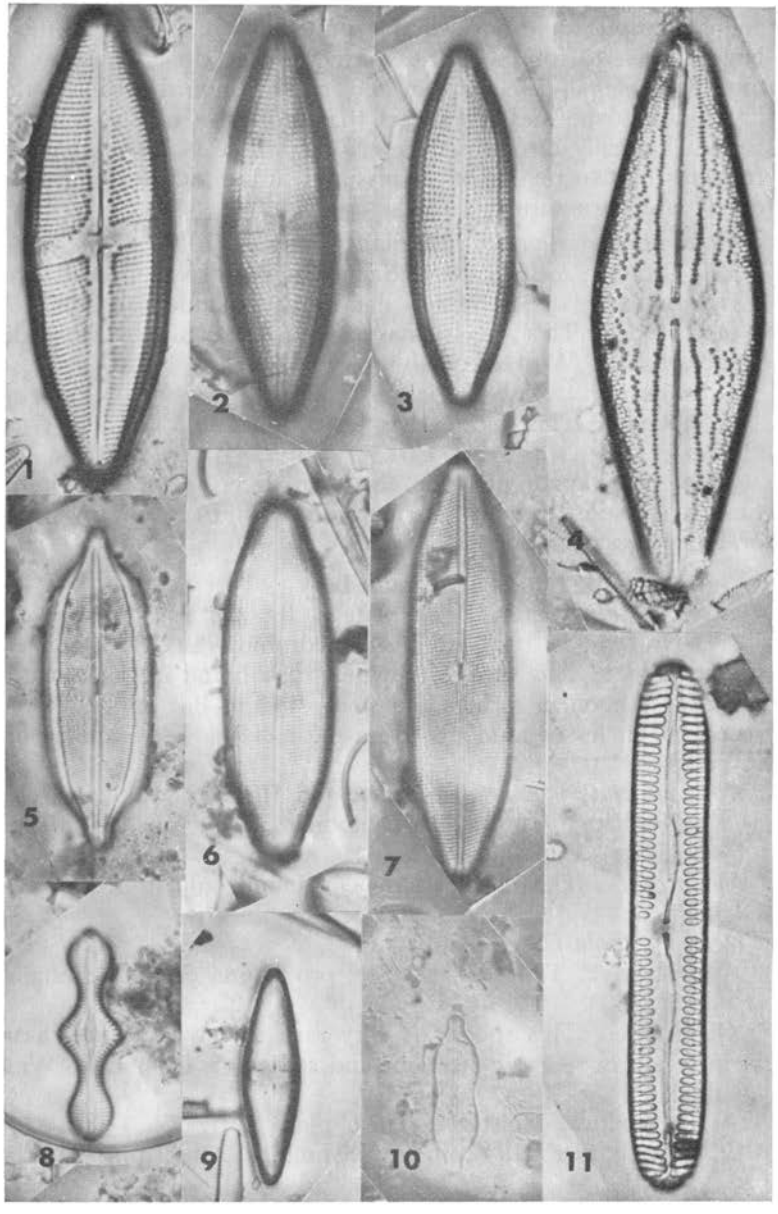

Plate II

Figure 1. *Neidium kozlowi* Meresch.; 2-3. *N. distincte-punctatum* Hust.; 4. *Anomoeoneis costata* (Kütz) Hust.; 5. *Neidium affine* var. *humeris* Reimer; 6-7. *N. decens* (Pant.) Stoermer; 8. *Caloneis lewisii* Patr.; 9. *Stauroneis acutiuscula* Per. and Herib.; 10. *Neidium binodis* (Ehr.) Hust.; 11. *Pinnularia aequilateralis* Patr. and Freese. All figures 890X.

band running across the long axis of the striae. Electron microscope observations have shown (6) that some members of the

genus *Gomphonema* have doubly punctate striae. Some authors have chosen to return entities formerly placed in *Gomphoneis* to *Gomphonema*. The two can be easily distinguished under the light microscope and it appears that the striae of *Gomphoneis* have a basically different structure that those of *Gomphonema*. It seems best to retain this genus until further studies are made of its valve structure.

Gomphoneis eriense Grun. plate 4, figs. 4, 5.

Grunow, A. 1878. *in*: O. Schneider, Naturwissenschaftliche Beitrage zur Kenntniss der Kaukasusländer, p. 109.

Occurrence: This species has been found only in the sediments of Lake West Okoboji.

G. eriense var. plate 4, figs. 6, 7, 8.

Occurrence: This species has been noted in East and West Okoboji.

This entity apparently has not been described in the literature. It is one of the most common diatoms in the summer flora of Lake West Okoboji.

Navicula Bory

Navicula abiskoensis Hust. plate 3, fig. 4.

Hustedt, F. 1942. Archiv f. Hydrobiol. 39:118, fig. 36.

Occurrence: This species is widely distributed in the state. It is most common in springs and small streams but has also been recorded, in lesser numbers, from most of the lakes and rivers investigated.

N. americana var. *bacillaris* Per. and Herib. plate 3, fig. 11.

Heribaud, J. 1893. Les Diatomees d'Auvergne, p. 116, pl. 4, fig. 13.

Occurrence: This species has been found only in Lake West Okoboji.

N. amphibola Cleve plate 3, fig. 1.

Cleve, P. T. 1891. Acta Soc. pro Fauna et Flora Fennica 8(2):33.

Occurrence: This species is very rare. A few examples have been found in recent collections and sediments from Lake West Okoboji.

N. circumtexta Meister ex Hust. plate 3, fig. 7.

Hustedt, F. 1934. *in*: A. Schmidt's Atlas, pl. 394, fig. 33-35.

Occurrence: This species has been noted in a few collections from Lake West Okoboji and the Des Moines River.

N. decussis Ostr. plate 3, fig. 9.

Ostrup, E. 1910. Danske Diatomeer, p. 77, pl. 2, fig. 50.

Occurrence: This species is common in collections from a number of localities in Iowa: East Okoboji, Spirit Lake, Clear Lake, Des Moines River.

N. exigua var. *capitata* Patr. plate 3, fig. 6.
Patrick, R. 1945. Farlowia 2(2):179.

Occurrence: This species has been found only in Lake West Okoboji.

N. explanata Hust. plate 3, fig. 8.
Hustedt, F. 1948. Schwiez. Zeit. f. Hydrobiol., 11(½):207, fig. 7, 8.

Occurrence: Only a few examples of this species have been noted from Lake West Okoboji.

This entity was originally described from Pleistocene deposits in Europe. Reimer (7) has reported it from several localities in the United States, both recent and fossil. Most of the specimens we have noted came from sediments, but a few examples were from modern collections.

N. insociabilis var. *dissipatoides* Hust. plate 3, fig. 10.
Hustedt, F. 1957. Abh. Naturw. Ver. Bremen 34(3):303, fig. 27.

Occurrence: This species has been found only in sediments from West Lake Okoboji.

N. lanceolata var. *cymbula* (Donk.) Cleve plate 3, figs. 15, 16.
Cleve, P. T. 1895. Kongl. Sven. Vet-Akad. Handl., ser. 2, 27(3):22.

Occurrence: This species has been noted only in collections from Lake West Okoboji. It is more common in the sediments than in modern collections.

N. nyassensis fo. *minor* O. Müll. plate fig. 13.
Müller, O. 1911. Bot Jahrb. 45:83, pl. 1, fig. 6.

Occurrence: This species has been noted in collections from Clear Lake and Lake West Okoboji.

N. pampeana Freng. plate 3, fig. 14.
Frenguelli, J. 1926. Bol. Acad. Nac. Cien. Cordoba 29:43, pl. 10-14.

Occurrence: This very large and characteristic species has been found only in West Lake Okoboji.

N. platycephala O. Müll. plate 3, fig. 12.
Müller, O. 1911. Bot. Jahrb. 45:84, pl. 1, fig. 12.

Occurrence: This species has been noted in collections from Clear Lake and Lake West Okoboji.

N. skabitschewskyi Kiselev plate 3, figs. 17, 18.
Kiselev, I. (Original description not available, cited in Zabelina, M. 1951. Opredelitel Presnovodnyek Vodorosley U. S. S. R., p. 279.)

Occurrence: This species has been found only in sediments from Lake West Okoboji.

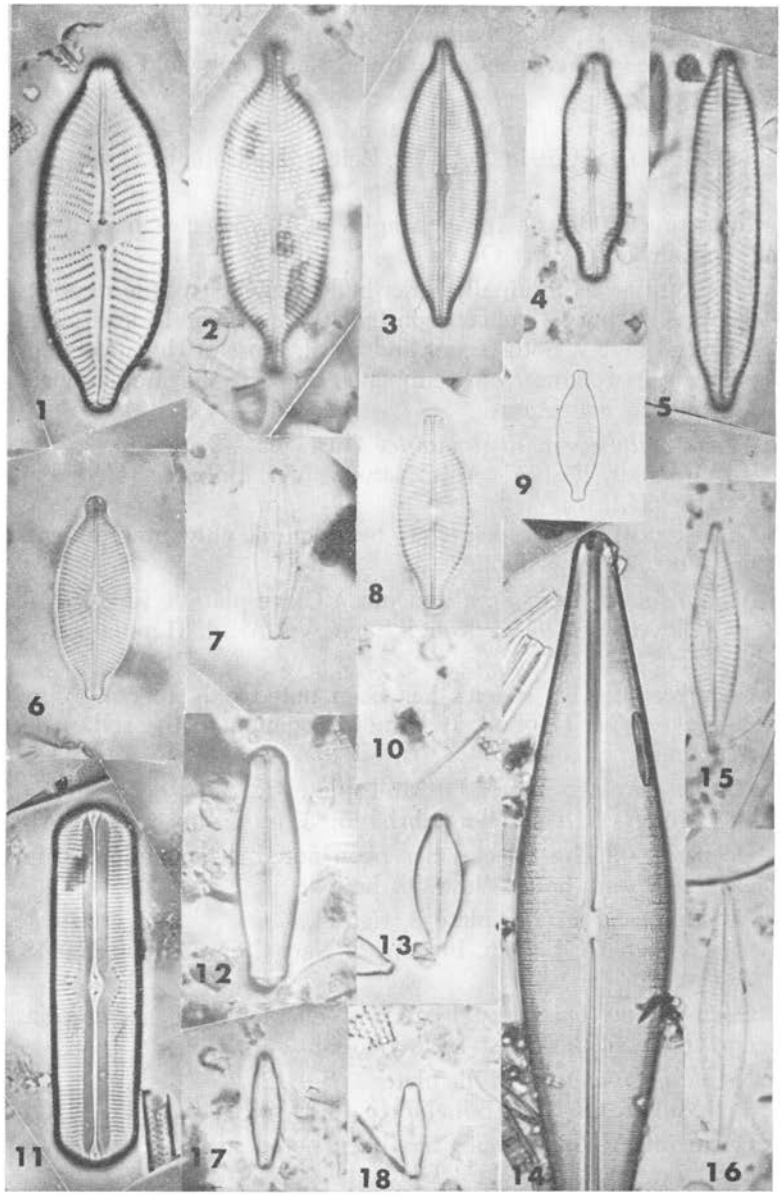

Plate III

Figure 1. *Navicula amphibola* Cleve; 2. *N. tuscula* fo. *angulata* Hust.; 3. *N. strosei* A. Cleve; 4. *N. abiskoensis* Hust.; 5. *N. viridula* var. *linearis* Hust.; 6. *N. exigua* var. *capitata* Patr.; 7. *N. circumtexta* Meister ex Hust.; 8. *N. explanata* Hust.; 9. *N. decussis* Ostr.; 10. *N. insociabilis* var. *dissipatoides* Hust.; 11. *N. americana* var. *bacillaris* Per. and Herib.; 12. *N. platycephala* O. Müll.; 13. *N. nyassensis* fo. *minor* O. Müll.; 14. *N. pampeana* Freng.; 15-16. *N. lanceolata* var. *cymbula* (Donk.) Cleve; 17-18. *N. skabitschewskyi* Kiselev. Figure 14. 500X; all others 890X.

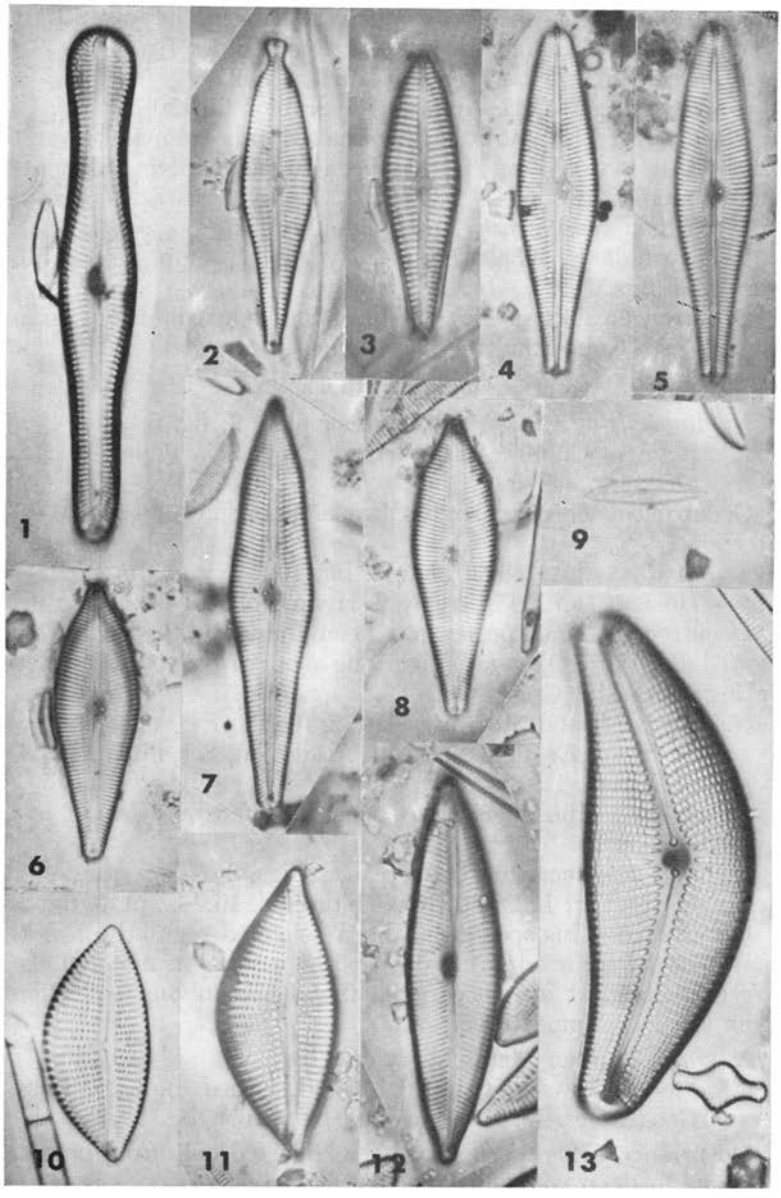

Plate IV

Figure 1. *Gomphonema constrictum* var. *elongata* Herib. and Per.; 2. *G. sphaerophorum* Ehr.; 3. *G. mexicanum* Grun.; 4-5 *Gomphoneis eriense* Grun.; 6-8. *G. eriense* var. ——.; 9. *Cymbella ruttneri* Hust.; 10-11. *C. triangulatum* (Ehr.) Cleve; 12. *C. acuta* (A. Schmidt) Cleve; 13. *C. mexicana* (Ehr.) Cleve. All figures 890X.

N. strosei A. Cleve plate 3, fig. 3.
Cleve-Euler, A. 1922. Acta Forestalia Fennica 22(4):63, pl. 1, fig. 19.

Occurrence: This species is widely distributed in Iowa: East Okoboji, West Okoboji, Clear Lake, Des Moines River.

N. tuscula fo. *angulata* Hust. plate 3, fig. 2.

Hustedt, F. 1942. Archiv f. Hydrobiol. 39:120, fig. 37.

Occurrence: This entity has been noted only from Lake West Okoboji. It is very rare, but has been found in both sediments and modern collections.

N. viridula var. *linearis* Hust. plate 3, fig. 5.

Hustedt, F. 1938. Archiv f. Hydrobiol., supp. 15:264, pl. 19, figs. 1, 2.

Occurrence: This species has been found in collections from Lake West Okoboji and the Des Moines River.

Neidium Pfitzer

Neidium affine var. *humeris* Reimer plate 2, fig. 5.

Reimer, C. 1959. Proc. Acad. Nat. Sci. Phila. 111:11, pl. 1, fig. 4.

Occurrence: This species has been found only in Lake West Okoboji.

N. binodis (Ehr.) Hust. plate 2, fig. 10.

Hustedt, F. 1945. Archiv f. Hydrobiol. 40(4):933.

Occurrence: This species has been found in the sediments from Lake West Okoboji and in one modern collection from a spring along Mill Creek.

N. decens (Pant.) Stoermer Plate 2, figs. 6, 7.

Stoermer, E. 1963. Not. Nat. Acad. Nat. Sci. Phila., 358:3, pl. 1, figs. 8, 9.

Occurrence: This species has been collected only from Lake West Okoboji.

N. distincte-punctatum Hust. plate 2, figs. 2, 3.

Hustedt, F. 1922. Int. Rev. Hydrobiol. 10:242, pl. 3, fig. 2.

Occurrence: This species has been collected regularly in bottom material from relatively deep (5-15 meters) water in Lake West Okoboji. It also occurs in abundance in one collection from the Des Moines River.

Neidium kozlowi Meresch. plate 2, fig. 1.

Mereschkowsky, C. 1906. Arb. d. Exped. d. Kais. Russ. Geogr. Ges. 1899-1901, vol. 8, p. 16, text fig. 5.

Occurrence: This species has been collected only from bottom material in deep water in Lake West Okoboji.

Pinnularia Ehrenberg

Pinnularia aequilateralis Patr. and Freese plate 2, fig. 11.

Patrick, R. and L. Freese. 1960. Proc. Acad. Nat. Sci. Phila. 112(6):228, pl. 3, fig. 3.

Occurrence: This species is very rare. It has been found in only one collection from Lake West Okoboji.

Stauroneis Ehrenberg

Stauroneis acutiuscula Per. and Herib. plate 2, fig. 9.

Heribaud, J. 1893. Les Diatomees d'Auvergne, p. 78, pl. 3, fig. 20.

Occurrence: This species has been collected only from bottom material in deep water in Lake West Okoboji.

Stephanodiscus Ehrenberg

Stephanodiscus niagarae Ehr. plate 1, fig. 3.

Ehrenberg, C. 1845. Ber. Akad., Wiss., Berlin 1845:80.

Occurrence: This species has been found in Clear Lake and West Okoboji. It is quite rare in modern collections but is found in abundance in some levels of the sediment from West Okoboji.

S. *niagarae* var. *magnifica* Fricke plate 1, figs. 1, 2.

Fricke, F. 1901. *in*: A. Schmidt's Atlas, pl. 227, figs. 12, 13.

Occurrence: This species is one of the major planton dominants in West Okoboji. It has not been found in other localities in Iowa.

Surirella Turpin

Surirella guatimalensis Ehr. plate 5, fig. 1.

Ehrenberg, C. 1854. Mikrogeologie, pl. 33(6), fig. 7.

Occurrence: This entity is common in collections of bottom debris from Lake West Okoboji. It has not been recorded from any other locality.

S. *panduriformis* Wm. Smith plate 5, fig. 4.

Smith, W. 1953. Synopsis of the British Diatomaceae, Vol. I, p. 33, pl. 30, fig. 258.

Occurrence: This species has been found only in Lake West Okoboji.

Synedra Ehrenberg

Synedra goulardi Breb. plate 1, fig. 5.

Brebisson, A. de, in lit. (see Mills, F. 1934. Index to the genera and species of the Diatomaceae, vol. 3.)

Occurrence: This species has been found in collections from Clear Lake and Lake West Okoboji.

S. *incisa* Boyer plate 1, fig. 6.

Boyer, C. 1920. Bull. Torrey Bot. Club 47:68, pl. 2, fig. 8.

Occurrence: Occasional populations of this species have been found in Lake West Okoboji and in "Lake La Verne" (I.S.U. campus).

The unusual form of the frustules of this entity probably is the result of adaptation to epizooic growth habit.

Tropidoneis Cleve

Tropidoneis lepidoptera var. *proboscidea* Cleve plate 5, fig. 2.

Cleve, P. 1894. Kongl. Sven. Vet-Akad. Handl., ser. 2, 26(2):25.

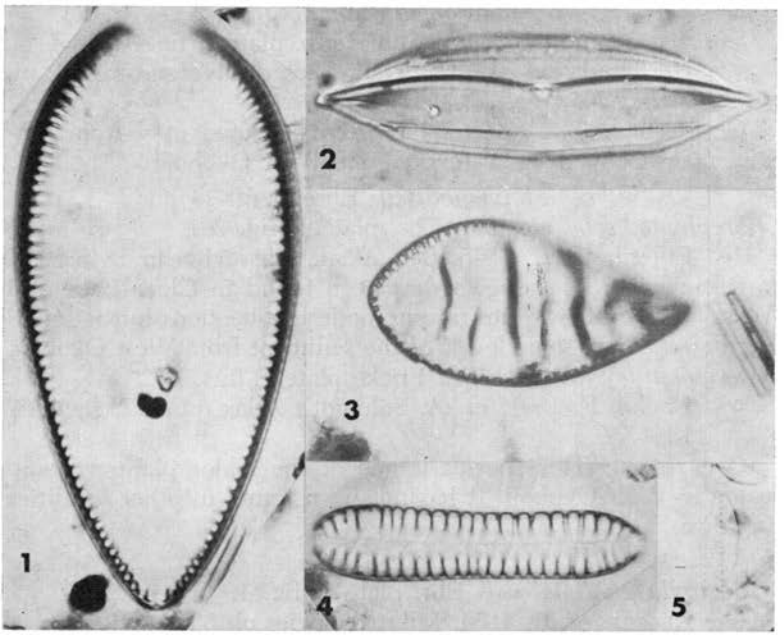

Plate V

Figure 1. *Surirella guatimalensis* Ehr.; 2. *Tropidoneis lepidoptera* var. *proboscidea* Cleve; 3. *Cymatopleura cochlea* J. Brun; 4. *Surirella panduriformis* Wm. Smith; 5. *Cymbellonitzschia diluviana* Hust. Figures 1, 3, 500X. Others 890X.

Occurrence: This species has been found, in quantity, in Clear Lake and Lake West Okoboji.

This entity is most often reported from marine or brackish water. Hustedt (8,9) has reported it from fresh water in the tropics, but considered it to be allochthonous. Living cells have been seen from both reported localities in Iowa.

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