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Some Algae of Land Between The Lakes, Kentucky and Tennessee, I. Chlorophyta

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ABSTRACT

This paper lists 124 species of chlorophyte algae collected at Land Between The Lakes, Kentucky and Tennessee, and previously unreported or infrequently reported as occurring in Kentucky. Included are first Kentucky records for species of the genera *Chlorogonium* and *Docidium*.

INTRODUCTION

Land Between The Lakes (LBL) is a 170,000-acre national recreation area in western Kentucky and Tennessee. LBL is an inland peninsula resulting from the impoundment of the Cumberland and Tennessee rivers, giving rise to Lake Barkley on the eastern border and Kentucky Lake on the western border. Over a period of several years (1989–1999) I secured periodic samples of the phytoplankton and metaphyton from Duncan Lake (Lyon County, Kentucky) and Energy Lake and Hematite Lake (Trigg County, Kentucky) and analyzed them for the algal taxa present. Phytoplankton was collected with a plankton net (80 μm), and metaphyton was collected by hand squeezing aquatic macrophytes present in the lakes.

CHECKLIST OF CHLOROPHYTA

Nomenclature follows that of Prescott (1962); Prescott, Croasdale, and Vinyard (1972, 1975, 1977); Prescott, Croasdale, Vinyard, and Bicudo (1981); Prescott, Bicudo, and Vinyard (1982); Croasdale, Bicudo, and Prescott (1983); Komarek and Fott (1983); Kadlubowska (1984); and Mrozinska (1985). All previous reports of chlorophyte algae from Kentucky are presented with descriptions and pertinent literature citations in Dillard (1989a, 1989b, 1990, 1991a, 1991b, 1993). Checklist entries preceded by a double asterisk represent new generic reports for Kentucky; those preceded by a single asterisk represent new reports of infra-generic rank. Others represent records of algal taxa infrequently reported from Kentucky.

VOLVOCALES

***Chlorogonium euchlorum* Ehrenberg. Duncan and Energy lakes. Pl. 1, Fig. 1.

TETRASPORALES

Gloeocystis planctonica (West & West) Lemmermann. Duncan, Energy, and Hematite lakes. Pl. 1, Fig. 2.

CHLOROCOCCALES

Planktosphaeria gelatinosa G.M. Smith. Duncan, Energy, and Hematite lakes. Pl. 1, Fig. 3.

Tetraedron minimum (Braun) Hansgrig. Duncan, Energy, and Hematite lakes. Pl. 1, Fig. 4.

T. regulare Kuetzing. Energy and Hematite lakes. Pl. 1, Fig. 5.

Schroederia setigera (Schroeder) Lemmermann. Duncan Lake. Pl. 1, Fig. 6.

Sphaerocystis schroeteri Chodat. Duncan, Energy, and Hematite lakes. Pl. 1, Fig. 7.

Oocystis parva West & West. Duncan and Hematite lakes. Pl. 1, Fig. 8.

**O. solitaria* Wittrock. Duncan Lake. Pl. 1, Fig. 9.

Eremosphaera viridis DeBary. Duncan and Hematite lakes. Pl. 1, Fig. 10.

**Nephrocytium obesum* West & West. Duncan, Energy, and Hematite lakes. Pl. 8, Fig. 12.

Kirchneriella lunaris (Kircher) Moebius. Duncan and Hematite lakes. Pl. 1, Fig. 11.

K. obesa (West) Schmidle. Duncan and Hematite lakes. Pl. 1, Fig. 12.

Selenastrum gracile Reinsch. Duncan and Hematite lakes. Pl. 1, Fig. 13.

Ankistrodesmus falcatus (Corda) Ralfs. Dun-

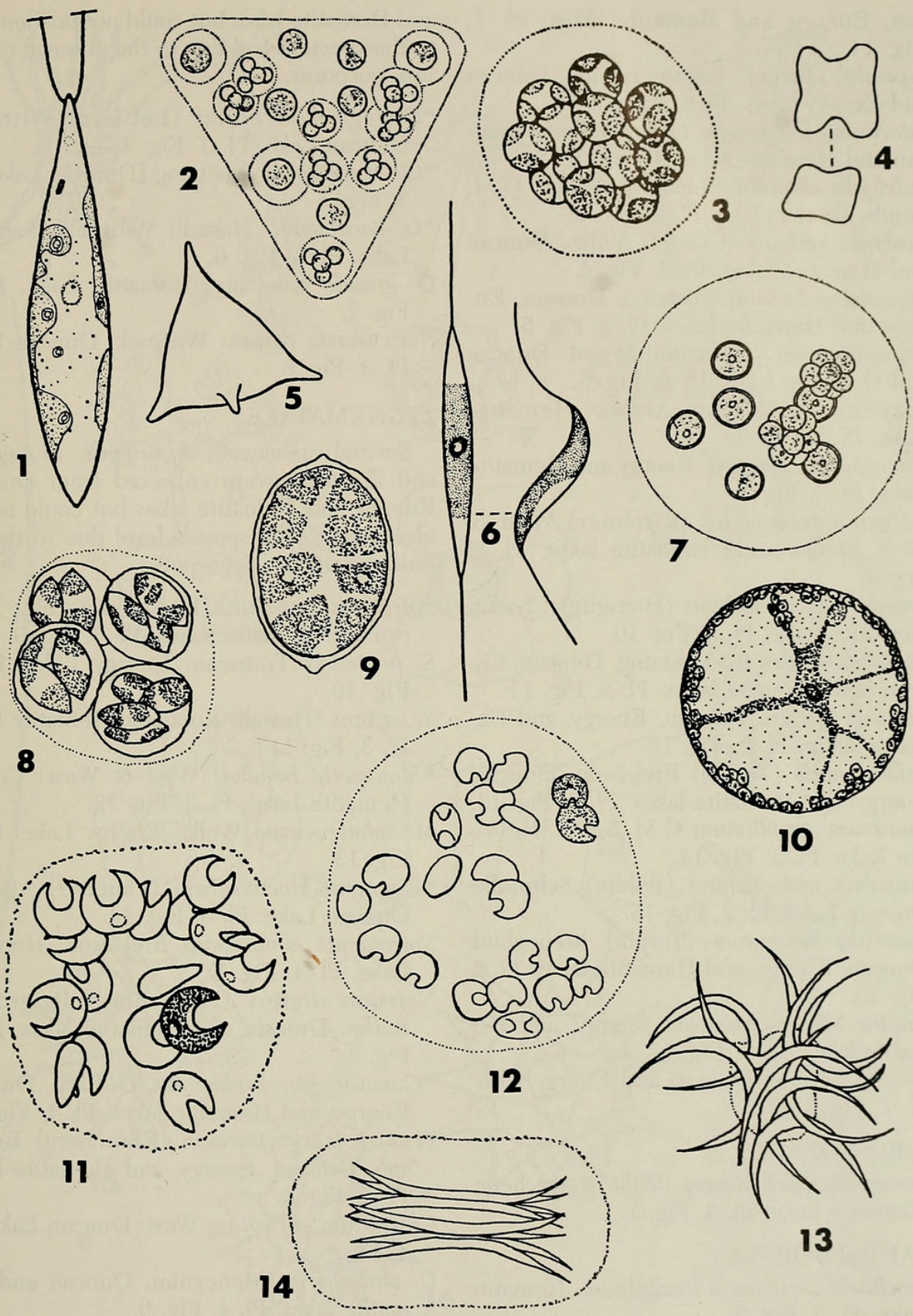

Plate 1. 1. *Chlorogonium euchlorum;* 2. *Gloeocystis planctonica;* 3. *Planktosphaeria gelatinosa;* 4. *Tetraedron minimum;* 5. *T. regulare;* 6. *Schroederia setigera;* 7. *Sphaerocystis schroeteri;* 8. *Oocystis parva;* 9. *O. solitaria;* 10. *Eremosphaera viridis;* 11. *Kirchneriella lunaris;* 12. *K. obesa;* 13. *Selenastrum gracile;* 14. *Ankistrodesmus falcatus.*

can, Energy, and Hematite lakes. Pl. 1, Fig. 14.

A. spiralis (Turner) Lemmermann. Duncan and Energy lakes. Pl. 2, Fig. 1.

Closteriopsis longissima Lemmermann. Duncan and Hematite lakes. Pl. 2, Fig. 2.

Quadrigula chodatii (Tanner-Fullman) G.M. Smith. Duncan lake. Pl. 2, Fig. 3.

Golenkinia radiata (Chodat) Wille. Duncan and Hematite lakes. Pl. 2, Fig. 4.

Botryococcus braunii Kuetzing. Duncan, Energy, and Hematite lakes. Pl. 2, Fig. 5.

Dictyosphaerium pulchellum Wood. Duncan and Hematite lakes. Pl. 2, Fig. 6.

Coelastrum cambricum Archer. Hematite Lake. Pl. 2, Fig. 7.

C. microporum Naegeli. Energy and Hematite lakes. Pl. 2, Fig. 8.

Crucigenia tetrapedia (Kirchner) West & West. Duncan and Hematite lakes. Pl. 2, Fig. 9.

**Scenedesmus bicaudatus* (Hansgirg) Chodat. Hematite Lake. Pl. 2, Fig. 10.

S. dimorphus (Turpin) Kuetzing. Duncan, Energy, and Hematite lakes. Pl. 2, Fig. 11.

S. obtusus Meyen. Duncan, Energy, and Hematite lakes. Pl. 2, Fig. 12.

S. quadricauda (Turpin) Brebisson. Duncan, Energy, and Hematite lakes. Pl. 2, Fig. 13.

Actinastrum gracillimum G.M. Smith. Hematite Lake. Pl. 2, Fig. 14.

**Sorastrum americanum* (Bohlin) Schmidle. Duncan Lake. Pl. 2, Fig. 15.

Pediastrum boryanum (Turpin) Meneghini. Duncan, Energy, and Hematite lakes. Pl. 2, Fig. 16.

P. duplex Meyen. Duncan, Energy, and Hematite lakes. Pl. 2, Fig. 17.

P. simplex Meyen. Duncan and Energy lakes. Pl. 2, Fig. 18.

MICROSPORALES

**Microspora pachyderma* (Wille) Lagerheim. Hematite Lake. Pl. 3, Fig. 1.

CHAETOPHORALES

Coleochaete orbicularis Pringsheim. Hematite Lake. Pl. 3, Fig. 2.

C. scutata Brebisson. Hematite Lake. Pl. 3, Fig. 3.

OEDOGONIALES

Several species of *Oedogonium* and *Bulbochaete* were collected from Duncan, Energy, and Hematite lakes but could not be identified to the species level due to the absence of mature oospores.

**Oedogonium boscii* (LeClerc) Wittrock. Duncan Lake. Pl. 3, Fig. 4.

**O. capilliforme* Kuetzing. Duncan Lake. Pl. 3, Fig. 5.

**O. cardiacum* (Hassall) Wittrock. Hematite Lake. Pl. 3, Fig. 6.

O. grande Kuetzing. Hematite Lake. Pl. 3, Fig. 7.

Bulbochaete varians Wittrock. Duncan Lake. Pl. 3, Fig. 8.

ZYGNEMATALES

Several species of *Spirogyra, Mougeotia,* and *Zygnema* were collected from Duncan, Energy, and Hematite lakes but could not be identified to the species level due to the absence of mature zygospores.

Spirogyra communis (Hassall) Kuetzing. Duncan and Hematite lakes. Pl. 3, Fig. 9.

S. pratensis Transeau. Energy Lake. Pl. 3, Fig. 10.

S. varians (Hassall) Kuetzing. Hematite Lake. Pl. 3, Fig. 11

**Mougeotia boodlei* (West & West) Collins. Hematite Lake. Pl. 3, Fig. 12.

M. sphaerocarpa Wolle. Energy Lake. Pl. 3, Fig. 13.

**Zygnema decussatum* (Vaucher) Agardh. Duncan Lake. Pl. 3, Fig. 14.

Spirotaenia condensata Brebisson. Hematite Lake. Pl. 4, Fig. 1.

Netrium digitus (Ehrenberg) Itzigson & Rothe. Duncan and Hematite lakes. Pl. 4, Fig. 2.

**Gonatozygon brebissonii* DeBary. Duncan, Energy, and Hematite lakes. Pl. 4, Fig. 3.

Penium margaritaceum (Ehrenberg) Brebisson. Duncan, Energy, and Hematite lakes. Pl. 4, Fig. 4.

Closterium abruptum West. Duncan Lake. Pl. 4, Fig. 5.

C. ehrenbergii Meneghini. Duncan and Hematite lakes. Pl. 4, Fig. 6.

C. setaceum Ehrenberg. Duncan and Hematite lakes. Pl. 4, Fig. 7.

***Docidium baculum* Brebisson. Duncan and Hematite lakes. Pl. 4, Fig. 8.

***D. undulatum* Bailey. Hematite Lake. Pl. 4, Fig. 9.

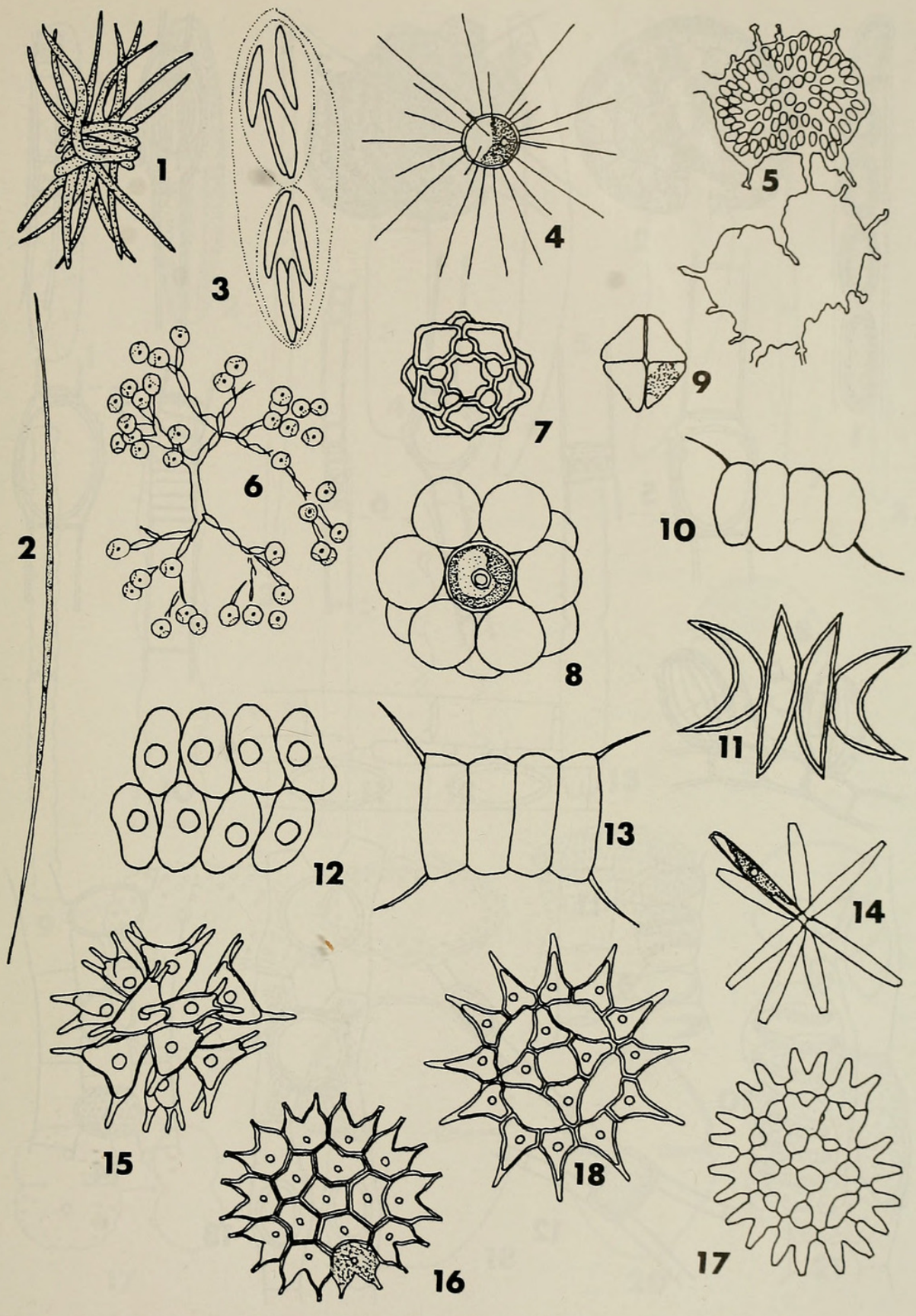

Plate 2. 1. *Ankistrodesmus spiralis;* 2. *Closteriopsis longissima;* 3. *Quadrigula chodatii;* 4. *Golenkinia radiata;* 5. *Botryococcus braunii;* 6. *Dictyosphaerium pulchellum;* 7. *Coelastrum cambricum;* 8. *C. microporum;* 9. *Crucigenia tetrapedia;* 10. *Scenedesmus bicaudatus;* 11. *S. dimorphus;* 12. *S. obtusus;* 13. *S. quadricauda;* 14. *Actinastrum gracillimum;* 15. *Sorastrum americanum;* 16. *Pediastrum boryanum;* 17. *P. duplex;* 18. *P. simplex.*

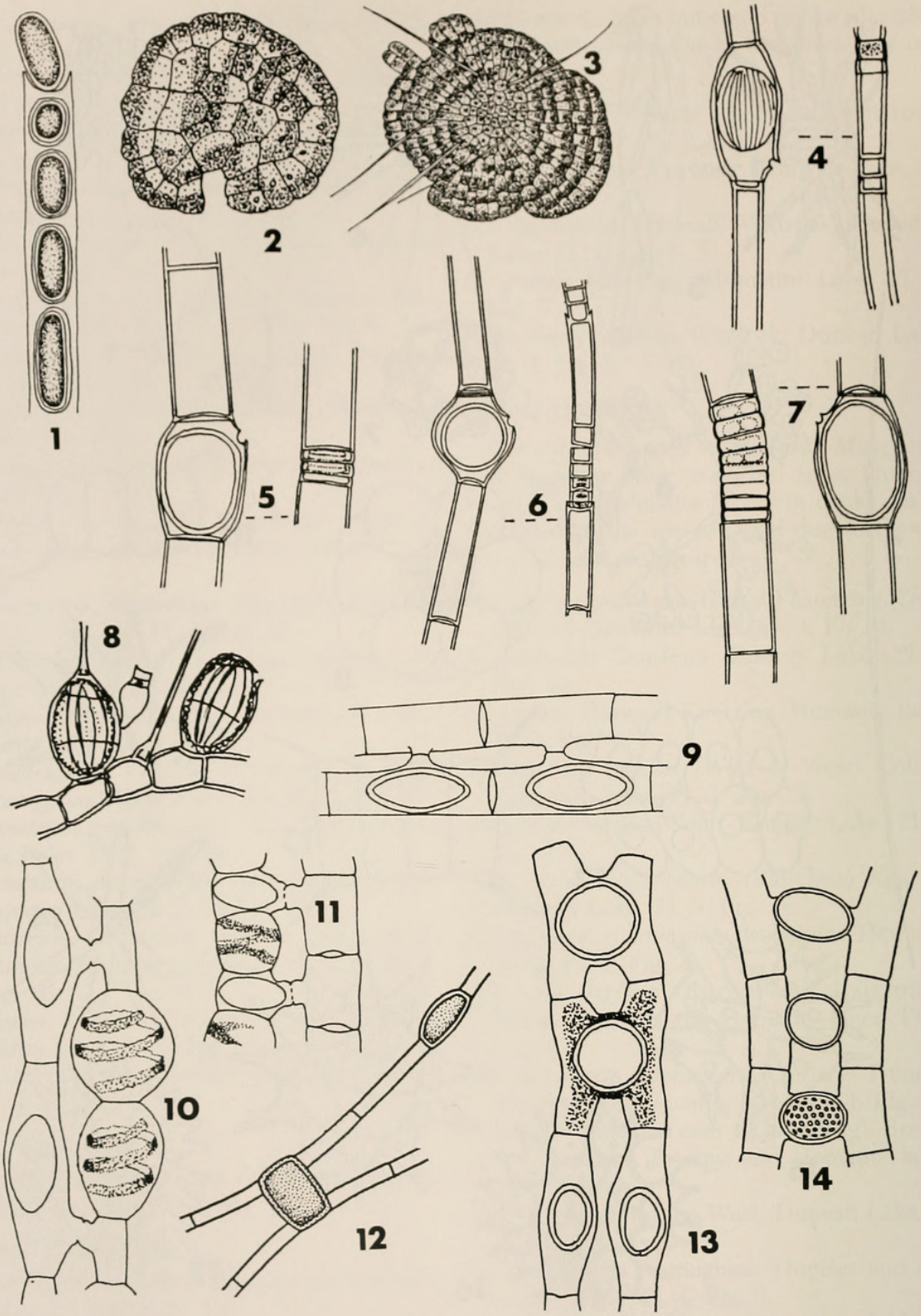

Plate 3. 1. *Microspora pachyderma;* 2. *Coleochaete orbicularis;* 3. *C. scutata;* 4. *Oedogonium boscii;* 5. *O. capilliforme;* 6. *O. cardiacum;* 7. *O. grande;* 8. *Bulbochaete varians;* 9. *Spirogyra communis;* 10. *S. pratensis;* 11. *S. varians;* 12. *Mougeotia boodlei;* 13. *M. sphaerocarpa;* 14. *Zygnema decussatum.*

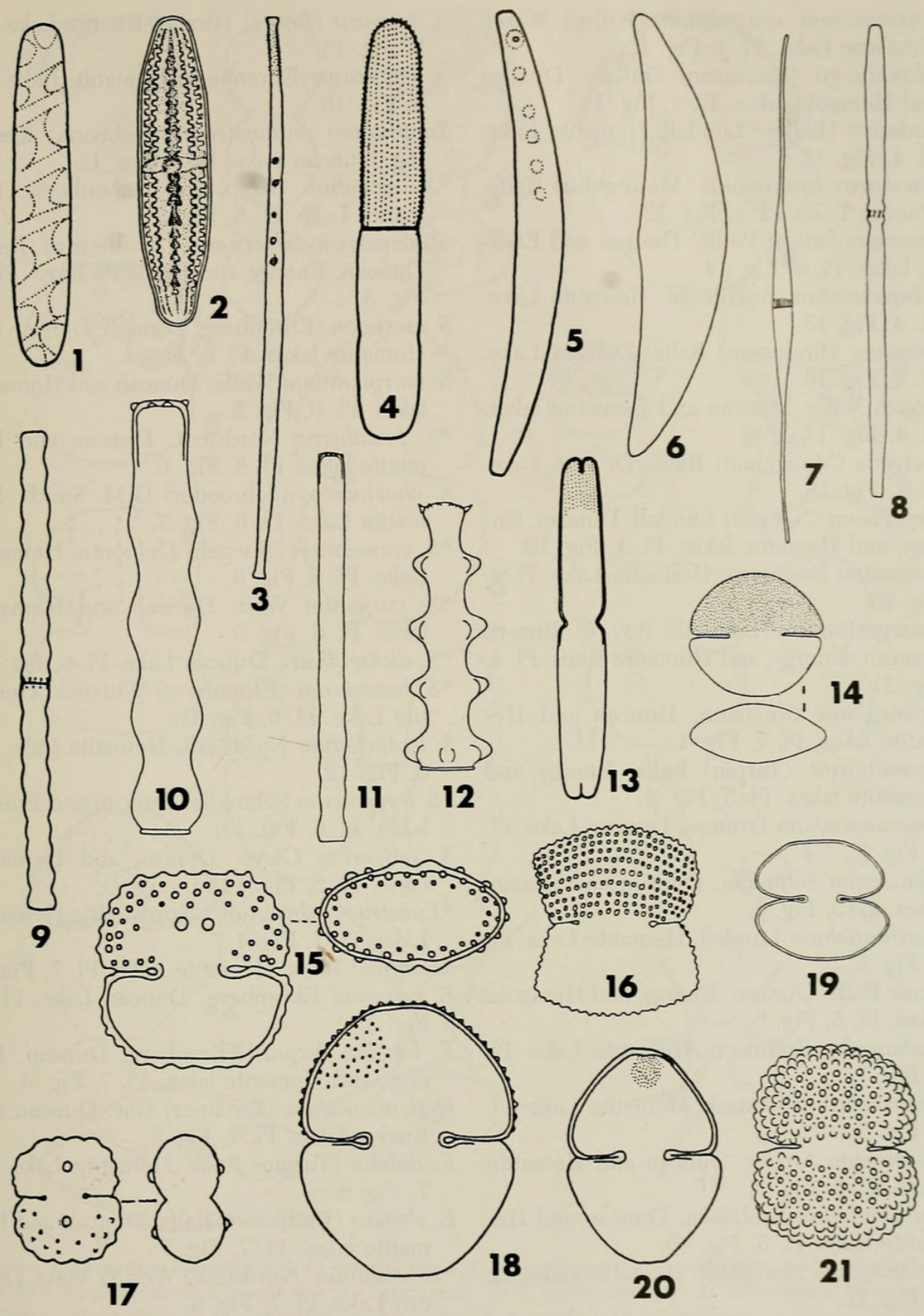

Plate 4. 1. *Spirotaenia condensata;* 2. *Netrium digitus;* 3. *Gonatozygon brebissonii;* 4. *Penium margaritaceum;* 5. *Closterium abruptum;* 6. *C. ehrenbergii;* 7. *C. setaceum;* 8. *Docidium baculum;* 9. *D. undulatum;* 10. *Pleurotaenium constrictum;* 11. *P. ehrenbergii;* 12. *P. nodosum;* 13. *Tetmemorus brebissonii;* 14. *Cosmarium baileyi;* 15. *C. bipunctatum;* 16. *C. biretum;* 17. *C. blyttii;* 18. *C. botrytis;* 19. *C. depressum;* 20. *C. granatum;* 21. *C. margaritatum.*

**Pleurotaenium constrictum* (Bailey) Wood. Hematite Lake. Pl. 4, Fig. 10.
P. ehrenbergii (Brebisson) DeBary. Duncan and Hematite lakes. Pl. 4, Fig. 11.
P. nodosum (Bailey) Lundell. Hematite Lake. Pl. 4, Fig. 12.
Tetmemorus brebissonii (Meneghini) Ralfs. Duncan Lake. Pl. 4, Fig. 13.
Cosmarium baileyi Wolle. Duncan and Energy lakes. Pl. 4, Fig. 14.
**C. bipunctatum* Boergesen. Hematite Lake. Pl. 4, Fig. 15.
C. biretum (Brebisson) Ralfs. Duncan Lake. Pl. 4, Fig. 16.
C. blyttii Wille. Duncan and Hematite lakes. Pl. 4, Fig. 17.
C. botrytis (Meneghini) Ralfs. Duncan Lake. Pl. 4, Fig. 18.
C. depressum (Naegeli) Lundell. Duncan, Energy, and Hematite lakes. Pl. 4, Fig. 19.
C. granatum Brebisson. Hematite Lake. Pl. 4, Fig. 20.
C. margaritatum (Lundell) Roy & Bissett. Duncan, Energy, and Hematite lakes. Pl. 4, Fig. 21.
C. meneghinii Brebisson. Duncan and Hematite lakes. Pl. 5, Fig. 1.
C. moniliforme (Turpin) Ralfs. Energy and Hematite lakes. Pl. 5, Fig. 2.
**C. nymannianum* Grunow. Duncan Lake. Pl. 5, Fig. 3.
C. obtusatum Schmidle. Duncan and Energy lakes. Pl. 5, Fig. 4.
**C. orthostichum* Lundell. Hematite Lake. Pl. 5, Fig. 5.
C. ovale Ralfs. Duncan, Energy, and Hematite lakes. Pl. 5, Fig. 6.
**C. phaseolus* Brebisson. Hematite Lake. Pl. 5, Fig. 7.
**C. porrectum* Nordstedt. Hematite Lake. Pl. 5, Fig. 8.
C. portianum Archer. Duncan and Hematite lakes. Pl. 5, Fig. 9.
C. pyramidatum Brebisson. Duncan and Hematite lakes. Pl. 5, Fig. 10.
C. subtumidum Nordstedt. Hematite Lake. Pl. 5, Fig. 11.
C. turpinii Brebisson. Duncan and Hematite lakes. Pl. 5, Fig. 12.
Cosmocladium pusillum Hilse. Duncan Lake. Pl. 5, Fig. 13.
Arthrodesmus convergens Ehrenberg. Duncan and Hematite lakes. Pl. 5, Fig. 14.
A. extensus (Borge) Hirano. Energy Lake. Pl. 5, Fig. 15.
A. octocornis Ehrenberg. Hematite Lake. Pl. 5, Fig. 16.
Xanthidium antilopaeum (Brebisson) Kuetzing. Duncan Lake. Pl. 6, Fig. 1.
**X. armatum* (Brebisson) Rabenhorst. Hematite Lake. Pl. 6, Fig. 2.
Staurastrum alternans (Brebisson) Ralfs. Duncan, Energy, and Hematite lakes. Pl. 6, Fig. 3.
S. arctiscon (Ehrenberg) Lundell. Duncan and Hematite lakes. Pl. 6, Fig. 4.
S. botryophilum Wolle. Duncan and Hematite lakes. Pl. 6, Fig. 5.
**S. brasiliense* Nordstedt. Duncan and Hematite lakes. Pl. 6, Fig. 6.
S. chaetoceros (Schroeder) G.M. Smith. Hematite Lake. Pl. 6, Fig. 7.
**S. crenulatum* (Naegeli) Delponte. Hematite Lake. Pl. 6, Fig. 8.
**S. curvatum* West. Duncan and Hematite lakes. Pl. 6, Fig. 9.
**S. dickiei* Ralfs. Duncan Lake. Pl. 6, Fig. 10.
**S. hexacerum* (Ehrenberg) Wittrock. Hematite Lake. Pl. 6, Fig. 11.
S. leptocladum Nordstedt. Hematite Lake. Pl. 6, Fig. 12.
**S. limneticum* Schmidle. Duncan and Energy lakes. Pl. 6, Fig. 13.
S. setigerum Cleve. Duncan and Hematite lakes. Pl. 6, Fig. 14.
**Euastrum abruptum* Nordstedt. Hematite Lake. Pl. 7, Fig. 1.
**E. affine* Ralfs. Hematite Lake. Pl. 7, Fig. 2.
E. ansatum Ehrenberg. Duncan Lake. Pl. 7, Fig. 3.
E. binale (Turpin) Ehrenberg. Duncan, Energy, and Hematite lakes. Pl. 7, Fig. 4.
E. denticulatum (Kirchner) Gay. Duncan and Energy lakes. Pl. 7, Fig. 5.
E. didelta (Turpin) Ralfs. Hematite Lake. Pl. 7, Fig. 6.
E. elegans (Brebisson) Ralfs. Duncan and Hematite lakes. Pl. 7, Fig. 7.
**E. evolutum* (Nordstedt) West & West. Duncan Lake. Pl. 7, Fig. 8.
E. insulare (Wittrock) Roy. Energy Lake. Pl. 7, Fig. 9.
E. verrucosum Ehrenberg. Duncan, Energy, and Hematite lakes. Pl. 7, Fig. 10.
Micrasterias americana (Ehrenberg) Ralfs. Duncan and Hematite lakes. Pl. 7, Fig. 11.

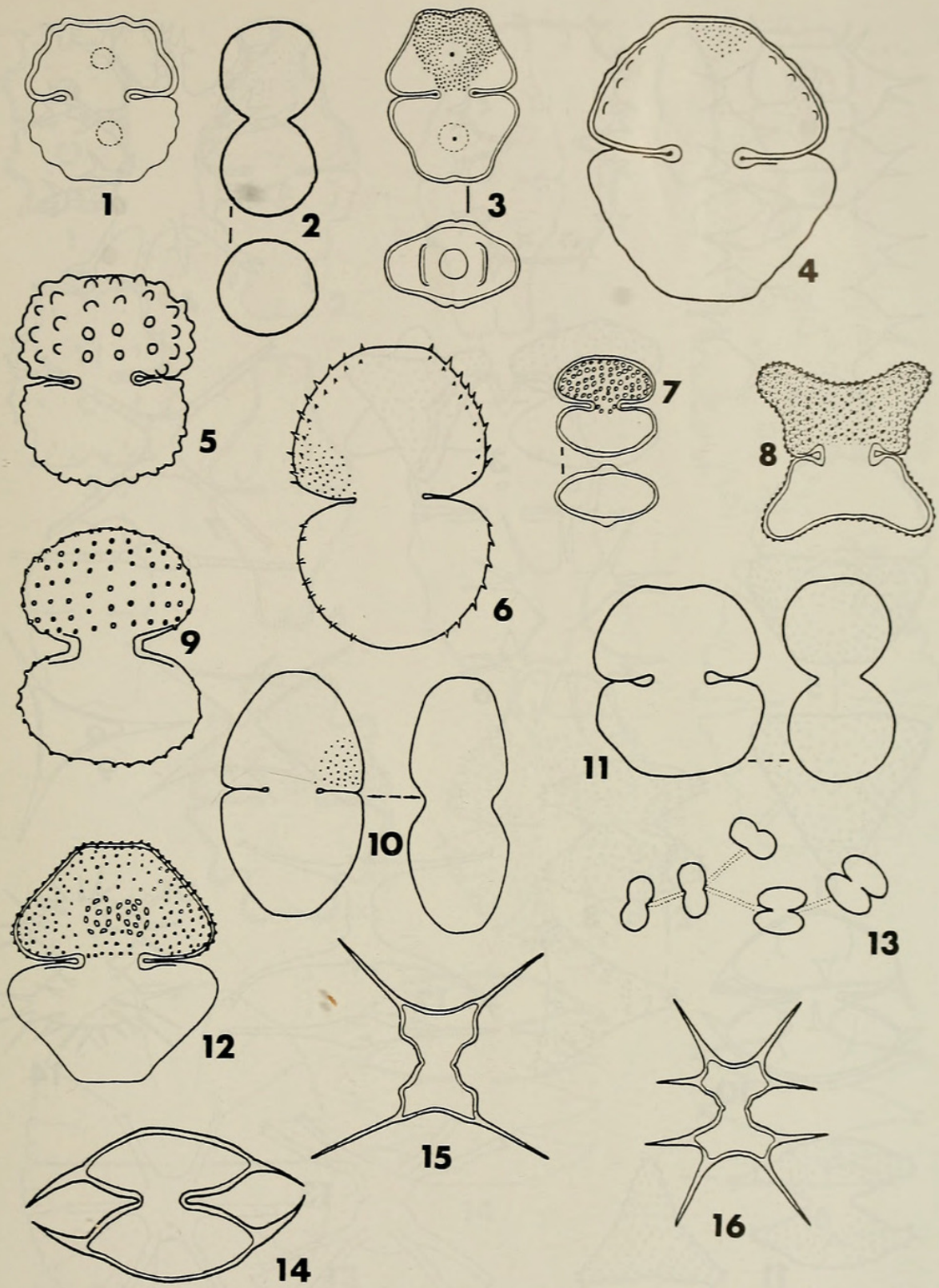

Plate 5. 1. *Cosmarium meneghinii;* 2. *C. moniliforme;* 3. *C. nymannianum;* 4. *C. obtusatum;* 5. *C. orthostichum;* 6. *C. ovale;* 7. *C. phaseolus;* 8. *C. porrectum;* 9. *C. portianum;* 10. *C. pyramidatum;* 11. *C. subtumidum;* 12. *C. turpinii;* 13. *Cosmocladium pusillum;* 14. *Arthrodesmus convergens;* 15. *A. extensus;* 16. *A. octocornis.*

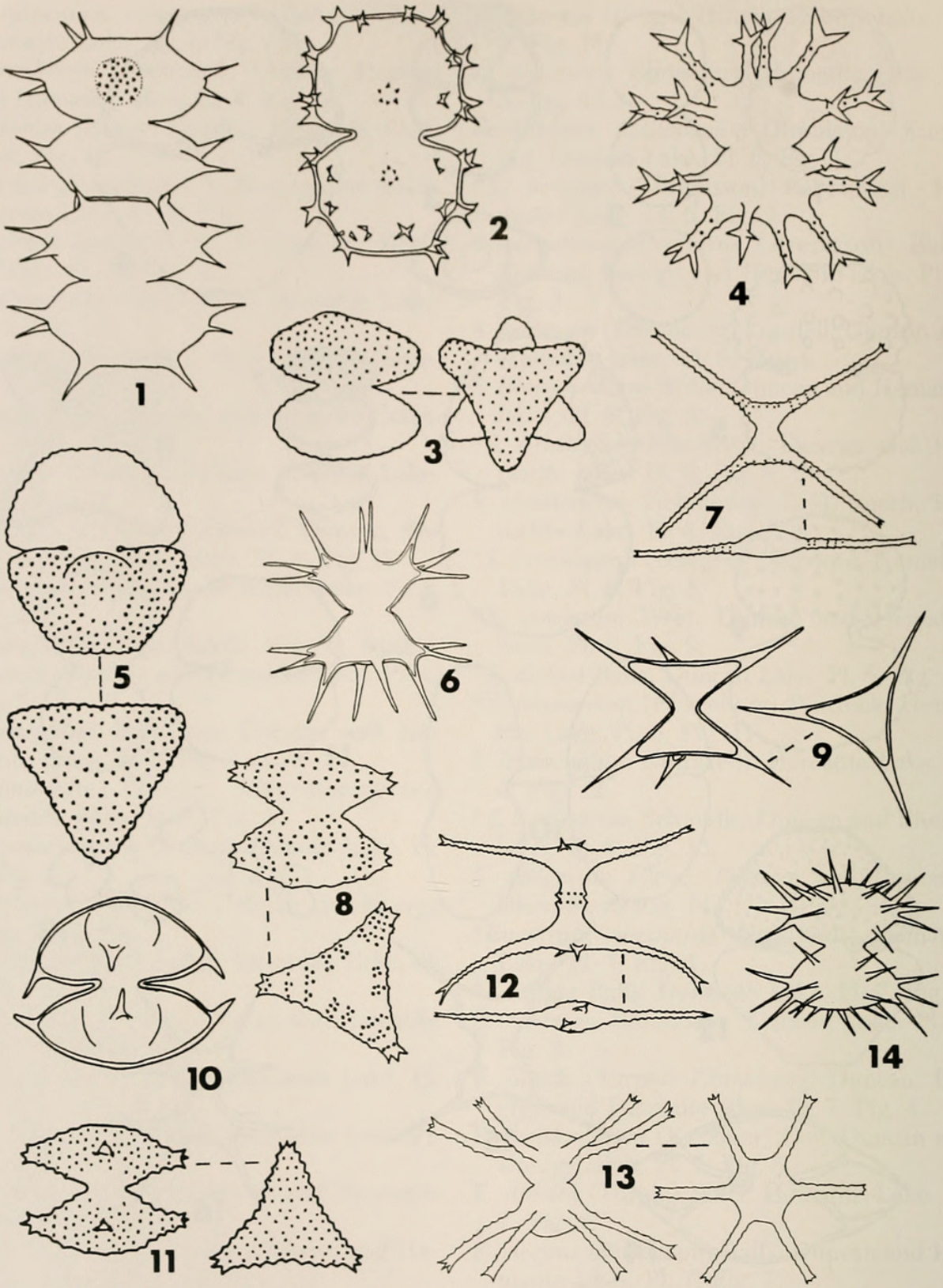

Plate 6. 1. *Xanthidium antilopaeum;* 2. *X. armatum;* 3. *Staurastrum alternans;* 4. *S. arctiscon;* 5. *S. botryophilum;* 6 *S. brasiliense;* 7. *S. chaetoceros;* 8. *S. crenulatum;* 9. *S. curvatum;* 10. *S. dickiei;* 11. *S. hexacerum;* 12. S. leptocladum 13. *S. limneticum;* 14. *S. setigerum.*

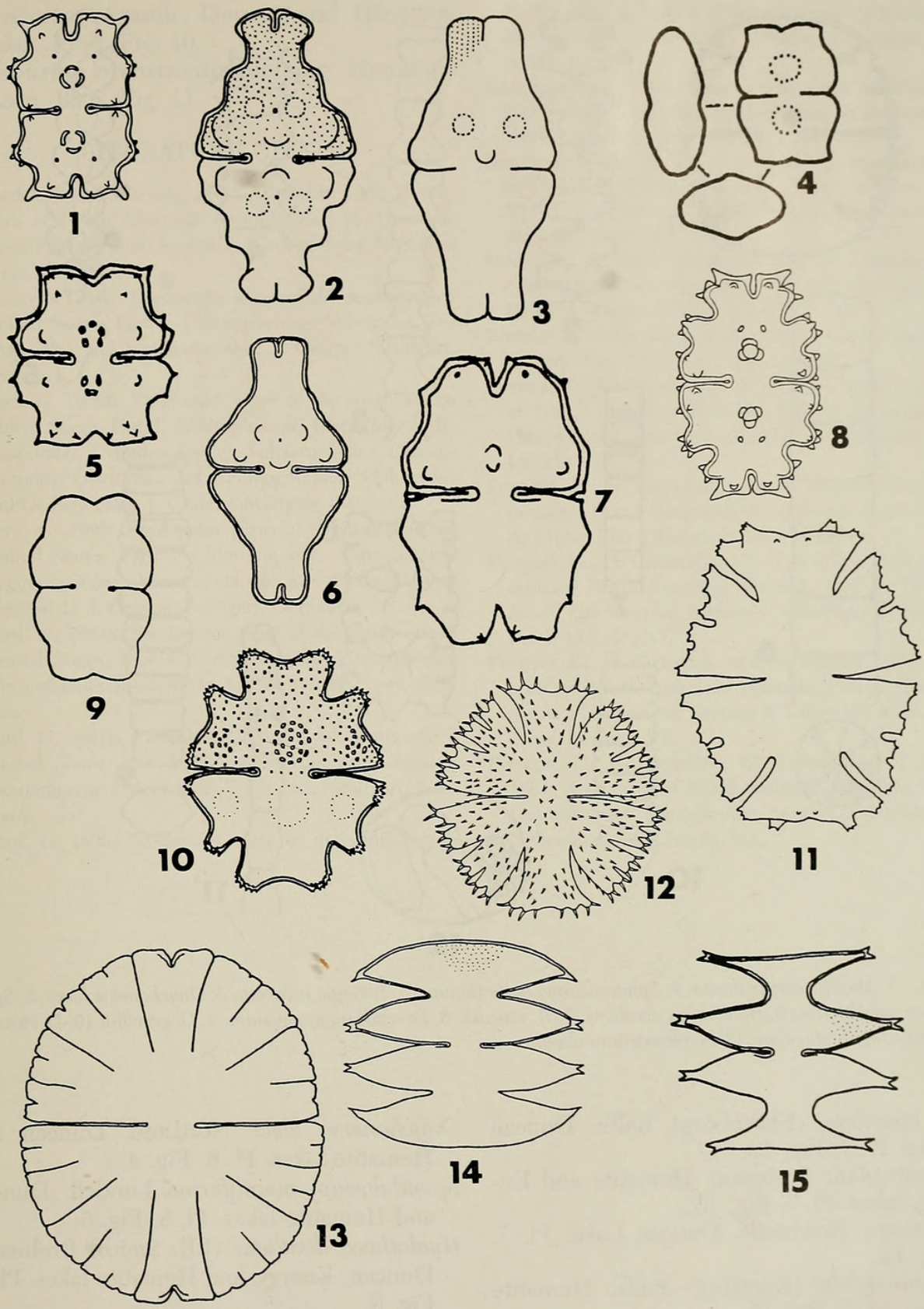

Plate 7. 1. *Euastrum abruptum;* 2. *E. affine;* 3. *E. ansatum;* 4. *E. binale;* 5. *E. denticulatum;* 6. *E. didelta;* 7. *E. elegans;* 8. *E. evolutum;* 9. *E. insulare;* 10. *E. verrucosum;* 11. *Micrasterias americana;* 12. *M. apiculata;* 13. *M. denticulata;* 14. *M. laticeps;* 15. *M. pinnatifida.*

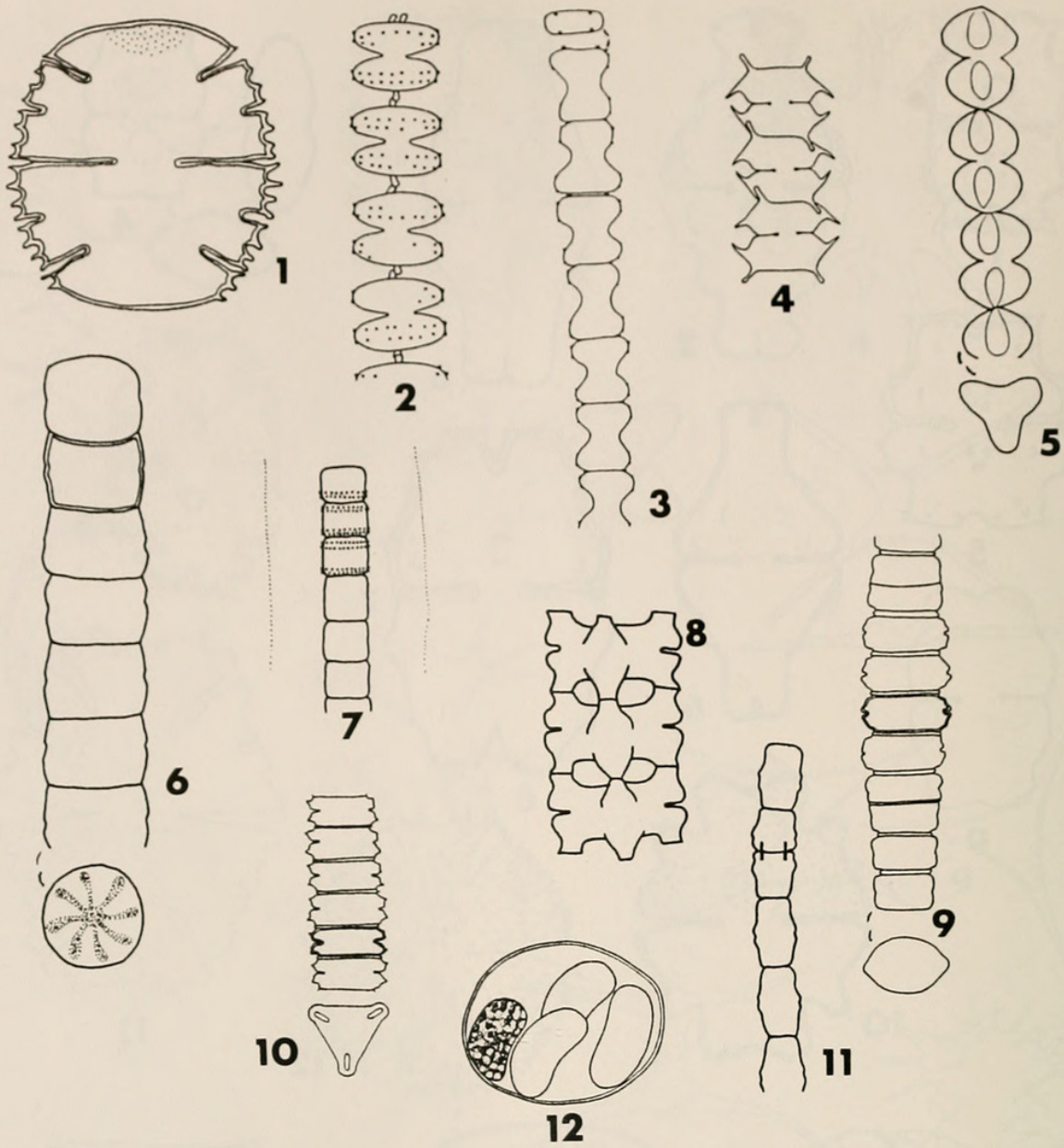

Plate 8. 1. *Micrasterias truncata*; 2. *Sphaerozosma aubertianum*; 3. *Teilingia excavata*; 4. *Onychonema laeve*; 5. *Spondylosium moniliforme*; 6. *Hyalotheca dissiliens*; 7. *H. mucosa*; 8. *Desmidium aptogonum*; 9. *D. grevillii*; 10. *D. swartzii*; 11. *Bambusina brebissonii*; 12. *Nephrocytium obesum*.

**M. apiculata* (Ehrenberg) Ralfs. Duncan Lake. Pl. 7, Fig. 12.

M. denticulata Brebisson. Hematite and Energy lakes. Pl. 7, Fig. 13.

M. laticeps Nordstedt. Duncan Lake. Pl. 7, Fig. 14.

M. pinnatifida (Kuetzing) Ralfs. Hematite Lake. Pl. 7, Fig. 15.

M. truncata (Corda) Brebisson. Duncan and Hematite lakes. Pl. 8, Fig. 1.

Sphaerozosma aubertianum West. Hematite Lake. Pl. 8, Fig. 2.

Teilingia excavata (Ralfs) Bourrelly. Duncan and Hematite lakes. Pl. 8, Fig. 3.

Onychonema laeve Nordsted. Duncan and Hematite lakes. Pl. 8, Fig. 4.

Spondylosium moniliforme Lundell. Duncan and Hematite lakes. Pl. 8, Fig. 5.

Hyalotheca dissiliens (J.E. Smith) Brebisson. Duncan, Energy, and Hematite lakes. Pl. 8, Fig. 6.

H. mucosa (Mertens) Ehrenberg. Duncan and Hematite lakes. Pl. 8, Fig. 7.

Desmidium aptogonum Brebisson. Duncan and Hematite lakes. Pl. 8, Fig. 8.

D. grevillii (Kuetzing) DeBary. Hematite Lake. Pl. 8, Fig. 9.

D. swartzii Agardh. Duncan and Hematite lakes. Pl. 8, Fig. 10.

Bambusina brebissonii Kuetzing. Hematite Lake. Pl. 8, Fig. 11.

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