

A SYNOPSIS OF THE NEW ENGLAND SPECIES OF
PLEUROTAENIUM.

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(Plate 75.)

WHILE the New England desmids have had much less attention given to them than has been given to those of the British Isles, there are nevertheless ten species of *Pleurotaenium* known from New England. There are but nine species of *Pleurotaenium* given in Wests' British Desmids. Four of our species have not been reported from the British Isles. The species are all comparatively large and conspicuous and are easily distinguished from one another. They fall naturally into three groups. The majority of the species of the genus have straight sides or in certain cases slightly undulate. The species of the second group including *P. nodosum* and *P. constrictum* have definite enlarged portions or annulations. The third group is represented by the single species *P. verrucosum*, which has the surface divided into rectangular areas in more or less distinct rings. Our species with their several varieties are given below and their distribution in New England as far as known. The records followed by an exclamation point are those from which specimens have been seen by the writer. In most points the recent monograph of the Wests has been followed. A key to the New England species is given here, based in part upon that of the Wests.

PLEUROTAENIUM Nägeli, 1849.

Cells cylindrical, circular in end view, sides straight or somewhat sinuate; semicells with a basal inflation and often with secondary ones distally, apex truncate, usually with a ring of tubercles; chloroplasts several, in irregular longitudinal bands parietally arranged.

KEY TO THE NEW ENGLAND SPECIES OF PLEUROTAENIUM.

I. Cells cylindrical or slightly attenuated, end view circular, sides nearly straight or very slightly sinuate toward the base of the semicell, or evenly curved from base to apex, not prominently sinuate and without a thickened surface pattern.

1. Apices furnished with a ring of tubercles.
 - A. Cells broadest at or near base of semicells.
 - a. Cells 10–15 times as long as wide *P. coronatum*.
 - b. Cells 6–9 times as long as wide *P. truncatum*.
 - c. Cells 15–18 times as long as wide. *P. Ehrenbergii*.
 - B. Cells broadest in middle of semicells. *P. subgeorgicum*.
2. Apices usually without tubercles.
 - A. Cells of medium size, basal inflation not usually prominent. *P. Trabecula*.
 - B. Cells very large, basal inflation prominent. *P. maximum*.
- II. Cells with a surface pattern of quadrilateral thickenings, ends circular. *P. verrucosum*.
- III. Cells with a few broad constricted areas, sides very sinuate. *P. constrictum*.
- IV. Cells with rings of nodules, end view sinuate-stellate. *P. nodosum*.

PLEUROTAENIUM CORONATUM (Bréb.) Rabenh., Flor. Europ. Algar., III, 1868, p. 143; *Docidium coronatum* Bréb., in Ralfs, Brit. Desm., 1848, p. 217, Pl. XXXV, f. 6; Wolle, Desm. U. S., 1884, p. 49, Pl. XI, f. 9–10. Cells large, 10–15 times as long as wide, gradually attenuated from base to apex, prominent basal inflation, sides undulate, apex truncate with 6–8 blunt tubercles. Length 340–575 μ ; breadth at base 34–63 μ ; apex 27–40 μ .—Me.: Bridgeton! N. H.: Noone's Station!; Pudding Pond, North Conway! Mass.: Lake Quinsigamond, Worcester (Stone); Plainville! Randolph! Bridge-water!

P. CORONATUM var. FLUCTUATUM West, Jour. Linn. Soc. Bot., Vol. XXIX, 1892, p. 118, Pl. XIX, fig. 11. Cells considerably larger than in the typical form, 12–14 times as long as broad, sides of semicells undulate for their entire length. Length 850–900 μ ; breadth at base 65–72 μ ; apex 46–50 μ .—N. H.: Intervale! Mass.: Lake Watuppa, Fall River! This is one of the largest of our desmids and is easily visible without a lens. It is not common.

P. CORONATUM var. NODULOSUM (Bréb.) West, Jour. Linn. Soc. Bot., Vol. XXIX, 1892, p. 119. *Docidium nodulosum* Bréb. in Ralfs, Brit. Desm., 1848, p. 155, Pl. XXVI, fig. 1. Semicells with the basal inflation and apical tubercles much reduced. Length 560 μ ; breadth at base 65 μ ; apex 46 μ .—Mass.: Amherst (W. West); Salem (Bailey). R. I.: Wainskut pond, North Providence (Bailey). I have not found this variety myself in New England although it has several times been reported by others. The measurements are given from an Ohio specimen which was typical.

P. TRUNCATUM (Bréb.) Näg., Gatt. Einz. Alg., 1849, p. 104. *Closterium truncatum* Bréb. in Chev., Micr., 1839, p. 272. *Docidium truncatum* Bréb. in Ralfs, Brit. Desm., 1848, p. 156, Pl. XXVI, fig. 2; Wolle, Desm. U. S., 1884, p. 48, Pl. IX, figs. 6 & 7. Cells large, 6–9 times as long as wide, decidedly attenuated towards the apex, 11–15 apical tubercles, their bases depressed below the actual end of the semi-cell; cell wall coarsely punctate. Length 450–520 μ ; breadth 53–80 μ ; apex 37–45 μ .—Me.: Orono (Harvey, W. West). Mass.: Pondville! Carver's Pond, Bridgewater! This does not appear to be common in New England, as it has appeared in but two of the many lots of material examined. It seems to be common in the British Isles, however, and has a wide distribution elsewhere.

P. EHRENBERGII (Bréb.) DeBary, Conj., 1858, p. 75. *Docidium Ehrenbergii* Bréb. in Dict. Univ. Hist. Nat., 1844, Vol. V, p. 93. Cells of medium size, 15–18 times as long as wide, somewhat attenuated towards the apices, a basal inflation and one or two additional ones above it; apices with 7–9 tubercles, cell wall punctate. Length 350–496 μ ; breadth 21–32 μ ; apex 12.5–19 μ .—Mass.: Tewksbury (Lagerheim)! Randolph! Halifax! Lake Watuppa, Fall River! Nantucket! Although this is the most frequent species of the genus in the British Isles according to the Wests, in New England there are other species that occur more frequently.

P. EHRENBERGII var. ELONGATUM West, Jour. Linn. Soc. Bot., Vol. XXIX, 1892, p. 119. Cells narrow and much elongated, about 25 times longer than the diameter. Length 573–660 μ ; breadth 25–30 μ ; apex 19–22 μ .—N. H.: Pudding Pond, North Conway! Mass.: Halifax!

P. EHRENBERGII var. UNDULATUM Schaarschm., Magyar Tudom. Akad. Math. s. Termeszettud. Kozlemenyei, Vol. XVIII, 1882, p. 278, Pl. I, fig. 21. Cells larger than in the typical form and with the sides undulate throughout their length. Length 496 μ ; breadth 25 μ ; apex 15 μ .—N. H.: Pudding Pond, North Conway!

P. TRABECULA (Ehrenb.) Näg., Gatt. Einz. Alg., 1849, p. 104, Pl. VI, fig. A. *Closterium Trabecula* Ehrenb., Beitr. zur Kenntniss der Organismen der Infus., 1830, p. 62. *Docidium Trabecula* Wolle, Desm. U. S., 1884, p. 48, Pl. IX, figs. 2–4, Pl. XII, figs. 1–7. Cells large, 9–19 times as long as wide, sides of semicells nearly straight, apices rounded truncate, usually without tubercles. Length 320–620 μ ; breadth at base 25–44 μ ; apex 23–27 μ .—Me.: Orono (Har-

vey); Kittery, common! N. H.: North Woodstock! Noone's Station! Mass.: Near Salem (*Bailey*); Amherst (*W. West*); Reading! Plainville! Carver's Pond, Bridgewater! Long Pond, Tewksbury! Nantucket!

P. TRABECULA forma GRANULATUM G. S. West, Jour. Bot., Vol. XXXVII, 1899, p. 113, Pl. CCCXCVI, fig. 6. "Cell wall distinctly and irregularly granulate." Length $505\ \mu$; breadth at base of semicells $34\ \mu$; apex $28\ \mu$.—N. H.: Mt. Moosilauke!

P. TRABECULA forma CLAVATUM (Kütz.) W. & G. S. West, Bot. Trans. Yorks. Nat. Union, Vol. V, 1902, p. 58. *Docidium clavatum* Kütz. in Ralfs, Brit. Desm., 1848, p. 156, Pl. XXVI, fig. 3; Wolle, Desm. U. S., 1884, p. 48, Pl. IX, fig. 8. "Cells about 12 times longer than their diameter; semicells slightly tumid and subclavate." Length $360\ \mu$; breadth at base, $31\ \mu$; apex $25\ \mu$.—Mass.: West Bridgewater!

P. TRABECULA var. RECTUM (Delp.) W. & G. S. West, Brit. Desm. Vol. I, 1904, p. 212, Pl. XXX, figs. 9–10. *Pleurotaenium rectum* Delp., Mem. R. Accad. Scienze di Torino, ser. 2, Vol. XXX, 1877, p. 129, Pl. XX, figs. 8–11. Cells smaller than the typical, 12–15 times as long as wide. Length $250\ \mu$; breadth at base of semicells $18.5\ \mu$; apex $15\ \mu$.—N. H.: North Woodstock! Mass.: North Eastham (*F. S. Collins*)!

P. SUBGEORGICUM Cushman, RHODORA, Vol. VII, 1905, p. 117, Pl. LXI, fig. 4. Cells large, 12–15 times as long as wide, semicells widest at a point more than midway from the isthmus, thence tapering gradually to either end; basal portion with several inflations, remaining portion of the sides smooth; apex truncated, with a crown of 10 bluntly rounded tubercles. Length $600\text{--}700\ \mu$; breadth at base $30\text{--}35\ \mu$; at middle of semicells $45\text{--}58\ \mu$; apex $25\text{--}30\ \mu$.—N. H.: North Woodstock!

P. MAXIMUM (Reinsch) Lund., Nova Acta Reg. Soc. Scient. Upsala, ser. 3, Vol. VIII, 1871, p. 89. *Docidium maximum* Reinsch, Spec. Gen. Alg., 1867, p. 140, Pl. XX. C, figs. 1–2. *D. Archeri* Wolle, Desm. U. S., ed. II, 1892, p. 51, Pl. XII, fig. 2. Cells large, 14–18 times as long as wide; apices truncate with rounded angles; prominent basal inflation. Length $600\text{--}850\ \mu$; breadth at base $40\text{--}55\ \mu$; apex $22\text{--}30\ \mu$.—Me.: Orono (*W. West*). Mass.: Amherst (*W. West*).

P. INDICUM (Grun.) Lund., Nova Acta Reg. Soc. Scient. Upsala, ser. 3, Vol. VIII, 1871, p. 90. *Docidium indicum* Grun., Desmid. Banka, 1865, p. 13, Pl. II, fig. 18. Length $630\ \mu$; breadth at base

21 μ ; apex 16 μ .—Mass.: Tewksbury (*Lagerheim*). This species rests upon this record and could not be verified although many of the records of Lagerheim have been gone over by the writer from some of the material from which Lagerheim took his desmids. For the present it must remain as a single record.

P. CONSTRICTUM (Bail.) Wood, F. W. *Algae N. Am.*, 1873, p. 121. *Docidium constrictum* Bail. in Ralfs, *Brit. Desm.*, 1848, p. 218, Pl. XXXV, fig. 7. Wolle, *Desm. U. S.*, 1884, p. 50, Pl. XI, fig. 2. Cells large, 12–15 times as long as wide, very slightly attenuated from base to apex; a prominent basal inflation and three or four others in each semicell; apices truncate with a peripheral ring, usually 8 large bluntly pointed tubercles, membrane evenly punctate; basal inflation occasionally with small plications, usually 8 in number. Length 435–560 μ ; breadth at base 40–50 μ ; apex 25–32 μ .—N. H.: Laconia, scarce, (*Wests*); Pudding Pond, North Conway! Mass.: Tewksbury (*Lagerheim*). R. I.: Worden's Pond, North Providence (*Bailey*).

P. NODOSUM (Bail.) Lund., *Nova Acta Reg. Soc. Scient. Upsala*, ser. 3, Vol. VIII, 1871, p. 90. *Docidium nodosum* Bailey in Ralfs, *Brit. Desm.*, 1848, p. 218, Pl. XXXV, fig. 8. Wolle, *Desm. U. S.*, 1884, p. 50, Pl. XI, figs. 11–12, Pl. XII, fig. 20. Cells large, 7–10 times as long as wide, semicells with rings of nodules, usually four in number including the basal ring and equidistant, 6–8 nodules in each ring; apices dilated, with a ring of 6–8 tubercles. Length 300–460 μ ; breadth at base 40–70 μ ; apex 28–40 μ .—Me.: Orono (*Harvey*). N. H.: Laconia (*Wests*); Pudding Pond, North Conway! Intervale! Noone's Station! Mass.: Near Salem (*Bailey*); Lake Quinsigamond, Worcester (*Stone*); Carver's Pond, Bridgewater! R. I.: Wainskut Pond, North Providence (*Bailey*). This seems to be one of the commonest species of the genus in New England. It is rare in the British Isles.

P. VERRUCOSUM (Bail.) Lund., *Nova Acta Reg. Soc. Scient. Upsala*, ser. 3, Vol. VIII, 1871, p. 6. *Closterium verrucosum* Bail., *Am. Jour. Sci.*, n. s. Vol. I, 1846, p. 127, fig. 4. *Docidium verrucosum* Bail. in Ralfs, *Brit. Desm.*, 1848, p. 218. Wolle, *Desm. U. S.*, 1884, p. 52, Pl. X, figs. 4–5. Cells of medium size, about 10–15 times as long as wide, semicells with straight sides, slight inflation at the base, cell wall with 13–15 rings of irregularly quadrilateral areas, the last ring distally more elongated than the others. Length 400–460 μ ; breadth at base 30–40 μ ; apex 22–30 μ .—N. H.: Pudding Pond, North Conway, frequent! Mass.: Mt. Everett (*Wolle*). R. I.: Near Providence (*Bailey*).

EXPLANATION OF PLATE 75.

- Fig. 1. *Pleurotaenium coronatum* (Bréb.) Rabenh., $\times 351$.
 Fig. 2. " *truncatum* (Bréb.) Näg. (after W. & G. S. West)
 $\times 310$.
 Fig. 3. " *Ehrenbergii* (Bréb.) DeBary, $\times 350$
 Fig. 4. " *Trabecula* (Ehrenb.) Näg., $\times 350$.
 Fig. 5. " *subgeorgicum* Cushman, $\times 350$.
 Fig. 6. " *constrictum* (Bail.) Lund., $\times 350$.
 Fig. 7. " *nodosum* (Bail.) Lund., $\times 350$.
 Fig. 8. " *verrucosum* (Bail.) Lund., $\times 350$.

STREPTOPUS OREOPOLUS A POSSIBLE HYBRID.—In April, 1906, I described from the alpine region of Mt. Albert, Gaspé Co., Quebec, as *Streptopus oreopolus*¹ a plant which in some ways combined characteristics of *S. amplexifolius* and *S. roseus*, but in its deep claret-colored perianth was unlike either. The original description was based upon simple or subsimple alpine specimens, and at that time the plant was known only from a limited area on Mt. Albert.

During the summer of 1906, however, Professor J. Franklin Collins and the writer found *Streptopus oreopolus* in company with *S. amplexifolius* and *S. roseus* abundant along alpine brooks on the northern hornblende slopes of Mt. Albert, and in extreme abundance everywhere on alpine meadows and in the open park-like subalpine forests of the granitic tableland of Table-top Mountain. In fact, on Table-top Mountain *S. oreopolus* impresses one as perhaps the most abundant plant of the cool slopes and alpine meadows, always more abundant than *S. roseus* and *S. amplexifolius*, maintaining its slightly ciliate-hispid stems and leaves (pronouncedly less ciliate than in *S. roseus*) and its attractive flowers, in form and structure like those of *S. amplexifolius* but always a deep claret-purple in color.

Since the fruit of this local plant of the Gaspé mountains was still unknown we took special interest in examining daily, through our four weeks' residence in the alpine areas, the colonies of *Streptopus*. The result of a very close observation of the plants over an area of about one hundred square miles was that, while both *S. roseus* and *S. amplexifolius* were found to mature abundant fruit, not a single plant of *S. oreopolus* could be found with even a vestige of good fruit. In

¹ RHODORA, viii, 70 (1906).



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