Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

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Vol. 10. January, 1908. No. 109.

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Boston, Mass.
740 Exchange Building.

Providence, R. I.
Preston and Rounds Co.

RHODORA.—A monthly journal of botany, devoted primarily to the flora of New England. Price $1.00 per year ($1.25 to all foreign countries including Canada); single copies 15 cents. Volume 1, $2.00, Vol. 2, $1.50. All remittances by check or draft, except on Boston or New York, must include ten cents additional for cost of collection. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be gladly received and published to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than one page of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.

Address manuscripts and proofs to
B. L. ROBINSON, Clement Circle, Cambridge, Mass.

Subscriptions, advertisements, and business communications to
W. P. RICH, 300 Massachusetts Avenue, Boston, Mass.

Single copies may be had from
E. L. RAND, Corresponding Sec'y N. E. Botanical Club,
740 Exchange Building, Boston, Mass.

Entered at Boston, Mass., Post office as Second Class Mail Matter

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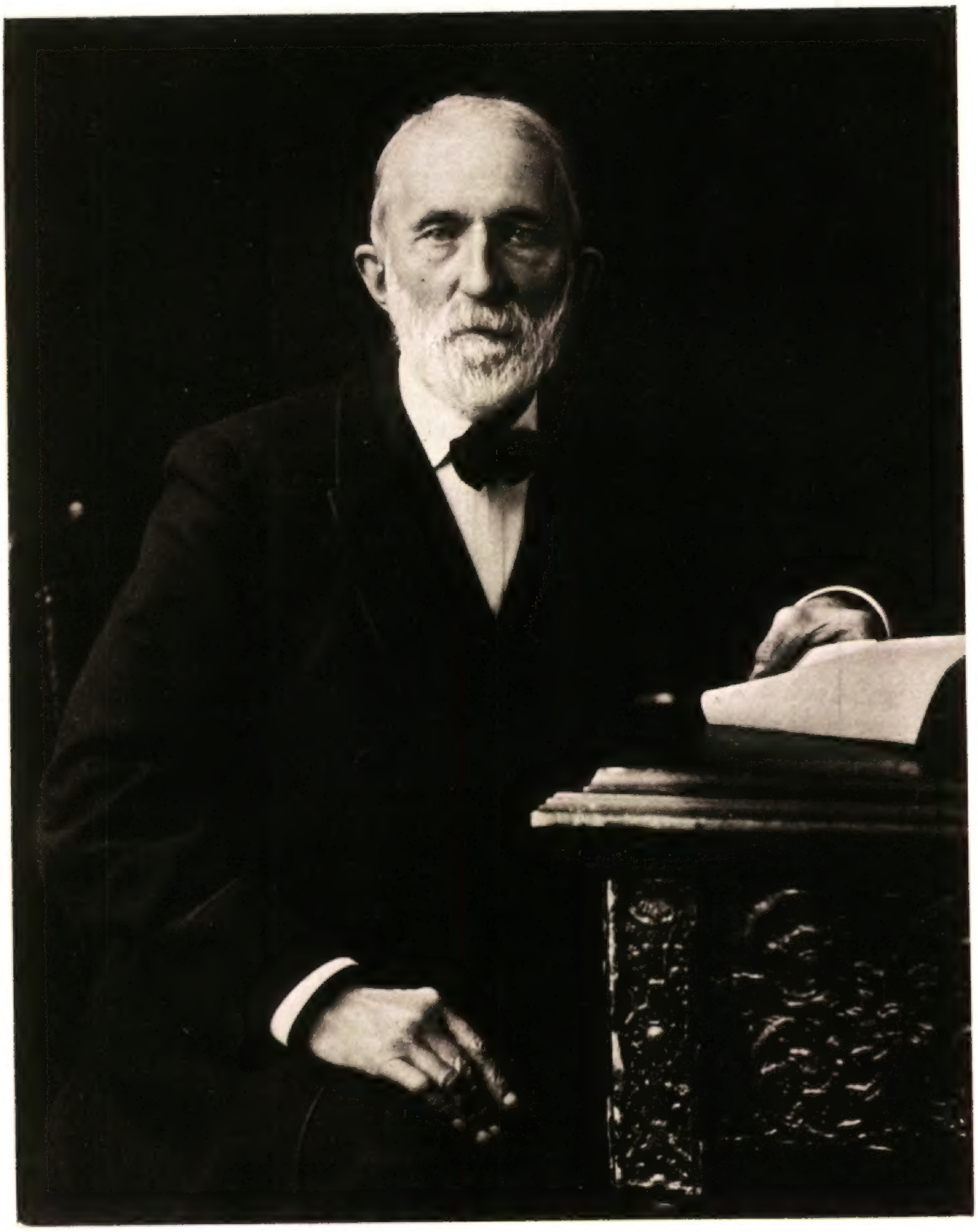
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Very Truly Yours
George E. Davenport

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. January, 1908. No. 109.

GEORGE EDWARD DAVENPORT.

F. S. Collins.

(With portrait.)

George Edward Davenport was born in Boston, August 3d, 1833, the son of William E. and Deborah (Skidmore) Davenport, both of old Boston families. He completed the regular public school course, graduating from the High School. At twenty years of age he married Miss Mary Francis and removed to South Boston, remaining there until 1875, after which date his home was at Medford. He died November 27, 1907, leaving a wife, eight children, ten grandchildren and one great grandchild.

Even in his school days he was much interested in nature studies, soon concentrating the interest on botany, later making ferns a specialty, which they remained all of his life. The study, however, had to be pursued in what time was left from an active business, which he kept up till two years before his death. In all the study of the ferns for the past forty years he had a noteworthy part; though no work of great volume remains from his pen, his influence is to be seen in much of what has been published by others, and his shorter articles are to be found in many botanical publications, notably the Bulletin of the Torrey Botanical Club, the Fern Bulletin and Rhodora. The bibliography of these articles at the end of this note, compiled by Miss Mary A. Day of the Gray Herbarium, is probably fairly complete, but does not attempt to include the many articles he wrote referring more especially to forestry or horticulture. He had long been at work on a manual of the North American ferns, but when his release from business cares gave him the time he so much needed for the task, sight and strength were no longer equal to it, much to his sorrow. The last

two years his time was largely spent in his garden; here in small compass was a remarkable variety of conditions, rich ground, swamp, rocky hillside; here he had growing nearly every fern found in New England, and here too he watched with much interest a little group of flowering plants, selected as best showing the phenomena of heredity and mutation that now attract so much interest. The enthusiasm with which he showed me these treasures one Sunday morning early in last October, will always be a most pleasant recollection.

It would seem that an active business life and the thorough study of a specialty would be all that one could achieve; but he had other interests as well. He was an active worker in the anti-slavery movement, one of the first to be interested in labor reform questions, a leading spirit in the work of securing for the public the Middlesex Fells, and for eighteen years he was a member of the school board of Medford. He was an original member of the New England Botanical Club, a life member of the Massachusetts Horticultural Society and a fellow of the American Academy of Arts and Sciences.

I first became acquainted with him at the time of the formation of the Middlesex Scientific Field Club, of which he was one of the chief promoters; in the many excursions we made in the Fells region and elsewhere in the county he was a leader, and his knowledge of the region was of much value for the Flora of the county, published by the Middlesex Institute; he was always ready to give his time and advice to those of us who were then beginners, and whose ignorance must have seemed to him monumental. He was a man of strong and enduring attachments; sensitive as a woman, but with a man's courage in defense of his convictions. Whatever he believed in he championed with an almost passionate devotion; whether it were the giving of freedom to the slave, the rescuing of the Fells from destruction, or the true theory of the terminal bud of Botrychium, he would fight for it as long as his strength endured. That others could not take the same stand, indeed might hold other views, seemed often to surprise and distress him, but never impaired his kindness of heart to the delinquents. Though a careful student of details of structure and development, he never lost sight of the beauty of the living plant, and he was a lover of nature all his life. No more fitting end to his life can be imagined than that which came to him, in open air, among the familiar objects of his loved Middlesex Fells, now, so much by his own exertions, safe for all time.

The Botanical Writings of the late George Edward Davenport.

[The following list of Mr. Davenport's writings has been kindly prepared at our request by Miss Mary A. Day to accompany the above sketch. It is due to Miss Day to state that the compilation has been made with unavoidable haste and during pressure of other work. Although a wide range of periodical literature has been examined and all Mr. Davenport's botanical papers and notes have been included so far as they have been found, it is quite possible that some titles have been overlooked, especially as Mr. Davenport's botanical activity extended through a long period of years and his publications have been widely scattered. — Ed.]

1. Catalogue of North American ferns in the herbarium presented to the Massachusetts Horticultural Society by George E. Davenport, June 5, 1875.

1a. Flora of Medford [with a full account of the ferns of Massachusetts. Being a series of papers published in the Medford Chronicle]. 1875–1876.

2. Asplenium Filix–foemina, Bernh. var. laciniatum, Moore. Bull. Torr. Bot. Club, vi. 88. Apr. 1876.

3. Aspidium Thelypteris, Swz. Bull. Torr. Bot. Club, vi. 113. Oct. 1876.

4. Forking ferns. Bot. Gaz. ii. 80–81. Feb. 1877.

5. Aspidium spinulosum Swz. Bot. Gaz. ii. 81. Feb. 1877.

6. Variations in Lomaria and Polypodium. Bull. Torr. Bot. Club, vi. 136. Feb. 1877.

7. Asplenium Filix-foemina, var. laciniatum Moore. Bull. Torr. Bot. Club, vi. 168. Aug. 1877.

8. Vitality in ferns. Bot. Gaz. ii. 134. Sept. 1877.

9. Botrychium Lunaria in New York state. Bull. Torr. Bot. Club, vi. 176. Sept. 1877.

10. Variations of color in flowers. Bot. Gaz. ii. 141–142. Oct. 1877.

11. Notes on Botrychium simplex, Hitchcock. Nov. 1877.

12. A new Cheilanthes. Bull. Torr. Bot. Club, vi. 190–191. Dec. 1877.

13. Vernation in Botrychia, with special reference to its importance as a means for distinguishing the different species. Bull. Torr. Bot. Club, vi. 193–199, plate. Jan. 1878.

14. ASPLENIUM EBENOIDES, R. R. SCOTT. Bull. Torr. Bot. Club, vi. 200. Jan. 1878.
15. CAMPTOSORUS IN EASTERN MASSACHUSETTS. Bull. Torr. Bot. Club, vi. 206. Feb. 1878.
16. BOTRYCHIUM SIMPLEX, HITCHC., IN MASS. Bull. Torr. Bot. Club, vi. 234. June, 1878.
17. POLYGAMOUS FLOWERS IN POPULUS. Bot. Gaz. iii. 51. June, 1878.
18. FERNS OF KENTUCKY. Bot. Gaz. iii. 54–55. June, 1878.
19. ASPIDIUM SPINULOSUM (SWARTZ) AND ITS VARIETIES. Am. Nat. xii. 707–717. Nov. 1878.
20. CATALOGUE OF THE "DAVENPORT HERBARIUM" OF NORTH AMERICAN FERNS NORTH OF MEXICO. Salem, 1879.
21. ASPIDIUM BOOTTII TUCKERMAN. Am. Nat. xiii. 186-188. Mar. 1879.
22. FERN ETCHINGS. BY JOHN WILLIAMSON, AUTHOR OF THE FERNS OF KENTUCKY, LOUISVILLE, KY. JOHN P. MORTON & CO., PUBLISHERS. Bull. Torr. Bot. Club, vi. 351. Oct. 1879.
23. TRAPA NATANS. Bull. Torr. Bot. Club, vi. 352. Oct. 1879.
24. PTERIS AQUILINA. Bot. Gaz. v. 30–31. Mar. 1880.
25. A NEW FERN. Bull. Torr. Bot. Club, vii. 50–51. May, 1880.
26. FERN NOTES. Bull. Torr. Bot. Club, vii. 85–86. Aug. 1880.
27. "SYSTEMATIC FERN-LIST." Bot. Gaz. v. 131–132. Oct. 1880.
28. VERNATION OF BOTRYCHIUM BOREALE, MILDE. Bull. Torr. Bot. Club, vii. 115–116. Nov. 1880.
29. THE FLORA OF ESSEX COUNTY, MASSACHUSETTS, JOHN ROBINSON, ESSEX INSTITUTE, SALEM, 1880. Bot. Gaz. vi. 187–188. Mar. 1881.
30. THE HERBARIA AND BOTANICAL LIBRARIES OF THE UNITED STATES. IV. THE MASSACHUSETTS HORTICULTURAL SOCIETY. Bull. Torr. Bot. Club, viii. 30–32. Mar. 1881.
31. A NEW AMERICAN FERN. Bull. Torr. Bot. Club, viii. 61–62, pl. 8. June, 1881.
32. FERN NOTES. II. Bull. Torr. Bot. Club, viii. 88–89. Aug. 1881.
33. "OUR NATIVE FERNS." Bot. Gaz. vi. 264. Sept. 1881.
34. VERNATION IN BOTRYCHIA. Bull. Torr. Bot. Club, viii. 100–101. Sept. 1881.

35. ONOCLEA SENSIBILIS, VAR. OBTUSILOBATA. Bull. Torr. Bot. Club, viii. 109–111. Oct. 1881.
36. CHEILANTHES MYRIOPHYLLA, DESV. Bull. Torr. Bot. Club, viii. 116. Oct. 1881.
37. WOODSIA OBTUSA, TORREY. Bull. Torr. Bot. Club, viii. 116. Oct. 1881.
38. AN INTERESTING FERNERY. Bot. Gaz. vi. 295–296. Dec. 1881.
39. FERN NOTES. III. Bull. Torr. Bot. Club, ix. 20–23. Feb. 1882.
40. A BIT OF FERN HISTORY. Bot. Gaz. vii. 60–64. May, 1882.
41. FERN NOTES. IV. Bull. Torr. Bot. Club, ix. 68–69. May, 1882.
42. OPHIOGLOSSUM NUDICAULE, L. FIL. Bull. Torr. Bot. Club, ix. 71–72. May, 1882.
43. FERN NOTES. V. Bull. Torr. Bot. Club, ix. 99–101. Aug. 1882.
44. OUR NATIVE FERNS AND THEIR ALLIES, WITH SYNOPTICAL DESCRIPTIONS OF AMERICAN PTERIDOPHYTA NORTH OF MEXICO. BY LUCIEN M. UNDERWOOD, PH.D. 2d EDITION. BLOOMINGTON, ILL. 1882. Bull. Torr. Bot. Club, ix. 108. Aug. 1882.
45. SOME ALASKA FERNS, WITH NOTES. Bot. Gaz. vii. 96–97. Aug.–Sept. 1882.
46. ALBINISM IN GENTIANA CRINITA. Bot. Gaz. vii. 135. Nov. 1882.
47. ALASKA FERNS. Bot. Gaz. viii. 160. Jan. 1883.
48. FERN NOTES. VI. Bull. Torr. Bot. Club, x. 4–7. Jan. 1883.
49. SOME COMPARATIVE TABLES SHOWING THE DISTRIBUTION OF FERNS IN THE UNITED STATES OF NORTH AMERICA. Am. Phil. Soc. Proc. xx. 605–612. Feb. 1883.
50. CATALOGUE OF THE DAVENPORT HERBARIUM. SUPPLEMENT. Mar. 1883.
51. ASPIDIUM LONCHITIS SWZ. Bull. Torr. Bot. Club, x. 40: Apr. 1883.
52. NORTH AMERICAN FERNS. Apr. 1883.
53. A NEW FERN. Bull. Torr. Bot. Club, x. 61–62, pl. 34. June, 1883.
54. JOHN WILLIAMSON.— OBITUARY. Bot. Gaz. ix. 122–126. Aug. 1884.

55. FERN NOTES. VII. Bull. Torr. Bot. Club, xii. 21–24. Feb. & Mar. 1885.
56. LINES ON DR. ASA GRAY'S SEVENTY-FIFTH BIRTHDAY, NOVEMBER 18, 1885. Bot. Gaz. xi. 9. Jan. 1886.
57. REVERCHON'S TEXAS FERNS. Bot. Gaz. xi. 67. Mar. 1886.
58. FERN NOTES. VIII. Bull. Torr. Bot. Club, xiii. 81–82. May, 1886.
59. FERN NOTES. IX. LIST OF FERNS COLLECTED ON THE MOUNTAINS NEAR THE CITY OF CHIHUAHUA, MEXICO, DURING THE SEASON OF 1885, BY C. G. PRINGLE, OF CHARLOTTE, VERMONT. Bull. Torr. Bot. Club, xiii. 129–135, pl. 58. Aug. 1886.
60. OPHIOGLOSSACEAE OF THE UNITED STATES. Vick's Ill. Mag: 1888, 71–74.
61. FERN NOTES. X. CHEILANTHES FIBRILLOSA, DAVENPORT, IN HERB. MASS. HORT. SOC'Y, 1884, AND IN UNDERWOOD, OUR NATIVE FERNS, 3d ED.; LIST OF FERNS COLLECTED IN THE STATES OF MEXICO AND CHIHUAHUA, MEXICO, BY C. G. PRINGLE, DURING THE SEASONS OF 1886–87. Bull. Torr. Bot. Club, xv. 225–229. Sept. 1888.
62. OBSERVATIONS ON THE NEW TEXAS FERN NOTHOLAENA NEALLYI SEATON, AS DESCRIBED IN "CONTRIBUTIONS FROM THE U. S. HERBARIUM," II, P. 61, NO. 894, JUNE, 1890, AND A MEXICAN FERN COLLECTED BY C. G. PRINGLE NEAR GUADALAJARA IN 1888. Bot. Gaz. xvi. 53–54. Feb. 1891.
63. FILICES MEXICANAE. I. Gard. & For. iv. 448–450, fig. 71. Sept. 1891.
64. FILICES MEXICANAE. II. Gard. & For. iv. 483–484, fig. 75. Oct. 1891.
65. FILICES MEXICANAE. III. Gard. & For. iv. 519–520, fig. 80. Nov. 1891.
66. FILICES MEXICANAE. IV. Gard. & For. iv. 555–556, fig. 88. Nov. 1891.
67. FILICES MEXICANAE. V. AN ENUMERATION OF THE FERNS COLLECTED IN MEXICO BY C. G. PRINGLE OF CHARLOTTE, VERMONT, DURING THE SEASONS 1891–1892 AND 1893. Bot. Gaz. xix. 389–396. Oct. 1894.
68. TWO NEW FERNS FROM NEW ENGLAND, WITH SOME OBSERVATIONS ON HYBRIDITY AND NOMENCLATURE. Bot. Gaz. xix. 492–497. Dec. 1894.

69. Aspidium simulatum Dav. Bot. Gaz. xx. 229–230. May, 1895.
70. Daniel Cady Eaton. Bot. Gaz. xx. 366–369, pl. 26A. Aug. 1895.
71. Botanical nomenclature. Bot. Gaz. xxi. 85–88. Feb. 1896.
72. Filices Mexicanae. VI. Ferns collected in the states of Oaxaca, Morelos and Vera Cruz, Mexico, during the seasons of 1894 and 1895 by C. G. Pringle, of Charlotte, Vermont. Bot. Gaz. xxi. 253–265, pl. 18. May, 1896.
73. Aspidium cristatum × marginale Davenport. Fern Bull. iv. 40. July, 1896.
74. [Letter relating to the Boston fern, Nephrolepis exaltata, var. bostoniensis Davenport, n. var.] The New England Florist, ii. 136–137, reprinted on p. 150, figures. Sept. 1896.
75. Aspidium cristatum × marginale Davenport. Gard. & For. ix. 444–446, fig. 58. Nov. 1896.
76. On the use of the term "frond" as applied to ferns. Bot. Gaz. xxii. 497–498. Dec. 1896.
77. Aspidium simulatum. Gard. & For. ix. 484, fig. 69. Dec. 1896.
78. Botrychium ternatum Swz. var. lunarioides (Michx.) Milde. Bot. Gaz. xxiii. 282–287. Apr. 1897.
79. Wind-blown ferneries. Fern Bull. v. 24–25. Apr. 1897.
80. Botrychium ternatum Swz., and its varieties. Fern Bull. v. 40–43. July, 1897.
81. Abnormal forms of hybridity in ferns. Linnaean Fern Chapter (Boston Meeting), 1–11. 1899.
82. Acrostichum lomarioides Jenman. Bull. Torr. Bot. Club, xxvi. 318–319. June, 1899.
83. Lycopodium alopecuroides. Fern Bull. vii. 97. Oct. 1899.
84. Ferns of Maranacook, Maine. Rhodora, i. 218–220. Dec. 1899.
85. John Williamson. Fern Bull. viii. 1–5. Portrait. Jan. 1900.
86. To fern collectors. Rhodora, ii. 212. Oct. 1900.
87. Dicksonia pilosiuscula, var. cristata. Rhodora, ii. 220–221. Nov. 1900.
88. A plea for the preservation of our ferns. Society for the Protection of Native Plants, Leaflet 3. 1901.

89. A PLUMOSE VARIETY OF EBONY SPLEENWORT. Rhodora, iii. 1–2, pl. 22. Jan. 1901.
90. BOTRYCHIUM MATRICARIAEFOLIUM A. BR. Fern Bull. ix. 37–38, Apr. 1901.
91. MISCELLANEOUS NOTES ON NEW ENGLAND FERNS AND ALLIES. Rhodora, iii. 223–225. Sept. 1901.
92. THE "AMERICAN FERN BOOK" OR "OUR FERNS IN THEIR HAUNTS" BY WILLARD N. CLUTE, WITH ILLUSTRATIONS BY WILLIAM WALWORTH STILSON. Rhodora, iii. 238. Sept. 1901.
93. TWO NEW FERN LISTS. I. Fern Bull. ix. 77–80. Oct. 1901.
94. MISCELLANEOUS NOTES ON NEW ENGLAND FERNS. II. Rhodora, iii. 266–270. Nov. 1901.
95. MISCELLANEOUS NOTES ON NEW ENGLAND FERNS. III. Rhodora, iv. 7–13. Jan. 1902.
96. TWO NEW FERN LISTS.— II. Fern Bull. x. 22–24. Jan. 1902.
97. MISCELLANEOUS NOTES ON NEW ENGLAND FERNS. IV. Rhodora, iv. 49–55. Mar. 1902.
98. A CORRECTION. Fern Bull. x. 59. Apr. 1902.
99. MISCELLANEOUS NOTES ON NEW ENGLAND FERNS. V. Rhodora, V. 157–166. Aug. 1902.
100. EARLY FERN STUDY IN AMERICA. Fern. Bull. x. 97–101. Oct. 1902.
101. MISCELLANEOUS NOTES ON NEW ENGLAND FERNS. VI. Rhodora, vi. 31–33. Feb. 1904.
102. THE DEATH OF WILLIAM WENDTE. Rhodora, vi. 209–210. Oct. 1904.
103. MIDDLESEX FELLS CHANGES. SOME OF THEIR EFFECTS UPON NATIVE PLANTS. Boston Evening Transcript, Mar. 17, 1905.
104. A NEW TYPE OF ANEIMIA. Fern Bull. xiii. 18–21. Apr. 1905.
105. THE CHANGED MIDDLESEX FELLS. Boston Evening Transcript, May 26, 1905.
106. REVERSIONS AND THEIR FLUCTUATIONS. Fern Bull. xiii. 106–107. Dec. 1905.
107. A HYBRID ASPLENIUM NEW TO THE FLORA OF VERMONT. Rhodora, viii. 12–15. Feb. 1906.
108. BOTRYCHIUM MATRICARIAEFOLIUM A. BR. AN ENQUIRY INTO THE RELATIONSHIPS BETWEEN BOTRYCHIUM NEGLECTUM WOOD, BOTRYCHIUM MATRICARIAEFOLIUM A. BRAUN, AND

Botrychium ramosum Ascherson. Fern Bull. xiv. 11–19, pl. 1, 2. Mar. 1906.

109. The forms of Botrychium simplex. Fern Bull. xiv. 84–85. July, 1906.

Articles relating to Mr. Davenport's herbarium and work.

The Davenport herbarium. Bull. Torr. Bot. Club, vi. 51–54, 1875; 314–315, 1879.

Catalogue of North American ferns. [Notice of] Bull. Torr. Bot. Club, vi. 273. 1878.

[Editorial note on work of Mr. Davenport.] Fern Bull. viii. 70. 1900.

[Account of herbarium.] Rhodora, iii. 220. 1901.

[Editorial note on life and work of Mr. Davenport, with portrait.] Fern Bull. ix. 44. 1901.

NOTES ON FUNGI,— I.

W. G. Farlow.

Tremella reticulata. While botanizing at Lake Dunmore, Vermont, in September, 1896, I found a quantity of a tremellinaceous fungus growing over the ground and fallen branches in a coniferous wood. The season was very wet and the fungus, owing to the rain, was in places reduced to shapeless masses, but there remained a number of specimens which retained their normal habit. From a solid gelatinous base there rose to the height of 7.5 cm. (3 inches) or more masses of a white jelly, which resembled in outline certain large and coarse species of *Cladonia*, as *C. Boryi* Tuckm. Subcylindrical branches arose from a common base, more or less anastomosing below, reticulated and becoming free and irregularly forking upwards, the branches gradually tapering to the tips, which were fimbriate. The color when fresh was white except at the tips, which were somewhat yellowish or brownish. In drying, the whole fungus shrivelled very much and became a yellow brown. Microscopic examination showed

a typical tremelline structure, with hyphae embedded in jelly and basidia divided vertically into four parts. The spores, which were not very abundant in specimens examined, were broadly allantoid or broadly elliptic with one side flattened and the lower part apiculate on the inner side. They measured 8 μ–10 μ × 5 μ–6 μ. The germination could not be studied.

When fresh and in good condition the fungus is very striking and does not resemble any other of our *Tremellinaceae* known to me. An examination of the literature led me at first to think that the species was *Tremella fuciformis* Berk. from the Amazon, described in Hooker's Jour. Bot. 1856, p. 277 and later recorded from Cuba in Jour. Linn. Soc. **10**, 340, 1869. A later examination, however, convinced me that the fungus is the same as that described by Berkeley under the name of *Corticium tremellinum* B. & Rav., var. *reticulatum* Berk. in Grevillea **1**, 180, June, 1873. In explanation of my reasons for forming this opinion it is necessary to refer to certain specimens which I have examined.

In Herb. Curtis are four specimens marked *Corticium tremellinum* including the variety *reticulatum*. The first, from the collection cited in Grevillea, is marked "In caudice Filicis? Cotoosa Springs, Ga., 1853. Ravenel (1754)"; the second is marked "Ad basin culm. et gramin., Sept. 1855. Ala. Super. Peters (897)"; the third is marked "(6393) Wisconsin, coll. Lapham. Sprague (996)." The three specimens above named are all called *C. tremellinum*, the fourth is marked "*Corticium reticulatum*. Damp naked earth under shrubbery in a garden, Penna., 1851. Michener (1212) (3942)," the collection cited in Grevillea under the variety *reticulatum*. There are besides two duplicate specimens from Michener inserted in Herb. Curtis and all three specimens are identical in structure.

The specimen of Lapham from Wisconsin may be excluded from consideration, since it shows no characteristic structure and is a mixture of different things entangled in hyphae which cannot be referred to any particular genus. In the next place, an examination of the other three specimens shows that none of them belongs to the genus *Corticium* but that all are *Tremellinaceae*, since they have the characteristic 4-parted basidia. The specimen from Cotoosa Springs (*Ravenel*) and that from Alabama (*Peters*) appear to be the same species, but the so-called variety, Pennsylvania (*Michener*), is quite different. The former are more or less bullate masses, wrinkled and

cerebriform on the surface as is the case in several species of *Tremellinaceae*. The specimens from Michener are undoubtedly the same as the fungus collected at Lake Dunmore.

Of specimens of *T. fuciformis* Berk. there is in Herb. Curtis one from Cuba marked "Ad lign. corrump. Sept. C. Wright (233). This specimen has a certain general resemblance to *C. reticulatum*, but a microscopic examination shows that it is a much thinner and more delicate species; the hyphae are not closely compacted and the hymenium is looser and thinner. Furthermore, although the specimen is by no means all that could be desired, one can see that the tips are not cylindrical-tapering and fimbriate as in *C. reticulatum*, but complanate and, as was remarked by Berkeley in the original description, recall in their habit species of *Chondrus*. The expression, flabelliformi-dilatata, used by Berkeley does not apply certainly to our plant.

There have been few references in mycological literature to *Corticium tremellinum* since its original publication. In Grevillea **20**, 13, Sept. 1891, the var. *reticulatum* is called by Cooke *Corticium reticulatum*; the original name, *C. tremellinum* and its variety, are retained in Saccardo's Sylloge **6**, 632, 1888, and by Massee in Jour. Linn. Soc. **27**, 146, 1890, and O. Kuntze in Rev. Gen. Plant. **2**, 873, 1891 changed the name to *Terena tremellina*. References to *Tremella fuciformis* are more numerous. There may be mentioned here Patouillard, Essai Taxonomique 21, Duss, Champignons Guadeloupe et Martinique 9, and Hennings, Verh. Bot. Ver. Brandenburg, **40**, 113, 1898 where the species is reported as occurring in hot houses at the Botanical Garden of Berlin. A. Moeller in Protobasidiomyceten 115 et seq., 1895, gives a detailed account of *T. fuciformis* found by him in Brazil. Although he had been unable to examine a type specimen of the species, there can be no reasonable doubt that the fungus studied by him was the true *T. fuciformis*. He mentions the great resemblance in habit to *Chondrus* and his photograph, Pl. I, f. 5, shows that it is not our plant. Apparently also the spores are ovoid and not of the same shape as in *C. reticulatum*.

In North America *T. fuciformis* has been reported by Atkinson, Mushrooms, 206, f. 207, 1901, by R. Campbell, Canadian Rec. Sci. **9**, 98, 1903, and by Brown and Fernekes, Bull. Wis. Nat. Hist. Soc. **2**, 55, 1902. Whether the species referred to by the writers above named is the *T. fuciformis* of South America and the West Indies or the *C. reticulatum* of Pennsylvania and Vermont I am not at present

able to say. From the plate of Atkinson, together with his description including the account of the spores, I am inclined to believe that his plant is the same as that found in Vermont. So much can be said with certainty that specimens and photograph received last September from Ohio from Mr. C. G. Lloyd show that the species extends from Vermont and Pennsylvania to Ohio.

In short, *Corticium tremellinum* B. & Rav. is not a *Corticium* but a tremelline. *C. tremellinum* B. & Rav., var. *reticulatum* is a distinct species, which should bear the name **Tremella reticulata** (Berk.) Farlow, and to it should be referred the species above mentioned. Although for reasons given I do not now think that *T. reticulata* and *T. fuciformis* are identical, it remains for those who have an opportunity of seeing both the South American and our Northern fungus in fresh condition to furnish information to settle their identity beyond all doubt. If they are identical, then the name *T. fuciformis* has priority.

SYNCHYTRIUM PLURIANNULATUM (B. & C.) Farlow. In the Botanical Gazette, **10**, 243, March, 1885, it was shown that *Uromyces pluriannulatus* B. & C., Grevillea, **3**, 57, 1874, does not belong to the *Uredinaceae* but to the *Chytridiaceae*, and it was referred by me to the genus *Synchytrium* with the statement that "the peculiarity of the ripe resting spores shows that the development must be studied before the exact position of the fungus can be decided." The hosts given were *Sanicula marilandica* and *S. Menziesii*, with a range from Illinois and Alabama to California. At that time I had been able to examine only dried specimens. Since then I have found the parasite on *S. marilandica* at Holderness, N. H., but in very small quantity, two leaves only being infected. I did not, when collecting it, recognize that the fungus was the same as that which I had studied from dried material for, when fresh, the appearance is more that of a gall of animal origin than of a *Synchytrium*. An examination of fresh material enabled me to see a character not noticed in the dried. The resting spores, or more properly sporangia, were not free in the enlarged epidermal cells in which they were parasitic but were attached at the centre of the flattened side to a hypha similar to that of *Urophlyctis Kriegeriana*, figured by Magnus in Annals of Botany, **11**, Pl. 7, 1897. It was not possible for me to study the development of the fungus owing to the very scanty material and absence of proper equipment at the time it was collected, but it is evident that it must be

removed from *Synchytrium* and be placed in *Urophlyctis*. The name to be adopted is **Urophlyctis pluriannulatus** (B. & C.) Farlow. Its relation to *U. Kriegeriana* is very close and it may even be a question whether the species of Magnus, described in 1888, Sitzber. Ges. Naturf. Freunde, Berlin, p. 100, is not the same as the American species. The former grows in the epidermal cells of *Carum Carui* and the description of the galls formed as pearl-shaped with a depressed umbo at the apex applies well to those of *U. pluriannulatus* when seen in fresh condition and in general the microscopic characters of the galls and the sporangia are much the same in both species. The development of the American species, however, needs to be studied by some one living in the region where the fungus is less rare than in New England.

Although rare in the Northeastern States it is common apparently in the Central States and on the Pacific Coast. In Herb. Farlow it is represented by specimens not previously enumerated in the Botanical Gazette, l. c., as follows: Michigan (*H. L. Merrow*); Wisconsin (*J. J. Davis*); Illinois (*C. A. Hart*); Iowa (*B. D. Halsted*); Kansas (*Kellerman & Carlton*). In these states the hosts were *S. marilandica*, *S. gregaria*, and in one case, as it is said, *S. canadensis*. On the West Coast it has a range from San Diego Co. on *S. bipinnatifida* (*C. R. Orcutt*), La Honda (*T. S. Brandegee*), Santa Barbara on *S. arctopoides* (*Mrs. Brigham*), Tamalpais (*H. W. Harkness*), and Mendocino Co. (*W. C. Blasdale*) in California to Eugene, Oregon (*A. R. Sweetser*) and Mt. Tacoma on *Ligusticum apiifolium* (*E. W. D. Holway*), the common host plant in the Pacific States being *S. Menziesii*. It was distributed by Seymour & Earle in Economic Fungi Suppl. A, 10, and by Ellis & Everhart in North American Fungi, no. 1806, Fungi Columbiana, no. 652, and Winter, Fungi Europaei, no. 3474. The name *Caeomurus pluriannulatus* was given to the species by Otto Kuntze in Rev. Gen. Plant. 3^2, 450, 1898, in ignorance of the fact that it is not a *Uromyces*.

Puccinastrum arcticum (Lagh.) Tranzsch. A few years ago while examining some leaves of *Rubus occidentalis* collected near Cambridge, which were infested with *Chrysomyxa albida* J. Kühn, a species placed in *Phragmidium* by recent writers, I found a very small but striking uredo, which did not apparently have any connection with the *Chrysomyxa* since it had a pseudoperidium such as is found

in certain melampsoraceous genera. A further examination showed very small teleutosporic sori, difficult to see, as they are concealed by the hairs on the *Rubus* leaves. I then searched among the unnamed uredoes on *Rubi*, which had gradually accumulated in the herbarium and found that the uredo in question was well represented in several collections, especially on *Rubus neglectus* Peck[1] and also less frequently on *R. strigosus*. It was abundant on specimens collected near the Bussey Institution in Oct. 1875, and also on specimens from Newton, Mass., in Sept. 1877, in company with a *Phragmidium*. In the Newton specimens both uredo and teleutospores were abundant. I have also specimens from Arlington, Mass. (*B. M. Davis*), from Ellis River, N. H. (*L. M. Underwood*), and from Madison, Wis. (*W. Trelease*), not to mention some recent collections. The uredo, which is scattered over the under side of the leaves, is at once distinguished by its peculiar peridium, which is conical, truncate, and contracted at the very narrow mouth, which is surrounded by a crown of from three to six cells, whose upper surface is aculeate, while below they are constricted, the wall of the lower part being much thickened. Around the base of the peridia, which are usually from 80 μ–90 μ in height and from 70 μ–75 μ in diameter at the base, there is a collar formed by the ruptured epidermis. The other cells of the peridium are irregularly rhomboidal, nearly transparent so that the spores beneath can be seen, and nearly smooth. Those above are longer than those below and in well developed specimens they have a more or less linear arrangement. The spores when young are generally obovoid but fully developed and especially the free spores have a very constant ellipsoidal shape, the average being 16–18 μ by 11–12 μ, some being as long as 22 μ. The surface is somewhat rough but not spiny.

This uredo is the same as the one described by Dietel in Hedwigia **44**, 330, Aug. 1905, of which he gave a characteristic figure. He considered it to be connected with *Phragmidium gracile*. The host is not mentioned but it is probable that Dietel's material came from the United States. While it is true that the uredo sometimes occurs in company with *Phragmidia* its real connection is without doubt with the teleutospores which I have referred to, for both belong to the melampsoric group and furthermore they are found together in cases where no *Phragmidia* are present. The only question seems to me to

[1] I am indebted to Prof. M. L. Fernald for the determination of the species of *Rubus* cited in this paper.

be whether the fungus on *Rubi* in the Northeastern United States is *Pucciniastrum articum* (Lagh.) Tranzschel, of which the uredo was first described on *Rubus arcticus* from Lapland by Lagerheim in Hedwigia **28**, 109, 1889, and the teleutospores by Tranzschel in Script. Bot. Hort. Univ. Imp. Petrop. **4**, 300, 302, 1895, from Finland and the Ural and on *R. saxatilis* near St. Petersburg. If not, it is certainly a closely related species. *P. arcticum* is given by Arthur in N. Am. Flora **7**, part 2, 107 as occurring on *R. stellatus* from Alaska in its uredo-form.

The only American specimen I have seen, which seems to belong to the typical *P. arcticum* is one collected at Grand Manan, N. B., on *R. triflorus* by Prof. K. Miyabe. Of European specimens I have examined the no. 857 of Vestergren, Microm. Rar. Select. in which the teleutospores are not present. There is nothing in the teleutospores of the New England fungus which would enable one to distinguish them from those described by Tranzschel. His description is as follows: "soris teleutosporarum hypophyllis, fuscis, parvis, planis. Teleutosporis globosis vel mutua pressione rotundato-cubicis, in cellulas 2–4 longitudinaliter divisis, intercellularibus, 19–25 μ diam." Newton specimens afforded excellent material of teleutospores. The sori are hypophyllous and only slightly raised above the epidermis. I have in but one instance seen teleutospores on the upper surface of the leaf. The sori vary very much in size, some being very minute with not more than a dozen spores, while the diameter of the larger sori is often as much as 180 μ. The expression, intercellular, as applied to species of *Pucciniastrum* is not altogether clear. In our specimens it is not difficult to see that the beginning of a sorus is beneath a stoma. The mycelium running horizontally in the palisade-cells buds out and produces an ovoid cell, which soon divides into two by a vertical wall and the process is repeated so that, seen from above, the spores are arranged in groups of two and fours. Other buds are formed from the adjoining mycelium and as the mass of the sorus is formed the closing cells of the stoma are torn apart and the sorus is then covered only by the compressed adjacent epidermal cells. It is not clear whether spores borne in this way can be said to be intercellular or not, but it is easy to see the formation of sori beneath the stomata beginning with a single spore or pair of them.

If our plant is to be distinguished from *P. arcticum* it must be by

the characters of the uredo. The pseudoperidium of *P. articum* is described as "mammiformiprominulo, apice pertuso; cellulis apicis pseudoperidii aculeatis." This description applies accurately to the specimen in Vestergren but, if one glances at the figure of Dietel, which is a good representation of our species, the peridium could hardly be said to be even prominently mamillate. The aculeation of the peristomal cells is a character more common in species of *Pucciniastrum* than is generally supposed. When in good condition those cells in *P. Potentillae* Komarov are distinctly aculeate. In short our New England species is distinguished from the type of *P. arcticum* in which, as is shown by Vestergren no. 857, the peridium hardly projects beyond the epidermis, by its markedly conical shape and prominent corona. If we ask what are the variations in American specimens, I can say that after examining a large number of specimens I find a certain difference in the general appearance of the peridia but, except in the specimen from Grand Manan, I find none which agree with the European type. I should regard our fungus, however, not as a distinct species, since in most essential details it agrees with *P. arcticum*, but rather as a geographical variety or, if you please, race in which there is a more marked development of the pseudoperidium. I would to distinguish it give it the name

P. ARCTICUM (Lagh.) Tranzs., var. **americanum** Farlow a *P. arctico* typico pseudoperidio conico-truncato cellulis spinosissimis coronatis distinctum.

Another *Pucciniastrum* very common on *Potentilla tridentata* of which the uredo has often been collected but to which there is scarcely any reference in mycological literature seems to me to be specifically undistinguishable from *P. Potentillae* Komarov. first described from Ninguta, Manchuria, on *P. fragarioides* in Jaczewski, Komarov & Tranzschel, Fungi Rossiae Exsiccati **7**, no. 327, 1899. I first found it Sept. 1877 at Eastport and Portland on the Maine coast and since then I have found it on all the higher peaks of the White Mts. and as far south as Mt. Monadnock, N. H., and Berlin Mt. on the boundary between Massachusetts and New York, at Noonmark Mt. in the Adirondacks and I have specimens from White Fish Lake near Duluth collected by F. W. Dewart. It also occurs in Canada and specimens were distributed from Dr. J. Dearness in Fungi Columbiani, no. 2367. Recognizing the resemblance of the uredo to *U.*

Agrimoniae DC., now placed in the genus *Pucciniastrum*, I kept the numerous collections on *Potentilla* next to that species but it was not until a few years ago that I was successful in finding the teleutospores which are not abundant and form small reddish brown spots on the leaves and stipules. The specimen in Fungi Rossiae has only uredosori but they agree with the fungus on *Potentilla*. Probably the species is common wherever *Potentilla tridentata* occurs.

Cambridge, Massachusetts.

THE REPRESENTATIVES OF RUMEX SALICIFOLIUS IN EASTERN AMERICA.

M. L. Fernald.

In his revisions of the North American species of *Rumex*, Professor Trelease [1] placed together as *R. salicifolius* a vast amount of material with the broad range: "Arctic America across to Alaska, south to New Hampshire, the Great Lakes, and in the mountains to southern California and Mexico, where it closely approaches *R. Mexicanus*." Then, after referring to certain variations of the species as thus interpreted, the author says: "It may be that these forms will bear separation, even from the Old World type; but the (frequently young) specimens in herbaria show as many intermediate forms and admit of so poor a geographical delimitation, that I cannot find good grounds for recognizing more than a single species."

"A more zigzag plant with broad elliptical rather firm leaves (3 × 8 cm.) and one valve almost covered by the very large callosity (1.5 to 2 × 3 to 4 mm.), the other two naked, occurs from Sta. Cruz Mountains .... Sta. Lucia Mountains .... and about San Francisco, Cal..... Others may consider this to be clearly distinct, but I leave it here for the present."

Students of the flora of Western America have recently been inclined to recognize in the aggregate *Rumex salicifolius* a number of

[1] Trelease, Third Ann. Rep. Mo. Bot. Gard. 87 (1892).

apparently distinct species; and since we have in New England and Eastern Canada two clearly separable plants which have been passing as *R. salicifolius* it becomes important to determine what they should be called.

In the first place we must determine what plant Weinmann had before him in describing *Rumex salicifolius*. This is much simpler than would be inferred from Professor Trelease's reference to "the Old World type"; for Weinmann's plant came from California and his description was very obviously based upon the peculiar local plant, with elliptical leaves and "one valve almost covered by the very large callosity, the other two naked", which Professor Trelease singled out from the aggregate as most worthy of separation from *R. salicifolius*. The original description was as follows:

"2. RUMEX SALICIFOLIUS mihi. Floribus dioicis, valvulis integerrimis; unica granifera, foliis oblongo-lanceolatis integerrimis acuminatis subtus glaucescentibus.

Radix perennis et caulis basi interdum lignescens, 2–3 pedalis, ramosus, erectus. Folia petiolata, oblongo-lanceolata, undique attenuata 6–7 uncias longa, sesquiuncias lata. Ochreae tenerrimae semperlacerae. Verticilli congesti multiflori. In California, ♄. ♃." [1]

This Californian plant the true *Rumex salicifolius*, which is well shown in specimens collected by Mr. A. A. Heller on the beach near the Cliff House, San Francisco, June 16, 1902, is very distinct from all the other plants which have been referred to that species not only in its short oblong or elliptical leaves, but in the solitary very large grain of the fruit; and so far as the writer is able to determine from the herbarium material at hand it is confined to the region from San Francisco southward into Monterey County, California.

The very different plant of the New England coast which has been passing under the name *Rumex salicifolius*, the familiar White Dock of our salt marshes and sea beaches, is a somewhat depressed plant, the stems (usually several) more or less reclining or decumbent, finally ascending. Its pale leaves are narrowly lanceolate and elongate, the principal ones measuring 1 to 2 dm. long, 1.3 to 2.5 cm. broad. The lower branches of its mature panicle spread nearly at right angles. Its fruiting calyx is whitish-brown, the valves 3 to 4 mm. long, but slightly exceeding the 3 conspicuous whitish ovoid or lance-ellipsoid

[1] Weinmann, Flora, iv. 28 (1821).

spongy grains (2.5 to 3 × 1 to 2 mm.). This plant which abounds upon sea-coasts of Nova Scotia and eastern New England becomes rather local southward, though it is said to reach the coast of southern New York; and it is gratifying to find it beautifully characterized by our own New England botanist, Jacob Bigelow, in the second edition of the Florula Bostoniensis, as

"*Rumex pallidus. *White Dock.*

R. foliis lineari-lanceolatis, acutis; spicis gracilibus; valvulis ovatis, integris, granum vix superantibus.

Leaves linear-lanceolate, acute; spikes slender; valves ovate, entire, hardly larger than the grain.

Stems numerous, ascending, smooth, round, slightly furrowed. Leaves smooth, linear-lanceolate, acute, petioled, more or less waved on the margin. Spikes slender, owing to the shortness of the pedicels, the largest with a leaf at base. Calyx linear, acute. Petals ovate, obtuse, erect. Stamens six, anthers whitish, two lobed. Styles three. Fruit crowded, the valves ovate, entire or furnished with a single tooth at base, with a large, white, fleshy, obtuse grain nearly covering the back of each.— Salt marshes.— June.— Perennial.

First sent by Dr. Nichols from Danvers."[1]

The other plant of eastern America which has been passing as *Rumex salicifolius* is more upright and generally taller and greener than *Rumex pallidus*, its leaves somewhat broader (1.5 to 3.5 cm. broad), and its pedicels longer; but its chief distinctions are in the form of its panicle and the size, color, and grains of the fruiting calyx. The branches of the very dense elongate panicle are strict or very strongly ascending, not horizontally spreading as in *R. pallidus*; the valves of the olive-brown or ruddy calyx are 3.5 to 6 mm. long, their tips much exceeding the 2 or 3 narrowly ellipsoid to subulate brown grains (2 to 2.5 × 0.5 to 1.5 mm.); and the achenes are smaller than those of *R. pallidus*. This plant, with the strict inflorescence, darker and longer fruiting calyx and slender grains, replaces *R. pallidus* on the coasts of eastern Quebec, Newfoundland, and Labrador, and extends from sea-level in the East westward to Assiniboia and British Columbia, south very locally to central Maine, Michigan and Missouri; and along the Rocky Mts. at altitudes ranging from 1675 to 2750 meters (5500 to 9000 feet) to central Mexico and even to Mt.

[1] Bigelow, Fl. Bost. ed. 2, 143 (1824).

Orizaba. This is the plant which was described in 1856 by Meisner[1] as *Rumex mexicanus*, a name which may seem doubtfully applicable to a plant which extends into the northern Rocky Mountains and eastward across Canada to the Gulf of St. Lawrence. But this range is in reality a very natural one and it is followed by more than sixty of our best marked northeastern species, such as *Ranunculus Cymbalaria, Rumex persicarioides, Lonicera involucrata, Limosella aquatica, Veronica americana,* &c., which, crossing the boreal district of North America, extend southward along the Rocky Mountain System to northern and central Mexico; and *Chimaphila umbellata, Pyrola secunda, Cystopteris fragilis, Asplenium Trichomanes,* &c., which reach the high summits of Mt. Orizaba or of the Volcan de Fuego in Guatemala, where the last named species is found above 3350 meters (11,000 feet).

GRAY HERBARIUM.

SCIRPUS HUDSONIANUS IN RHODE ISLAND.— On June 22d, while in company with Prof. J. Franklin Collins the writer discovered *Scirpus hudsonianus* (Michx.) Fernald (*Eriophorum alpinum* L.), in a cold bog not far from Diamond Hill in the town of Cumberland. At only one other station known to the writer has this plant been discovered so far south. In RHODORA [1900] Mr. Roland Harper refers to it as occurring at Willington, Connecticut, which is at about the same latitude as the Rhode Island station reported above.— ERNEST SHAW REYNOLDS, Providence, Rhode Island.

[*Scirpus hudsonianus* occurs at a number of stations besides Willington in Tolland County, Connecticut. One of these, Storrs, where the plant was recently found by Professor A. F. Blakeslee, is about twenty miles further south than the Diamond Hill station.— Eds.]

[1] DC. Prodr. xiv. 45 (1856).

Vol. 9, no. 108, including pages 221 to 252 and title-page of volume, was issued 30 December, 1907.

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JOURNAL OF THE

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Conducted and published for the Club, by

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WILLIAM PENN RICH
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Vol. 10. February, 1908. No. 110.

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SOME TERATOLOGICAL FORMS OF TRILLIUM UNDULATUM.

WALTER DEANE.

THREE interesting cases of teratological modification have come to my notice in our common Painted Trillium, *T. undulatum*, Willd., perhaps more familiar under the name *T. erythrocarpum*, Michx. Although many monstrosities have been observed in the Trilliums of the northeastern United States, abnormal development in this particular species seems to have been rarely noticed, for a careful search through American botanical journals has brought to light but two authentic records of this kind. It seems fitting, therefore, to record the forms recently observed.

The first case is as follows. The plant grew at Squam Lake, Holderness, New Hampshire, on the grounds of Mr. Edwin DeMeritte, who has a summer camp there. He noticed this Trillium for the first time on August 6 or 7, 1907, and writes that "there were two stems precisely alike growing side by side....in the leaf-mould and scanty soil on a rocky ridge near the lake." One of these specimens Mr. DeMeritte picked and, through the kindness of Mr. William Brewster, presented to the Gray Herbarium, where I have had access to it, as well as to the other specimens to be mentioned later.

The plant was in fruit, which was "well formed and apparently ripe or nearly so, as it had turned red." Unfortunately when the specimen reached Cambridge the fruit and its pedicel were gone, but I am assured that these were normal, the three persistent sepals being present. Mr. DeMeritte writes that the fruit "was at the end of the stem above the upper tier of leaves exactly as when only one tier is found." Whether the petals and stamens were normal it is of

course impossible to say at present, as the plant was not observed in flower. Irregularities of this sort, however, have been shown to be remarkably persistent, and observations will be made during the coming season to determine this point.

The striking abnormality of this plant lies in the fact that, instead of the single whorl of leaves normally present, there are here three such whorls, one above the other, and separated by well developed internodes. Each whorl contains three leaves of normal size and shape. The leaves of the uppermost whorl, which is at the top of the stem, are narrowly ovate, taper-pointed, sessile, and from 7.5 to 9 cm. long. Those of the middle whorl, which is 4.5 cm. below the uppermost, are ovate, taper-pointed, slightly petioled, and 11.5 cm. long. The lowest whorl is 4.8 cm. below the middle one, and its leaves are broadly ovate, taper-pointed, 12.5 to 13.3 cm. long, and borne on petioles 2.5 cm. in length.

A similar teratological formation in the case of *Trillium sessile* has been recorded by Mr. L. S. Hopkins in the Plant World, September, 1902, pp. 182, 183. In the plant there described there were three stems from the same rootstock and one of these "had three whorls of three leaves each. The lower whorls were crowded very closely together, while the upper two were half an inch apart." This peculiarity was accompanied by irregularities in the flower.

A second anomaly in the Painted Trillium is shown by two specimens in the Gray Herbarium. On one sheet are two plants that doubtless grew close together, perhaps from the same rootstock. They were collected by Mr. Swallow at Brunswick, Maine, as indicated in Dr. Gray's handwriting on the sheet. There is no date, but the appearance of the sheet indicates age. The petals and stamens, so far as I can judge, are not of the normal number, but that may well be due to the fact that the plants are passing out of flower, as the fruits are already forming and some of the petals and stamens may have fallen. In this case the abnormality lies in the enormous calyx. In both flowers the sepals are leaf-like, ovate, and taper-pointed, as in the typical leaves, though sessile. In one specimen the sepals are 8.2 cm. long and this greatly enlarged calyx is borne on a pedicel 7.5 cm. long above the leaves, which are normal, being 1 dm. long, on petioles 2.5 cm. in length. In the other specimen the sepals are 9.2 cm. long, the calyx being raised upon a pedicel 3.8 cm. long above the normal leaves, which are 9 cm. long, on petioles 1.3 cm. in length.

On another sheet in the Gray Herbarium I find the third unrecorded instance of teratology in the species in question. The specimen was collected in Fitzwilliam, New Hampshire, in May, 1891, by Miss K. L. Kimball. In this plant the leaves, sepals, petals, and styles are in fours. There are seven stamens but there was probably an additional one originally.

In the Plant World for April, 1903, p. 89, Mr. E. L. Morris states that abnormalities in *Trillium undulatum* "have been noted by the Macouns, father and son." In regard to this Mr. J. M. Macoun writes me that "neither my father nor I have ever noted teratology in *T. undulatum*," so there must have been some misunderstanding in regard to the matter.

Two other records deserve mention. In RHODORA for February, 1905, p. 40, Mr. Frederick S. Beattie says, "I collected a specimen of this [*T. undulatum*] on May 21 in Gloucester which possessed two stems proceeding from the same corm. Furthermore, on the flower of one of the two twin-stems, one of the sepals was enlarged to a length five-sixths that of the ordinary leaves, the shape of this sepal also approximating that of a leaf, rather than that of a sepal."

In the American Journal of Science and Arts, 3d series, vol. XV, February, 1878, p. 153, Dr. Asa Gray says, "Pastor Wibbe also sends a polymerous state of *Trillium erythrocarpum*. Something of the kind not rarely occurs in *Trillium*. This plant, which has been constant since discovered five years ago, has all the parts from leaves to carpels regularly increased (in the leaves apparently by chorisis) from three to nine, except that the stamens hardly keep up to double the number of the petals." Doubtless the very specimen referred to is the one that I find in the Gray Herbarium. It is labelled in Dr. Gray's handwriting, "T. erythrocarpum — 8-merous — Lily Marsh near Oswego, N. Y.— J. H. Wibbe — 1877." A careful examination of the plant, however, shows a discrepancy between the number of parts and the description as quoted above, the statement on the label being more nearly correct. There are eight sepals and eight petals and all these are normal with the exception of one sepal which has a white petaloid growth on one side. There are at least 20 stamens and on the side of the pistil that is visible there are six carpellary divisions of the ovary. The leaves are in a whorl at the top of the stem and are seven in number, but the 8-merous character is shown by the fact that one of the leaves is double. It has two midribs and is forked at the tip, the sinus between the two apices being half an inch deep.

The genus *Trillium* seems peculiarly subject to departures from the normal type and cases without number, affecting every part of the plant, have been recorded in our journals. A perusal of these shows how infinite are the combinations of abnormalities that can be found in individual plants. Various whorls of leaves of different shapes, some long-petioled and rising from the base of the stem, sepals white, petals green and petioled, ovary stalked, leaves and various parts of the flower wanting — these are but a few of the manifold changes that the various species of *Trillium* are subject to. Teratology is of great assistance in teaching us the morphology of the plant and hence is a study of much importance. It is hoped that due record will be made of the discovery of any new instance of variation in *Trillium undulatum*.

Cambridge, Massachusetts.

THE NEW ENGLAND SPECIES OF PSEDERA.

Alfred Rehder.

Another old name has come to light to replace one of our well known generic names, for there is no doubt that we must on the ground of priority substitute the name *Psedera*[1] of Necker (Elem. Bot. 1:158. 1790) for *Parthenocissus* and also for *Ampelopsis* if we consider *Ampelopsis quinquefolia* as belonging to the latter genus. Greene, who seems to have studied very thoroughly Necker's much neglected and misunderstood work, has recently drawn attention to the fact that Necker's *Psedera* usually referred as a doubtful genus to the *Araliaceae* represents a genus based on *Hedera quinquefolia* of Linnaeus. Aside from his description the statement of Necker that the genus is based on a species of *Hedera* Linnaeus places Greene's identification beyond doubt, for Linnaeus describes only two species, *Hedera Helix* and *H. quinquefolia*, of which the second agrees exactly with Necker's description of his *Psedera*. The acceptation of this name

[1] The name is apparently shortened from *Pseudohedera*, which refers to the fact that its type had been first described as a species of *Hedera*.

relieves us of two other vexing nomenclatorial questions, the fixing of the type of *Ampelopsis* Michaux and the question whether *Quinaria* of Rafinesque should supersede *Parthenocissus* of Planchon. It will be remembered that *Ampelopsis* was published by Michaux (Fl. Bor. Am. **1**:159. 1803) with three species without indication as to which one he considered the type of the genus. Torrey & Gray (Fl. N. Am. **1**:245. 1838) took *Ampelopsis quinquefolia* as the type and referred the other species to *Vitis*, but 8 years before Rafinesque (Am. Man. Grape Vin. 6. 1830) had made *Ampelopsis quinquefolia* the type of his new genus *Quinaria*. Objections in regard to the validity of this name have been raised in account of an older homonym, Loureiro's *Quinaria* of 1790, which, however, is identical with *Cookia* Sonnerat of 1782, both being based on the same species, and therefore the older homonym being non-valid would not prohibit the use of *Quinaria* of Rafinesque. *Quinaria* and *Parthenocissus* will now become simple synonyms of *Psedera*, while *Ampelopsis* will also disappear as a genus, if *Ampelopsis cordata* and its allies are not considered as constituting a distinct genus; as it is hardly possible to separate them from *Cissus* by any constant and reliable characters, it seems best not to retain *Ampelopsis* as a genus.

Two species of *Psedera* occur in New England:[1]

PSEDERA QUINQUEFOLIA Greene, Leafl. Bot. Observ. **1**:220. 1906. — *Hedera quinquefolia* Linnaeus, Sp. Pl. 202. 1753. — *Vitis quinquefolia* Lamarck, Ill. **2**:135. 1793.— *Ampelopsis quinquefolia* Michaux, Fl. Bor. Am. **1**:160. 1803.—*Cissus hederacea* Persoon, Syn. **1**:143. 1805.— *Quinaria hederacea* Rafinesque, Am. Man. Grape Vin. 6. 1830.— *Parthenocissus quinquefolia* Planchon, De Candolle Monogr. Phan. **5**:448. 1887. High climbing shrub fastening itself by the disks of its tendrils to the support. Leaf-buds in spring and the young branchlets at the tips light red. Tendrils with 5 to 8 disk-bearing ramifications. Leaves long-petioled, 5-foliolate or occasionally 3-foliolate; leaflets ovate to ovate-oblong, 5 to 10 cm. long, acuminate, usually narrowed at the base, coarsely and usually crenately serrate, dull green above, glaucescent beneath, usually of thickish texture. Flowers on slender pedicels in 3- to 6-flowered umbels terminating the ramifications of the unequally dichotomous or thyrsoidal corymbs usually crowded at the end of the branchlets and forming leafy panicles.

[1] For fuller citation of the synonymy see Rehder, Sargent's Trees & Shrubs **1**: 183–190, (1905) and Mitteil. Deutsch. Dendr. Ges. **14**: 129–136 (1905).

Fruits globose, 5 to 7 mm. thick, bluish black, and with slight bloom, seeds usually 2 or 3, with an orbicular or sometimes obovate chalaza. Flowers from the middle of July to the end of August. New Hampshire: Seabrook, Aug. 7, 1898, *E. F. Williams*. Vermont: Burlington, Aug. 4, 1902, *A. Rehder*; Middlebury, July 7, 1878, and Sept. 30, 1880, *E. Brainerd*. Massachusetts: Amherst, August 15, 1902, *A. Rehder*; Blue Hills, Sept. 1, 1895, *W. H. Manning*, Sept. 9, 1905 *J. R. Churchill*; Cohasset, Aug. 4, 1902, *J. G. Jack*; Medford, July 31, *Wm. Boott*; Revere, Aug. 30, *E. F. Williams*; Oak Island, Revere July 16, 1882, *H. A. Young*; Lynn, May 23, 1903, *A. Rehder*; Cape Cod, Centreville, Aug. 11, 1903, *Clara I. Cheney*. Rhode Island: Tiverton, Aug. 1879, *C. S. Sargent*. Connecticut: Southington, July 17, 1898, *L. Andrews*. Distributed west to New York, Ohio, Indiana, Illinois and Missouri, south to Florida and Mexico.

Psedera quinquefolia var. **hirsuta**, n. comb.— *Cissus hederacea β. hirsuta* Pursh, Fl. Am. Sept. **1**:170. 1814.— *Ampelopsis hirsuta* [Donn, Cat. Hort. Cantabr. ed. 2. 50. 1802, nomen nudum] Roemer & Schultes, Syst. **5**:321. 1819.— *Quinaria hirsuta* Rafinesque, Am. Man. Grape Vin. 6. 1830.— *Ampelopsis Graebneri* Bolle, Gartenfl. **48**:257, tab. 1462. 1899.— *Parthenocissus hirsuta* Small, Fl. S. E. U. S. 758. 1903.— *Psedera hirsuta* Greene, Leafl. Bot. Observ. **1**:220. 1906.— Differs from the type in the pubescence, which is found in specimens typical for the variety on almost all parts of the plant, while toward its northern range of distribution they are apt to become glabrescent and are sometimes only pubescent on the young shoots as are specimens seen from Middlebury and Burlington, Vt. The young shoots are usually of a brighter red than in the type and the seeds are somewhat larger, more lustrous and have a usually obovate chalaza. Vermont: Burlington, Aug. 4, 1902, *A. Rehder*; Middlebury, Sept. 1, 1902, *E. Brainerd*. Massachusetts: Amherst, Aug. 15, 1902, *A. Rehder*. Distributed from Ontario (Dr. Wm. Macoun, orally) through western New England and along the western slope of the Alleghany mountains through New Mexico to Mexico. In the North this variety very rarely flowers and fruits, which suggests that it is not at home there, but probably introduced from the south by birds migrating north; many birds seem to be fond of the berries of *Psedera*.

The following varieties are sometimes met with in cultivation but are not found wild in New England:

Psedera quinquefolia var. **murorum**, n. comb.— *Ampelopsis latifolia* Tausch, Flora **21**:738. 1838.— *Ampelopsis hederacea* var. *murorum* Focke, Abh. Naturw. Ver. Bremen **4**:560. 1875. A southern form distinguished from the type by its more numerous, usually 8 to 12 ramifications of the tendrils and the broader leaflets.

Psedera quinquefolia var. **minor**, n. comb.— *Parthenocissus radicantissima* var. *minor* Graebner, Gartenfl. **49**:286. 1900. This is apparently a form of the proceeding variety and differs from it only in its smaller and broader, oval to orbicular-ovate, more slender-petioluled leaflets.

Psedera quinquefolia var. **Saint-Paulii**, n. comb.— *Parthenocissus Saint-Paulii* Graebner, Gartenfl. **49**:283. 1900.— *Ampelopsis Saint-Paulii* Mottet, Rev. Hort. **79**:567. 1907. A variety occurring in Iowa, Illinois, Missouri and Texas; differing from the type in the tendrils having 8 to 12 ramifications and in the elliptic to obovate leaflets gradually narrowed into a very short petiolule and pubescent beneath like the branchlets; it has more than any other variety the tendency to form aerial rootlets.

Psedera vitacea Greene, Leafl. Bot. Observ. **1**:220. 1906.— *Cissus quinquefolia* Sims. Bot. Mag. **51**: tab. 2443. 1824.— *Ampelopsis hederacea* var. *dumetorum* Focke, Abh. Naturw. Ver. Bremen. **4**:559. 1875.— *Quinaria quinquefolia* Koehne, Gartenfl. **41**:402. 1892, not Rafinesque.— *Parthenocissus laciniata* Small, Fl. S. E. U. S. 759. 1905. A climbing shrub usually low and rambling over bushes, but occasionally climbing high into trees, fastening itself by the twining ramifications of the tendrils; branchlets like the leaf-buds green while young, distinctly swollen at the joints, branches always without aerial rootlets; tendrils with 3 to 5 slender twining ramifications without disks. Leaves long-petioled, 5- or occasionally 3-foliolate, leaflets oval to ovate-oblong, acuminate, usually narrowed at the base, coarsely serrate or incisely serrate with the teeth often spreading, bright or dark green and lustrous above, lighter green and lustrous beneath, glabrous or sparingly pubescent on the midrib beneath. Corymbs glabrous, on slender peduncles, opposite to the leaves and solitary, distinctly dichotomously branched, with usually elongated ramifications, 5 to 7 cm. broad. Berries subglobose, 6 to 8 mm. thick, bluish black without or with slight bloom; seeds usually 3 or 4, with an oval or obovate chalaza. Flowers from the end of June to the end of July. Maine: Hartford, *J. C. Parlin*; Piscataquis River

valley, Foxcroft, July 17, 1895, *M. L. Fernald*. New Hampshire: Winchester, Aug. 1, 1898, *B. L. Robinson*. Vermont: Charlotte, July 6 and October 11, 1879, *C. G. Pringle*; Manchester, Aug. 1, 1898, *M. A. Day*; Pownal, banks of Hoosic River, June 27, 1904, *J. R. Churchill, A. Rehder*. The specimens from Winchester are not typical but suggest a possible hybrid between *Psedera vitacea* and *P. quinquefolia*. Distributed from eastern Canada and New England through northern New York and the Great Lake region to Manitoba, Montana, Wyoming, Utah, Arizona, New Mexico, Texas, Kansas and Iowa.

The following varieties and forms can be distinguished:

Psedera vitacea forma **macrophylla**, n. comb.— *Vitis quinquefolia* var. *macrophylla* Lauche, Deutsch. Dendr. 470. 1880.— *Ampelopsis quinquefolia* b. *latifolia* Dippel. Handb. Laubholzk. **2**:474. 1892. This is only a garden form with large leaves, the leaflets being sometimes up to 10 cm. broad.

Psedera vitacea var. **dubia**, n. comb.— *Parthenocissus hirsuta* Graebner, Gartenfl. **49**: 251. 1900.— *Parthenocissus vitacea* var. *dubia* Rehder, Mitt. Deutsch. Dendr. Ges. **14**:135. 1905. This is a somewhat doubtful form; it differs from the type in the usually rather sparse hairiness of the young branchlets and the under side of the leaves. I have never seen a specimen which agrees exactly with Graebner's description; the specimen upon which he based his description and supposed to be from the Eastern States could not be found in the Herbarium of the Berlin Botanical Museum, as I was looking there for it. Cultivated forms named by Dr. Graebner *P. hirsuta* show but a slight pubescence and suggest a hybrid between *Psedera vitacea* and *P. quinquefolia* var. *hirsuta*.

Psedera vitacea var. **laciniata**, n. comb.— *Parthenocissus quinquefolia* δ *laciniata* Planchon in De Candolle, Monogr. Phan. **5**:449. 1887.— *Psedera laciniata* Greene, Leafl. Bot. Observ. **1**:220. 1906. This is the Rocky Mountain form and occurs in Wyoming, Colorado, Utah, Arizona and New Mexico. It differs from the type in its smaller, narrower and incisely serrate leaflets and their usually pale yellowish green color.

Besides these two species only one more occurs in North America; this is **Psedera heptaphylla**, n. comb.— *Ampelopsis heptaphylla* Buckley, Proc. Philad. Acad. 1861:450.— *Vitis hederacea* var. *texana* Buckley ex Durand, Bull. Soc. Acclim. Paris **9**:486. 1862.— *Psedera*

texana Greene, Leafl. Bot. Observ. 1:220. 1906. Occurs in Texas and is easily distinguished from *P. vitacea* by its 6- to 7-foliolate leaves.

Of the foreign species only the well known "Boston Ivy," so extensively planted for the covering of walls and buildings, need to be mentioned here; it is **Psedera tricuspidata**, n. comb.— *Ampelopsis tricuspidata*, Siebold & Zuccarini, Abh. Akad. Wiss. Muench. 4:88. 1846.— *Parthenocissus tricuspidata* Planchon, De Candolle Monogr. Phan. 5:452. 1887.— *Ampelopsis Veitchii* Hort. This species differs from its American congeners in having partly three-lobed and partly 3-foliolate leaves. As it flowers and fruits freely in southern New England, it may possibly soon become naturalized and carried even to localities remote from settlements through the agency of birds which are often seen feeding on the berries.

Arnold Arboretum.

NOTES ON THE VASCULAR PLANTS OF THE NORTHEASTERN UNITED STATES.

B. L. Robinson.

In the course of work at the Gray Herbarium, it has been necessary, during the last few months, to assign new names to a considerable number of plants (many of them minor varieties and forms), which, either from changed views regarding their proper classification or more often from the provisions of the Vienna Rules of Botanical Nomenclature, can no longer be accurately designated by previously existing names and combinations. As the new combinations needful must from time to time be employed in the identification of specimens for persons preparing local floras or otherwise desirous to mention such names in publication, it seems best to record them here briefly with the explanatory synonymy.

Asplenium platyneuron (L.) Oakes, var. **incisum** (E. C. Howe), n. comb. *A. ebeneum* Ait., var. *incisum* E. C. Howe, Ann. Rep. Regents Univ. N. Y. xxii. 104 (1869); Gordinier & Howe, Fl. Rensse-

laer Co., N. Y., 38 (1894). *A. ebeneum* Ait., var. *Hortonae* Davenp. Rhodora, iii. 1, t. 22 (1901).— On noticing the close correspondence of characters given by Dr. E. C. Howe for var. *incisum* and those of Mr. Davenport's var. *Hortonae*, the writer applied to Prof. Charles H. Peck for further information regarding the New York plant. Prof. Peck kindly supplied further details as to the type specimen of var. *incisum* and sent a tracing of one of its fronds. From the information thus gained it appears certain that the two varieties are identical. The older name is of course to be maintained under the altered specific name. This attractive plumose variety of *A. platyneuron* has been reported at isolated stations from Vermont to Maryland, Missouri, and Arkansas.

Aspidium Goldianum Hook., var. **celsum** (Palmer), n. comb. *Dryopteris Goldieana*, subsp. *celsum* Palmer, Proc. Biol. Soc. Wash. xiii. 65, t. 1 (1899). The Vienna Rules are unhappily incomplete as to the Pteridophytes. This large group of plants, as well as the Bryophytes and Thallophytes, was not covered by the list of nomina conservanda. However, a note from Article 9 states explicitly that "lists of nomina conservanda for all divisions of plants other than Phanerogams" are subject to consideration at the Congress of 1910. Under these circumstances it seems unwise to abandon such well established generic names as *Aspidium* or to take up hurriedly in their place names like *Dryopteris*, which are precisely parallel to many which in the case of the flowering plants it has seemed best to discard.

Woodsia Cathcartiana, n. sp. *W. scopulinae* affinis et simillima, sed minute glanduloso-puberula nec hispidula; frondibus 2–3 dm. altis obscure viridibus firmiusculis lanceolatis 25–55 mm. latis bipinnatifidis; pinnis oblongis, inferioribus distantibus, lobis sinubus modice latis separatis oblongis denticulatis; soris submarginalibus; indusio obscuro eo *W. scopulinae* simile.— *W. scopulina* D. C. Eaton apud Gray, Man. ed. 6, 691 (1890), non D. C. Eaton, Can. Nat. ii. 90 (1865).— Nearly related and very similar to *W. scopulina*, but minutely glandular-puberulent, not hispidulous; fronds 2–3 dm. high, dull green, rather firm in texture, lanceolate, 25–55 mm. wide, bipinnatifid; pinnae oblong, the lower distant; lobes oblong, denticulate, separated by rather wide sinuses; sori submarginal; indusium obscure, similar to that of *W. scopulina*.— Taylor's Falls of the St. Croix River, Minnesota, 1874, *Miss Ellen Cathcart* (type, in hb. Gray); also on rocks, Lower Falls of the Menomine River, Michigan, 31 August, 1892, *C.*

F. Wheeler. This species was sent to Dr. Gray soon after its original collection. It was referred by him to Prof. Eaton, who evidently was somewhat puzzled by it. He reported it as belonging to his *W. scopulina* remarking, however, upon its peculiar glandular puberulence. Much additional material of the real *W. scopulina*, a species frequent from the Rocky Mountains westward, is now at hand and the constancy of the distinctions pointed out above is such as to warrant the publication of the plant of Minnesota and Michigan as a separate species.

Sagittaria latifolia Willd., forma **obtusa** (Muhl.), n. comb. *S. obtusa* Muhl. Cat. 86 (1813). *S. variabilis*, var. *obtusa* Engelm. apud Gray, Man. ed. 5, 493 (1867).

Sagittaria latifolia Willd., forma **gracilis** (Pursh), n. comb. *S. gracilis* Pursh, Fl. ii. 396 (1814). *S. variabilis*, var. *gracilis* Engelm. l. c.

Sagittaria latifolia Willd., forma **diversifolia** (Engelm.), n. comb. *S. variabilis*, var. *diversifolia* Engelm. l. c.

Lophotocarpus calycinus J. G. Smith, var. **maximus** (Engelm.), n. comb. *Sagittaria calycina*, var. *maxima* Engelm. apud Torr. Bot. Mex. Bound. 212 (1859).

Camassia esculenta (Ker), n. comb. *Scilla esculenta* Ker, Bot. Mag. t. 1574 (1813). *C. Fraseri* Torr. Pacif. R. Rep. iv. 147 (1856). *Quamassia esculenta* Coville, Proc. Biol. Soc. Wash. xi. 65 (1897), where detailed and critical synonymy may be found. *Q. hyacinthina* Britton, Ill. Fl. i. 423 (1896).— It is to be carefully noted that the plant here called *C. esculenta*, dating back to the synonym of Ker (1813) is quite distinct from the *C. esculenta* of Lindley, a larger-flowered species of the Northwest, which, dating back merely to the synonym *Quamasia esculenta* Raf. Am. Month. Mag. ii. 265 (1818), must take the name *Camassia quamash* (Pursh) Greene, Man. Bay Reg. 313 (1894), a combination derived from the earlier *Phalangium quamash* Pursh, Fl. Am. Sept. i. 226 (1814).

Oxybaphus linearis (Pursh), n. comb. *Allionia linearis* Pursh, Fl. 728 (1814). *Oxybaphus angustifolius* Sweet, Hort. Brit. ed. 2, 429 (1830). *Allionia Bushii* Britton, Bull. Torr. Bot. Club, xxii. 223 (1895).

Polygonum dumetorum, L., forma **cristatum** (Engelm. & Gray), n. comb. *P. cristatum* Engelm. & Gray, Journ. Bost. Soc. Nat. Hist. v. 259 (p. 51 of the reprint), 1845.— Repeated examinations of many

specimens of *P. dumetorum* and *P. cristatum* have failed to show other differences than the slight and inconstant toothing of the wings of the fruiting calyx.

Acnida tuberculata Moq., var. **prostrata** (Uline & Bray), n. comb. *A. tamariscina*, var. *prostrata* Uline & Bray, Bot. Gaz. xx. 158 (1895).

Amaranthus hybridus L., var. **hypochondriacus** (L.), n. comb. *A. hypochondriacus* L. Spec. Pl. 991 (1753).

Carya glabra (Mill.) Spach, var. **villosa** (Sarg.), n. comb. *Hicoria glabra*, var. *villosa* Sarg. Silv. vii. 167 (1895). *H. villosa* Ashe, Bull. Torr. Bot. Club, xxiv. 481 (1897).

Asarum canadense L., var. **reflexum** (Bicknell), n. comb. *A. reflexum* Bicknell, Bull. Torr. Bot. Club, xxiv. 531, 533, t. 317 (1897). — Repeated efforts to find constant distinctions between *A. canadense* and the sometimes well marked *A. reflexum* have failed, and it appears that the latter plant is more naturally classed as a variety of the former.

Radicula obtusa (Nutt.) Greene, var. **sphaerocarpum** (Gray), n. comb. *Nasturtium sphaerocarpum* Gray, Mem. Am. Acad. iv. 6 (1849). *Roripa sphaerocarpa* Britton, Mem. Torr. Bot. Club, v. 170 (1894). — In taking up the old generic name *Radicula* for the genus which has long passed as *Nasturtium*, the writer merely follows the course rendered necessary by the Vienna Rules. It is one of several cases, happily rather few, where from apparent oversight the list of nomina conservanda was not made sufficiently complete to guard against awkward change.

Radicula palustris Moench, var. **hispida** (Desv.), n. comb. *Brachylobus hispidus* Desv. Journ. Bot. iii. 183 (1814). *Nasturtium hispidum* DC. Syst. Veg. ii. 201 (1821). *N. palustre*, var. *hispidum* Gray, Man. ed. 2, 30 (1856). *Roripa hispida* Britton, Mem. Torr. Bot. Club, v. 169 (1894).

Radicula aquatica (Eaton), n. comb. *Cochlearia aquatica* Eaton, Man. ed. 5, 181 (1829). *Roripa americana* Britton, Mem. Torr. Bot. Club, v. 169 (1894). *Nasturtium lacustre* Gray, Gen. Ill. i. 132 (1848).

Radicula Armoracia (L.), n. comb. *Cochlearia Armoracia* L. Spec. Pl. 648 (1753). *Nasturtium Armoracia* Fries, Fl. Scan. 65 (1835). *Roripa Armoracia* Hitchc. Spring Fl. Manhattan, 18 (1894).

Physocarpus opulifolius (L.) Maxim., var. **intermedius** (Rydberg), n. comb. *Opulaster intermedius* Rydberg, apud Britton, Man. 492 (1901).

PYRUS ARBUTIFOLIA L. f., var. **atropurpurea** (Britton), n. comb. *Aronia atropurpurea* Britton, Man. 517 (1901).

AMELANCHIER OBLONGIFOLIA Roem., var. **micropetala**, n. var., fruticosa suberecta plus minusve ramosa, saepissime 2–9 dm. alta, foliis, pubescentia, etc., formae typicae omnino simillima, sed floribus multo minoribus, petalis vix conspicuis linearibus vel oblanceolato-oblongis, vel spatulatis calycem paulo superantibus.— Branching shrub, suberect, usually 2–6 dm. high, in leaves, pubescence, etc., closely similar to the typical form, but with much smaller flowers, the petals scarcely conspicuous, linear, oblanceolate-oblong, or spatulate, 3–4 mm. long, 1–1.5 mm. wide, scarcely surpassing the calyx.— MASSACHUSETTS: on ledges, toward the summit of Blue Hill, Milton, *G. G. Kennedy & M. L. Fernald*, 7 May, 1899 (type, in hb. Gray), *Bartlett*, no. 846, 14 July, 1907 (hb. Gray); moors, Nantucket, *J. R. Churchill*, 30 May, 1904 (hb. Gray): CONNECTICUT: thin soil on ledge of rocks, Oxford, *E. B. Harger*, 12 May and 7 June, 1901 (hb. Gray); dry ground, Alewive Cove, Waterford, *C. B. Graves*, 20 May and 3 July, 1901 (hb. Gray); dry sandy soil, Southington, *C. H. Bissell*, 12 May and June 13, 1901. This low small-flowered plant is strikingly different in its small petals from the common and typical form of the species, but intermediates have already been observed at several stations, as for instance at Wilmington, Massachusetts, by Mr. Hollis Webster, which seem fully to justify the view that the smaller-flowered form is merely a variety of the larger.

ACACIA ANGUSTISSIMA (Mill.) Ktze., var. **hirta** (Nutt.), n. comb. *A. hirta* Nutt. in Torr. & Gray, Fl. i. 404 (1840). *A. filicoides* Trelease ex Branner & Coville, Rep. Geol. Surv. Ark. 1888, pt. 4, 178 (1891), and *A. filiculoides* Trelease ex Britton, Ill. Fl. ii. 254 (1897), as to plant, not as to synonymy.

Astragalus eucosmus, n. nom. *A. orobioides*, var. *americanus* Gray, Proc. Am. Acad. vi. 205 (1864). *Phaca parviflora* Nutt. ex Torr. & Gray, i. 348 (1838), not *A. parviflorus* (Pursh) MacMillan. *P. elegans* Hook. Fl. Bor. Am. i. 144 (1830). *A. elegans* Sheldon, Minn. Bot. Stud. i. 154 (1894); Britton in Britton & Brown, Ill. Fl. ii. 303 (1897), not Bunge, Sp. Astrag. Geront. ii. 89 (1869).

DESMODIUM CANESCENS (L.) DC., var. **hirsutum** (Hook.), n. comb. *D. canadensis*, var. *hirsuta* Hook. Comp. Bot. Mag. i. 23 (1835). *D. canescens*, var. *villosissimum* Torr. &. Gray, Fl. i. 365 (1838). *Meibomia canescens*, var. *hirsuta* Vail, Bull. Torr. Bot. Club, xix. 111 (1892).

Desmodium bracteosum (Michx.) DC., var. **longifolium** (Torr. & Gray), n. comb. *D. canadense*, var. *longifolium* Torr. &. Gray, Fl. i. 365 (1838). *Meibomia longifolia* Vail, Bull. Torr. Bot. Club, xxiii. 140 (1896).

Ilex opaca Ait., forma **xanthocarpa**, n. f., formae typicae omnino simillima sed drupis laete flavis.— Quite like the typical form but with bright yellow drupes.— Near New Bedford, Massachusetts, where discovered by Mr. E. Williams Hervey, in the autumn of 1900 (type, in hb. Gray).

Ilex laevigata (Pursh) Gray, forma **Herveyi**, n. f., omnino ut forma typica sed drupis laete flavis.— Altogether like the typical form, but the drupes bright yellow.— Near the pumping station, Little Quittacus Lake, Lakeville, Massachusetts, 22 October, 1900, *E. W. Hervey* (type, in hb. Gray).

Lechea intermedia Leggett, var. **juniperina** (Bicknell), n. comb. *L. juniperina* Bicknell, Bull. Torr. Bot. Club, xxiv. 88 (1897).

Lechea maritima Leggett, var. **interior**, n. var., quam forma typica paulo gracilior laxius ramosa viridior; foliis tenuioribus; pedicellis filiformibus 2–3 mm. longis.— A little more slender than the typical form, more loosely branched, and greener; leaves thinner; pedicels threadlike, 2–3 mm. long.— Dry soil, Troy, N. H., 11 September, 1897, *B. L. Robinson*, no. 588 (type, in hb. Gray). This variety is proposed to cover a puzzling, by no means rare, inland phase of *L. maritima*, in many ways simulating *L. intermedia* yet showing the pyramidal branching and slightly smaller fruit of the former species.

Oenothera muricata L., var. **canescens** (Torr. & Gray), n. comb. *O. biennis*, var. *canescens* Torr. & Gray, Fl. i. 492 (1840).

Oenothera laciniata Hill, var. **grandiflora** (Wats.), n. comb. *O. sinuata*, var. *grandiflora* Wats. Proc. Am. Acad. viii. 581 (1873). *O. laciniata*, var. *grandis* Britton, Mem. Torr. Bot. Club, v. 358 (1894).

Oenothera linearis Michx., var. **Eamesii**, n. var., decumbens; foliis ellipticis, majoribus 2.7 cm. longis, 1.1 cm. latis.— Decumbent; leaves elliptical, the larger 2.7 cm. long, 1.1 cm. wider.— Sandy shore of a salt pond Stratford, Connecticut, *E. H. Eames* (type, hb. Gray).

Oenothera longipedicellata (Small), n. comb. *Kneiffia longipedicellata* Small, Bull. Torr. Bot. Club, xxiii. 178 (1896).

Oenothera pratensis (Small), n. comb. *Kneiffia pratensis* Small, Fl. S. E. U. S. 842, 1335 (1903).

Spermolepis patens (Nutt.), n. comb. *Leptocaulis patens* Nutt.

ex DC. Prodr. iv. 107 (1830). *Apiastrum patens* Coult. & Rose, Rev. Umbell. 110 (1888).

Rhus glabra L., forma **laciniata** (Carr.), n. comb. *R. glabra*, var. *laciniata* Carr. Rev. Hort. 1863, p. 7.

Oxypolis rigidior Coult. & Rose, var. **ambigua** (Nutt.), n. comb. *Oenanthe ambigua* Nutt. Gen. i. 189 (1818). *Sium longifolium* Pursh, Fl. 194 (1814). *Archemora rigida rigida*, var. *ambigua* Wood, Class-Book, 380 (1861). *Archemora ambigua* DC. iv. 188 (1830). *Tiedemannia rigida*, var. *ambigua* Coult. & Rose, Rev. Umbell. 47 (1888). *Oxypolis rigidus*, var. *longifolius* Britton, Mem. Torr. Bot. Club, v. 339 (1894).— It is to be noticed in regard to this combination that the specific name should retain its earlier form, *rigidior*, and not be changed as by several recent writers to the positive degree. The restoration of the varietal name *ambigua* is necessitated by Art. 48 of the Vienna Rules and rests upon the fact that *ambigua*, not *longifolia*, was the name first applied to this plant in the varietal category.

Bartonia paniculata (Michx.), n. comb. *Centaurella paniculata* Michx. Fl. i. 98, t. 12, f. 1 (1803). *C. Moseri* Steud. & Hochst. ex Griseb. Gen. et Spec. Gent. 308 (1839). *Bartonia lanceolata* Small, Fl. S. E. U. S. 932 (1903).

Gerardia grandiflora Benth., var. **serrata** (Torr.), n. comb. *G. serrata* Torr. ex Benth. in DC. Prodr. x. 521 (1846). *Dasystoma Drummondi*, var. *serrata* Benth. l. c. *G. grandiflora*, var. *integriuscula* Gray, Syn. Fl. ii. pt. 1, 291 (1878). *Dasystoma serrata* Small Bull. Torr. Bot. Club, xxviii. 451 (1901).

The Discovery of Cryptogramma Stelleri in Maine.— *Cryptogramma Stelleri* (Gmel.) Prantl (*Pellaea gracilis* Hook.) has not been reported, I believe, from Maine. On July 29, 1906, I found it growing in abundance at Berry Ledge in West Paris. The plants were not on limestone, but upon a coarse granitic formation. When acid was applied to the rock, however, it caused effervescence, showing the presence of lime in the rock.— Walter L. Bacon, Norway, Maine.

Two Additions to the Lichen Flora of the Blue Hills.— I have found lately in my herbarium the following species of lichens

which are not included in the "Flora of the Blue Hills, Middlesex Fells, Stony Brook and Beaver Brook Reservations, of the Metropolitan Park Commission" of 1896, compiled and edited by Mr. Walter Deane. The species are in no way remarkable, but are perhaps worthy of record as additions to a published flora.

1. *Parmelia caperata* (L.) Ach. One specimen from Chickatawbut Hill, Oct. 7, 1906, collected by Miss E. C. Barker, and one specimen from Great Blue Hill, May 18, 1907, collected by Mrs. G. S. Parker.

2. *Umbilicaria Muhlenbergii* (Ach.) Tuckerm. Two specimens, data as above.— R. Heber Howe, Jr., Thoreau Museum, Concord, Massachusetts.

Preliminary Lists of New England Plants,— XV. Addenda. — To a preliminary check-list of New England *Loranthaceae, Euphorbiaceae*, and certain other families, published in Rhodora, vi. 85–88, the following additions have been made, which may now be indicated with a + sign in the proper columns in the list, since through the kindness of Professor J. F. Collins, Dr. E. H. Eames, and the late J. A. Wheeler, Esq., specimens of all have been examined by the writer and are in his herbarium.

Arceuthobium pusillum Peck. Rhode Island: Bowdish Reservoir, Glocester, 19 May, 1904, *J. F. Collins.* See Rhodora, vi. 150.

Crotonopsis linearis Michx. Connecticut: Milford, 30 August, 1907, *E. H. Eames*, no. 5876.

Euphorbia Lathyris L. Connecticut: Bridgeport, 2 August, 1897, *E. H. Eames.* By oversight in copying omitted from the former list.

Euphorbia Preslii Guss. New Hampshire: Meredith Neck, August, 1894, *Mrs. L. A. Carter*; Milford, 5 September, 1902, *J. A. Wheeler.* — Arthur Stanley Pease, Cambridge, Massachusetts.

Vol. 10, no. 109, including pages 1–20 and portrait, was issued February 20, 1908.

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Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
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Vol. 10. March, 1908. No. 111.

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Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. March, 1908. No. 111.

SOME MOSSES FROM AROOSTOOK COUNTY, MAINE.

J. Franklin Collins.

A very interesting small packet of mosses, collected in Caribou Bog at Crystal in southern Aroostook County, Maine, by Professor and Mrs. M. L. Fernald, was recently handed to me for determination. It contained one species of *Sphagnum*, one hepatic, and four true mosses. The *Sphagnum* is *S. teres* Ångstr., a moss of wide distribution in northern Eurasia and North America, having been recorded on this continent at various places from Labrador to British Columbia, and southward to New England and New Jersey, including Maine.

The hepatic has been determined by Dr. Evans. He writes "Your hepatic from Maine (5351) is a slender form of *Riccardia pinguis* (L.) S. F. Gray. I have not before seen it from this state." It has previously been reported in New England from New Hampshire, Vermont, Rhode Island, and Connecticut.

The four species of true mosses have not, so far as the writer knows, been hitherto recorded from Maine, yet all of them, judging from their previously known distribution, should have been expected to occur in the state. In their general distribution they may be classed as northern mosses reaching their southern limits in the bogs and swamps, usually if not always limy, of New England, New York, Pennsylvania, or Ohio, or in the general latitude of 40° N. Their names, together with the previously recorded distribution of each, are given below.

Hypnum stellatum Schreb. Eurasia. Greenland, Hudson Strait, Labrador, Newfoundland, Miquelon, Anticosti, Gaspé, Vermont, Massachusetts, Rhode Island, Pennsylvania, Ontario, Lake Superior, Manitoba, Montana, Athabasca, Canadian Rockies, British Columbia, Yukon, Alaska.

Hypnum scorpioides L. Eurasia. Greenland, Labrador, Newfoundland, Miquelon, Anticosti, Gaspé, New Hampshire, Vermont, Ontario, Peace River, Canadian Rockies, British Columbia, Yukon, Alaska.

Camptothecium nitens (Schreb.) Schimp. Eurasia. Hudson Strait, Labrador, Anticosti, Gaspé, New Brunswick, Vermont, Rhode Island, Connecticut, New York, Pennsylvania, Ontario, Minnesota, Saskatchewan, Peace River, Canadian Rockies, British Columbia, Northwest Territory, Alaska.

Hypnum trifarium Web. & Mohr. Eurasia. Greenland, Gaspé, Ontario, Ohio, British Columbia. No record of this species having been collected in New England has been found.

Even a casual perusal of the distribution of the last four species, as here outlined, will show the striking similarity of general range. The collections of the writer in the Gaspé Peninsula during the past four years have demonstrated the fact that there they, especially the last three, are occasionally associated in the marly bogs and along marly pond margins. The strikingly similar general range of the four in North America at least suggests the possibility that they may be closely associated elsewhere than in Gaspé and Maine. That the last named species has not been reported from as many stations as the other three may be due partly to the fact that it often grows more or less scattered or isolated through great colonies of much more conspicuous mosses, for example, *Hypnum scorpioides*.

Providence, R. I.

VIOLA CHINENSIS IN THE EASTERN UNITED STATES.

Ezra Brainerd.

The behavior of *Viola chinensis* in four or five localities in the Eastern States indicates the possibility of its becoming established as a more or less troublesome weed. The story of the introduction of the gypsy moth and of the English sparrow into the United States, and of the American water-weed, *Elodea canadensis*, into the canals and rivers of England, should make us watchful of foreign plants or animals, that are cultivated from scientific curiosity.

I first made the acquaintance of *Viola chinensis* in the violet beds of the New York Botanical Garden. Numerous seedling plants were noticed, scattered about and growing with other species. In several instances it was the only plant that answered to a label such as *Viola hirta* (of Europe) or *V. odontophora* (of the Rocky Mts.). Evidently in these cases the plant originally set had died, and the self-sown *V. chinensis*, springing up in its place, had been taken by the gardener for the rightful plant. At the time I utterly failed to make out the proper name of the usurper; but plants and seeds were obtained for further study in my own garden.

I soon learned to connect this puzzle with another. In the Britton Manual, p. 637, there is described a stemless, purple violet, "escaped from cultivation and established, Washington, D. C. Adventive from Europe," under the name "*Viola lancifolia* Thore." But a moment's reference to a European Botany reveals the fact that Thore's *V. lancifolia* is a *stemmed* violet, allied to, if not a variety of, the Dog-violet (*V. canina*). Yet however unaccountable the use of this name might be, the plant so designated by Mr. Pollard was evidently identical with the lusty stranger at Bronx Park.

The plants transferred to the Middlebury garden seemed but little disturbed by the change, and kept on producing seeds until late in the autumn. The following spring numerous young plants came up within a radius of eight feet from the mother plants, so that I destroyed the fine crop that had appeared from seeds intentionally sown in the seed boxes,— realizing that my guest was making himself rather too much at home with me. A few weeks later I received living plants of the same thing from Prof. Fernald, of Cambridge, who spoke of it as a strange violet which "has become a weed in a large portion of the Botanic Garden."

On my next visit to Washington, last April, I was able through the kind assistance of Mr. Theo. Holm to clear up much of the mystery that had surrounded the plant. Specimens sent to Mr. W. Becker, the violet specialist of Berlin, were pronounced by him to be *Viola chinensis* G. Don, a native of Eastern Asia. Mr. Holm was informed at the Botanic Garden that the plants came from seed obtained in England about twenty years ago, and that it had spread as a weed in the garden. I saw it also well established in the grounds about Mr. Holm's residence in Brookland, D. C., to which he had transferred plants about ten years previous.

The plant though very distinct from any American species, is yet more nearly allied to our *V. sagittata* and *V. cucullata* than to any species of Europe or of Western America,— another instance of the close relationship, pointed out by Dr. Gray, between the Flora of northeastern Asia and that of northeastern America. *V. chinensis* has a long, stout, somewhat branching root, and seems well prepared to withstand drought, or the hot sun of open fields. The flower is lilac-purple; the spur 7 mm. long, rounded at the end, much compressed laterally, being 4 mm. wide but only 1.5 mm. thick. The numerous cleistogamous capsules are ovoid, green, on erect peduncles. Most of the stations named are populous cities of Japan or Eastern China; from which we may surmise that the species is more or less domesticated, and thrives in cultivated ground in the Orient, as it certainly does with us.

Middlebury, Vermont.

SPHAGNUM FAXONII; AN ADDITION TO THE FLORA OF NEW ENGLAND.

Carl Warnstorf.

Since my friend the late Edwin Faxon was one of the original members of the New England Botanical Club, it seems fitting that the Sphagnum which I have recently named in his memory should be brought to the attention of his old associates by publishing in Rhodora a translation of the original description.[1] I wish to say, by way of preface, that Mr. Faxon, an indomitable collector of Sphagna, sent me for investigation during the nineties thousands of specimens from New England, all prepared with the most pains-taking care. To many others than myself "Sphagna Boreali-Americana Exsiccata," an extremely noteworthy collection of one hundred seventy-two representative specimens of American peat mosses issued by Faxon in collaboration with Professor D. C. Eaton, stands as testimonial to his persevering and accurate work as a collector. Faxon was preëmi-

[1] Neue europäische und aussereuropäische Torfmoose. Hedwigia XLVII. p. 117 (1908).

nently lovable, unselfish, and modest,— such a man as I have but seldom come in contact with during my life. He translated my "Contributions to the Knowledge of the North American Sphagna" for publication in the Botanical Gazette,[1] but although I urged him to do so, he did not associate his own name with the articles. I hope that in describing the following moss I have permanently connected the name of this truly exceptional man with his favorite genus.

Sphagnum Faxonii Warnst. Forming closely compacted tufts as much as 12 cm. deep, below grayish-brown, above pale yellowish, in habit similar to a weak *Sph. cuspidatum* var. *plumosum*. Cortex of two or three layers of cells, plainly differentiated from the strong, pale or yellowish woody axis. Prosenchyma cells widened and thick-walled. Stem leaves (both dry and moist) spreading, isosceles-triangular or in part almost triangular-linguiform, 0.75–1.00 mm. long and 0.50–0.60 mm. broad, at the narrow truncate apex minutely denticulate, otherwise entire, with broad margins which are greatly expanded below the middle. Hyaline cells either not at all or only occasionally septate, fibrillose in the upper third or even to the middle of the leaf, on the inner surface mostly with a few unringed pores between the fibrils, on the outer surface, toward the apex, with a few small corner-pores. Fascicles moderately crowded, generally three- but occasionally four-branched. Branches almost equally strong and spreading, up to 12 mm. in length, attenuated toward the apex; their leaves crowded, when dry not or hardly at all undulate, when moist slightly turned to one side, lanceolate, on the average 1.40–1.45 mm. long and 0.30–0.35 mm. wide, at the broad truncate apex coarsely three- or four-toothed, narrowly margined by two or three rows of elongated cells, involute clear to the base so as to be almost tubular, entire. Hyaline cells reënforced by numerous fibril-bands, on the inner surface of the leaf with comparatively few generally unringed medium sized pores in the cell angles, on the outer surface with hardly any pores except in the lower cell angles, but occasionally weakly ringed pseudo-pores occur in short rows along the commissures of scattered cells. Chlorophyll cells in cross-section usually trapezoidal and exposed on both sides of the leaf, with the longer of the parallel sides exposed on the outer surface, but triangular cells occur sporadically, in which case they are enclosed on the inner surface of the leaf by the

[1] Bot. Gaz. XV pp. 127–140, 189–198, 217–227, 242–255. (1890.)

strongly under-arching hyaline cells.— Massachusetts, 16 Sept., 1891, leg. Faxon.

This species may be distinguished from *Sph. cuspidatum* by the very narrowly margined branch leaves, from *Sph. angustilimbatum* by much smaller stem leaves which are not fibrillose to the base, and which have the margins broadened below, as well as by the mostly three-branched fascicles with equally divergent branches.

Friedenau, 25 Feb. 1908.

Nomenclatorial Changes in Isoëtes.— Isoëtes macrospora Dur., var. **heterospora,** comb. nov. *Isoëtes heterospora* A. A. Eaton appears to be a form of *I. macrospora* Dur., endemic in streams and ponds on Mt. Desert Island. The vegetative parts of the two appear to be practically identical, differences being confined to the spores, which vary greatly in size and markings in the Mt. Desert plants. I therefore think it proper to reduce *I. heterospora* to the rank of a variety of *I. macrospora.*

I. Dodgei A. A. Eaton, var. **Robbinsii,** comb. nov. In compliance with Art. 49 of the Vienna Code the name *I. Dodgei* must be restored to the species designated by Engelmann as *I. riparia,* var. *canadensis* (*I. canadensis* A. A. Eaton), since it is the earliest name of the plant in its present rank. It becomes necessary, therefore, to change *I. canadensis,* var. *Robbinsii* to *I. Dodgei,* var. *Robbinsii.*— A. A. Eaton, The Ames Botanical Laboratory, North Easton, Massachusetts.

A SOUTHERN FLORA AND FAUNA OF POST-PLEISTOCENE AGE IN ESSEX COUNTY, MASSACHUSETTS.

John H. Sears.

This paper is the result of special studies upon a fossil or ancient marine molluscan fauna, collected in estuaries and bays on our coast, with a view to explaining the presence of certain plants of a southern flora found growing today in Essex County, Massachusetts, and elsewhere near the coast of New England. The data and conclusions of the paper may be stated under three headings.

I. A warm epoch is indicated by the presence in Essex County and in adjacent parts of New England of a southern flora which has become acclimated here and is apparently a survival from a warmer period. The most striking plants of this flora are enumerated below, and for sake of clearness the distance in miles from their stations north of Boston to the nearest known stations south of Boston is given.

Names of Plants.	*Stations north of Boston.*	*Interval in Miles*[1]	*Nearest known Stations south of Boston.*
Sparganium lucidum Fernald & Eames.	Medford.	65	Barnstable, Mass.
Sagittaria Engelmanniana J. G. Smith.	Tewksbury.	80	Barnstable, Mass.
Echinodorus tenellus (Martius) Buchenau.	Winchester.	340	Canterbury, Del.
Scirpus Hallii Gray	Winchester.	1115	Indian River, Fla.
Fuirena squarrosa Michx.	Tewksbury.	50	Plymouth, Mass.
Scleria reticularis Michx.	Winchester.	40	Plymouth, Mass.
Betula nigra L.	Merrimac Valley, Pelham, N.H.; Lawrence; North Andover; Ipswich (rare).	115	Suffolk Co., L. I.
Magnolia virginiana L.	Essex and Magnolia Swamps, becoming nearly extinct.	120	Suffolk Co., L. I.
Crotalaria sagittalis L.	Cambridge, Winchester, Wakefield, etc.	40	Plymouth, Mass.
Linum sulcatum Riddell.	Peabody and Arlington.	40	Providence, R. I.
Ilex opaca Ait.	Rockport, where extinct since 1880.	36	Quincy, Mass.
Ilex glabra (L.) Gray.	Wenham and Magnolia Swamps, where the growing shrubs are rarely more than 2 feet high with stems ½ inch in diameter.	30	Blue Hill Reservation, Mass.
Ludwigia sphaerocarpa Ell.	Waltham, Bedford, Lowell, etc.	105	Guilford, Conn. & Suffolk Co., L. I.
Sabatia stellaris Pursh.	Amesbury and Salisbury.	50	Pembroke, Mass.
Cuscuta arvensis Beyrich.	Winchester.	90	Nantucket.
Cuscuta compacta Juss.	Tewksbury.	50	Lincoln, R. I.
Coreopsis rosea Nutt.	Winchester and Woburn.	40	Plymouth, Mass.

Professor W. G. Farlow, in the Marine Algae of New England, p. 6, writes "In the town (now city) of Gloucester, near the village of Squam, is a small sheet of water called Goose Cove. In this cove, to my surprise, I found *Rhabdonia tenera*, *Gracilaria multipartita*, *Chondria Baileyana*, *Polysiphonia Harveyi*, and *Polysiphonia Olneyi*. In short the flora was entirely different from anything I had ever seen before north of Cape Cod."

II. A warmer period is indicated in Essex County, Massachusetts, and in other parts of New England, by the finding on our coast of a fossil marine fauna such as is now known to inhabit the mud on the coast primarily south of Cape Cod, where the waters of the bays are much warmer than on the coast of Essex County. In deep digging for the foundation of the Boston and Maine Railroad bridge across Parker River in Newbury, the workmen came upon a large bed of

[1] These distances are in a direct line taken from Colton's Atlas.

shells of the oyster, *Ostrea virginiana*, many of which had both valves intact, showing that they had lived in the mud there. A few years later, in putting a new foundation for the railroad bridge at Rowley across Rowley River, still larger beds of shells of *Ostrea virginiana* were uncovered, some of which shells were 12 inches long by 3 inches wide. Upon an examination along the shore, I found extensive Indian shell heaps made nearly exclusively of these shells. Again, upon the working over of another Indian shell heap, on Perkins Island, Ipswich River, there were found large deposits of these shells, together with shells of *Venus mercenaria* (Quahog) and *Mya arenaria* (the common clam).

Recent investigations, in looking over the mud dredged from the bed of Bass River in Beverly, revealed shells of *Ostrea virginiana*, together with shells of *Pecten gibbus* L. var. *borealis*, *Astarte sulcata* and *A. undata* Gould, and *Pandora Gouldiana* Dall; also a coralline cluster of Bryozoans incrusting stones (*Schizoporella unicornia* Johnston, identified by Dr. Bassler of the National Museum). These cluster-colonies completely covered stones six inches long and three inches broad and were built up nearly half an inch thick. In washing the mud I collected many thousands of shells of Foraminifera of several species.

A few feet below the living fauna, in the muddy bottom of Danvers River, near the new bridge connecting North Salem with Beverly, I found another large bed of the shells of *Ostrea virginiana*, together with numerous shells of *Pecten*. Shells of *Astarte undata* were also abundant; and shells of *Anomia glabra* Verrill, of great size, one of them three inches in diameter, with many other species, were thickly scattered among them. Shells of *Venus mercenaria* (Quahog), some of which measured four and a half by three and a half inches, were common. Several species of coralline clusters of Bryozoans, including *Schizoporella* sp. and *Escharella variabilis* Verrill, were found.

The fauna represented by the above species, from these various stations in Essex County, is now known to live south of Cape Cod, where the Gulf Stream flows nearer the coast thus giving a much warmer climate. This indicates that there must have been a similar warm climate on the coast of Essex County, when this fauna flourished here and elsewhere north of Cape Cod — on the coast of northern New England and probably in the Bay of Fundy and the Gulf of St. Lawrence; and as these shell fish, *Ostrea virginiana*, *Venus mercenaria*,

etc., were used by the Indians as food, they must have lived here in our tidal estuaries and harbors until modern times.

III. The warm epoch along the coast of Essex County and northern New England is explained by an elevation of the land in New England and adjacent regions which followed the Champlain subsidence. At the end of the Champlain subsidence the land on our coast had become submerged to a depth of 360 or more feet, as pointed out in the Physical Geography and Geology of Essex County.[1] After the Champlain subsidence the land was again elevated, as is proved by the finding of fossil shells of *Portlandia arctica* Gray, *P. lucida* Loven, and other species of Arctic mollusks, together with the hard parts of a large starfish, *Asteracanthion Lincki* Muhler, in the clay beds at about the present sea level in Danvers and Lynn, Essex County, Massachusetts; for at present the above species of *Portlandia* are taken alive on the coast of Norway only at a depth of from 360 to 500 feet. Judging from the rate of the subsidence now going on,[2] about one foot in a century, this elevation of 360 or more feet must have taken approximately 36,000 years. In the course of this elevation at the North, the Straits of Belle Isle must have become land locked,[3] thus forcing the Labrador current, with its cold waters and icebergs, to join the Greenland current in its northward flow. This closing of the Straits of Belle Isle allowed the warm waters of the southern seas to come into Cape Cod and Boston Bays. Under such conditions the climate of Essex County and northern New England must have been similar to the climate of southern New England, and probably to that of the New Jersey coast; and a warm epoch continued here probably for a long time. During this epoch the fauna previously described, of *Ostrea*, *Pecten*, etc., was introduced and multiplied in our waters; and as the land emerged above the waters the southern flora took possession of it. Some of the plants of that southern flora, as previously noted, have survived to the present time, according to situation or environment, and have become acclimated.

Professor James D. Dana writes "On the coast of Maine there are large Indian shell heaps of the common clam, *Venus mercenaria* (the Quahog of the Indians) and, in some places, of the Virginia Oyster, species that are now nearly extinct on the cold coast. As made known by Verrill there is a colony of living southern species in Quahog Bay,

[1] Sears, Phys. Geogr., Geol. etc. of Essex Co. 373. (1905).
[2] See Sears, l. c.; Chapter on Subsidence, p. 58.
[3] At the present time an elevation of 200 feet would close the Straits of Belle Isle.

near Bath, twenty miles east of Portland, among which are *Venus mercenaria*, and others, reminding one, as Verrill says, of the coast fauna of New Haven, on Long Island Sound. Shells of oysters, clams, and scallops (the southern *Pecten irradiens*) are abundant in the deeper portions of the mud of the harbor of Portland. As with the flora, so with the fauna, certain species are found to-day, living in protected situations." [1]

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NOTES ON SOME PLANTS OF NORTHEASTERN AMERICA.

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During studies upon various North American plants the attention of the writer has been called to several northeastern species, varieties, and notable forms which are either undescribed or are now passing by names which they cannot retain under the international rules adopted at Vienna. Most of these plants are of such diverse affinities as to furnish slight thread for a continuous discussion, and the notes upon them have, therefore, been allowed to accumulate. As the number of these notes is now considerable they are here presented that they may be more readily available.

Potamageton **bupleuroides,** n. sp., caulibus gracilibus 1–2 mm. crassis 3–7 dm. longis plerumque ramosissimis rectis, internodiis brevibus 0.5–1.5 (raro ad 3) dm. longis; foliis planis fulvis valde unicostatis nerviis lateralibus 6–16, superioribus orbicularibus vel ovatis obtusis basi amplexicaulibus 1–3 cm. longis, inferioribus ovatis vel lanceolatis obtusis vel subacutis 2.5–4.5 cm. longis; stipulis obsoletis vel nullis; pedunculis gracilibus 2–6 cm. longis; spicis 0.7–2 cm. longis; fructibus anguste obovoideis 2.5–3.2 mm. longis lateraliter compressis valde impressis dorso convexo obscure carinato, stylo gracili, epicarpo olivaceo-fulvo arcte contento. — Stems slender, 1–2 mm. thick, not spongy, 3–7 dm. long, simple below, usually much branched above,

[1] Dana Manual of Geology, 561.

straightish; the internodes short, 0.5–1.5 (rarely becoming 3) dm. long: leaves flat, scarcely crisped at the margin, drying bronze or blackish-green, 7–17-nerved, only the midrib prominent; the upper orbicular to ovate, obtuse, amplexicaul, 1–3 cm. long; the lower ovate to lanceolate, obtuse or subacute, 2.5–4.5 cm. long: stipules obsolete or when present very short and inconspicuous: peduncles slender, not spongy-thickened, 2–6 cm. long: spikes 0.7–2 cm. long: fruit slender-obovoid, 2.5–3.2 mm. long, the sides flat and deeply pitted, the back rounded and obscurely 3-keeled; style slender and prominent; epicarp olive- or reddish-brown, closely investing the seed.— Brackish, occasionally fresh, ponds and quiet streams, Newfoundland and Gaspé Co., Quebec to Florida, chiefly near the coast, and rarely inland to western New York and Michigan. Type collected in pools at Holyrood, Newfoundland, 23 August, 1894 (*Robinson & Schrenk*, no. 207). The coastal representative of *Potamogeton perfoliatus*, which has ordinarily thicker softer or spongy stems and peduncles; larger crisp-margined greener leaves with more numerous nerves (15–27); stipules, when developed, nearly 1 cm. long; longer spikes; and larger fruit which is more obviously keeled and has a looser-fitting or puckered epicarp.

Melica striata (Michx.) Hitchc., forma **albicans** (Fernald), n. comb. *Avena striata* Michx., forma *albicans* Fernald, Rhodora, vii. 244 (1905).

Eriophorum tenellum Nutt., var. **monticola**, n. var., nanum 1–2 dm. altum; foliis confertis; spicis solitariis; bractea involucris et squamis ut apud formam typicam.— Dwarf, 1–2 dm. high, with crowded leaves: spike solitary: involucral bract and scales as in the typical form.— Quebec, in a quagmire at the edge of Lac Chicoutey, altitude 975 m., Table-top Mountain, Gaspé Co., August 10, 1906 (*Fernald & Collins*, no. 174). A very pretty alpine extreme of the common *E. tenellum* (*E. paucinervium* A. A. Eaton), in its solitary spike suggesting *E. Chamissonis*, var. *albidum*; but with the definite 1-leaved involucre, the elongate acute leaf-blades, and the pale stramineous scales of *E. tenellum*.

Carex scirpoides Schkuhr, var. **capillacea** (Bailey), n. comb. *C. interior* Bailey, var. *capillacea* Bailey, Bull. Torr. Bot. Cl. xx. 426 (1893).— In the Proceedings of the American Academy, xxxvii. 457, 485 (1902) and in other publications the writer has inclined to the opinion that Schkuhr's *C. scirpoides* (1806) could not be maintained

on account of the earlier *C. scirpoidea* Michx. (1803) and that the species described by Schkuhr must be known as *C. interior* Bailey. The Vienna Code, however, indicates that, although differing only slightly, the names are to be treated as different.

Carex scirpoides Schkuhr, var. **Josselynii** (Fernald), n. comb. *C. interior* Bailey, var. *Josselynii* Fernald, Rhodora, viii. 115 (1906).

Carex diandra Schrank, var. **ramosa** (Boott), n. comb. *C. teretiuscula* Good., var. *ramosa* Boott, Ill. 145 (1867). *C. prairea* Dewey in Wood, Classbook, 578 (1855). *C. teretiuscula*, var. *prairea* Britton in Britton & Brown, Ill. Fl. i. 344 (1896).— The name *C. diandra* Schrank, Cent. Bot. Anmerk. 57 [49] (1781) must replace the later *C. teretiuscula* Good. Trans. Linn. Soc. ii. 163 (1794).

Carex rostrata × saxatilis, var. miliaris, n. hybr., quam *C. saxatilis*, var. *miliaris* (Michx.) Bailey vix minus gracilis; culmis 2.5–4 dm. altis supra scabris; foliis planis elongatis 2–3 mm. latis; spicis fertilibus 1–5 varie dispositis nunc omnibus vel fere omnibus arcte aggregatis nunc remotis 1–3 cm. longis; perigyniis stramineis ovoideis obscure nerviis vel enerviis, rostro brevi acuto bidentato; squamis purpureis in eodem specimine longitudine diversis obtusis vel acuminatis; acheniis plerumque abortivis.— Nearly as slender as *C. saxatilis* L., var. *miliaris* (Michx.) Bailey, the culms, 2.5–4 dm. high, scabrous above: leaves flat, elongate, 2–3 mm. broad: pistillate spikes 1–5, variously disposed, sometimes all or nearly all closely aggregated, sometimes all or nearly all very remote, 1–3 cm. long: perigynia stramineous, ovoid, faintly nerved or nerveless; the short beak sharply bidentate: scales purplish, of various lengths on the same plant, blunt or acuminate: achenes mostly undeveloped.— Quebec, growing with the two parents in a boggy meadow near the northern end of Table-top Mountain, Gaspé Co., August 13, 1906 (*Fernald & Collins*, no. 188).

Juncus alpinus Vill., var. **fuscescens**, n. var., ramis inflorescentiae laxe ascendentis non strictis, glomerulis compactis regulariter floriferis, floribus viridescentibus vel stramineis.— Branches of the inflorescence loosely ascending, not strict: glomerules compact and regularly flowered: flowers greenish or straw-colored.— Widely distributed from western Vermont to British Columbia and Missouri. Type collected about a brackish spring, Cayuga Marshes, New York, August 16 and September 23, 1885 (*W. R. Dudley*, no. 137). In *J. alpinus* and its var. *insignis* Fries, the branches of the inflorescence

are strict, and the loose glomerules usually have one or more of the flowers elevated above the rest on elongate pedicels.

Quercus rubra L., var. **ambigua** (Michx. f.), n. comb. *Q. ambigua* Michx. f., Hist. Arb. Am. ii. 120, t. 24 (1812). *Q. borealis* Michx. f., N. Am. Sylva, i. 198 (1859). *Q. coccinea*, var. *ambigua* Gray, Man. ed. 5, 454 (1867).— This tree not only in its foliage but in its generally northern or upland range is clearly an extreme of *Q. rubra*, rather than of the ordinarily more southern *Q. coccinea*.

Nymphaea advena Ait., var. **variegata** (Engelm.), n. comb. *Nuphar advena* Ait. f., var. *variegatum* Engelm. in Gray, Man. ed. 5, 57 (1867). *Nymphaea variegata* G. S. Miller, Proc. Biol. Soc. Wash. XV. 13, pl. 2 (1902).— Both the yellow Cow Lilies and the White (or pink) Pond Lilies were included by Linnaeus under *Nymphaea*, but by the majority of authors this name has been subsequently maintained for the genus including our familiar fragrant White Water Lily, while the yellow Cow Lilies have taken the name *Nuphar* Sibth. & Smith (1808 or 1809). Prior to the splitting of the Linnean genus by Sibthorp & Smith, however, Salisbury had published an elaborate monograph of the showier Water Lilies as *Castalia* (1805), leaving the name *Nymphaea* to stand for the remainder of the Linnean genus, *i. e.* the plants which were later taken up under the name *Nuphar*. It is unfortunate that such confusion in the names has prevailed, but the principle of priority demands the taking up of *Castalia* and of *Nymphaea* (*Nuphar*).

Castalia odorata (Ait.) Woodville & Wood, var. **gigantea** (Tricker), n. comb. *Nymphaea odorata* Ait., var. *gigantea* Tricker, Water Garden (1897) ex Conard, Water Lilies, 186.

Thalictrum polygamum Muhl., var. **hebecarpum**, n. var., carpellis villosis; foliolis subtus plerumque pubescentibus.— Carpels villous: lower surfaces of the leaflets usually pubescent. The northeastern extreme of the species, more abundant than the typical form of the species in the Gaspé Peninsula and northern Maine, extending to Newfoundland, New Hampshire, and southern Ontario. Type collected in a gravelly thicket by the St. Lawrence, Rivière du Loup, Quebec, August 2, 1902 (*E. F. Williams & M. L. Fernald*).

Fragaria **multicipita**, n. sp., caespitosa; caudice rarissime stolonifero in ramos (apud exempla robusta etiam 30–40) breves congestos diviso; ramis quibusque folia 3–4 gerentibus; petiolis 2–7 cm. longis gracillimis appresse sericeis; foliolis 1–2.5 cm. longis supra viridibus

paulo strigosis vel glabratis subtus albis paulo appresse sericeis, terminali anguste cuneato-obovato vix stipellato infra apicem rotundatum vel subtruncatum grosse incurvo-serratum integro, lateralibus obliquis latere interiori cuneata basi integro latere exteriori basi rotundato dentato; scapis gracillimis sericeis quam petioli brevioribus vel eos subaequantibus 1–2 (raro 4)-floris; bracteis lanceolatis integris vel laceratis; pedicellis fructiferis recurvatis; calyce 5–10 mm. lato, lobis lanceolato-oblongis acuminatis; bracteolis paulo angustioribus; fructu ut apud *F. virginianam* subgloboso vel breviter ovoideo 5–10 mm. longo; achaeniis laevibus 1 mm. longis.— Plant caespitose, the caudex freely divided into several (in large plants 30 to 40) short crowded upright branches, very rarely stoloniferous; each branch bearing 3 or 4 small leaves: petioles 2–7 cm. long, very slender, appressed-silky: leaflets 1–2.5 cm. long, green and slightly strigose or glabrate above, white and sparingly appressed-silky beneath; the terminal narrowly cuneate-obovate, barely stipellate, entire below the rounded or subtruncate coarsely incurved-serrate tip; lateral leaflets oblique, the inner side cuneate and entire at base, the outer rounded at base and toothed: scapes very slender, silky, shorter than or about equaling the petioles, 1–2 (rarely 4)-flowered: bracts lanceolate, entire or lacerate: fruiting pedicels recurving: calyx 5–10 mm. broad, the lobes lance-oblong, acuminate; bractlets slightly narrower: fruit as in *F. virginiana*, subglobose or short-ovoid, 5–10 mm. long: achenes smooth, 1 mm. long. – Quebec, gravelly and sandy beaches and bars or the River Ste. Anne des Monts, July 14–17, 1906 (*Fernald & Collins*, no. 230).

Potentilla monspeliensis L., var. **labradorica** (Lehm.), n. comb. *P. labradorica* Lehm., Del. Sem. Hort. Hamb. 12 (1849) and Pugil. ix. 21 (1851).— This little known plant has been collected recently at several stations, not only on the Labrador coast, but about the lower St. Lawrence and on the White Mountains. It is a pronounced extreme of the common bristly-villous *P. monspeliensis*, in which the pubescence is nearly or quite wanting. The specimens examined are all small, some tufted and acaulescent, others simple and becoming 3 dm. high.

Rubus idaeus L., var. aculeatissimus Regel & Tiling, forma **albus**, n. comb. *R. strigosus* Michx., var. *albus* Fuller ex Bailey, Cyc. Am. Hort. 1582 (1902).

Rubus alleghensis Porter, forma **albinus** (Bailey), n. comb.

R. villosus, var. *albinus* Bailey, Am. Gard. xi. 720 (1890). *R. nigrobaccus* Bailey, var. *albinus* Bailey, Evolution of Our Native Fruits, 380 (1898).— As recently shown by Mr. W. H. Blanchard (RHODORA, viii. 217) *R. allegheniensis* Porter (1896) must be taken up in place of *R. nigrobaccus* Bailey (1898).

RUBUS ALLEGHENIENSIS Porter, var. **calycosus** (Fernald), n. comb. *R. nigrobaccus*, var. *calycosus* Fernald, RHODORA, iii. 234 (1901).

RUBUS ALLEGHENIENSIS Porter, var. **Gravesii** (Fernald), n. comb. *R. nigrobaccus*, var. *Gravesii* Fernald, RHODORA, iii. 295 (1901).

ASTRAGALUS ALPINUS L., var. **Brunetianus,** n. var., ramis elongatis 2–6 dm. longis; foliolis plerumque 15–29; leguminibus maturis virescentibus vel stramineis strigosis, pilis brevis nigris vel albidis.— Branches elongate (2–6 dm. long): leaflets usually 15–29: mature pods greenish or pale brown, strigose with short black or even whitish hairs.— Calcareous ledges and gravelly shores, eastern Quebec to Hudson Bay, south to southern New Brunswick, central Maine, and Vermont; also abundant in the Rocky Mts. Type collected on gravelly shores, Fort Fairfield, MAINE, July 18, 1893 (*Fernald*, no. 24). Dedicated to the late Abbé Louis Ovide Brunet, of Laval University, Quebec, a close student of the flora of Quebec and founder of the botanical Museum of his university. The more northern or alpine *Astragalus alpinus* is a smaller plant with fewer leaflets (11–23) and with the pods intensely black with long slightly spreading hairs. The two extremes clearly pass together as shown by several specimens, and the more southern plant has been called by Mr. E. P. Sheldon *Astragalus giganteus* (Pallas) Sheldon (Bull. Geol. and Nat. Hist. Surv. Minn. ix. 65). Pallas's *A. alpinus*, var. *giganteus*, however, upon which Mr. Sheldon based his so-called species, is shown clearly by the original plate (Astrag. 42, t. 33) to have little to do with our plant, but to be nearer related to *A. oroboides*.

LESPEDEZA CAPITATA Michx., var. **velutina** (Bicknell), n. comb. *L. velutina* Bicknell, Torreya, i. 102 (1901). *L. Bicknellii* House, Torreya, v. 167 (1905).— Prolonged study in the field has convinced the writer that, although *L. velutina* is a notable extreme of the very variable *L. capitata*, it does not retain its characters with sufficient constancy to merit specific rank.

CALLITRICHE **anceps,** n. sp., caulibus valde compressis ancipitis humilibus simplicibus vel subsimplicibus 5–25 mm. longis, internodiis perbrevibus 1–4 mm. longis; foliis uniformibus linearibus 2–7 mm.

longis, apice leviter emarginato; fructu suborbiculari 0.5–0.8 mm. diametro angulis rotundatis, stigmatibus celeriter deciduis.— Stems strongly compressed, ancipital, low, simple or subsimple, 5–25 mm. long; the internodes very short, 1–4 mm. long: leaves uniform, linear, 2–7 mm. long, slightly emarginate at apex: fruit suborbicular, 0.5–0.8 mm. in diameter, the angles rounded; stigmas promptly deciduous, not observed in any of the mature specimens.— In silt and granitic gravel at the bottoms of alpine and subalpine ponds and lakes, Table-top Mountain, Gaspé Co., Quebec. Type collected in "Lac des Américains," altitude 670 m., western base of Table-top Mt., August 1, 1906 (*Fernald & Collins*, no. 234). Observed in many other lakes and ponds up to an altitude of 1150 meters. Ordinarily the plant, which is quickly distinguished from *C. heterophylla* by its small size, uniform foliage, ancipital stem, and promptly deciduous stigmas, grows in deep water with *Subularia aquatica*, *Isoëtes macrospora*, etc., and shows no inclination to lengthen its stem and to reach the surface. Occasionally it is stranded at the margins of lakes when it becomes very dwarf, with closely crowded shorter uniformly linear-oblanceolate leaves.

Rhus canadensis Marsh., var. **illinoensis** (Greene), n. comb. *Schmaltzia illinoensis* Greene, Leafl., i. 131 (1905).— A shrub of central Illinois differing from the typical form of the species in its greater pubescence.

Sphaeralcea **remota** (Greene), n. comb. *Iliamna remota* Greene, Leafl., i. 206 (1906). *Sphaeralcea acerifolia* Gray, Syn. Fl. i. 317, as to Illinois plant, not Nutt. in Torr. & Gray, Fl., i. 228.— Professor Greene has shown very clearly that the local plant of a gravelly island in the Kankakee River, near Altorf, Illinois, is specifically distinct from the northwestern plant described by Nuttall as *S. acerifolia*.

Myriophyllum humile (Raf.) Morong, forma **natans** (DC.), n. comb. *M. ambiguum* Nutt. Gen. ii. 212 (1818). *M. ambiguum*, var. *natans* DC. Prodr. iii. 70 (1828).— Rafinesque's *Burshia humilis* (1808) was clearly the dwarf shore plant which has been known as *Myriophyllum ambiguum*, var. *limosum* Nutt., and, as the first specific name, must be retained for the species.

Myriophyllum humile, forma **capillaceum** (Torr.), n. comb. *M. capillaceum* Torr. Compend. 355 (1826). *M. ambiguum*, var. *capillaceum* Torr. & Gray, Fl. i. 530 (1840).

Osmorhiza longistylis (Torr.) DC., var. **villicaulis**, n. var.,

caulibus albo-villosis, foliis fructibusque eis formae typicae similibus. — Stems white-villous: leaves and fruit as in the typical form.— Pennsylvania, Illinois and Kansas; the type collected on limestone, on the Conostega, near Binkley's Bridge, Lancaster Co., PENNSYLVANIA, June 21, 1901 (*A. A. Heller*). In its pubescence strongly simulating *O. Claytoni* (Michx.) Clarke, but with the foliage and fruit of *O. longistylis*.

LYONIA **nitida** (Bartr.), n. comb. *Andromeda nitida* Bartr. ex Marsh. Arb. 8 (1785). *Pieris nitida* Benth. & Hook. f. Gen. ii. 588 (1876).— *Lyonia* is well distinguished from *Andromeda* by its angulate capsule with thickened or corky sutures, and by its awnless anthers.

LYONIA LIGUSTRINA (L.) DC., var. **foliosiflora** (Michx.), n. comb. *Andromeda pedunculata*, var. *foliosiflora* Michx. Fl. i. 254 (1803). *Xolisma foliosiflora* Small, Fl. 889, 1336 (1903).— This variety is more pronounced in the Southern States than in the North, where the typical form of the species is most abundant. Occasionally, however, the variety is found in New England.

GAYLUSSACIA BACCATA Wang., forma **leucocarpa** (Porter), n. comb. *G. resinosa* (Ait.) Torr. & Gray, var. *leucocarpa* Porter, Bull. Torr. Bot. Cl. xvi. 21 (1889).— Mr. Mackenzie has recently called attention[1] to the fact that Wangenheim, in 1787, clearly described and illustrated our common Huckleberry as *G. baccata*, two years before the shrub was designated by Aiton *Vaccinium resinosum*. The white- or amber-fruited form is rare, but it is occasionally found in sufficient quantity to furnish fruit to local markets.

VACCINIUM **neglectum** (Small), n. comb. *Polycodium neglectum* Small, Fl. 893, 1336 (1903).— A pretty species of our southeastern states with the branchlets, leaves, etc., strictly glabrous.

VACCINIUM **nubigenum**, n. sp., caule fruticoso 2–7 dm. alto, ramis teretibus purpureo-brunneis junioribus pubescentibus vel glabrescentibus; foliis ellipticis utrinque subacutis 1.5–3.5 cm. longis 7–17 mm. latis submembranaceis glabris sublucidis valde reticulatis serrulatis, dentibus spinulosis; floribus axillaribus solitariis, pedunculis 3–5 mm. longis; corollis ellipsoideo-urceolatis 6 mm. longis 4–5 mm. latis; baccis globosis vel pyriformibus glauco-nigris 7–9 mm. longis.— Shrub 2–7 dm. high: branches terete, the older ones purplish-brown beneath the freely exfoliating light gray epidermis; the young branchlets paler brown, puberulent or glabrate: leaves elliptic, subacute at each end,

[1] K. K. Mackenzie, Torreya, vii. 60 (1907).

1.5–3.5 cm. long, 7–17 mm. wide, submembranaceous, glabrous, somewhat lustrous, the veins prominently reticulate, the fine and numerous appressed teeth spinulose: flowers axillary, solitary, on peduncles 3–5 mm. long: corolla ellipsoid-urceolate, pink, 6 mm. long, 4–5 mm. wide: berries globular or pyriform, deep blue-black, with a bloom, 7–9 mm. long.— Quebec, abundant in Gaspé County, in subalpine and alpine districts on the hornblende-schist of Mt. Albert, and on the granitic area of Table-top Mt. Type material, in flower and young fruit, collected on hornblende-schist or in the alluvium of an alpine brook, Allen's Ravine, north slope of Mt. Albert, July 26 and 28, 1906 (*Fernald & Collins*, no. 242); in mature fruit, on Table-top Mt., August 9, 1906 (no. 688). Also represented in the Gray Herbarium by nos. 684, 685, 687, 689, and 690. Associated in the subalpine forests and ravines with *V. ovalifolium* Sm. and *V. caespitosum* Michx., ordinarily in more sheltered situations than *V. uliginosum* L. and *V. pennsylvanicum*, var. *angustifolium* (Ait.) Gray. Nearest related to the northwestern *V. membranaceum* Dougl., which has the paler branches somewhat angled, the larger leaves paler beneath, and the larger corolla depressed-globose.

Centaurium **spicatum** (L.), n. comb. *Gentiana spicata* L. Sp. 230 (1753). *Erythraea spicata* Pers. Syn. i. 283 (1805).— The little group of plants known as Centauries were very generally called by pre-Linnean botanists *Centaurium*, but in the 1st edition of the *Species Plantarum* Linnaeus placed them under *Gentiana*. In 1790, Necker separated them as *Erithrea* (often spelled *Erythraea*) and they have subsequently borne that name. Prior to Necker's publication, however, as recently pointed out by Messrs. Britten & Rendle, the old name *Centaurium* had been clearly used by Hill in his British Herbal (1756), and consequently this historic name must be maintained for the genus. In eastern America we have two other species:

Centaurium **texense** (Griseb.), n. comb. *Erythraea texensis* Griseb. ex Hook. Fl. Bor.-Am. ii. 58 (1838) and Gen. et Sp. Gent. 39 (1839).

Centaurium **calycosum** (Buckl.), n. comb. *Erythraea calycosa* Buckl. Proc. Acad. Phila., 1862, 7 (1863).

Nymphoides **lacunosum** (Vent.), n. comb. *Villarsia lacunosa* Vent. Choix des Pl. 9 (1803). *Limnanthemum lacunosum* Griseb. Gen. et Sp. Gent. 347 (1839).— Hill, again, in 1756 clearly defined the European yellow-flowered Floating Heart as *Nymphoides*, fourteen years

before it was distinguished by S. P. Gmelin as *Limnanthemum* (1770), and this name must accordingly be used for our Floating Hearts. The larger of our northeastern species should be called

Nymphoides **aquaticum** (Walt.), n. comb. *Anonymos aquatica* Walt. Fl. Carol. 109 (1788). *Limnanthemum trachyspermum* Gray, Man. ed. 5, 390 (1867). *Limnanthemum aquaticum* Britton, Trans. N. Y. Acad. Sci. ix. 12 (1889).

Apocynum cannabinum L., var. **nemorale** (G. S. Miller), n. comb. *A. nemorale* G. S. Miller, Proc. Biol. Soc. Wash. xiii. 87 (1899).—With the small greenish or greenish-white flowers of *A. cannabinum*, but with the leaves mostly drooping or spreading on elongate petioles 1–1.5 cm. long.

Convolvulus sepium L., var. **pubescens** (Gray), n. comb. *C. repens* L. Sp. 158 (1753) as to Gronovian plant. *C. sepium*, var. *repens* Gray, Syn. Fl. ii. pt. 1. 215 (1878). *Calystegia sepium* (L.) R. Br., var. *pubescens* Gray, Man., ed. 5, 376 (1867).—This pretty plant, abundant on the coast from the Gulf of St. Lawrence southward, is commonly pubescent, but not infrequently essentially glabrous, when it is separable from true *C. sepium* only by the less hastate basal lobes of the leaves, a character too inconstant to allow the specific separation of the two plants.

Myosotis virginica (L.) B S P., var. **macrosperma** (Engelm), n. comb. *M. macrosperma* Engelm., Am. Jour. Sci., xlvi. 98 (1844). *M. verna* Nutt., var. *macrosperma* Chapm. Fl. 333 (1860).

Gray Herbarium.

(*To be continued.*).

The 13th Annual Winter Meeting of the Vermont Botanical Club was held at the University of Vermont, Burlington, January 17 and 18. Nineteen new members were elected and the longest program in the history of the Club, with 23 titles, was carried out. The annual supper complimentary to visiting members was held on the evening of the 17th, followed by a very interesting lecture on "The Flora of the Shickshock Mts. and the Gaspé Coast" by Prof. M. L. Fernald of Harvard University, illustrated by lantern slides. John Ritchie Jr. gave a talk on Mt. Washington, where the Club intends to go the first week of July next. This was also illustrated by the lantern. The

officers were reelected as follows:— Pres., Ezra Brainerd, Vice-Pres., C. G. Pringle, Treas., Mrs. Nellie F. Flynn, Sec'y., L. R. Jones. Additional members of the executive committee, Dana S. Carpenter, Mrs. E. B. Davenport, Miss Nancy Darling. Miss May O. Boynton gave a report on a beginning of a Club Library and was appointed Librarian with authority to continue the work. The Club's Bulletin No. 3 will be issued some time in April probably.— Nellie F. Flynn.

Sparganium diversifolium, var. acaule in Massachusetts.— In a preliminary list of New England *Sparganiaceae* (Rhodora, ix. 86, May, 1907) *Sparganium diversifolium* Graebner, var. *acaule* (Beeby) Fernald & Eames was reported from all the New England states except Massachusetts and Rhode Island. Late last summer I found this Sparganium in Framingham, Mass. There were several plants in a muddy brook in a warm, open meadow and they were fruiting well. Near by in a shallow pool drained by this stream were numerous plants of the species. None of the latter, however, were found in the running water, nor any of the variety in the pool and no intermediate forms were observed. With the list the suggestion was made that this plant be sought in central and western Massachusetts and in northwestern Rhode Island. It now seems that, as this dwarf variety has been found somewhat east of the hill country and in the midst of sand-plains, it may well be watched for elsewhere in eastern Massachusetts and perhaps through Rhode Island.— Arthur J. Eames.

Salix incana at Castine, Maine. — On Sept. 19, 1906, I collected in Castine, Hancock Co., Maine, a willow, which is pronounced by Prof. Fernald to whom it has been submitted for identification, *Salix incana* Schrank, a European species that, according to the Cyclopedia of American Horticulture, is cultivated by American Nurserymen.

The several plants found were growing on a dry natural bank or low bluff close by the sea beach. They were spreading and procumbent at their bases with branches rising to 4.5–6 dm.; leaves linear or narrowly lanceolate, with margins strongly revolute, and under surface densely white-tomentose.— Robert A. Ware, Boston.

Vol. 10, no. 110, including pages 21–36, was issued 12 March, 1908.

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RHODORA

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
EDWARD LOTHROP RAND } Publication Committee.

Vol. 10. April, 1908. No. 112.

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Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. April, 1908. No. 112.

OEDOGONIUM HUNTII REDISCOVERED?

F. S. Collins.

In the American Naturalist, Vol. 1, p. 517, 1868, is an article entitled "A botanical excursion in my office" in which Horatio C. Wood describes in a popular way a number of minute plants appearing in an aquarium. Figures of some of them are given, 3, 4, 5 & 7 representing an *Oedogonium*, no species being indicated by name. In A Prodromus of a Study of the Fresh water Algae of North Eastern North America, Proc. Amer. Phil. Soc., Vol. X, p. 333, 1869, the same writer proposes the name of *Oedogonium Huntii* for the plant. This Prodromus was followed by the more elaborate A Contribution to the History of the Fresh-Water Algae of North America,[1] Smithsonian Contributions to Knowledge, Vol. XIX, 1874. In this the genus *Oedogonium* is broken up into several genera, and our species appears as *Androgynia Huntii* Wood. There is no reference to the Prodromus, but only "*Syn.-Oedogonium Huntii* Wood, American Naturalist, 1868"; as we have seen, no such name appears in that periodical. Plate XVII, fig. 2, however, evidently represents the same thing as the figure in the Naturalist, and the text, p. 198, speaks of the alga as occurring in Wood's aquarium.

There seems to be nothing more known of the plant; Wolle [2] condenses Wood's description and copies his figures; Wittrock [3] adds nothing. DeToni [4] puts the description into Latin. Hirn[5] sum-

[1] So reads the title page; the running title throughout is Fresh-Water Algae of the United States, and this latter form is very generally used in citations referring to the work.

[2] Fresh Water Algae of the U. S., p. 85, Pl. LXXXIV, fig. 9, 1887.

[3] Oedogonieæ Americanæ, hucusque cognitæ; Bot. Notiser, p. 136, 1878.

[4] Sylloge Algarum, Vol. I, p. 60, 1889.

[5] Monographie und Iconographie der Oedogoniaceen, Acta Societatis Scientiarum Fennicae, Vol. XXVII, p. 208, 1900.

marizes what we have noticed, except the Am. Nat. and Prodromus citations, which were unknown to him; and copies Wood's figure as Pl. XXXIV, fig. 213. In a later paper[1] he completes his record by giving the two missing citations.

In Oct., 1906, Prof. F. D. Lambert called my attention to some algae growing in a sunken wooden tub near Tufts College, and on examination I found that among these were filaments bearing slender hairs like those represented in Wood's figures. Unfortunately there was no fruit, and soon after that time the water froze, and nothing more could be done. Visits in the spring of 1907 showed no fruit, but in Sept., 1907, considerable material was obtained with fairly plentiful but not quite mature fruit. The four spiral lines on the spore were not visible, but otherwise everything agreed with the descriptions. About a week later the station was visited in the hope that the ripe fruit might be found: the tub had been covered over and a path made across it; the locality was destroyed.

The identification cannot be considered as absolutely certain, but there is no described species that has the characters of the Tufts College plant, and these characters all agree with those of *Oe. Huntii* at the same stage of development, so that there is at least a strong probability of identity. The terminal hairs are very peculiar; they consist of a series of ten or more superimposed, long, cylindrical cells, each somewhat smaller in diameter than the one below; the effect is like that of a many-jointed spy-glass, pulled out to the full length, except that the terminal cell is much more slender in proportion to the basal cell; not a twentieth of the diameter. Several species are figured with terminal hairs in Hirn's monograph, but none at all resembling this. It is curious that though this structure is plainly shown in Wood's figures and their copies in later authors, descriptions all simply say "long apical seta" or some equivalent phrase. If any one should observe an *Oedogonium* with setae of this character, it is to be hoped that diligent care will be taken to obtain the mature fruit, and that no "improvements" will take place in that vicinity until the fruit is gathered.

Malden, Massachusetts.

[1] Studien ueber Oedogoniaceen, l. c., Vol. XXXIV, p. 38, 1906.

REPORTS ON THE FLORA OF THE BOSTON DISTRICT—II.

The local flora committee of the New England Botanical Club has continued to collect information as outlined in its first publication (Rhodora, ix. 81). Numerous botanists have contributed to the work by sending card-records regarding their specimens, and the collections of the Gray Herbarium, the Arnold Arboretum, and the New England Botanical Club have been personally examined. No doubtful records have in any case been included in the following list, and every species is represented by at least one herbarium specimen. Any additions will be welcomed, for the present list is regarded as by no means final.

There is need of much fuller information in regard to soil, moisture and other ecological factors, and future reports to the committee will be of greater value if they are more detailed than most of those we now have.

There is a large block of towns south of the Blue Hills, which are very little known botanically. We have no reports from the South Shore, and Bridgewater, Easton, Canton and Norfolk are the only inland towns which are well represented among our records for this section. The committee therefore urges upon the collectors of this district the importance of more detailed exploration south of the Blue Hills. The Committee will also try personally to collect in these towns as extensively as possible, but there is great need for coöperation in this part of the work.

The *Isoëtaceae* of this list have been contributed by Mr. A. A. Eaton of the Ames Botanical Laboratory. The committee wishes to thank Mr. Eaton for his zealous coöperation in this and other matters connected with the work.

MARSILEACEAE.

MARSILEA.

M. quadrifolia L. Introduced in muddy bottoms of lakes and streams; Charles and Concord Rivers; Glacialis and vicinity, Cambridge; Malden (1877, *Morong*); Boxford.

EQUISETACEAE.

EQUISETUM.

E. arvense L. Moist sand and gravel, occasional in richer soil. Very common and variable.

E. sylvaticum L. Wet fields and woods, frequent.

E. litorale Kühlewein. Wet shore of Merrimac River in Amesbury and Newburyport (*A. A. Eaton & Raynal Dodge*).

E. fluviatile L. (*E. limosum* L.) Stagnant water. Frequent, especially in northern portion of the district.

E. hyemale L., var. **affine** (Engelm.) A. A. Eaton. Moist soil, infrequent. (All the material examined is of this variety, which is distinguished from the typical form by having rounded instead of biangulate ridges).

E. scirpoides Michx. Wet clay bank under hemlocks, Amesbury (*A. A. Eaton*).

LYCOPODIACEAE.

LYCOPODIUM.

L. lucidulum Michx. Damp woods, frequent.

L. inundatum L. Wet sand, rare. Not reported south of Boston.

Var. **Bigelovii** Tuckerm. Swamps and borders of ponds, occasional.[1]

L. annotinum L. Rich woods, abundant in Essex and Manchester.

L. clavatum L. Dry woods, occasional.

L. obscurum L. Moist woods, occasional.

Var. **dendroideum** (Michx.) D. C. Eaton. As common as the typical form.

L. complanatum, L., var **flabelliforme** Fernald. Originally common in dry woods and pastures, but eradicated in many places.

L. tristachyum Pursh. (*L. complanatum*, var. *Chamaecyparissus* Milde.) Open woods and pastures. Abundant in a few localities, but not generally distributed.

[1] **Note.** The plant reported from Plum Island, Newbury, as *L. alopecuroides* L. (Fern Bulletin v. 4) has been carefully examined, and the committee has decided it is not different from this variety.

SELAGINELLACEAE.

SELAGINELLA.

S. rupestris (L). Spring. Dry rocks, rather common.

S. apus (L.) Spring. Wet places; locally abundant in northern portion, occasional elsewhere; probably often overlooked.

ISOËTACEAE.

ISOËTES.

I. Dodgei A. A. Eaton, var. **Robbinsii** A. A. Eaton. (*I. canadensis*, var. *Robbinsii* A. A. Eaton, RHODORA, v. 279. 1903.) In Mulberry Meadow Brook, Easton (*A. A. Eaton*).

I. Eatoni Dodge. In Tuxbury's Pond, Amesbury (*A. A. Eaton & Raynal Dodge*); in Parker River, Byfield (*Raynal Dodge*). Scarce.

I. echinospora Durieu, var. **Braunii** (Durieu) Engelm. Abundant throughout, mostly in mud, but sometimes on sandy shores and bottoms of ponds and large streams.

Var. **muricata** (Durieu) Engelm. Reported from twelve localities, covering the northern and southern limits of the district. Usually plentiful where found at all.

I. Engelmanni A. Br. In ponds and ditches, mostly over a clay subsoil; common in the northern part of the district, but not reported south of the Blue Hills.

I. foveolata A. A. Eaton, var. **plenospora** A. A. Eaton. In ponds, North Easton (*A. A. Eaton*). Plentiful.

?I. Gravesii A. A. Eaton. Arlington Brook (*Wm. Boott*). The specimens seen are fragmentary and unsatisfactory.

I. saccharata Engelm., var. **Amesii** A. A. Eaton. In ponds on gravelly bottom, North Easton (*A. A. Eaton*). Abundant.

I. Tuckermani A. Br. In ponds on sandy bottom, common.

? Var. **Harveyi** (A. A. Eaton) Clute. Fresh Pond, Cambridge (*Wm. Boott*). All material seen has been fragmentary and unsatisfactory.

(Note.— From the material examined, the genus would appear to

have a north-south distribution through the district, but this is doubtless more apparent than real. The genus has been little collected in the region except by Tuckerman, Boott, and others, who have lived in the neighborhood of Boston. When the western portions of the district have been thoroughly explored, they will probably yield a fair quota of species of this genus. *I. lacustris* L. and *I. riparia* Engelm. have been reported in the district, but I have personally examined material of all the collections referred to these species and find it to belong to other species.— A. A. Eaton.)

TAXACEAE.

TAXUS.

T. canadensis Marsh. Cold woods; abundant at a few stations.

PINACEAE.

PINUS.

P. Strobus L. Common. The best specimens are those in the Appalachian Club Reservation at Carlisle, where the forest has never been cut off.

P. rigida Mill. Dry sterile soil, very abundant throughout.

P. sylvestris L. Escaped from cultivation; Danvers (*John Robinson*, Flora of Essex Co., 1880); "trees of all sizes, and some escaped into the roadside, sandy soil" Newburyport, (*Raynal Dodge*); "very rare in mixed woods," Belmont (*A. H. Moore*).

P. resinosa Ait. Dry soil; found sparingly as far south as Chestnut Hill, Brookline.

LARIX.

L. laricina (Du Roi) Koch. Cold swamps, not common.

L. decidua Mill. Self-sown in Hemenway place, Canton (*E. F. Williams*).

PICEA.

P. rubra (Du Roi) Dietr. Abundant on rocky hillside near Cape Pond, Rockport (*J. H. Sears*); a single tree in Neponset River meadow, Milton, "in too wet land for an introduced tree" (*G. G. Kennedy*); a few trees in Randolph (*E. F. Williams, G. G. Kennedy*).

P. mariana (Mill.) B. S. P. Cold swamps; reported from eleven towns, mostly in northern portions of district.

P. ABIES (L.) Karst. (*P. excelsa* Link.) Spontaneous on west side of Blue Hill, evidently from large trees on the Hayward land (*G. G. Kennedy*).

ABIES.

A. BALSAMEA (L.) Mill. Reported from a few scattered stations but apparently not native in our range.

TSUGA.

T. canadensis (L.) Carr. Cold soil of rocky ridges and ravines, frequent.

CHAMAECYPARIS.

C. thyoides (L.) B. S. P. In very wet places throughout, usually forming "cedar swamps"; less common northward.

THUJA.

T. OCCIDENTALIS L. Reported from a few stations as introduced.

JUNIPERUS.

J. communis L., var. **depressa** Pursh. Dry sterile soil, very common. (True *J. communis* L. is arborescent, and has not been reported in our range).

J. horizontalis Moench (*J. Sabina*, var. *procumbens* Pursh). A single large specimen at the north base of Oldtown Hill, Newbury (*A. A. Eaton*). Probably the southern limit.

J. virginiana L. Dry soil throughout, common.

(Note.— Other extra-limital species of this family are likely to persist around old places, or occasionally to reproduce themselves. Those trees not known to have reproduced by seed are not included in this list.)

C. H. Knowlton,
J. A. Cushman,
Walter Deane,
A. K. Harrison,
} *Committee on local flora.*

FURTHER NOTES ON THE VASCULAR PLANTS OF THE NORTHEASTERN UNITED STATES.

B. L. Robinson.

In the February issue of Rhodora the writer put on record some new combinations which had been found essential to consistent usage in the work and publications of the Gray Herbarium. Several further combinations of similar nature are given below, together with their synonymy. Those relating to the grasses are published by the kind permission of their respective authors. In several cases these combinations, which have already appeared in the subspecific category, are here put on record in order that they may have also a technical accuracy in the varietal rank, it being likely that they will be so placed by many writers who, according to long-established usage maintain the two categories, subspecies and variety, as being to a certain extent distinct.

Sagittaria latifolia Willd., forma **hastata** (Pursh), n. comb. *S. hastata* Pursh, Fl. Am. Sept. ii. 396 (1814).

Panicum columbianum Scribn., var. **thinium** Hitchc. & Chase, n. comb. *P. unciphyllum*, var. *thinium* Hitchc. & Chase, Rhodora, viii. 209 (1906).

Panicum Boscii Poir., var. **molle** Hitchc. & Chase, n. comb. *P. latifolium*, var. *molle* Vasey, U. S. Dept. Agric. Div. Bot. Bull. viii. 34 (1889).

Panicum huachucae Ashe., var. **silvicola** Hitchc. & Chase in litt. quam forma typica altius gracilius laetiore viride minus pubescens;

laminis foliorum tenuibus laxis patentibus 5–10 cm. longis 6–10 mm. latis supra minus dense pilosis subtus appresse pubescentibus sericeis; panicula 5–8(–10) cm. longa, ramis patentioribus; spiculis ellipticis minus turgidis breviore pubescentibus; statu autumnale plus minusve decumbente, ramulis fasciculatis quam internodia principalia brevioribus. (*P. lanuginosum* as described by Scribner & Merrill, not Ell.) — Woods and clearings, range of the typical form, more common southward. Type, District of Columbia, *Chase*, no. 2400, in National Herbarium.

MUHLENBERGIA SCHREBERI Gmel., var. **palustris** Scribner in litt. *M. Schreberi*, subsp. *palustris* Scribner, RHODORA, ix. 17 (1907).

SPHENOPHOLIS OBTUSATA (Michx.) Scribner, var. **pubescens** (Scribner & Merrill) Scribner in litt. *Eatonia pubescens* Scribner & Merrill, Circ. U. S. Div. Agrost 27, p. 6 (1900). *S. obtusata*, subsp. *pubescens* Scribner, RHODORA, viii. 143, 144 (1906).

SPHENOPHOLIS OBTUSATA (Michx.) Scribner, var. **lobata** (Trin.) Scribner in litt. *Trisetum lobatum* Trin. Mém. Acad. Pétersb. sér. 6, i. 66 (1831). *S. obtusata*, subsp. *lobata* Scribner, RHODORA, viii. 143, 144 (1906).

SPHENOPHOLIS NITIDA (Spreng.) Scribner, var. **glabra** (Nash) Scribner in litt. *Eatonia glabra* Nash in Britton, Man. 1043 (1901). *S. nitida*, subsp. *glabra* Scribner, RHODORA, viii. 143, 145 (1906).

SPHENOPHOLIS PALLENS (Spreng.) Scribner, var. **major** (Torr.) Scribner in litt. *Koeleria truncata*, var. *major* Torr. Fl. U. S. 117 (1824). *S. pallens*, subsp. *major* Scribner, RHODORA, viii. 143, 145 (1906).

SPHENOPHOLIS PALUSTRIS (Michx.) Scribner, var. **flexuosa** Scribner in litt. *S. palustris*, subsp. *flexuosa* Scribner, RHODORA, viii. 143, 145 (1906).

TRISETUM MELICOIDES (Michx.) Vasey, var. **majus** Hitchc., n. comb. *Graphephorum melicoides*, var. *major* Gray, Ann. Bot. Soc. Can. i. 57 (1861) & Proc. Am. Acad. v. 191 (1861).

PUCCINELLIA **Borreri** (Bab.) Hitchc., n. comb. *Festuca Borreri* Bab. Trans. Linn. Soc. xvii. 565 (1837).

FESTUCA RUBRA L., var. **prolifera** Piper in litt. *F. rubra*, subsp. *prolifera* Piper, Contrib. U. S. Nat. Herb. x. 21 (1906).

ELYMUS VIRGINICUS, var. **hirsutiglumis** (Scribn.) Hitchc. in litt. *E. hirsutiglumis* Scribn. U. S. Dept. Agric. Div. Agrost, Bull. xi. 58 (1898).

Amaranthus hybridus, forma **hypochondriacus** (L.), n. comb. *A. hypochondriacus* L. sp. Pl. ii. 991 (1753). *A. hybridus*, var. *hypochondriacus* Robinson, Rhodora, x. 32 (1908), by clerical error.

Actaea rubra (Ait.) Willd., forma **neglecta** (Gillman), n. comb. *A. neglecta* Gillman in Lloyd, Drugs and Medicines, 235 (1884–5). *A. eburnea* Rydb. Mem. N. Y. Bot. Gard. i. 153 (1900). This is the problematic *Actaea*, seemingly merely a color form of *A. rubra*, which has white berries on slender pedicels.

Bacopa **acuminata** (Walt.), n. comb. *Gratiola acuminata* Walt. Fl. Car. 61 (1788). *Maturea nigrescens* Benth. Comp. Bot. Mag. i. 173 (1835). *Herpestis nigrescens* Benth. Comp. Bot. Mag. ii. 56 (1836). *Monniera acuminata* Ktze. Rev. Gen. ii. 463 (1891). This new combination and the next are necessitated by the legalization of *Bacopa* through its inclusion in the list of nomina conservanda of the Vienna Rules.

Bacopa **caroliniana** (Walt.), n. comb. *Obolaria caroliniana* Walt. Fl. Car. 166 (1788). *Monniera amplexicaulis* Michx. Fl. Bor. Am. ii. 22 (1803). *Herpestis amplexicaulis* Pursh, Fl. Am. Sept. 418 (1814). *Monniera caroliniana* Ktze. Rev. Gen. ii. 463 (1891).

Ilysanthes. For some years it has been known that there are two kinds of *Ilysanthes* growing in the northeastern United States. Whether these are to be regarded merely as varieties of the same species or are better treated as fairly independent species is still to some extent an open question. For the latter course it may be urged that the ranges of the two are not entirely identical, that the differences of the plants in question, when once understood, are pretty readily seen, and finally that the copious material of the two, collected during recent years, instead of showing further evidence of intergradation, tends rather to prove a fairly high degree of constancy in their differences. Accepting at least provisionally the view that these plants are better treated as species, we are confronted with the problem of their specific nomenclature. The plants in our present discussion may be distinguished as I and II with the following salient distinctions.

I. Leaves relatively large, ovate to oblong; lower pedicels only about as long as the subtending leaves or shorter; calyx-lobes linear about equalling or slightly exceeding the ellipsoidal pod.

II. Leaves smaller; pedicels long and filiform, even the lower ones much exceeding the subtending leaves; calyx-lobes somewhat shorter than the pod.

In his paper on the North American Species of Ilysanthes, Bull. Torr. Bot. Club, xxiii. 296 et seq. (1896), Dr. J. K. Small treats plant II as *S. gratioloides* (L.) Benth. and makes for plant I a new combination *I. attenuata* (Muhl.) Small, regarding it identical with *Lindernia attenuata* Muhl. Cat. 59 (1813).

Some years later Dr. J. H. Barnhart, Bull. Torr. Bot. Club, xxvi. 376 (1899), calls attention to the fact that the name *I. gratioloides* (L.) Benth., founded upon *Capraria gratioloides* L. Sp. Pl. ed. 2, ii. 876 (1763), must give place to *I. dubia* (L.) Barnhart, founded upon the earlier and identical *Gratiola dubia* L. Sp. Pl. i. 17 (1753). It is to be noticed that subsequent writers, *e. g.* Britton, Man. 830 (1901), have assumed that Dr. Barnhart as well as Dr. Small regarded the Linnaean species (founded upon Clayton's no. 164 collected in Virginia) as being the small-leaved long-pediceled form which we have called plant II. However, the description which Gronovius himself gave of this plant of Clayton's, — see Gronovius, Fl. Virg. 73, 129 (1739), — contains the significant words *pedunculis solitariis unifloris longitudine foliorum*, an expression strongly pointing to its identity not with plant II but with plant I. To make sure of this identity the writer applied to Mr. E. G. Baker of the British Museum of Natural History to examine the still extant specimen of Clayton. This he most kindly did and sent a tracing of it to the Gray Herbarium showing conclusively its identity with the larger-leaved relatively shorter-pediceled form, which Dr. Small has called *I. attenuata*.

In the light of this new information the two species in question would seem to require the following nomenclatorial treatment.

I. I. DUBIA (L.) Barnhart, Bull. Torr. Bot. Club, xxvi. 376 (1899), as to actual Linnaean type. *Gratiola dubia* L. Sp. Pl. i. 17 (1753). *Capraria gratioloides* L. Sp. Pl. ed. 2, ii. 876 (1763). *Lindernia attenuata* Muhl. Cat. 59 (1813). *Gratiola attenuata* Spreng. Syst. i. 39 (1825). *I. gratioloides* Benth. in DC. Prodr. x. 419 (1846). *I. riparia* of many auth., at least in part, probably not of Raf. *I. gratioloides*, var. *curtipedicellata* Bush, Bull. Torr. Bot. Club, xxi. 494 (1894). *I. attenuata* Small, Bull. Torr. Bot. Club, xxiii. 297 (1896).

II. **I. anagallidea** (Michx.), n. comb. *Gratiola anagallidea* Michx. Fl. Bor. Am. i. 6 (1803). *Lindernia dilatata anagallidea* Muhl. Cat. 59 (1813). *L. pyxidaria* Pursh, Fl. Am. Sept. 419 (1814). ? *I. riparia* Raf. Ann. Nat. 13 (1820). *I. dubia* of auth., not of Barnhart as to the Linnaean type.

Rudbeckia speciosa Wenderoth, var. **Sullivanti** (Boynton & Beadle), n. comb. *R. Sullivanti* Boynton & Beadle, Biltmore Bot. Stud. i. 15 (1901).

Coreopsis major Walt., var. **stellata** (Nutt.), n. comb. *C. stellata* Nutt. Journ. Acad. Philad. vii. 76 (1834). *C. senifolia*, var. *stellata* T. & G. Fl. ii. 342 (1842). *C. major*, var. *Oemleri* Britton, Mem. Torr. Bot. Club, iv. 131 (1894). *C. Oemleri* Ell. Sk. ii. 435 (1823). The name *stellata* must be taken up in place of *Oemleri* as the varietal designation since it has priority in the category in which it is here used.

Actinea **herbacea** (Greene), n. comb. *Actinella scaposa*, var. *glabra* Gray, Man. ed. 5, 263 (1867). *Tetraneuris herbacea* Greene, Pittonia, iii. 268 (1898).

NOTES ON THE GENUS SENECIO.

J. M. Greenman.

During the season of 1904 Messrs. J. F. Collins, M. L. Fernald and A. S. Pease collected in the Province of Quebec several Senecios which were referred to the writer for identification. One of these appeared to be intermediate in general aspect between *Senecio aureus* L. and *S. Balsamitae* Muhl., and upon a detailed study it was characterized as a probable hybrid between these species; publication was suspended, however, in the hope that further collections from different localities would produce additional material giving cumulative evidence of hybridity.

In June of last year the writer, while botanizing near Lake Michigan in the vicinity of Beach, Lake County, Illinois, found a large colony of *Senecio Balsamitae* growing in sandy soil, and near by in moist situations *Senecio aureus* L. was also relatively abundant. Associated with these two species in low wet meadows in limited number was noticed a peculiar Senecio intermediate in size and foliar characters between the two species mentioned. This form has since been examined more in detail, and the intermediate characters were found to extend to the different parts of the head. Moreover, upon com-

parison of my plant with the specimens secured in eastern Quebec by Collins, Fernald and Pease the two appear to be identical. On the whole there is every reason to believe that the plant in question is a natural hybrid, and it seems worthy of characterization as follows:

Senecio aureus > × **Balsamitae**, n. hyb., caulibus erectis 2.5–8 dm. altis glabratis vel sparse lanato-tomentosis; foliis inferioribus petiolatis oblongo-rotundatis vel oblongo-ovatis vel subellipticis 1–6 cm. longis 1–3.5 cm. latis, apice rotundatis vel obtusis marginibusque crenato-dentatis vel rarius acute-dentatis, basi subcordatis vel abrupte contractis et cuneatis superioribus lyratis vel laciniato-pinnatifidis; petiolis 2–15 cm. longis gracilibus; achaeniis glabratis vel sparse pilosis.— Stem erect, 2.5 to 8 dm. high, glabrous or nearly so; lower leaves oblong-rotund to oblong-ovate or subelliptic, 1 to 6 cm. long, 1 to 3.5 cm. broad, rotund to obtuse at the apex, crenate-dentate or occasionally rather sharply toothed, the earliest subcordate, the later either abruptly or rather gradually contracted at the base into the petiole; petioles 2 to 15 cm. long, slender; stem-leaves lyrate to laciniate-pinnatifid; inflorescence few to many-headed: heads medium sized: achenes glabrous or sparingly pilose, about one-third approximately developing perfect embryos.— Wet alluvial shores between Baldié and the Baie des Chaleurs, Bonaventure River, Province of Quebec, 5, 6, and 8 August, 1904, *Collins, Fernald & Pease* (hb. Gray); in low wet meadows, vicinity of Beach, Lake County, Illinois, 16 June, 1907, *Greenman*, nos. 1991, 2022 (hb. Field Mus.). Associated with the two parent species, and intermediate in size, leaf-outline and in technical characters of the head, bearing rather more the general aspect, however, of *S. aureus*.

Senecio Balsamitae Muhl., var. **Crawfordii** (Britton), n. comb. *S. Crawfordii* Britton, Torreya, i. 21 (1901). This plant, although at first taken to be distinct from *S. Balsamitae* Muhl., upon the examination of a large series of specimens can scarcely be regarded as of more than varietal rank. Its somewhat more luxuriant growth, than is characteristic of typical forms of the species, is most probably due to the moist rich habitat in which it was growing.

Field Museum of Natural History, Chicago.

NOTES ON HABENARIA.

Oakes Ames.

Habenaria dilatata var. **media** (Rydb.) n. comb.— *Limnorchis media* Rydb. Bull. Torr. Bot. Cl. **28**: 618 (1901).

The original specimen on which *H. dilatata* was based is in the herbarium of the British Museum. It was collected by Sir Joseph Banks in Newfoundland in 1766, and described by Pursh as *Orchis dilatata* in his Flora Americae Septentrionalis. The common New England form is considerably taller than the Banksian specimen and might readily be taken for a distinct species if it were not for perfect agreement in specific details. Strangely enough the form characteristic of the type is extremely rare in herbaria and is best matched by a series of specimens collected in high alpine bogs on Mt. Albert, Gaspé Co., Quebec, where they were found in August, 1905, at an altitude between 900 and 1050 meters by Collins and Fernald. The range of variation between the type and the luxuriant specimens frequently found in New England is sufficiently enormous to induce caution where new species are contemplated. *H. dilatata* is a widely distributed species and consequently adaptable to conditions which have a marked influence on growth. An examination of large quantities of material has convinced me that Dr. Rydberg's *Limnorchis media* is simply a variety of *H. dilatata* characterized by yellowish-green flowers. The labellum is slightly rhombic-lanceolate and the rostellar glands are similar to those of *H. dilatata*. The living specimens which I have examined have all been deliciously fragrant as is the case with typical *H. dilatata*.

Habenaria blephariglottis var. **conspicua** (Nash) n. comb.— *H. conspicua* Nash Bull. Torr. Bot. Cl. **23**: 100 (1896) — *Blephariglottis conspicua* Small Fl. Se. U. S. 313 (1903).

This variety differs from the type mainly in its longer spur, and is the common form in the southern states.

H. × **Canbyi** hybr. nov. (*H. cristata* × *H. blephariglottis*).

This interesting natural hybrid was collected near Lewes, Delaware in July, 1878, by Wm. M. Canby. At the time it was discovered its hybrid origin was suspected. The following transcript from the collector's notes is of interest:

"*Habenaria cristata* × *blephariglottis?* Intermediate in color, size of flowers, openness of panicle, etc. between the two species. Hab., Swamp near Lewes, Delaware, in company with *H. cristata* and *H. blephariglottis*, July 27, 1878."

The labellum of the hybrid is more or less ragged-fringed, 7 mm. long, more closely resembling *H. cristata* than *H. blephariglottis*. The length of the spur is 12 mm. and consequently of very great diacritical value, as in combination with other characters more or less intermediate between the parent species it excites that suspicion as to origin which usually results in the detection of natural hybrids.

The foliage is intermediate.

Type in Hb. College of Pharmacy, New York City.

North Easton, Massachusetts.

Preliminary Lists of New England Plants,— XIX. Addenda.— Since the publication of "Preliminary Lists of New England Plants,— XIX." (Rhodora, **8**: 131, July, 1906), several new records for some of the mosses there listed have been reported to the writer, in most cases accompanied by specimens. To bring this list to date the additions and corrections noted below should be incorporated.

In Rhodora (**4**: 239) Mr. A. LeR. Andrews records finding *Buxbaumia indusiata* Brid. on Mt. Greylock, Mass. In the manuscript for the original list a dash (—), based upon this record, appears in the column for Massachusetts, but through some oversight in proofreading its omission in the printed list passed unnoticed. It should be inserted.

Catharinaea Macmillani Holz. was originally described by Professor J. M. Holzinger, in 1903,[1] from sterile specimens collected in Minnesota. In Rhodora (**9**: 98) Mr. E. B. Chamberlain fully described both gametophyte and sporophyte of this species and published illustrations, together with complete data in regard to its discovery in New England. A cross (+) should be inserted in the "Me." column and a dash (—) in the "Conn." column.

Catharinaea crispa James has been collected by Miss A. L. Crockett

[1] Minn. Bot. Studies, **3**: 120.

in Camden, Maine, as recorded in Rhodora (9: 74), and in East Hartford, Connecticut, by Mr. C. A. Weatherby. A cross should be inserted in both the columns indicated.

Pogonatum alpinum var. *arcticum* (Sw.) Brid. In June, 1906, Professor Fernald and the writer made a brief visit to Salisbury, Connecticut, where, in Sage's Ravine, a few sterile specimens of this moss were collected, but they were not determined until later in the year, after the printed list appeared. According to government maps of this ravine the specimens undoubtedly grew in Connecticut, though only a few rods from the Massachusetts boundary.

Polytrichum commune var. *perigoniale* (Mx.) Bry. Eur. Specimens of this variety, collected in Vermont, are in the herbarium of Dr. Abel J. Grout, this state being the only one from which it had not been seen at the time the list was published.

Polytrichum gracile Dicks. was recorded from the Rangeley Lakes, Maine, in Rhodora (9: 64) by Mrs. E. M. Dunham. As there stated the specimens examined by the writer were not quite typical. A cross (+) should be used in recording the last three mosses.— J. Franklin Collins, Providence, Rhode Island.

Euclidium syriacum in Massachusetts.— On June 23, 1907, while collecting in Dedham, Mass., I came across an abandoned henyard. Here, with *Erysimum cheiranthoides* L. and *Lepidium apetalum* Willd., grew one specimen of a peculiar plant which I did not recognize as a crucifer. With the assistance of Dr. B. L. Robinson I have identified the plant as *Euclidium syriacum*, R. Br., a field plant ranging from lower Austria and Russia to Persia, Baluchistan and Cashmere. The following description may lead to further reports of this waif, which so far as I know has never been reported in this country before. The specimen I have given to the Gray Herbarium.

Branching, hairy, 3 dm. tall; leaves 2.5–3 cm. long, alternate, rough, with small distant denticulations; flowers inconspicuous, yellow scattered on naked tips of branches; fruit densely rough-pubescent, 2–4 mm. long, with an abruptly reflexed beak of nearly the same length; seeds few.— C. H. Knowlton, Boston, Mass.

Vol. 10, no. 110, including pages 21–36, was issued 4 April, 1908.

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Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
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Vol. 10. May, 1908. No. 113.

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THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. May, 1908. No. 113.

THE CRATAEGI OF THE NORTHEASTERN UNITED STATES AND ADJACENT CANADA.

W. W. Eggleston.

The genus *Crataegus* presents an interesting problem, and one for the study of which we are just beginning to get sufficient data. Up to ten years ago the American species of this genus were much better known in European botanical gardens than at home; and one of the most vexing problems of the present in regard to the group is to know precisely what has been meant by the species described in Europe.

In preparing a treatment of the genus soon to be issued I have endeavored, first to give a clear characterization of the different sections, with good keys; second to take up the more important published species and varieties, without even pretending to deal with every form that may prove worthy of recognition. Much more thorough work needs to be done in the field, and careful cultural experiments will have to be made, before the genus can be exploited finally.

The part of northeastern North America that really needs the most exploration in connection with this genus is southern Virginia, east of the Blue Ridge. Here should be found a number of the *Flavae* and other southern forms. Profitable work, however, can still be done all over the northeastern states and in adjacent Canada, both in extending the known ranges of old species and in finding new forms.

In my judgment much of the trouble found in *Crataegus* arises from hybridization, and why may not mutation be another disturbing element? Along these lines there is a fine field for experimental work. Unhappily, such investigation in the case of *Crataegus* offers much greater difficulty than in *Viola* where the whole life history can be observed within a year or so. In *Crataegus* it would require perhaps

eighteen months for the germination of the seed and from eight to ten years to secure mature fruit from the first generation. Thus one would need the equipment and backing of an arboretum to carry on such work on a scale sufficiently extended to secure definite results.

So far as known, the genus produces plenty of good seed, and the plantations at Biltmore, the Arnold Arboretum, and my own, at the New York Botanical Garden, have shown that the forms of the genus reproduce themselves surprisingly true from seed. Yet, further experiments are greatly to be desired, in which *all* the seed from a single tree are retained and raised to maturity. When this is tried, it will be surprising indeed if *Crataegus* differs from other members of the Rose Family, which are so notoriously susceptible to crossing.

The genus is so variable that it is impossible to find characters which will hold absolutely true, either between species or even sections; then again, characters which seem to hold good in one section are useless in the next. Thus in the *Molles* and *Coccineae* certain species have cordate leaves on their vegetative shoots, but in the *Tenuifoliae* and *Pruinosae* both cordate and wedge-shaped leaves occur on the same plant.

The best time to study *Crataegi* is when they are in mature fruit. Often it is impossible to name dried flowering material closer than to one of two groups, while mature fruiting material, even in the dried state, would easily settle the species. This case holds particularly true between the *Tenuifoliae* and *Pruinosae*, the *Coccineae* and *Molles*, the *Macracanthae* and *Anomalae*.

Personally I am fast losing confidence in the number of stamens as a reliable diagnostic character. It is true that in a general way the flowers of many species seem to have prevailingly 5–10 stamens or 10–20 stamens, but both 10-stamened and 20-stamened flowers sometimes are found on the same tree; and material is fast accumulating which seems to show that for every 10-stamened form somewhere a similar form will occur with 20 stamens, and the reverse.

In a general way color of anthers seems to be correlated with color of the immature foliage; thus yellow anthers go with yellow-green leaves, pink anthers with bronze-green leaves; and the different sections have their own particular color. For instance, the only constant difference between the *Coccineae* and the *Molles* is this color difference, all other distinctions breaking down at some point; but even this character must be employed with caution, particularly if

there are hybrids in the genus, for plants are often encountered which have seemingly the wrong anther-color; thus *Pruinosae* and *Tenuifoliae*, which habitually have pink anthers, occasionally exhibit yellow anthers. In the North one would naturally investigate these as probable crosses with the *Rotundifoliae*, *Intricatae*, or *Molles*. The section *Macracanthae* is one of the most easily distinguished because the nutlets have pits on their inner faces, and naturally a hybrid between one of the *Macracanthae* and a species with plane nutlets would be marked. One would expect in such a form nutlets with pits of all degrees of depth, and forms of this sort are in fact often found in nature.

One of the best places to study *Crataegus* hybrids is in the Northwest, where there are only three groups represented, one with black fruit, the others with red. In this region forms with brown or chestnut-colored fruit are found, but they are relatively so scarce as to suggest hybrid origin.

Although anther-color seems to be of value in determining *Crataegi*, it is a distinction which cannot be used in the case of dried material, and even in the live plants it is of such short duration that I have left it out of my keys.

Reliable characters are to be found in the fruits, number of nutlets, sculpture of the nutlets, and consistency of the flesh, whether hard or soft at maturity, and form of the calyx, while even the leaves and sepals are of more permanent aid to us than the color character.

In sectional names the oldest known have been used. Fortunately only one section had to be renamed. For this I used the name of the oldest as well as the most characteristic species, as follows:

Rotundifoliae, n. nom. *Coccineae* Sarg. Man. Trees N. A. 366 (1905), not Loudon, Arb. et Frut. Brit. **2**: 816 (1838).

Other notes and nomenclatorial changes which it seems best to put on record together with synonymy and bibliography are as follows:

C. Crus-galli L., var. **exigua** (Sarg.), n. comb. *C. exigua* Sarg. Rhod. **5**: 52 (1903).

C. Crus-galli L., var. prunifolia (Poir.) Loud. Arb. et Frut. Brit. **2**: 821 (1838). *Mespilus prunifolia* Poiret, Encyc. Method. **4**: 443 (1797) and in Nouveau Duhamel Traité des Arbres et Arbust. **4**: 150, t. 40 (1809). *C. attenuata* Ashe, Jour. Elisha Mitchell Soc. **19**: pt. 1, 30 (1903). This variety seems to have been subject to a mistaken interpretation, which needs revision. Poiret's description

and plate call for a glabrous form of *C. Crus-galli* with rather broad and somewhat acute-pointed leaves. The form occurring at Port Huron, Mich., and Windsor, Ontario (*C. attenuata* Ashe) exactly fits this plate. It is to be noted that *M. prunifolia* Poiret originally came from Canada. Furthermore as *C. Crus-galli* is an extremely rare form in Canada, this southern Ontario region being the only place where it is known to occur native, the evidence seems very clear that this particular form is the original of var. *prunifolia*. Unfortunately the name *prunifolia* after Poiret's time was transferred both in botanical gardens and in literature to a broad-leaved form of *C. Crus-galli* with pubescent leaves and corymbs (see for instance DeCandolle, Torrey and Gray, etc.).

C. Crus-galli × **macracantha,** n. hybr. Certain broad-leaved individuals with foliage as in *C. Crus-galli*, var. *prunifolia*, the corymbs pubescent, the calyx-lobes serrate, the nutlets 2–3, their pits varying from shallow to deep, have all the appearance of being natural hybrids between these two species. (*C. persimilis* Sarg.; *C. prunifolia* of European gardens, in part.) — Occasional.

C. BERBERIFOLIA T. & G., var. **Engelmanni** (Sarg.), n. comb. *C. Engelmanni* Sarg. Bot. Gaz. **31**: 2 (1901).

C. COLLINA Chapm., var. **sordida** (Sarg.), n. comb. *C. sordida* Sarg. Bot. Gaz. **33**: 114 (1902).

C. COLLINA Chapm., var. **Lettermani** (Sarg.), n. comb. *C. Lettermani* Sarg. Bot. Gaz. **31**: 220 (1901).

C. APPOSITA Sarg., var. **Bissellii** (Sarg.), n. comb. *C. Bissellii* Sarg. Rhod. **5**: 65 (1903).

The name C. COCCINEA has been applied to many different plants both by Linnaeus himself and by later authors. Linnaeus, Sp. Pl. ed I, **1**: 476 (1753), thus describes *C. coccinea*: —

"CRATAEGUS foliis ovatis repando angulatis serratis glabris. *Hort. cliff.* 187 [1737]. *Hort. Ups.* 126 [1748]. *Gron. virg.* 54 [1739]. *Roy. lugdb.* 272 [1740].

Mespilus, apii folio virginiana spinis horrida, fructu amplo coccineo. *Pluk. Alm.* 249. *t.* 46. *f.* 4 [1691].

Mespilus spinosa s. Oxyacantha virginiana maxima. *Angl. hort.* [Catalogus plantarum....quae in hortis non procul a Londino propagantur] 49. *t.* 13. *f.* 1 [1730].

Habitat in Virginia, Canada.

Variat cum validis spinis lateralibus & absque spinis."

Here the first three paragraphs undoubtedly refer to three distinct species, belonging to three sections of the genus. The plant of the first paragraph is represented in the British Museum by a small fragment of Plukenet's labeled as of t. 46, f. 4, and supposed to have come from Virginia. This Plukenet specimen is so incomplete that it is impossible to determine the species to which it belongs. See Sarg. Bot. Gaz. **31**: 12 (1901). My photograph of this type seems clearly to represent a form of the group *Coccineae* Loud. For further confirmation of this view, see Miller, Dict. ed. I, no. 8 (1731), ed. VII, nos. 7 and 8 (1759), ed. VIII, no. 4 (1768); Aiton, Hort. Kew. ed. I, **2**: 167 (1789); Watson, Dendr. Brit. **1**: t. 62 (1825); Hook. Bot. Mag. t. 3432 (1835); Loud. Arb. et Frut. Brit. **2**: 816 (1838); and T. & G. Fl. N. A. **1**: 465 (1840).

Plate 3432 in the Botanical Magazine represents a flowering specimen with pink anthers and ten stamens, which must have been very near either *C. pedicillata* or *C. polita* Sarg. This seems good evidence for *C. coccinea* Mill. and for the section *Coccineae* Loud. But the Plukenet type is so incomplete as to be undeterminable and might easily belong in the section *Molles* as Prof. Sargent (Bot. Gaz. **31**: 12, 1901) thinks, and therefore this vague element in the composite should be ignored if there is another covered by the Linnaean description which we can determine. Happily this is the case and it is possible to identify both the other elements included by Linnaeus under the composite *C. coccinea* of the first edition of his Species Plantarum. The second plate cited by Linnaeus, namely, a fine colored one in Angl. Hort. 49, t. 13, f. 1 (1730), is unmistakably *C. Phaenopyrum* (L. f.) Medic. This species, under any rule can be eliminated from the question if we can determine the species represented by the first plate. This first plate, Pluk. Alm. 249, t. 46, f. 4, has been variously interpreted. It was, without much doubt, drawn from material collected by Banister in Virginia (Chesapeake Bay region). These Banister-Plukenet types are preserved in the British Museum, as is also the later material collected by Clayton in Virginia. Mr. James Britten kindly sent me photographs of these *Crataegus* types, but the one supposed to be the original of t. 46, f. 4 I saw at once could not have been used to make this plate. Mr. Britten made another search and found an unnumbered specimen of Plukenet's that he says does exactly match the plate. This is fortunately in mature fruit. Mr. Britten was so kind as to send me one of the fruits and this at once

decided the question. It is a red-brown pubescent fruit with firm flesh, and, when the type of leaves is considered, can represent no other American thorn than *C. modesta* Sarg. These facts, together with the circumstance that the form in question is one of the few known from the Chesapeake Bay region ought to settle the status of *C. coccinea* L.

This species seems to have been rarely collected by the early American botanists. It is represented in the Torrey herbarium (N. Y. Bot. Gard.) by a specimen from West Point, N. Y. (1825), in regard to which Dr. Gray recorded the opinion that this was exactly the *C. glandulosa* of Pursh as seen in the Barton herbarium.

The following synonyms appear to belong to this species: — *C. coccinea*, var. *viridis* T. & G. Fl. N. A. **1**: 465 (1840), in part. *C. intricata* J. Lange, Bot. Tidssk. **19**: 264 (1895). *C. modesta* Sarg. Rhod. **3**: 28 (1901). *C. premora* Ashe, Ann. Car. Mus. **1**: 391 (1902).

The history of *C. coccinea* is rendered still more complex by the fact that Linnaeus in subsequent publications included in his species still other elements. Thus in the second edition of the Species Plantarum (1762) he added the description and cited the plate of Miller's *Mespilus cordata*. Finally in the Mantissa altera, 397 (1771) he gives a description which points to still a fifth species and group, namely to the plant here called *C. rotundifolia*, var. *Faxoni*. This last is the form taken up by Prof. Sargent for *C. coccinea* (Bot. Gaz. **31**: 12, 1901).

It would take a small volume to discuss critically the forms taken up by authors since the time of Linnaeus for *C. coccinea*. Indeed the species has been made a sort of general dumping ground for unknown forms.

C. TOMENTOSA L. *C. uniflora* Muench. Hausv. **5**: 147 (1770). *C. parvifolia* Ait. Hort. Kew. ed. I, **2**: 169 (1789). *C. tomentosa* is another badly interpreted species. It also came from the Chesapeake Bay region (*Banister*) and as published by Linnaeus is a composite. The first paragraph relating to the species in L. Sp. Pl. ed. I, **1**: 476 (1753) "Craetaegus foliis cuneiformi-ovatis serratis subangulatis subtus villosis, ramis spinosis. Habitat in Virginia" can refer to but one plant of this region; while the expression "ramis spinosis" will not fit the form *C. tomentosa* T. & G., and this form does not occur in the Chesapeake Bay region. In Sp. Pl. ed. II, **1**: 682 (1762), Linnaeus adds "Mespilus virginiana, grossulariae foliis. Pluk. phyt.

100. f. 1." Of this plate Plukenet, Alm. 249 (1696) says: "Mespilus Virginiana grossulariae foliis, fructu rubro minore, Phytogr. Tab. 100. f. 1. an Oxyacanthus folio parvo subrotundo, flore unico, theca foliacea incluso summitatibus ramulorum insidente *Banisteri.*" This unmistakably places the species, as there is only this one-flowered species in the region. See also Miller's Dict. ed. VIII (1768) under *C. tomentosa* L., as also Michaux, etc., for further confirmation of our views.

C. TOMENTOSA L., var. **Smithii** (Sarg.), n. comb. *C. Smithii* Sarg. Trees and Shrubs, **1**: 67, t. 34 (1903).

C. COLUMBIANA Howell, var. **Piperi** (Britton), n. comb. *C. Piperi* Britton, Torreya, **1**: 55 (1901).

C. COLUMBIANA Howell, var. **Brunetiana** (Sarg.), n. comb. *C. Brunetiana* Sarg. Rhod. **5**: 64 (1903).

C. IRRASA Sarg., var. **Blanchardi** (Sarg.), n. comb. *C. Blanchardi* Sarg. Rhod. **7**: 218 (1905).

C. ROTUNDIFOLIA Moench, var. **Bicknellii,** n. var. foliis ad apicem modice acute lobatis; corymbis paullo villosis mox glabris; calycis lobis longis laciniatis persistentibus ad maturitatem fructus; nucellis saepissime 4–5.— Leaves somewhat sharply lobed towards the apex; corymbs slightly villous, soon glabrous; calyx-lobes long, laciniate, persistent on the fruit; nutlets usually 4–5.— Nantucket, Mass.: Wauwinet, June 5, 1900 (in flower), *Miss Mary A. Day,* no. 76; Polpis, September 5, 1904, *E. P. Bicknell* (type, in Herbarium of the New York Botanical Garden); also Quaise, September 19, 1907, *E. P. Bicknell.* Mr. Bicknell says "this is a round-topped shrubby tree, sometimes 3 m. high, of which I know only a few individuals."

The only other native thorn that I have seen from Nantucket is a specimen of the *Intricatae* (in leaf only), collected by Mr. Bicknell. This is likely to be *C. apposita* Sarg.

C. ROTUNDIFOLIA Moench, var. **Faxoni** (Sarg.), n. comb. *C. Faxoni* Sarg. Rhod. **5**: 161 (1903). *C. coccinea* of the Linnaean Herbarium in part. See Sarg. Bot. Gaz. **31**: 12 (1901); L. Sp. Pl. ed. III, **1**: 682 (1764).

C. ROTUNDIFOLIA Moench, var. **chrysocarpa** (Ashe), n. comb. *C. chrysocarpa* Ashe, Bull. N. Car. Agric. Coll. **175**: 110 (1900).

C. Marshallii, n. nom. *Mespilus apiifolia* Marsh. Arb. 89 (1785). *C. apiifolia* Michx. Fl. **1**: 287 (1803), not Medic. Gesch. 83 (1793).

C. LUCORUM Sarg., var. **insolens** (Sarg.), n. comb. *C. insolens* Sarg. Rhod. **7**: 217 (1905).

C. MACROSPERMA Ashe, var. **pentandra** (Sarg.), n. comb. *C. pentandra* Sarg. Rhod. **3**: 25 (1901).

C. MACROSPERMA Ashe, var. **demissa** (Sarg.), n. comb. *C. demissa* Sarg. Rhod. **5**: 139 (1903).

C. MACROSPERMA Ashe, var. **pastorum** (Sarg.), n. comb. *C. pastorum* Sarg. Rhod. **3**: 24 (1901).

C. MACROSPERMA Ashe, var. **matura** (Sarg.), n. comb. *C. matura* Sarg. Rhod. **3**: 24 (1901).

C. MACROSPERMA Ashe, var. **acutiloba** (Sarg.), n. comb. *C. acutiloba* Sarg. Rhod. **3**: 23 (1901).

C. Grayana, n. sp., foliis flabellatis 3–8 cm. longis 2–7 cm. latis basi cuneatis vel truncatis apice acuminatis simplice vel duplice serratis, dentibus parvis rectis, lobis 4–5-jugis acuminatis saepe recurvatis; foliis junioribus supra et subtus in veniis paullo appresse pubescentibus mox glabratis membranaceis supra obscure viridibus subtus pallidioribus; petiolis gracilibus 1.5–3 cm. longis glabris; corymbis multifloris paullo villosis, floribus 1.5–1.8 cm. latis; tubo calycis subtus villoso supra glabro, lobis lanceolatis acuminatis circa 5 mm. longis glabris integris vel remote glandularibus; staminibus circa 20, antheris roseis; stylis 3–5 basi tomento pallido circumdatis; fructu subgloboso vel breviter ellipsoidali angulari 10–15 mm. crasso atrorubenti paullo villoso sed glabrato; pericarpio crasso farinaceo flavo; sepalis patentibus persistentibus; nucellis plerisque 4–5, dorso carinatis, 6–7.5 mm. longis, fasciculo nucellarum 6–8 mm. crasso.— Leaves flabellate, 3–8 cm. long, 2–7 cm. wide, cuneate to truncate at the base, acuminate at the apex, simply or doubly serrate with fine straight teeth, with 4–5 pairs of acuminate often recurved lobes; young leaves with a straight appressed pubescence above and along the veins beneath, becoming glabrous, membranaceous, dull green above, paler beneath; petioles slender, 1.5–3 cm. long, glabrous; corymbs many-flowered, somewhat villous; flowers 1.5–1.8 cm. wide; calyx-tube villous below, glabrous above; calyx-lobes lanceolate, acuminate, about 5 mm. long, glabrous, entire or remotely glandular; stamens about 20; anthers pink; styles 3–5, surrounded at the base by pale tomentum; fruit subglobose to short-ellipsoidal, angular, 10–15 mm. thick, dark crimson, slightly villous, becoming glabrous; sepals spreading, persistent; flesh thick, mealy, yellow; nutlets usually 4–5, ridged on the back, 6–7.5 mm. long, nest of nutlets 6–8 mm. thick.— Round-topped shrubs or small trees, sometimes 6 m. high, armed with chestnut-brown curved thorns 2–5 cm. long; vegetative twigs chestnut-brown, glabrous.— Montmorency Falls to Montreal, Que., western New England, and northeastern New York. Type no. 2762 *Eggleston*, Caughnawaga Reservation, Quebec, May 28, Sept. 25, 1902 (in hb. Gray).

Of this species I have examined the following specimens:— PROVINCE OF QUEBEC: Montmorency Falls, May 30, Sept. 23, 1901, *J. G. Jack*, nos. 128, 131 (hb. Arn. Arb.); Longueil, May 27, Sept. 25, 1902, *J. G. Jack*, no. 138 (hb. Arn. Arb.); Mount Royal, Oct. 6, 1903, *Eggleston*, no. 3339 (hb. N. Y. Bot. Gard., hb. Egg.); La Tortue, May 30, Oct. 4, 1900, *W. A. Jack*, no. 68 (hb. Arn. Arb.); Highlands (Island of Montreal), May 30, Sept. 21, 1901, Sept. 26, 1902, *J. G. Jack*, no. 134 (hb. Arn. Arb.); Caughnawaga, May 30, Sept. 24, 1900, *J. G. Jack*, nos. 83, 84 (hb. Arn. Arb.); May 28, Sept. 25, 1902, *Eggleston*, no. 2762 (hb. Gray, hb. N. Y. Bot. Gard., hb. Egg.); Chateaugay, May 31, Sept. 25, 1900, *J. G. Jack*, no. 871 (hb. Arn. Arb); Phillipsburg, July 25, 1901, *E. Brainerd*, no. 28 (hb. Arn. Arb., hb. Egg.). NEW YORK: Crown Point, June 4, Sept. 21, 1902, *Eggleston*, nos. 2703, 3154 (hb. Arn. Arb., hb. Egg.); Sept. 12, 1903, *C. H. Peck*, no. 4 (hb. Arn. Arb.). NEW HAMPSHIRE: North Walpole, May 17, Oct. 4, 1903, *Eggleston*, no. 2923 (hb. Arn. Arb., hb. Egg.). VERMONT: Mr. W. H. Blanchard has collected material in Bellows Falls, which he has referred to this species, but I have not seen it. MASSACHUSETTS: Southborough, May 17, Sept. 4, 1904, *C. S. Sargent*, no. 4 (hb. Arn. Arb.). CONNECTICUT: Giant's Neck, East Lyme, May 3, Aug. 19, Sept. 5, 16, 1904, *C. B. Graves*, no. 70 (hb. Arn. Arb.).

C. PRUINOSA (Wendl.) C. Koch, var. **latisepala** (Ashe), n. comb. *C. latisepala* Ashe, Bull. N. Car. Agric. Coll. **175**: 109 (1900).

C. PRUINOSA (Wendl.) C. Koch, var. **philadelphica** (Sarg.), n. comb. *C. philadelphica* Sarg. Proc. Acad. Sci. Philad. **57**: 588 (Sept. 1905).

C. PRUINOSA (Wendl.) C. Koch, var. **conjuncta** (Sarg.), n. comb. *C. conjuncta* Sarg. Rhod. **5**: 57 (1903).

C. PRUINOSA (Wendl.) C. Koch, var. **Porteri** (Britton), n. comb. *C. Porteri* Britton, Bull. N. Y. Bot. Gard. **1**: 448 (1900).

C. PRUINOSA (Wendl.) C. Koch, forma **dissona** (Sarg.), n. comb. *C. dissona* Sarg. Rhod. **5**: 60 (1903).

C. SILVICOLA Beadle, var. **Beckwithae** (Sarg.), n. comb. *C. Beckwithae* Sarg. Proc. Roch. Acad. Sci. **4**: 124 (1903).

C. BEATA Sarg., var. **compta** (Sarg.), n. comb. *C. compta* Sarg. Proc. Roch. Acad. Sci. **4**: 102 (1903).

C. LEIOPHYLLA Sarg., var. **Maineana** (Sarg.), n. comb. *C. Maineana* Sarg. Proc. Roch. Acad. Sci. **4**: 106 (1903).

C. COCCINIOIDES Ashe, var. **dilatata** (Sarg.), n. comb. *C. dilatata* Sarg. Bot. Gaz. **31**: 9 (1901).

C. Pringlei Sarg., var. **exclusa** (Sarg.), n. comb. *C. exclusa* Sarg. Rhod. **5**: 108 (1903).

C. Pringlei Sarg., var. **lobulata** (Sarg.), n. comb. *C. lobulata* Sarg. Rhod. **3**: 22 (1901).

C. pedicillata Sarg., var. **Ellwangeriana** (Sarg.), n. comb. *C. Ellwangeriana* Sarg. Bot. Gaz. **33**: 118 (1902).

C. polita Sarg., var. **Tatnalliana** (Sarg.), n. comb. *C. Tatnalliana* Sarg. Bot. Gaz. **35**: 106 (1903).

C. mollis (T. & G.) Scheele, var. **sera** (Sarg.), n. comb. *C. sera* Sarg. Bot. Gaz. **33**: 115 (1902).

C. Phaenopyrum (L. f.) Medic. Gesch. der Bot. 83 (1793). *Mespilus Phaenopyrum* L. f. Suppl. 254 (1781). *Crataegus cordata* Ait. Hort. Kew. ed. I, **2**: 168 (1789); not *M. cordata* Mill. Dict. ed. VIII, no. 4 (1769) and in Fig. of Plants, 119, t. 179 (1760). This fine species was one of the first American thorns raised in Great Britain, being listed and illustrated by a fine colored plate (t. 13, f. 1) in the Catalogus plantarum...quae in hortis non procul a Londino propagantur (1730). Philip Miller, who was one of the gardeners who prepared this catalogue and was doubtless familiar with this species, tells us in regard to his *Mespilus cordata* of later date, that it was raised in the Chelsea Garden (where he was gardener) in 1738 from seeds which came from America. Furthermore neither his description nor his excellent colored plate of this later species corresponds to *C. Phaenopyrum*, but rather to some form of the *Tenuifoliae*, apparently nearest to *C. macrosperma* Ashe.

C. Brainerdi Sarg., var. **scabrida** (Sarg.), n. comb. *C. scabrida* Sarg. Rhod. **3**: 29 (1901).

C. Brainerdi Sarg., var. **Egglestoni** (Sarg.) Robinson in herb., n. comb. *C. Egglestoni* Sarg. Rhod. **3**: 30 (1901).

C. Brainerdi Sarg., var. **asperifolia** (Sarg.), n. comb. *C. asperifolia* Sarg. Rhod. **3**: 31 (1901).

C. macracantha Lodd., var. **rhombifolia** (Sarg.), n. comb. *C. rhombifolia* Sarg. Rhod. **5**: 183 (1903).

C. macracantha Lodd., var. **occidentalis** (Britton), n. comb. *C. occidentalis* Britton, Bull. N. Y. Bot. Gard. **1**: 448 (1900). *C. Colorado* Ashe, Bull. N. C. Exper. Sta. **175**: 110 (1900). *C. coloradensis* Nelson, Proc. Biol. Soc. Wash. **17**: 175 (1904).

C. macracantha Lodd., var. **succulenta** (Schrad.), n. comb. *C. succulenta* Schrad. ex Link, Handb. **2**: 78 (1831).

C. MACRACANTHA Lodd., var. **neofluvialis** (Ashe), n. comb. *C. neo-fluvialis* Ashe, Jour. Elisha Mitchell Soc. **16**: pt. 2, 71 (1900).

C. CHAPMANI (Beadle) Ashe, var. **Plukenetii**, n. var. *C. tomentosa* of the Linnaean herbarium and of authors, but not of the Linnaean description. *C. leucophleos* Moench, Verz. Ausl. Baeume, 31 (1785)? This thorn was one of the first raised in Great Britain, as is shown by its inclusion in such early works as the above mentioned Catalogus plantarum....quae in hortis non procul a Londino propagantur t. 13, f. 2 (1730) and in Plukenet's Phyt. t. 46, f. 1 (1691).

Of the other two Linnaean species there can be no question, for *C. Crus-galli* L. rests on Kalm's description and is also represented in the British Museum by Clayton's specimen; while *C. viridis* L. is represented in the British Museum by Clayton's specimen (type), though I know of no other specimen of *C. viridis* L. from Virginia. However, there is a specimen of *C. viridis* L. in the U. S. Nat. Herb. (no. 130624) from Chesapeake City, Maryland, *L. F. Ward*. This Ward specimen I referred to *C. Margaretta* Ashe in Torreya **7**: 154 (1907); but a careful study of flowering material for a key has shown my mistaken identification. *C. Margaretta* has two or sometimes three styles, crenately lobed leaves, and numerous spines, while *C. viridis* has four or five styles, acutely lobed leaves, and very few or no spines. *C. viridis*, in flower, is much harder to distinguish from a form of *C. Canbyi* Sarg., namely the one called *C. Pennypackeri* Sarg.; the latter differing from *C. viridis* most obviously in its abundant thorns; and there is a possibility that this Ward specimen is *C. Pennypackeri* without thorns. Our Washington and Baltimore botanists have an excellent opportunity both to investigate this Chesapeake City region, and also Clayton's region about "Windsor" on the Plankatank, for the type location of *C. viridis* L.

Much of my study of the genus *Crataegus* has been done in the herbarium of the New York Botanical Garden, where for some months I have been engaged in bringing together as complete a representation as possible of the group. I have also been greatly aided by facilities afforded me at the Gray Herbarium, and I owe much to the privilege of examining the excellent herbarium and live collections of the Arnold Arboretum. I am further indebted to the Missouri Botanical Garden for the loan of over three thousand sheets of the genus, to the United States National Museum, to the Philadelphia Academy, to Prof. Aven Nelson, to President Ezra Brainerd

for the loan of much additional material, and to a great many botanical friends who have sent me specimens of interest. Mr. C. D. Beadle gave me the privileges of the Biltmore Herbarium and very kindly aided me in the examination of the southern species. Mr. W. W. Ashe most kindly made a three days' trip to allow me to see his *Crataegus* herbarium. I have also to thank Dr. Marshall A. Howe for numerous translations of the descriptions of the older species.

NEW YORK BOTANICAL GARDEN.

NOTES ON SOME PLANTS OF NORTHEASTERN AMERICA.

(*Continued from page 55.*)

M. L. FERNALD.

DENTARIA LACINIATA Muhl., var **integra** (Schulz), n. comb. *Cardamine laciniata* (Muhl.) Wood, var. *integra* Schulz in Engler's Bot. Jahrb. xxxii. 349 (1903).— A rather local extreme, having the leaves strictly ternate; the lateral leaflets entire or slightly toothed, but not cleft. Known only from western New York to Illinois.

GAYLUSSACIA BACCATA (Wang.) C. Koch, forma LEUCOCARPA (Porter) Fernald, RHODORA, x. 53 (1908). My attention has been called by several friends to a clerical error by which, in the original publication of this combination, I credited Wangenheim instead of C. Koch with the publication of *G. baccata*. *G. baccata* (Wang.) C. Koch, Dendrol. ii. pt. 1, 93 (1872) was based upon *Andromeda baccata* Wang., Beitr. Holzger. iii. t. 30, fig. 69 (1787).

TEUCRIUM CANADENSE L., var. **littorale**(Bicknell), n. comb. *T. littorale* Bicknell, Bull. Torr. Bot. Cl. xxviii. 169 (1901).— A lower stiffer and usually more simple plant than the inland *T. canadense*, but clearly passing to it in rich soil. In their most extreme developments the two plants are easily distinguished; the var. *littorale* of coastal beaches having the upper surface of the leaves papillose-roughened beneath the fine appressed pubescence, while the plant of less exposed situations is, as we should expect, thinner-leaved and with less developed papillae.

Teucrium occidentale Gray, var. **boreale** (Bicknell), n. comb. *T. boreale* Bicknell, Bull. Torr. Bot. Cl. xxviii. 171 (1901).— The first specimens cited by Dr. Gray under his *T. occidentale,* the Nebraska plants of *Hayden,* "etc." [*H. Engelmann*], have abundant short capitate or stipitate glands amongst the longer somewhat viscid hairs, and represent a species which extends across the continent from Maine to British Columbia and California. An extreme phase of the plant with few or no capitate glands amongst the long hairs of the calyx has a similar range and does not seem specifically separable from *T. occidentale.* This is the plant described by Mr. Bicknell as *T. boreale.* It has been mistaken by Piper, in his Flora of Washington[1] for the true *T. occidentale,* while the typical viscid *T. occidentale* is described by him as a new subspecies *viscidum* Piper, Contrib. U. S. Nat. Herb. xi. 487 (1906).

Stachys tenuifolia Willd., var. **aspera** (Michx.), n. comb. *S. aspera* Michx. Fl. ii. 5 (1803).— The familiar specific name, *S. aspera,* unfortunately, is antedated by *S. tenuifolia* Willd. Sp. iii. 100 (1801), which must be taken up for the species. *S. tenuifolia* is the smoother phase of the plant, which has been passing as *S. aspera,* var. *glabra* Gray, Syn. Fl. ii. pt. 1, 387 (1878).

Stachys palustris L., var. **homotricha**, n. var., caule retrorso-hirsuto, pilis longis subuniformibus.— Sides and angles of the stems almost uniformly hirsute with long retrorse hairs; otherwise like the typical form.— A frequent plant from eastern New Brunswick to Connecticut and central New York, thence westward to the Pacific. Type collected by the writer on a sandy esker at Brownville, Maine, September 20, 1900. In typical *S. palustris* the angles of the stem are hirsute with spreading or reflexed hairs, but the sides of the stem are finely appressed-pubescent.

Satureja **glabra** (Nutt.), n. comb. *Hedeoma glabra* Nutt. Gen. i. 16 (1818). *H. arkansana* Nutt. Trans. Am. Phil. Soc., n. s., v. 186 (1834). *Calamintha Nuttallii* Benth. in DC. Prodr. xii. 230 (1848). *Calamintha glabella,* var. *Nuttallii* Gray, Man. ed. 2, 307 (1856). *Clinopodium glabrum* Ktze., Rev. Gen. 515 (1891). *Satureja arkansana* Briq. in Engl. & Prantl, Pflanzenf. iv. Ab. 3, 302 (1896).— The writer follows Briquet in considering *Calamintha* Lam. inseparable generically from the older *Satureja* L.

[1] Contrib. U. S. Nat. Herb. xi. (1906).

Pycnanthemum **pycnanthemoides** (Leavenw.), n. comb. *Tullia pycnanthemoides* Leavenw., Am. Jour. Sci. xx. 343, pl. 5 (1831). *Pycnanthemum Tullia* Benth. Lab. Gen. et Sp. 328 (1834). *Koellia pycnanthemodes* Ktze. Rev. Gen. ii. 520 (1891).— By vote of the Vienna Congress the long established name *Pycnanthemum* Michx. (1803) is retained for this genus instead of the earlier but long overlooked *Koellia* Moench (1794).

Mentha arvensis L., var. **glabrata** (Benth.), n. comb. *M. canadensis*, var. *glabrata* Benth. Lab. Gen. et Sp. 181 (1833). *M. arvensis*, var. *Penardi* Briq. Bull. Herb. Boiss. iii. 215 (1895).— As already indicated by Briquet, *Mentha arvensis* L. and *M. canadensis* L. are confluent, and the latter American extreme is treated as a narrow-leaved variety of the more broadly distributed *M. arvensis*. The var. *glabrata*, common across Canada, and locally southward into New England and Pennsylvania, and along the Rocky Mts., is generally well marked by its less branched smoother stem and smoother leaves, but it clearly intergrades with the other varieties of the species.

Gerardia pedicularia L., var. **ambigens**, n. var., caule supra glanduloso-villoso; pedicellis calycibusque plerumque villosis.— Stem glandular-villous above; pedicels and calyx usually villous.— Wisconsin to North Carolina and Missouri. Type collected at St. Croix Falls, Wisconsin, August 20, 1900 (*C. F. Baker*). Transitional between the typical *G. pedicularia*, with the stems puberulent above, and the more southern var. *pectinata* Nutt. Gen. ii. 48 (1818), which has the stems very villous and the calyx glandular-hispid.

Viburnum Lentago L., var. **sphaerocarpum** Gray, n. var. in herb., drupis sphaeroideis 7–9 mm. diametro.— Drupes spherical, 7–9 mm. in diameter.— The original specimens thus labeled by Dr. Gray were collected in North Dakota, at Fort Abraham Lincoln, by *Dr. V. Havard*; but other material has accumulated which shows this small- and globose-fruited extreme to occur from New England to Wyoming.

Eupatorium purpureum L., var. **foliosum**, n. var., inflorescentia late corymbosa foliis bracteisque breviore.— Inflorescence broadly corymbose as in var. *maculatum*, but overtopped by the very long upper leaves and bracts.— The characteristic form of the species from western Newfoundland and the Gaspé Peninsula to northern Maine, extending westward to northern Michigan and Iowa. Type collected by the writer in a river-thicket at Van Buren, Maine, September 18, 1900.

EUPATORIUM URTICAEFOLIUM Reichard, var. **villicaule**, n. var., caule petiolisque sordido-villosis.— Stem and petioles sordid-villous; otherwise as in the typical form.— VIRGINIA, Bedford Co., 1871 (*A. H. Curtiss*).

SOLIDAGO PETIOLARIS Ait., var. **Wardii** (Britton), n. comb. *S. Wardii* Britton, Man. 935 (1901). — Differing from *S. petiolaris* only in the firmer more glutinous and therefore more lustrous foliage.

SOLIDAGO HISPIDA Muhl., var. **lanata** (Hook.), n. comb. *S. lanata* Hook. Fl. Bor.-Am. ii. 4 (1834). *S. bicolor*, var. *lanata* Gray, Proc. Am. Acad. xvii. 190 (1882).— Plants from the banks of the Little Cascapedia and Grand Cascapedia Rivers, and other portions of the Gaspé Peninsula, Quebec, are identical with the original material collected by Drummond on the Plains of the Saskatchewan.

SOLIDAGO **calcicola** (Fernald), n. comb. *S. Virgaurea*, var. *calcicola* Fernald, RHODORA, i. 190 (1899).— Recent detailed studies of types and authentic specimens of this group have convinced the writer that we have in eastern America no plant which can satisfactorily be placed with the Eurasian *S. Virgaurea*. The nearest American ally of that species, as understood by the writer, is *S. macrophylla* Pursh, which, however, is distinct in its longer involucre, etc. *S. calcicola* also simulates forms of *S. Virgaurea* but is quickly distinguished by its firmer more herbaceous bracts and much shorter achenes (only 1–2 mm. long). Its range is now extended from the northeastern border of Maine to the limestone mountains of Gaspé Co., Quebec.

SOLIDAGO **Cutleri**, n. nom. *S. Virgaurea*, var. *alpina* Bigelow, Fl. Bost. ed. 2, 307 (1824). *S. alpestris* Porter, Bull. Torr. Bot. Cl. xx. 210 (1893) and other Am. authors, not Waldst. & Kit. in Willd. Sp. iii. 2065 (1804).— The late Dr. Porter considered this plant identical with the Old World *S. alpestris*; but that species as shown by many European specimens, as well as Waldstein & Kitaibel's own beautiful plate (Ic. t. 208), is very unlike the alpine plant of Bigelow. In fact, it is superficially very similar to the dwarfed alpine variety *thyrsoidea* [1] of *S. macrophylla*, having thinnish leaves with the closely sharp-serrate elliptic or ovate blades rather abruptly narrowed to the slender petiole; and its involucral bracts are thin and linear-attenuate. *S. Cutleri*,[2] on the other hand, has the thick obovate

[1] RHODORA, viii. 228 (1906).

[2] Since the name *Solidago alpina* has been twice used and there is already a *S. Bigelovii*, it is appropriate that our alpine Goldenrod should bear the name of the distinguished New England botanist and pioneer explorer of the White Mountains, MANASSEH CUTLER.

to oblanceolate leaves crenate or serrate chiefly above the middle and tapering gradually to a broad-winged base; and its subherbaceous obtuse or merely acutish bracts are oblong or lanceolate. From other American plants of the *Virgaurea* group, *S. Cutleri* is quickly distinguished by its 30–50-flowered broad heads, its few (2–4, rarely 5) large cauline leaves, and its long (3–3.5 mm.) hirsute achenes. It is confined apparently to the most alpine districts of New England and New York, being known to the writer only from the following mountains. MAINE, Mt. Katahdin; Mt. Bigelow, altitude 1150 m.: NEW HAMPSHIRE, alpine regions of Mts. Adams, Washington, and Monroe; summit of Mt. Lafayette: VERMONT, Chin of Mt. Mansfield: NEW YORK, summit of Mt. Whiteface.— Reported from other high summits, but from none of the lesser mountains.

SOLIDAGO RANDII (Porter) Britton, var. **monticola** (Porter), n. comb. *S. puberula*, var. *monticola* Porter, Bull. Torr. Bot. Cl. xix. 129 (1892). *S. Virgaurea*, var. *monticola* Porter, Bull. Torr. Bot. Cl. xx. 209 (1893). *S. Virgaurea*, var. *Deanei* Porter, Mem. Torr. Bot. Cl. v. 320 (1894).— *S. Randii* includes a large portion of the material which has passed with us as *S. Virgaurea*. In very exposed situations it passes to the dwarf extreme which has been separated as var. *monticola*, and which is often mistaken needlessly for *S. Cutleri*. In *S. Randii* and its variety the heads are 15–30-flowered, in well developed plants the cauline leaves are much more numerous than in *S. Cutleri*, and the appressed-setulose or glabrate achenes are only 2–2.6 mm. long. As far as observed by the writer *S. Cutleri* and *S. Randii*, var. *monticola* are of quite different altitudinal distribution. As pointed out in the preceding paragraph *S. Cutleri* is a truly alpine species. *S. Randii*, var. *monticola*, on the other hand, is apparently unknown on our highest summits, but occurs on the lesser peaks and slopes of northern New England. Its most elevated stations are on the summits of such mountains as Mt. Willard, New Hampshire (793 m.), Mt. Monadnock, New Hampshire (967 m.), and Mt. Willoughby, Vermont (808 m.); and it descends on the granitic coast of eastern Maine to rocks bordering the sea.

SOLIDAGO HUMILIS Pursh, Fl. 543 (1814). The plant which has long passed as *S. humilis* Pursh or *S. Purshii* Porter has a most unfortunate nomenclatorial history. The plant itself is one of the best marked of our eastern species, characterized by its racemose or thyrsoid inflorescence, with the often glutinous heads frequently on

comparatively elongate pedicels (5–15 or even 25 mm. long). Its stem is exceedingly leafy, the subuniform or very gradually smaller oblanceolate or linear cauline leaves numbering, in well developed plants, 10 to 30 or more and commonly bearing small fascicles of leaves in their axils. Its obscurely ribbed oblanceolate basal leaves are 3–12 cm. long, 5–7 mm. broad. This distinct plant occurs on more or less calcareous cliffs and ledgy shores, from the Aroostook River, New Brunswick, to the Potomac, and locally westward to the sand-hills of Lake Michigan. Dr. Gray, on returning from a study of types of American Goldenrods in European herbaria, identified[1] this plant with Pursh's *S. humilis*; but an examination of Pursh's type, now preserved at the British Museum of Natural History, shows that this conclusion must have been reached through some confusion of data.

As Dr. Gray clearly states the Pursh type was "the Newfoundland plant, in herb. Banks, where Solander indicated the species." [1] A photograph of this original sheet in the Banks herbarium and notes taken by the writer show that there are three individual plants upon it. In the middle of the sheet is a specimen with seven very long leaves, all but the uppermost long-petioled, the middle one more than one third as long as the full height of the plant. The inflorescence is an interrupted more or less wand-like panicle. This specimen, which bears the data (on the reverse side of the sheet) "Newfoundland J. B.," was correctly indicated by a note on the sheet in Dr. Gray's hand as the original of *S. humilis* Pursh. The other two plants on the sheet are clearly of one collection and bear the data, "Amer. Sept. Hudson Bay, Albany Fort, 1781," and are marked by Dr. Gray: "Perhaps is the *S. stricta* Torr. & Gray, Fl. non Ait. A. Gray, 1881." These plants from Hudson Bay are, as identified by Dr. Gray, clearly *S. uliginosa* Nutt. (*S. stricta* Torr. & Gray, not Ait.); but the Newfoundland plant collected by Banks is less obviously that species and may be an uncharacteristic *S. uniligulata* (DC.) Porter. As shown by the manuscript descriptions of the Banks plants preserved at the British Museum, Solander had written a description (p. 321) to cover a Bartram plant from Florida and the Banks plant from Newfoundland. Subsequently, however, Dryander altered the description to include the Hudson Bay specimen but to exclude the Florida plant; and Pursh in his Flora (p. 543) took his description

[1] Gray, Syn. Fl. i. pt. 2, 148 (1884).

description of *S. canadensis*, which was originally said to have the heads smaller than in the subentire-leaved *S. altissima* and which was characterized "foliis trinerviis subserratis."

A detailed study of the small-headed northern plant, which was considered by Dr. Porter a variety of *S. canadensis* but which is the *S. canadensis* of the old European gardens and herbaria and very evidently of Linnaeus, and the larger-headed more southern plant, which was described by Linnaeus as *S. altissima* and has subsequently passed as a large variation of *S. canadensis* (var. *scabra* Torr. & Gray and much which has passed as var. *procera* Torr. & Gray) has convinced the writer that they are perfectly good species and that they are separated by several other characters besides those originally emphasized by Linnaeus. *S. canadensis* has the stem glabrous at least below, though often minutely pubescent above; in *S. altissima* the stem is cinereous-puberulent. In *S. canadensis* the leaves are thin, narrowly lanceolate, glabrous above, minutely pubescent on the nerves beneath, and mostly sharp-serrate; in *S. altissima* the thickish leaves are lanceolate, minutely pubescent or scabrous above, short-pilose beneath, and subentire or only slightly toothed. The involucre of *S. canadensis* is 2–2.8 mm. long, of thin greenish-straw-colored mostly attenuate bracts; that of *S. altissima* 3.2–4.5 mm. long, with more herbaceous and coarser bracts. *S. canadensis*, which abounds from Newfoundland and the lower St. Lawrence to North Dakota, extending southward throughout northern and eastern New England and along the mountains to West Virginia and Kentucky, is in the height of bloom from July to September; *S. altissima* occurs from eastern Massachusetts and Vermont to Michigan and Kansas, extending south to the Gulf of Mexico, and flowers from August to October.

Solidago altissima L., var. **procera** (Ait.), n. comb. *S. procera* Ait. Hort. Kew. iii. 211 (1789). *S. canadensis*, var. *procera* Torr. & Gray, Fl. ii. 224 (1841).

Solidago graminifolia (L.) Salisb., var. **Nuttallii** (Greene), n. comb. *Euthamia Nuttallii* Greene, Pittonia, v. 73 (1902).— *S. graminifolia* is the common glabrous or nearly glabrous plant of eastern Canada and the northern states, but it passes very frequently to the var. *Nuttallii*, which has the leaves more pubescent and the branches of the inflorescence hirtellous. As originally defined by Professor Greene the more pubescent plant was assigned a known range from

comparatively elongate pedicels (5–15 or even 25 mm. long). Its stem is exceedingly leafy, the subuniform or very gradually smaller oblanceolate or linear cauline leaves numbering, in well developed plants, 10 to 30 or more and commonly bearing small fascicles of leaves in their axils. Its obscurely ribbed oblanceolate basal leaves are 3–12 cm. long, 5–7 mm. broad. This distinct plant occurs on more or less calcareous cliffs and ledgy shores, from the Aroostook River, New Brunswick, to the Potomac, and locally westward to the sand-hills of Lake Michigan. Dr. Gray, on returning from a study of types of American Goldenrods in European herbaria, identified[1] this plant with Pursh's *S. humilis*; but an examination of Pursh's type, now preserved at the British Museum of Natural History, shows that this conclusion must have been reached through some confusion of data.

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of *S. humilis* from the complex description of Solander and Dryander, citing "*Herb. Banks.* mss." From the fact that Solander, in the original manuscript description of *S. humilis*, cited (besides the subsequently discarded Florida plant) only one plant, the Banks specimen from Newfoundland, it is fairly clear that this should stand as the type of Pursh's species. Whether or not it proves on more critical examination to be *S. uniligulata* (which is probable) or *S. uliginosa*, it certainly is not the plant of our river-gorges and cliffs to which the name *S. humilis* has so long been applied.

On account of a supposed earlier *Solidago humilis* accredited to Miller, which, however, was published by Miller as *S. humilius*[1] and which is *S. canadensis* L., Porter rejected the name *S. humilis* Pursh and assigned to the plant which has been passing as Pursh's *S. humilis* the name *S. Purshii*,[2] defining his species merely by the citation of the synonym *S. humilis* Pursh. The name *S. Purshii* Porter is, therefore, strictly synonymous with *S. humilis* Pursh; and since, as above pointed out, the plant which must stand as the type of Pursh's species is *S. uniligulata* or a related species, the names *S. humilis* and *S. Purshii* are equally untenable for the plant of our northeastern river-banks and cliffs. A well known station for the plant specially under discussion is at the Great Falls of the Potomac. The plants from this station long have been and by most botanists still are considered conspecific with those from the ledges of the Aroostook, Kennebec, Winooski (or Onion) and Susquehanna Rivers; but by Professor E. L. Greene they have been separated on supposed characters of the inflorescence, involucre, and achenes as *S. racemosa*.[3] The characters upon which Professor Greene relies for the separation all fail when tested by comparison with more northern specimens; and the range assigned by him on a succeeding page ("that plant of the East Canadian coast and islands which is typical *S. humilis*, Pursh, now received under the more safe name of *S. Purshii*, Porter"[4]) suggests that his segregation of *S. racemosa* from the plant of our river-gorges and cliffs, which is known from only a single "East Canadian" station[5] and from no coastal or island stations, was accomplished without a precise understanding of the northern "*S.*

[1] Mill Dict. ed. viii. no. 16 (1768). [2] Porter, Bull. Torr. Bot. Cl. xxi. 311 (1894).
[3] Greene, Pittonia, iii, 160 (1897). [4] Greene, Pittonia, iii. 162 (1897).
[5] The Gorge of the Aroostook River, less than two miles from the northern Maine border.

humilis." Nevertheless, although proposed by Professor Greene for a plant which he supposed distinct, *S. racemosa* is the first name clearly applied to the plant with racemose inflorescence which has passed as *S. humilis* or *S. Purshii*.

SOLIDAGO RACEMOSA Greene, var. **Gillmani** (Gray), n. comb. *S. humilis*, var. *Gillmani* Gray, Proc. Am. Acad. xvii. 191 (1882). *S. Virgaurea*, var. *Gillmani* Porter, Bull. Torr. Bot. Cl. xx. 209 (1893). This splendid plant of the Great Lake region has not only the leaf-texture and -outline but the axillary fascicles, the elongate pedicels, and the involucre and achenes of *S. racemosa*, and seems to differ only in its great size and in the tendency of the lower leaves to have longer and sharper teeth.

SOLIDAGO RUGOSA Mill., var. **villosa** (Pursh), n. comb. *S. villosa* Pursh, Fl. ii. 537 (1814). The material in the Banks herbarium upon which Pursh based his species represents a beautifully marked extreme of *S. rugosa* in which the panicle is elongate and most of the racemes nearly equaled or exceeded by the large subtending leaves. It is the common tendency of the species in western Newfoundland, southern Labrador, and the lower St. Lawrence region, extending into northern Maine.

SOLIDAGO ALTISSIMA L. Sp. 878 (1753). As stated by Dr. Gray, "the true original of the Linnaean species is the 'Virga aurea altissima serotina, panicula speciosa patula, Mart. Cent. 14, t. 14.'" [1] This plate [2] is remarkably characteristic and represents a plant which was taken by Dr. Gray as "a large form of *S. Canadensis*." In fact, Linnaeus compares it with *S. canadensis* in the following words: "Habitus *praecedenti* [*S. canadensis*] *simillimus, diversus magnitudine, tempore florendi, serraturis nervisque foliorum*," etc.,[3] thus showing a clearer conception of the two plants, *S. canadensis* and *S. altissima*, than have most subsequent authors. *S. canadensis*, as interpreted by Dr. Gray, apparently with good reason, is the small-headed plant which has subsequently been described as *S. canadensis*, var. *glabrata* Porter, Bull. Torr. Bot. Cl. xxi. 310 (1894). Dr. Porter, in describing the northern plant as var. *glabrata*, separated it from the commoner plant southward on account of its smoother stem, linear-lanceolate sharp-serrate smoothish leaves, and especially its smaller panicles and involucres; characters which in the main agree with the Linnaean

[1] Gray, Proc. Am. Acad. xvii. 177 (1882).
[2] Martyn, Hist. Pl. 14, t. 14, (1728).
[3] L. Sp. 878 (1753).

description of *S. canadensis*, which was originally said to have the heads smaller than in the subentire-leaved *S. altissima* and which was characterized "foliis trinerviis subserratis."

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SOLIDAGO ALTISSIMA L., var. **procera** (Ait.), n. comb. *S. procera* Ait. Hort. Kew. iii. 211 (1789). *S. canadensis*, var. *procera* Torr. & Gray, Fl. ii. 224 (1841).

SOLIDAGO GRAMINIFOLIA (L.) Salisb., var. **Nuttallii** (Greene), n. comb. *Euthamia Nuttallii* Greene, Pittonia, v. 73 (1902).— *S. graminifolia* is the common glabrous or nearly glabrous plant of eastern Canada and the northern states, but it passes very frequently to the var. *Nuttallii*, which has the leaves more pubescent and the branches of the inflorescence hirtellous. As originally defined by Professor Greene the more pubescent plant was assigned a known range from

New Jersey and Pennsylvania to Virginia. Material in the Gray Herbarium shows it to extend northeastward to Nova Scotia and west to Michigan.

Solidago **polycephala**, n. nom. *Euthamia floribunda* Greene. Pittonia, v. 74 (1902), not *S. floribunda* Phil. Anal. Univ. Chil. lxxxvii. 430 (1894).— This pretty species is quickly distinguished from *S. graminifolia,* var. *Nuttallii* by its tiny involucre (3–3.5 mm. long), with very conspicuous appressed deltoid green tips to the bracts. It was originally described from southern New Jersey but the writer has examined characteristic material from adjacent Pennsylvania.

Solidago **minor** (Michx.), n. comb. *S. lanceolata,* var. *minor* Michx. Fl. ii. 116 (1803). *S. tenuifolia* Pursh, Fl. ii. 540 (1814) in part. *Euthamia minor* Greene, Pittonia, v. 78 (1902).— Distinguished from *S. tenuifolia* Pursh, which has the flat leaves 2–6 mm. wide and the campanulate involucre 2–3 mm. broad, by its almost acicular leaves (the middle cauline 1–1.5 mm. wide) and its nearly cylindric acute-based involucre only 1–1.5 mm. broad. Best developed from Virginia to Florida and Alabama, but said by Professor Greene to reach Connecticut.

Solidago (Euthamia) **Moseleyi**, n. sp., caule glabro 5–6 dm. alto fastigiatim ramoso, ramulis scabris; foliis linearibus vel linearilanceolatis apice attenuatis 2–3 mm. latis 1-nerviis minute punctatis, foliis ramorum minoribus, ramulorum minutis subulatis; capitulis plerumque pedicellatis, pedicellis scabris; involucro snbcylindrico 3–4 mm. longo 1.5–2 mm. lato, bracteis linearibus tenuibus valde inequalibus.— Stem glabrous, 5–6 dm. high, fastigiate-branched above the middle; branchlėts scabrous: leaves linear or linear-lanceolate, taper-pointed, 2–3 mm. broad, 1-ribbed, minutely punctate; rameal leaves smaller, those of the branchlets reduced to minute subulate bracts: heads mostly on scabrous pedicels: involucre subcylindric (slender-turbinate in drying), 3–4 mm. long, 1.5–2 mm. broad; its very unequal thin bracts linear.— Ohio, Oxford Prairie, Erie Co., September 5, 1898 (*E. L. Moseley*). Resembling *S. tenuifolia* Pursh, but without the axillary fascicles of small leaves which usually characterize that species; the bracts of the branchlets much shorter; the heads less glomerulate; and the involucre much smaller and more slender, with softer bracts, that of *S. tenuifolia* being campanulate, 2–3 mm. thick, with firm oblong bracts.

Solidago **gymnospermoides** (Greene), n. comb. *Euthamia gym-*

nospermoides Greene, Pittonia, v. 75 (1902).— A well marked species of the lower Mississippi basin, differing from *S. leptocephala* Torr. & Gray in its more copious fastigiate branching; its linear-attenuate strongly glutinous leaves at most 2–3 mm. broad, instead of linear-lanceolate, merely acute, and 4–6 mm. wide; and the involucre extremely viscid.

Aster **depauperatus** (Porter), n. comb. *A. ericoides*, var. *pusillus* Gray, Syn. Fl. i. pt. 2, 184 (1884). *A. ericoides*, var. *depauperatus* Porter, Mem. Torr. Bot. Cl. v. 323 (1894).— This delicate plant of serpentine barrens of southern Pennsylvania and adjacent West Virginia is readily separated from *A. ericoides* by its very slender stem; its tiny rameal leaves; and especially by the turbinate, not campanulate nor hemispherical, involucre only 2–3 mm. broad; and by its much less rigid bracts. In richer soil westward it is represented by

Var. **parviceps** (Burgess), n. comb. *A. ericoides*, var. *parviceps* Burgess in Britton & Brown, Ill. Fl. iii. 379 (1898). This is a stouter plant with densely white-villous stems and broader leaves, but with the heads as in the typical form of *A. depauperatus* or slightly larger. It occurs on prairies or in woods of Illinois and Missouri.

Aster lateriflorus (L.) Britton, var. **bifrons** (Gray), n. comb. *A. diffusus*, var. *bifrons* Gray, Syn. Fl. i. pt. 2, 187 (1884). *A. lateriflorus*, var. *grandis* Porter, Mem. Torr. Bot. Cl. v. 324 (1894).

Gnaphalium polycephalum Michx., var. **Helleri** (Britton), n. comb. *G. Helleri* Britton, Bull. Torr. Bot. Cl. xx. 280 (1893).— This seems to differ from *G. polycephalum* only in its glandular-viscid stems and to be, therefore, only of varietal value.

Cirsium **iowense** (Pammel), n. comb. *Cnicus iowense* Pammel, Proc. Iowa Acad. Sci. viii. 231 (1901).— *Cnicus* L. Sp. 826 (1753) is now generally accepted as a monotypic genus, its only species being the Blessed Thistle, *Cnicus benedictus* L. By a few recent American botanists our thistles with plumose pappus are united with the Old World genus *Carduus* L., which has the bristles plumeless; but the writer finds himself in agreement with DeCandolle, Bentham and Hooker, Gray, Engler, Hoffmann, and many others in keeping the two apart. The earliest designation of the thistles with plumose pappus is apparently *Cirsium* Hill. Brit. Herbal, 427 (1756).

Cirsium undulatum (Nutt.) Spreng., var. **megacephalum** (Gray), n. comb. *Cnicus undulatus*, var. *megacephalus* Gray, Proc. Am. Acad. x. 42 (1874). *Carduus undulatus*, var. *megacephalus* Porter, Mem. Torr. Bot. Cl. v. 345 (1894).

Cirsium muticum Michx., var. **subpinnatifidum** (Britton), n. comb. *Carduus muticus*, var. *subpinnatifidus* Britton in Britton & Brown, Ill. Fl. iii. 489 (1898).

Cirsium **Hillii** (Canby), n. comb. *Cnicus Hillii* Canby, Gard. & For. iv. 101 (1891). *Carduus Hillii* Porter, Mem. Torr. Bot. Cl. v. 344 (1894).

Prenanthes altissima L., var. **cinnamomea**, n. var., pappo cinnamomeo.— Pappus cinnamon-color; otherwise like the typical form.— Indiana to Missouri and Louisiana. Type collected in rich woods, Monteer, Missouri, October 5, 1905 (*Bush*, no. 3534).

Gray Herbarium.

The Annual Botanical Symposium.— The fifth annual symposium will be held at Georgetown, Delaware, July 1–8, 1908. Headquarters will be Hotel Eagle, where rooms may be secured at $1.50 a day. Trips will be made to Lewes, Rehoboth, Chesapeake Bay, Indian River, etc. Those desiring to attend should inform Joseph Crawford, 2824 Frankford Ave., Philadelphia, Pa.

Josselyn Botanical Society.— The annual meeting of the Josselyn Botanical Society of Maine will be held at Manset, Mount Desert Island, August 4th to 8th, 1908. A reduced rate of $2.00 per day for board and lodging has been granted by the Stanley House, and reduced railroad fares will be arranged. All who propose attending should communicate at once with O. W. Knight, Chairman of Committee on Arrangements, Bangor, Maine.

Lemna minor and Sparganium eurycarpum in Rimouski County, Quebec.— For several summers Professor J. F. Collins and the writer have visited Bic and the adjacent towns of Rimouski County, Quebec, on account of the great development in that region of bold limestone headlands and ridges, upon which are found an extensive high-northern flora (see Rhodora, ix. 158–172). Bordering the harbor of Bic is a salt marsh, the brackish borders of which likewise support a pronouncedly northern flora: *Catabrosa aquatica* (L.) Beauv., *Poa eminens* J. S. Presl, *Scirpus rufus* (Huds.) Schrad., *Carex norvegica* Willd., *C. glareosa* Wahlenb., *Rumex occidentalis* Watson, etc. In

July last, it was, therefore, a great surprise to find a small slightly brackish pool back of the marsh closely covered with *Lemna minor* L., while near by were luxuriant plants of *Sparganium eurycarpum* Engelm.; two species which are very typical of the coastal region from Nova Scotia and eastern Massachusetts southward and of the Mississippi Basin. These plants which are very local at Bic are not definitely recorded in Macoun's Catalogue from the Province of Quebec, though credited to the vicinity of Ottawa. The nearest stations for the *Lemna* seem to be at Petitcodiac, New Brunswick, about 250 miles to the southeast, and at the head of Lake Champlain, about 330 miles to the southwest. The most northerly stations previously known to the writer for *Sparganium eurycarpum* are at Pictou, Nova Scotia, about 350 miles to the southeast, at Oldtown, Maine, 200 miles or more nearly due south, and on Lake Champlain.— M. L. FERNALD, Gray Herbarium.

Vol. 10, no. 112, including pages 57–72, was issued 16 May, 1908.

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Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
EDWARD LOTHROP RAND } Publication Committee.

Vol. 10. June, 1908. No. 114.

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Rhodora

JOURNAL OF

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Vol. 10. June, 1908. No. 114.

A SYNOPSIS OF THE NEW ENGLAND SPECIES OF MICRASTERIAS.

Joseph A. Cushman.

The genus *Micrasterias* includes some of the largest and most showy of the Desmids. The cells are usually disc-shaped and sub-circular in outline, cut into many divisions by more or less radiately arranged incisions. Species are often very common in certain areas, but many of them seem limited to lakes or bodies of water of some size. There are twenty-two species given here for New England and this number is probably fairly complete. There are eighteen species given in the Wests' British Desmids. Two of the British species have not been found as yet in America and a third one while reported from the United States has not been found in New England. On the other hand eight of the species given here have not been found in the British Isles and certain of these seem to be peculiar to America. Some of these eight, such as *M. foliacea*, *M. Nordstedtiana* and *M. muricata* are very different in type from others of the genus. The figures given in Wolle's Desmids of the United States were much conventionalized and therefore it is often hard to say just what Wolle actually saw. The same is true of the reported localities where the identification of the species depended upon Wolle's figures. In this genus however this difficulty is much less than is the case of certain other more difficult genera. As shown by Johnson (Bot. Gaz. 1894) the species of *Micrasterias* are very variable. According to the Wests this variability is much greater in American than in British specimens. However as many of these so called varieties are often seen forming one semicell of a specimen, the other semicell of which is typical, it seems hardly wise to recognize them as good varieties.

Many of the species are represented by mounted slides in my own

collection. In nearly all cases there is a single specimen of the species in a central position and alone on the slide so that it may be easily found. These are referred to by number, e. g. H. C. no. 701, etc. Reference is occasionally made to the slides of the Johnson collection now the property of the Cryptogamic Department of Harvard University. These are referred to as H. J. no. 650, etc. All localities from which specimens have been actually examined by the writer are followed by an exclamation point. In other cases the author's name in parentheses follows the record. Enough of the synonymy is given under each species to refer to the original place of publication and to published figures. Measurements are from New England specimens only, unless otherwise stated. A key is given which will help in the identification of the species.

MICRASTERIAS Agardh, 1827.

Cells usually large, commonly sub-circular or elliptical in outline, deeply constricted; semicells usually five lobed, occasionally three lobed, much compressed; polar lobe broadening distally, frequently with a median notch at the middle of the outer border; lateral lobes usually dichotomously divided; zygospores globose, with stout spines; surface often ornamented, usually with acute granules.

A KEY TO THE NEW ENGLAND SPECIES OF MICRASTERIAS.

A. Polar lobe entire or slightly retuse, lateral lobes of semicells two, transversely placed, generally entire and attenuated to their extremities.
  1. Polar lobe fusiform, end strongly convex.
    1. Polar lobe narrower and smaller than the basal lobes. 1. *M. oscitans.*
    2. Polar lobe nearly as wide as basal lobes and of similar size. 2. *M. laticeps.*

  II. Polar lobe spreading, usually with a retuse end.
    1. Apices of polar lobe bifid, narrower than basal lobes. 3. *M. pinnatifida.*
    2. " " " " acute, nearly as wide as " " 4. *M. arcuata.*

B. Lateral lobes of semicells four, radiately disposed and broadest distally.
  I. Polar lobe entire, lateral lobes barely divided. 5. *M. depauperata.*
  II. " " with a median incision.
    1. Lateral lobes generally much divided, interlobular incisions narrow.
      a. Inter-lobular incisions not deep.
        (1) Depth of polar lobe much less than half the length of the semicell.
          (a) Cell nearly as broad as long, smooth. 6. *M. truncata.*
          (b) " much longer than broad, surface granular. 7. *M. Jenneri.*
        (2) Depth of polar lobe at least half the length of the semicell. 8. *M. conferta.*
      b. Interlobular incisions deep.

(1) Polar lobe prominently exserted. 9. *M. apiculata.*
(2) " " not prominently exserted.
(a) Cell without spines or spinose projections.
10. *M. denticulata.*
(b) " with " " " "
aa. Polar lobe very narrow, sides parallel for most of their length, sinus undulate. 11. *M. sol.*
bb. Polar lobe broader, gradually broadening from the base, sinus not undulate.
* A spine on either side of the terminal notch, interlobular incisions with a row of denticulations. 12. *M. papillifera.*
** No spines close to terminal notch, no surface ornamentation. 13. *M. rotata.*
cc. Polar lobe broad and anvil shaped at apex, angles uncinate. 8a. *M. conferta,* var. *hamata.*

2. Lateral lobes with fewer divisions, interlobular incisions widely open.
a. Polar lobe without processes, lateral lobes unequal, upper one with three, lower with two lobules. 14. *M. Torreyi.*
b. Polar lobe with long processes, lateral lobes typically equal and each with two lobules elongated into processes. 15. *M. radiata.*
c. Polar lobe without long processes, lateral lobes equal but not elongated into processes. 16. *M. crux-melitensis.*

C. Polar lobe with accessory processes one on either side of the lobe asymmetrically, not broadened distally as in B.
I. Lateral lobes each divided, divisions broad and obliquely truncate. 17. *M. americana.*
II. Lateral lobes with only the upper divided or neither, the ends narrowed, not obliquely truncate. 19. *M. mahabuleshwarensis.*

D. Polar lobe divided laterally.
I. Semicell three lobed, sides with a conical projection above the basal lobes. 20. *M. Nordstedtiana.*
II. Semicell five lobed, lobes separated by broadly rounded sinuses. 21. *M. muricata.*

E. Polar lobe with interlocking teeth so that cells are united into filaments, lateral lobes with their divisions arranged parallel to those of the opposite side. 22. *M. foliacea.*

1. Micrasterias oscitans Ralfs in Jenner's Flora of Tunbridge Wells, 1845, p. 198; Brit. Desm., 1848, p. 76, pl. 10, fig. 2; Wolle, Desm. U. S., 1884, p. 116, pl. 33, figs. 3, 4; W. & G. S. West, Brit. Desm., 1905, p. 78, pl. 41, figs. 1–4. This species has been reported from New England by three observers; Massachusetts (*Wolle*), Lake Quinsigamond, Worcester (*Stone*), Rhode Island, near Providence (*Bailey*). I have not as yet seen undisputed material from New England. Bailey at least had this species for I have found excellent drawings of the typical form among his notes.

2. Micrasterias laticeps Nordst., Desm. Brasil., 1870, p. 220, pl. 2, fig. 14; Wolle, Desm. U. S., 1884, p. 115, pl. 37, figs. 4, 5. *M. incisa* Bail., Micr. obs., 1851, p. 142, pl. 1, fig. 13 (*non Bréb.*). *M. disputata* Wood, Fr. Alg., 1873, p. 142, pl. 13, fig. 4. Cells of medium size, a little broader than long, deeply constricted, semicell three-lobed, polar lobe nearly as wide as the cell, lateral interlobular inci-

sions acute, polar lobe acute at the ends, fusiform, lateral lobes bifid at the tips, cell wall minutely punctate. Length 112–150 μ, breadth 112–198 μ, polar lobe 110–170 μ, isthmus 15–31 μ. Me.: Bog between Orono and Bangor, frequent (*W. West*). N. H.: Pudding Pond, North Conway, rare! Hill's Pond, Alton (*H. C. no. 664*)! Mass.: Lake Quinsigamond, Worcester (*Stone*); Carver's Pond, Bridgewater! Lake Watuppa, Fall River (*H. C. no. 7*)! Plymouth (*H. C. no. 660*)! Westport (*H. C. no. 702*)! Sandwich! Eastham! R. I.: Near Providence (*Bailey*); Newport (*Leidy*); Portsmouth! Nyatt (*H. C. no. 673*)! This species as will be seen by the above list of stations is well distributed. It never seems to be abundant however, scattered specimens being the rule in all material examined.

3. Micrasterias pinnatifida (Kütz.) Ralfs, Brit. Desm., 1848, p. 77, pl. 10, fig. 3; Wolle, Desm. U. S., 1884, p. 116, pl. 37, figs. 7, 8; Johnson, Species of Micrasterias, 1894, p. 58, pl. 6, figs. 5, 6; W. & G. S. West, Brit. Desm., 1905, p. 80, pl. 41, figs. 7–11, 13. *Euastrum pinnatifidum* Kütz., Phyc. Germ., 1845, p. 134. *Euastrum No. 7*, Bailey, Amer. Bacill., 1841, pl. 3, fig. 29. Cells small, slightly broader than long, deeply constricted, sinus open; semicells three lobed, lateral interlobular incisions deep and broadly rounded; polar lobe narrower than the cell, but spreading, the apices minutely bifid, cell wall minutely punctate. Length 53–65 μ, breadth 62–75 μ, polar lobe 46–55 μ, isthmus 9.5–13 μ. Me.: Orono (*Harvey, W. West*); Scarboro' (*W. West*). N. H.: Intervale! Pudding Pond, North Conway! Hill's Pond, Alton (*H. C. no. 668*)! Mass.: Lake Quinsigamond, Worcester (*Stone*); Medford (*H. C. no. 701*)! Sessaquin Lake, Middleboro (*H. C. no. 652*)! R. I.: Wainskut Pond, North Providence (*Bailey*); Nyatt! This small species is more commonly found in numbers than the preceding species, although perhaps not any more widely distributed as far as New England is concerned. Several varieties have been recorded and described from New England. In abundant material it has been shown that this species in common with others of this genus is very variable within certain limits (Johnson, Bot. Gaz., 1894). Specimens were found in which one semicell was typical, the other being var. *inflata* Wolle. Var. *divisa* West also occurs in a similar manner. A trigonal form from Orono, occurring with the typical form and both var. *inflata* and var. *divisa* was named var. *trigona* by West. Such forms which are evidently montrosities seem hardly worthy of varietal rank. Thus *M. pinnati-*

fida may be seen to be variable in the same lot of material within certain limits.

4. Micrasterias arcuata Bailey, Micr. obs., 1851, p. 37, pl. 1, fig. 6; Wolle, Desm. U. S., 1884, p. 117, pl. 38, fig. 5. Mass.: Lake Quinsigamond (*Stone*).

4a. Micrasterias arcuata, var. expansa (Bailey) Nordst., Alg. Brasil., 1877, p. 23, fig. II, 5, 6, and b in text. *M. expansa* Bailey, Micr. obs., 1851, p. 37, pl. 1, fig. 7; Wolle, Desm. U. S., 1884, p. 117, pl. 37, fig. 12. Mass.: Lake Quinsigamond, Worcester (*Stone*). These records are all there are for New England.

5. Micrasterias depauperata Nordst., var. Kitchelii (Wolle) W. & G. S. West, Some N. Amer. Desm., 1896, p. 239; Cushman, Notes on Micrasterias, 1904, p. 396, fig. 2 in text. *Micrasterias Kitchelii* Wolle, Bull. Torrey Club, 1880, p. 45, pl. 5, fig. M; Desm. U. S., 1884, p. 116, pl. 37, figs. 1–3. Cells of medium size, about as long as broad, deeply constricted, sinus open: semicells barely five lobed, the lateral lobes being divided by a rounded incision of slight depth, polar lobe widely spreading, separated from the lateral lobes by a fairly deep, broadly rounded incision, the width across the distal part of the lateral lobes, slightly less than the entire width of the cell. Extremities of all the lobes bifid. Length 125 μ, breadth 125 μ, polar lobe 75–100 μ. Mass.: Gilder Pond, Mt. Everett, Mount Washington (*Wolle*). Although I collected in Gilder Pond in May 1907 I failed to find this or any other form of *M. depauperata*. Due to the late spring few desmids were present. Wolle's material was collected in August.

5a. Micrasterias depauperata Nordst., var. Wollei Cushman, Notes on Micrasterias, 1904, p. 396, fig. 3 in text. *M. Kitchelii* Wolle, var., Desm. U. S., 1892, p. 129, pl. 42, fig. 2. *M. depauperata* W. & G. S. West, Some N. A. Desm., 1896, p. 238, pl. 14, fig. 1. Cells larger than in the preceding, somewhat longer than broad, the lateral lobes even less divided by a very shallow sinus, apical lobe narrower, width across the distal portion of the lateral lobes only about three fourths of the whole width of the cell; cell wall punctate. Length 140–155 μ, breadth 130–145 μ, polar lobe 90–100 μ, isthmus 21–27 μ. N. H.: Pudding Pond, North Conway, rare! Mass.: Tewksbury (*Lagerheim*); Lake Watuppa, Fall River, common (*H. C. no. 35*)! This is the only form of *M. depauperata* that I have seen from New England. It seems to be a rare species and in but one of the localities was it at all common.

6. Micrasterias truncata (Corda) Bréb., in Ralfs, Brit. Desm., 1848, p. 75, pl. 8, fig. 4, pl. 10, fig. 5; Wood, Fr. Alg., 1873, p. 144, pl. 21, fig. 15; Wolle, Desm. U. S., 1884, p. 114, pl. 38, fig. 6; W. & G. S. West, Brit. Desm., 1905, p. 82, pl. 42, figs. 1–8, pl. 45, figs. 5, 6. *Cosmarium truncatum* Corda, Alm. de Carlsbad, 1834, pp. 180, 206, pl. 2, figs. 23, 24. *M. crenata* Bréb., in Ralfs, Brit. Desm., 1848, p. 75, pl. 7, fig. 2, pl. 10, fig. 4; W. & G. S. West, Brit. Desm., 1905, p. 85, pl. 42, figs. 10–13. *Euastrum No. 3* Bailey, Amer. Bacill., 1841, p. 294, pl. 3, fig. 24. Cells small, very slightly longer than broad, medium sinus deep and narrow, polar lobe wide, in general fusiform, lateral angles acuminate or bifid, end of the lobe either broadly rounded or slightly retuse; lateral lobes two on each side separated from the polar lobe by a comparatively deep sinus, slightly open; sinus between the lateral lobes shallow and narrowly open, ultimate lobules variable, usually each lobe with two lobules which may have two projections or none. Length 86–113 μ, breadth 80–110 μ, polar lobe 55–81 μ, isthmus 14–22 μ. Me.: Orono (*Harvey, W. West*); Spencer Pond, East Middlesex (*H. C. no. 629*)! Mud Pond, Township Range! Kittery! Bridgton! N. H.: Hanover (*Edwards*); Intervale! Pudding Pond, North Conway! North Woodstock! Mass.: Amherst (*W. West*); Lake Quinsigamond, Worcester (*Stone*); Tewksbury (*Lagerheim*); Reading! Lake Watuppa, Fall River (*H. C. no. 38*)! Sandwich! Eastham! Chilmark! Squam Pond, Nantucket! R. I.: Wainskut Pond, North Providence (*Bailey*). As various gradations occur between typical *M. truncata* and the form known as *M. crenata* Bréb., it seems best not to use the two names. Especially is this true when in American specimens one finds what would pass for typical *M. crenata* making up one semicell and the other having the retuse polar lobe and the lateral lobes of typical *M. truncata*. Since noting such specimens it has seemed best to place all the forms under *M. truncata*. For purposes of distinguishing between the two extremes, the form with the deeper and more rounded polar lobe and the less deeply incised lateral lobes may be known as *M. truncata* (Corda) Bréb., var. **crenata** (Bréb).

7. Micrasterias Jenneri Ralfs, Brit Desm., 1848, p. 76, pl. 11, fig. 1; Wood, Fr. Alg., 1873, p. 146, pl. 13, fig. 7; W. & G. S. West, Brit. Desm., 1905, p. 86, pl. 42, fig. 14, pl. 43, figs. 1, 2. Me.: Orono (*Harvey*), "with truncata." This is the only New England record for this species. It is worthy of note that W. West does not record it from his material from the same locality.

8. Micrasterias conferta Lund., var. hamata Wolle, Bull. Torrey Club, 1883, p. 19, pl. 27, fig. 1; Desm. U. S., 1884, p. 114, pl. 38, figs. 3, 4; W. & G. S. West, Some N. A. Desm., 1896, p. 241, pl. 14, figs. 8, 9; Brit. Desm., 1905, p. 90, pl. 43, figs. 10, 11. Cells of medium size, deeply constricted, with a linear sinus, semicells five lobed, interlobular sinuses narrow except those between the lateral and polar lobes, these being widely gaping, polar lobe cuneate, the distal end broadly extended laterally and the angles uncinate with tooth-like projections and with two pairs of small teeth at either side of the apical notch, lateral lobes twice divided dichotomously by shallow sinuses, cell wall coarsely punctate. Length 106 μ; breadth 100 μ, polar lobe, 43.4 μ, isthmus 12.4 μ. Me.: Spencer Pond, East Middlesex (*H. C. no. 604*)! Mass.: Mt. Everett, Mount Washington (Wolle): Lake Quinsigamond, Worcester (*Stone*).

9. Micrasterias apiculata (Ehrenb.) Menegh., Synops. Desm., 1840, p. 216; W. & G. S. West, Brit. Desm., 1905, p. 97, pl. 47, figs. 1, 2. *M. fimbriata*, forma *apiculata* Wolle, Desm. U. S., 1884, p. 110, pl. 36, fig. 2. *M. furcata* Wood, Fr. Alg., 1873, p. 144, pl. 13, fig. 5. *Euastrum apiculatum* Ehrenb., Organ. kl. Raum, 1834, p. 245; Infus., 1838, p. 161, pl. 12, fig. II. Cells large, slightly longer than broad, sinus deep, narrowly linear, opening outward; semicells five lobed, polar lobe exserted, sides nearly parallel, except at the distal end which is expanded, angles with a pair of stout diverging spines, on the inner side a stout incurved spine at each side and a smaller spine on either side of the median notch; lateral lobes nearly equal, each dichotomously twice divided, the resulting divisions each with a pair of curved spines, all sinuses narrow except those between the lateral and polar lobes, these opening much more widely; surface of the cell with many minute spines, with four larger ones just above the isthmus in each semicell and arranged in a quadrate manner. Length 240–254 μ, breadth 200–217 μ, polar lobe 42–46 μ, isthmus 31 μ. N. H.: Hill's Pond, Alton (*H. C. no. 666*)! Mass.: Medford! There is considerable variation in the spines of the polar lobe. In some cases they are very large and strongly curved.

9a. Micrasterias apiculata, subsp. fimbriata (Ralfs) Nordst., Bornh. Desm., 1888, p. 190; W. & G. S. West, Brit. Desm., 1905, p. 99, pl. 46, fig. 6, pl. 47, figs. 2, 3. *M. fimbriata* Ralfs, Brit. Desm., 1848, p. 71, pl. 8, fig. 2; Wolle Desm. U. S., 1884, p. 109, pl. 36, fig. 1. *M. fimbriata* var. *nuda* Wolle, Bull. Torrey Club, 1880, p. 45; Desm.

U. S., 1884, p. 110, pl. 36, fig. 4. *M. fimbriata*, var. *elephanta* Wolle, l. c. fig. 3. *M. fimbriata*, forma *simplex* Wolle, l. c. fig. 8. *M. subfimbriata* Wolle, l. c. fig. 7. In this variety the surface usually has no ornamentation of spines, the spines on the polar lobe are fewer and smaller and the whole lobe less projecting; the basal lobulations of the lateral lobes often project beyond the others. Length 186–229 μ, breadth 180–205 μ, polar lobe 40–50 μ, isthmus 38 μ. Me.: Pushaw Stream (*Harvey*); Scarboro', frequent (*W. West*). N. H.: Rochester (*Wolle*). Mass.: Amherst (*W. West*); Lake Quinsigamond, Worcester (*Stone*); Carver's Pond, Bridgewater! Lake Watuppa, Fall River (*H. C. no. 15*)! Wolle figured and named many forms of this variable species but they seem to be but variations of the same thing. His forms are included in the above synonymy.

10. Micrasterias denticulata Bréb., Alg. Falaise, 1835, p. 54, pl. 8; Ralfs, Brit. Desm., 1848, p. 70, pl. 7, fig. 1; pl. 8, fig. 1; Wolle, Desm. U. S., 1884, p. 109, pl. 34, figs. 4–8 (*forms*); W. & G. S. West, Brit. Desm., 1905, p. 105, pl. 49, figs. 1–7, pl. 50, figs. 1, 2. Cells large, slightly longer than broad, outline subcircular, deeply constricted, sinus very narrowly linear as are the interlobular ones; semicells five lobed, polar lobe broadening distally, concave at the apex with a median notch, angles rounded, lateral lobes broadly cuneate, dichotomously three times divided, ultimate divisions retuse, without spines; surface without ornamentation. Length 234–410 μ, breadth 195–300 μ, polar lobe 65–76 μ, isthmus 25–42 μ. Me.: Penobscot River at Orono (*Harvey*). N. H.: Hanover (*Edwards*); Intervale! Pudding Pond, North Conway! Mass.: Carver's Pond, Bridgewater! Lake Watuppa, Fall River! R. I.: Wainskut Pond, North Providence (*Bailey*). This is one of the few species without spines on some portion of the cell.

10a. Micrasterias denticulata, var. angulosa (Hantzsch) W. & G. S. West., Alg. N. Ireland, 1902, p. 30; Brit. Desm., 1905, p. 107, pl. 50, figs. 3, 4. *M. angulosa* Hantzsch in Rab. Alg., 1862, no. 1407. *M. denticulata* Wood, Fr. Alg., 1873, p. 145, pl. 13, fig. 6. *M. radiosa*, var. *punctata* West, Desm. Mass., 1889, p. 20, pl. 2, figs. 1, 2. Cells more angular than in the typical form, the widest part of the semicell usually above the base, lateral lobes but twice divided, surface coarsely punctate. Length 245–310 μ, breadth 210–300 μ, polar lobe 68–77.5 μ, isthmus 28 μ. N. H.: North Woodstock! Mass.: Amherst (*W. West*); Lake Watuppa, Fall River (*H. C. no. 34*)! This variety

grows to a very considerable size, its angular form and coarsely punctate surface giving it a very different appearance from the typical form than which it seems to be more rare.

11. Micrasterias sol (Ehrenb.) Kütz., Spec. Alg., 1849, p. 171; W. & G. S. West, Brit. Desm., 1905, p. 95, pl. 46, figs. 1, 2. *M. radiosa* Ralfs, Brit. Desm., 1848, p. 78, pl. 8, fig. 3; Wolle, Desm. U. S., 1884, p. 109, pl. 31, fig. 2. *Euastrum sol* Ehrenb., Mikr. Leb. Sud. u. N. Amer., 1843, p. 413, pl. 4, fig. 16. Cells large, circular in general outline, very deeply constricted, sinus narrowly open, the sides undulate, semicells five lobed, all the sinuses deep; polar lobe with nearly parallel sides, broadest distally, apex concave with a slight median notch, the outer angles each with two teeth, a single tooth within at either side of the median notch; upper lateral lobes larger than the lower ones and often with more lobules, lower lobes dichotomously twice divided to form four equal lobules, the apices variously toothed; cell wall unornamented. Length 140–220 μ, breadth 125–235 μ, polar lobe 25–34 μ, isthmus 20–25 μ. N. H.: Pudding Pond, North Conway! Hill's Pond, Alton! Mass.: Lake Quinsigamond, Worcester (*Stone*); Reading! Carver's Pond, Bridgewater: R. I.: Near Providence (*Bailey*).

11a. Micrasterias sol, var. ornata Nordst., Point sfor. Skand. Vaxt., 4, 1880, p. 25; W. &. G. S. West, Brit. Desm., 1905, p. 97, pl. 46, figs. 3, 4. *M. radiosa*, var. *ornata* Nordst., Desm. Brasil., 1870, p. 223, pl. 2, fig. 11. *M. radiosa* Wolle, Desm., U. S., 1884, pl. 31, fig. 3. *M. radiosa* var. *Wollei* Cushman, Notes on Micrasterias, 1904, p. 394. Cells similar to those of the typical form but with a row of minute teeth bordering the sinus and the interlobular incisions except on the polar lobe. Length 152 μ, breadth 146 μ, polar lobe 28 μ. Mass.: Chilmark, Marthas Vineyard.

11b. Micrasterias sol, var. **Swainii** (Hastings) n. comb. *M. Swainii* Hastings, in Wolle, Desm. U. S., 1892, p. 119, pl. 42, fig. 1. *M. radiosa* var. *Swainii* W. & G. S. West, Some N. A. Desm., 1896, p. 240, pl. 13, fig. 30. A variety with the basal lobules of each semicell simple and produced into elongated processes. Length 150–160 μ, breadth 151–164 μ, polar lobe 34 μ, isthmus 11.5–16 μ. N. H.: Rochester (*Hastings*). Mass.: Reading (*H. C. no. 644*)!

12. Micrasterias papillifera Bréb., in Ralfs, Brit. Desm., 1848, p. 72, pl. 9, fig. 1; Wolle, Desm. U. S., 1884, p. 109, pl. 32, figs. 8, 9; W. & G. S. West, Brit. Desm., 1905, p. 91, pl. 44, figs. 1,

2, 7; Cushman, Zygosp. Desm., 1905, p. 225, pl. 7, figs. 7, 7a. Cells of medium size, slightly longer than broad, nearly circular in general outline; deeply constricted, sinus linear; semicells five lobed, separated by linear sinuses; polar lobe broadening distally with nearly straight or slightly concave sides, apex concave with a median notch, the lateral angles bifid and a tooth at each side of the median notch; lateral lobes cuneate, about equal in size, divided twice dichotomously, the ultimate divisions emarginate; cell wall with a row of acute granules on either side of the sinus and interlobular incisions. Zygospore subglobose, with strong spines, simple or furcate at the apex. Length 152–155 μ, breadth 135–148 μ, polar lobe 36–43 μ, isthmus 15.5–21 μ. Zygospore: length with spines 103–105 μ, without spines 75 μ, breadth with spines 95 μ, without spines 75 μ. Me.: Orono (*W. West*); Bridgeton! N. H.: Pudding Pond, North Conway! Mass.: Amherst (*W. West*); Lake Quinsigamond, Worcester (*Stone*); Reading (*H. C. no. 734*)! also with zygospores! R. I.: Near Providence (*Bailey*). The zygospores that I have observed had the majority of the spines simple, occasionally a few with the apices once furcate but none as much furcate as in Ralfs' figure. The material from Reading had an abundance of zygospores associated with the empty semicells.

13. MICRASTERIAS ROTATA (Grev.) Ralfs, Ann. Nat. Hist., 1844, p. 259, pl. 6, fig. 1; Brit. Desm., 1848, p. 71, pl. 8, fig. 1a, (b?); Wolle, Desm. U. S., 1884, p. 109, pl. 34, figs. 1, 2; W. & G. S. West, Brit. Desm., 1905, p. 102, pl. 48, figs. 1–6. *Echinella rotata* Grev., in Hooker, Br. Fl., 2, 1833, p. 398. Cells large, slightly longer than broad, general outline broadly elliptical; deeply constricted, sinus narrowly linear; semicell five lobed, polar lobe broadening distally, apex with a median notch, the angles with two spines, lateral lobes unequal, the basal ones smaller, each divided dichotomously three times, the ultimate divisions with spinose angles, interlobular sinuses narrowly linear, those between the lobules broader; no surface ornamentation. Length 242 μ, breadth 226 μ, polar lobe 57 μ, isthmus 29 μ. Me.: Penobscot River, near Orono (*Harvey*); Spencer Pond, East Middlesex (*H. C. no. 614*)! N. H.: Pudding Pond, North Conway! Mass.: Amherst (*W. West*); Lake Quinsigamond, Worcester (*Stone*); Westport (*H. C. no. 739*)! R. I.: Wainskut Pond, North Providence (*Bailey*). This is one of our largest and showiest desmids.

14. MICRASTERIAS TORREYI Bailey, in Ralfs, Brit. Desm., 1848,

p. 210, pl. 35, fig. 5; Wolle, Desm. U. S., 1884, p. 108, pl. 30, figs. 1–8. *M. Pseudotorreyi* Wolle, Bull. Torrey Club, 1883, p. 19, pl. 27, fig. 2; Desm. U. S., 1884, p. 108, pl. 32, fig. 1. Cells large, generally subcircular in outline, deeply constricted, sinus at first narrowly linear then opening outward; semicells five lobed, polar lobe broadening distally, sides concave, end emarginate with or without a median notch, angles acute or with a truncate emargination; lateral lobes unequal, in the more common form, the lower with two, the upper with three lobules, usually concave with acute angles, occasionally the lobules again divided and the interlobular incisions narrower but usually opening widely outward; surface without ornamentation. Length 215–280 μ, breadth 170–310 μ, polar lobe 47–90 μ, isthmus 25–38 μ. N. H.; Pudding Pond, North Conway! Mass.: Mt. Everett, Mount Washington (*Wolle*); Lake Quinsigamond, Worcester (*Stone*); Reading! Randolph! There seems to me no doubt that *M. Pseudotorreyi* Wolle is a synonym of *M. Torreyi.* It is reported only from the localities where *M. Torreyi* is found and in my own material specimens were found which bridge the gap in size, and the form of the lobes is variable in all the specimens I have seen. In some cases specimens were nearly as regular as in Wolle's figure but something must be allowed for the conventionalizing of Wolle's figures.

15. Micrasterias radiata Hass., Br. Alg., 1845, p. 386, pl. 90, fig. 2; W. & G. S. West, Brit. Desm., 1905, p. 113, pl. 52, figs. 1–9. *M. melitensis* Ralfs, Ann. Nat. Hist., 1844, p. 260, pl. 6, fig. 2 (*not M. melitensis Menegh. 1840*). *M. furcata* Ralfs, Brit. Desm., 1848, p. 73, pl. 9, fig. 2 (not *M. furcata* Ag. 1827); Wolle, Desm. U. S., 1884, p. 111, pl. 35, figs. 5, 6; Johnson, Bot. Gaz., 1894, p. 58, pl. 6, figs. 8–14. *M. pseudofurcata* Wolle, Bull.Torrey Club, 1881, p. 1, pl. 6, fig. 3; Desm. U. S., 1884, p. 111, pl. 35, fig. 4. *M. furcata* var. *simplex* Wolle, Bull., Torrey Club, 1885, p. 128, pl. 51, figs. 6, 7; Fr. Alg., 1887, p. 40, pl. 59, figs. 6, 7. Cells of medium size, slightly longer than broad; very deeply constricted, sinus widely open, often partly closed by the basal lobules; semicells five lobed, polar lobe with parallel sides below, then widely expanding into diverging elongated processes; apex furcate; lateral lobes usually once divided but very variable, ends furcate, lobules diverging; cell wall unornamented. Length 145–192 μ, breadth 124–160 μ, polar lobe 62–105 μ, isthmus 18–30 μ. Me.: Bog between Orono and Bangor; Scarboro', frequent (*W. West*). Vt.: Johnson! N. H.: Noone's Station! Pudding

Pond, North Conway! Mass.: Lake Quinsigamond, Worcester (*Stone*); Tewksbury! Medford (*H. C. no. 712*)! Wellesley! Carver's Pond, Bridgewater! Lake Watuppa, Fall River! Nokechoke Lake, Westport! Milford Pond, Swansea (*H. C. no. 669*)! R. I.: Worden's Pond, near Providence (*Bailey*); Nyatt (*H. C. no. 636*)! As shown by Johnson this species is very variable, all gradations existing between *var. simplex* Wolle and the typical form, and the two semicells of a single specimen often being considerably different. The angle at which the lateral lobes diverge is also very variable.

15a. MICRASTERIAS RADIATA, var. **dichotoma** (Wolle) n. comb.; *M. dichotoma* Wolle, Bull. Torrey Club, 1884, p. 14; Desm. U. S., 1884, p. 111, pl. 52, fig. 2. Similar to the type but with the lobes much more spreading and drawn out laterally. Length 190–250 μ, breadth 155–200 μ, polar lobe 93–111 μ, isthmus 13–18 μ. Mass.: Lake Quinsigamond, Worcester (*Stone*); Tewksbury (*Lagerheim*); Nokechoke Lake, Westport (*H. C. no. 645*)! This seems best considered a variety of *M. radiata* as it differs in but minor characters, the drawn out condition of the lobes being the main thing that distinguishes it.

16. MICRASTERIAS CRUX-MELITENSIS (Ehrenb.) Hass., Br. Alg., 1845, p. 386, pl. 90, fig. 7; Ralfs, Brit. Desm., 1848, p. 73, pl. 9, fig. 3; Wolle, Desm. U. S., 1884, p. 111, pl. 35, fig. 3; W. & G. S. West, Brit. Desm., 1905, p. 116, pl. 53, figs. 1–3. *Euastrum crux-melitensis* Ehrenb., Entw. d. Inf., 1832, p. 82. Mass.: Lake Quinsigamond, Worcester (*Stone*). This is the only New England record for this species. I have never seen specimens which I could refer to this species.

17. MICRASTERIAS AMERICANA (Ehrenb.) Ralfs, Brit. Desm., 1848, p. xix; Wood, Fr. Alg., 1873, p. 143, pl. 12, fig. 17; Wolle, Desm. U. S., 1884, p. 112, pl. 32, fig. 2; W. & G. S. West, Brit. Desm. 1905, p. 117, pl. 53, figs. 4, 5, pl. 54, figs. 1–3. *M. morsa* Ralfs, Brit. Desm., 1848, p. 74, pl. 10, fig. 1. *Euastrum americanum* Ehrenb. Mikr. Leb. Sud. u. N. Amer., 1843, p. 413, pl. 4, fig. I. 15. *Euastrum No. 4* Bailey, Amer. Bacill., 1841, p. 295, pl. 3, fig. 25. Cells of medium size, slightly longer than broad, deeply constricted, sinus opening outward, semicells five lobed, polar lobe large and broadening distally, apex widely retuse, each angle extended into a broad process, denticulate at the end, from near the base of each of these processes is a shorter similar process, each on the opposite side of the polar lobe;

polar lobe widely separated from the lateral ones, which are scarcely separated from one another by a shallow open sinus, each lobe once divided, the lobules obliquely truncated and denticulate; surface of the cell with scattered denticulate granules, most numerous towards the ends of the lobes, and an irregular group centrally above the isthmus on each semicell. Length 124–158 μ, breadth 105–138 μ, polar lobe 50–75 μ, isthmus 18–28 μ. Me.: Orono (*Harvey*). N. H.: North Woodstock! Mass.: Amherst (*W. West*); Lake Quinsigamond Worcester (*Stone*); Stony Brook, Weston! Misery Island, off Beverly Farms! Medford! Plainville! Pondville! Carver's Pond, Bridgewater! Swansea! Framingham (*H. C. no. 726*)! R. I.: Near Providence (*Bailey*). This species seems to be common in material from southern New England but has been met with very seldom in collections north of Massachusetts. Like other species of this genus it is variable. The polar lobe assumes various forms yet none of them with the exception of the following variety is united with other distinctive characters. The four large granules at the apex of the terminal lobe seem to be lacking more often than they are present and the whole cell is often nearly smooth.

17a. Micrasterias americana, var. recta Wolle, Bull. Torrey Club, 1876, p. 122; 1881, pl. 6, fig. 2; Desm. U. S., 1884, p. 112, pl. 32, fig. 3: W. & G. S. West, Brit. Desm., 1905, p. 119, pl. 54, fig. 4. Extremities of the processes of the polar lobe all very short and rounded, apex of the polar lobe nearly straight, sinuses separating the lateral lobes and lobules reduced and a much more even outline developed than in the type. Length 143 μ, breadth 121 μ, polar lobe 65 μ, isthmus 28 μ. N. H.: North Woodstock! Mass.: Carver's Pond, Bridgewater! Framingham (*H. C. no. 703*)! Pond near Old North Cemetery, Nantucket! There are varying gradations between this variety and the type from which it is difficult to group but as a rule the variety seems to be distinct. It is much less common in New England than the typical form.

18. Micrasterias ringens Bailey, var. serrulata Wolle, Bull. Torrey Club, 1885, p. 128, pl. 51, fig. 15; Fr. Alg., 1887, p. 41, pl. 59, fig. 15; W. &. G. S. West, Some Desm. U. S., 1898, p. 296. Length 156 μ, breadth 152 μ. N. H.: Laconia (*H. J. no. 650, 679*). Whether this is the same as *M. mahabuleshwarensis* Hobson or not seems to be an open question. Upon examining Johnson's slides nos. 650 and 679 I was unable to find the specimens in condition for critical exami-

nation. This is the only New England record and must rest upon the specimens which Johnson saw. "These forms appear to differ from many specimens of *M. mahabuleshwarensis* that we have seen only in the absence of the additional apical process" (W. & G. S. West 1898, p. 296).

19. MICRASTERIAS MAHABULESHWARENSIS Hobson, Ind. Desm., 1863, pp. 168, 169, text fig.; Wolle, Desm. U. S., 1884, p. 112, pl. 37, fig. 10; Johnson, New and rare Desm. U. S., II, 1895, p. 292; W. &. G. S. West, Brit. Desm., 1905, p. 121. *M. americana*, var. *Hermanniana* Wolle, Desm. U. S., 1884, p. 112, pl. 32, fig. 5. This species resembles *M. americana* but differs in the following points. Cells larger, lower and often the upper lateral lobes undivided, ornamentation consisting of a series of acute denticulations bordering the interlobular sinuses, a central ring of four large granules above the isthmus, and often a single granule just above the isthmus. Length 151–220 μ, breadth 135–190 μ, polar lobe 75–100 μ, isthmus 19–22 μ. N. H.: Meredith, rare (*Johnson*). Mass.: Lake Quinsigamond, Worcester (*Stone*); Carver's Pond, Bridgewater! The measurements are those given by W. & G. S. West, British Desmids. This species is closely related to *M. americana* if it is not a variety of it. It has a more southern distribution and is much more common in material from our southern states. It is rare in New England.

20. MICRASTERIAS NORDSTEDTIANA Wolle, Bull. Torrey Club, 1884, p. 15; Desm. U. S., 1884, p. 113, pl. 52, figs. 3–5; Johnson, Bull. Torrey Club, 1895, p. 292, pl. 239, fig. 14; W. & G. S. West, Some N. A. Desm., 1896, p. 239, pl. 14, fig. 4. Cells somewhat longer than wide, semicells three lobed usually, but developing two rudimentary lateral lobes occasionally; polar lobe spreading, divided laterally to form two arms of unequal length on either side, ends with two or more spines, basal lobes bifurcate, spreading, ends spinose, sinus deep, somewhat gaping, rudimentary lateral lobes varying from a small conical projection to a considerable lobe ending in a pair of spines; surface smooth. Length 134–191 μ, breadth 115–171 μ, isthmus 14–27 μ. N. H.: Meredith, rare (*Johnson*).

21. MICRASTERIAS MURICATA (Bailey) Ralfs, Brit. Desm., 1848, p. 210; Wolle, Desm. U. S., 1884, p. 118, pl. 31, figs. 4–7. *M. muricata*, var. *tumida* W. & G. S. West, Some N. A. Desm., 1896, p. 240, pl. 14, fig. 7. *Euastrum muricatum* Bailey, Castk. Desm., 1846, p. 126, figs. 1, 2 in text. Cells large, semicells divided laterally into

three wide portions, connected by narrowed sections, the interlobular incisions deep but broadly rounded, sinus deep, acute angled, median and apical lobes split laterally, basal one split into three parts, the middle one of the three longest and occasionally bifid, apices of all the lobes minutely toothed, cell wall punctate. Length 160–195 μ, breadth 120–155 μ, polar lobe 120–140 μ, isthmus 21–31 μ. Me.: Spencer Pond, East Middlesex (*H. C. no. 633*)! N. H.: Pudding Pond, North Conway. Rare! Mass.: Lake Quinsigamond, Worcester (*Stone*); Tewksbury (*Lagerheim*); Carver's Pond, Bridgewater! Westport (*H. C. no. 689*)! R. I.: near Providence (*Bailey*).

21a. Micrasterias muricata, forma minor Cushman, Desm. Flora N. H., 1905, p. 254. A form in which the cells are much smaller than in the typical form of the species. Length 123 μ, breadth 84 μ, polar lobe 84 μ, isthmus 16 μ. N. H.: Intervale!

22. Micrasterias foliacea Bailey, in Ralfs. Brit. Desm., 1848, p. 210, pl. 35, fig. 3; Wolle, Desm. U. S., 1884, p. 118, pl. 38, figs. 10, 11; Johnson, Bot. Gaz., 1894, p. 56, pl. 6, figs. 1–4. Cells small, subquadrate in outline, deeply constricted, sinus narrow, linear throughout its length, semicell five lobed, lateral lobes with their outer margins nearly straight, the two sides of the semicell parallel, the upper of the lateral lobes being elongated and somewhat curved, each lateral lobe divided into two or four lobules, the upper usually with the distal lobule shortest; polar lobe rhomboid, end with a quadrate incision with a broad plate like projection on either side, between which are two teeth at one side and two on the reverse side, the opposite polar lobe exactly reversed, the shape allowing the interlocking of the cells to form long linear series: surface typically smooth. Length 80–96 μ, breadth 80–85 μ, polar lobe 36–38 μ, isthmus 14–15 μ, N. H.: Laconia, scarce (*H. J. no. 665*) Pudding Pond, North Conway, rare! Mass.: Gilder Pond, Mt. Everett, Mount Washington (*Wolle*); Lake Quinsigamond, Worcester, (*Stone*). R. I.: Worden's Pond, near Providence (*Bailey*). Johnson worked out the structure of the polar lobe in this species and his figures give a better idea of the structure than a description. This is one of our most beautiful and most interesting species. Johnson records filaments with over a hundred cells.

22a. Micrasterias foliacea, var. **granulifera** n. var. Like the type but the surface covered with large irregularly disposed granules. Var. membrana granulis magnis inordinatim dispositis. N. H.: Pudding Pond, North Conway!

Boston Society of Natural History.

SOME PLANTS OF TIVERTON, RHODE ISLAND.

Myra M. Sampson.

In the months of July and August, 1907, I collected specimens in the southeastern part of Rhode Island on the east bank of the Seaconnet River. This part of the state is isolated from the remainder by the above mentioned arm of Narragansett Bay and is thus more closely associated, in its flora, with the adjoining portions of Massachusetts. The particular areas from which collections were made, midway between Seaconnet Point and Stone Bridge, are known as Fogland and Punkatest Neck. The topography along the coast varies considerably. In some places there are high rocky banks, and in others low sandy and marshy areas. Inland there are meadows and swampy ground.

I have recently studied and arranged this material under the direction of Professor J. Franklin Collins who has verified all determinations. Most of the species have already been recorded as occurring in similar situations in other parts of the state, but there are several which appear as yet unrecorded or recorded from one or two special stations only.

Following is the list of species which are of the most interest. The nomenclature, unless otherwise noted, is that of the sixth edition of Gray's Manual.

Rumex Patientia L. Very common along the roadsides, on the river bank, and in waste places.

Amarantus chlorostachys Willd. Few specimens in salt marshes.

Iris prismatica Pursh. Very common in swampy areas within twenty-five yards of the river bank.

Rosa blanda Ait. Very common in swampy land with the preceding.

Triglochin maritimum L. Few specimens near the high tide mark, and in salt marshes.

So far as the writer can ascertain the preceding species have not been reported from Rhode Island, while the following have been recorded only from the stations mentioned in other parts of the state.

Reseda lutea L. Few specimens in cultivated areas within five yards of the river bank. Previously reported from Providence [Rhodora **1**: 47].

Sysrinchium angustifolium Mill. Common in meadow land. Apparently common throughout the state. Reported from Providence [Rhodora **1**: 106].

Cerastium arvense L. Few specimens in cultivated areas. Reported from Cumberland and Providence [Plants of Rhode Island, J. L. Bennett, 1888].

Funkia ovata Spreng. Common in cultivated areas. Reported from Providence [Rhodora **1**: 47].

Sparganium americanum var. *androcladum* (Engelm.) Fernald & Eames [Rhodora **9**: 87]. Common in very swampy ground. Reported from Providence, Cranston, Warwick [Rhodora **1**: 105].

Fall River, Massachusetts.

THE TYPE LOCALITY OF SPHAGNUM FAXONII.

Harley Harris Bartlett.

The March number of Rhodora contains a translation from Hedwigia of the original description of *Sphagnum Faxonii* Warnst. There only the following meagre information is given as to the origin of the type specimen: "Massachusetts, 16 Sept., 1891, leg. Faxon." Warnstorf has been so kind as to send me part of his type material in order that I might match it with more accurately labeled specimens in the duplicate collection of Faxon *Sphagna* at the Harvard Cryptogamic Herbarium, and thus gain accurate knowledge as to the type locality. Search for plants collected on 16 Sept., 1891, proved successful,— enough were found to prove beyond peradventure that on that date Mr. Faxon collected at Streeter Pond in Lisbon, New Hampshire. Furthermore, on that date he collected no peat moss more closely allied to *Sphagnum cuspidatum* (the nearest affinity of *Sphagnum Faxonii* is with this species) than *Sphagnum recurvum* var. *parvifolium*. It seems necessary to conclude, therefore, that both the locality and date given in Warnstorf's article are incorrect.

An examination of all the *Sphagnum cuspidatum* and allied species in the Faxon collection showed but one number which matched the type material of *Sphagnum Faxonii* sent by Warnstorf, namely no. 1049, collected at Sunken Heath, Mt. Desert Island, Maine, 29 June,

1891, by Mr. Faxon, in company with Mr. Rand. This number agrees with the type not only in structural details, but also in those elusive characters of habit which so often give individuality to all the material of the same collection. In the present case the identification of the Mt. Desert plant as the original source of Warnstorf's type is strongly confirmed by the presence, intermingled with both specimens, of the same hepatic, which has been determined by Prof. Evans as *Lophozia inflata* (Huds.) M. A. Howe. It may be mentioned in passing, although it must be admitted that in view of the small number of botanists who collect hepatics it is at best a doubtful argument in favor of Mt. Desert as the type locality of *Sphagnum Faxonii*, that *Lophozia inflata* has never been reported from Massachusetts.

As a check upon the accuracy of the data accompanying the specimens at the Harvard Cryptogamic Herbarium, Mr. Rand's Mt. Desert herbarium was examined, and, as expected, still more of the characteristic original material of *Sphagnum Faxonii* was found, again intermingled with *Lophozia inflata*. Mr. Rand's herbarium afforded, also, two additional stations for the plant on or near Mt. Desert,—Great Marsh Heath, Sea Wall and Great Cranberry Isle. In two cases the labels gave the habitat as "shallow pools." The local use of the word "Heath" on Mt. Desert is explained in the introduction to Rand and Redfield's "Flora of Mt. Desert Island, Maine." Here will also be found citation of all the specimens now referred to *Sphagnum Faxonii*, catalogued under vars. *plumulosum*, *submersum* and *falcatum* of *Sphagnum cuspidatum*.

To determine the relationship of *Sphagnum Faxonii* with other members of the *Cuspidata*, which occur in the same region, should prove an interesting problem to the bryologists of the Josselyn Botanical Society during their annual meeting at Mt. Desert in August.

CAMBRIDGE, MASS.

SOME ALGAE FROM HUDSON BAY.

WILLIAM ALBERT SETCHELL AND FRANK SHIPLEY COLLINS.

HUDSONS BAY is a large body of salt water lying in the Northern portion of North America, between lat. 51° N. and 64° N. and long. 77° W. and 95° W., and nearly enclosed by land. There have been

no reports of algae having been collected in this bay so far as is known to the writers, and one seeking for information as to the characteristics of the marine flora of this vast expanse, situated as it is, near to the North Atlantic on the one side, yet not entirely separated from the western portion of the American Arctic Ocean on the other, searches in vain. Some years ago, Professor D. C. Eaton, of Yale University, received from George Comer, of the Bark Canton, a few specimens which had been cast ashore on Depot Island in lat. 63° 55′ N. and long. 90° 20′ W. and gave them to one of us (W. A. S.) to be disposed of as might seem best. The other of us (F. S. C.) received from Professor John Macoun, a decidedly more extensive collection made by William Spreadborough for the herbarium of the Canadian Geological Survey, on the western shores of James Bay, somewhere between Cape Henrietta Maria and Moose Factory, and consequently between lat. 51° and 55° N. and about long. 82° W.

Although the number of species in the combined collections is not large and does not contain any specimens of particular interest, yet it seems best to the writers to put on record the species in a simple list, in the interest of promoting a knowledge of the distribution of our American forms.

In all we have 28 species and varieties to record and practically all are well known and circumpolar in their distribution, as may be seen by reference to Kjellman's "Algae of the Arctic Sea." The only real exceptions to circumpolar distribution are probably *Agarum Turneri* and *Delesseria denticulata* var. *rostrata*. The former quite certainly does not occur on the coasts of Northern Europe nor in the Siberian Sea. The latter, up to this time, has been supposed to be restricted to Baffin Bay. *Harveyella mirabilis* and *Actinococcus subcutaneus* are inconspicuous and parasitic species, not very well known as yet, and may probably be found to be circumpolar when our knowledge has been made reasonably complete. Postels and Ruprecht have figured a parasite (?) on *Rhodomela floccosa* from the North Pacific Ocean which may be *Harveyella*, and it is reported from Southern California. *Euthora cristata* is reported from the northern Pacific Ocean, but its place seems to be largely taken by the related species *E. fruticulosa*. *Enteromorpha crinita* is not to be regarded as yet as a strictly circumpolar species, but it occurs in the various temperate seas in both Atlantic and Pacific Oceans.

Algae of Hudson Bay.

Chlorophyceae.

Ulva Lactuca L. James Bay.
Enteromorpha crinita (Roth) J. Ag. James Bay.
Enteromorpha intestinalis f. *cylindracea* J. Ag. James Bay.
Enteromorpha intestinalis f. *clavata* J. Ag. James Bay.

Phaeophyceae.

Chaetopteris plumosa (Lyngb.) Kuetz. James Bay and Depot Island.
Chordaria flagelliformis (Muell.) Ag. James Bay.
Desmarestia aculeata (L.) Lamour. James Bay and Depot Island.
Pylaiella littoralis (L.) Kjellm. James Bay.
Elachista lubrica Rupr. James Bay.
Chorda filum (L.) Lamour. James Bay.
Agarum Turneri P. & R. James Bay and Depot Island.
Fucus edentatus De la Pyl. James Bay.
Fucus evanescens Ag. Depot Island.

Rhodophyceae.

Harveyella mirabilis (Reinsch) R. & S. On *Rhodomela lycopodioides* f. *flagellaris* Kjellm., James Bay.
Ahnfeldtia plicata (Huds.) Fr. James Bay.
Phyllophora Brodiaei f. *pygmaea* Darb.? Depot Island.
Phyllophora Brodiaei var. *interrupta* (Grev.) Rosenv. James Bay.
Actinococcus subcutaneus (Lyngb.) Rosenv. On the preceding, James Bay.
Rhodymenia palmata (L.) Grev. James Bay.
Euthora cristata (L.) J. Ag. Depot Island.
Delesseria sinuosa (G. & W.) Lamour. James Bay.
Delesseria denticulata f. **rostrata** Collins comb. nov. (*Delesseria Montagnei* f. *rostrata* Rosenvinge. James Bay.
Polysiphonia nigrescens (Dillw.) Grev. James Bay.
Rhodomela lycopodioides f. *flagellaris* Kjellm. James Bay.
Rhodomela lycopodioides f. *tenuissima* (Rupr.) Kjellm. James Bay.
Odonthalia dentata f. *angusta* Harvey. Depot Island.
Antithamnion boreale (Gobi) Kjellm. James Bay.
Ptilota pectinata (Gunn.) Kjellm. James Bay and Depot Island.

Vol. 10, no. 113, including pages 73 to 96, was issued 4 June, 1908.

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Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
EDWARD LOTHROP RAND } Publication Committee.

Vol. 10. July, 1908. No. 115.

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Boston, Mass.
1052 Exchange Building.

Providence, R. I.
Preston and Rounds Co.

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THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. July, 1908. No. 115.

ON THE IDENTITY OF RUBUS CANADENSIS.

W. H. Blanchard.

In 1753 Linnæus in his Species Plantarum, page 494, described as follows a *Rubus* to which he gave the specific name *Canadensis*.

6. Rubus foliis digitatis denis quinis ternatisque, caule inermi. Habitat in Canada. Kalm.

Caulis subpurpureus. Foliola lanceolata, utrinque nuda, tenuissima, argute serrata. Bractæ lanceolatæ. Stipulæ lineares, acutæ.

6. Rubus with digitate leaves, in tens, fives, and threes, stem unarmed.

Habitat in Canada. Kalm.

Stem somewhat purple. Leaflets lanceolate, naked on either side, very thin, acutely serrate. Bracts lanceolate. Stipules linear, acute.

For a time authors of American floras included this name evidently not because they knew plants that they referred to such a species, but simply because Linnæus had described it. At length, however, it was used for the common northern edible dewberry. This usage continued till 1898 when Prof. L. H. Bailey, in his Evolution of Our Native Fruits, showed that the *R. Canadensis* of Linnæus was an erect, unarmed, glabrous plant. This he learned by examining the original specimens of Linnæus preserved in London.

There he found two sheets. One of these he has figured on page 383. It has on the new cane five long narrow obovate leaflets, long-pointed at each end and very much like those of *R. setosus* Bigelow. The other specimen, unfortunately, he did not figure, but he obtained a good photograph of it, which he has kindly sent to me. This appears to be identical with a plant common in all the elevated parts of Vermont and New Hampshire and not rare generally in the lower sections.

I have now pretty thoroughly explored both states and write with knowledge obtained from personal observation. Specimens of this Rubus have been widely distributed under the name of *R. Canadensis* by President Ezra Brainerd and Mr. W. W. Eggleston. The leaflets of this second Linnæan specimen on the new cane are also five in number, narrow, the middle one ovate with rounded base, the side ones oval or slightly ovate, and the basal ones oval. The one fruit branch has a rather short but otherwise typical raceme.

Linnæus may have had both specimens before him, when he wrote the above description, but there is positive proof that he had the latter. As Dr. Gray has pointed out in Torrey and Gray's Flora of the United States in his remarks on *R. Canadensis*, this latter specimen has one of its leaves pressed directly on the top of another, a leaflet covering one petiole so that the two leaves would appear to a person with poor eyesight to be one leaf with ten leaflets. Here Linnæus undoubtedly got his idea of ten leaflets. The only ternate leaves on either specimen are on the fruit branches. He could get his description of narrow leaflets, lanceolate bracts, and linear stipules from either specimen or from both of them.

This latter form, the *R. Canadensis* described by President Brainerd in Rhodora (**2**: 23) in 1900, can be found by botanists visiting the White Mountains, where it occurs in great abundance in Pinkham Notch near the entrance to Tuckerman's Ravine on the road from Jackson to Gorham. Those visiting Lake Willoughby will find that though *R. Alleghaniensis* Porter is common at West Burke, it disappears about three miles up toward the lake where *R. Canadensis* has the field to itself.

It has been to me a matter of much interest to know the situation in Canada — that part from which it is to be presumed the specimens of Linnaeus were obtained. Accordingly during the last days of August and throughout September, 1907, I searched for Rubus in Canada. No light was obtained from examinations made during the time of the collections in Montreal and Ottawa, but near the headwaters of the Connecticut River in Vermont, New Hampshire and adjacent Canada *R. Canadensis* was abundant. On a trip from Newport, Vermont, to Quebec I found in sheltered places near large rivers some *R. Alleghaniensis* and also occasionally *R. glandicaulis* Blanchard, but the main high-bush blackberry was *R. Canadensis*, exactly the same form which we have in Vermont.

I found it around Sherbrooke, Richmond and Victoriaville, and some at Lyster, which is twenty miles southwest of Quebec. Beyond Sherbrooke all forms of Rubus except *R. strigosus* Michx. become rather scarce and people are not troubled with "briars." *R. strigosus*, however, I found as far north as I went. Some peculiar blackberries grew a few miles north of the citadel at Quebec but I found none there that I knew.

From Quebec I took a continuous car-ride to Roberval on Lake St. John. At Lake Edward, eighty miles north of Quebec, while the train was waiting for the hunters to get off, I found a blackberry that has considerable resemblance to the specimen of Linnæus figured by Prof. Bailey, but this was the only one I saw in Canada.

It may be of interest to botanists to know, and it was a great surprise to me to find, that on both sides of the railroad as far as one can see, from Rivière à Pierre Junction to Lake St. John, a distance of about one hundred miles, the land has been burned over so often that nothing grows there apparently except "fire-weeds." There is also a border at least thirty miles wide all around the lake that has had a similar fate. A small tract on the lake at Roberval was cleared on the occasion of the first fire and has escaped that baptism, and here I was able to learn something of the flora of this northern region. I expected to see it as Michaux saw it, and but for fires it would be nearly the same. I found no blackberries here.

At Three Rivers good *R. Canadensis* was found and also at Kazabazua, forty miles north of Ottawa, but *R. Alleghaniensis* is evidently the prevailing species of the immediate valleys of the St. Lawrence and Ottawa rivers from Three Rivers to Ottawa. Crossing into New York at Brockville at the foot of the Thousand Islands, I found very good *R. Canadensis* at Oswego on the Oswego River, and also at Rochester, and at McLean about fifteen miles northeast of Ithaca. Going through the Adirondacks I found it abundant at Fulton Chain, scattering at Saranac Lake and at Lake Placid, and quite abundant from North Elba till I began to descend into the Ausable valley in Keene.

There now seems to be no good reason to doubt that the specimen with oval-ovate leaflets which Linnæus certainly used in writing his description should be regarded as the type of the species and that we know the plant; while his specimen with cuneate leaflets was probably a sport or an intergrade, or possibly a form of limited range. Were

plants similar to this cuneate-leaved form abundant and widespread it would be more uncertain, but even in such a case the blunder of the ten leaflets ought to settle the question of which to regard as *R. Canadensis.*

There are other though probably local forms of unarmed, glabrous, high-bush blackberries. *Rubus Millspaughii* Britton is one, as I tried to show in the American Botanist, Nov., 1904, and *R. amabilis* Blanchard (Rhodora, **8**: 173) is another.

R. Canadensis is never absolutely unarmed like *R. triflorus* Richardson. Even in deep shade there are a few small prickles, and in open sun they are often quite noticeable. Neither is the species often perfectly glabrous in every part, as will be seen from the description following.

Rubus Canadensis L., Sp. Pl. 494 (1753). Plants large, erect, pyramidal in outline with stout furrowed stems. Glabrous or slightly pubescent, glandless. Unarmed or with few short prickles. Flowers large and showy on slender pedicels. Leaflets narrow. Fruit rather small, sour, in large, open racemes.

New canes. Stems rather strong, erect, seldom branched, recurved above, 4 to 6 ft. high, 5 to 8 ft. long, dark red, glabrous and glandless, well angled and furrowed. Prickles few, straight, small, nearly or quite wanting in shade, frequently quite noticeable in open sun, very variable; when present a true prickle, rather stout, set perpendicular to the stem and on its angles only. Leaves large, 5 to 8 in. long and wide, 5-foliate, thin, dark green and glabrous on the upper surface, bright green and glabrous or sometimes finely pubescent beneath. Leaflets narrow, long-stalked, taper-pointed, finely and doubly serrate-dentate, the middle one ovate, more than twice as long as wide, rounded at the base; the others oval and narrower in proportion, the side ones slightly rounded at the base and the basal ones cuneate. Petioles and petiolules rather stout, glabrous, nearly unarmed, the petiolule of the middle leaflet on large leaves 1½ inches long, the side ones one-half as long and the basal leaflet short-stalked.

Old canes. Erect as ever, normally pyramidal in outline, the second year's growth consisting of racemes on the upper part of the stem and long, leafy branches resembling new canes below, generally one from each old leaf axil but often two. Axis of long leaf-branches nearly straight, terete, glabrous, generally unarmed. Leaves 3-foliate or some of the outer 5-foliate, resembling those on new canes. Racemes 4 to 7 in. long; axis nearly straight, stout, glabrous or finely pubescent, unarmed; pedicels very slender, set at a great angle to the axis and subtended by small bracts; leaves two or three, of fair size, unifoliate or trifoliate, leaflets generally narrow; flowers 10–15, appearing about the middle of June, large and showy, 1¼ to 1½ in. broad, petals oblong,

two-thirds as wide as long; sepals reflexed. Fruit ripening after the middle of August, generally small, short, as wide as long, short-oblong, commonly rather sour.

Abundant as observed by the writer in the higher parts of Vermont and New Hampshire, and in the southeastern townships of the Province of Quebec, and at least occasional in other parts of Canada; occurring also in New York from Rochester to Lake Champlain.

This species is not entirely confined to the high sections, but is occasional near the Connecticut River especially in light shade. Here it is often slightly pubescent and is earlier than in its higher home, but the large flowers, dark green leaves, red, nearly unarmed stems, narrow leaflets and poor fruit are very noticeable. Pubescence on the under side of the leaves and on the inflorescence marks many plants where it is most at home. Some people call it the "sour blackberry" and where it is the only blackberry to be had, people seem to prefer to go without rather than gather it. Nowhere have I seen it thrive better than near the Town House in Stratton, Vt., and on the old turnpike road in the vicinity of the field now marked by a log-cabin where the famous Whig gathering on "Stratton Mountain" was held in 1840 with Daniel Webster as speaker.

The high blackberry situation in Southeastern Vermont is this: Near the Connecticut River the only high blackberry most people know is the long, aromatic *Rubus nigrobaccus* Bailey, an older name for which is *R. Alleghaniensis* Porter which must now be used. As you go west and get into more elevated sections this becomes scarce and another species *R. pergratus* Blanchard (Rhodora, **8**: 96) often called the "square blackberry" is sought by berry pickers who call *R. Alleghaniensis* the "long blackberry," "sow-teat" and "sheep-teat." As you get into still higher sections this becomes scarce and *R. Canadensis* which has grown more and more plenty as you advanced has the field to itself.

Westminster, Vermont.

THE GENUS PILINIA.

F. S. Collins.

Plate 77.

In a previous paper[1] the writer noted the occurrence of *Pilinia rimosa* Kütz. in Maine, and made some comparison of the species with the plant known as *Aeroblaste Reinschii* Wille. There is nothing to add in regard to the former species, but observations made on forms of *Aeroblaste* from various stations indicate that all can best be included under *Pilinia*, with somewhat changed definition, as follows:—

Basal layer of abundantly branched filaments, from which arise erect filaments, simple or branched, sometimes terminating in articulate hairs; chromatophore covering the cell wall; sporangia roundish, ovoid or clavate, terminal or lateral on erect filaments, or sessile on the basal layer, the contents forming numerous biciliate zoospores, which escape through an opening at the summit, development unknown.

With this extension the genus will include six American species, all marine, *P. rimosa* and *P. maritima* occurring also in Europe, the others known only in America; *P. maritima* connecting it with *Chaetophora* and originally placed in that genus by Kjellman; *P. Lunatiae* and *P. minor* at the other end coming close to *Gongrosira*. The following key may be found convenient in distinguishing the species.

Key to the American Species of Pilinia.

1. Filaments often ending in hairs.	*P. maritima.*
1. Hairs not present.	2.
2. Erect filaments short, densely packed.	3.
2. Erect filaments longer, yellowish.	4.
3. Dark green; filaments 8–12 μ diam.; on live shells.	*P. Lunatiae.*
3. Yellowish green; filaments only 2–5 μ diam.; on pebbles.	*P. minor.*
4. Forming a rather firm, spongy coating on woodwork.	*P. rimosa.*
4. Forming a thin, soft coating.	5.
5. On shells, pebbles, etc.; sporangia on erect filaments.	*P. Reinschii.*
5. On woodwork; sporangia on basal layer, rarely lateral on erect filaments.	*P. Morsei.*

[1] Collins, Notes on New England Algae, Rhodora, Vol. V, p. 207, 1903.

The genus *Acroblaste* was founded on material from Buzzards' Bay,[1] but no specific name was given; it was left in the unsatisfactory form *Acroblaste* spec., but with sufficient description and good figures. Wille[2] gave it the name *Acroblaste Reinschii*. There appears to have been no farther report of its occurrence in southern New England, but when a somewhat similar form was found at Revere Beach, Massachusetts, it was identified by the writer with Reinsch's plant, and was distributed under Wille's name as P.B.–A., No. 162. This plant, which was found only on the shells of *Lunatia heros* Adams, differed somewhat from Reinsch's description, but in the absence of any specimens, it was impossible to determine how much variation should be allowed for. Within the last two years the writer has found a plant at Mattapoisett, Wood's Hole and Eastham, all in southern Massachusetts, all agreeing with each other and with Reinsch's description and figures, without any tendency in the direction of the differences shown by the Revere Beach plant. The latter has, moreover, been collected at all seasons of the year, and in no instance did it come any nearer to the southern form. Under these circumstances it seems best to consider it distinct, and to characterize it as follows:—

P. Lunatiae n. sp. *Acroblaste Reinschii* Collins, List, RHODORA, Vol. II, p. 43, 1900, as to northern Massachusetts localities only; Collins, Holden & Setchell, P. B.–A., No. 162, 1896. Filamentis basalaribus mox in stratum subparenchymaticum concretis, cellulis forma ac magnitudine variantibus, rotundatis vel angularibus, ad 15 μ diam.; filamentis erectis 8–12 μ diam., superne incrassatis, plerumque 5–6-cellularibus, rarissime usque ad 10-cellularibus, dense stipatis, ramificatione densa; cellulis ejusdem filamenti variantibus quoad formam et magnitudinem; sporagio e cellula terminali formato, a cellulis ceteris parum diverso; colore viridi intenso.

Basal filaments soon becoming united into a subparenchymatous layer, cells of varying shape and size, roundish or angular, up to 15 μ diam.; erect filaments 8–12 μ diam., increasing in size upward, usually 5–6 cells in length, quite rarely up to 10 cells, densely branched and very compact, cells varying in size and shape in the same filament; terminal cell becoming the sporangium, differing but little from any other cell of the filament; color deep green. On live shells of *Lunatia heros* Adams, Revere Beach, Massachusetts.

[1] Reinsch, Bot. Zeit., Vol. XXXVII, p. 361, Pl. III. A, 1878.
[2] Engler & Prantl, Nat. Pflanzenfam., Algen, p. 97, 1890.

This plant is common on the Lunatia shells at Revere Beach, so much so that in spring and early summer it is the exception to find a live shell free from it, and at all times it is to be found plentifully. It appears to die with the host, for it has never been found on dead shells. Its distribution seems to be very limited, as there is no record of its occurrence except at this one station, though the *Lunatia* is found all along the coast, and the alga has been sought for carefully on the Maine coast and in southern New England. It always occurs on the spire of the shell, which in the genus is quite flat; here it forms a roundish patch, thickest at the centre, the tip of the spire, and has never been known to cover more than a quarter of the surface of the shell. The color is a deep rich green, an unusual color in this genus, where a yellowish color is general. The substance is dense, and it is only by crushing or dissection that the structure can be made out. The basal layer is largely continuous, the filaments showing distinctly only at the edges; the erect filaments are short, stout, and of cells usually quite irregular in shape; they increase in size upward, but rather irregularly, the terminal cell being the largest, with a broad rounded top, but not differing otherwise from any other cell of the filament; the spores escape through an opening in the summit, as in other species. The general appearance is rather that of *Gongrosira* than of *Pilinia*.

P. MINOR Hansgirg in Foslie, Contribution to Knowledge of the Marine Algae of Norway, Tromsö Museums Aarshefter, XIII, p. 146, Pl. II, figs. 17–22, 1890. Stratum thin-coriaceous or almost crustaceous, yellow green, more or less extended. Filaments generally short and little branched. Vegetative cells 3–5 μ wide, 1–2 times as long, end cells rounded; in each cell a parietal band-shaped chromatophore. Prof. N. Wille of Christiana has kindly determined the American plant as belonging to the species of Hansgirg, of whose original description the foregoing is a translation. Our plant, however, seems to be more fully developed, so that a more complete account is now possible. There is little distinction between horizontal and erect filaments; near the substratum there is a densely packed cellular mass, in which it is difficult or impossible to distinguish filamentous structure; above this short filaments are easily made out, but they are not uniformly vertical, and they are quite irregular in size and shape of the cells. The latter may be cylindrical, as little as 2 μ diam., but are usually larger and not much longer than broad, ovoid or even subspherical;

the cells in a filament increase in diameter from the base to the summit, and may reach 6 or 7 μ diam. When the terminal cell changes to a sporangium, the size is still greater; the normal form of a sporangium seems to be pyriform, and the size 20–24 × 10–12 μ, but various irregular forms are common. The distinction between basal and erect filaments is less than in *P. Lunatiae*, but the sporangia are more clearly differentiated. It was found on pebbles on the shore of the "Salt Pond," Eastham, Massachusetts, July, 1907. The pebbles were between high and low tide marks, and when the tide was out were wet with cold fresh water from a spring.

P. Reinschii (Wille) nov. comb. *Acroblaste* spec. Reinsch, Bot. Zeit., Vol. XXXVII, p. 361, Pl. III. A, 1878; *A. Reinschii* Wille in Engler & Prantl, Nat. Pflanzenfam., Algen, p. 97, 1890; Collins, List, RHODORA, Vol. II, p. 43, 1900, as to southern Massachusetts localities only; not Collins, Holden & Setchell, P. B.–A., No. 162, 1896. In this species the basal layer shows the filamentous character throughout, even when the filaments are laterally united; often they remain practically free. The erect filaments are 5–8 μ. diam., and may reach a length of 400 or 500 μ; they are regularly cylindrical except for a slight constriction at the nodes, or less commonly increase in size very slightly upwards; in either case the terminal sporangium is sharply differentiated from the other cells, ovoid or oblong, 16–18 μ diam. Sometimes the erect filaments are simple, and it is only in such cases that the upper cells are larger than the lower; the difference is slight, in any case. Ordinarily the filaments are more or less freely branched, and of the same size throughout. The sporangia are terminal on the main filament or on longer or shorter branches; in some cases a branch is developed from the cell below a sporangium, pushing the latter to one side, so that it appears to be a lateral growth. The spores escape through a terminal opening in the sporangium, almost as large as its diameter; after their escape the filament may resume its growth, coming up through the persistent empty sporangium. It is not uncommon to find several empty shells at different heights on a long filament. The color is a yellowish, somewhat olivaceous green; Reinsch notes its resemblance to small species of *Ectocarpus*. He found it growing on shells of a species of *Turritella*, which it covers with a dense coating; and also on pebbles, both between tides and in shallow water. The writer has found it on other shells, and also on the claws of the spider crab, *Libinia canali-*

culata Say. It is often mixed with *Microchaete grisea* Thuret, *Calothrix* species, and other small algae.

P. RIMOSA Kützing, Phyc. Gen., p. 273, 1843; Collins, RHODORA, Vol. V. p. 207, 1903; Collins, Holden & Setchell, P. B.–A., No. 971, 1902. There is nothing to add to what was given in the writer's note on the first occurrence in America; no other locality has been reported.

P. Morsei n. sp. Filamentis basilaribus irregulariter contortis, plus minusve concretis, cellulis rotundatis, 8–15 μ diam., saepe longitudinaliter divisis, membranam subparenchymaticam bi-polystromaticam formantibus; filamentis erectis ad 2 mm. altis, 7–11 μ diam.; cellulis 1–2 diam. longis, cylindricis vel leviter moniliformibus; sporangiis ovoideis vel pyriformibus, stratum basale insidentibus, sessilibus vel ad pedicellum paucicellulare.

Basal filaments irregularly contorted, more or less united; cells rounded, 8–15 μ diam., often divided longitudinally and forming a subparenchymatous membrane of two or more layers; erect filaments up to 2 mm. high, 7–11 μ diam., cells 1–2 diam. long, cylindrical or slightly moniform; sporangia ovoid or pyriform, on the basal layer, sessile or on a few-celled pedicel. On woodwork, Atlantic City, New Jersey, *Prof. S. R. Morse.*

In this species there seems to be a differentiation between the fertile and the assimilative growths from the basal layer; the former are short, in many cases nothing but the sporangium itself; the latter are longer than in any other species of the genus. After a sporangium is emptied another may be produced by the same filament, but while in *P. Reinschii* the sporangia are at considerable intervals on a long filament, in *P. Morsei* they are "nested," usually only a single cell being produced to support the new sporangium. The cells of the basal filaments divide longitudinally, by a plane approximately parallel to the substratum. The color is yellowish. The writer takes pleasure in giving to this species the name of Prof. Silas Rutilus Morse of the New Jersey State Museum, who first called his attention to it, and to whom we are indebted for much of our knowledge of the algae of the New Jersey coast.

P. MARITIMA (Kjellm.) Rosenvinge, Gronlands Havalger, p. 933, fig. 43, 1893; *Chaetophora maritima* Kjellman, Spetsbergens Alger p. 51, Pl. IV, figs. 15–16, 1877. Frond subspherical, 1–3 mm. diam., with basal layer not strongly developed; erect filaments 6–10 μ diam.,

cells about as long as broad, terminating in articulate hairs or ovoid-elliptic cells; sporangia terminal, clavate, 11–12 × 16–21 μ; color green. Greenland.

This species indicates the connection between *Pilinia* and *Chaetophora;* instead of an extended layer it forms roundish gelatinous thalli, forming, with *Calothrix* species, etc., a continuous stratum near high water mark. In 1884 the writer reported[1] its occurrence at Kennebunkport, Maine, but it has not since been seen, and subsequent examination of the material in question failed to show it, so that the report is now unconfirmed by any specimen. There is no reason, however, why it should not be found on the Maine coast, in company with other arctic forms.

Malden, Massachusetts.

Explanation of Plate 77.

Fig. 1. *Pilinia Lunatiae*, portion of basal layer.
Fig. 2. " " two erect filaments with branches.
Fig. 3. " " filament with emptied sporangium.
Fig. 4. *P. Morsei*, section of basal layer with cells longitudinally divided, and two erect filaments.
Fig. 5. *P. Morsei*, basal layer more developed, with long and short filaments and new and old sporangia.
Fig. 6. *P. Morsei*, successive sporangia on short filament.

Achillea tomentosa at Westford, Massachusetts.— Between 1884 and 1888 I found at Westford, a striking yellow-flowered species of yarrow, since identified as *Achillea tomentosa* L., a native of southern and central Europe. It was in a field with other plants, introduced through the generous use of wool waste as a fertilizer. Some of the *Achillea* was transplanted to a private garden, where it still persists after twenty years, though in the field where it originally grew it has disappeared. As now applied the wool waste is kept until it decomposes sufficiently to kill the weed seeds it so often contains — a procedure more favorable to good agriculture than productive of botanical rarities.— Emily F. Fletcher, Westford, Massachusetts.

[1] Bull. Torrey Bot. Club, Vol. XI, p. 130.

REPORTS ON THE FLORA OF THE BOSTON DISTRICT.—III.

In preparing this list of the *Liliaceae* it has seemed best to the Committee to omit several introduced species that are mentioned in some of our local floras. In most cases this is because no records of existing specimens have been received, while the few definite records that do exist, indicate that such plants are merely persistent and not spreading.

The plants introduced around Concord by the late Minot Pratt have thus been purposely omitted. In fact, only one herbarium specimen of the *Liliaceae* has been reported, and that plant, *Trillium grandiflorum* Salisb., is gradually losing ground. Persons interested are referred to the lists published by the late Alfred W. Hosmer, in Rhodora i, September, 1899. These records of nine years ago, without recent reports, do not seem to the Committee sufficient to entitle any of these species to a place here.

LILIACEAE.

VERATRUM.

V. viride Ait. Wet woods and meadows; very abundant north and west of Boston, but not reported south of the Blue Hills.

UVULARIA.

U. perfoliata L. Leaf-mould soil in open deciduous woods; occasional.

OAKESIA.

O. sessilifolia (L.) Watson. Moist open woods, common.

ALLIUM.

A. tricoccum Ait. Rich woods; Andover, locally abundant; Framingham, rare; Waltham, very abundant in one station.

A. canadense L. Moist open woods and meadows, frequent; not reported south of Needham.

A. VINEALE L. Waste and cultivated ground, a rare weed; Cambridge (Botanic Garden), Milton, Woburn.

A. SCHOENOPRASUM L. Sparingly introduced in Essex county; Georgetown (*Mrs. C. N. S. Horner*).

HEMEROCALLIS.

H. FULVA L. Persistent and spreading around old dwellings; common, but seldom collected.

LILIUM.

L. philadelphicum L. Open woods and fields in rather dry soil; common throughout.

L. canadense L. Meadows, frequent.

L. TIGRINUM Ker. Persistent and spreading about house-sites; occasional.

ERYTHRONIUM.

E. americanum Ker. Moist deciduous woods; common in Essex county, occasional elsewhere.

SCILLA.

S. SIBIRICA Andr. Ballast near Parker St., Cambridge (*M. L. Fernald*, May 16, 1901); damp meadow, station spreading, Concord (*E. F. Williams*).

ORNITHOGALUM.

O. UMBELLATUM L. Moist fields, a frequent escape from gardens.

MUSCARI.

M. BOTRYOIDES (L.) Mill. Essex Co. (*Wm. Oakes*, 1817); in oak woods, Putnamville, Danvers, covering a patch three or four yards square (*J. Robinson*, May 22, 1879); North Andover (*H. C. Sargent & C. H. Morss*, May 1, 1885).

ASPARAGUS.

A. OFFICINALIS L. Fields and roadsides, common.

CLINTONIA.

C. borealis (Ait.) Raf. Rich woods, locally abundant.

SMILACINA.

S. racemosa (L.) Desf. Deciduous woods, very common.
S. stellata (L.) Desf. Sandy soil and wet meadows, occasional.
S. trifolia (L.) Desf. Cold bogs and cedar swamps, rare.

STREPTOPUS.

S. roseus, Michx. Rich woods, Newburyport (*Edward Moulton*, May 20, 1887); Rockport (*Mrs. Ann Babson*, 1866); also near Hospital Point, Beverly (*J. H. Sears*).

MAIANTHEMUM.

M. canadense Desf. Woods, common throughout.

POLYGONATUM.

P. GIGANTEUM Dietr. Escaped, Cambridge (*J. M. Hunnewell*, 1898); roadside, introduced in tall grass, and apparently well established, Woburn (*A. S. Pease & A. H. Moore*).
P. biflorum (Walt.) Ell. Moist deciduous woods, common.

CONVALLARIA.

C. MAJALIS L. Well established in Franklin (*E. F. Williams*) and Watertown (*M. L. Fernald*); also in Danvers and Salem (*J. Robinson*), Wakefield (*F. S. Collins*), Woburn (*A. H. Moore*).

MEDEOLA.

M. virginiana L. Rich deciduous woods, common.

TRILLIUM.

T. erectum L. Rich woods, occasional in Essex county; Milton, "doubtless introduced" (*C. H. Morss*).

T. cernuum L. Damp woods, common throughout.

T. undulatum Willd. (*T. erythrocarpum* Michx.) Rich woods, rare.

ALETRIS.

A. farinosa L. Sandy roadside, common, Bridgewater (*J. A. Cushman*); formerly in Needham, but exterminated in 1885 (*T. O. Fuller*).

SMILAX.

S. herbacea L. Moist fields and open woods; fairly common, but not reported south of the Blue Hills.

S. rotundifolia L. Woods, very common; more luxuriant in moist situations.

S. glauca Walt. Dry thickets and railroad embankments; Dedham, Hanson, Milton, Roxbury, Weston, Westwood.

C. H. Knowlton
J. A. Cushman
Walter Deane
A. K. Harrison
} *Committee on Local Flora.*

NOTE ON WEIGELA ROSEA.

Mary F. Peirce.

There is a small gland at the base of the blossom of *Weigela rosea*. I knew this forty years ago; but had entirely forgotten it, until, in looking over some old letters a short time ago, I discovered one from a pupil of mine, the niece of Dr. Asa Gray. This reads as follows.—

"I showed Uncle Gray the little gland in *Weigela rosea*. He had

not noticed it before and can not account for it. He can not tell why there is but one, or in fact why it should be there at all. I presume that he will look it up and thanks to you, it will appear in the next Botany.

Yours ever,

Alice A. Gray.

Botanic Garden,
June 28th 1867."

On making inquiry at the Botanic Garden, Cambridge, a few days ago, I could not find that Dr. Gray had made any record of the study of the point called to his attention. The *Weigela* is a foreign shrub and therefore has not been included in the Flora of this country.

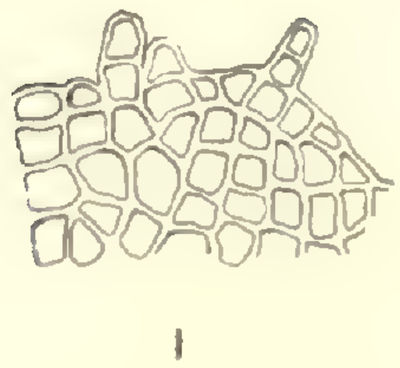
The gland is small, oblong, and green in a fresh blossom. It lies within and at the base of the monopetalous corolla. It is close to the base of the style, but forms no part of it. It seems to secrete a honey-like substance. The style is very lightly attached to the ovary (which lies below the calyx) and is easily separated from it in the attempt to open the blossom. This makes it easy to mistake the gland for the ovary.

Has this been noticed in any magazine or paper, or has any one attempted to explain its use? After forty-one years of waiting, I should be glad to learn something more about it.

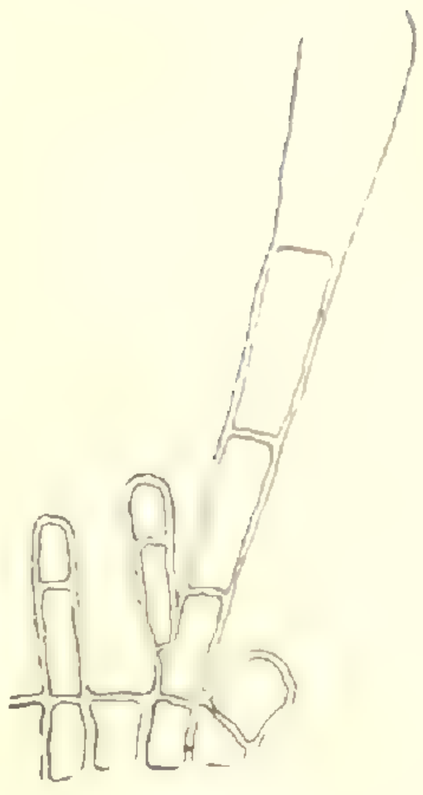
Weston, Massachusetts.

[In a search, necessarily hurried, we find the following references to the structure in question: 1) Eichler, Blüthendiagramme, i. 267, where it is mentioned as an anteriorly placed glandular outgrowth of the disk, its position being shown in figure 142 E on page 265. 2) Knuth, Handbook of Flower Pollination (J. R. Ainsworth's translation), ii. 525, where under *Weigela* it is stated that the nectar is "secreted by a green swelling between the base of the style and the corolla." The structure has been examined in fresh material and we are inclined to agree with the authors cited, in believing it to be an elevated outgrowth of the disk, modified to secrete nectar and attract insects, which effect cross-pollination.— Ed.]

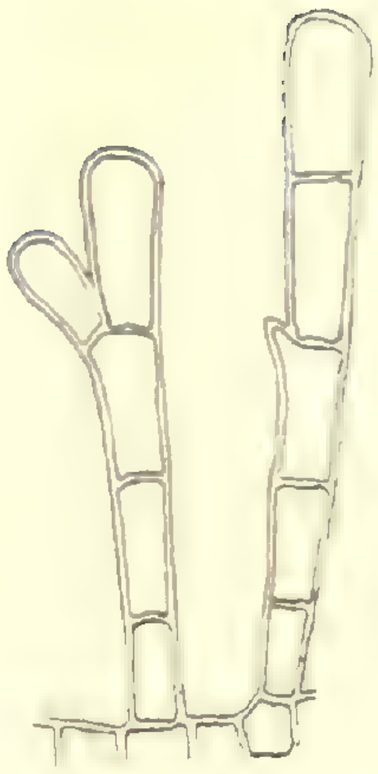
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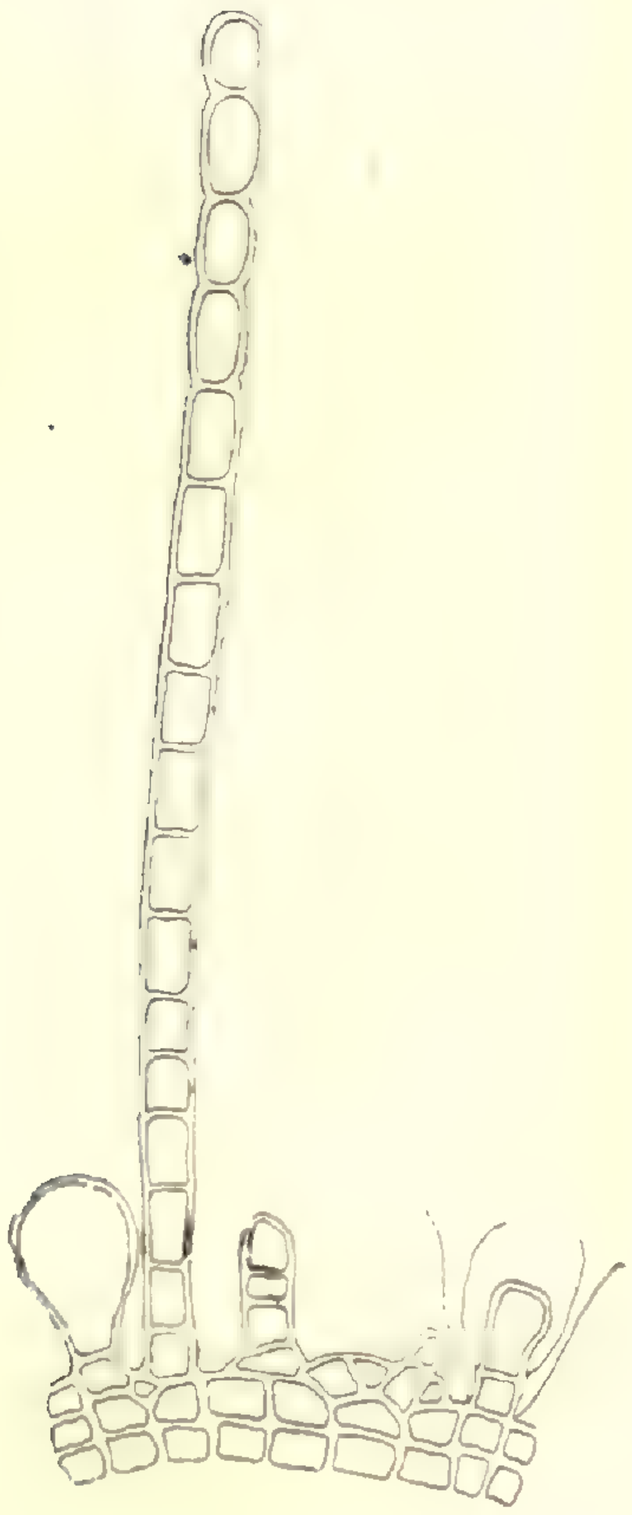
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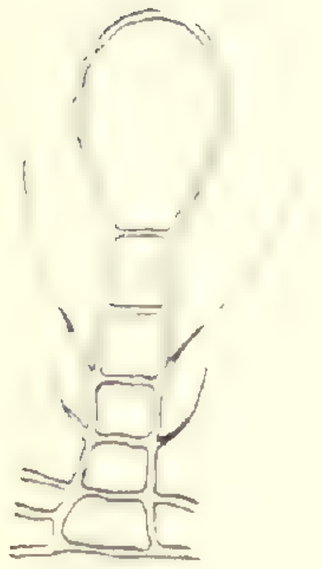
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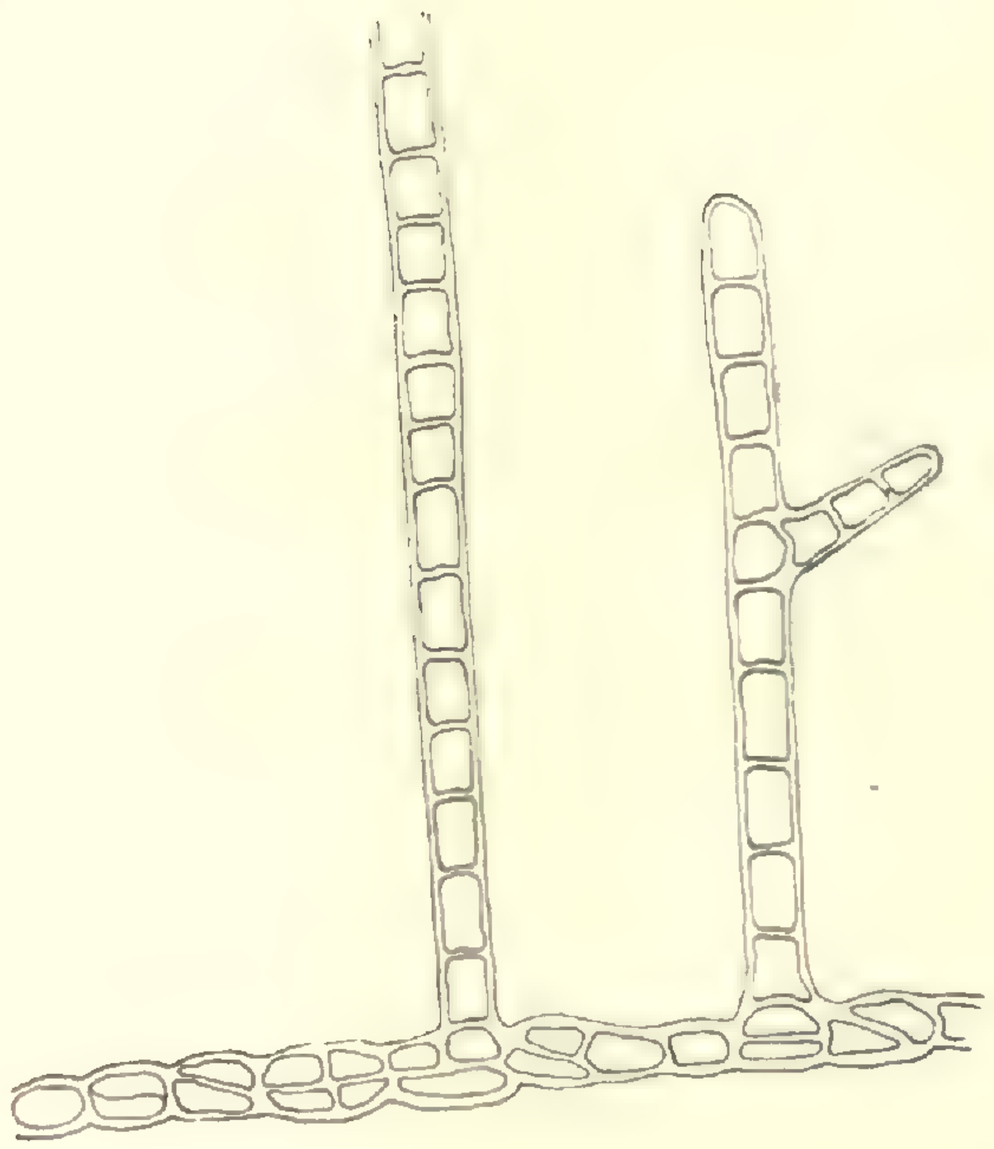
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F. S. Collins ad nat. del.

Figs. 1–3, Pilinia Lunatiae. Figs. 4–6, P. Morsei.

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JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
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Vol. 10. August, 1908. No. 116.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

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TWO NEW SPECIES OF ACROCHÆTIUM.

F. S. Collins.

Acrochætium minimum n. sp. Strato basali e filamentis epi-vel endophyticis constituto, ad superficiem vel inter cellulas superficiales plantæ hospitis repentibus, initio liberis, mox plus minus concretis, non autem membranam veram formantibus; cellulis 2–4 μ diam., 1–4 diam. longis, forma valde irregularibus; filamentis basalibus ramos plures breves emittentibus, ultra superficiem plantæ hospitis emergentes, 1–4 cellulares, cellulis 2–3 μ diam., 1½–3 diam. longis, sæpe in sporam pyriformem, indivisam, 5 × 7 μ, desinentes; minus frequenter filamenta longiora, usque ad 25 cellulas, cellulis ad 8 diam. longis, 2–3 μ diam., simplicia, interdum sporam lateralem, sessilem vel ad pedicellum unicellulare affixam, sporæ terminali similem, gerentia.

Basal layer composed of epi- or endophytic filaments, creeping on the surface or among the superficial cells of the host plant, at first free, later more or less united, but not forming a genuine membrane; cells 2–4 μ diam., 1–4 diam. long, of quite irregular form; basal filaments emitting many short branches, extending beyond the surface of the host, 1–4-celled, cells 2–3 μ diam., 1½–3 diam. long, often terminating in an undivided pyriform spore, 5 × 7 μ; less frequently emitting longer filaments, up to 25 cells, cells up to 8 diam. long, 2–3 μ diam., occasionally bearing a lateral spore, sessile or on a unicellular pedicel, similar to the terminal spore. On *Desmarestia viridis* (Fl. Dan.) Lamour., Robinson's Hole, Massachusetts, Aug., 1907. I. F. Lewis.

The dimensions here given are less than those of any hitherto described species of the genus, and the erect part is smaller in proportion to the horizontal, but it seems to be an *Acrochætium*. The filaments of the basal layer wind about the round cortical cells of the *Desmarestia*, but do not seem to penetrate below the outer layer; the cells assume all possible forms, according to the space available for

them. The host was more or less infested, almost to the extreme ends of the young branchlets. The germinating spore appears generally to send out the horizontal filaments at once, but no erect filaments; these arise later from the horizontal layer. When the end of one horizontal filament encounters another filament, it may either attach itself and cease growing, or bend until it is parallel to the other filament, adhering to it laterally. Short erect filaments are abundant, seldom over 25 μ long, normally ending in a pyriform spore; much less common are the long filaments, straight, long-jointed, usually simple and sterile, occasionally with one or two lateral spores, usually sessile, rarely borne on a short cell.

Several other epiphytes were growing on the *Desmarestia*; *Streblonema oligosporum* Stromf., *Acrochætium Daviesii* (Dillw.) Näg., *Erythrotrichia ceramicola* (Lyng.) Aresch., a young *Polysiphonia* and some small, sterile, Peysonnellia-like disks. *Desmarestia viridis* is an abundant plant all along the New England coast, and hardly any abundant species is so generally free from epiphytes; it would be interesting to know what combination of circumstances at this place made it an attractive residence for all these species.

A. Hoytii n. sp. Cellula basali (spora originali) rotundata, 12–25 μ diam., vel verticaliter elongata, tunc ad 30 μ longa, filamenta 1–3 erecta, 6–7 μ diam., emittente, cellulis 2–4 diam. longis; ramificatione subfrequente inferne, superne minus frequente, ramis ultimis præ-longis, simplicibus vel subsimplicibus, in setam tenuissimam attenuatis. Sporis lateralibus, oblongis, 6–15 μ, ad pedicellum unicellulare, parte superiore filamenti affixis.

Basal cell (original spore) 12–25 μ diam., spherical or somewhat elongate vertically, then up to 30 μ long; 1–3 filaments arising from each basal cell; main filament about 6 μ diam., cells 2–4 diam. long; branching rather frequent below, rarer above; ultimate branches very long, simple or nearly so, gradually tapering into a hair. Spores lateral on the upper part of the filament and branches, on one-celled pedicels, oblong, 6 $\times$ 15 μ. On *Dictyota dichotoma* (Huds.) Lamour., Beaufort, North Carolina. W. D. Hoyt.

In this species the germinating spore not merely remains distinct through the life of the plant, but increases to several times its original size, and may send up more than one vertical filament. At least this seems to be the only explanation of the appearance presented. The large cell is more or less imbedded in the cortex of the host, but has neither descending nor lateral growth. Among American species it seems nearest related to *A. Dasyæ* Collins, but in the latter the per-

sistent spore increases little if any in size, and has not been observed to produce more than one erect filament. The spores in *A. Dasyæ* are larger and sessile. This plant was received from Mr. Hoyt, who has been making some interesting studies in *Dictyota* at the Beaufort station of the U. S. Bureau of Fisheries, of which some of the results have been published.[1] The type is in the herbarium of the National Museum. For a liberal supply of identical material, to be distributed in the Phycotheca Boreali Americana, the writer is indebted to the authorities of the Bureau of Fisheries.

Malden, Massachusetts.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS,— XXI.[2] CYPERACEAE.[3]

M. L. Fernald.

[The sign + indicates that an herbarium specimen has been seen; the sign − that a reliable printed record has been found.]

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Cladium mariscoides (Muhl.) Torr.	+	+	+	+	−	+
Cyperus aristatus Rottb.	+	+	+	+	−	+
" dentatus Torr.	+	+	+	+	+	+
" " var. ctenostachys Fernald				+		
" diandrus Torr.	+	+	+	+	+	+
" Engelmanni Steud.				+		
" erythrorhizos Muhl.				+		+
" esculentus L.	+	+	+	+	+	+
" " var. leptostachys Boeckl.					+	+
" ferax Rich.				+	−	+
" filiculmis Vahl.				+	+	+
" " var. macilentus Fernald	+	+	+	+	+	+
" fuscus L.				+		−
" Grayi Torr.				+	−	+

[1] Bot. Gazette, Vol. XLIII, p. 383, 1907.
[2] Printed in Rhodora as supplementary matter.
[3] For the list of *Carices* see Rhodora, iv. 218 (1902).

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Cyperus Houghtonii Torr.			+	+		
" Nuttallii Eddy	+			+	+	+
" ovularis (Michx.) Torr.				+		
" rivularis Kunth	+	+	+	+	+	+
" strigosus L.	+	+	+	+	+	+
" " var. capitatus Boeckl.	+	+	+	+		+
" " var. compositus Britton				+		
" " var. robustior Kunth				+		+
Dulichium arundinaceum (L.) Britton	+	+	+	+	+	+
Eleocharis acicularis (L.) R. & S.	+	+	+	+	+	+
" diandra C. Wright	+	+	+	+		+
" Engelmanni Steud.				+		+
" " var. detonsa Gray				+		
" intermedia (Muhl.) Schultes	+		+	+		+
" interstincta (Vahl) R. & S.				+	+	
" melanocarpa Torr.				+	+	
" obtusa (Willd.) Schultes	+	+	+	+	+	+
" olivacea Torr.	+	−	+	+	+	+
" ovata (Roth) R. & S.	+		+	+		+
" palustris (L.) R. & S.	+	+	+	+	+	+
" " var. calva (Torr.) Gray			+			
" " var. glaucescens (Willd.) Gray	+		+	+		+
" " var. vigens Bailey	+	+	+			+
" quadrangulata (Michx.) R. & S.						+
" Robbinsii Oakes	+	−		+	+	+
" rostellata Torr.		+		+	+	+
" tenuis (Willd.) Schultes	+	+	+	+	+	+
" Torreyana Boeckl.						+
" tuberculosa (Michx.) R. & S.				+	+	+
Eriophorum angustifolium Roth.	+					
" " var. majus Schultz	+					
" callitrix Cham.	+	+	+	+	+	+
" gracile Roth.	+	+	+	+	+	+
" opacum (Björnstr.) Fernald	+			+		
" tenellum Nutt.	+	+	+	+	+	+
" virginicum L.	+	+	+	+	+	+
" " var. album Gray						+
" viridi-carinatum (Engelm.) Fernald	+	+	+	+	+	+
" " var. Fellowsii Fernald	+			+		
Fimbristylis Frankii Steud.	+	+	+	+	+	+
Fuirena squarrosa Michx.				+	−	
Hemicarpha micrantha (Vahl) Britton		+		+	+	+
Kobresia elachycarpa Fernald	+					

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Psilocarya scirpoides Torr.				+	+	
Rynchospora alba (L.) Vahl	+	+	+	+	+	+
" " var. macra Clarke				+		
" capillacea Torr.	+		+			
" " var. leviseta E. J. Hill	+					
" fusca (L.) Ait. f.	+	+	+	+	+	+
" glomerata (L.) Vahl	+	+	+	+	+	+
" macrostachya Torr				+	+	+
" " var. inundata (Oakes) Fernald				+		
" Torreyana Gray		+				
Scirpus americanus Pers	+	−	−	+	+	+
" atrocinctus Fernald	+	+	+	+	+	+
" " var. brachypodus Fernald	+	+	+	+		+
" atrovirens Muhl.	+	+	+	+	−	+
" var. pycnocephalus Fernald	+					
" caespitosus L.	+	+	+			
" campestris Britton, var. Fernaldii (Bicknell) Bartlett.	+			+		
" " var. novae-angliae (Britton) Fernald	+	+		+	−	+
" " var. paludosus (A. Nelson) Fernald	+	+		+	+	+
" Clintonii Gray	+					
" cyperinus (L.) Kunth	+	+	+	+	+	+
" " var. Andrewsii Fernald			+	+		+
" " var. condensatus Fernald	+	+	+	+	+	+
" " var. pelius Fernald	+	+	+	+	+	+
" debilis Pursh	+		+	+	+	+
" " var. Williamsii Fernald				+		
" Eriophorum Michx.						+
" fluviatilis (Torr.) Gray			+	+	−	+
" georgianus Harper	+	+	+	+	+	+
" Hallii Gray				+		
" heterochaetus Chase			+	+		
" hudsonianus (Michx.) Fernald	+	+	+	+	+	+
" lineatus Michx.			+	+		+
" nanus Spreng.	+		−	+	+	−
" occidentalis (Watson) Chase	+		+	+		
" Olneyi Gray		+		+	+	+
" " var. contortus Eames						+
" pauciflorus Lightf.	+		+			
" Peckii Britton		+	+	+		

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Scirpus pedicellatus Fernald	+	+	+	+		+
" " var. pullus Fernald	+	+	+			
" planifolius Muhl.			+	+	+	+
" polyphyllus Vahl				+	−	+
" " var. macrostachys Boeckl.						+
" robustus Pursh				+		
" rubrotinctus Fernald	+	+	+	+		+
" " var. confertus Fernald	+					
" Smithi Gray	+		+		+	+
" " var. setosus Fernald	+			+		
" subterminalis Torr.	+	+	+	+	+	+
" sylvaticus L.	+	+		+	+	+
" " var. Bissellii Fernald						+
" Torreyi Olney	+	+	+	+	+	−
" validus Vahl	+	+	+	+	+	+
Scleria pauciflora Muhl., var. caroliniana (Willd.) Wood				+		+
" reticularis Michx.				+	+	
" " var. pubescens Britton					−	−
" triglomerata Michx.			−	+	−	+
" verticillata Muhl.				−		+
Stenophyllus capillaris (L.) Britton	+	+	+	+	+	+

Notes upon the above List.

Cyperus ferax Rich. As understood by the writer this includes *C. speciosus* Vahl.

C. filiculmis Vahl. All the material examined from northern New England is var. *macilentus* Fernald.

C. ovularis (Michx.) Torr. has been collected on made land about Boston, but is perhaps not persistent.

C. erythrorhizos Muhl., var. *pumilus* Engelm., *Eleocharis diandra* C. Wright, var. *depressa* Fernald, and several other minor variations are purposely omitted from this list as they seem to be only states due to temporary conditions of environment.

Eriophorum angustifolium Roth. This is the plant which was taken by the writer in his former discussion of the genus (Rhodora vii. 88) to be *E. polystachion* L. Messrs. Rendle and Britten have recently shown,[1] however, that the name *E. polystachion* must be

[1] Rendle & Britten, Journ. Bot. XLV, 443 (1907).

restricted to the endemic Eurasian plant which has generally passed as *E. latifolium* Hoppe, and that the more widely distributed boreal species which has been called *E. polystachyon* must be known as *E. angustifolium* Roth.

Fimbristylis Frankii Steud. This is the northern plant which has been passing very generally as *F. autumnalis*. True *F. autumnalis* (L.) R. &. S. is a southern species with more slender spikelets in mostly decompound umbels.

Stenophyllus capillaris (L.) Britton is our representative of a characteristic genus of warm regions. Our plant has recently been known as *Fimbristylis capillaris* (L.) Gray.

Suggestions for Special Observation.

Cyperus cylindricus (Ell.) Britton extends along the coast from Texas to Long Island and may be expected to reach Cape Cod and the adjacent sandy regions.

C. dentatus Torr., var. *ctenostachys* Fernald is a characteristic plant of the pine-barren regions of Cape Cod and New Jersey, and should be sought in Rhode Island and southeastern Connecticut.

C. Engelmanni Steud. and *C. erythrorhizos* Muhl. are both rather abundant in low grounds of the Boston basin. They occur beyond our limits along the coastal plain and in the Mississippi basin, and should be watched for in southern New England.

C. flavescens L. extends along the coast northward to Long Island and should be sought in southern New England. It has been reported in many lists, but all the New England specimens so named which the writer has seen have been either *C. diandrus* Torr., *C. rivularis* Kunth, or *C. Nuttallii* Eddy.

C. Nuttallii Eddy is undoubtedly in brackish marshes on the New Hampshire coast, as it is abundant in southern Maine and in eastern Massachusetts.

C. ovularis (Michx.) Torr. follows the coastal plain northward to southern New York and, as already noted, has been found as an adventive plant in Boston. It should be sought in the sandy regions of southern New England.

C. rotundus L., the Nut Grass of the Southern States, is adventive about New York City and should be watched for near our ports.

C. strigosus L., var. *compositus* Britton occurs on Cape Cod and should be sought in Rhode Island and southeastern Connecticut.

Eleocharis acuminata (Muhl.) Nees, a characteristic species in calcareous regions of northern New York, should be sought in western New England, especially in northern Vermont.

E. Engelmanni Steud. and its var. *detonsa* Gray, although very local in our region, are to be expected throughout southern New England.

E. intermedia (Muhl.) Schultes is common in wet calcareous soils in the northern half of Maine and frequent in northern Vermont. It should be sought in such places, especially marly bogs, in northern New Hampshire.

E. intermedia (Muhl.) Schultes, var. *Habereri* Fernald, now known only from the shores of Oneida Lake, New York, should be sought throughout the range of the species. It is distinguished by its lack of perianth-bristles.

E. interstincta (Vahl) R. & S., extending from Tropical America along the coastal plain to ponds of Rhode Island and eastern Massachusetts is likely to be found in southeastern Connecticut.

E. melanocarpa Torr., likewise, is a coastal species, found in southeastern Massachusetts, in Rhode Island and on the eastern end of Long Island. It is, therefore, probable that it reaches southeastern Connecticut.

E. ovata (Roth) R. & S. is found in wet places in northern Maine and northern Vermont. In Maine it apparently prefers calcareous soils and it should be looked for in such soils in northern New Hampshire. It is readily distinguished from *E. obtusa* (Willd.) Schultes (*E. ovata* of many American authors, not R. & S.) by its very purple-brown scales and by the very narrow tubercle.

E. palustris (L.) R. & S., var. *calva* (Torr.) Gray is apparently a very local plant and any information as to its occurrence is desirable.

E. palustris (L.) R. & S., vars. *glaucescens* (Willd.) Gray and *vigens* Bailey are probably of general distribution in New England.

E. Robbinsii Oakes is abundant in ponds of the coastal region of New England, and it extends inland in the Connecticut valley at least to west-central Massachusetts. It should be confidently watched for in ponds of southeastern Vermont, especially at low altitudes, where occur many other common coastal species, such as *Aspidium simulatum, Selaginella apus, Potamogeton pulcher, Cyperus diandrus, Fimbristylis Frankii, Scirpus Torreyi, Xyris caroliniana, Rhexia virginica,* &c.

E. rostellata Torr. is apparently frequent in salt marshes of eastern Massachusetts and New Hampshire. It is to be expected in the extensive marshes of southern Maine.

E. Torreyana Boeckl. occurs in wet pine-barrens from Florida north to New Jersey and it has recently been found by Messrs. C. B. Graves and R. W. Woodward on the shores of Beach Pond in Voluntown, Connecticut. The head of Beach Pond lies within the state of Rhode Island and the botanists of that state should easily extend the range of *E. Torreyana* into their territory.

E. tricostata Torr. follows the coastal plain from Florida to eastern Long Island. It possibly reaches the pine-barren region of southern New England, and should be watched for on wet sandy shores of ponds.

Eriophorum angustifolium Roth and its var. *majus* Schultz are abundant on the colder bogs of northern and central Maine and probably are of wide distribution in northern New England.

E. Chamissonis C. A. Meyer and its var. *albidum* (F. Nylander) Fernald occur locally in bogs of eastern Quebec and New Brunswick. They delight in the muck of the wettest quagmires and are possibly to be found in such situations in northern and eastern Maine.

E. opacum (Björnstr.) Fernald is as yet but little known in New England. Its recent discovery in eastern Maine and in northeastern Massachusetts suggests that it may be widely distributed in our cold bogs. It is less caespitose than *E. callitrix* (*E. vaginatum* of Am. auth., not L.), forming small loose tufts; its leaves are glabrous instead of scabrous; the upper sheaths are close, instead of conspicuously inflated; its heads are much smaller; and its bristles sordid instead of bright white.

E. tenellum Nutt., var. *monticola* Fernald is a characteristic dwarf plant (1–2 dm. high), with solitary spikelets, in a quagmire by an alpine pond on Table-top Mountain, Gaspé Co., Quebec. It is there associated with *Scheuchzeria palustris*, *Carex rariflora*, *C. limosa*, *C. pauciflora*, *Rubus Chamaemorus*, *Potentilla palustris*, and so many other New England plants, as to indicate the possibility that it occurs upon our highest mountains and colder bogs.

E. viridi-carinatum (Engelm.) Fernald, var. *Fellowsii* Fernald has the spikelets all sessile or subsessile, thus suggesting *E. virginicum*. It largely supplants the typical form of the species in the few stations known and may well be sought throughout New England.

Fimbristylis castanea (Michx.) Vahl occurs in marshes and sands along the coast from Florida to eastern Long Island. It should be watched for in southern New England.

Fuirena squarrosa Michx. occurs on sandy margins of ponds in eastern Massachusetts, Rhode Island and on Long Island. It is possibly in similar situations in southeastern Connecticut.

Psilocarya scirpoides Torr. is one of our most local plants, known from a very few wet sandy shores and swamps in Massachusetts and Rhode Island. Its occurrence about a pond at Springfield, Massachusetts, suggests that it may be watched for in Connecticut.

P. nitens (Vahl) Wood grows in mucky or wet sandy shores from Florida to northeastern Long Island. It is to be sought in southern New England.

Rynchospora axillaris (Lam.) Britton occurs in sandy swamps near the coast from Louisiana and Florida northward, and approaches our region in northern Long Island. It should be looked for in the pine-barren area of New England.

R. capillacea Torr. or its var. *leviseta* E. J. Hill occur very locally on wet limestone or in marly bogs in northern and central Maine and northern Vermont and in eastern Quebec. They are probably of wider distribution in northern New England than at present known.

R. macrostachya Torr. has recently been reported with some positiveness from Hartland, Vermont, by Mr. B. P. Ruggles who says, "Some members of the [Vermont] Botanical Club did not agree that [my *R.*] *macrostachyon* is a true *Rhynchospora*, but held that it was a depauperate or abnormal form of some Juncus. However I think it agrees with the description and plate in the Manual and is a true species. I have received the same from Massachusetts with that name and am not willing to give it up."[1] The specimen from Hartland which was referred to the writer was certainly a *Juncus* of the group with nodulose leaves. It is, however, possible that *R. macrostachya* may reach southern Vermont since it is known to extend inland at least to Franklin Co., Massachusetts.

R. macrostachya Torr., var. *inundata* (Oakes) Fernald may be expected throughout the range of the species.

R. Torreyana Gray. This well marked species, which is characteristic of the pine-barrens from New Jersey to Florida, was collected

[1] B. P. Ruggles, Vt. Bot. Cl., Bull. iii, 45 (1908).

by C. F. Parker in 1868 in bogs at East Washington, New Hampshire. Several other coastal plain and pine-barren species,— *Aletris farinosa, Ranunculus laxicaulis, Sclerolepis uniflora,* etc.— reach extreme northern and inland stations in swamps or on sandy shores of Cheshire and adjacent counties in New Hampshire and most of them occur in the coastal region of southern New England. *Rynchospora Torreyana,* therefore, should be watched for in southeastern Massachusetts, Rhode Island, and eastern Connecticut.

Scirpus Clintonii Gray is abundant on alluvial terraces and even on rocky banks throughout the calcareous-slate region of northern and central Maine; and it is also in northern and western New York. The plant, which is somewhat intermediate in appearance between *S. planifolius* and *S. caespitosus,* should be sought in northern New Hampshire and Vermont.

S. Hallii Gray is one of the most local members of the genus. It has long been known from the shores of Winter Pond, Winchester, Massachusetts, but from no other station northeast of Georgia. Its association at Winter Pond with such plants of southern New England as *Scleria reticularis, Eleocharis Engelmanni,* var. *detonsa, Crotalaria sagittalis, Cassia nictitans, Rotala ramosior, Coreopsis rosea,* etc. indicates the probability that it will be found about sandy-bottomed ponds in other portions of southern New England.

S. heterochaetus Chase, known from Lake Champlain, Vermont, and from the Charles River in eastern Massachusetts, is to be sought throughout western and southern New England, particularly at sheltered margins of lakes and quiet pools.

S. nanus Spreng. is undoubtedly to be found on the salt marshes of New Hampshire. It is abundant in southern Maine and in eastern Massachusetts.

S. occidentalis (Watson) Chase is frequent in Maine and Vermont especially near the margins of the larger lakes, and it is found locally in eastern Massachusetts. Further observations will probably show it to be widely distributed in New England.

S. pauciflorus Lightf. is found on wet limy rocks or marly shores at several stations in northern and north-central Maine and in northern Vermont. It should be watched for in such situations in northern New Hampshire.

S. rufus (Hudson) Schrad. is one of the characteristic turf-forming plants of salt marshes about the Gulf of St. Lawrence where it is

associated with many of our best known species: *Triglochin maritima*, *Elymus arenarius* L., *Carex norvegica* Willd., *Polygonum Fowleri* Robinson, *Spergularia canadensis* (Pers.) Don, *Glaux maritima* L., var. *obtusifolia* Fernald, etc. Since all these and many other species with which it grows are abundant on the eastern coast of Maine, it is hoped that *Scirpus rufus* may soon be found in that region.

S. Smithii Gray and its var. *setosus* Fernald are often confused in herbaria with *S. debilis* and are probably more widely distributed than at present known. *S. debilis* has the achene biconvex, *S. Smithii* plano-convex, one of the faces being distinctly flattened.

S. sylvaticus L. grows at Hanover, New Hampshire and will probably be found on the Vermont side of the Connecticut.

Scleria. The species of *Scleria* are all very local and little known in New England. Any new stations for them are of unusual interest. They occur chiefly in damp pine-barrens.

Gray Herbarium.

Filipendula rubra in Maine.— Five years ago in June, I observed near a road which runs through a meadow near my camp a plant with which I was not familiar. In July when it blossomed I determined it to be *Filipendula rubra* (Hill) Robinson and sent a specimen to the Gray Herbarium for verification. Mr. Bartlett wrote me that the plant was what I thought. He says it is native only in the central and southern states though it is commonly cultivated in the East and sometimes escapes. There is however none under cultivation in this town and the plant must have been introduced by grass seed. Mr. Bartlett says it is reported as well established in Vermont and Connecticut but has never been recorded from Maine.

The plant has increased until there is a large clump of it and it presents a striking appearance with its stalks of pink blossoms.—

Elizabeth Meads Moody, South Limington, Me.

ADDITIONS TO THE PLANTS OF MOUNT DESERT ISLAND.— Among the many additions to the flora of Mount Desert Island, Maine, made since the publication of the list of 1894, specimens of the following plants have recently come to the Herbarium.

Mention of them may prove of interest at this time.

Lycopodium clavatum L.	
var. monostachyon Grev. & Hook.	F. G. Floyd, E. L. Shaw, S. A. Lurvey.
Carex intumescens Rudge	
var. Fernaldii Bailey	M. L. Fernald
Veratrum viride Ait.	E. L. R.
Cypripedium pubescens Willd.	E. L. R.; E. L. Shaw.
Goodyera tessellata Lodd.	E. L. R.; E. L. Shaw, et al.
Chelidonium majus L.	E. L. R.
Hesperis matronalis L.	S. A. Lurvey.
Apios tuberosa Moench.	E. L. R.
Pyrola secunda L.	
var. obtusata Turcz.	E. L. Shaw.
Viola incognita Brainerd	E. L. Shaw.
Vaccinium Pennsylvanicum Lam.	
var. angustifolium (Ait.) A. Gray	E. L. R.
var. nigrum Wood	E. L. R. et al.
Anagallis arvensis L.	——
Apocynum cannabinum L.	E. L. R.
Myosotis palustris L.	H. Jaques.
Plantago Rugelii Dec.	——
Taraxacum erythrospermum Andrz.	——
Bidens vulgata Greene	M. L. Fernald.
Anthemis tinctoria L.	S. Toppan.
Senecio Robbinsii Oakes	E. L. R.
" viscosus L.	M. L. Fernald: E. L. R.

It is hoped that before long a complete list of additions to the flora can be prepared. Information from other botanists will be gratefully received.— EDWARD L. RAND, Boston.

A NEW STATION FOR IRIS HOOKERI IN MAINE.— On June 27th, 1908, I found on Great Cranberry Isle, a very interesting island lying just off Mount Desert, a large plant of *Iris Hookeri*, Penny. It was growing on the outskirts of a colony of *I. versicolor*,— but nearer the gravelly stony beach,— and was almost through flowering while the latter species was showing its first blossoms. Perhaps this difference in the time of flowering explains why this species has not been reported before from this station by summer visitors. I was unable,

however, to form any conclusion as to its abundance. This island is, I believe, the most southern station for *I. Hookeri* yet reported from the Maine coast.— ELSIE L. SHAW, Lexington, Massachusetts.

SOME MAINE ADDENDA.

J. C. PARLIN.

ON July 7, 1906, I found a few plants of a small, hoary crucifer, growing in association with *Sisymbrium altissimum* L., along a side track, in Canton, Maine, where grain cars are switched off. I laid it aside in my yearly budget for Prof. Fernald, who finds it to be *Erysimum parviflorum* Nutt., a vagrant from the Northwest. Both species named probably were brought in grain.

August 11, 1906, a quantity of *Eragrostis capillaris* Nees, was found growing along the edge of the sidewalk on Point Avenue in Canton Village. Again, on the 16th, I found a large quantity of it near the Gilbertville station in this town. This is the most northern known station of the species, although it was previously known in the state, having been collected at North Berwick several years ago.

While the following are not addenda, they serve to indicate the richness of the flora in this section of the state:— *Anemone cylindrica* Gray; *Caulophyllum thalictroides* Michx.; *Dentaria diphylla* L. *Arabis Drummondi* Gray; *Viola arenaria* DC.; *Aralia quinquefolia* Desene. & Planch.; *Echinacea pallida* Nutt.; *Antennaria Parlinii* Fernald; *A. occidentalis* Greene; *A. Canadensis* Greene, staminate plants; *Petasites palmata*, Gray; *Vaccinium vacillans* Sol.; *Polygonum Hartwrightii* Gray; *Juniperus Virginiana* L.; *Listera convallarioides* Nutt.; *Spiranthes Romanzoffiana* Cham.; *Orchis spectabilis* L.; *Habenaria bracteata* R. Br.; *Cypripedium parviflorum* Salisb.; *C. spectabile* Swartz.; *Scirpus hudsonianus* Fernald; *Carex Pseudo-cyperus* L.; *C. prasina* Wahl.; *C. paupercula* Michx., var. *irrigua* Fernald; *C. virescens* Muhl., var. *Swanii*, Fernald; *C. longirostris*, Torr.; *C. plantaginea* Lam.; *C. deflexa* Hornem.; *C. novae-angliae* Schw.; *C. arcta* Boott; *C. cephaloides* Dewey; *C. foenea* Willd., var. *perplexa* Bailey; *C. leporina* L.; *Phragmites communis* Trin.; *Poa alsodes* Gray.

CANTON, MAINE.

NOTE ON MICHAUX'S VACCINIUM MYRTILLOIDES.

M. L. Fernald.

The name *Vaccinium myrtilloides*, first published by Michaux for a common blueberry of eastern Canada and the Hudson Bay regon, has been variously interpreted. Recently, however, it has rested as a synonym either of *V. pennsylvanicum* Lam. or its var. *angustifolium* (Ait.) Gray, plants to which it has its closest affinity.

Of the common blue-fruited *V. pennsylvanicum* there are three pronounced tendencies. The typical form of the species, the shrub of the eastern United States and of portions of Canada, has the twigs glabrous or at most a little pilose at tip and the leaves glabrous beneath. The dwarf shrub, ordinarily confined to our alpine or colder regions, differs only in its reduced stature and tiny narrow leaves and is var. *angustifolium* (Ait.) Gray (*V. angustifolium* Ait. Hort. Kew. ii. 11). The third extreme is nearly if not quite as pubescent as *V. canadense*, differing from that species in its lustrous leaves with spinulose margins, as in the typical glabrous or glabrate *V. pennsylvanicum*.

The very pubescent extreme of *V. pennsylvanicum* is the common representative of the species in many sections of eastern Canada and it occurs in characteristic development from Labrador to Hudson Bay, south to Newfoundland, Nova Scotia, and northern Maine, and locally to Massachusetts. Throughout this region, as already stated, the shrub is usually mistaken for *V. canadense*; but it has the foliage-characters and the earlier sweeter berries of *V. pennsylvanicum*, and is very clearly the shrub described by Michaux as *V. myrtilloides*. Michaux's specimen, now preserved at the Muséum d'Histoire Naturelle in Paris, was over ripe and each of the two seemingly lateral clusters has lost all but a single berry. The branch shows clearly, however, that other berries had been present. The specimen was examined by the writer in 1903, and a tracing and note made by Dr. Robinson in 1900 bear out the decision that Michaux's plant described "foliis angusto-lanceolatis, integris, subtus juxta nervos et margine pubescentibus, membranaceis: .... *Bluets* Canadensium. *Hab.* a Canada ad sinum *Hudsonis*"[1] is the common pubescent extreme of *V. pennsylvanicum* and that it should not be longer confused with the

[1] Michx. Fl. i. 234 (1803).

glabrous *V. pennsylvanicum* and its equally glabrous var. *angustifolium* but should be given varietal recognition as

Vaccinium pennsylvanicum Lam., var. **myrtilloides** (Michx.) n. comb. *V. myrtilloides* Michx. Fl. i. 234 (1803).

Gray Herbarium.

Draba aurea in Rimouski County, Quebec.— In Rhodora vii. 267 (1905) I reported as *Draba borealis* DC. a plant found in fruit on seacliffs at Bic, Rimouski County, Quebec. Subsequently I have been able to examine the Bic plant at several stations and to secure excellent flowering material. The petals prove to be, not white as in *D. borealis* to which the plant was originally referred, but golden yellow, in this character differing strikingly from the other species of *Draba* known from the lower St. Lawrence. The Bic plant when well developed is by far the largest species of the genus in eastern America, the luxuriant plants producing as many as fifty fruiting branches, the thick and very brittle leaves being 1.5–2 cm. broad, and the mature pods 1.2–1.8 cm. long. Although these luxuriant specimens are much larger and have broader leaves than most herbarium specimens of *D. aurea* Vahl, smaller individuals are apparently identical with that polar species. As noted in the original report of the Bic plant (as *D. borealis*) the juicy leaves and young tips are freely eaten by the Herring Gulls which nest on the limestone rocks at Bic where *Draba aurea* abounds.— M. L. Fernald, Gray Herbarium.

A new Station for Hieracium pratense.— For the last three or four years I have noticed a Hieracium of rather unfamiliar appearance growing in a field near Norwood Cove, at Southwest Harbor, Mount Desert Island, Maine. This year I found plants of the same species in several other fields, not only in the neighborhood, but near Western Mountain and near Beech Hill. On examination it proves to be *H. pratense* Tausch, an introduced plant of very limited range in this country. It has been reported by Mr. Emile F. Williams as occurring at Van Buren, Maine, (Rhodora, III. 36), but I think not elsewhere in New England.— Sam A. Lurvey, Southwest Harbor, Maine.

Vol. 10, no. 116, including pages 117 to 132 was issued 15 August, 1908.

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Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
EDWARD LOTHROP RAND } Publication Committee.

Vol. 10. September, 1908. No. 117.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. September, 1908. No. 117.

CITY BOTANIZING.

William P. Rich.

It is commonly believed that the botanical collector must of necessity get away from the city to find material for his studies and that the open fields and woodlands of the country are the only places of interest to him in the pursuit of his favorite avocation.

It is one of the advantages, however, of plant collecting that the botanist is not always obliged to travel far to find objects of interest to him. If, by reason of the exacting requirements of his daily occupation, he is unable to visit new fields in distant regions during the flowering season, he can generally find close at hand abundant sources of interesting and profitable employment.

There are few localities that will not yield some plants worthy of record, the consideration of which will repay the local botanist for the time devoted to them, and even within the city's limits will be found collecting grounds that may well engage his attention.

In this connection I cannot refrain from referring to a paragraph in an address delivered in 1816 by Stephen Elliott, the author of the "Botany of South Carolina and Georgia." Speaking of his favorite study he said "It has been for many years the occupation of my leisure moments; it is a merited tribute to say that it has lightened for me many a heavy and sometimes many a rugged hour; that beguiled by its charms, I have found no road rough or difficult, no journey tedious, no country desolate or barren. In a solitude never solitary, in a desert never without employment. I have found it a relief from the languor of idleness, the pressure of business, and even the unavoidable calamities of life."

To the sentiments so well expressed in this quotation I am moved to

add the city's claim as a desirable field of botanical observation, and to call attention in this article to some of the plants collected in Boston during recent years which have been of interest to me. The localities mentioned are not those of suburban districts but are in close proximity to busy streets or residential avenues of the city proper.

The first time I ever found *Ranunculus sceleratus* L. was in the ditches along the old Providence Railway, near Newton Street. It grew there abundantly along with *Lemna minor* L. until the draining of the ditches exterminated it and I have seldom met with it since in more extended explorations. My first collection of *Setaria verticillata* Beauv. was in a front yard on Mount Vernon Street, and this also has been infrequently met with. *Chenopodium glaucum* L. I collected for the first time in the crevices of the brick sidewalk on the edge of the Public Garden, and in the last few years *Galinsoga parviflora* Cav. var. *hispida* DC. has been growing freely at the base of the granite wall at the Church Street entrance to the Subway.

But it is the vacant lots and dumping grounds of the city that furnish the city botanist with an almost inexhaustible supply of material. On every visit something new and strange will be seen, perhaps disappearing in a few days, to be replaced by other surprises.

There are two localities in Boston which have proved sources of continual botanical interest for a number of years. One of these, the South Boston flats, now mostly occupied as a railway terminal, has furnished many interesting species, the enumeration of which would require another article and may be left for future presentation.

The other locality is the Back Bay lands and a list of some of the more noteworthy plants collected here at various times in recent years is the principal object of this sketch.

This region, formerly a salt marsh, has been filled in with gravel brought from the neighboring town of Needham. The streets are filled up to city grade, leaving many vacant lots, in some of which the original solid marsh still remains.

For a few years, while the filling was in progress, many native plants and shrubs, brought in with the gravel, maintained their existence, but, at length, most of them succumbed; apparently unable to meet the competition of the hosts of cosmopolitan weeds which soon overran the entire region and now flourish in the greatest luxuriance, forming jungles of vegetation in many of the lots.

The establishment and planting of the Back Bay Fens in later years

have been the sources from which many of the more conspicuous plants herewith mentioned have been doubtless derived. Some of them thrive for a few seasons and disappear while many seem to have taken up a permanent abiding place here, and only the inevitable course of the city's growth will finally destroy them.

In the accompanying record only those plants, for the most part, that are likely to attract the attention of the passer-by or that are of especial botanical interest are noted. The many species of the ordinary weeds and grasses and those that are commonly found elsewhere are omitted.

Perhaps the first flowering plant of the season that will attract notice, other than the willows and poplars, is the *Petasites vulgaris* Desf., one of the coltsfoots. It has flourished on a damp gravelly bank for at least eleven years, sending up in April and May numerous thick, naked flower stalks, succeeded later in the season by enormous leaves a foot and a half in diameter.

In the early part of the summer few plants of especial note are prominent and it is not until later in the season that the richness of the flora is manifested.

In June I have recorded the following species in flower:

Amorpha fruticosa L., a shrub five or six feet high; *Lonicera Morrowii* Gray, rather frequent; *Desmodium Canadense* DC.; *Ptelea trifoliata* L., abundant as a small tree; *Amsonia Tabernaemontana* Walt., a bushy, herbaceous plant, about three feet in height, with milky juice and bluish flowers; and *Coronilla varia* L., very abundant and covering broad areas of gravelly banks with its profusion of rose-colored blossoms.

An Astragalus, growing in one of the lots on Boylston Street, has attracted attention during the past two years, and has been collected in flower and fruit. It has been identified by Prof. M. L. Fernald of the Gray Herbarium as *Astragalus glycphyllos* L. It is a European plant and is probably one of the escapes from the neighboring Back Bay Fens.

In June, 1907, I came across a clump of a trailing, raspberry-like plant with a profusion of small, pale-red flowers. I watched it from week to week until it fruited, to make sure that it belonged to the raspberry section of the genus Rubus. I could find no description of such a plant in any of the horticultural lists or botanical manuals and it was at length identified by Mr. Alfred Rehder of the Arnold Arboretum

as *Rubus triphyllus* Thunberg, a species from Japan. It is still flourishing the present year.

Another Rubus growing here has for several years greatly interested me. It is a coarse-leaved prostrate plant but with the inflorescence and fruiting racemes of the high-bush blackberry, *Rubus argutus* Link. It seems to answer very well to the description of *Rubus villosus* Ait., var. *humifusus* T. & G. of Gray's Manual.

In this month the Russian thistle, *Salsola Kali* L. var. *Tragus* Moq., begins to show itself and is more characteristic in its early stages and differs more from its close relative, the seashore species, than it does later in the season. *Sisymbrium altissimum* L., a comparatively recent immigrant to this part of the country, is also becoming abundant and will be very much in evidence, especially in its later stages of development as a "tumble weed," for the rest of the season.

The July list could be greatly extended by the inclusion of many species that are common outside of the city as well as here, and I shall mention only those in which I have been particularly interested or which are of sufficient importance for botanical record.

Lysimachia vulgaris L. grew abundantly at one time in a vacant lot near where now stands the Institute of Technology on Boylston Street, and not far away from it was a little colony of *Euphorbia marginata*, Pursh. *Heracleum villosum* Fisch., probably thrown out from the Park, has taken possession of several corner lots and is one of the most conspicuous plants in the entire region. *Echinops sphaerocephalus* L., the globe thistle, and *Polygonum cuspidatum* S. & Z., also outcasts from the Park, appear to be happy and thriving in their new locations on the gravelly banks and can be found in many different places. A few plants of *Genista tinctoria* L. were seen in 1906 and in the same season Mr. C. H. Knowlton called my attention to *Epilobium hirsutum* L. which he had discovered in one of the lots.

Another interesting find made July 18, 1906, in company with Mr. Knowlton, was a single plant of *Polygonum arenarium* W. & K. This, as far as I can learn, is the first published report of this species in Massachusetts, although a specimen I collected in July, 1899, on the South Boston flats appears to be the same. *Brassica Sinapistrum* Boiss. and *Brassica juncea* Cosson both grow here, the latter species, however, much more abundant.

The list for August is a long one in my records and must be abbreviated here. *Sida Napaea*, Cav. with its white flowers and maple-like

leaves grows in scattered colonies to a height of six and eight feet and near by can be usually found dense masses of *Bocconia cordata* Willd. attaining an equal height. Various species of sunflowers enliven the masses of vegetation, the most interesting among them being *Helianthus tuberosus* L., *Helianthus strumosus* L., and *Silphium perfoliatum* L., the last species being especially conspicuous. *Inula Helenium* L. has been noticeable in one of the lots for several years.

Polygonums occupy large areas, the principal species being *Polygonum Pennsylvanicum* L., *P. lapathifolium* L., *P. Persicaria* L., and frequently *P. orientale* L. Both species of Datura are found, *D. Stramonium* L. and *D. Tatula* L., and the velvety-leaved *Abutilon Avicennae*, Gaertn. is occasionally seen. *Lespedeza capitata* Michx. is abundant and *Senecio vulgaris* L. and *S. viscosus* L. have been collected. *Ipomoea hederacea* Jacq., *Petunia nyctaginiflora* Juss., *Campanula rapunculoides* L., and the canary grass, *Phalaris Canariensis* L. can be usually found this month on dumping grounds. *Artemisia caudata* Mich. is abundantly distributed over the gravelly levels and, occasionally, in damp places, a few plants of *Lythrum alatum* Pursh. have been seen. The large-headed burdock, *Arctium Lappa* L. var. *majus* Gray, is somewhat frequent on gravelly banks.

Cyperus speciosus Vahl. I first collected here in August, 1879, and it was still in existence in August of the present year. Among the numerous grasses are *Panicum miliaceum* Willd., *Panicum Walteri* Pursh, *Eragrostis Purshii* Schrader, *Bromus tectorum* L., and *Phragmites communis* Trin. The Phragmites I think must be of comparatively recent introduction as it has not yet attained the flowering stage. It is also abundant and spreading in the South Boston locality.

September is, perhaps, if a choice must be made, the best month of all for this kind of botanizing. Most of the August plants are still lingering in flower, while belated species are pushing forward to complete their cycle of life. Noteworthy among the Compositae at this season are *Aster Novae-Angliae* L. and *Aster subulatus* Michx., the latter species very abundant in the marshy lots. In September, 1879, I found *Helianthus rigidus* Desf., but it has been long since covered up. *Pluchea camphorata* DC., one of our native plants, still maintains itself in certain lots. *Artemisia biennis* Willd., mentioned in the Sixth Edition of Gray's Manual as rapidly extending eastward from the West, has since that time arrived in Boston and is now common,

and *Bidens vulgata* Greene, which a few years ago I thought rare is abundant on every hand.

Polygonum prolificum Robinson is plentiful in damp ground inside the Park, and in 1905 Mr. Henry A. Purdie brought me specimens of *Polygonium exsertum* Small from the same place, where I have seen it every year since. Last year I came across a few plants of what I make out to be *Chenopodium Bosc*ianum Moq., the only time I have ever collected it. *Chenopodium Botrys* L. is occasionally found and *C. ambrosioides* L. var. *anthelminticum* Gray is abundant. *Rumex pallidus* Bigelow has been collected several times and *Amarantus blitoides* Watson, forming flat mats in waste ground, can generally be found this month. *Cassia Chamaecrista* L., *Urtica dioica* L., *Pycnanthemum lanceolatum* Pursh, and *Echinocystis lobata* T. & G. are occasionally met with. *Euphorbia Esula* L. grew here some twenty or more years ago but has now disappeared.

Last year Mr. Purdie called my attention to a goldenrod which he found somewhat puzzling. I made it out to be *Solidago asperula* Desf. and the identification was afterwards verified by Prof. Fernald of the Gray Herbarium. These particular plants seem to have more of the *rugosa* character in them than is usual with those I had heretofore seen, and I am more than ever of the opinion, of which there has long been a suspicion that the so-called *Solidago asperula* Desf. is really a hybrid of *S. sempervirens* L. and *S. rugosa* Mill.

Two shrubs whose origin here can be directly traced to the neighboring Park are becoming noticeable in several of the lots. They are *Baccharis halimifolia* L. and a Tamarix, the species of which I am not sure of. Another herbaceous plant, probably from the same source, is conspicuous with its handsome blue flowers on several gravelly banks in August and September. My first identification of it was *Lycopsis arvensis* L., but Dr. E. H. Eames of Bridgeport, Connecticut, to whom specimens had been sent, pronounced it *Anchusa officinalis* L., which is probably correct. These two species bear very close superficial resemblances.

The nomenclature used in this list is mostly that of Gray's Manual, Sixth Edition, while the names of the garden plants mentioned are those in common use by horticulturists.

I look forward with interest to continued investigation of the flora of this region while it lasts. But the area is being gradually restricted as section after section is built upon and the time is not far distant when

all that will remain of its present profusion of plant life will be the specimens in the herbaria of the few collectors interested in city botanizing.

Boston, Massachusetts.

NOTES ON ALGAE. IX.

F. S. Collins.

Gloeocystis scopulorum Hansgirg in Foslie, Contributions to knowledge of the marine algae of Norway, I. East Finmarken. Tromso Museums Aarshefter XIII, p. 155, 1890. This species was described by Hansgirg from material sent him by Foslie, collected in northern Norway; the material was found in clefts of rocks at high water mark and contained a number of minute forms, some of which Hansgirg described as new, while he identified others with already described species. Prof. Foslie has kindly furnished the writer with some of these forms, among them *G. scopulorum*. It forms gelatinous masses of greenish yellow color with cells 4–6 μ in diameter, united in colonies of two to eight cells, with distinctly stratified envelop. At Ragged Island, off Harpswell, Maine, in July, 1908, the writer found in a warm-water pool, above high water mark, among various small green and blue-green algae, an organism agreeing exactly with Foslie's specimen. But it is well known that in stations of this character plants often undergo strange transformations, *Ulothrix*, for instance, assuming Palmella and Gloeocystis forms that no one would connect with the normal form unless by observing the transitions. One can hardly resist the suspicion that *G. scopulorum* is some such stage of a *Ulothrix* or a *Urospora*, which are common in such stations in spring.

Protococcus ovalis Hansgirg, l. c., p. 159, Pl. III, fig. 12. Another doubtful form occurring in similar stations with the last mentioned species. The cells are ovoid or ellipsoid, 8–10 $\mu \times$ 9–12 μ, with thin wall and yellow-green contents, solitary or congregated in a formless, not specially mucilaginous layer. At the Ragged Island locality a form occurred agreeing with this description, and with the specimen from Foslie.

Pilinia endophytica n. sp. For several years the writer has been puzzled by a small green alga, endophytic in *Ralfsia Borneti* Kuckuck, a common *Ralfsia* along the New England coast on live mussels and *Lithothamnion* in tide pools, occasionally occurring on rocks. In July of the present year, while the writer was dredging in Harpswell Sound, Maine, a stone was brought up from about five meters depth at low water, on which was a growth of *Ralfsia*, in which the endophyte occurred rather more abundantly than usual; while the description that can now be made leaves something to be desired, at least it can be put on record and attention called to the plant, so that further investigation can be hoped for. It may be characterized as follows:—

Fronde formae indefinitae, filamentorum plerumque brevium, simplicium vel ramosorum, sistente, inter filamenta plantae hospitis serpentium; cellulis quoad formam et magnitudinem variantibus, cylindricis, clavatis, subsphaericis, vel irregularibus, 7–22 μ diam., 1–5 diam. longis; chromatophora laete virente, cellulam complente, vel plerumque cupuliformi, partem superiorem cellulae occupante. Sporangiis terminalibus, sphaericis vel ovoideis, ad 30 μ diam., sporas numerosas foventibus.

Frond of no definite form, consisting of usually short, simple or branched filaments, creeping among the filaments of the host; cells variable in form and size, cylindrical, clavate, subspherical or irregular, 7–22 μ diam., 1–5 diam. long; chromatophore light green, sometimes filling the cell, more commonly cup-shaped, at the upper end of the cell. Sporangia terminal, spherical or ovoid, up to 30 μ diam., containing numerous spores. In fronds of *Ralfsia Borneti* Kuckuck, Harpswell, Maine, July, 1908. Type in herb. F. S. C.

The placing this species in the genus *Pilinia* might be considered somewhat intuitional, as the vegetative characters are so vague; but imperfect and stunted as the filaments are, their appearance recalls that of undoubted Pilinia species. The occurrence of the terminal sporangium seems to confirm this, but the form must be regarded as greatly modified by the endophytic habit. All distinction between vertical and horizontal filaments is lost, and the cells are very irregular in shape and size; sometimes a filament will be found of six or seven cylindrical or slightly clavate cells, 2–5 diam. long, quite as in typical Pilinia species, but this is unusual. Whether the sporangia produce zoospores or aplanospores could not be determined. The nearest relation of this species would seem to be *P. minor* Hansg. If we may imagine a descent from the latter, from living free on pebbles to living

among the firm and closely packed filaments of the *Ralfsia*, the disappearance of the now useless basal, attaching filaments, and the irregular form of what remains, seem not unnatural. The host is found all along the New England coast from Bridgeport, Connecticut to Cutler, Maine, and whenever it has been examined for the endophyte, the latter has been found.

PRINGSHEIMIA SCUTATA Reinke. When the writer was collecting at Eastham, Massachusetts, Aug. 16, 1908, at "The Salt Pond," really the head of a bay among salt marshes, the Zostera growing there abundantly was found to be the host for many of the smaller species of algae; most of these were familiar and require no comment, but it was of interest to note *P. scutata*, of which only a single record appears for this coast.[1] Here it was not uncommon, and a set for distribution in the Phycotheca was easily obtained. The plant forms minute, rounded, thin, pale green dots on the Zostera, barely perceptible to the naked eye, but easily distinguished by the hand lens.

OCHLOCHAETE FEROX Huber, Ann. Sci. Nat., Series 7, Bot., Vol. XVI, p. 292, 1892. In looking over the material mentioned in the last paragraph, it was noticed that some spots were of a much deeper green color than the others, and microscopic examination showed quite a different structure. In *Pringsheimia* there is originally a thin disk of laterally united radiating filaments, later developing another layer in the middle part of the disk, the cells of this second layer rounded but with no outgrowths. In the other form the frond consists of a densely packed mass of cells, with no indication of radiating filaments; the cells are ovoid or flask-shaped, vertically elongate, and terminate each in a long colorless hair. These characters identify it with *O. ferox*, not before recorded for America. Though not quite as frequent as the *Pringsheimia*, enough was found for distribution in the Phycotheca Boreali-Americana, and both species will appear in Fascicle XXXI.

SPHACELARIA FUSCA C. Ag., Sp. Alg., Vol. II, p. 34, 1828. This species, though dating from so long ago, was always a matter of doubt until Sauvageau,[2] brought forward the characters that distinguish it from the common *S. cirrhosa* (Roth) Ag. The latter species is abundant on the New England coast from Cape Cod south, and is occasionally found, usually in warm, sheltered bays, as far north as the Gulf

[1] Collins, Bull. Torrey Bot. Club, Vol. XVIII, p. 340, 1891.
[2] Sauvageau, Jour. de Bot., Vol. XVI, p. 209, 1902.

of St. Lawrence. June 16, 1907, the writer found on the bay shore of Eastham, Massachusetts, growing on a spider crab, *Libinia canaliculata* Say, what appears to be *S. fusca*. *S. cirrhosa* is a variable species, and as regards most characters it is hard to draw a line between it and *S. fusca*; the most conspicuous character is found in the pro-pagula; in *S. cirrhosa* the three rays are sharply contracted at the base; in *S. fusca* there is no such contraction, the rays being cylindrical or tapering slightly from base to summit.

Petrocelis Middendorffii (Rupr.) Kjellman, Algae of the Arctic Sea, p. 140, 1883. The first notice of the occurrence of *Petrocelis* on the New England coast is by Farlow [1] under the name of *P. cruenta* J. Ag.; this name has since been retained in all references to the plant of this region. A comparison with a specimen from Cherbourg, France, collected and determined by Le Jolis, shows so much difference that the two cannot be considered as belonging to the same species. The frond in *Petrocelis* forms an incrustation on rocks at or near low water mark on exposed shores; it is thin but not as thin as the frond of the common *Hildenbrandtia prototypus* Nardo; the latter is more or less translucent, the color being a lighter or darker red according to the color of the substratum. The Petrocelis frond is quite opaque and usually of a duller red. It consists entirely of vertical filaments, in which two parts can be distinguished; a lower layer in which the filaments are firmly united laterally, and an upper layer in which they are in contact, but do not adhere. On the top is a relatively firm cuticle. When the cover glass is pressed down on a bit of the plant under the microscope, it is common for the filaments of the upper part to be held by the basal part below and by the cuticle above, while separating easily between. In the European plant the basal part is only a small portion of the whole thickness, while in the New England plant it is seldom of less thickness in a mature plant than the upper part, and often it is two thirds of the whole thickness. In the European plant the cells of the free filaments are moniliform, 1–2 diam. long, about 8 μ diam. at the base, diminishing to 4 μ at the top. In the American plant the filaments are cylindrical or only slightly tapering, 3–4 μ diam., cells up to 3 diam. long. These characters indicate that our plant is *P. Middendorffii*, a plant probably of circumpolar distribution, as it occurs in Norway, and in the Pacific from Alaska to California.

[1] Farlow, N. E. Marine Algae, p. 115, 1881.

That the distinction has not before been made is not unnatural; our plant does not grow on small or loose stones, it seems to prefer the hardest rock, seldom occurring on soft or crumbling rocks, where it could be easily removed. It cannot be scraped off without reducing it to a shapeless mass, but a knife must be used, and unless special care is taken, the greater portion of the basal part is left on the rock. In material so obtained the difference between the basal part and that of *P. cruenta* is not noticeable. The material distributed in P. B.–A., No. 899, is of this character; it is intended to distribute another lot, of more perfect material, which will show the identity with the *P. Middendorffii* of the west coast, distributed as P. B.–A., No. 900.

The tetraspores of *Petrocelis* are formed by transformation of cells of the upper part; in *P. cruenta* and *P. Middendorffii* one cell in a filament is so transformed, rarely two cells. In *P. Hennedyi* (Harv.) Batters of northern Europe the tetraspores are seriate, often occupying a considerable portion of the filament; this species may occur with us. Unfortunately, spores in *Petrocelis* are rare, except in winter, which is not a pleasant time to collect on exposed shores at low water mark. The writer has examined specimens of *Petrocelis* from Nahant and Magnolia, Massachusetts; from Mount Desert Island, Cutler, several points in Penobscot Bay and several points in Casco Bay, Maine; after allowing for the effect on the basal layer of the manner of collecting, they agree very closely; specimens from Scotland and England agree equally well with Le Jolis' plant. The writer formerly reported *P. cruenta* as occurring in Southern Massachusetts;[1] a re-examination of the specimen shows that it is not a *Petrocelis*; so that as far as our records go, the genus is limited to the region north of Cape Cod.

The marine flora of the New England coast from Cape Cod north is of a typical arctic character, but as is well known, there are exceptional stations where plants characteristic of more southern regions occur; such stations have been recorded at Weymouth and Quincy, Massachusetts,[2] Gloucester, Massachusetts,[3] Penobscot Bay, Maine.[4] At all these stations there is much variation from one year to another, apparently on account of the difference in temperature, etc., in different years. An early spring, followed by a warm summer, will bring an abundant development of characteristic southern forms, while

[1] Bull. Torrey Bot. Club, Vol. X, p. 56, 1883.
[2] Collins, Bull. Torrey Bot. Club, Vol. X, p. 29, 1884.
[3] Farlow, N. E. Marine Algae, p. 6, 1881.
[4] Collins, Rhodora, Vol. I, p. 69, 1899.

in a year in which the spring is late and the summer not warmer than the average few or none may appear. The past summer would seem to have been an ideal one for these plants, the excess of temperature above the normal for the year being about 400° at Boston on the first of August. The writer had an opportunity in July to observe two stations, not previously recorded in this respect, and the following notes may have some interest.

Along the New England coast as far north as Portland, Maine, salt marshes form quite a considerable portion of the shore, but beyond Portland they are less common. At Stover's Point in South Harpswell is a small salt marsh, separated from Harpswell Sound by a ridge of stones and gravel, through which there is a quite narrow and shallow opening. Except at spring tides the change of level in the numerous shallow pools of various size that are scattered through the marsh is slight, and the greater part of the water remains from one tide to another. In the hot days of last July the water in these pools was almost unpleasantly warm to the hand. The felty mass of algae, usual in such places, covered the smaller pools, and much of the surface of the larger pools. The composition of this mass was the common warm water combination, *Cladophora expansa* (Mert.) Kütz., *Rhizoclonium riparium* (Roth) Harv., *Lyngbya aestuarii* (Mert.) Liebm., *L. confervoides* Ag., *Enteromorpha intestinalis* (L.) Link, *E. crinita* (Roth) J. Ag., *E. Hopkirkii* McCalla, *Ilea fulvescens* (Ag.) J. Ag., and in less quantity *Pleurocapsa fuliginosa* Hauck, *Calothrix confervicola* (Dillw.) Ag., *C. scopulorum* (Web. & Mohr) Ag., *C. aeruginea* (Kütz.) Thuret. *Palmellococcus marinus* Collins, described from material collected here in 1906, was present this year, but in less quantity; and there was considerable of two blue-green algae, usually found only in fresh water, *Nostoc sphaericum* Vauch. and *Gomphosphaeria aponina* Kütz.

In the largest pool were floating many fragments of algae, naturally growing in exposed places, the same as are found washed up all along the shore; but in this warm water they had assumed a quite different appearance. *Chondrus crispus* (L.) Stack. was abundant, and the fronds had continued to grow with a luxuriance quite unknown before; fronds two or three dm. long were not uncommon, broad and richly branched, often with proliferous growths; the color pale red or yellow; evidently the environment was much to their liking. Common also were floating fronds of *Ahnfeltia plicata* (Turn.) Fries, but all were

dead; the normally dark and shining wiry fronds were a brownish yellow, and their surface was variegated with "collars" of *Ralfsia verrucosa* Aresch. The *Ahnfeltia* is common all along the Maine coast, as is also the *Ralfsia*, but the latter has never been observed to grow on the former under normal conditions. Luxuriant coatings of *Ralfsia* were found on the dead or dying floating fronds of *Fucus vesiculosus* L., *F. evanescens* Ag., and *Ascophyllum nodosum* (L.) Le Jolis. The *Ralfsia* formed a continuous coating on practically the whole surface of these fronds, though never occurring on them in their natural habitat, whether attached or floating.

The other locality noticed was at Ragged Island, about five miles off the Maine shore, between Cape Elizabeth and Cape Small Point. The island is about half a mile in diameter, the coast entirely rock cliff, often rising perpendicularly for some height. On the south side there are perpendicular rocks of this character, the top considerably above even the spring tides. From some peculiarity of this rock, there is a series of rather large and deep pools just back from the edge; into these pools a certain amount of fresh water drains from the neighboring part of the island, but the supply must be small; apart from this, and whatever rain falls into the pools, the only supply is from the surf breaking over the wall. During a gale this supply must be continuous, but in ordinary weather it is cut off. It is evident that a great range in temperature and salinity is possible here. If we suppose the pools filled by a storm, and then a long period of quiet weather without rain, the salinity must steadily increase. A rainfall would somewhat diminish it, but only a very heavy rain, sufficient to fill the pools and run over, could bring the salinity below that of the surrounding sea. The salinity would be higher than normal until a severe storm should throw in water enough to fill the pools several times over, practically replacing the contents with normal salt water. Whenever the pools were so filled, the temperature would be that of the sea, which here is very cool, even at midsummer, while in winter they would be undoubtedly frozen, and a few hot calm days in summer would bring them to a temperature reached by the sea only in the tropics. The list of permanent tenants of such a pool would be reduced to forms capable of enduring very salt water as well as the ordinary salinity, and both tropical and arctic temperatures. On the other hand, plants developing very quickly under favorable conditions, forming at once spores that will carry them through unfavorable condi-

tions, would delight in such a station, where there would be few or no all-the-year natives to compete with these summer visitors to the Maine coast.

On July 13, 1908, there was here an immense quantity of individuals, though not very many species; most of them were blue greens; *Polycystis elabens* Kütz., *Entophysalis granulosa* Kütz., *Glococapsa crepidinum* Thuret, *Oscillatoria tenuis* Ag., *Spirulina subsalsa* Oersted, *S. Meneghiniana* Zan., *Lyngbya aestuarii* (Mert.) Liebm., *L. semiplena* (Ag.) J. Ag., *L. subtilis* Holden, *Plectonema Battersii* Gom., *P. calothrichoides* Gom., *Anabaena torulosa* (Carm.) Lagerh., *Nodularia Harveyana* (Thwaites) Thuret, *N. spumigena* Mert., *Calothrix scopulorum* (Web. & Mohr.) Ag., *Amphithrix violacea* (Kütz.) Born. & Flah., and some forms of *Chroococcus* and *Plectonema* that have not been specifically determined. The green algae were *Enteromorpha intestinalis* (L.) Link, *E. Hopkirkii* McCalla, *E. crinita* (Roth.) J. Ag., *Cladophora expansa* (Mert.) Kütz., *Ilea fulvescens* (Ag.) J. Ag., and *Urococcus Foslieanus* Hansg. The *Entophysalis* was chiefly attached to the rocks; the *Calothrix* and *Amphithrix* to *Enteromorpha* and *Cladophora*; all the others were free and mingled in all proportions; sometimes in loose masses on the bottom, sometimes in rather denser masses at the surface; the color varying according to the proportion of the different species and to the exposure to light; the strata at the bottom, sheltered from the light, were mostly dark green or olive; those at the surface pale green, yellowish or almost white. The quantity was astonishing; at least half the surface was covered by the mats, and very little of the bottom could be seen. When we remember than an individual of *Polycystis* is about 3 μ diameter, about one ten-thousandth of an inch, while a filament of *Spirulina* is considerably less, the number of individuals in these pools, with a surface of perhaps an acre and a depth of several feet, would reach a figure with no real meaning to us. And there is no doubt that the entire quantity had developed since the beginning of the warm weather. The winter storms must sweep the pools clear of all such vegetation, except stray spores or resting cells in crevices or under ice.

The writer visited this station in 1903 and in 1906, each season in July, and the conditions were then much the same, but in 1908 the growth was considerably more luxuriant than before, and the level of the water decidedly lower, which of course meant increased salinity. The effect of the latter condition was seen in some abnormal appear-

ances in the Enteromorphas, which are most at home in ordinary sea water; in an increase in the Spirulinas, which are specially plants of lagoons and drying-up pools. Possibly these conditions may have induced the development of *Gloeocystis scopulorum*, mentioned earlier in this paper, from some Ulothrix which was here earlier in the season, but could not maintain its normal form under the summer conditions.

One species remains to be mentioned; *Chaetomorpha aerea* (Dillw.) Kütz. This is usually spoken of as a common species on the New England coast, and if we include under the name the free-floating form known as *C. Linum* (Fl. Dan.) Kütz., just as what has been known as *C. Picquotiana* (Mont.) Kütz. is now considered a free form of *C. Melagonium* (Web. & Mohr) Kütz., this opinion is undoubtedly correct; the *C. Linum* form abounds from Long Island Sound to Passamaquoddy Bay. But as to the attached plant, *C. aerea* in the older sense, the case is different. South of Cape Cod it is not uncommon and grows at low water mark and some distance above and below; but in 30 years collecting the writer has only twice found it north of Cape Cod, and in each case it was in a rock pool, at extreme high water mark; once at Cohasset, once at Marblehead, in both cases in small quantity. Here at the Ragged Island pools there was a dense growth around most of the edge, just below the water line; as densely packed as the grass in a lawn. The filaments were all quite short, and there was a white band of dead fronds, above the water level, considerably broader than that of living fronds below the level; evidently the environment had been exceptionally favorable to the species earlier in the season. In 1903 and 1906 nothing was seen of this species, and if we suppose that it is distinct from the floating *C. Linum*, it would be hard to account for its sudden appearance in such quantity; the currents here tend southerly, and the chance of a frond or a spore being brought from southern New England and thrown up by the waves into the pool would be very small. Even if this were possible, there must have been several generations of plants in a very short time to produce this dense growth for such a distance. But if we suppose that it arose from the floating form, which is abundant in the vicinity, the spores finding favorable conditions, similar to those of warmer regions, all is clear.

To sum up as regards these two stations:— even on shores where conditions are subarctic, individual stations may be found where the conditions for a short time are almost subtropical; in such stations the

number of species must be limited, but the number of individuals developed in a short time may be enormous; they will be mostly plants of very rapid development and of short life, and mostly of quite low organization; some plants, common in the subaretic waters may here assume a sudden luxuriance (*Chondrus*); some may also appear on a different substratum (*Ralfsia*); some may take on a habit so distinct as to be considered a separate species native to lower latitudes (*Chaetomorpha*).

MALDEN, MASSACHUSETTS.

A TRIP TO KILLINGLY, CONNECTICUT.

CLARENCE H. KNOWLTON.

AFTER considering several other places for a one-day botanical excursion, Mr. L. J. Spalding and I finally decided on Killingly, Windham county, Conn. We were led to this by a study of the map, which revealed a diversified region ranging in elevation from 280 to 875 feet above sea-level, with brooks, ponds and hills. A previous reconnoissance in July, 1903, had shown us that the underlying rocks were sandstone and quartzite. We had also noted and collected several interesting plants at that time.

The day chosen (Aug. 23, 1908) was clear and cool after heavy rainfall, the vegetation was fresh, and walking easy. We left the cars at Attawaugan, and the first plant collected was *Commelina communis* L. It grew luxuriantly in the woods near Five-Mile River, on a bank which had been used as a dump at some time previous. The delicate blue flowers were still open, and the plant seemed to flourish in its adopted home.

The next accession grew abundantly in the millyard and by the roadside at Ballouville. This was *Euphorbia hirsuta* Wiegand, easily distinguishable from its nearest relative by its hairy stem, smooth fruit and peculiar seed. These specimens were not so nearly prostrate as *E. maculata* L. usually is.

We now left the villages and explored a large meadow, part of which had been mowed. In this part grew good specimens of *Parnassia Caroliniana* Michx., just coming into flower. In the uncut portion, along with many common plants, were *Pycnanthemum linifolium*,

Pursh, *P. lanceolatum* Pursh, and *P. muticum* Pers., all these closely allied species occupying the same territory, and showing no choice in the matter of soil or moisture. Later in the day we found the fourth New England representative of the genus, *P. incanum* Michx., growing in dry rocky woods. The prevailing alder in this meadow and throughout the town seems to be *Alnus incana* Willd., for I did not see any other during the entire day. *Calamagrostis Nuttalliana* Steud. also flourished in this meadow.

The road led from the lowland up the side of Break Neck Hill, and wayside glimpses of *Circaea alpina* L., the true *Viola blanda* of Willdenow, and big clumps of *Collinsonia canadensis* L. led to an investigation of the rich woods near by. The *Collinsonia* is a frequent plant throughout the region in such woods, and its presence was not unexpected, but further search showed an abundance of *Allium tricoccum* Ait., in excellent fruit, *Adiantum pedatum* L., *Galium lanceolatum* Torr., *Eupatorium ageratoides* L., *Sanguinaria canadensis* L., *Trillium cernuum* L., *Uvularia perfoliata* L. and mountain laurel. The woods were largely red oak, chestnut, cherry birch and sugar maple. Part had been cut over within ten years, while the other part had not felt the axe for at least forty, but there was little difference in the herbaceous flora beneath their shade.

Further up the hill were open pastures and clearings, with ledges which gave fine views of neighboring villages, and the level sky-line of the Windham county hills. Over the dry ledges grew *Woodsia obtusa* Torr. and the more common ebony spleenwort, while in moist shaded crevices grew *Asplenium Trichomanes* L. The dry clearings were full of *Gerardia quercifolia* Pursh in full bloom, very tall and handsome. *G. flava* L., *G. pedicularia* L. and *G. tenuifolia* Vahl were also present, but only the latter was abundant. *G. paupercula* (Gray) Britton we had found in our first swamp. Along with these were some very fine specimens of *Hieracium Gronovii* L., two or three feet high, and on one ledge in the hot sunshine grew *Muhlenbergia glomerata* Trin., undismayed by changed environment.

Down beyond the clearings was another stretch of rich woods, colder and more moist than the first, and here came the greatest surprises of the day. First of all was *Habenaria Hookeriana* Gray, with broad flat leaves and spikes of appressed green flowers, and fruit. Further search for this revealed as its neighbors *H. bracteata* R. Br. and *Corallorrhiza multiflora* Nutt., also well fruited, and several

specimens of each were collected, without seriously affecting the supply. There were also good colonies of *Monotropa Hypopitys* L., bright scarlet instead of golden yellow, their prevailing color. Along a brook were splendid plants of *Phegopteris hexagonoptera* Fée, only waiting the hand of the collector to transfer their beauty to the herbarium.

Reluctantly we left these woods, and investigated some of the mill-ponds beyond East Killingly, near the Rhode Island line. Two of these were well filled with *Myriophyllum ambiguum* Nutt., var. *capillaceum*, Torr. & Gray, while *Brasenia* was the prevailing plant in the others. The largest pond, Chestnut Hill Reservoir, was covered with the peltate leaves, which concealed the water and gave a peculiar leathery effect to its surface. I finally secured a specimen of this slimy plant, with leaves uneaten by the insects. Along the roadside thickets near the ponds were large quantities of *Apios tuberosa* Moench both in flower and fruit, and occasional plants of *Solidago Elliottii* T. & G. just coming into bloom.

Our next point was a steep unnamed hill near Elliotville, which we had visited in 1903. The eastern side of this is a big cliff of slightly metamorphosed sandstone, varying from 20 to 60 feet in height, with its white escarpment broken by fracture planes and caves, far surpassing in natural interest the more famous Wolf Den region of Israel Putnam in the adjoining town of Pomfret. In the woods here grew an abundance of *Clematis verticillaris* DC. and *Oryzopsis melanocarpa* Muhl. The westerly side of the hill proved ordinary and uninteresting, except for a curious side-hill peat-bog, caused probably by some hidden spring. Mr. Spalding has since found a large tree of *Betula papyrifera* Marsh on the southwest corner of this hill.

Whetstone Brook flows through the little valley below, on its way to join the Quinebaug River. In one of its tributaries grew *Sium Carsonii* Durand, but it did not seem to flourish in the main brook, where the water was too deep or the current too swift for this lazy degenerate of a worthy type. The brook gets its name from the easily cleaving, fine-grained sandstone of the region, and flows through rather ordinary meadows full of *Carex stricta* Lam., to the exclusion of most other species. There were fine colonies of *Sparganium americanum* Nutt. in some places, and in others there were *Xyris flexuosa* Muhl., *Peltandra*, *Decodon*, and *Rhexia*. At our 1903 visit we found large quantities of *Ranunculus aquatilis* L. var. *trichophyllus* Gray,

exceptionally large specimens, but we did not find it this time, probably because it was too late. *Lonicera caerulea* L. is a frequent shrub along the meadows.

Our last collecting for the day was in Putnam, Conn., where we excited the distrust of the natives by groping successfully in the dusk of early nightfall for *Vernonia noveboracensis* Willd., and *Liatris scariosa*, Willd., conspicuous plants which we had located on the morning journey, and reserved for our homeward way.

All in all, we considered the day a very successful and enjoyable one, and the region well worth further exploration. Most of the plants mentioned are represented by specimens in my collection or Mr. Spalding's, and although but few are distinctly rare, many of them belong in that larger class so well known to botanists as "interesting."

I am indebted to Mr. Walter Deane for kindly assistance in identifying the *Myriophyllum* and the *Sparganium*.

Boston, Massachusetts.

Four Introduced Plants at Cambridge, Massachusetts.—On 31 July of this year I noted, beneath a hedge-row along a street in Cambridge, a specimen of *Neslia paniculata* (L.) Desv., a crucifer with small, globose, indehiscent, reticulated silicles. The specimen was a small one but the distinctive fruit made it easily determinable. I have gathered it in better condition and greater abundance on docks at Quebec, 31 August, 1904. *Thymus Serpyllum* L. was found in abundance in a plot of grass land in Cambridge on 23 July of this year, and on 8 August another patch about a half-mile away, across the Charles River, near Soldiers' Field in Brighton. On 8 August I came across a bush of *Colutea arborescens* L. escaped by a roadside near Mt. Auburn Cemetery. *Epilobium hirsutum* L. is well established near Glacialis Pond, Cambridge. Specimens of these plants are in my herbarium.—Arthur Stanley Pease, Cambridge, Massachusetts.

New Edition of Gray's Manual.—We have received just as we are going to press the seventh edition (illustrated) of Gray's Manual,[1] which will be reviewed in a subsequent issue of Rhodora.

[1] A Handbook of the Flowering Plants and Ferns of the central and northeastern United States and adjacent Canada rearranged and extensively revised by Benjamin Lincoln Robinson and Merritt Lyndon Fernald. American Book Co., New York. $2.50.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS,—XXII.[1]

M. L. Fernald.

[The sign + indicates that an herbarium specimen has been seen; the sign — that a reliable printed record has been found.]

NAJADACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Najas flexilis (Willd.) Rostk. & Schmidt	+	+	+	+	+	+
" " var. robusta Morong				+		
" gracillima (A. Br.) Magnus				+	+	+
Potamogeton alpinus Balbis	+	+	+	+		+
" americanus C. & S.	+	+	+	+	+	+
" " var. novaeboracensis (Morong) Benn.						+
" amplifolius Tuckerm.	+	—	+	+	+	+
" angustifolius Berchtold & Presl			+	+		—
" " var. connecticutensis (Robbins) Benn.			+			+
" bupleuroides Fernald	+	+	+	+	+	+
" confervoides Reichenb.	+	+	+	+		
" crispus L.				+		—
" dimorphus Raf.	+	+	+	+	+	+
" epihydrus Raf.	+	+	+	+	+	+
" " var. cayugensis (Wiegand) Benn.	+					+
" × Faxoni Morong			+			
" filiformis Pers.	+		+			
" foliosus Raf.	+	—	+	+	+	+
" " var. niagarensis (Tuckerm.) Morong	+	+	+			
" Friesii Rupr.			+	+		+
" gemmiparus Robbins	+			+	+	+
" heterophyllus Schreb.	+		+	+	—	+
" " forma graminifolius (Fries) Morong	+	+	+	+	+	+
" " forma longipedunculatus (Merat) Morong	+		+	+	+	+

[1] Printed in Rhodora as supplementary matter.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Potamogeton heterophyllus forma maximus Morong	+	+		+		+
" " forma myriophyllus (Robbins) Morong	+			+	+	—
" " forma terrestris Schlecht.	+		+			+
" Hillii Morong						+
" hybridus Michx.	+	+	+	+	+	+
" " var. multi-denticulatus (Morong) Asch. & Graebn.						+
" lateralis Morong				+		+
" lucens L.	+		+	+		+
" mysticus Morong				+		
" natans L.	+	+	+	+	+	+
" × nitens Weber	+	+		+		
" Oakesianus Robbins	+	+	+	+	—	+
" obtusifolius Mertens & Koch	+		+	+		+
" pectinatus L.	+	+	+	+	+	+
" perfoliatus L.	+					
" praelongus Wulfen	+	+	+	+		+
" pulcher Tuckerm.	+		—	+	+	—
" pusillus L.	+	+	+	+	+	+
" " var. polyphyllus Morong	+			+		
" " var. Sturrockii Benn.	+		+	+		+
" " var. tenuissimus Mertens & Koch	+	+	+	+		
" Richardsonii (Benn.) Rydb.	+	+	+			+
" Robbinsii Oakes	+	+	+	+	+	+
" rutilus Wolfgang	+		+			
" × spathaeformis Tuckerm.				+		
" strictifolius Benn.	+	+	+	+		
" Vaseyi Robbins	+		+	+		+
" zosterifolius Schum.	+		+	+	—	+
Ruppia maritima L.	+	—		+	+	+
Zannichellia palustris L.	+	+	—	+	+	+
" " var. pedunculata J. Gay				+		
Zostera marina L.	+	—		+	+	—

JUNCAGINACEAE.

Scheuchzeria palustris L.	+	+	+	+	+	+
Triglochin maritima L.	+	—		+	+	+
" palustris L.	+					

Notes upon the above List.

Potamogeton confervoides Reichenb. This species (as *P. Tuckermani* Robbins) is listed without station in J. L. Bennett's Plants of Rhode Island. There is no specimen in Mr. Bennett's herbarium, and the occurrence of this unique species chiefly in subalpine or very cold ponds indicates that its Rhode Island record is extremely doubtful.

P. perfoliatus L., although reported from all the New England states, has been examined only from Maine. All the material from the other New England states seen by the writer has been either *P. bupleuroides* Fernald or *P. Richardsonii* (Benn.) Rydb.

Many minor hybrids are recognized by Old World students of *Potamogeton*. Little has been done in America to make out our hybrid forms and most such plants are at present omitted from the list.

Suggestions for Special Observation.

Najas flexilis (Willd.) Rostk. & Schmidt, var. *robusta* Morong. This extreme form is known in New England only from ponds of eastern Massachusetts. It is found, however, in New York and should be sought in Rhode Island and Connecticut.

Najas guadalupensis (Spreng.) Morong, quickly distinguished from *N. flexilis* by its dull conspicuously reticulated seed, extends northward from Tropical America to eastern Pennsylvania, and has recently been reported from southern New York. It is to be expected in southeastern Massachusetts and Rhode Island.

Potamogeton angustifolius Berchtold & Presl, var. *connecticutensis* (Robbins) Benn. (*P. lucens*, var. *connecticutensis* Robbins) has the 3-keeled fruit of *P. angustifolius* but differs in its greater size, its fruits being 4–4.5 mm. long, while those of *P. angustifolius* are 3–4 mm. long. The variety is known in Vermont and Connecticut, and should be sought in central and western Massachusetts.

P. epihydrus Raf., var. *cayugensis* (Wiegand) Benn. (*P. Nuttalii*, var. *cayugensis* Wiegand) occurs in eastern Maine, in Connecticut, and in Lake Memphremagog, Quebec, and is to be sought in lakes of New Hampshire, Vermont, and western Massachusetts. It differs from the common *P. epihydrus* (*P. pensylvanicus* Willd., *P. Nuttalii*

C. & S.) in its larger floating leaves (29–41-nerved), its broader submersed leaves (9–13-nerved) and its large fruit (3.5–4.5 mm. long).

P. filiformis Pers. occurs locally in northern Maine and northern Vermont. In Maine and Quebec it is apparently confined to shallow ponds and streams with marly bottoms, and it should be sought in such situations in northern New Hampshire.

P. gemmiparus Robbins is frequent in slow streams and pools through southern Maine and it occurs in eastern and central Massachusetts, Rhode Island, and northeastern Connecticut. It should, therefore, be found in southern New Hampshire.

P. heterophyllus Schreb. The different forms are apparently due in great part to the conditions under which they grow and probably are all of more general distribution than the herbaria indicate.

P. interruptus Kit., differing from *P. pectinatus* in its strongly keeled fruit, occurs in brackish waters of eastern New Brunswick and also in Michigan. Search may readily show it to be on the New England coast as well.

P. lateralis Morong, occurring in eastern Massachusetts and in northern Connecticut, is to be sought, naturally, in Rhode Island.

P. obtusifolius Mertens & Koch, frequent in north-central Maine and in Vermont, should be sought in northern New Hampshire. In Maine it prefers clear cold streams.

P. polygonifolius Pourret, a common species of Eurasia, Greenland, and even of Africa and Australia, occurs in Newfoundland and on the coast of Nova Scotia. It has the aspect of a very reduced *P. pulcher*, with extremely slender spikes, the tiny fruits being only 1.5–2 mm. long. It is to be watched for in eastern Maine.

P. pulcher Tuckerm. This distinct species is frequent in eastern Massachusetts, and it is known from southern Maine and from Brattleboro, Vermont (according to Morong). It is, therefore, to be expected in southern New Hampshire.

P. pusillus L., vars. *polyphyllus* Morong and *Sturrockii* Benn., likewise, should be looked for in southern New Hampshire.

P. rutilus Wolfgang, one of our rarest species, is known from the St. Francis River in northern Maine and from a single station in Lake Champlain. It resembles very slender extremes of *P. pusillus*, but has much longer stipules, which are persistent and rather conspicuous; and its sharp-acuminate leaves are almost erect.

P. Vaseyi Robbins is apparently more common than generally supposed and is probably well distributed in southern New England.

Triglochin maritima L., in spite of its usually maritime habitat, is frequent on wet shores and in mossy swamps of northern and north-central Maine and it also occurs in swamps of interior New York. In Aroostook County, Maine, it is associated in Larch and Arbor Vitae Swamps with *Cypripedium hirsutum* Mill, *Valeriana uliginosa* (T. & G.) Rydb., &c., and it may be looked for in similar situations in northern New Hampshire and Vermont.

T. palustris L. is also of wide distribution in Maine. It is a common plant of limy or slightly brackish wet places in the northern section of the state as well as in northern New Brunswick and Quebec; and it follows the coast, in brackish marshes, to Wells, near the New Hampshire border. The species may be confidently sought on the coast of New Hampshire as well as in marly bogs of northern New Hampshire and Vermont.

GRAY HERBARIUM.

MEETING OF THE JOSSELYN BOTANICAL SOCIETY.— The fourteenth annual meeting of the Josselyn Botanical Society of Maine was held at Manset, Mt. Desert Island, Maine, from August 4th to 6th. About a dozen members and guests were present. Unfortunately the weather did not prove as favorable as was hoped, but in other respects the meeting was very successful. Excursions were made to Great Cranberry Island, Bass Harbor, the Sea Wall, Sargent Mountain, Flying Mountain, and Robinson Mountain. The Mt. Desert region is as well studied as any area of similar size in the state, hence it was not expected that any real additions to the local list would be made, save such species as may have been described since the publication of the Flora of Mt. Desert. In this, however, the Society was most agreeably disappointed, and the following species are believed to represent real additions to the flora of the island. I am indebted to Mr. Ora W. Knight for the determination of the Carices.

Carex Bebbii Olney.
" *lurida* Wahl., vâr. *gracilis* Bailey.
" *scoparia* Schkuhr, var. *condensa* Fernald.
" *vesicaria* L., var. *monile* Fernald.
Vicia tetrasperma L.
Echinospermum Lappula Lehm.
Campanula uliginosa Rydb.

A list of the plants seen or collected during the meeting, containing stations for the rarer species, will soon be issued as Bulletin 2 of the Society.— EDWARD B. CHAMBERLAIN, Cumberland Center, Maine.

Vol. 10, No. 117, including pages 133 to 148 was issued 10 September, 1908.

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JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
EDWARD LOTHROP RAND } Publication Committee.

Vol. 10. October, 1908. No. 118.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. October, 1908. No. 118.

THE THREE ADVENTIVE HEATHS OF NANTUCKET, MASSACHUSETTS.

Maria L. Owen.

On the island of Nantucket are three small heaths which attract a degree of attention quite disproportionate to their size. Botanists look at one and question "How came you here?" Flower lovers admiring all of them are content to say "The self-same power that brought me here brought you." Then the Athenians of our day who spend their time seeking new things wherever they journey, hearing of our plant that grows nowhere else on this continent from Greenland to Cape Horn, rush out to the commons to see it; they may be disappointed at its modest appearance, still they show that they too, in their way, care for the wonder, and for all these pilgrims the following story is written.

Erica cinerea, L., *Erica tetralix*, L. and *Calluna vulgaris*, Salisb. are the three heaths, all common and abundant in Northern Europe; the interest lies in the fact that they appear on the Western Continent. Their family is well represented here, but of the genera to which these few specimens belong, *Erica* is totally lacking, and of *Calluna*, although it appears in a few localities quickly counted, it is not certain that it is indigenous with us.

There are three heaths on the island, but it is *Erica cinerea*, the bell-heather, that is the Jean Paul of the trio,— "The Only-One". In August, 1868, a single plant of this species was detected in Nantucket by Mrs. Elizabeth E. Atwater of Chicago, and a notice of this in Wood's Manual of 1874 met my eye. I could hardly believe what I read, but after satisfying myself that there were in the Gray Herbarium specimens verifying Prof. Wood's statement, I took steps to

find the plant again. The island is my birthplace, and I have known its commons, its swamps and thickets, its sea beaches and its pond shores from childhood, but not living there in 1874 I wrote to Mrs. Matthew Starbuck and asked her to be on the lookout for this heather. She is a lady fond of our wild flowers and with facilities for collecting them, but the island has an area of some fifty square miles, and we had no clew to the locality where Mrs. Atwater made her happy find, so it is not strange that years passed before the plant was seen by Nantucket eyes.

I learned in 1879 that Mrs. T. E. Morris, of Saginaw, Michigan, saw it for the second time in 1871. She was Mr. Atwater's niece and was with her uncle and aunt when the plant was first found. In a letter to Mrs. Atwater she tells of visiting again the spot where they had seen it together, of finding "the same old roots" and of searching the vicinity in vain for more specimens. She says "roots"; that is misleading, for there was only one plant, as I know from seeing it many times, year after year.

In 1878 Mrs. Starbuck's daughter, Mrs. Merriam (afterwards Mrs. Spinney), brought home from a walk and showed her mother "a new flower" which the latter declared at once must be the one I had charged her to seek. She was right; the long-hidden heath was rediscovered.

The next time I went to Nantucket I was taken to see the precious plant. It was seven or eight inches high and a bushy little thing, full of flowers; its habit always was to bloom from early summer till late in the fall, and on that account it was conspicuous, but it was fortunately screened from observation by bushes growing between it and the road, and furthermore the bitter polygala, which matches the bell-heather closely in color, was abundant in the vicinity. This plant lived till about 1903, thirty-five years after Mrs. Atwater first saw it. Mrs. Stokeley Morgan, who had known it for several years before its death, tells me that she found it alive and vigorous in the late fall either of 1902 or 1903 and protected it by blocks and boughs; the next spring it was dead, perhaps killed by some heavy thing (part of the protection) which had fallen upon it, or perhaps it had lived its life. And so our fair flower went in mystery as it came. But some time before this Mrs. Morgan had found a second plant not far from the original, and after that was dead she took Judge Churchill of Dorchester to see the new one. He remarked that if the first

had ever ripened seed the prevailing wind at that place would blow it in amongst the trees; they searched at once and were rewarded by the discovery of another plant of the size and apparent age of Mrs. Morgan's first find. This was in 1903 or 1904, and till this year there was no question but they were the direct offspring of Mrs. Atwater's plant; what new testimony has come out will be told farther on. These new plants are in fine condition: I have seen them this year as well as in the two years preceding.

When we consider the eminent botanists who have gone to Nantucket from the time of Oakes and Hitchcock down to the present day and have made diligent collections without ever discovering an *Erica*, it may be confidently inferred that the first specimen could not have been there many years before 1868, but that more may be found is not impossible, for persistent efforts have been made to raise the plant by scattering seed at random and also sowing it in many places.

Mr. Sidney Starbuck told me that he once brought from Scotland two or three pounds of both purple and white heather seed and gave it to his aunt, the Mrs. Starbuck before mentioned, and that she had it sown on the commons.

Mr. John Appleton tells me that the late Mr. Kimball, a well known seedsman and florist of Rochester, N. Y., who had a summer residence on the island for many years, once carried there a bushel of heather seed, with which he supplied those who wanted it until it was nearly all gone and then gave him the remainder which he sowed. Mrs. Dahlgren who spent many summers with her family at their house on the Cliff was so bent on multiplying these additions to the island flora that she procured from a florist directions for propagating heather, and by following them on her own premises with constant care, she raised all three kinds,— the bell-heather, the cross-leaved and the *Calluna* or ling. I saw them once,— tiny little things in two-inch pots, perhaps thirty or more. She gave the plants away generously; I had two myself, but they soon died, and there may not be one living now. I should add that Mrs. Dahlgren, like others already mentioned, took unwearied pains to propagate this pretty heather out of town, with the ultimate object of naturalizing it on the island. On her drives she carried in her lap an uncovered box of seed which she scattered along the roadside, and also had her driver sow some carefully in favorable spots amongst the pines and on the commons.

Miss Lydia M. Folger tells me this year that she was with Mrs. Dahlgren once when she set out plants in just about the spots where Mrs. Morgan found the two now living. This raises the question whether these are really from wind-blown seed or are those of Mrs. Dahlgren's that have lived and flourished. The only thing apparently certain is that they are not to be classed with Mrs. Atwater's discovery. Mrs. Morris searched the vicinity in 1871, and others have done the same year after year, but all in vain till the two specimens now growing near the plant of 1868 appeared; as to the origin of that all are free to form a conjecture, or to call it a waif and there let it rest.

There is no mystery about *Erica tetralix* and *Calluna vulgaris*, found in Mr. Henry Coffin's nursery. It is only this year that I learned the true history of the trees there. I had been told before this that Mr. Coffin, owning unimproved land, exchanged some of it with Mr. George B. Emerson for an equivalent in trees; this is not quite correct, but we are not concerned now with the way Mr. Emerson acquired property in Nantucket. I have at hand a copy of a letter written in April, 1877, by Mr. Coffin to Mr. J. S. Tewksbury of Winthrop, who was Mr. Emerson's agent in the business. He reports in it the arrival of a box of young trees and says that he had at the time of writing finished planting, with the help of three or four men, the six acres of Mr. Emerson's land, and was now going to plant six acres for himself. He was to have twenty thousand two year old trees consigned to him and ten thousand one year old, but apparently they had not all reached him then. He goes on to speak of "the first three boxes which came from Europe, and they contained only 7253 trees, said to be 10,000. They were the fir trees and so were much larger."

This letter proves what had been guessed for many years,— that some, if not all, of the trees were imported stock; we know now that 7253 crossed the ocean to us, quite enough to account for the heaths that sprang up in the nursery. The *Erica* was found there in 1884 by Miss Susan Coffin and the *Calluna* in 1886 by Mr. Lawrence Coffin, but the size of the Callunas showed that they must have been there in 1884, although not distinguished by Miss Coffin and her father. Mr. Lawrence Coffin recognized this heath from his previous familiarity with its appearance. Six years before, while still a schoolboy, he had found a single specimen of *Calluna* on the open com-

mon, a plant that could have had no connection with those of the nursery from which it was miles away. This 1880 plant evidently belongs with those scattered specimens found from time to time in our country from Newfoundland to Massachusetts.

Either in 1886 or soon after, the late Mr. John H. Redfield went to Nantucket expressly to see the three heaths of which he had heard from his friend Dr. Asa Gray. After visiting those to which this paper refers, Mr. Lawrence Coffin took him to see the one which he had found so long before. Mr. Redfield wrote to me that the size of the stock and general appearance of this solitary plant indicated a very considerable age. It disappeared years ago.

As for the future of our immigrants, the two bell-heather plants seem likely to live out their natural lives and the ling (*Calluna*) may become naturalized in a few spots. In 1907 I went to see every individual plant of all three of the heaths of which Mr. John Appleton had any knowledge, and he is well informed about their localities. I found the Calluna quite widely spread. There is a fine large plant raised from a cutting, carefully cherished in a yard in the heart of the town, and Mr. Appleton has two equally large on his farm transplanted from land of his own adjoining the Coffin nursery, while in the nursery itself there may be from twelve to twenty,— I could not easily count them. A few neglected straggling specimens are still to be found amongst the grass on the Dahlgren place.

Mr. Abajian has attempted propagation and he showed me a few minute specimens in his window box; this was in 1906, but they were gone in 1907. A "cliff-dweller" took me to two beautiful plants on the face of the Cliff set out there a few years before, now large and healthy bushes;— this because I was trustworthy, so I say no more of that locality.

Next a most interesting patch far along on the Cliff. Within a space measuring twelve feet by six, there are, by actual count, about fifty vigorous little plants, some hardly above the ground, and others from that size up to three or four inches in height, some in bloom.

These are puzzlers. I might think they were from seed, but who sowed it? Dr. and Mrs. Workman own the place, but they left Nantucket for the Himalayas years ago, and their house has been closed ever since. The few who know of this interesting cluster lay it to Mrs. Dahlgren's agency,— really a probable conjecture,— her cottage was not far from Monsalvat, the Workman place — and although

she has not been on the island for five years, these little plants may be older than we think; we cannot set up as judges of the age of plants which we in this country have never had a chance of studying. It would be absurd to suppose they were natives of the soil and had shown themselves only in these late years. When I saw these pretty little things so stout and healthy amongst the grass, I felt that the Scotch ling had settled there to stay; it thrives in our climate, and in time the slope may be covered with it, at the right season all aglow with its rosy flowers.

In August of this year I heard of two *Callunas* discovered in a new locality by Dr. E. Le Roy Thomson of New Haven, Ct., and under his guidance I went to see them. They are a few feet apart on the open common, growing amongst the usual vegetation of the locality; the largest spreads from one root about three feet six inches by two feet nine, the other, nearly circular, is about three feet in diameter. Dr. Thomson first observed them in July, 1906, while on one of his frequent rides over the island and has seen them every year since; from their rate of growth, which is more rapid than that of the Coffin plants, he judges that they may be from eight to ten years old. They are miles away from any human habitation as well as from the nursery; it seems improbable that they can have sprung from wind-wafted seed of the Henry Coffin plants, but are more likely to be of the Starbuck, Kimball or Dahlgren sowing, and this will be the most plausible explanation for the appearance of any that may be discovered hereafter on the island.

In September of this year Dr. Thomson found still another *Calluna* on the open common, but far from the two just mentioned as well as from the nursery. This is a large plant, about three feet in diameter.

The cross-leaved heather, *E. tetralix*, has diminished sadly in numbers since 1887 when Miss Coffin found some twenty-five plants, more than twice as many as in 1884. It is very attractive with its head of delicate pink blossoms, and by the reckless picking of some of its admirers it is too often pulled out of the ground, so that it has been reduced in number to five individuals. This is in the locality by which the road passes, but in the ten acres or more of the Coffin and Emerson nurseries Dr. Thomson has discovered other specimens, eight measuring each from twelve to twenty inches in diameter and eleven small ones. By means of these hidden away in places difficult of access the species may keep its existence.

The sum of these investigations is this: that one plant of *Erica cinerea* which it has been impossible to trace to human agency appeared in Nantucket forty years ago and lived till 1902 or 1903; that there are two of the same species of doubtful origin now alive near the spot where the first was found; that the Lawrence Coffin *Calluna*, now dead, in all probability adds one more locality for this as a wild plant to those previously known in New England and the British provinces; that the *Calluna* of the nursery came in from Europe with the imported trees; that every other bit of it on the island goes back to that for its origin, or else has come from the Kimball, Dahlgren or Starbuck seed, and that the cross-leaved heather, *Erica tetralix*, stays under the pines and larches where it was first found.

Brooklyn, N. Y.

ADDITIONAL LISTS OF CONNECTICUT DIATOMS.

William A. Terry.

During the past year I sent to Tempère at his request some fifty different gatherings of North American diatoms. He was about to issue the second edition of the "Diatomeés du monde entier" [1] and I was pleased at the opportunity of bringing these collections to the notice of the scientific world, especially as many of them contained new species that I had discovered. Among these gatherings was one from "Doer's Mountain Grove" Ice pond, on a small mountain brook near New Britain reservoir. This was notable as containing abundance of *Surirella Terryi* Ward. This *Surirella* was the principal form in Spring's Pond, a small pond on the north bank of the Pequaback River in Bristol, and with it were numbers of the small *S. ovalis* var. *angusta* (Kütz.) V. H. A quarter mile down the river just east of Saw Shop is a pond hole on the Lee property formed by cutting off a bend of the river when the highway was moved to accommodate the railroad; this is also rich in *S. Terryi*. Below this

[1] Diatomées du monde entier. Collection Tempère et Peragallo. Deuxième Édition. 1907–1908.

is Downs' Pond, a large part of which is a cove setting back from the river, in which the mud is three or four feet deep, all very rich in diatoms, including abundance of the species in question, which is abundant also in Thompson's Pond, on the headwaters of a small brook flowing into Downs' Pond, and Allen's Pond in Stafford district, near the northeast corner of Bristol, on the headwaters of a small stream, and Beattie's Pond, at Leete's Island. At this last station are also other rare species, including *Navicula peripunctata* Brun, *Pleurosigma simile* Grun., and the very rare *P. subsalinum* Per. Outside these ponds above noted I have never found more than an occasional specimen of *S. Terryi* in all the hundreds of gatherings by myself and others from streams, ponds, lakes and rivers all over the country. Of the seven ponds in which this species is found, four are on the headwaters of streams many miles apart, but all in Connecticut, while the others are on the Pequaback River.

The following lists from the third and fourth fascicles of the Diatomées du monde entier are from my material and are interesting as being the latest and most authoritative determinations; many species here given were not in my list[1] and some of them have never before been credited to North America. In spelling, abbreviations and italics, the original is followed; the explanation as there given is —"Nota. Le nom des espèces prédominantes sont imprimés en caractère gras; les rares en italique et les autres en caractère courant."

The Fall Mountain gathering was from a small brook flowing from a mountain spring; Bunnell's Pond is the highest in a series of ponds on a stream flowing from South Mountain reservoir.

No. 78. Ice Pond, New Britain, (Connecticut, U. S. A.).

Achnanthes coarctata Grun.
Amphora libyca Ehr.
ovalis Ktz.
pediculus Ehr.
Cymbella amphicephala Naeg.
Ehrenbergii Ktz.
gastroides Ktz.
naviculaeformis Auers.
Encyonema lunatum Grun.
Epithemia argus v. amphicephala Grun.
gibba Ktz.
v. ventricosa Ktz.
zebra v. proboscida Grun.
Eunotia *diodon Eh. fa. minor.*
impressa Grun.

[1] Rhodora, Vol. IX, p. 125.

Eunotia lunaris Grun.
major Rab.
v. *ventricosa* Cl.
monodon Eh.
pectinalis Rab.
v. ventricosa Grun.
praerupta v. bidens Grun.
ternaria Eh.
Fragilaria *virescens Ralfs.*
Gomphonema acuminatum Eh.
dichotomum W. Sm.
intricatum Ktz.
montanum Shum.
montanum v. suecica Grun.
Hantzschia amphioxys Grun.
elongata Grun.
Meridion *constrictum Ralfs.*
Navicula acrosphaeria Bréb.
affinis Ktz.
amphirynchus Eh.
bicapitata v. hybrida Grun.
Braunii Grun.
v. interrupta.
Brebissonii Ktz.
cryptocephala Ktz.
cuspidata Ktz.
dubia Greg.
gigas Ehr.
iridis Eh.
limosa Ktz.
v. subundulata.
major Ktz.
Navicula mesogongyla v. interrupta Cl.
mesolepta v. stauroneiformis Gr.
mesotyla Eh. var.
nobilis Ktz.
nodosa v. curta Rab.
pupula v. lineare v. n. avec la striation de N. pupula et la forme bacillaire à extrémités arrondies M. P.
trinodis Lewis.
var.
viridis Ktz.
v. commutata Grun.
Nitzschia sigmoidea W. Sm.
Stauroneis anceps Eh.
v. linearis Eh.
gracilis Eh.
legumen Ktz. La forme représentée dans V. H. Syn. 4/11 n'en est qu'une variété très étroite.
Surirella saxonica Auersw.
splendida Eh.
tenera v. splendidula A.S.
Terryi Ward n. sp.
Synedra *capitata Eh.*
ulna Eh.
Van Heurckia rhomboides v. amphipleuroides Grun.

Nos. 103, 104. Fall Mountain, Bristol, Connecticut no. 1 (Etats-Unis).

(Sources et ruisseaux à 800 pieds d'altitude).

Achnanthes lanceolata Bréb.
v. Haynaldii?
Cymbella gastroides Ktz.
Diatoma anceps v. capitata M. Per. à extrémités resserrées et fortement capitées.

Diatoma anceps v. linearis M. Per. trés étroite, lineare à extrémités atténuées.
hyemale fa curta.
var.mesodon Grun.
Encyonema ventricosum Grun.
Eunotia *arcus Eh. v. minor V. H.* *v. tenella* Grun.
minor Rab.
pectinalis v. stricta Rab.
Fragilaria *aequalis v. producta* Lag.
Gomphonema angustatum Ktz.
angustatum v. elongata M. Per. plus long que le type, biconique à extrémités à peine un peu produites. Longueur 60 μ.
angustatum v. producta P. P.
dichotomum W. Sm.
micropus Ktz.
tenellum Ktz.
Hantzschia amphioxys Grun.
fa major Grun.
vivax v. granulata M. Per. très grand, porte à une certaine distance de la caréne une ligne de points analogues aux points carénaux. Longueur 250 μ. 13 stries en 10 μ.
Meridion constrictum fa elongata, très long et étroit.
constrictum v. Zinkenii Grun.
Navicula acrosphaeria v. minor M. Per. et F. H.
appendiculata Ktz.
Navicula bisulcata Lag.
Bogotensis v. ininterrupta M. P. à striation non interrompue au milieu de la valve.
Bogotensis v. undulata M. Per. diffère de A. S. 44/30 par les bords trionduléś.
Cari Eh. v. angusta Grun.
decurrens Eh.
dicephala Eh.
dicephala v. lata M. Per. largement elliptique, rostrée, capitée et striation du *Nav. dicephala.*
divergens W. Sm.
elegantissima M. Per. Petite, largement elliptique à extrémités rostrées, capitées; structure formée de granules fines disposées en élégantes lignes courtes décussées comme chez les Orthoneis.
elliptica Ktz.
fasciata Lag.
gibba Ktz.
hemiptera Ktz.
heroina A. S.
major Ktz.
parva Eh.
Smithii v. dilatata M. Per. fortement dilatée, presque circulaire; aire centrale développée, côtes fines et isolées, peu distinctement granulées.
stomatophora Grun.
subcapitata v. stauroneiformis.

Navicula viridis Ktz.
v. commutata Grun.
v. fallax Cl.
Pleurosigma *attenuatum W. Sm.*
Stauroneis anceps Eh.
v. linearis.
anceps v. capitata M. Per. Semblable à la variété amphicephala mais plus petit, à bords droits et à extrémités relativement plus larges et plus capitées. Long 22 μ largeur 7 μ.
Synedra ulna Eh.
v. vitraea V. H.
Tabellaria fenestrata Ktz.
flocculosa Ktz.
v. ventricosa Grun.
Van Heurckia vulgaris Thw.

No. 105, 106. Bunnel's Pond, Bristol, Connecticut (Etats-Unis) (Dépôt fossile d'eau douce).

Amphora Lybica Eh.
pediculus Grun.
Cocconeis placentula Eh.
v. lineata V. H.
Cymbella cuspitata Ktz.
Ehrenbergii v. minor V. H.
gastroides Ktz.
heteropleura Ktz.
producta M. Per. De forme élliptique, à extrémités productes, semblable à celle figurée dans A. S. atlas 9/52 mais plus grande à aire centrale plus développée et stries distinctement divisées en travers. Long 74 μ; 7 stries dorsales, 8, 5 ventrales en 10 μ.
Encyonema ventricosum Ktz.
Epithemia *turgida Ktz.*
Zebra Ktz.
Eunotia arcus Eh.
v. plicata J. B. et F. H.
diodon Eh.
fa. minor Grun.
formica Eh.
Eunotia *gracilis v. nodosa?* les extrémités sont rondes, différentes de celles de *E. formica.*
incisa Greg.
lunaris Grun.
monodon Eh.
pectinalis v. ventricosa Grun.
praerupta Eh.
robusta v. tetraodon V. H.
Fragilaria Harrissonii Grun.
virescens Ralfs.
Gomphonema acuminatum Eh.
angustatum Ktz.
augur Eh.
commutatum Grun.
constrictum v. capitata Eh.
constrictum v. subcapitata Eh.
Herculaneum Eh.
micropus Ktz.
Mastogloia **Smithii** *Thw. var.*
Meridion constrictum Ralfs.
Navicula acrosphaeria Ktz.
acrosphaeria var. dilatata M. Per. à centre très

fortement dilaté en forme de cercle et à extrémités capitées.
affinis v. amphirynchus Eh.
Navicula affinis fa. maxima.
americana v. bacillaris M. P. et F. H.
amphigomphus Eh.
bisulcata Lag.
Bogotensis Grun. var.
brevicostata Eh.
commutata Grun.
dactylus fa. curta Ktz.
Dariana A. S.
divergens W. Sm.
divergens v. bacillaris M. Per. tout à fait bacillaire à extrémités exactement hémicirculaires.
divergens v. constricta M. Per. à partie ventrale resserrée et à extrémités atténuées arrondies.
elegantissima M. Per.
fasciata Lag.
gentilis Donk.
gibba Eh.
Hitchcockii Eh.
iridis Eh.
legumen Eh.
limosa Ktz.
linearis Greg.
major Ktz.
mesolepta v. stauroneiformis Grun.
mesostyla Ktz.
nobilis Eh.
rhyncocephala Ktz.
rupestris Hantz.
transversa A. S.
viridis Ktz.

Bristol, Connecticut.

Navicula sp. A. S. atlas 44/44.
sp. A. S. atlas 49/40. (N. producta v. acuta.)
Nitzschia spectabilis Ralfs.
Stauroneis acuta W. Sm.
v. gracilis Eh.
gracilis Eh.
lanceolata Ktz.
Phoenicenteron Eh.
Pteroidea Eh.
Stephanodiscus astraea Grun.
Surirella **Guatemalensis** Eh. = Sm.
Cardinalis Kitt.
Kittoni? A. S. v. elliptica.
linearis W. Sm.
v. constricta Grun.
pseudo cruciata M. Per., de structure tout à fait semblable à celle de A. S. 56/15, 16 mais ne présentant pas le renforcement de la partie centrale.
splendida Eh.
tenera Greg.
v. nervosa A. S.
v. splendidula A. S.
valida A. S.
Synedra splendens Ktz.
ulna Eh.
v. lanceolata fa brevis Grun.
v. undulata Greg.
Tabellaria fenestrata Ktz.
flocculosa Ktz.
flocculosa v. ventricosa Grun.
Van Heurckia rhomboides Bréb.
rhomboides v. amphipleuroides Grun.
vulgaris Thw.

NOTES ON NEW ENGLAND HEPATICAE, — VI.

Alexander W. Evans.

During the past year several important additions have been made to the hepatic flora of New England, more especially to the local floras of Maine, New Hampshire, and Connecticut. These additions are recorded in the present paper, although a number of them have already been noted in earlier publications.[1] The synonymy of six other New England species is also briefly discussed.

1. Metzgeria pubescens (Schrank) Raddi, Mem. Soc. Ital. delle Sci. in Modena **18**: 46. 1818. *Jungermannia pubescens* Schrank, Prim. Fl. Salisb. 231. 1792. *J. tomentosa* Hoffm. Deutschlands Flora **2**: 91. 1795. *Echinomitrium pubescens* Hüben. Hepat. Germ. 48. 1834. On bark of yellow birch, near base of tree. Franconia Notch, New Hampshire (*Miss Haynes*). The species is most frequently found on limestone rocks. It has a wide distribution in Europe and Asia and is not uncommon along the Pacific Coast of North America from Alaska to Washington. It has also been reported from eastern North America, but the records are indefinite and the specimens upon which they are based seem to have disappeared. The plants collected by Miss Haynes are fragmentary and mixed with *M. conjugata*, but there seems to be no doubt as to the correctness of the determination. *M. pubescens* is at once distinguished from our other species by the fact that the upper or antical surface of the thallus is densely covered with hairs, which give it a velvety appearance. In well-developed plants the midrib is bounded both above and below by from eight to ten rows of cells, although the number is frequently less on slender branches. There is also but little difference in size between these cortical cells and those which form the interior of the midrib. In *M. conjugata* and the other species known from the United States the upper surface of the thallus is smooth, and the midrib is bounded above by only two rows of cells and below by from two to four rows. There is also a sharp distinction in size between the large cortical cells and those in the interior of the midrib. *M. pubescens* is further distinguished by its pinnate rather than dichotomous

[1] Collins: Some Mosses from Aroostook County, Maine. Rhodora **10**: 37, 38. 1908. Evans & Nichols: The Bryophytes of Connecticut. Conn. Geol. and Nat. Hist. Survey **11**: 1-203. 1908. Miss Lorenz: Jungermannia in New Hampshire. Torreya **8**: 55, 56. 1908.

branching, a peculiarity which is not always evident on poorly developed material.

2. **Marsupella robusta** (DeNot.) comb. nov. *Jungermannia emarginata*, var. *aquatica* Lindenb. 1829. *Sarcoscyphus Ehrharti*, var. *aquaticus* Nees, 1833. *S. Ehrharti*, var. *robustus* DeNot. 1861. *Nardia robusta* Lindb.; Carrington, Brit. Hep. 16. 1874 (incidental mention). *N. robusta* Trevis. 1877. *S. aquaticus* Breidl. 1894. *Marsupella aquatica* Schiffn. 1896.[1] The strict application of either the Vienna Rules or the American Association Code of Nomenclature necessitates the above change. Although Lindenberg's variety *aquatica* is so much older than the variety *robustus* of DeNotaris, it was under the latter name that the species was first adequately published by Trevisan. As the synonymy shows the name *Nardia robusta* had already been used for the present species by Lindberg,[2] but he apparently never published it and we know it only from the incidental mention in Carrington's work. *Marsupella robusta* is still known in New England from Maine and New Hampshire only.

3. Nardia crenuliformis (Aust.) Lindb. Acta Soc. Sci. Fenn. **10**: 530. 1875. *Jungermannia crenuliformis* Aust. Bull. Torrey Club **3**: 10. 1872. *Solenostoma crenuliforme* Steph. Bull. de l'Herb. Boissier II. **1**: 494. 1901. On rocks along a stream. Beacon Falls, Connecticut (*A. W. E.*). New to New England. The species is apparently confined to the eastern United States, but its range is very indefinitely known, the only stations recorded being the following: Closter, New Jersey (*Austin*); Coschocton County, Ohio (*Sullivant*); Tibb's Run, West Virginia (*Andrews*). Even at the time of its original publication Austin recognized its relationship to *N. crenulata*, and Lindberg considered the relationship so close that he was almost ready to deny it specific rank. Austin,[3] however, insisted that it was distinct, and it has recently been recognized as a clearly defined species by both Underwood and Stephani. The most striking peculiarity which the two species possess in common is the border of enlarged and thick-walled cells, which usually forms a conspicuous feature of the leaves and bracts. This border is even more constant in *N. crenuliformis* than in *N. crenulata*, in slender forms of which

[1] For fuller references and additional synonyms see the writer's notes on *M. aquatica* in Rhodora **6**: 167. 1904.

[2] See Schiffner, Lotos **44**: 267. 1901.

[3] Bull. Torrey Club **6**: 85. 1876.

it is often restricted to the uppermost bracts. Even in the borders, however, certain differences are to be observed. In *N. crenulata* the marginal cells lie in the plane of the leaf and are considerably larger than the cells just within; in *N. crenuliformis* they lie in a different plane and form an elevated ridge around the leaf, but the contrast in size is less marked. The remaining leaf-cells also show differential characters: in *N. crenulata* they average about 35 μ in the middle of the leaf, and their walls are either thin throughout or show minute trigones; in *N. crenuliformis* the median cells average about 25 μ and show distinct trigones. *N. crenuliformis* is further distinguished by its place of growth (*N. crenulata* preferring sandy banks and roadsides), by its numerous flagella, and by its reddish rhizoids. The last peculiarity indicates an approach to *N. hyalina* and *N. obovata,* both of which show a uniform cell-structure in their leaves.

4. Lophozia attenuata (Mart.) Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Jungermannia gracilis* Schleich. Pl. Crypt. Exsic. Helvet. **3**: *60.* 1804 (*nomen nudum*); Lindberg, Musc. Scand. 7. 1879. *J. quinquedentata δ attenuata* Mart. Fl. Crypt. Erlangensis 177. *pl. 6, f. 50c.* 1817. *J. attenuata* Lindenb. Nova Acta Caes. Leop.-Carol. **14**, suppl.: 48. 1829. *J. quinquedentata β gracilis* Hüben. Hepat. Germ. 203. 1834. *J. barbata,* var. *attenuata* Nees, Naturgeschichte der europ. Leberm. **2**: 163. 1836. *Lophozia gracilis* Steph. Bull. de l'Herb. Boissier II. **2**: 47. 1902. *Barbilophozia attenuata* Loeske, Verhandl. Bot. Ver. Prov. Brandenburg **49**: 37. 1907. According to the prevailing codes of nomenclature *Jungermannia gracilis* of Schleicher was not adequately published by its author. The name first appeared in a set of exsiccatae of Swiss cryptogams, issued early in the last century. The specimens were distributed with printed labels, but no diagnoses accompanied the species which Schleicher considered undescribed. The names of these new species are therefore to be regarded as *nomina nuda,* unless subsequent authors have republished them either with descriptions or with the citation of synonyms. In the case of *J. alpestris* Schleich. this was soon done by Friedrich Weber,[1] so that this name is now universally recognized. In the case of *J. gracilis,* however, adequate publication was delayed for many years, although

[1] Hist. Musc. Hepat. Prodr. 80. 1815.

the name was quoted from time to time in synonymy. Meanwhile the species which Schleicher called *J. gracilis* was published as new by Lindenberg under the name *J. attenuata*, and it is by this specific name that it ought now to be designated. *L. attenuata* is known in New England from Maine, New Hampshire, Vermont, and Connecticut, and ought surely to be expected in Massachusetts.

5. Lophozia Baueriana Schiffn. Lotos **51**: (9). 1903. *Jungermannia barbata*, var. *pusilla* Schiffn.; Schiffner & Schmidt, Lotos **35**: 25. 1886. *Lophozia Floerkii*, var. *Baueriana* Schiffn. Oesterr. Bot. Zeitschr. **50**: 274. 1900. *J. Floerkii*, var. *aculeata* Loeske, Moosfl. des Harzes 86. 1903. On wet rocks. Little Saddleback Mountain, Franklin County, Maine (*Chamberlain & Knowlton*). New to New England but recently recorded from arctic America (Greenland, Ellesmere Land, and North Lincoln) by Bryhn.[1] *L. Baueriana* was proposed by Schiffner to include plants which were formerly considered connecting links between *L. Floerkii* and *L. lycopodioides*. Although so recently published it has already received wide acceptance in Europe, where it has an extensive distribution. It agrees with its nearest allies in having distinct underleaves and in developing a cluster of teeth or cilia near the postical base of each leaf. It differs from *L. Floerkii* in the fact that its leaves usually have four lobes instead of three, some of the lobes at least being tipped with bristle-like teeth, instead of being uniformly blunt. These peculiarities it shares with *L. lycopodioides*, but the latter species is distinguished by its larger size and by its crispate leaves commonly broader than long. *L. Baueriana* is further characterized by producing an abundance of gemmae, these bodies being very rare in most species of the *barbata*-group. Another very close relative is *L. Hatcheri* (Evans) Steph.,[2] of antarctic regions, a species which also reproduces itself largely by means of gemmae. According to Loeske the two species are probably synonymous, and he unites them under the name *Barbilophozia Hatcheri* Loeske.[3] In view, however, of their wide geographical separation it seems quite justifiable to keep them apart until their ranges of variability are better known, more especially since no species of the *barbata*-group are known from intermediate regions. For fur-

[1] Rep. Second Norwegian Arctic Exped. in the "Fram" **11**: 37. 1906.
[2] Bull. de l'Herb. Boissier II. **2**: 159. 1902. *Jungermannia Hatcheri* Evans, Bull. Torrey Club **25**: 417. *pl. 346, f. 1–7.* 1898
[3] Verhandl. Bot. Ver. Prov. Brandenburg **49**: 37. 1907.

ther information about *L. Baueriana* the following references may be consulted: Arnell, Bot. Notiser 1906: 145–157. Arnell & Jensen, Naturw. Unters. des Sarekgebirges in Schwedisch-Lappland **3**: 109. 1907. Macvicar, Jour. Bot. **45**: 258. 1907.

6. Lophozia longiflora (Nees) Schiffn. Lotos **51**: (45). 1903. *Jungermannia longiflora* Nees, Naturgeschichte der europ. Leberm. **2**: 95. 1836. *L. ventricosa*, var. *longiflora* Macoun, Cat. Canadian Pl. **7**: 17. 1902. In tufts of *Sphagnum*, near Schoodic Lake, Maine (*A. W. E.*). New to New England. Probably widely distributed in North America but easily confused with other species of the *ventricosa*-group. Until revived by Schiffner the species had long been ignored or forgotten by the majority of European writers. *L. longiflora* is closely related to *L. porphyroleuca* and perhaps represents a swamp or bog variety of that species, although Schiffner states that he has never seen connecting forms. When compared with typical *L. porphyroleuca*, which grows on rotten logs, *L. longiflora* is seen to be about three times as large, the difference in size being especially apparent in the perianth. As a rule the leaf-cells have smaller trigones, and their walls are sometimes scarcely thickened at all. The mouth of the perianth is not lobed as in *L. porphyroleuca* but simply minutely and irregularly toothed, very much as in *L. ventricosa*. Unfortunately the Maine specimens are destitute of perianths but agree in all other respects with those distributed by Schiffner (Hep. Europaeae Exsic. *138*, *139*).

7. **Cephaloziella Sullivantii** (Aust.) comb. nov. *Jungermannia Sullivantii* Aust. Proc. Acad. Philadelphia for 1869: 221. *Cephalozia Sullivantii* Aust. Hep. Bor.-Amer. *50*. 1873. The genus *Cephaloziella* was first proposed by Spruce[1] as a subgenus under *Cephalozia* and afterwards raised to generic rank by Schiffner.[2] It is not universally accepted, even in Europe, and yet the species which belong to it form a group which can be easily distinguished. They are considerably smaller than in *Cephalozia* (subgenus *Eucephalozia* Spruce), their leaf-cells also are smaller, and their female flowers are usually borne on leading branches rather than on short postical branches. The cell-structure of the stems and branches is also characterized by being uniform, while in *Cephalozia* a cortical layer of enlarged cells is usually differentiated. The perianth in *Cephaloziella*, finally,

[1] On Cephalozia 62. 1882.
[2] Engler & Prantl, Nat. Pflanzenfam. **1**[3]: 98. 1895.

commonly bears several supplementary keels in addition to the three keels characteristic of the Trigonantheae as a whole. These peculiarities afford an excellent combination of generic characters, although it must be admitted that some of them are not invariably constant. In addition to the species noted above, *Cephaloziella divaricata* (Sm.) Schiffn. and *C. myriantha* (Lindb.) Schiffn. are also known from New England.[1] It is also probable that the number of species would be still further increased if the material on hand were thoroughly revised.

8. Bazzania tricrenata (Wahl.) Trevis. Mem. R. Ist. Lomb. III. **4**: 415. 1877. *Jungermannia triangularis* Schleich. Pl. Crypt. Exsic. Helvet. **2**: *61*. 1803 (*nomen nudum*). *J. tricrenata* Wahl. Fl. Carpat. 364. 1814. *J. deflexa* Mart. Fl. Crypt. Erlangensis 135. *pl. 3, f. 8*. 1817. *Pleuroschisma tricrenatum* Dumort. Syll. Jung. 70. 1831. *P. deflexum* Dumort. l. c. 71. *Herpetium deflexum* Nees, Naturgeschichte der europ. Leberm. **3**: 59. 1836. *Mastigobryum denudatum* Torrey; G. L. & N. Syn. Hep. 216. 1845. *M. ambiguum* Lindenb. l. c. 217. *M. deflexum* Nees, l. c. 231. *Bazzania triangularis* Lindb. Acta Soc. Sci. Fenn. **10**: 499. 1875. *B. deflexa* Underw. Bull. Ill. State Lab. Nat. Hist. **2**: 83. 1884. The same reasoning which applies to *Lophozia attenuata* applies to *Bazzania tricrenata* as well. Schleicher's *Jungermannia triangularis*, inadequately published as a *nomen nudum*, ought to be superseded by the adequately published *J. tricrenata* of Wahlenberg. The synonymy of the species is exceedingly complicated, and only the more important of its many names are indicated above. It is usually abundant in mountainous and northern regions and is known in New England from New Hampshire, Vermont, Massachusetts, and Connecticut. Strangely enough it has not yet been reported from Maine.

9. Leucolejeunea clypeata (Schwein.) Evans, Torreya **7**: 227. 1908. *Jungermannia clypeata* Schwein. 1821. *Lejeunea clypeata* Sulliv. 1848. *Archilejeunea clypeata* Schiffn. 1895. This species is known from Massachusetts and from numerous localities in Connecticut. It should also be looked for in Vermont, since it has already been found on the eastern shore of Lake George, New York.

10. Leucolejeunea unciloba (Lindenb.) Evans, Torreya **7**: 228. 1908. *Lejeunea unciloba* Lindenb. 1845. *Archilejeunea unciloba* Steph. 1895. *A. Sellowiana* Steph. 1895. The only known

[1] See Evans, Rhodora **7**: 55. 1905.

New England station for this species is Quidquisset, Rhode Island (*Bennett*). It probably reaches its northern limit in southern New England, but its range extends southward into Brazil. The reasons for separating this and the preceding species from *Archilejeunea* are fully stated by the writer in Torreya **7**: 225–229. 1908. The same paper also calls attention to the fact that *Archilejeunea Sellowiana* Steph. must be considered a synonym of *Lejeunea unciloba* Lindenb. For descriptions and figures of *L. clypeata* and *L. unciloba*, see Evans, Mem. Torrey Club **8**: 122–128. *pl. 16*. 1902.

11. Frullania Selwyniana Pears. List of Canadian Hepat. 1. *pl. 1*. 1890. Evans, Trans. Conn. Acad. **10**: 29. *pl. 13, f. 10–17*. 1897. *Frullania Sullivantiae* Aust. Bull. Torrey Club **3**: 16. 1872 (not *F. Sullivantii* Aust. 1869). On bark of *Thuja occidentalis*. Shores of Schoodic Lake, Piscataquis Co., Maine (*A. W. E.*). New to New England. The type specimens were collected by Macoun near the mouth of Ste. Anne des Monts River, Gaspé County, Quebec. The species is also known from several localities in Ohio, Austin's specimens of *F. Sullivantiae* having been collected near Urbana. *F. Selwyniana* looks at first sight like a small form of *F. Asagrayana*, resembling it in color and in glossiness. It also agrees in having blunt leaves, each marked by a median row of ocelli or discolored cells. It may be at once distinguished, however, by its autoicous inflorescence and by the fact that the female flower terminates the main stem or a leading branch instead of being borne on a short and simple branch. The coarsely dentate perichaetial bracts are also a striking feature.

12. Anthoceros Macounii M. A. Howe, Bull. Torrey Club **25**: 19. *pl. 326, f. 1–9*. 1898. Along a roadside. Mechanics Falls, Androscoggin County, Maine (*J. A. Allen*). This interesting species was based on specimens collected by Macoun at the outlet of Leamy's Lake, near Hull, Quebec, and distributed in Canadian Hepaticae *81*, as *A. punctatus*. It has since been found near Winona, Minnesota, by Holzinger[1] and is now known therefore from three widely separated localities. It agrees with *A. punctatus* in its dark-colored spores but differs, as Howe clearly shows, in its shorter capsules, in its muriculate spores, the roughness extending over both the inner and the outer surfaces, and in its scanty or abortive sterile cells or pseudo-elaters. In *A. punctatus* the spores are echinulate or

[1] Bryologist **10**: 13. 1907.

setose-papillate on the outer surface, while the inner surfaces are simply foveolate-areolate, and the pseudo-elaters are much better developed.

Aside from the species already mentioned in the preceding pages, the following additions may be recorded:—

For Maine. *Riccardia pinguis;* Crystal, Aroostook County (*M. L. Fernald*). *Calypogeia tenuis* and *Jungermannia pumila*; vicinity of Schoodic Lake, Piscataquis Co. (*A. W. E.*). *Lophocolea minor*; Fort Fairfield (*E. B. Chamberlain & J. F. Collins*). *Lophozia bicrenata* and *Marsupella ustulata*; Mount Katahdin (*A. W. E.*). *Porella pinnata* and *Sphenolobus Hellerianus*; vicinity of Schoodic Lake (*A. W. E.*). *Anthoceros punctatus*; Kittery Point (*R. Thaxter*).

For New Hampshire. *Ricciella fluitans*; Sanbornton (*Mrs. Carter*). *R. Sullivantii*; Dalton (*A. S. Pease*). *Calypogeia suecica, C. tenuis, Cephalozia serriflora,* and *Cephaloziella myriatha*; Franconia Mountains.[1] *Jungermannia cordifolia*; Waterville (*Miss Lorenz*). *Lepidozia setacea* and *Lophozia marchica*; Franconia Mountains.[1] *Nardia hyalina*; Waterville (*Miss Lorenz*).

For Massachusetts. *Jubula pennsylvanica*; Melrose (*C. C. Kingman*).

For Rhode Island. *Ptilidium pulcherrimum;* Providence (*J. F. Collins*).

For Connecticut. *Cephaloziella myriantha*; East Granby and West Hartford (*Miss Lorenz*). *Scapania curta*; Meriden (*Miss Lorenz*). *S. dentata*; Burlington (*G. E. Nichols*). *Lophozia ventricosa*; Salisbury (*Miss Lorenz*).

The Maine records for *Pellia epiphylla, Cephalozia pleniceps, C. serriflora, Lepidozia setacea, Lophozia marchica,* and *Scapania irrigua* may now be definitely marked with the sign "+", although most of them are marked in the writer's Preliminary List with the sign "—". The same is true of the New Hampshire record for *Cephalozia pleniceps* and the Rhode Island record for *Lunularia cruciata.* Unfortunately the Rhode Island record for *Frullania Tamarisci* must be erased, since, as Professor Collins notes, it is based on specimens collected at Blackstone, Massachusetts, just across the Rhode Island line. The Massachusetts record for this rare species may therefore be marked with the sign "+".

[1] Collected by a committee of the Sullivant Moss Chapter, consisting of Miss Haynes, Miss Lorenz, Miss Robinson, and the writer. A full report on the collections, by Miss Lorenz, will appear in the Bryologist for November, 1908.

The census of New England Hepaticae now stands as follows: Total number of species recorded, 147; number recorded from Maine, 101; from New Hampshire, 116; from Vermont, 84; from Massachusetts, 82; from Rhode Island, 64; from Connecticut, 107; common to all six states, 43.

Yale University.

GRAY'S MANUAL OF BOTANY, SEVENTH EDITION.[1]

Karl M. Wiegand.

Perhaps it is not too much to say that no work has been awaited with so much interest by botanists as the new edition of Dr. Gray's famous text-book, which is now before us. It has been a long time since the last edition appeared in 1890, and in this age when progress in scientific fields is so rapid it was inevitable that the work should gradually fall behind the times. A new edition brought completely up to date has long been promised us until to the uninitiated it has seemed like a truly elusive will-o-the-wisp. The delay, however, was due solely to the very great amount of labor and time required for a complete revision and verification of the enormous mass of facts contained in the work. For nearly ten years the editors have been engaged at their task, and it is safe to say that the Manual has never before received a more critical revision.

To the botanist who has not followed recent progress in his science, and who is familiar only with the Gray's Manual of the past, this new edition will appear strange indeed. The most striking change lies undoubtedly in the substitution of the newer Eichler or Engler and Prantl system of classification, now so generally adopted everywhere, for the somewhat antiquated Benthamian system previously used. We now find the *Compositae* at the end of the book and the grasses near the beginning. The older botanist will also find unfamiliar the numerous text illustrations inserted on many pages of the work. These illustrations are small in size and are intended to illustrate not the whole plant but certain characters that are difficult to

[1] Gray's New Manual of Botany, 7th ed. Illustrated.— Rearranged and extensively revised by Prof. B. L. Robinson and Prof. M. L. Fernald of the Gray Herbarium (Harvard Univ.)— American Book Co. 1908, pp. 926.

make clear verbally. They seem carefully done and will undoubtedly prove very useful. A third innovation lies in the adoption of the Vienna code of nomenclature throughout the work. This has necessitated a change in many familiar names, but in fewer than would have been the case had a more radical system been adopted. We also find evidence throughout the work of painstaking investigation into the types of the older authors, resulting frequently in the discovery of long-followed error in interpretation. Rectification of such error has also resulted necessarily in some change of names.

The older botanist will also find much evidence of the great activity in taxonomic botany of recent years. Many species are added; others are broken up; while some are united, in accord with recent revision of the various groups. In this however the authors have maintained a conservative attitude, critically reviewing all new propositions, omitting species of doubtful status, and treating as varieties all those forms that freely intergrade. The policy has also been,—when in doubt, leave it as it was.

We note also the introduction of many specific keys under difficult genera. To the reviewer this seems a very commendable feature, but one that might well have been introduced much more freely. The genus *Aster* and the genus *Solidago* show very strikingly this contrast in treatment. Another new feature, also a good one, is the addition of synonymy under each species. This will be especially appreciated by the amateur botanist who has not time to follow all the changes in nomenclature.

The liverworts have been omitted from this edition, but the ferns and their allies are still retained. The plates that were found at the back of the book are also omitted, most of their figures having been redrawn and more conveniently distributed in the text. At the beginning of the book the synopsis of families has been much reduced, and the analytical key has been made to occupy a more prominent place.

Notwithstanding these many innovations the book is still recognizable as a Gray's Manual. Throughout the work the well known "manual" practice of italicising the distinguishing characters has been followed in family, generic, and specific descriptions. Following the family characterization of the larger families we also find the familiar synopsis divided into tribes with the subdivisions marked with the asterisk and the dagger, and we also find the interpolation in the

genus of the familiar text synopsis. In the use of the various kinds of type too an attempt has been made to follow the plan of the previous editions.

The conservative attitude of the authors is also evidenced by the retaining of the old limits in family and genus as opposed to the practice of segregation. The *Compositae*, *Rosaceae*, and *Leguminosae* still retain their old limits; as also do *Pyrus*, *Potentilla*, *Oenothera*, and *Habenaria*.

The familiar glossary is found at the end of the book, and also a specially prepared index. This index includes family, generic, specific, and popular names, as well as synonyms, all in one, and is a specially commendable feature of the work.

The authors have been assisted in the revision by specialists in certain groups. The *Gramineae* have been revised by Prof. A. S. Hitchcock; the *Orchidaceae* by Mr. Oakes Ames; the Genus *Viola* by Pres. Ezra Brainerd; *Equisetum* and *Isoetes* by Mr. A. A. Eaton; *Senecio* by Dr. J. M. Greenman; and *Crataegus* by Mr. W. W. Eggleston.

The area covered by the Manual has been somewhat changed. The range of this edition is from the Atlantic Seaboard to the western boundary of Minnesota and Iowa and south along the 96th meridian; and from the 48th parallel at the east, and the international boundary at the west, southward to the southern boundary of Kansas, Missouri, Kentucky, and Virginia.

The following statistics are interesting,—

6th Ed.	Genera		Species	
	Native	Introd.	Native	Introd.
Monocots.	170	22	721	64
Dicots.	581	106	1908	380
Total	751	128	2629	444
7th Ed.				
Monocots.	184	26	993	92
Dicots.	596	154	2280	571
Total	780	180	3273	663

The press work is of high class and is a credit to the publishers. Especially is this true when the task of condensing 926 pages into a book of convenient size is considered. A leather-covered pocket edition is in press.

As a whole the work is fully up to the standard of Gray's Manuals,

and is a distinct credit to the already well known reputation of the editors.

It is learned from the publishers that the exact date of issue was 18 September, 1908.

Wellesley, Massachusetts.

New Stations for Ferns in Vermont.— The writer had the good fortune to find within a mile from this city in June a swamp containing several hundred plants of *Woodwardia Virginica* (L.) Sm., thus establishing a third station in Vermont for this interesting fern, the others being Fort Ethan Allen pond, near Burlington, and a bog in Franklin. The circumstances under which the *Woodwardia* was growing here are rather interesting. The bog is of the typical sphagnum type, situated between two ledges, at perhaps 700 feet elevation. The hill on which it is found shelters a large pond bordered by a sphagnum bog, evidently a typical place for *Woodwardia*, yet not a plant of the fern is to be found there although it is only a few hundred feet from the new station. Another interesting fern to be found in the Woodwardia bog and one which I have never before seen in Vermont is *Osmunda cinnamomea* var. *incisa*. About half of a large number of plants of this *Osmunda* growing in the bog show well incised pinnae. The effect of these cut pinnae on the general appearance of the frond is very pretty. None of the incised form of *O. cinnamomea* grows in the other bogs on the hill. A number of botanists to whom I have showed the incised form of cinnamon fern expressed the belief that it would not reproduce true to parent but the finding of so many plants of the fern in the bog looks as though it were something more than a freak.— George L. Kirk, Rutland, Vermont.

To collectors and those who possess herbaria within the region covered by Gray's Manual it will be of interest to learn that a Check List of the new (7th) edition has been prepared by Miss Mary A. Day, Librarian of the Gray Herbarium, Cambridge, Massachusetts. It is of pocket size and will be found convenient alike for field notes and exchange records.

Vol. 10, no. 117, including pages 149 to 172 was issued 30 September, 1908.

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Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER } Associate Editors.

WILLIAM PENN RICH
EDWARD LOTHROP RAND } Publication Committee.

Vol. 10. November, 1908. No. 119.

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Boston, Mass.
1052 Exchange Building.

Providence, R. I.
Preston and Rounds Co.

RHODORA.—A monthly journal of botany, devoted primarily to the flora of New England. Price $1.00 per year ($1.25 to all foreign countries including Canada); single copies 15 cents. Volume 1, $2.00, Vol. 2, $1.50. All remittances by check or draft, except on Boston or New York, must include ten cents additional for cost of collection. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be gladly received and published to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than one page of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.

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Subscriptions, advertisements, and business communications to
W. P. RICH, 300 Massachusetts Avenue, Boston, Mass.

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E. L. RAND, Corresponding Sec'y N. E. Botanical Club,
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On and after April 1, 1907, the price of Volume 1, (1899) of RHODORA will be $2.00, and Volume 2, $1.50.

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Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. November, 1908. No. 119.

BIDENS CONNATA AND SOME OF ITS AMERICAN ALLIES.

M. L. Fernald.

Bidens connata Muhl.

In September last Mr. C. A. Weatherby and the writer made two visits to the shores of Winter Pond in Winchester, Massachusetts, a station which for generations has furnished New England botanists with local or otherwise remarkable plants. One of the conspicuous plants at that season was a *Bidens* which grew in abundance between the thicket and the sandy beach as well as in the adjacent swampy areas. The primary leaves of the plant were so unusual in their appearance, especially in having toward the base two lobes which were strongly decurrent to the winged petiole, that we gathered material for further study. Later comparison in the herbarium showed it to be a little known plant, represented in the Gray Herbarium only by a specimen collected as unusual by the late Alvah A. Eaton and the writer at Salisbury, Massachusetts, in 1902, and another collected by Professor John Macoun at Ste. Anne de Beaupré, Quebec, in 1905; while the herbarium of the New England Botanical Club has two sheets,— one collected by Mr. W. P. Rich at Spot Pond, Stoneham, Massachusetts, in 1894, the other by Mrs. Clara Imogene Cheney at Centerville, Massachusetts, in 1900. More recently Professor K. M. Wiegand and the writer have revisited the Winter Pond station; and we have found the plant with the lateral lobes of the leaves conspicuously decurrent along the petiole about Lake Waban at Wellesley, Massachusetts. The writer has also seen it in the Fresh Pond marshes in Cambridge. It is probable, then, that this peculiar plant is much

more generally distributed than its representation in the herbaria would indicate. Careful study of the material and comparison of the original description leads to the somewhat surprising conclusion that it is exactly the plant described by Muhlenberg as *Bidens connata*,[1] while the commoner plant with simple slender-petioled leaves which is passing as *B. connata* is ordinarily so distinct as to merit varietal recognition and was even characterized as a species, *B. petiolata*,[2] by Nuttall.

As treated by recent authors *Bidens connata* is supposed to be the plant (Nuttall's *B. petiolata*) with usually simple distinctly petioled leaves, while the occurrence of 3-lobed leaves if noted at all is considered unusual. This is a somewhat natural conclusion, since the herbarium representation of the former is so much more complete than of the latter plant. The two plants in their extreme forms are very different, but the writer has sought in vain for constant characters by which they can be clearly separated.

The surfaces of the achenes at first seemed to offer good concomitant characters; for in some plants with the slender-petioled unlobed leaves the achenes are quite smooth, while in some specimens with the broad-petioled lobed leaves they are tuberculate or warty. This presence or absence of warts on the achene has been much emphasized by European students of the group who, finding about various lakes of continental Europe *B. connata* with warty achenes, maintain that American specimens with smooth achenes cannot belong to the same

[1] "*8. BIDENS *connata*.

B. floribus discoideis, calyce exteriore flore triplo longiore, foliis caulinis ternatis foliolis lateralibus connatis, floralibus oblongo-lanceolatis. W.

Bidens connata. *Muhlenberg.*

Verwachsener Zweyzahn. W.

Habitat in America *boreali.* ⊙ (*v. s.*)

Caulis *laevis ramosus.* Folia *caulina petiolata ternata, foliolis lateralibus oblongis acutis serratis sessilibus, basi inferiore in petiolum decurrentibus, foliolum intermedium petiolatum oblongum utrinque attenuatum serratum.* Folia *floralia et summa ramea petiolata oblonga utrinque attenuata serrata.* Calyx *duplex, exterior pentaphyllus, foliolis lanceolatis flore triplo longioribus; interior foliolis coloratis obtusis margine membranaceis aequalibus. Corolla discoidea. Differt a B. frondosa foliorum forma, calyce exteriore breviore tantum pentaphyllo.* W." — Willd. Sp. iii. 1718 (1804).

[2] "57. BIDENS **petiolata.* Glabra, foliis simplicibus petiolatis angusto-lanceolatis utrinque acuminatis serratis, floribus discoideis, calyce exteriore mediocri.

⊙Low, but considerably branched. The leaves all entire, attenuated below into a longish petiole, the smaller branch leaves often nearly entire. The outer calyx small. The flowers without rays and rather small.

Hab. On the margins of ponds in various parts of New England."

Nuttall, Jour. Acad. Nat. Sci. Phila., vii. pt. 1, 99 (1834).

species.[1] This character, however, proves to be very inconstant in *B. connata* and *B. petiolata*, warty or smooth achenes occurring on plants with either type of foliage; and very often the immature achenes of the younger heads are smooth while those of the older heads are distinctly warty. In all these plants the faces of the inner achenes are prominently ribbed making the achenes 4-angled, and the awns are 4 in number, while the 3-angled outer achenes usually have 3 awns. There is, futhermore, great probability that the smooth-fruited American specimens with which recent German botanists have contrasted the warty-fruited *B. connata* are not of this species but are *B. comosa* (Gray) Wiegand (a species which long passed in American collections as *B. connata*), for, as stated by Dr. Warnstorf, in the American plant with which he was contrasting his Neuruppin material "the fruits are always smooth and usually two-awned, only occasionally having a shorter median awn"; while Professor Ascherson, writing to Dr. Robinson in 1898, stated that the so-called *B. connata* examined from America had the outer bracts of the involucre "6–8 or more" and "achenia smooth, ribs less prominent [than in the Neuruppin *B. connata*], awns 2–3"; all of which characters belong to the American *B. comosa* rather than to *B. connata*. The conclusion is, then, that in *B. connata* the presence or absence of warts and the degree of their development are characters which are not concomitant with the marked differences of foliage.

As already noted by Professor Wiegand, the plant with short broad petioles is commoner in New England while the slender-petioled form is more general westward.[2] Yet the plant with three-lobed leaves (typical *B. connata*) has apparently been found in Michigan, for in his Flora of Detroit, Mr. O. A. Farwell, obviously ignoring both Muhlenberg's and Nuttall's descriptions, makes the following singular disposition of the plants.

[1] "Meanwhile, my long-time friend Professor Dr. Ascherson of Berlin, who had become interested in the plant [from Neuruppin, Germany] made an examination of the Berlin Botanical Museum and referred our plant, by Mühlenberg's type specimen, in Willdenow's herbarium under no. 15,021, to *B. connatus*. The matter would have been thereby settled had I not already received from various parts of North America as *B. connatus* an entirely different plant. In this the fruits are always smooth and usually two-awned, only occasionally having a shorter median awn. They are, thus, just like those of *B. tripartitus*. On this account the specimens from the United States heretofore seen by me cannot possibly be identified with Mühlenberg's type in the Willdenow herbarium, but belong to another good species." — Warnstorf, Bot. Gaz. xxv. 48 (1898).

[2] "In New England the leaves are shorter petioled, while in the West the petioles are often very long (1 cm.)" — Wiegand, Bull. Torr. Bot. Cl. xxvi. 415 (1899).

"815. connata, Muhl. Belle Isle, etc. Common and variable: leaves undivided incisely cut or -serrate (the type); or pinnately three divided with the terminal division petioled,

816. var. petiolata, (Nutt.) (*B. petiolata*, Nutt. Jour. Acad. Philad. 7: 99)." [1]

Nevertheless, in spite of Mr. Farwell's complete reversal of the proper names of the two plants, the name-bringing synonym, *Bidens petiolata* Nutt., must be taken as the basis of the preceding combination and the plant which was so clearly described by Nuttall must stand as the type of the var. *petiolata*.[2]

The two extremes of *Bidens connata* may be distinguished as follows.

Bidens connata Muhl. in Willd. Sp. iii. 1718 (1804). *B. connata*, var. *petiolata* Farwell, Ann. Rep. Comm. Parks and Boulevards Detroit, xi. 91 (1900) as to plant described, not *B. petiolata* Nutt. At least the primary cauline leaves three-lobed, the two lateral oblong lobes broad-based and conspicuously decurrent to the broadly margined petiole; the uppermost and rameal leaves usually unlobed, subsessile or with short margined petiole.— On shores and in swamps, Quebec to Massachusetts and Michigan and doubtless southward. Less common westward than

Var. petiolata (Nutt.) Farwell, Ann. Rep. Comm. Parks and Boulevards Detroit, xi. 91 (1900) as to name-bringing synonym but not as to plant described. *B. petiolata* Nutt. Jour. Acad. Nat. Sci. Phila. vii. pt. 1, 99 (1834). All or nearly all the leaves unlobed, tapering to slender or narrowly margined petioles.— Common from Maine to Minnesota and Kansas.

Bidens tripartita L.

As already noted, the discovery at several stations in Europe of the American *Bidens connata* has given rise to considerable discussion among European botanists, and since it was first called to notice many additional stations have been reported. It is, therefore, interesting to record the occurrence in North America of the European *B. tripartita* L. of which *B. connata* Muhl., *B. frondosa* L., and *B. vulgata* Greene are the common American representatives.

In August, 1904, while visi ing Percé, Gaspé Co., Quebec, with

[1] Farwell, Ann. Rep. Comm. Parks and Boulevards Detroit, xi. 91 (1900).

[2] There is a slight possibility that *Bidens tripartita* L., var. ? *fallax* Warnstorf, Verhandl. bot. Vereins für Brandenburg, xxi. 157 (1879), is the same as *B. connata*, var. *petiolata*, for Warnstorf describes it with "meistens ungetheilten Stengelblätter"; but he later (Bot. Gaz. xxv. 58) states that his plant matches Muhlenberg's type of *B. connata* in the Willdenow herbarium.

Professor J. F. Collins and Dr. A. S. Pease, the writer came upon a colony of *Bidens tripartita* in damp hollows of an Arbor Vitae (*Thuja*) swamp. The plant, which was quite new to him, suggested in some ways all three of its American allies, *B. frondosa*, *B. vulgata* and *B. connata*. Its simple leaves are on margined petioles and are variously cut, mostly into 3 or 5 coarsely toothed segments; thus differing from those of *B. frondosa* and *B. vulgata* which have the 3- or 5-foliolate leaves on marginless petioles, the terminal leaflet usually being distinctly petiolulate. From *B. connata*, the foliage of which more nearly approaches that of *B. tripartita*, it is quickly distinguished by its flattish smooth 2–3-awned achene and the conspicuously ciliate foliaceous outer bracts of the involucre.

When *Bidens tripartita* was found at Percé the writer, not knowing what it was, took it without question for an indigenous plant. It was growing with native species in a partly cleared swamp not far, however, from the telegraph road which passes through the village. It has been seen nowhere else in the Gaspé Peninsula and it is possible that it may have been introduced from Europe, but its occurrence only in the swamp and not about the village or the wharves points to its probable indigenous character. In this connection it is noteworthy that the clearly indigenous flora of the Percé region — that of the mountain-crests, woods and primative swamps — contains many species common in northern Europe but rare or unknown in temperate America except about the Gulf of St. Lawrence. Among such plants may be mentioned *Catabrosa aquatica* (L.) Beauv., typical *Glyceria fluitans* (L.) R. Br., *Poa alpina* L., *Scirpus rufus* (Huds.) Schrad., *Thalictrum alpinum* L., *Draba incana* L. (true), *Drosera anglica* Huds., *Pleurogyne rotata* (L.) Griseb., *Lappula deflexa* (Wahlenb.) Garcke, *Euphrasia arctica* Lange, *E. borealis* Towns., and *Rhinanthus stenophyllus* (Schur) Schinz & Thellung. It is probable, then, that *Bidens tripartita*, like the foregoing plants of northern Europe, is indigenous in the Gaspé Peninsula and that further search will show it to occur elsewhere than in the single swamp at Percé.

Bidens hyperborea Greene.

Another *Bidens* of the Gaspé Peninsula which in some of its characters suggests *B. tripartita* and *B. comosa* is a little plant which occurs in great abundance at the estuaries of rivers, where it is completely

submerged at high tide. In its leaves and involucre the plant might pass as a dwarf halophytic variant of *B. comosa*, but it has conspicuously striate 4-awned achenes more suggestive of those of *B. cernua*. From dwarf forms of the latter species, however, it is clearly distinct in its petioled or merely sessile entire or remotely dentate leaves, its ellipsoid-campanulate heads, the few (2–4) very long ascending foliaceous bracts, and the flattish, not 4-angled, achene. The writer, after studying the descriptions of recently proposed species of *Bidens*, could find only one description, that of *B. hyperborea* Greene from Rupert House, James Bay, which closely approached the Gaspé plant. In many points Professor Greene's diagnosis scarcely fitted the more eastern plant, so that the writer applied to Professor John Macoun for an opportunity to examine the type of *B. hyperborea* which is in the Herbarium of the Geological Survey Department at Ottawa. This original material which Professor Macoun generously loaned the writer is a sheet of three small plants which, as stated by Professor Greene, are quite simple and monocephalous, thus differing from the Gaspé material which is usually freely branched with very numerous heads. The Rupert House plants, furthermore, have shorter outer bracts than most of the Gaspé specimens. Except for these discrepancies the two plants are essentially alike,— in their foliage, corollas, chaff, and achenes identical. The more abundant collections from eastern Quebec add much to our knowledge of the plant, however, and that it may be more readily recognized by others who find it the following description, somewhat amplifying the original account of the species, is given.

BIDENS HYPERBOREA Greene, Pittonia, iv. 257 (1901). Stems 5–25 cm. high, simple, or more often slightly to freely branched, erect or depressed and matted, glabrous: leaves rather fleshy, narrowly spatulate to oblanceolate, 1.5–6.5 cm. long, 3–9 mm. broad, entire or remotely 2–4-dentate, obtuse at tip, narrowed to a sessile or short-petioled base: heads ellipsoid-campanulate, the involucre 5–10 mm. in diameter; outer bracts 2–4, strongly ascending, foliaceous, 2–6 cm. long: inner bracts 8–12, narrowly oblong, obtuse or subacute, yellow, with dark striations: chaff similar, about equaling the awns: ligules (when developed) narrowly obovate to oblong, 4–6 mm. long, deep yellow: disk-corollas funnelform, about equaling the awns; the 4 short ascending blunt teeth exceeding the purple anthers: achenes linear-cuneiform, 7 mm. long, 1.8 mm. broad at the rounded summit, flattish, about 15-ribbed on each face; the midrib scarcely thickened; the margins (and sometimes the midribs) retrorsely barbed:

awns 4, straight, retrorsely barbed, the 2 pairs unequal, the longer about 3 mm. long.— Originally described from Rupert House, James Bay. Found in August, 1904, on brackish or saline shores, submerged at high tide, near the mouths of the Bonaventure, the St. John (or Douglastown) and the Dartmouth Rivers, Quebec.

Gray Herbarium.

FURTHER NOTES ON THE BUTTON-BUSH.

Walter Deane.

In the December number of Rhodora for 1902 (iv. 243–4) I published an account of the persistence of the Button-bush on the farm of Mr. Augustus E. Philbrook of Shelburne, New Hampshire. The place where it grew had been drained and the bushes, though buried under three feet of sand and loam, had persisted in pushing their way up to the light, and for thirty-seven years had flourished, flowering in profusion in their most unnatural quarters, despite the fact that the space in which they grew had long been enclosed and used as a yard for pigs and hens. Notwithstanding the treatment that the Button-bush received, it grew as if unconscious of its changed surroundings.

I have visited Philbrook Farm every year since 1902 and have watched with interest the struggle for existence of my plants. Though at the time when I wrote the article I thought that there was no limit to their life, I was soon aware that each year the number of living stems was diminishing with considerable rapidity. This was apparently due wholly to the fact that the plants were being entirely denuded of their bark at the base, owing to the too great familiarity of their porcine companions.

In 1907 feeling that the little colony was playing a losing game, I had a small space of between three and four square meters enclosed in one corner of the yard.

This was done through the kindness of Mr. Philbrook who has been much interested in this singular case from the beginning. The enclosed space included the most flourishing part of the Button-bush and removed it from all noxious influences. But few plants outside the enclosure showed any signs of life.

In October of the present year, 1908, the status was as follows. In my small preserve five stems were alive — they had produced an abundance of flowers during the summer, but no fruit had set. Everything outside the protected part had been cut down to make way for improvements. This included but two or three living plants. The future is I think very uncertain as the bark of the five survivors has been so roughly handled that they may not long survive. However they have lived already for forty-three years under the most disadvantageous conditions and I trust that I shall yet see the old veterans with their many scars for some years longer.

Cambridge, Massachusetts.

Notes from Manchester, New Hampshire. — Some years ago the writer received from a friend in Andover, N. H., a few specimens of *Subularia aquatica* L. These were placed as rarities in the herbarium of our local Institute. In 1906, while hunting for shore plants at Lake Massabesic, a sheet of water 2500 acres in extent, which supplies the city of Manchester, there were found a few plants of this very local crucifer which had been driven by the south wind upon Severance's beach, a long stretch of fine white "scouring sand" on the north shore, in the town of Auburn. In October, 1907, the lake being unusually low, more of the bottom was exposed, and the plants were found in great abundance. This year (1908) the extraordinary drought has reduced the level still more, the surface being 2 ft. below the dam at the outlet, and about 5 ft. below the level of the lake when full, so that a much larger area of sand is exposed. There was found (Oct. 8) to be an almost continuous belt of the plants, from 2 ft. to 2 rods wide, the greater part immersed, extending a distance of not less than 1500 ft. A square foot of sand, measured off where the plants were sown thickest, contained, by actual count, more than 100 plants. There is evidently no immediate danger of the species being exterminated at this station.

The following extensions of the known range of certain species may be of interest. Specimens of all the plants named have been sent to the Gray Herbarium. In 1906 *Eleocharis diandra* C. Wright was found on the sandy shore of Merrimack River. When the station was revisited this season there were also found *Scirpus americanus* Pers. and *S. debilis* Pursh. In the same locality with the *Subularia*

at Lake Massabesic, near the high water level, were found more of the *Scirpus americanus*, and also a station of *S. Smithii* Gray. Close by the last named, growing in a dense mat, was a large colony of *Ilysanthes anagallidea* (Michx.) Robinson. The plants were mostly less than 8 cm. high, some in fruit being barely 2 cm. high,— all very different in aspect from *I. dubia* (L.) Barnhart, which is common in this vicinity. — F. W. Batchelder, *Manchester, New Hampshire.*

A Grass New to Eastern Canada.— This summer (1908) I found *Melica Smithii* (Porter) Vasey, to be a common grass on top of limestone cliffs and among talus at their base on the east shore of the Bruce Peninsula, Ontario. I first collected it at Colpoy's Bay, Ont., on June 21st. Dr. Theo. Holm to whom I sent specimens confirmed my determination. Isle Royal, Michigan, is apparently the furthest east from which it has been previously recorded. In Canada it has been reported only from British Columbia.— A. B. Klugh, Botanical Dept., Queen's Univ., Kingston, Canada.

A RIBES NEW TO MASSACHUSETTS.

Stewart H. Burnham.

During the ascent of Mt. Greylock by the carriage road from North Adams, 4 July, 1908, at about 3000 feet and approximately a mile from the summit I collected a few branches from a reclining shrub, specimens of which are deposited in the Gray Herbarium. Prof. M. L. Fernald in his letter of September 18th says: "It is *Ribes triste* Pallas, var. *albinervium* (Michx.) Fernald, Rhodora **9**:4. Jan. 1907. The shrub is very common in coniferous forests and on the mountains of northern New England and eastern Canada but has not been recorded from Massachusetts. It is interesting to note that your plant from the schistose upper area of Mt. Greylock is the variety, which is also the characteristic plant of the other mica-schist, granite and gneiss mountains northward; while typical *R. triste* is in my experience best developed in strongly limy soils."

Ribes lacustre (Pers.) Poir and *R. prostratum* L'Hér. were collected

on this excursion; the latter being the common species on the mountain. *Lycopodium clavatum monostachyon* Grev. & Hook. was found along the roadside in the Notch. *Milium effusum* L., *Luzula parviflora* (Ehrh.) Desv., *Amelanchier oligocarpa* (Michx.) Roem. and *Rubus Canadensis* L. were also found near the summit of the mountain. The flora of Mt. Greylock, although 3505 feet above sea level, is poorer in mountain plants than one would expect: but the lichen flora is very rich, especially in those species found on the trunks of balsam fir, mountain ash, birch and other hardwood trees.

Geological Hall, Albany, N. Y.

Stellaria aquatica in Vermont.— In a note on the preliminary list of the Caryophyllaceae of New England, Rhodora V. 190, it is stated that "the sole basis for the report *Stellaria aquatica* Scop. in New England is a single but unmistakable specimen collected near the Boston & Albany Railway at Newtonville, Mass., July 28, 1881, by C. J. Sprague." I can report another and more prolific station located in southwestern Vermont at North Pownal. This station, also, is near a railway, the Boston & Maine, and extends along both banks of the Hoosac river for a mile or more. I collected the species here Sept. 17, 1907. It occurs in alluvial soil, in partial shade, and is very abundant in places. The Stellarias from this locality are remarkable for their length. I measured several whose main stems were over two meters long and saw others which I estimated to be even longer. As they branch freely, they may extend nearly an equal distance laterally, and a single plant can, under favorable conditions, spread out over a considerable area. Specimens have been deposited in the Gray Herbarium and in the Herbarium of the University of Vermont.— R. W. Woodward, New Haven, Connecticut.

THE TEXT-FIGURES IN GRAY'S NEW MANUAL OF BOTANY.

AGNES CHASE.

Two reviews of Gray's Manual of Botany, Seventh Edition, have recently appeared in Science and in RHODORA respectively. Both reviewers have mentioned that there are numerous illustrations, but neither has bestowed on these illustrations the attention they merit. They are not merely figures of uniform size, so many to the page, but are faithful and beautifully executed representations of important specific characters. When in the old days we pored over the Carex keys until we almost knew them by heart, we were often hard put to it to decide whether the perigynium in hand should go under "Beakless" or "Beaked," or whether the puzzling specimen in Ovales had a "Perigynium ovate-lanceolate with winged margins" or one "ovate-lanceolate or narrower, scale-like, with little distinction between body and margin," or "Spikes spreading or drooping" or "Spikes erect," trying first the one division, then the other. Here these very points are shown in the figures, and beak and teeth and wings, that almost defy description in words, stand forth in characteristic form. The keys show the most painstaking work, but to make a perfect key is beyond the power of any human being, since Nature does not divide her species dichotomously. An accurate figure of the typical form, then, becomes of the greatest value.

The figures of Aster and of Desmodium serve as further examples of the fidelity of the drawings and their usefulness in identification of species, illustrating in the former the involucral bracts and the jointed pods in the latter. In like manner are the various diagnostic characters of the different genera brought out. Magnified cross-sections of the stem and portions of the epidermis are figured in Equisetum, the achenes in Sagittaria, flowers in *Orchidaceae*, the fruiting calyx in Rumex, pods and leaves in most of the *Cruciferae*, but rootstocks in Dentaria, fruit and cross-section of it in *Umbelliferae*, inflorescence and magnified flowers in *Labiatae*, the very distinct capsules of the commonly confused *Plantago major* and *P. Rugelii*, and so throughout all the genera which are illustrated.

The fidelity of the artist's work to the plant before him is shown in the figure of the grotesque achene of *Carex Tuckermanii* Dewey,

which is nowhere, not even here, described in print. This strikingly characteristic achene years ago led some of us to think that our specimens of this Carex must belong to a new species because such an achene was nowhere described, but examination of specimens of *C. Tuckermanii* revealed the fact that this queer achene was characteristic of that species.

There are 1036 figures in all, and each is a work of both science and art.

Washington, D. C.

Hedeoma hispida in Connecticut.— During the recent meeting of the Connecticut Botanical Society at Putnam, Connecticut, I was fortunate enough to discover a quantity of *Hedeoma hispida* Pursh. growing near the Quinebaug River. Although the individual plants were mostly small (5–10 cm. tall), they could be gathered by the handful over an area of an acre or more. The station is in open ground and the soil is a sandy alluvium on the flood-plain of the river, thus offering conditions in some measure similar to those in the native habitat of the plant on the western plains. The woolen mills of the town suggest themselves as the means of its introduction. This seems to be the first record of the species in Connecticut but Mr. W. W. Eggleston has reported its occurrence in Vermont (Rhodora 6:142) and Mr. C. A. Weatherby informs me that there is in the herbarium of the New England Botanical Club a specimen of the same plant collected at Reading, Massachusetts, in 1887 by W. H. Manning and described by him as "a weed in gardens." — E. B. Harger, Oxford, Connecticut.

Vol. 10, no. 118, including pages 173 to 196, was issued 9 November, 1908.

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Rhodora

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NEW ENGLAND BOTANICAL CLUB.

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WILLIAM PENN RICH
EDWARD LOTHROP RAND } Publication Committee.

Vol. 10. December, 1908. No. 120.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 10. December, 1908. No. 120.

IN MEMORIAM: ALVAH AUGUSTUS EATON

R. G. Leavitt.

It is already known to many readers of this journal that Alvah A. Eaton died at his home in North Easton, September 29th, after long suffering endured with heroic courage. Mr. Eaton's publications had made his name widely known. With a considerable number of American students of plants, especially students of ferns and fern-allies, he had formed relations of friendly and professional intercourse. He had been very active as a collector in the region of his residence, in which he had brought to light many plants of interest, including some that were new to science. From his excursions to little explored districts of Florida he had brought back valuable collections of orchids, ferns, and woody plants. He possessed a remarkable talent for finding things of interest and importance, however well concealed from ordinary eyes they might be, which, combined with activity, willingness to penetrate dangerous parts, and persistence in the face of difficulty, made him a very useful contributor to the progress of botanical science. Such men as he was can ill be spared.

Beyond the memorial of appreciation due to everyone who has given his life in devotion to the work which has lain before him, those who were during several years his associates in common tasks wish to express their admiration for Mr. Eaton's many excellent qualities as a man. His sincerity was perfect; every call made upon him for effort was accepted with eager responsiveness; his courage to face any difficult situation, danger to life, or bodily anguish, was of the finest quality.

The writer first became acquainted with him some seven years ago through an inquiry after certain aquatic plants in which Mr. Eaton

was expert. An invitation to the writer to visit Seabrook, N. H., followed. Upon the ensuing excursion to the Powow River and two subsequent trips along the Merrimac, Mr. Eaton's remarkable knowledge of habitats became clear. His transference to North Easton seemed not to disturb his accurate feeling for localities in which plants should be found, an instinct born of long and close familiarity with nature, and amounting oftentimes — so to the onlooker it seemed — to clairvoyant power. This apparent prescience and very remarkable vision distinguished Mr. Eaton among collectors of plants. His eye exhausted the details of the field at once, and picked out the smallest objects of search at distances which baffle any but the strongest sight. Walking rapidly along the roadside he would suddenly retrace his steps a little and out of the grass bring forth some small growth altogether beneath the range of the ordinary trained observer. This keenness was in part a gift, as regards optical perfection, partly the result of self-training in concentration and alertness of mind.

For, finally, this is to be said in honor of Mr. Eaton as a man of science, that he achieved what he achieved by his own efforts, unaided, and often against the force of circumstances. With only a high school education — received at Newburyport and accomplished in half the time usually required — he familiarized himself with much in the results of modern science, mastered French, German, and Latin sufficiently for his needs in taxonomy, mastered the local flora thoroughly and the fauna extensively, and above all won a position of authority in the study of two or three groups of particularly difficult plants. Most of this was done while he was supporting himself by work on a farm. Few men would have overcome the influence of poor health, lack of means, and varied discouragements as he did.

He left two unpublished papers of considerable length, one a study in the family *Orchidaceae*, already announced; the other his most important contribution to science, a monograph of North American Isoëtes, the result of many years of study, revised not long before his final illness.

His friends will be glad to know that in the closing weeks of his life, after it had become certain that he could not live, not only did he show a calmness and fearlessness, the fruition of a sincerely good life, but he was able — such was the strength of his nature — to feel in spite of pain much of peaceful enjoyment of his home and of the outdoors world. He said that the view from his tent door out across the mead-

ows to the trees beyond was as beautiful to him as anything on earth could be; and in a letter written shortly before death he said that he had been moved into the front room of his house — "the pleasantest room in the world." During the entire last period, after the surgeon's knife had, vainly, done its work and his bodily strength had gone, the real nature of the man shone out, noble and ennobling.

State Normal School, Trenton, New Jersey.

BOTANICAL WRITINGS OF THE LATE ALVAH AUGUSTUS EATON.

M. A. Day.

[Feeling that a list of Mr. Eaton's botanical writings would be both a respectful tribute to his memory and an aid to students of American botany, Miss Day, librarian of the Gray Herbarium, has at our request kindly prepared the following bibliography to accompany Dr. Leavitt's sketch. It is due to Miss Day to state that the compilation was necessarily hurried, but it is believed that it includes all Mr. Eaton's more important published contributions to botany and most if not all his minor notes. It is possible that some of the latter have appeared in local journals and have escaped mention. As Dr. Leavitt's notice has taken the form of an appreciation of Mr. Eaton's character and work, rather than an account of his life, it seems desirable to record here the following biographical data:— Alvah Augustus Eaton was born November 20, 1865, at Seabrook, New Hampshire. In 1898, he was elected Secretary of the Linnaean Fern Chapter, and in the following year chosen president of the same society. December 5, 1902, he was made a non-resident member of the New England Botanical Club. In September, 1904, he married Constance E. Wilkins. For about six years at the close of his life Mr. Eaton was officially connected with the Ames Botanical Laboratory at North Easton, Massachusetts, where he was engaged chiefly in monographic, bibliographic, determinative, and field work of a taxonomic nature. He is survived by his widow and only child, Fred W. Eaton.—Ed.]

1. Ophioglossum vulgatum. Fern Bull. iv. 60–61, fig. 1896.
2. Lycopodium alopecuroides in Massachusetts. Fern Bull. v. 3–5. 1897.
3. Two odd Ophioglossums. Fern Bull. v. 11. 1897.
4. A new quillwort from Mexico. Fern Bull. v. 25–26. 1897.
5. Get it in your eye. Fern Bull. v. 29. 1897.
6. A new Cheilanthes of the section Adiantopsis. Fern Bull. v. 43–45. 1897.
7. [Note on Osmunda cinnamomea frondosa.] Fern Bull. v. 65. 1897.
8. [Note on preserving Equisetum.] Fern Bull. v. 66. 1897.
9. [Note on Botrychium ternatum with two fertile fronds.] Fern Bull. v. 66. 1897.
10. A new Isoëtes. Fern Bull. vi. 5–7. 1898.
11. Isoëtes minima n. sp. Fern Bull. vi. 30. 1898.
12. Two new species. Bull. Torr. Bot. Club, xxv. 338–341. 1898.
13. The genus Equisetum, with reference to the North American species. Fern Bull. vi. 45–49, 69–71. 1898; vii. 57–59, 85–88. 1899; viii. 75–78. 1900; ix. 3–4, 33–37, 61–63, 81–84. 1901; x. 43–45, 71–74. 1902; xi. 7–12, 40–44, 73–75, 108–114. 1903; xii. 23–25, 39–43. 1904.

In this series of papers numbers 10 to 17 bear the title The genus Equisetum in North America.

14. Notes on a peculiar Botrychium. Linnaean Fern Chapter (Boston Meeting), 25–30. 1899.
15. A new species of Botrychium. Fern Bull. vii. 7–8. 1899.
16. Fern variation. Fern Bull. vii. 12–13. 1899.
17. A new species of Selaginella. Fern Bull. vii. 33–34. 1899.
18. Two new Isoëtes. Fern Bull. viii. 12–14. 1900.
19. [Note on finding Botrychium simplex.] Fern Bull. viii. 19. 1900.
20. Isoëtes Howellii and Isoëtes Nuttalli[i]. Fern Bull. viii. 32–33. 1900.
21. Parietaria debilis in New Hampshire. Rhodora, ii. 158. 1900.
22. A new variety of Isoëtes. Fern Bull. viii. 60–61. 1900.
23. A few additions to the New Hampshire flora. Rhodora, ii. 167–168. 1900.

24. The genus Isoëtes in New England. Fernwort Papers, 1–16. 1900.

25. A new variety of Dryopteris munita. Fern Bull. ix. 7–8. 1901.

26. Our western Woodwardia. Fern Bull. ix. 86–87. 1901.

27. The earliest fern. Fern Bull. ix. 91. 1901.

28. Specific characters in Botrychium tenebrosum. Fern Bull. x. 54–56. 1902.

29. A new form of Nephrodium Thelypteris. Fern Bull. x. 78. 1902.

30. A new Equisetum. Fern Bull. x. 120–122. 1902.

31. An interesting form of Leersia oryzoides. Rhodora, v. 118. 1903.

32. Isoëtes riparia canadensis and Isoëtes Dodgei. Bull. Torr. Bot. Club, xxx. 359–362. 1903.

33. Additional notes on Botrychium tenebrosum. Rhodora, v. 274–276, pl. 48. 1903.

34. Three new varieties of Isoëtes. Rhodora, v. 277–280. 1903.

35. Dodge's fern. Am. Bot. v. 117. 1904. Reprinted in Fern Bull. xii. 57. 1904.

36. Note on Equisetum pratense. Rhodora, vi. 92. 1904.

37. Preliminary list of Pteridophyta collected in Dade County, Florida, during November and December, 1903. Fern Bull. xii. 45–48. 1904.

38. A correction Fern Bull. xii. 70. 1904.

39. The California gold fern. Fern Bull. xii. 77–78. 1904.

40. Is Asplenium lanceum American? Fern Bull. xii. 79–80. 1904.

41. Isoëtes Amesii: a correction. Fern Bull. xii. 89. 1904.

42. Pellaea Ornithopus. Fern Bull. xii. 113–114. 1904.

43. Notes on Isoëtes. Fern Bull. xiii. 51–53. 1905.

44. Botrychium biternatum Underw. Fern Bull. xiii. 87. 1905.

45. Pteridophytes observed during three excursions into southern Florida. Bull. Torr. Bot. Club, xxxiii. 455–486. 1906.

46. Nomenclatorial studies in three orchid genera. Proc. Biol. Soc. Wash. xxi. 63–67. 1908.

47. Nomenclatorial changes in Isoëtes. Rhodora, x. 42. 1908.

48. Isoëtaceae. In Flora of the Boston District, II. Rhodora, x. 61–62. 1908.

49. Ostrich fern, var. pubescens. Fern Bull. xvi. 47–48. 1908.

50. A question of nomenclature. Fern Bull. xvi. 77–79. 1908.

51. Equisetaceae. In Gray's New Manual of Botany, Seventh Edition, 51–54. 1908.

52. Isoëtaceae. In Gray's New Manual of Botany, Seventh Edition, 58–62. 1908.

Articles relating to Mr. Eaton's herbarium and work.

[Notes on work of Mr. Eaton.] Fern Bull. v. 33. 1897.

The herbarium of Mr. A. A. Eaton. Rhodora, iii. 221. 1901.

Alvah Augustus Eaton. By W. N. Clute. Fern Bull. x. 52–53. 1902, with portrait.

MORE TERATOLOGICAL FORMS OF TRILLIUM UNDULATUM.

Walter Deane.

I have recently received, through the kindness of Mr. Edwin DeMeritte, some more examples of teratology in our common Painted Trillium (*Trillium undulatum* Willd.) from Holderness, New Hampshire. A specimen of this species, illustrating this curious modification, was collected in August, 1907, by Mr. DeMeritte, in the same locality, and it formed the basis of an article, which I published some months ago (Rhodora, x. 21–24). The locality, as I described before, is on the shore of Squam Lake "in the leaf-mould and scanty soil on a rocky ridge" near the water.

It was in early July that Mr. DeMeritte visited and collected the plant for the second time. On the very same spot as before, and one stem at least evidently from the same rootstock as the plant of 1907, there were five stalks growing in a close cluster, three of them with three whorls of three leaves each, one with two whorls of three leaves

each, and one with four whorls of three leaves. Two of these specimens were collected. It is significant that the plan of three was followed each year. About two meters from this spot was a single stalk with one whorl of four leaves. This specimen was also taken and the three plants were pressed and given to me for study. Perfectly normal types grew in abundance near by. It was intended to revisit the station while the plants were still in flower, but this was impossible. The fruit in my specimens was beginning to develop and the petals were withered. The persistency, however, of the stamens as well as the petals in Trillium has enabled me to make an accurate examination of the floral envelopes.

I will now describe the three specimens. There is one bearing two whorls of three leaves each, the leaves all taper-pointed and those of the lowest whorl broadly ovate with petioles, 2.5 cm. long. The blades are respectively 16 cm., 14 cm., and 14.5 cm. in length. The internode above is 2.5 cm. long. The leaves of the next whorl are broadly ovate with petioles, 1 cm. long. The blades are 11 cm., 13 cm., and 12.5 cm. in length. Above this is the flower with a peduncle, 5.5 cm. long. The sepals are ovate, taper-pointed, sessile, and of extraordinary size, being 4 cm. wide and 9 cm. long. Indeed they resemble typical leaves. There are four petals of normal shape in this specimen, alternating with the sepals, two of the petals being contiguous and doubtless the result of chorisis. These replace the third petal normally present. There are but three stamens, one at the base of each of three of the petals, and all normal. The ovary has two main styles, the division between them extending to the base, one of the styles being cleft half way down, thus making three styles in all. The ovary is one-celled with two parietal placentae, bearing respectively 5 and 3 developing ovules.

This specimen is probably from the same stock as the one of 1907. Closely contiguous to it is the second stalk which has three whorls of three leaves each, all taper-pointed. In the lowest whorl the petioles are 7 cm. long. The blades of two of the leaves have been destroyed, but the third is present and is broadly ovate and 13.5 cm. long. The internode above is 7.5 cm. in length. In the next whorl one leaf is gone, the scar showing its position. The remaining two have petioles 2.5 cm. long and blades 12 cm. in length. The next internode is 4.5 cm. long and the leaves in the third and uppermost whorl are sessile and 10.3 cm., 10 cm., and 11 cm. in length respectively. The peduncle is 1.5 cm. long and there are three large sepals, 5 cm. long,

each with a normal stamen at the base. The three petals, which are also normal, are persistent and withered and have no stamens opposite them. It will be noticed that in this flower it is the outer row of stamens that were developed, whereas in the former flower it was the inner row (those opposite the petals). The ovary has three styles and is one-celled with three parietal placentae, and contains many ovules as yet undeveloped.

The third specimen, which, as I stated above, was growing about two meters from those just described, has a single whorl of four leaves at the top of the stem, broadly ovate and taper-pointed. Three of them have normal petioles 1 cm. long and blades 15 cm., 15 cm., and 14 cm. in length respectively. The fourth leaf has a broadly winged petiole 1 cm. long and blade 15.5 cm. in length. The peduncle is 4.5 cm. long and there are four sepals of normal size 3 cm. long, each with a typical stamen at the base. Three petals only, normal, each with a typical stamen at its base, are present. The ovary has four styles and was plainly four-celled, the partitions separating three of the cells having been broken away by the enlarging ovules, one of the cells being intact. The ovary was filled with forty-six well developing ovules that bade fair to be good seeds. These three specimens with the dissected parts are in my herbarium.

Mr. C. H. Knowlton has kindly sent to me for examination an abnormal *Trillium undulatum*, collected by him in July, 1897, at Farmington, Maine. The plant is just past the flowering stage. A single whorl of four leaves crowns the top of the stem. They are perfectly normal in shape and from 7.5 cm. to 9 cm. in length. The peduncle, two sepals, and three petals are normal, one sepal having evidently been destroyed by an insect. There are six stamens, five of them typical and one more or less petaloid and occupying the place opposite the missing sepal. The ovary has three styles and is one-celled with three parietal placentae, the cell well filled with ovules.

Teratological forms of Trillium seem to be unusually vigorous, and two at least of the specimens that I have just described would evidently have set well developed fruit. I draw no deductions from these statements, but think it best to put on record facts for future specialists.

Cambridge, Massachusetts.

A Bulletin on Shade Trees, a publication in which the Massachusetts Forestry Association and the Agricultural Experiment Station have co-operated, has been recently issued and will meet a long felt want. Every one loves trees and much time and money are spent in planting and caring for them. The results are not infrequently disappointing on account of injudicious selection, wrong methods in setting, or improper or insufficient care. This bulletin gives the substance of the laws pertaining to shade trees and tree wardens, and discusses the duties of the latter. The selection of varieties suited to different localities is considered. Statistics showing the rate of growth of different trees, together with directions for setting, transplanting, and pruning, are given. Methods of preventing or repairing damages to trees receive attention, and such topics as chaining and bolting, treating decayed cavities, filling, etc., are fully discussed. Injuries to trees due to leaky gas mains, contact with electric wires, and other electrical injuries are considered and the best methods of prevention described. The concluding section of the bulletin gives descriptions of the more serious insect enemies and explicit directions for destroying them or preventing their injuries. This bulletin will be sent to members of the Massachusetts Forestry Association, to tree wardens in all parts of the state, and to public librarians. Other persons desiring copies should write to the Massachusetts Agricultural Experiment Station, Amherst, Mass.

New England Botanical Club, Annual Meeting.— At the annual meeting of the New England Botanical Club held at 3 Joy Street, Boston, on the evening of December 4th, 1908, the Phaenogamic Curator reported the gift to the Club by Miss Kate Furbish of Brunswick, Maine, of her extensive herbarium of Maine plants. The forming of this collection has been one of Miss Furbish's chief interests for the past forty years. It is, therefore, especially valuable as the pioneer collection of flowering plants and ferns from many sections of Maine which have not been visited by other botanists. Altogether the floras of more than two hundred towns and villages are represented; and when the material has been worked over it is expected that fully 10,000 specimens will be added to the organized collections of the Club, and that many of the species will be additions to the recorded flora of Maine.

Officers of the Club for the ensuing year were elected as follows: President, Walter Deane; Vice-President, Fred Dayton Lambert; Corresponding Secretary, Edward Lothrop Rand; Recording Secretary and Treasurer, Emile Francis Williams; Phaenogamic Curator, Merritt Lyndon Fernald; Cryptogamic Curator, Hollis Webster; Members of the Council, George Golding Kennedy, Clarence Hinckley Knowlton, Benjamin Lincoln Robinson.

The following gentlemen were elected to membership in the Club: Austin Walter Cheever, Mattapan, Massachusetts; Herbert Spencer Jackson, Cambridge, Massachusetts; and George Elwood Nichols, New Haven, Connecticut.

ERRATA.

Page 12, line 18; for *Ur dinaceae* read *Uridinaceae*.
" 16, " 1; " *articum* read *arcticum*.
" 32, " 17; " **sphaerocarpum** read **sphaerocarpa**.
" 33, " 30; " *orobioides* read *oroboides*.
" 35, " 7; omit second *rigida*.
" 46, " 22; for POTAMAGETON *read* POTAMOGETON.
" 67, " 3; " *S. gratioloides* read *I. gratioloides*.
" 146, " 32; " *cephaloides* read *cephaloidea*.
" 148, last line; for *116* read *115*.
" 151, line 31; for *glycphyllos* read *glycyphyllos*.
" 162, " 27; " than *read* that.
" 172, last line; for *117* read *116*.
Pages 179, 181, and 183, in the page-heading; for Lists of Connecticut *read* Lists of Connecticut Diatoms.
Page 184, line 38; for *mesostyla* read *mesotyla*.

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