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THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY

DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICIS AND LICHENS

VOLUME XVII

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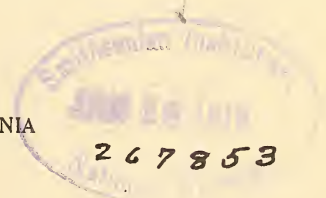
LINCOLN W. RIDDLE, Ph.D.

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PITTSBURGH, PENNSYLVANIA

1914



INDEX, 1914

Star (*) Indicates Illustrations; Dagger (†), Distribution Maps

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ERRATA

Page 7, line 26, for *fastigiata* read *fastigiatus*.

Page 8, line 8 from bottom, for *aurem* read *aureum*.

Page 14, line 1, for *variens* read *varians*; line 14, for *Sphaerocapus* read *Sphaerocarplus*; line 15, for *diivision* read *division*.

Page 16, line 13 from bottom, for *hassei* read *Hassei*; line 5 from bottom, for *Girriphyllum* read *Cirriphyllum*; last line, for *Gladonia* read *Cladonia*.

Page 32, line 2 from bottom, for *Bacidium naegelii* read *Bacidia Naegeli*.

Page 34, line 9 from bottom, for *complanta* read *complanata*.

Page 57, line 10, for *leptatea* read *leptalea*.

Page 61, line 4, for *lignicola* read *lignicola*; line 18, for *fructigena* read *fluctigena*.

Page 63, line 5* from bottom, for *Polytrichum* read *Polytrichum*.

Page 67, line 3 from bottom, for *Bermudina* read *bermudiana*.

Page 75, line 2, for *othero* read *others*.

Page 76, line 27, for present read May, 1914.

Page 78, line 20, for *albocaerulesceus* read *albocaerulescens*.

Page 80, line 15, for immediacly read immediately; line 14 from bottom, for *calicaria* read *calicaris*.

Page 96, line 6, in space add 1842.

For other additions and corrections. see pages 68, 69, and 86.

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VOLUME XVII

NUMBER 1

JANUARY 1914

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
O. E. JENNINGS, Ph.D., Editor-in-Chief

Associate Editors

ABEL JOEL GROUT, Ph.D.
GEORGE N. BEST, M. D. JOHN M. HOLZINGER, M. S.
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“Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879.”

THE BRYOLOGIST

Bimonthly Journal of
THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICAS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVI, 1898-1913, \$15.00.

TEN YEAR INDEX, \$1.00

Checks, except New York City, MUST contain 10 cents extra for collection fee. Manuscripts should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania. Forms close on the first of the month prior to that of publication. Subscriptions and advertisements should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania, or to Mr. Edward B. Chamberlain, 18 West 89th Street, New York City.

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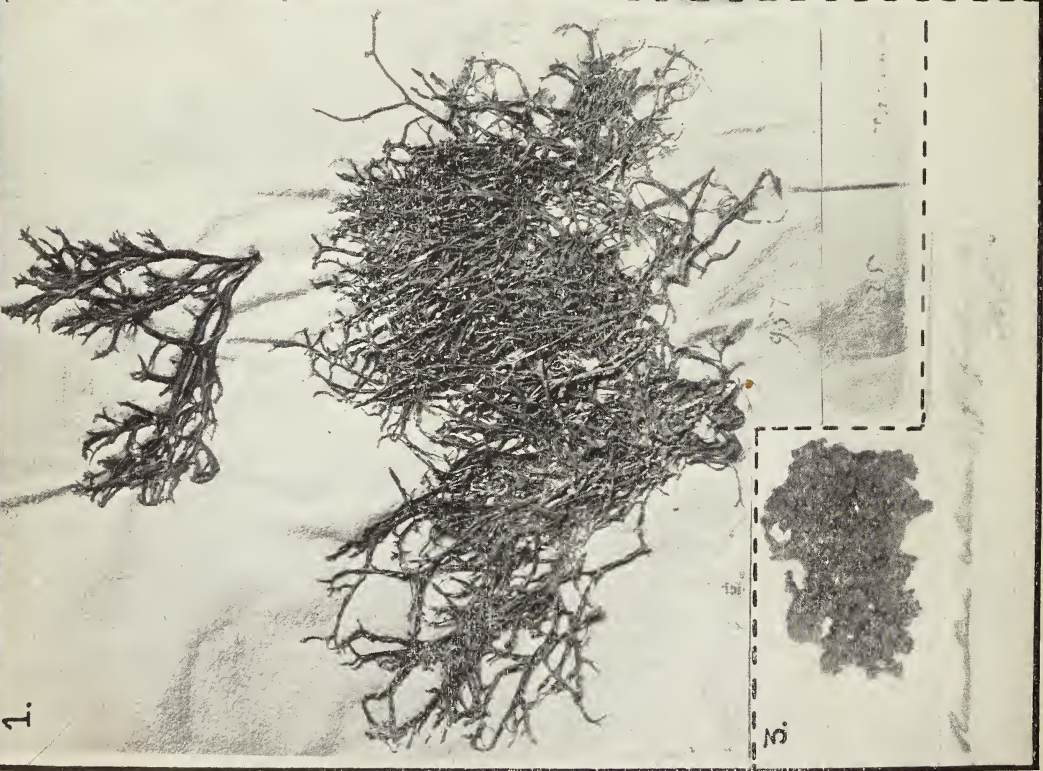
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THE BRYOLOGIST

Vol. XVII

JANUARY, 1914

No. 1

NORTH AMERICAN SPECIES OF THE GENUS RAMALINA.—PART III.

R. HEBER HOWE, JR.

Key to the Series *Myelopoeae* [Continued].*

- Laciniae linear, slender
 Laciniae canaliculate, esoraliate..... *canaliculata*
 Laciniae not canaliculate, soraliate
 Apices simple or subsimple..... *farinacea*
 Apices multifold or erose..... *intermedia*
 Laciniae not linear
 Laciniae narrow, laciniate, apothecia scattered.... *fastigiata*
 Laciniae wide, laciniate, apothecia lateral..... v. *subampliata*

Ramalina farinacea (L.) Ach.

SYNONYMY: *Lichen farinaceus* Linn. Spec. Plant. 2:1146. 1753.

Ramalina farinacea Ach. Lich. Univ. 606. 1810.

TYPE: In the Linnean herbarium, Burlington House, London, *vide* author.

TYPE LOCALITY: "Europae," l. c.

ORIGINAL DESCRIPTION:

"foliaceus erectus compressus ramosus farinaceus: lateribus verrucosis." l. c.

FIGURE: Ach. Kongl. Vet. Acad. Nya Handl. Stock. 18: Pl. II, f. 1. 1797. Smith, Engl. Bot. Pl. 889. 1801.

DIAGNOSIS: *Thallus* caespitose, subcompressed, linear, subrigid, laterally soraliolate, apothecia marginal, spores straight.

DESCRIPTION: *Thallus* caespitose (max. length 10 cm.), subrigid, pale virescent to pale stramineous; *cortex* glabrous, longitudinally subrugose, soraliolate; *laciniae*



FIG. 1.—Distribution of *Ramalina farinacea*.

*Because of lack of space, *R. fastigiata* var. *subampliata* and *R. canaliculata* will appear in the March issue.—Ed.

linear, subterete to compressed, rarely subcanaliculate, (max. width 2 mm.), dichotomous, apices attenuate. *Apothecia* rare, marginal, concave at length convex, marginate becoming immarginate (max. diam. 2.5 mm.), disk buff; spores ellipsoid, straight¹.

CONTINGENT PHASE: (a) Laciniae pendulous, slender (= *Ramalina farinacea* γ *pendula* Ach.). TYPE: At Helsingfors. TYPE LOC.: Not given. ORIG. DESCR.: "thalli laciniis angustatis elongatis dependentibus." I. c. (b). Dicroic. (c). Blackening. (d). Laciniae wide (4mm.), = *R. farinacea* f. *latus* Merr. BRYOLOGIST 11: 49. 1908²) or (= ? *P. farinacea* f. *phalerata* Ach. Meth. Lich. 264. 1803³).

SUBSTRATA: On trees, old wood, and rarely on rocks.

DISTRIBUTION: Common in the Transition and Boreal Zones throughout our area, from Alaska (*Bean* and *Rothrock*) south to Mexico and from Newfoundland (Labrador, *Arnold*) to North Carolina.

STATIONS: MAINE: Cape Elizabeth; Camden; Megunticook Lake; Knox Co.; Southwest Harbor; Islesboro; Warren; New Harbor; Castine. NEW HAMPSHIRE: Mt. Moosilauke. VERMONT: Colchester; Charlotte; Branford; Woodstock. MASSACHUSETTS: Scituate; Brewster; Orleans; Nantucket; New Bedford; Barnstable. RHODE ISLAND: Noyes Beach. NEW YORK: Wilmington Notch; Ausable Chasm; Ellenville; Chilson Lake. DISTRICT OF COLUMBIA: Liberty Creek. TENNESSEE: Lookout Mt. OHIO: Fayette Co. MEXICO: Cima. CALIFORNIA: Santa Monica; Santa Cruz Island; Long Bridge; Santa Cruz; Nordhoff; Golden Gate; Black Mt.; Pigeon Pt.; Devil's Cañon; Searsville; Austrian Gulch; San Diego; Santa Barbara. OREGON: Sea coast; Portland; Albany; Dallas; Sanvier's Island. WASHINGTON: Mt. Alice; Friday Harbor; Arcas; Tenino; Seattle; Lake Washington. BRITISH COLUMBIA: Renfrew; Victoria; New Westminster; Pender Island; Hastings; Alert Bay; Thurlow Island; Carmannah; Comox; Nalulot; Cape Beale. ALASKA: Nyak Bay. MONTANA: Columbia Falls. WYOMING. MINNESOTA: Harding; Mainland; Grand Portage; Palisades; Pipestone; Rainy Lake City; Taylor's Falls; Upis; Minneapolis; Snow Lake; Beaudette. IOWA: Clayton Co. ONTARIO: Belleville; Algoma Pt.; Ottawa. NOVA SCOTIA: Baddeck; Grand Narrows. QUEBEC: Rigaud Mt.; Oka; Bic River; Gaspé; Anticosti. PRINCE EDWARD ISLAND: Brackley Pt. NEWFOUNDLAND: Stevenville; New Harbor; Chance Cove; Spread Eagle.

OBSERVATIONS: The species is best distinguished by its linear, slender, non-fistulous, soraliolate, rarely sorediate thallus. The reduced, erose, saxicolous

¹ Described as curved by Herre: the only fruited California plant examined by me had straight spores. NOTE—A straight spore must have its *axis* straight. A substraight spore must have *one* side-wall straight,—its *axis* may be thus a little bent. A curved spore must have *both* walls and its *axis* distinctly bent.

² TYPE LOC.: "San Juan Island, Wash." ORIG. DESCR.: "Extremely broad laciniae (9 mm.), with the soredia marginal and terminal."

³ TYPE LOC.: Not given. ORIG. DESCR.: "thalli laciniis sursum latioribus planis incisus verrucoso-scabridis, apice & marginibus plerumque laciniato-proliferis."

examples here referred by Tuckerman (Merrill, BRYOLOGIST 11: 51, 52. 1908) represent *Ramalina intermedia* Nyl. of modern authors (= ? α *minutula* Ach.). They may be separated from *pollinaria* by their soraliolate as well as sorediate linear laciniae, and from *pollinariella* by their eforaminous, non-dendroid, erose apices. Though having both a positive and negative reaction with KOH, apparently in some way attributable to the type of substratum, the plant is not easily confused with *subfarinacea*. The species (*farinacea*) has been said to represent a somewhat depauperate condition of what has been termed the *calicaris* stock. As it occasionally, however, develops apothecia (BRYOLOGIST *ibid.* 49) it may be regarded as a species of which there are recognized in Europe many varieties and contingent forms. Only one such has been described from our area, i. e. *latus*, from San Juan Island, Washington. Mr. Merrill considers it contingent in that he says its "peculiar condition [extremely broad laciniae (9 mm.)] is probably due to its growth in an excessively moist situation." It may prove to be synonymous with both *phalerata* Ach. and *frondosa* Oliv.

EXSICCATI: No. 113, Lich. Boreali-Amer., Cummings, etc. "Brewster, Mass." Nov. 10, 1894. L. A. Crocker.

No. 182, Decades No. Amer. Lich., Cummings, etc. Same data as above.

No. 74, Lich. Exsic. Merr. "Warren, Maine." Aug. 17, 1909. G. K. Merrill.

No. 2, Canadian Lich., Macoun. "Victoria, V. I." May 6, 1893. J. Macoun. (In part *pollinaria*). No. 106, *ibid.* Comox, V. I., May 3, 1887 (called var. *canaliculata* Fr.)

No. 57, Lich. Novae Angliae, Howe. "Wellfleet," Mass., April 7, 1913.

NOTE: *Ramalina farinacea* var. *dendroides* Müll. Arg. Flora 71: 492. 1888. This variety, which I have not seen, was recorded from Porto Rico.

Ramalina farinacea var. *pilosella* (Hue) Merrill. This supposed variety was recorded from Sandy Cove, N. S. (BRYOLOGIST 12: 40. 1909) by Miss J. Lowe. Mr. Merrill writes me that the combination was an error of Miss Lowe, or I should think possibly of the printer; the combination refers to *Parmelia crinita* var. *pilosella* (Hue) Merrill (l. c. 39).

Ramalina intermedia Nyl.

SYNONYMY: *Ramalina intermedia* Nyl. Recog. mono. Ram. 166, [68] 1870.

TYPE: In the Museum d'Histoire naturelle, Paris, *fide* author.

TYPE locality: "Terra Nova," "saxicola" Nyl. The type was, however, growing on a twig.

ORIGINAL DESCRIPTION: "Similis *Ramalinae minusculae* typicae, sed thallogonnonnihil firmiore, apicibus facile sorediiferis (sorediis subgloboso-granulosis); sterilis modo visa," l. c.

FIGURE of type to appear in *Plant World*, 1914.

OBSERVATIONS: This Nylander species, though placed under his *Stirps Ramalinae pusillae* was later moved by Crombie so as to follow *Ramalina farinacea*, of which he called it a subspecies. Only two authors have recorded this species from our area: Vermont, *Dutton*; Maine, Labrador, and Newfoundland,

Eckfeldt. The "fistulosus vel subfistulosus" characterization of the *pusillae* group has been except for a few species an uncertain distinction which I am modifying here. It is difficult to grant for *intermedia* more than subspecific rank, and the plants seem to be explained as abraded, erose, generally saxicolous states of *farinacea*. It seems to the author that lichenologists have failed sufficiently to credit lichens with stages of arrested growth during development, and that we find names given to undoubted intermediate* conditions. Half grown or abortive specimens, for example, are given the name *minutula*, and yet all realize the slow growth of lichens, and must recognize that they have innumerable stages of development entirely undeserving of name. The abbé Harmand recognizes this Acharian form *minutula*, saying: "C'est l'espèce a l'estat jeune ou arretee pas une cause quelconque dans son développement." Perhaps it is not, that he stopped in his collecting to gather specimens only partially grown, as he suggests. Would we give a half-grown oak any further title than immature, or one that was dwarfed in development, a varietal name? The variety *pendula* he recognizes is only the opposite extreme. *R. intermedia* as originally described was a saxicolous rather than a corticolous plant.

I am listing below plants referable here, and not including them with the former species:

EXSICCATI: No. 179, Lich. Boreali-Amer., Cummings, etc. "Weston, Mass." April 22, 1891. *C. E. Cummings*. (called *R. pollinariella* Nyl.)

No. 97, Lich. Exsic., Merrill. "Rockland, Maine." July 11, 1909. *G. K. Merrill*.

No. 152, Decades N. A. Lich., Cummings. Dell Rapids, S. D. Sept., 1894. *T. A. Williams*. (called *R. pollinariella*.)

STATIONS: MAINE: Rockland. NEW HAMPSHIRE: Franklin; Hinsdale; Gilford; Fitzwilliam; Peterboro. VERMONT: Charlotte; Brandon. MASSACHUSETTS: East Gloucester; New Bedford; Concord; Scituate; Weston; Nonquitt; Lynn. RHODE ISLAND: Middletown. CONNECTICUT: South Canterbury; Mt. Carmel. NEW YORK: Fisher's Island; Ellenville. NEW JERSEY: Cloister. PENNSYLVANIA: Coopersburg. NORTH CAROLINA: Crowder's Mt. TENNESSEE: Lookout Mt. VIRGINIA: Bald Knob. LOUISIANA: Pt. a la Hache. ALBERTA: Lake Athabasca. MINNESOTA: Grant's Falls; Beaver Bay; Taylor's Falls. IOWA: Clayton Co., Boone Co. ONTARIO: Thunder Bay; Nipigon; Porphyry Island. QUEBEC: Oka.; St. Anne des Monts. LABRADOR: L'Anse au Clair. NEWFOUNDLAND: Exploits; Sable Island.

Ramalina populina (Hoffm.) Wain.

SYNONYMY: *Lichen populinus* Ehrh. Crypt. Exsic. 276. 1785-93. *Nomen nudum*.

Lobaria populina Hoffm. Fl. Deutsch. 3: 140. 1795.

Ramalina populina Wain. Nat. Syn. Lich. 21. 1886.

Ramalina fastigiata (Pers.) Ach., *sensu* Nylander.

*See Olivier, *Ramalina pollinaria* var. *intermedians*.

TYPE: No. 276, Crypt. Exsic., Ehrhart. 1785-93 and in the Hoffman herbarium at Moscow?

TYPE LOCALITY: Not given.

ORIGINAL DESCRIPTION: None was given by Ehrhart; Hoffmann first described the species. "Erecta cespitosa laciniata: laciniis superne dilatatis turgidis fastigiatis." Hoffm. Fl. Deutsch. 3: 140. 1795.

FIGURE: Ach., Kongl. Vet. Acad. Nya Handl. Stockholm 20: Pl. 9, f. 1A. 1799.

Westring, Svenska Lafvarnas Färghistoria Pl. 12, f. E. 1806.

OBSERVATIONS: This species so long attributed to the lichen flora of our area, except by Nylander, I have not as yet found represented, even growing on *Populus*, when morphologically always most typical. Mr. Merrill also states that he has "seen no *R. fastigiata* (*sensu* Nyl.) from American sources. The typical plant is a large fastigate species, with terminal, corymbose apothecia and curved spores. It is the common European plant, ours being smaller with *straight* spores. Ehrhart's name, recognized by Drs. Wainio, Brandt, and Zahlbruckner, is a *nomen nudum* according to the International Code, and the species must be attributed to Hoffmann. Dr. Th. Fries's citation "et Fig" of an Ehrhart plate (Lich. Scand. 35. 1871) which Dr. Wainio refers to, was an error. Ehrhart published no plates so far as I can learn.

Ramalina fastigiata (Pers.) Ach. emend.

SYNONYMY: *Lichen fastigiatus* Pers. Usteri Ann. Bot. 7: 256 [156]. 1794.

Ramalina fastigiata Ach. Lich. Univ. 603. 1810.

Ramalina calicaris var. *subfastigiata* Nyl. Recog. mono. Ram.

132. 1870.

Ramalina calicaris var. *subampliata* Nyl. Recog. mono. Ram.

132. 1870. In part.

Ramalina calicaris β *fastigiata* Fr., *sensu* Tuckerman.

TYPE: In 'S Rijks Herbarium Leyden, Holland, *vide* author.

TYPE LOCALITY: Not given: Seven specimens compose the type material, one from "America," one from "Maryland, Amer." The others without localities. It is quite evident from an examination of material that this plant is not *populina* of Ehrhart as commonly cited, for the latter species is not known from our area. Though in examining the Persoon and Ehrhart types I have of course not felt at liberty to expose the spores, yet the two plants give every external evidence of representing the two distinct species.

Moreover, Persoon's plants came from a region (America) where plants with



FIG. 2.—Distribution of *Ramalina fastigiata*.¹

¹One somewhat atypical plant from Alberta is not indicated in Fig. 2.

curved spores have never been found. It seems evident, then, that *Ramalina fastigiata* (Pers.) represents a large part of the material recently referred to *R. calicaris* (Hoffm.) Fr. (*sensu* Nyl.) and *R. calicaris* (L.) Fr. (*sensu* Wainio) as well as *R. calicaris* var. *subfastigiata* Nyl. (*sensu* Nyl. and Merrill).

ORIGINAL DESCRIPTION: "Cespitose ramosa: ramis sursum dilatatis fastigiatis inermibus: scutellis subterminalibus." l. c.

FIGURE: *Pl. II, f. 2.*

DIAGNOSIS: *Thallus* caespitose, compressed, laciniate, subrigid, apothecia scattered, spores straight.

DESCRIPTION: *Thallus* caespitose (max. length 5 cm.) subrigid, pale virescent to virescent; cortex glabrous, sublacunose, subcanaliculate; rarely papillate, lacinae laciniate, compressed (max. width 4 mm.), dichotomous, apices attenuate. Apothecia common, marginal, lateral, or subterminal, concave at length convex, marginate or immarginate, (max. diam. 5 mm.), disk buff. Spores ellipsoid, straight.

CONTINGENT PHASES: (a) Small, crowded, canaliculate, but not linear, apothecia terminal (= *R. calicaris* var. *subfastigiata* Nyl.) Orig. Desc.: "Similis *Ramalina fastigiatae* (saepius breviori), sed sporae ellipsoideis rectis," l. c. (b) Laciniate (alt. 6 cm.), (= *R. calicaris* var. *laciniata* Harm.), but spores straight. (c) Lacinae longitudinally rugose (= *R. fastigiata* var. *nervosa* Nyl.), but spores straight. (d) Abraded, and blackening.

SUBSTRATA: On trees, shrubs, old wood and rarely rocks.

DISTRIBUTION: Common in the Upper Austral and Transition zones, replaced largely in the lower Boreal by the following species. Its range extends from Maine to Alberta and from Florida to Mexico and California. Macoun reports it also from British Columbia.

STATIONS: ONTARIO: Belleville; Algonquin Park; Edmonton; Brighton. MAINE: Camden; Scarborough; Westbrook; Ambejejus Lake; Orono; West Pembroke; Cumberland. NEW HAMPSHIRE: Gilford; Rye; Fitzwilliam; Peterboro; Mt. Monadnock; Hanover; Jackson; Clinton Mt.; Ossipee; Franconia; Chatham; Warren Hollis. VERMONT: Mt. Ascutney; Brandon; Charlotte; Colchester; Mt. Mansfield. MASSACHUSETTS: Berkshire; Duxbury; Concord; Ipswich; Mattapoissett; Kingston; Nonquitt; Townsend; Ashby; Littleton; Scituate; Bedford; Natick; Wellesley; New Bedford; Waltham. RHODE ISLAND: Bristol. CONNECTICUT: Central Village; South Canterbury; Stoford. NEW YORK: Fisher's Island; Mt. Meenahga; Chilson Lake; Canadaigua; East Galway. NEW JERSEY: Alco; Cloister; Newfield. PENNSYLVANIA: Haverford; Paoli; Philadelphia. MARYLAND: Cabin John. NORTH CAROLINA: Marshall. SOUTH CAROLINA: Santee. FLORIDA: Jacksonville. LOUISIANA: St. Martinsville. OHIO: Cincinnati. ILLINOIS: Canton; White Heath. IOWA: Fayette. MICHIGAN: Mackinac Island. MINNESOTA: Red Lake; South Haven; Beaver Bay; Auburndale. ALBERTA: Kananaskis. NOVA SCOTIA: Truro. QUEBEC: Montmorency. MEXICO: Cuzamaboga.

OBSERVATIONS: This exceedingly variable straight-spored species is not easily determined except by means of elimination. The boreal, delicate, linear, canaliculate plants must be referred to *R. canaliculata* (Fr.) Herre; the broad-lobed forms with only laceral apothecia to *subampliata*; all others belong to the species. That they all intergrade and represent one species is undoubted, but

I hesitate to form the new combinations necessary to distinguish them as such, especially as the tendency in nomenclature is to do away with varietal distinctions as much as possible. Nylander attributed his *subfastigiata* to our area (a contingent well-marked phase of the present species) but evidently had not seen *subampliata* from America, Mr. Merrill being the first one to attribute it to our lichen flora.

EXSICCATI: No. 5, Lich. Boreali-Amer., Cummings, etc. "Plymouth, N. H." May 28, 1891. C. E. Cummings. (in part *R. canaliculata*.)

No. 43, Decades N. A. Lich., Cummings, etc. Same as above.

No. 7, Lich. Novae Angliae, Howe. Ashby, Mass., Dec. 28, 1905. R. H. Howe, Jr.

No. 45, in part, Lich. Novae Angliae, Howe. Fitzwilliam, N. H. Aug. 8, 1909. R. H. Howe, Jr.

No. 172, Canad. Lich, Macoun. Brighton, Ont., Oct. 16, 1893.

[To be Continued.]

EXPLANATION OF PLATES I AND II

Plate I

1. The Linnean type of *Lichen farinaceus* at London (nat. size).
2. B. Authentic Acharian material of *Ramalina farinacea*, varieties *pendula*, *phalerata*, *minutula*, *gracilentata*, *leucorsa*, and *multifida* at London (nat. size).
3. Nylander type of *Ramalina calicaris* var. *subfastigiata* at Helsingfors (slightly reduced).

Plate II

1. The Nylander type of *Ramalina calicaris* var. *subampliata* at Helsingfors (nat. size).
2. The Persoon type of *Lichen fastigiata* var. *calicaris* at Leiden (nat. size).
3. The Fries type of *Ramalina calicaris* var. *canaliculata* at Upsala (nat. size).
4. One of the Ehrhart types of *Lichen populinus* at Kew (slightly reduced).

NOTES ON NOMENCLATURE—XII

ELIZABETH G. BRITTON

Since the completion of the mosses in the Engler and Prantl *Pflanzenfamilien* when my last note was printed¹ a number of corrections and additions have come to our notice. Last year in the *Revue Bryologique*² Monsieur Cardot has been giving a series of notes which it would seem worth while to condense and repeat in the BRYOLOGIST and we have also a few changes of our own to make which have reposed in our herbarium for some time, and which it behooves us to put on record.

¹ BRYOLOGIST 12: 62-63. May 1909.

² Revue Bryologique 40: 17-22, 40-45. 1913.

After much talk and tribulation, Monsieur Cardot has dropped the Paris code of 1867, with the priority of the subgeneric name, and adopted the Vienna Code of 1905, and the "Belgian Decision" of 1910, hence the following changes are made:

1. PIRELLA Cardot Rev. Bryol. 40: 17. 1913.

Pirea Cardot Bull. Soc. roy. Bot. Belg. 32: 176. 1893. Not Durand 1888.

Fifteen species are recognized: *P. cavifolia* (Card. & Herz.); *cubensis* Card. & Thér. ined.; *cymbifolia* (Sull.); *denticulata* Card. & Thér. ined.; *Fendleri* (C. M.); *filicina* (Sw. [Why Hedw. ex Sw.]); *guatemalensis* (Broth.) ined.; *Husnotiana* (Besch.); *Mariae* (Card.); *pachyclada* (R. & C.); *panamensis* (Broth & Par.) ined.; *papillosula* (R. & C.); *Pohlilii* (Schwgr.); *Tonduzii* (R. & C.); *trichomanoides* (Spruce), and among these four are still undescribed.

2. RHACOPILOPSIS Ren. & Card. Rev. Bryol. 27: 47. 1900.

Dimorphella (C. M.) R. & C. Bull. Soc. Roy. bot. Belg. 41: 101. 1902-3.

Hypnum section *Dimorphella* C. Müll. Flora 69: 523. 1886.

Quite recently *Rhacopilopsis Pechueli* (C. M.) Cardot has been discovered in French Guiana, collected by and sent to us by Monsieur Thériot. The species had heretofore been known only from Africa.

3. DIPLOSTICHUM Mont. Ann. Sc. Nat. 14: 116. 1845.

Phyllogonium Section *Eustichia* Brid. Bryol. Univ. 2: 674. 1827.

Eustichia C. Müll. Syn. 1: 41. 1849.

The following names are transferred, though their specific value is said to be doubtful: *D. Brotheri* (Besch.); *distichum* (Schwgr.); *longirostre* ("Broth.") which should be *D. longirostre* Mont., the type species of the genus.

4. HARPOPHYLLUM Spruce Cat. Mosses II. 1867.

Hemiragis Besch. Fl. bryol. Ant. fr. 68. 1876.

Leskea Section *Hemiragis* Brid. Bryol. Univ. 2: 334. 1827.

There is but one species of the genus known in North America: *H. aureum* (Lam.) Spruce ranging at higher elevations in the West Indies from Jamaica and Porto Rico to Trinidad, also in Costa Rica and Guatemala, and the Andes of Quito and Bogota. *Hemiragis Friedrichsthaliana* Reicht., known so far only from Guatemala,¹ and the type of which I have seen, agrees exactly with the former, and so widens the distribution of the former to include also Central America. There appears to be also an undescribed species in Jamaica which we have called *H. subulatum* ms. and which differs from *H. aureum* in being green, not glossy; stems more slender; leaves more secund, less serrate, with short, porose cells.

5. MITTENOTHAMNIUM Hennings, Hedwigia 41: 225. 1902.

Microthamnium Mitt. J. L. Soc. 12: 503. 1869 not *Microthamnium Nägeli* in Kutzing Spec. Alg. 352. 1849.

Hypnum sect. *Stereohypnum* Hpe. Linn. 31: 529. 1861-62.

Hypnum sect. *Rhizohypnum* Hpe. Flora 45: 457. 1862.

¹ C. M. Bull. Herb. Boiss. 5: 208. 1897.

Hypnum sect. *Chrysohypnum* Warming, Symb. fl. Bras. 286. 1870²

Stereohypnum (Hpe.) Fleischer Hedwigia 47: 273. 1908.

When Brotherus, five years ago³ issued the enumeration of the species of this genus he gave a brief chronological list of synonyms and indicated the confusion of generic, subgeneric and section names which Hampe and Karl Müller had indulged in between 1847 and 1879. Max Fleischer⁴ in the same year revised the genus to which he applied the sectional name *Stereohypnum* of Hampe. He gives on page 272 a list with the "inconsequential vagaries" of Hampe in chronological order and after spending two years on the study of the genus and seeing originals of most of the species, pronounced it a "time-robbing occupation." Unfortunately he took up one of Hampe's "inconsequential" names, which has given Monsieur Cardot the opportunity to transfer 106 names to *Mittenothamnium* of Hennings. One of Monsieur Cardot's methods of citation is peculiar! Why should *Mittenothamnium reptans* (Sw.) be cited as ("Hedw. ex Sw.")? Are all the Linnæan species to be cited in the same way? And is it to be (Hedw. ex Linn. ex Dillen.) because of the "1801" decision of the Belgian Congress?

I have recently had the opportunity of studying a portion of the type of *Hypnum diminutivum* Hpe. from Caracas and find that Max Fleischer is mistaken in referring this species to *Ctenidium*,⁵ and that it is an exact equivalent of what we have long known as *M. thelistegum* (C. M.). It includes also the following synonyms:

Mittenothamnium diminutivum (Hpe.) E. G. B. comb. nov.

Hypnum diminutivum Hpe. Linn. 20: 86. 1847.

Hypnum cubense C. M. Syn. 2: 267. 1851.

Hypnum thelistegum C. M. Syn. 2: 269. 1851.

Hypnum squamulosum C. M. Bot. Zeit. 14: 440. 1856.

Hypnum perspicuum Hpe. Linn. 31: 529. 1862.

Ectropothecium cubense Mitt. Journ. Linn. Soc. 12: 514. 1869.

Hypnum campaniforme Hpe.; Warming Symb. fl. Bras. 281. 1870. *vide* Fleischer.

Ctenidium diminutivum Fleisch. Hedw. 47: 291. 1908.

Taxithelium thelidiellum Besch.

TYPE LOCALITY: Caracas (On rotten logs, *Moritz No. 20*).

DISTRIBUTION: Florida, Cuba, Jamaica, Porto Rico, St. Domingo, St. Jan, Guadeloupe and Martinique to Trinidad and South America. Also in Mexico and Guatemala to Panama.

ILLUSTRATIONS: Fleischer, Hedwigia 47: 291. *fig. 10*.

EXSICCATAE: Sull. Musci Cub. Wright. 124, 125.

6. In the second series of Observations on Nomenclature⁶ M. Cardot takes up the question of citation in the case of *Anoetangium* Hedw., which Brotherus

² Reprinted from Vet. Med. f. d. Nat. For. Kjob. 18-20: 286. 1870.

³ Nat. Pflanzenfam. fasc. 231: 1049-1051. 1908.

⁴ Hedwigia 47: 272. 1908.

⁵ Hedwigia 47: 290. 1908.

⁶ Revue Bryologique 40: 40-45. 1913.

cites as (Hedw.) Br. Eu., and very truly says that, originally this genus did not include any of the species which are at present placed in it, and that Schwægrichen¹ was the first to place *A. compactum* in the genus and that therefore it should be "*Anoetangium* Schwgr. emend Br. Eu." Why not Schwgr. (ex Hedw.) emend. Br. Eu.? According to the previous ruling it should be so if we must be so exact and may not use *Anoetangium* in its original sense! This is not the only case in which Hedwig's original use of a generic name has been completely "emended" and all his species transferred somewhere else, keeping only the name with the citation given exactly as if no such emendation had taken place!

7. GLYPHOMITRIUM Brid. Mant. Musc. 31. 1819.

Aulacomitrium Mitt. Trans. Linn. Soc. 3: 161. 1891.

M. Cardot makes three new combinations: *G. calycinum* (Mitt.); *G. humilimum* (Mitt.); *G. Warburgii* (Broth.) and places the genus with the *Orthotrichaceae* and not with the *Grimmiaceae*.

8. The following series of citations sufficiently shows the ludicrous extent to which this method of citation will lead us!

"*Campylium* (Sull.) Mitt. extended by Bryhn."

"*Chaetomitrium* Doz. & Molk. extended by Bosch. & Lac."

"*Cryphidium* (Mitt.) Jaeg. extended by Broth."

"*Cynodontium* Sch. (non Brid. nec. Br. Eu.) emend Limpr."

"*Dicnemon* Schwaegr. not *Dicnemos* Broth."

9. *Didymodon* also has been subjected to so many additions and substractions that the names of the authors are "too numerous to mention." Accordingly Monsieur Cardot says it should be cited as *Didymodon* (Hedw.) emend!

10. The case of *Gymnostomum* is perhaps the worst of all because here the "*Hedwig 1801*" date of starting for the nomenclature of mosses, leads to worse confusion than the earlier date. In this case the original use of the name included three species in three genera; the second, fifteen species and twelve genera, so Monsieur Cardot solves the riddle by citing it as:

GYMNOSTOMUM Smith emend. (non Hedw.)

Gymnostomum Hedw. (1782).

(*Physcomitrium*, *Pottia* and *Pterigoneuron*).

Gymnostomum Hedw. (1801).

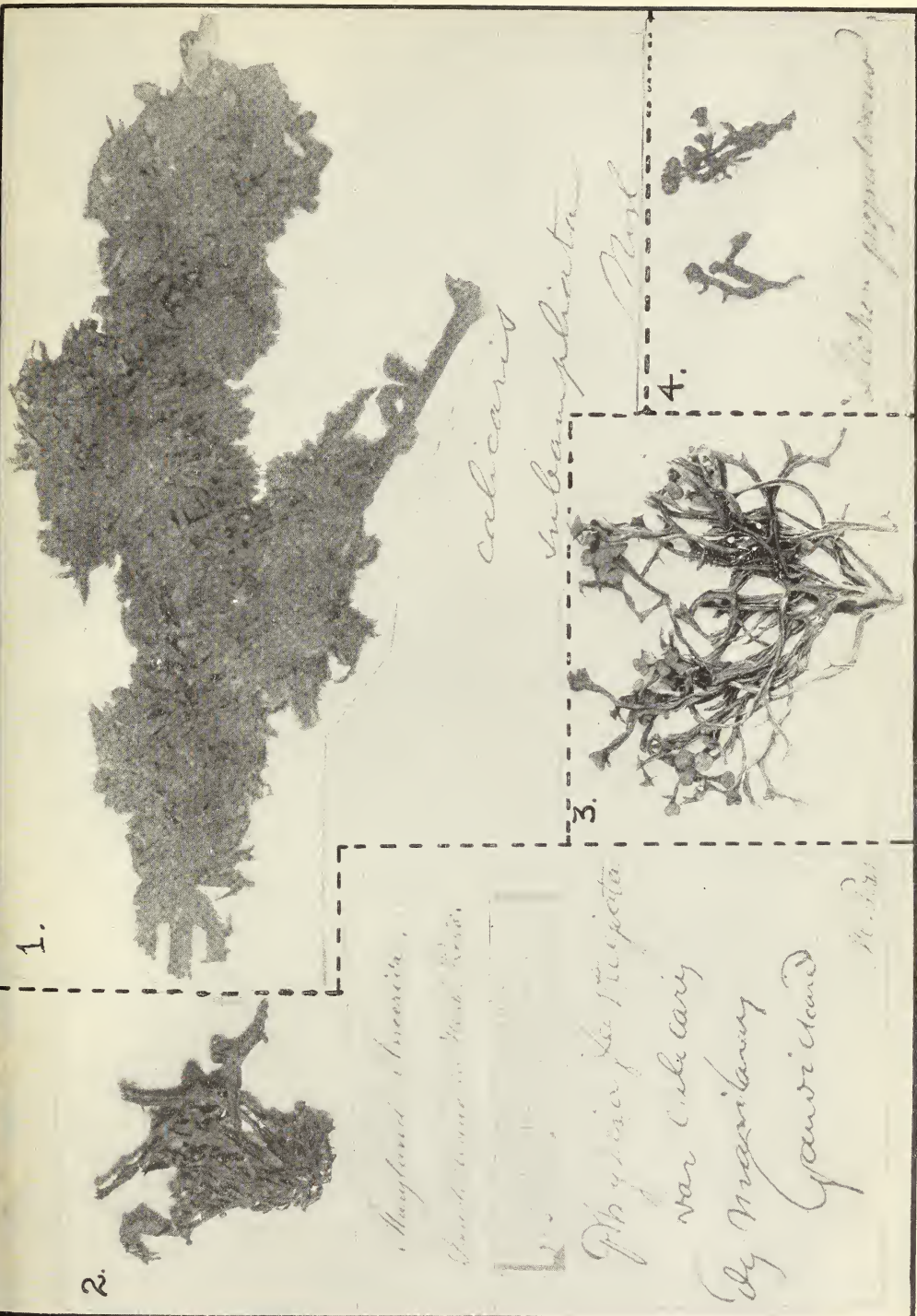
(*Pottia*, *Pterigoneuron*, *Schistostega*, *Anoetangium*, *Hymenostylium*, *Hymenostomum*, *Physcomitrium*, *Entosthodon*, *Drummondia*, *Schistidium*, *Weisia* and *Gyroweisia*.)

In this case he proposes to eliminate a bad series of puzzles by taking Hedwig's name, attributing it to a later author and emending it or using it as the German express it, because it is a "*freigewordenen*" name.

Such are some of the absurdities that the present efforts to see the right and still the wrong pursue, are leading to.

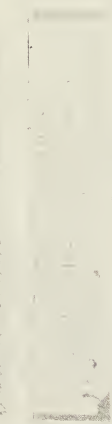
NEW YORK BOTANICAL GARDEN.

¹ Suppl. 1: 1, 33.



1.

Mayland, America,
Great Falls on Wash. River



Physcia *ser. Mexicana*
var. *calicaris*
By *Mexicana*
Gardneri *W. P. B.*

calicaris

subcapitata

Mex.

3.

4.

calicaris *subcapitata*

2.

REVIEW—ZUR MOOSFLORA DES LENA = TALES. ARNELL

JOHN M. HOLZINGER

Zur Moosflora des Lena-Tales (Contribution to the Moss flora of the Lena Valley), by H. Wilhelm Arnell. With 3 plates. Published in *Arkiv foer Botanik*, Band 13, No. 2. (Communicated April 9, 1913.)

Whether the "communication" stands for the date of publication is not certain to the writer of this review: the date of publication of this number of the *Arkiv* is Sept. 8, 1913. This is a report by Professor Arnell on the Hepatics and Mosses collected in 1898 in the valley of the Lena River in central Siberia which in its lower course flows for several hundred miles within the Arctic Circle. The paper is written in German; the descriptions of new species, in Latin. Herr Apotheker C. Jensen determined the Sphagna and made the drawings for the three plates.

For convenience in cross-reference to the author's previous work, *Musci Asiae borealis*, the same system and nomenclature is used, namely S. O. Lindberg's, but the author expressly disclaims agreement with Lindberg. In the foreword the moss literature of arctic America is briefly reviewed as far as it has accumulated up to date. The topography of the valley, as described by writers on this subject, appears to be closely paralleled by the upper Mississippi valley from St. Paul to central Iowa; each valley is a "deep furrow" in the general level of the country, cut thro strata of sand and limestone and shale.

The eighteen collecting stations enumerated range from 50° to 72° north latitude. The most intensive collecting was done within the Arctic Circle. In all, the author reports 61 *Hepaticae*, 14 *Sphagna*, and 241 *Musci*, a total of 316 species. The new species here described are: *Radula proligera*, *Aplozia cordifolia* var. *sibirica* A. & J., *Sphagnum contortum sibiricum* Jens., *Bryum Ehlei*, *B. obtusidens*, *B. purpurascens leucocarpum*, *Tortula mucronifolia emucronata*, *Mollia tortuosa arctica*, *Pleurozygodon sibiricum*, *Grimmia Ehlei*, *Amblystegium uncinatum chryseum*, *A. Ehlei*, *Hypnum plumosum revolutum*, *Helicodontium rotundifolium*, and *Stereodon revolutus plumosus*. In addition, there are enumerated 42 other species new to Siberia, in this collection.

The species figured in the plates are: *Radula proligera* Arn., *Martinella Simonsii* (Bryhn et Kaalaas), *Plagiochila arctica* Bryhn et Kaalaas, *Dicranum elongatum Sphagni* (Wg.) Th. Jensen, *Pleurozygodon sibiricum* Arn., *Grimmia Ehlei* Arn., *Amblystegium Ehlei* Arn., and *Helicodontium rotundifolium* Arn.

This brochure, of 94 pages, closes with an alphabetic index of genera and an enumeration of 33 references.

ANNUAL REPORTS OF THE SULLIVANT MOSS SOCIETY FOR 1913

Report of the President

As in previous years the President is able to report progress and a continued interest in the work of the Sullivant Moss Society on the part of its mem-

bers. Early in the year the editor-in-chief of the BRYOLOGIST, Dr. Abel J. Grout, felt compelled to resign his position on account of the pressure of other duties. The associate editors accepted his resignation with regret, fully appreciating his loyal services to the Society and the careful and valuable work which his editorship had involved. To succeed him, Dr. Otto E. Jennings, of the Carnegie Museum, Pittsburgh, was elected. He assumed charge of the BRYOLOGIST in May and has fulfilled his duties with ability and discretion during the remainder of the year. The current volume, exclusive of the index, numbers 96 pages and includes nine plates and fourteen figures in the text. Twenty-six original articles have been published during the year and of these sixteen relate to the mosses, two to the hepatics, and eight to the lichens. The articles on the mosses have been written by twelve different contributors, those on the hepatics by two, and those on the lichens by three, showing that the mosses still attract the majority of the members of the Society. The President takes pleasure in renewing his congratulations.

ALEXANDER W. EVANS, *President.*

NEW HAVEN, CONN.

Report of the Treasurer

In submitting the report for the year the Treasurer wishes to call attention to certain points. First, owing to unavoidable delays in the issue of the various numbers of the BRYOLOGIST, the payments for the September and November issues do not appear among the expenditures. This will necessarily reduce the apparent balance by about eighty dollars. In the second place, the transfer of the lichen herbarium to Dr. Hasse, the change in the editorship of the BRYOLOGIST, and the reprinting of certain early issues, have increased the normal expenditure by nearly forty dollars. It is necessary to bear these items in mind when reading the report. The Treasurer wishes to thank the members of the Sullivant Moss Society for their co-operation with him in the matter of the transfer of the treasurership, and for the kindness with which they have aided him in the discharge of his duties. He furthermore wishes to urge all members to aid in the extension of the membership and subscription lists. He will be very glad to receive the names of possible new members, and to send sample copies and other information to any person interested.

RECEIPTS

Balance on hand Dec. 1, 1912.....	\$.94
Dues for current year.....	219.62
Subscriptions for current year.....	80.63
Back dues collected.....	58.03
Back subscriptions collected.....	10.95
Sales of back numbers, files, etc.....	66.78
	<hr/>
	\$436.95

EXPENDITURES

Commissions on subscriptions.....	\$ 2.29
Bank fees.....	2.69
Mr. G. B. Kaiser, herbarium expenses.....	10.00
Messrs. Peckham & Little, printing and stationery.....	4.80
The E. F. Anderson Co., printing and stationery.....	4.36
The A. W. McCloy Co., envelopes and printing.....	4.70
Mr. E. B. Chamberlain, postage.....	8.01
Dr. O. E. Jennings, postage.....	5.49
Dr. A. J. Grout, postage and express.....	9.26
Express on shipments of BRYOLOGIST.....	3.55
Miss Mary F. Miller, lichen herbarium.....	11.55
Miss Dautun, purchase of file.....	13.00
Mrs. Annie Morrill Smith, hepatic lists.....	.25
National Photo-Engraving Co., plates.....	.70
Pittsburgh Photo-Engraving Co., plates.....	32.65
Printing, January BRYOLOGIST and Index.....	61.90
" Title page Vol. XIV.....	1.50
" Reprints, Dr. Herre.....	1.70
" March BRYOLOGIST.....	40.59
" Proof slips.....	2.75
" May BRYOLOGIST.....	43.56
" July BRYOLOGIST.....	37.00
" Reprints, Vol. I, No. 4, and Vol. II, No. 1.....	25.50
	<hr/>
	\$327.80
Cash on hand Dec. 1, 1913.....	109.15
	<hr/>
	\$436.95

Respectfully submitted,
EDWARD B. CHAMBERLAIN, *Treasurer.*

Report of the Curator of the Hepatic Herbarium

Our efforts the past year have been mostly devoted to the study and naming of a collection of *Hepaticae*, made by Mr. A. H. Brinkman, in British Columbia and Alberta. This proved a most pleasant and profitable task, for abundant material freshly gathered and dried was furnished from time to time. While quite a lot of material still remains to be examined, three hundred and thirty-one specimens of this Rocky Mt. material, mostly from the higher altitudes, have been added to the herbarium. Some of these species are new accessions from North America, and quite a few new additions to the society herbarium. The collection is especially rich in species of *Lophozia*. With the exceptions of *Lophozia Binsteadii*, *L. obtusa*, *L. Marchica*, *L. Mildeana*, and *L. Wentzelii*, all of the species listed in the Society Exchange List are present. The list includes such rarities as *L. confertifolia*, *L. guttulata*, *L. Hornschuchiana*, *L. Schultzii*, and *L. quadriloba*.

All of the North American species of *Sphenobolus* are found in this collection, with the exception of *S. exsectus*. There are many specimens of *S. scitulus*, *S. politus*, *S. ovatus*, and one of *S. saxicola*. Among the other species of note collected by Mr. Brinkman are *Clevea hyalina*, *Arnellia fennica*, *Nardia Breidlerii*,

Pallavicinia Flotowiana, *P. hibernica*, *Gymnomitrium varians*. *Pleuroclada albescens*, *Scapania cordifolia*, and *S. Bartlingii*. The collections sent the Society herbarium by Mr. Severin Rapp and Mr. S. C. Hood from Florida are equally valuable in new and rare species. Much of this material will be fully reported next year. Among the species added from this source, new to the herbarium, are *Frullania Rappii*, *Cephaloziella Rappii*, *Crossotolejeunea bermudiana*, *Lep-
tolejeunea elliptica*, *L. hamatata*, and *Ceretolejeunea integrifolia*.

Species new and rare to New England have been contributed by Miss Annie Lorenz, and they make an interesting list: *Riccia arvensis*, *R. sorocarpa*, *Grim-
aldia fragrans*, *Neesiella pilosa*, *Odontoschisma elongatum*, *Fossombronia Won-
draczecki*, *Marsupella Sullivantii*, *Nardia Geoscyphus*, *Lophozia confertifolia*, *L.
obtusa*, *L. Kaurini*, *L. Schultzei* var. *laxa*, *Cephalozia Francisi*, *C. Sullivantii*,
and *Scapania subalpina*. Miss Haynes, besides giving a generous portion of her
time, has sent many packets. Of special value was a specimen of *Sphaerocla-
pans*, and a division of the collection of Miss Alice M. Northrup from New-
foundland. Prof. A. S. Foster, Prof. H. Dupret, Dr. A. F. K. Krout, Mr. Frank
Dobbin, Prof. Holzinger, and Miss L. E. Hunt have contributed specimens
during the year. Mr. Geo. M. Pendleton of Sisson, California, added *Cepha-
lozia affinis*, new to the herbarium from North America. Mr. W. E. Haydock
gave a generous division of specimens collected at Crawford, N. H.

Dr. Evans has responded as usual upon request with type or rare material
for study and comparison. It is of interest that *Cephalozia Macounii* was
added to the herbarium from four localities: British Columbia by A. H. Brink-
man; Lac. Vieux Dessert, Wisconsin (collected by Cheney) and two specimens
from the Duluth-Superior District, contributed by the writer.

Acknowledgment is made of a fine full set of the species collected by the late
C. C. Kingman at Mooselauke, N. H. This was received just before his death,
by which the society lost an intelligent student, and enthusiastic collector, and
the writer, a valued friend. His large contributions to the herbarium the pre-
vious winter while a resident of California, and the weekly correspondence
which occurred, will be long remembered. The genus *Cephaloziella* has been
enriched by specimens and determinations by Prof. Douin, of Chartres, France.
Among these are *Cephaloziella Rappii*, *C. Baumgartneri*, *C. Brinkmanii*, *C.
Hampeana*, *C. Starkii*, *C. bifida*, *C. rubella*, *Evansia dentata*, *Cephalozia lancin-
ulata*, and *C. macrantha*, all of these from North America except *C. Baumgart-
neri* and *Evansia dentata*.

The announcement is made with pleasure that a complete set of the writer's
collections from the Duluth-Superior District has at last been added to the her-
barium. These specimens, 433 in number, fully represent the 82 species cited
in the paper "A Preliminary Report of the *Hepaticae* of the Duluth Superior
District, States of Minnesota and Wisconsin," *Trans. Wisc. Acad. Sci., Arts,
and Letters*, 1912: 985-1010. In all, one thousand specimens, representing 58
genera, and 192 species were added which makes 1913 a banner year.

The total number of specimens in the Society herbarium is now three thou-
sand seven hundred and ninety-one, representing 104 genera and 500 species.

Withdrawals, combinations, and early mistakes during the past ten years, have been 56 in number. This fact accounts for the discrepancy in the previous yearly reports and the actual recount.

GEORGE HALL CONKLIN, *Curator*.

SUPERIOR, WIS., Dec. 15, 1913.

Report of the Lichen Department for 1913

It is gratifying to note the increase shown in the study of Lichens, evinced not only by generous contributions to the herbarium, but also by the number of un-named specimens sent in for determination. These requests have been conscientiously and as promptly as possible complied with. The stock of duplicates on hand has assumed a quite respectable proportion, containing species from North America, the British Islands, and Australia. These are available to members desirous of adding to their private herbaria or, by way of exchange, with anyone for desirable forms not represented in the S. M. S. Herbarium.

The Society's Lichen Herbarium now contains 2,598 mounted specimens, representing 105 genera and 705 species, varieties, and forms. These accessions are due to the generosity of members abroad and in this country, and though encouraging, yet, considering the number devoted to the study of Lichens, a still better showing might be looked for.

H. E. HASSE, *Curator*.

SANTA MONICA, CALIFORNIA, Dec. 13, 1913.

Report of the Curator of the Moss Herbarium for 1913

During the past year 565 specimens have been mounted in the Moss Herbarium of the Sullivant Moss Society, adding 23 genera and 175 species and varieties new to the herbarium, which now contains 3,460 specimens, representing 1,145 species and varieties, belonging to 253 genera.

Fine collections from British Columbia have been sent by A. H. Brinkman, while valuable contributions to the herbarium from foreign sources have been made by E. Corti, Max Fleischer, I. Hagen, E. Iishiba, D. A. Jones, Mönckemeyer, P. G. M. Rhodes, and I. Thériot.

Among our home members who have been active are: F. S. Beattie, S. H. Burnham, W. W. Calkins, W. S. Cooper, Frank Dobbin, H. Dupret, D. L. Dutton, A. S. Foster, S. C. Hood, Mrs. E. L. Horr, H. S. Jewett, G. M. Pendleton, and S. Rapp. It is always the endeavor of the Curator to send out generous exchanges, and work of determination is earnestly solicited. There would be more offerings if more members took advantage of them. May the ensuing year show renewed interest. Greater co-operation on the part of all our members would soon show notable results.

GEORGE B. KAISER, *Curator*.

GERMANTOWN, PA., Dec. 15, 1913.

NEW MEMBERS—1913

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REPORT OF ELECTION OF OFFICERS FOR THE SULLIVANT MOSS SOCIETY FOR 1914

Whole number of votes cast.....	12
For President—Dr. A. W. Evans.....	12
Vice-president—Mrs. Annie Morrill Smith.....	12
Secretary—Treasurer—Mr. Edward B. Chamberlain.....	12

Respectfully submitted,

EVA B. GADSBY, *Judge of Elections.*

Germantown, Pa., Dec. 8, 1913.

Press dispatches report the death of Mr. C. B. Robinson in Amboyna, Malay Archipelago, where he was collecting plants for the Philippine Bureau of Science. Mr. Robinson was formerly connected with the New York Botanical Garden. He had been a member of the Sullivant Moss Society since 1902.—E. B. C.

EXCHANGE DEPARTMENT

Offerings—To Members Only, for Stamped Self-Addressed Envelope.

Rev. Frederick S. Beattie, St. Luke's Rectory, Charlestown, N. H.—*Trachypodopsis crispatula* (Hook.) Fleisch. st., collected in India.

Dr. H. E. Hasse, Box 583, Santa Monica, California.—*Microglaena hassei* A. Zahlbr., from California.

Mr. Charles P. Heffenger, The Middlesex School, Concord, Mass.—*Usnea trichodea* Ach. and *Usnea plicata* (L.) Web., both collected on the New Hampshire coast, verified by Dr. R. H. Howe, Jr.

Mr. Edward B. Chamberlain, 18 West 89th St., New York City.—*Hypnum aciculare* Labill. and *Polytrichum magellanicum* Hedw., both from New Zealand, collected by W. Gray, Esq.

H. S. Jewett, M.D., 15 W. Monument Ave., Dayton, Ohio—*Girriphyllum Boscii* (Schwaegr.) Grout, collected in Ross Co., Ohio, and *Georgia pellucida* (L.) Rabenh., collected at Littlejohn Island, Maine.

Mr. W. W. Calkins, Berwyn, Illinois.—*Weisia viridula* (L.) Hedw., *Tortella caespitosa* (Schwaegr.) Limpr., and *Gladonia cristatella* Tuck. and var. *vestita* Tuck.

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MARCH 1914

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
O. E. JENNINGS, Ph.D., Editor-in-Chief

Associate Editors

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and the

Advisory Board Officers of the Society

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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879."
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THE BRYOLOGIST

Bimonthly Journal of
THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICIS AND LICHENS

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FUNARIA HYGROMETRICA (L.) Sibth.

Smithsonian Institution,
MAR 27 1914
National Museum.

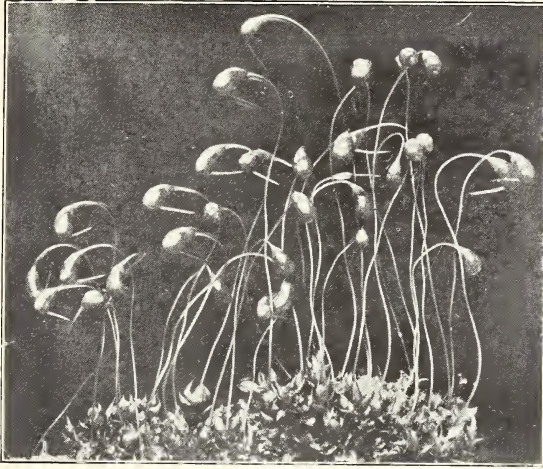


FIG. 1. FUNARIA HYGROMETRICA (L.) Sibth.

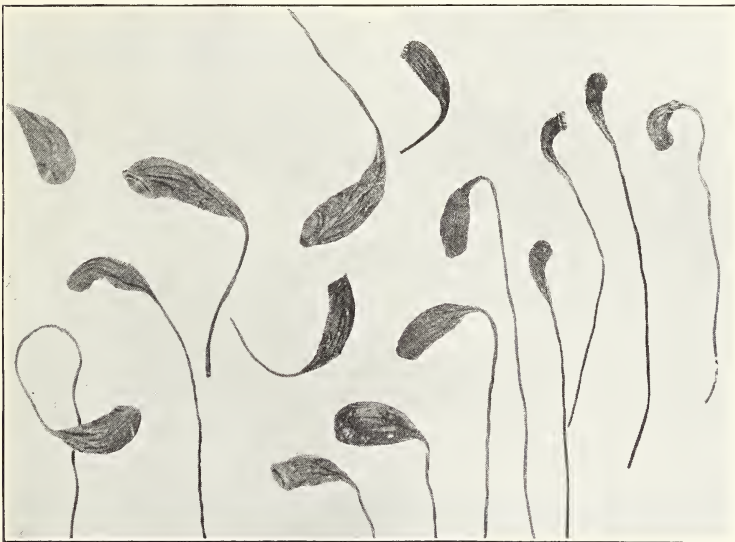
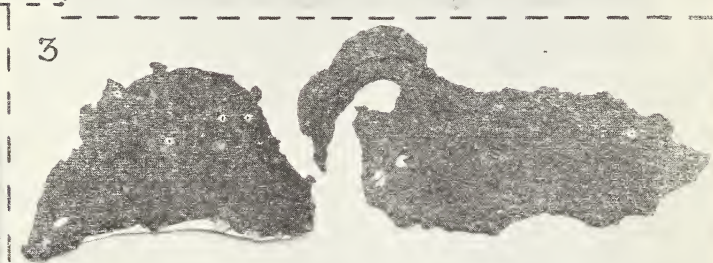
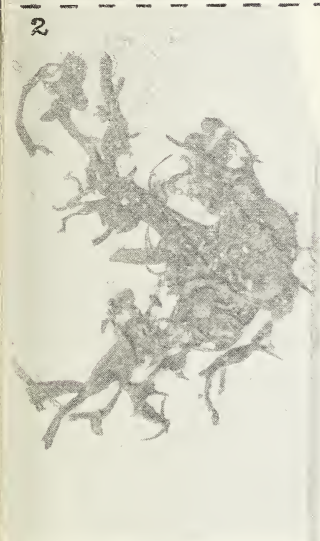
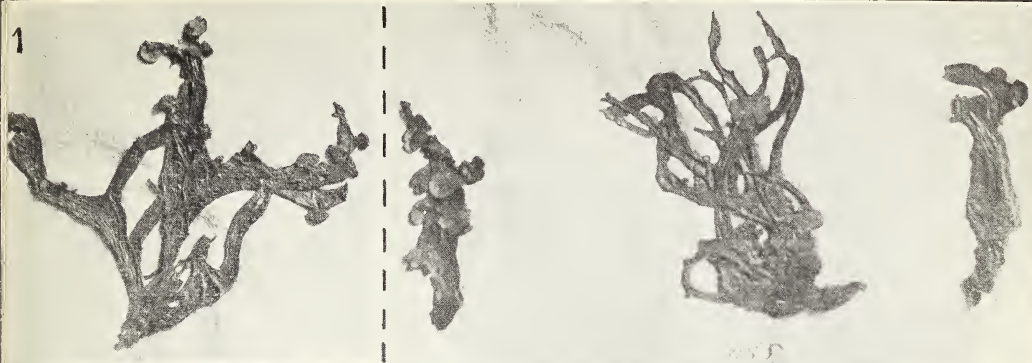
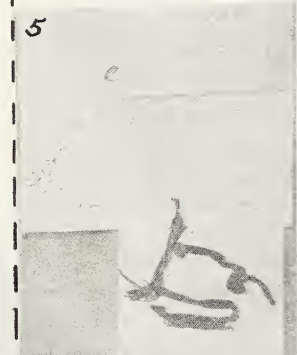


FIG. 2. FUNARIA HYGROMETRICA, FLAVICANS, and AMERICANA



R. fraxinea var. *ampliata* Ach.
 f. *monophylla* Comb.
 on aged oaks.
 near Stony New Forest.
 legit J.M.G. X/1869.



1

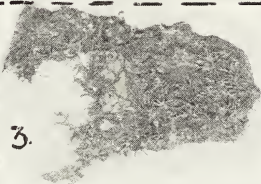


2.



Romulella reticulata (Hook.)
N. W. Cook of Florida -
Esp. - F. Mezger

3.

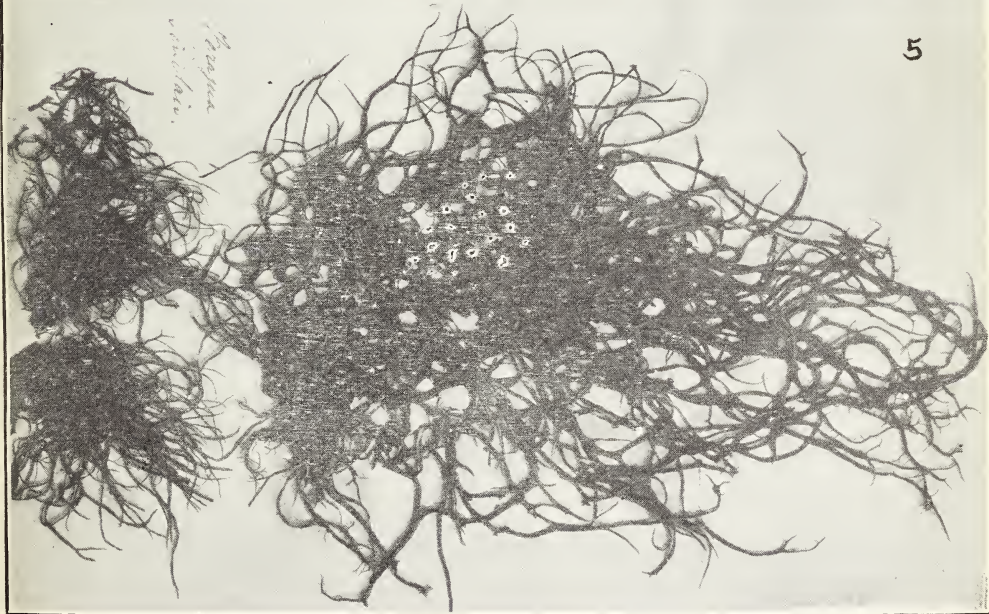


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Procladonia Do la Cour

5



Procladonia
Do la Cour

THE BRYOLOGIST

VOL. XVII

MARCH 1914

No. 2

NORTH AMERICAN SPECIES OF THE GENUS RAMALINA.—PART IV

R. HEBER HOWE, JR.

Ramalina fastigiata var. *subampliata* (Nyl. emend.) comb. nov.¹

SYNONYMY: *Ramalina calicaris* var. *subampliata* Nyl. Recog. mono. Ram. 132. [34]. 1870.

Ramalina calicaris var. *fraxinea* Fr., of most American authors.

TYPE: In the Nylander herbarium, Universitetets Botaniska Institution, Helsingfors, *vide* author.

TYPE LOCALITY: "Gallia," etc. Corsica. Bonifacio, Oleicola. Dec. 1877.

ORIGINAL DESCRIPTION: "thalli laciniis latioribus (latit. circiter 6-12 mm., altit. 5-10 centim.) et facie jam *Ramalinae fraxineae* jamve *fastigiatae*, sporis vero rectis mox distincta." l. c.

FIGURE: *Pl. II, f. 1.*

DIAGNOSIS: *Thallus* caespitose, *compressed, lobate*, subrigid, *apothecia lateral*, spores *straight*.

DESCRIPTION: *Thallus* caespitose (max. length 4 cm.) subrigid, virescent to dark virescent; *cortex* glabrous, rugose, lacunose; *lacinae* lacerate-lobate, compressed (max. width 1 cm.), simple or subsimple, apices obtuse. *Apothecia* common, lateral and marginal, concave or convex, marginate at length immarginate (max. diam. 3 mm.), disk buff. *Spores* ellipsoid, straight,

CONTINGENT PHASES: (a) Abraded and blackening. (b) With minute transverse laciniolae.

SUBSTRATA: On trees and old wood.

DISTRIBUTION: Uncommon in the Upper Austral and Transition zones from New Hampshire to North Dakota south to Louisiana and Florida. The abbé Hue records it from Lower California.

STATIONS: VERMONT: Colchester. MASSACHUSETTS: Berkshire; Worcester. DISTRICT OF COLUMBIA: Rock Creek. VIRGINIA: Lyonhurst. FLORIDA. LOUISIANA: St. Martinsville. MISSOURI: Emma. KANSAS: Douglas Co. IOWA: Fayette Co.; Wallingford; Bremer Co.; Decatur Co.; La Port. ILLINOIS: Wauconda; Canton; White Heath; Farmington; Kane. MICHIGAN: Mackinac Island. OHIO: Cincinnati; Georville; Painesville.



FIG. 1.—Distribution of *Ramalina fastigiata* var. *subampliata*.

¹ See Key at beginning of Part III, BRYOLOGIST, January 1914, for *R. fastigiata* var. *subampliata* and *R. canaliculata*.

OBSERVATIONS: This dark-colored variety is recognized by its expanded, lobate laciniae, lateral apothecia, and straight spores. As Mr. Merrill has said, it has been "commonly identified in this country as *R. calicaris fraxinea* Fr.," but is at once distinguished from true *fraxinea* by its smaller size and straight spores. Nylander's conception of his variety, judging from his type material, included also the narrower-lobed examples which are better referred to the lighter colored *fastigiata* (Pers.). Though Nylander did not attribute this species to our area both Mr. Merrill and the abbé Hue have recorded it from North America.

EXSICCATI: No. 223, Lich. Boreali-Amer., Cummings, etc. Rock Creek, N. D. May 30, 1898. T. A. Williams & Ethel Snell. (called *R. calicaris* a. *fraxinea* Fr.)

No. 291, Decades N. A. Lich., Cummings, etc. Same data as above.

No. 12, Canadian Lichens, Macoun, *vide* Merrill.

Ramalina canaliculata (Fr.) Herre.

SYNONYMY: *Ramalina calicaris* c. *canaliculata* Fries, Lich. Eur. reform. 30 1831.

Ramalina canaliculata Herre, Proc. Wash. Acad. Sci. 12: 220. 1910.

Ramalina calicaris c. *canaliculata* Fr., *sensu* Tuckerman.

Ramalina calicaris of recent authors.

Non *Ramalina canaliculata* Tayl.

TYPE: Lich. Sueciae Exsic., No. 72. 1818.

TYPE LOCALITY: "Sueciae."

ORIGINAL DESCRIPTION: "lacinii angustioribus, fructiferis canaliculatis, apotheciis ex apicibus reflexis appendiculatis." l. c.

FIGURE: Ach. Kongl. Vet. Acad. Nya Handl. Stockholm 20: Pl. 9, f. 1. G-K. and Harm., Lich. Fr. Pl. 12: f. 7. 1907.

FIG. 2.—Distribution of *Ramalina canaliculata*.



DIAGNOSIS: *Thallus* caespitose, compressed, linear, canaliculate, subrigid; apothecia subterminal, spurred; spores straight.

DESCRIPTION: *Thallus* caespitose (max. length 5 cm.), subrigid, pale virescent to virescent; cortex glabrous, sublacunose; laciniae sublinear, compressed, canaliculate (max. width 2 mm.), dichotomous, patulous, apices attenuate, deflexed. Apothecia common, mostly subterminal, spurred, marginate becoming immarginate, (max. diam. 3 mm.), disk buff. Spores ellipsoid, straight.

CONTINGENT PHASES: (a) Blackening.

SUBSTRATA: Trees and shrubs.

DISTRIBUTION: Common in the Upper Transition and Boreal zones from New Brunswick to Minnesota south to Iowa, Ohio, and New Jersey. Eckfeldt records it from Labrador and Newfoundland, Drs. Hasse and Herre from California (spores curved, Herre), and Macoun from as far west as the Rocky Mountains.

STATIONS: ONTARIO: Algonquin Park; Nipigon. MAINE: Southwest Harbor; Green Mt.; Mere Pt.; Brunswick; Manchester; Piscataquis Co.; Warren; West Pembroke. NEW HAMPSHIRE: Gilford; Franconia; Fitzwilliam; Mt. Monadnock; Peterboro. MASSACHUSETTS: Pepperell; Lunenburg; Natick; Ashby; Concord. CONNECTICUT: Goshen; South Canterbury. NEW YORK: Chilson Lake; Jay; East Galway. MICHIGAN: Sailor's Encampment. WISCONSIN. MINNESOTA.

OBSERVATIONS: This sub-Boreal species, recognized by its canaliculate condition throughout, and subterminal spurred apothecia, grades to some extent into the foregoing species and has been widely recorded from our area. *R. calicaris*, like *barbata* and *jubata*, borrowed by Tuckerman from Fries, stood for many years as a convenient catch-all for the innumerable integrading forms not well marked in varietal characteristics. In 1888, Dr. Wainio pointed out that *calicaris* L., heretofore considered "vagum," is synonymous with *canaliculata* of Fries, as proved by the majority of specimens in the Linnean herbarium, and a general acceptance of this view followed, excluding the verdict of Acharius. As has already been seen, Dr. Wainio was here referring to specimens found in the Linnean herbarium which were in no sense Linnean types, but probably had all been added after Linneus' death. It has also been pointed out that Linneus' description is not diagnostic of this species. We are left therefore to make an unfortunate adjustment of nomenclature, which, as it is based on types, we trust may be permanent. Dr. Herre records this species from California, but attributes to it curved spores. Is it not probable that his canaliculate examples should have been referred to young states of *R. Menziesii*, since *canaliculata* occurs as a typical Californian species with straight spores (see Hasse). As Mr. Merrill has said, often specimens determined as *R. rigida* represent typical material of this variety.

EXSICCATI: No. 183, Lich. Exsic., Merrill. Warren, Maine. Aug. 18, 1909. G. K. Merrill (called *R. calicaris*). No. 45, in part, Lich. Novae Angliae, Howe. Fitzwilliam, N. H. Aug. 8, 1909. R. H. Howe, Jr.

KEY TO THE SERIES *Myelopoeae* (Continued)

Laciniae expanded

- Coriaceous..... *fraxinea*
- Ample, laterally digitate..... *y. ampliata*
- Never coriaceous (membranaceous)
- Thallus reticulate..... *reticulata*
- Thallus never reticulate
- Laciniae lanceolate, not canaliculate below.. *yemensis*
- Laciniae never lanceolate, canaliculate below. *Menziesii*

Laciniae never expanded

- Canaliculate throughout
- Sorediate..... *sorediantha*
- Esorediate..... *linearis*

Ramalina fraxinea (L.) Ach.

SYNONYMY: *Lichen fraxineus* Linn. Spec. Plant. 2: 1146. 1753.

Ramalina fraxinea Ach. Lich. Univ. 602. 1810.

TYPE: In the Linnean herbarium, Burlington House, London, *vide* author.

TYPE LOCALITY: "Europae."

ORIGINAL DESCRIPTION: "foliaceus erectus oblongus lanceolatus sublaciniatus lacunosus glaber, scutellis subpedunculatis." *l. c.*

FIGURE: Hoffm. Pl. Lich. Pl. 18: figs. 1-2. 1790.

DIAGNOSIS: *Thallus* caespitose, compressed, *expanded*, *coriaceous*, *rugose*, apothecia *large*, *lateral*. Spores *curved*.

DESCRIPTION: *Thallus* caespitose (max. length 4 cm.) coriaceous, stramineous to virescent; *cortex* rugose; *lacinae* compressed, lacinate (max. width 9 mm.), apices obtuse. *Apothecia* common, large, lateral and marginal, concave, appanate or convex, at length lacerate, marginate (max. diam. 16 mm.), disk buff. *Spores* ellipsoid, curved (rarely a few substraight), $\frac{11-16}{5-7} \mu$.

CONTINGENT PHASES: (*a*) Small, costate, rugose, monophyllous, often pale beneath (= ? *R. fraxinea* var. *ampliata* f. *monophylla* Crombie, Grevillea 7: 141. 1879. ORIG. DESC.: "Thallus simple, very broad, oblong-rotundate, subreticulately costate-rugose.")

SUBSTRATUM: On trees.

DISTRIBUTION: Uncommon in the Transition Zone of the Central and Western States. Its exact range is still problematical.

STATIONS: ILLINOIS: Canton. MINNESOTA: South Haven; Lake Melissa; Mankato; St. Cloud. ARIZONA: Tucson. CALIFORNIA: Pajaro; Trinidad.

OBSERVATIONS: This species, recorded erroneously from our area by many authors, is distinguished by its expanded lacinae, laterally scattered *large* apothecia, and *curved* spores. I have never observed it in an absolutely typical state from North America. The following more ample variety and a small, more or less monophyllous, phase are also rare. This species would be most easily confounded with the following, *R. yemensis*, from which it is distinguished by its larger apothecia, obtuse apices of the lacinae, and *decidedly* more *coriaceous* thallus. The spores are also mostly straight in the latter species.

Ramalina fraxinea var. *ampliata* Ach.

SYNONYMY: *Parmelia fraxinea* γ *ampliata* Ach. Meth. Lich. 259. 1803.

Ramalina fraxinea δ *ampliata* Ach. Lich. Univ. 603. 1810.

TYPE: In the Acharian herbarium Universitetets Botaniska Institution, Helsingfors, *vide* Dr. Fred Elfving. Duplicate Acharian material in the herbarium of the Linnean Society, London, *vide* author.

TYPE LOCALITY: Not given.

ORIGINAL DESCRIPTION: "thalli laciniis amplissimis extrorsum latioribus margine plerumque fimbriatis." *l. c.*

FIGURE: Dill, Hist. Musc. Pl. 22, f. 59, C. 1741.

OBSERVATIONS: I have seen but two specimens of this distinctly larger variety, sent me by Drs. H. E. Hasse and A. C. Herre from the Santa Monica

Range and Santa Cruz Mts., California. It seems to be rare and confined to the Pacific Coast.

STATIONS: CALIFORNIA: Santa Monica Range; Mt. View Landing; Los Gatos.

Ramalina yemensis (Ach.) Nyl.

SYNONYMY: *Ramalina fraxinea* β *yemensis* Ach. Lich. Univ. 602. 1810.

Ramalina yemensis Nyl. Recog. mono. Ram. 144. 1870.

Ramalina laevigata Fr. Syst. orbis. veget. 283. 1825.

TYPE: In the Acharian herbarium, Universitetets Botaniska Institution, Helsingfors, *vide* Dr. Fred. Elfving.

TYPE LOCALITY: "Yemen Arabiae Forskohl."

ORIGINAL DESCRIPTION: "laciniis elongatis angustis linearibus subsimplicibus utrimque laciniusculis; apotheciis minutis subsessilibus marginalibus, disco plano albissimo pruinoso." *l. c.*

FIGURE: Zahlbr. Nat. Pflanzen-Fam. Engl. & Prantl. Pl. 115, f. F. 1907.

DIAGNOSIS: *Thallus* caespitose, compressed, expanded, *membranaceous*, rugose, apothecia small, lateral, spores *straight*.

DESCRIPTION: *Thallus* caespitose (max. length 6 cm.) *membranaceous*, stramineous to virescent; cortex rugose; *lacinae* compressed, lanceolate (max. width 8 mm.), apices acute. *Apothecia* common, lateral, small, concave or applanate, marginate (max. diam. 1 mm.), disk buff. *Spores* ellipsoid, straight or substraight, $\frac{10-16}{4.5.7}$ μ .

CONTINGENT PHASES: (*a*) lobes wide (13 mm.), (= *R. yemensis* f. *latior* Nyl. "Sporae ei longit, 0.012-25 millim., crassit 0.005-7 millim.")

SUBSTRATUM: On trees.

DISTRIBUTION: In the lower Austral Zone of the Southwestern States and Mexico.

STATIONS: LOUISIANA: St. Martinsville. TEXAS: Austin; San Antonio. NEW MEXICO. WYOMING: ? MEXICO: Japotlan; Monterey; Sierra Madre; Honez Station.

OBSERVATIONS: This species, distinguished from the preceding by its lanceolate lacinae, minute apothecia, and straight spores, was referred by Tuckerman to *R. laevigata* Fr. and has



FIG. 3.—Distribution of *Ramalina yemensis*.

been recorded from California by Dr. Hasse. The type of *laevigata* has apparently been lost, *vide* Dr. O. Juel, and the original description is not at all diagnostic, especially in its statement "apotheciorum margine crenato." Mr. Merrill records Nylander's varieties *sublinearis* and *latior* from Mexico.

EXSICCATI: No. 81. Lich. Boreali-Amer., Cummings, etc. Austin, Texas, Mar. 1894. Prof. F. W. Simmonds (called *R. laevigata* Fr.).

No. 13. Mex. Lich., Pringle. Monterey, Mexico.

No. 244. Mex. Lich., Pringle f. *latior* Nyl., *fide* Merrill.

No. 151. Decades N. A. Lich., Cummings, etc. Waco, Lannon Co., Texas, Mar. 2, 1894. A. A. Heller (called *R. laevigata* Fr.)

Ramalina Menziesii Tuck.

SYNONYMY: *Ramalina Menziesii* Tuck. Synop. Lich. N. Eng. 12. 1848.

Ramalina leptocarpha Tuck. Suppl. Enum. N. A. Lich. 423.

1858.

TYPE: "There are several specimens" in the Tuckerman herbarium, Botanic Museum, Cambridge, Mass., "but no indication to show whether any particular one was the type," *fide* Dr. W. G. Farlow.

TYPE LOCALITY: "Monterey," California.

ORIGINAL DESCRIPTION: "submembranaceous, thin, deeply lacunose or plane, canaliculate, smooth; apoth. lateral, sessile, with a thin elevated margin." *l. c.*

DIAGNOSIS: *Thallus* caespitose, compressed, *canaliculate below, membranaceous, rugose, apothecia lateral, spores curved.*

DESCRIPTION: *Thallus* caespitose at length pendulous (max. length 12 cm.), membranaceous, stramineous to pale virescent; *cortex* rugose, (puberulent?); *lacinae* compressed, often tortulous, canaliculate below, or throughout when immature, expanded above, at length foraminous (max. width 15 mm.), apices attenuate. *Apothecia* common, lateral and marginal, medium, concave at length convex, marginate (max. diam. 8 mm.), disk buff. *Spores* ellipsoid, $\frac{10-18}{3.5-7} \mu$.

CONTINGENT PHASES: (a) More or less soresiate or soraliate on the margins and laterally (= *R. Menziesii* f. *sorediata* Tuck., herb. Herre, Proc. Wash. Acad. Sci. 12: 219. 1910). (b) Blackening. (c) Reduced and degenerate.

SUBSTRATA: On trees, shrubs, and old wood [rarely "on the earth"].

DISTRIBUTION: Common in the Transition Zone from Washington to Southern California.

STATIONS: CALIFORNIA: Santa Monica Range; San Francisco Bay; Santa Cruz; Salinas; Mt. View Landing; Frenchman's Tower; Los Gatos; Stanford University; Bolinas; Santa Rosa: Santa Barbara; San Diego; Berkeley; Searsville; Coast Range. WASHINGTON: San Juan Island. LOWER CALIFORNIA: Guadalupe Is.



FIG. 4.—Distribution of *R. Menziesii*.

OBSERVATIONS: This species, recorded commonly from California, is far from well understood, especially to students of herbaria alone, and proved somewhat uncertain even to Tuckerman, who redescribed it under a new name ten years after his original notice. In its younger states it looks quite different from the fully developed condition, it becoming expanded and losing its canaliculate appearance with age. The canaliculate phases, however, need not cause it to be confused with the coriaceous *R. canaliculata*

(Fr.) Herre, as they almost invariably show a few minute marginal apothecia which always contain *curved* spores. Its membranaceous thallus also distinguishes

it from *R. canaliculata* Tayl. Its only distinct character is the membranaceous thallus which separates it from all the members of what had been known as the *calicaris* stock; and its medium to large apothecia and curved spores always distinguish it from *yemensis*. Nylander considered it closely allied to his *subfraxinea*, a species of which only the form *firmior* he attributed to our area, as already cited, and this form approaches closely true *fraxinea*. It is certain that *Menziesii* is very closely allied to this latter species, separated at times only by its more membranaceous thallus. No true puberulence has ever been observed. There are certain evidently young states, canaliculate and less membranaceous, that are comparable with the most developed condition of *R. linearis*. In fact, only a long and careful field study throughout the range can ever settle the exact limits of the species.

EXSICCATI: No. 4. Lich. Boreali Amer., Cummings. Berkeley, Cal., Feb. and Mar., 1893. *M. A. Howe*.

No. 93. Decades N. A. Lich., Cummings, same as above.

NOTE: *Ramalina fraxinea* var. *caliciformis* Nyl. Recog. mono. Ram. 136 [36], 1870, which was attributed to California by Nylander and l'abbé Hue, seems to be very much like the younger states of *Ramalina Menziesii* Tuck. or at least what have been taken for the younger states of this species. Nylander diagnosed it as follows: "Thallus attenuatus (altit. 3-12 centimetr.), facie sicut in *R. calicari*; apothecia marginalia et subterminalia (haec laciniola terminali subreceptaculo appendiculata). Sporae [curved] longit. 0.010-17 millim; crassit. 0.004-6 millim." Though I have seen the type and l'abbé Hue's material, a further study based on much more material is necessary. *Ramalina subfraxinea* f. *firmior* Nyl. Recog. mono. Ram. 139 [41], 1870, was attributed to Mexico by Nylander. I have seen no specimens except the type, preserved at Helsingfors, which was diagnosed as "thallo nigrescente. Magis vero notabilis est," by Nylander. *Ramalina polycarpa* Nyl. Recog. mono. Ram. 140 [42], 1870, was described from Mexico by Nylander. Though I have seen the species from New Zealand I have not met with other material than the type (and one plant from Warrnambool, Victoria, Australia) which is preserved at Helsingfors. Nylander defined the species as follows: "Facies fere *Ramalinae fraxinae* minoris (altit. 2-6 centimetr.), apotheciis alboglaucis suffusis minoribus (latit. 1-2 millim.), sporis tenuioribus (minusque curvis, longit. 0.010-16 millim., crassit. 0.004-5 millim.)"

Ramalina reticulata (Noedh.) Krempibr.

SYNONYMY: *Lichen retiformis* Menzies herb. (not published until 1848).

Lichen reticulatis Noedh. Schrad. Journ. Bot. 2: (3) 237, 238. 1800 [1801].

Ramalina Menziesii Tayl. London Journ. Bot. 6: 189. 1847.

Ramalina retiformis (Menz.) Tuck. Synop. Lich. N. Eng., etc. 12. 1848.

Ramalina reticulata Krempibr. Geschichte und Litt. Lich. 1: 86, 1867, and 2: 617, 1869.

Chlorodictyon foliosum J. Agardh. Ofo. K. Vet. Akad. Foch. 427-434. 1870.

TYPE: In the herbarium of the British Museum (Natural History), London, *vide* author.

TYPE LOCALITY: "Nord-west Küste von Amerika," not according to Krmelhuber "Insel das Austral-Oceans."

ORIGINAL DESCRIPTION: "cartilagineus, pallidus, pendulis, glaber, compressus, ramis dichotomia divisis interse reticulatim connexis, apicibus dichotomis intersecto subtili et eleganti reticulo, scutellis carneis, marginalibus, subpedunculatis, connexo-planis." *l. c.*

FIGURE: Agardh, *l. c.*, Pl. 3. Schneider, Guide Stud. Lich. Pl. 5. 1904. Cramer, Bull. Soc. Bot. Suisse 1: Pl. 1-3. 1891.

DIAGNOSIS: *Thallus pendulous*, compressed, *reticulate*; apothecia mostly marginal; spores straight or substraight.

DESCRIPTION: *Thallus pendulous* (max. length 2 m.), subrigid, cinereous to virescent; cortex longitudinally striate, subrugose; *lacinae* compressed, linear or expanded (max. width 40 mm.) subcanaliculate and tortulous, at length foraminous and reticulate, apices attenuate. *Apothecia* not uncommon, marginal or lateral, concave at length convex (max. diam. 3 mm.), disk buff to carneous. *Spores* ellipsoid, straight or substraight, $\frac{10.8-20}{4-7} \mu$.

CONTINGENT PHASES: (a) Blackening. (b) Branches subterete, including filaments of netted areas.

SUBSTRATA: On trees and old wood.

DISTRIBUTION: Abundant from the lower Austral to the lower Boreal Zone from Lower California to British Columbia from sea-level to 2000 feet.

STATIONS: CALIFORNIA: Santa Monica Range; Mayfield; San Diego; Santa Barbara; Ross Valley, Marin Co.; Mt. Santa Ana; Pacific Grove; Stanford University; Mt. View Landing; Pigeon Pt.; Alpine Creek; Ano Nuevo Creek; Frenchman's Tower; Searsville; Santa Cruz Island; Nordhoff; Los Canoas Cañon; Santa Clara Co., Berkeley; Mendocino Co.; Ukiah; San Roque Trail; Mission Dolores; Sausalito; San Luis Obispo; St. Helena; San Andreas; San Miguel; Sonoma Co.; Avalon; Nepa Valley; Lancelito. OREGON: Sanvier's Island; Dallas; Brockway. WASHINGTON: Rock Harbor; Westport; San Juan Co.; San Juan Island; Friday Harbor; Wasp Island; Seattle; Pt. Orchard. BRITISH COLUMBIA: Victoria; New Westminster; Port Renfrew; Beacon Hill Park; Vancouver Island. LOWER CALIFORNIA: Ensenada. MEXICO: Manzanillo; Monterey.



FIG. 5—Distribution of *R. reticulata*.

OBSERVATIONS: This remarkably beautiful and usually easily distinguished species possesses an interesting history.

The eminent algologist Agardh as late as the year 1870 curiously mistook it for an alga, though it had been described as a lichen seventy years earlier. Through the kindness of Mr. A. Gepp, of the British Museum, I am enabled here to give the complete synonymy. Two most remarkable, terete and yet netted specimens, one collected at Port Renfrew, Vancouver Island, by Dr. A. Schneider, the other from Avalon, Catalina Is. (U. S. Nat. Herbarium), have come before me. If these two specimens are not unique and prove to

represent a development of the species correlated with distribution, a varietal name is needed to distinguish this condition of growth.

EXSICCATI: No. 57. Lich. Amer. Sept. Exsic., Tuckerman. "Montibus Californiae." 1854.

No. 42. Decades N. A. Lich., Cummings, etc. "Gilroy, Calif.," Sept. 1892, Mrs. J. Forsyth.

No. 1. Canadian Lich., Macoun. "Victoria, V. I." [1875-77, May 6, 1893.] J. Macoun.

No. 573. Krypt. Exsic., Zahlbr. "California," 1901.

No. 19. Lich. Exsic., Merrill. "Westport, Washington," April 29, 1908. A. S. Foster.

No. 142. Lich. Exsic., Merrill. "Rock Harbor, Washington," July 12, 1904. J. B. Flett.

No. 3. Lich. Boreali-Amer., Cummings, etc. "Berkeley, Calif." Apr. 11, 1893. M. A. Howe.

Ramalina linearis (Sw.) Ach.

SYNONYMY: *Lichen linearis* Swartz, Linn. Meth. Musc. illus. 36. 1781.

Ramalina linearis Ach. Lich. Univ. 598. 1810.

TYPE: In the Riksmuseets Botaniska Afdelning herbarium, Stockholm. Another specimen is in the Linnean herbarium, Burlington House, London, *vide* author.

TYPE LOCALITY: "Nova Zelandia."

ORIGINAL DESCRIPTION: "foliaceus erectus dichotomus, ramis linearibus divaricatis altere latere canaliculatis, peltio minutis marginalibus." *l. c.*

FIGURE: Swartz Lich. Plant. Pl. 11, f. A-B, a. 1811.

DIAGNOSIS: *Thallus* caespitose, slender, linear, canaliculate, apothecia marginal, minute. Spores curved.

DESCRIPTION: *Thallus* caespitose (max. length 8 cm.), subrigid, stramineous to virescent; *cortex* glabrous; *lacinae* compressed, canaliculate, slender, branched, (max. diam. 2mm.), disk buff. Spores ellipsoid, curved, $\frac{9-18}{4-7} \mu$.

CONTINGENT PHASES: (a) Margins slightly spinulose (= *R. linearis* f. *spinulosa* Merr.¹ *l. c.*).

SUBSTRATUM: On trees.

DISTRIBUTION: Common in the Austral Zone in Cuba, Jamaica, in Lower California, Mexico, and north to Los Angeles Co., California.

STATIONS: CALIFORNIA: Los Angeles Co.; San Diego. MEXICO: Orizaba. JAMAICA. SAN DOMINGO.



FIG. 6.—Distribution of *R. linearis*.

¹TYPE LOC.: Jamaica. ORIG. DESC.: "Thallus attaining to 13 cm. in length, compressed, narrowed, canaliculate, linear and acuminate, pale straw colored, the secondary branches palest, as likewise the short filiform branchlets, with the major divisions present and clothed. Apothecia small, lateral, pedicellate, at length rather convex. Spores ellipsoid, straight, 13-17x7 μ ." *l. c.*

OBSERVATIONS: This slender species may be distinguished by its rigid, narrow, connivo-canaliculate laciniae, and minute marginal apothecia. Certain more membranaceous examples of it approach the most completely narrowed states of *R. Menziesii*. It is not the same plant which was later cited by Swartz from Jamaica (Fl. Ind. Occid. 3: 1910. 1806) and which, according to Nylander, is synonymous with *sorediantha* Nyl. Swartz's description, cited above, adds the words "glomerulis terminalibus albis," which do not seem applicable to the present species. Dr. L. W. Riddle records the species from Jamaica.

Ramalina canaliculata Tayl., New Lich., Hook. Journ. Bot. 6: 188, 1847, was attributed to "California" as a type locality.² Except for the type specimen preserved at Kew Gardens, London, I have seen no other material from our area, though the species seems to be almost synonymous with the preceding. It was defined as follows: "thallo caespitoso, glabro, nudo, subtus canaliculato, linearis, subdichotomo, albo-lutescenti, ramulis acuminatis; gemmis marginalibus, granulatis, statim spinuliformibus; apotheciis marginalibus, podicellatis, concavis, margine gemmis granulato." It would seem to be identical with *R. linearis* f. *spinulosa* Merrill (BRYOLOGIST 11: 50. 1908), and if deserving of recognition, no doubt should be called by Mr. Merrill's name, as Taylor's is pre-occupied; Fries' *canaliculata* not being synonymous with *calicaris* L. Mr. Merrill remarks when describing his variety: "*R. canaliculata* Tayl. is with difficulty separable from this species."

Ramalina sorediantha Nyl.

SYNONYMY: *Lichen linearis* Swartz Fl. Ind. Occid. 3: 1910. 1806.³

Ramalina sorediantha Nyl. Bull. Soc. Linn. 143. 1870.

TYPE: In the Nylander herbarium, Universitetets Botaniska Institution, Helsingfors, *vide* author.

TYPE LOCALITY: "Mexico, Tampico, Uzul, 1838."

ORIGINAL DESCRIPTION: "Thallus stramineo-pallidus vel testaceo-pallidus, compressus, rigescens, linearis (altit. 3-5 centimetr., latit. 0.5-1.5 millim.) et dichotome lineari-ramosus, canaliculatus, ramis divaricatis marginatis, laevis (passim obsolete longitudinaliter inaequalis), apicibus subfurcatis saepe glomerulis sorediosis albis terminalibus; apothecia glauco-albida (latit. 3-6 millim.) concava, receptaculo infra sublaevis; sporae oblongae, leviter curvulae, longit. 0.011-14 millim., crassit. 0.0035-0.0045 millim." *l. c.*

OBSERVATIONS: Besides the type I have seen but a few other specimens of this plant from Jamaica and Santo Domingo. It is not always markedly canaliculate.

[To be continued.]

² Type labeled "Venagua," a locality I cannot find except in Panama.

³ TYPE not traced. TYPE LOCALITY: "Jamaica." ORIG. DESC.: subcartilagineus, erectus linearis dichotomus canaliculatus pallidus glaber; scutellis marginalibus concoloribus, glomerulis terminalibus albis."

EXPLANATION OF PLATES V-VI

Plate V

1. The Linnean type of *Lichen fraxineus* at London (slightly reduced).
2. The Nylander type of *Ramalina subfraxinea* f. *firmior* at Helsingfors (nat. size).
3. The Crombie type of *Ramalina fraxinea* var. *ampliata*. f. *monophylla* at London (nat. size).
4. Acharian material of *Ramalina fraxinea* var. *ampliata* at London (slightly reduced).
5. The Nylander type of *Ramalina fraxinea* var. *calicariiformis* at Helsingfors (slightly reduced).
6. The Nylander type of *Ramalina polycarpa* at Helsingfors (slightly reduced).

Plate VI

1. *Ramalina Menziesii*, typical material determined by Tuckerman (nat. size).
2. The Noedhen type of *Lichen reticulatus* at London (slightly reduced).
3. The Nylander type of *Ramalina soreidiantha* at Helsingfors (slightly reduced).
4. The Swartz type of *Lichen linearis* at Stockholm (nat. size).
5. The Taylor type of *Ramalina canaliculata* at Kew ($\frac{3}{4}$ nat. size).

PHOTOGRAPHING MOSSES. II

BY A. J. GROUT

Somewhat more than a year ago I printed some photographs of mosses and a few notes on making such photographs. Since then I have exposed some hundreds of plates and have succeeded in showing differences between related species that most drawings and descriptions fail to express in an equally satisfactory manner.

Before the next number of THE BRYOLOGIST is received the *Funarias* will be maturing their spores, so I am presenting some photographs of three of our species, the only ones likely to be met with.

In the photographs of *F. hygrometrica* the beginner in bryology should note the young sporophytes, several just starting and one or two fairly well developed, yet with the capsule and calyptra still symmetrical or nearly so. (Plate III and Fig. 1, Plate IV.) Note that the enlarged photograph, Plate III, is of the same plants as those shown in the smaller photograph, Fig. 1, Plate IV, and observe how much detail is added by the enlargement.

In the photograph of the capsules of the three species, note that the dry and empty capsules of *F. Americana* look more like those of *Amblystegium* than *Funaria*. Of course, the fresh, plump capsules are more *Funaria*-like, but such were not accessible.

The plump capsules of *F. flavicans* are much less differentiated from those of *F. hygrometrica* than those that are shrunken, but even in the plumpest stage the mouth is noticeably less oblique and in the shrunken stage the differences in the obliquity of the mouth and outline of the capsules are very striking. I suspect, however, that the differences are not always so apparent as in the specimens photographed, which were considered fairly typical.

I tried to soak out some capsules of *F. hygrometrica* to show the difference in the same specimens when wet and dry, but the setae began to twist as soon as the specimens were put on the stage to be photographed and twisted so rapidly that the result was only a blur. I have frequently had the same trouble with fresh mosses where the time of exposure was from three to five minutes and the specimens separated from each other and the substratum.

Aside from getting suitable specimens the problem of getting good moss photographs resolves itself largely into the two problems of lighting and depth of focus. Next number is planned to contain a discussion of these problems, and in the advertising columns will be given a list of species of which prime fruiting specimens are needed for photographing.

EXPLANATION OF PLATES III AND IV

Plate III

Funaria hygrometrica (L.) Sibth. $\times 4$.

Plate IV

Fig. 1. *Funaria hygrometrica*, slightly enlarged.

Fig. 2. The four capsules on the right are *Funaria Americana* Lindb. The five next to the left of these, extending in an irregular line from top to bottom, are *F. flavicans* Mx. The others are *F. hygrometrica*—all are $\times 5$.

NOTES ON MAINE HEPATICAE AND THEIR COMPARISON WITH THE HEPATICAE OF THE SAREKGEIRGE

[Read by Mr. E. B. Chamberlain at the S. M. S. Meeting, Brooklyn Botanic Garden, May 24, 1913.]

ANNIE LORENZ

Round Mountain Lake is situated in the western part of Maine, in the township of Alder Stream, Franklin County, about 20 miles from the Canadian border, and adjoining the Megantic Club's preserves. The lake itself lies at 2300 ft. alt., with a row of five Round Mountains, averaging 3000 ft., on the west. The highest peak in the vicinity is Snow's Mt., 3986 ft., about 5 miles distant, but this was not visited by the writer. The lake is about half a mile long, and perhaps a quarter of a mile wide, rather shallow, spring-fed, and contains one beaver and some fair trout. At the outlet is a beaver dam with a small pond below it, and about this is a young bog where the *Sphagnum* is just beginning to gain a foothold.

The only peculiarly peat-bog hepatics were the two early arrivals *Mylia anomala* and *Cephalozia elachista*; this latter, in fact, is not dependent upon

the presence of *Sphagnum*, but is equally at home in a tuft of bog *Dicranum*. Among the sweet-gale bushes about the edge of the pond were much *Scapania irrigua* and *Chiloscyphus fragilis*, besides *Drepanocladus* sp.

The soil of the region contains a little lime, as is indicated by the arborvitae and hare-bells, also *Lophocolea minor* along the lake shore. The lake is approached via the typical Maine buckboard road, and the writer made her first addition to the state list on the way in, *Pellia Neesiana*, the only station noted. For full report of additions collected on this trip see *Rhodora* for November, 1912.

[To be Concluded.]

THE WORCESTER MOSS CLUB

A few years ago some of the nature students in Worcester, Massachusetts, evinced a decided interest in the study of mosses. They wished to be able to name the various species that they met in their walks; to have a speaking acquaintance with them at least. Out of that desire grew the present Moss Club of the Natural History Society of Worcester.

It had its real beginning as far back as 1905, when Mrs. Horr, the Custodian, formed a class at the Museum, whose first purpose was to find out only as much as a hand-lens would show. But the members soon found that a hand-lens did not carry them far enough, so in 1907 and again in 1909, Miss Helen E. Greenwood showed the class slides of leaf-sections, peristomes, antheridia, and archegonia under the compound microscope. Still later, in the fall and winter of 1910-11, Miss Alice C. Kendall, of Holden, gave a course of ten lessons, teaching the meaning of the terms used in the keys of the manuals, and making constant use of the compound microscope. At the end of her course she held an exhibit of freshly gathered specimens to which the public was invited.

As a result of the influence of these two friends, the members of the club felt that they, too, ought to have compound microscopes. Three of these were bought and two were borrowed of sympathizing friends, in addition to the one already owned by the Museum. So much enjoyment and profit have been gained from the use of these microscopes that all are eager to form a class each fall. Unfortunately, so many other classes are formed by the Museum in the spring, that the moss study has to be fall and winter work.

From the beginning the members have been taught to note the fruiting time of each moss, and to keep careful records. The object has come to be the working out of the local flora. About 120 different kinds have been found to date, with much material yet to be worked over. The members are good collectors at all seasons of the year, and represent many different localities, as several live in different towns near Worcester. Good herbaria are being made, some of beauty and value.

From the start THE BRYOLOGIST and the help given by the various curators of the Sullivant Moss Society have been a source of inspiration and have kept the class in good working spirit. As one of the members said in speaking of the work, "The social side is worth mentioning, with its bond of good fellowship,

in addition to the gain in methods of systematic, orderly study, and in our own personal knowledge of this particular field."

The Worcester Society of Natural History. MRS. ELLA L. HERR, *Custodian*

OSCAR DANA ALLEN

Professor Oscar Dana Allen died at Ashford, Washington, on February 19, 1913. He was born at Hebron, Maine, on February 25, 1836. During the years 1876-1883 while professor of chemistry in the Sheffield Scientific School of Yale University, he was an active student of bryology. At this time he was fortunately associated with Prof. D. C. Eaton and carried on correspondence with many eminent contemporary bryologists, among others Lesquereux, James, Austin, and Rau. During the greater part of this period Prof. Allen's son, Mr. J. A. Allen, was also interested in bryology, and much of the distributed material that has been accredited to the latter is really the product of their joint efforts. The extent of the field work done by these two workers may be appreciated from the fact that between them they were able to detect in Connecticut more than seventy-five species of liverworts and mosses which hitherto had not been recorded within the state. Of these, at least a dozen have never since been collected here, while two have been described as new species, viz.: *Thuidium Alleni* Aust. and *Fontinalis Allenii* Card. Outside of Connecticut their explorations extended into Maine, the White Mountains of New Hampshire, the Gaspé Peninsula of Quebec, Cape Breton Island, and the Labrador Peninsula. Among the most noteworthy of Prof. Allen's discoveries was the only known American station for the minute *Brachydontium trichodes* (Weber f.) Bruch., in Tuckerman's Ravine, Mount Washington, New Hampshire. In addition, however, to being a keen observer, he was also a remarkably thorough and painstaking student of the bryophytes, as is attested by the critical notes which are appended to so many of his herbarium specimens. In 1884, on account of failing health, Prof. Allen retired from teaching and removed to California. In 1889 he took up a homestead in the upper valley of the Nisqually River, within the present limits of the Mount Rainier National Forest, Washington, and here he spent the remaining years of his life. While in California, and for some years after settling in Washington, he confined his attention mainly to the study of phanerogamous plants, and for some time he was employed by the Gray Herbarium to collect sets of plants from the Cascade Mountain region. About the year 1898, however, he once more became interested in the study of the bryophytes in connection with the preparation of the "Mosses of the Cascade Mountains, Washington," an exsiccata issued by Mr. J. A. Allen. This interest continued until shortly before his death. Various specimens collected by Prof. Allen have been distributed in the exsiccatae of Austin, Grout, and Holzinger. The moss herbarium accumulated by the Allens during their residence in New Haven, comprising some three thousand specimens, has recently been purchased by the New York Botanical Garden.

GEORGE E. NICHOLS.

REVIEW

Die Laubmoose Europas [The *Bryineae* of Europe] edited by Leopold Loeske in association with prominent specialists. The work is illustrated with numerous figures, almost uniformly after original drawings, by P. Janzen, Prof. Dr. Gyorffy, Prof. Dr. Podpera, and others.

The prospectus of this new work on the Mosses of Europe is at hand, and sets forth for its *raison d'être* that even the best of its predecessors—to mention only the works of Schimper, and of Limpricht “might have been printed prior to the famous year 1859.” . . . Even the considerable progress achieved by Limpricht in morphological and anatomical respects can not make good this defect.” All previous Moss floras might as well have been written before Darwin!

The work here announced will be found essentially distinct from its predecessors in the following features:

1. There is a stronger emphasis on life conditions, on variability under change of environment and distribution, that is, emphasis on the biology of mosses.

2. The old principle, of the greater importance of the sporophyte (“*per se*” and for the system) is abolished, and fundamentally equal value is given to both generations. In particular cases, after weighing all points, either of the two generations may receive the greater emphasis.

3. The old principle, of laying greater emphasis on anatomical, as compared with morphological characters, is abolished. The former, in spite of their protected position, are in many cases only apparently protected against the outer world. Particular cases as under “2.”

4. The systematic units, inclusive of the species, are abstractions, although in the fixed, little changeable species, concept and object may correspond fairly well. There are no characters which may, at the outset, be assumed as “specific characters,” but each group of mosses must, down to species and forms, be attempted to be studied and classified according to its special peculiarities.

5. It is proposed to apply all obtainable results to the improvement of the system, which remains ever open to further critical study and improvement, and which knows no “conclusion,” although in scientific practise such conclusion must be attempted. In consequence of the lack of paleontological records the system of Mosses throughout may assume only tentatively the character of a phylogenetic system. However, by the application of comparative methods, the natural relationship of Mosses may be expressed in a much higher degree in their arrangement than has been the case heretofore.

6. Synonymy belongs to history, is not a necessary part of the description of mosses, and is largely restricted in this work. Nomenclature is an aid in systematic work. This system is a useful method for discriminating between forms that are to be described according to their structure and life, and at the same time for grouping them together again according to their relationships. Accordingly even the system is a means to an end, however, in an unequally higher degree than lists of synonyms and nomenclature. While synonymy is

for the most part a superfluous evil, nomenclature is, to be sure, necessary, while the system represents a tangible scientific result capable of improvement.

The application of these principles has for its consequence changes of the system, and the latter is accordingly in process of transformation. For this reason the elaborations of the several families do not at first appear in systematic order. Each individual elaboration is a unit by itself, is separately paged and separately indexed.

This important work promises well as the harbinger of a new era in systematic bryology. And it well deserves the systematic support of all moss students.

The first volume, *Grimmiaceae*, by Leopold Loeske, is ready. It is a volume of 250 pages, has numerous illustrations, all (or mostly) original. Price, 18 Marks. The work appears in Numbers (Lieferungen), at 5 Marks each. Any number or part may be bought separately. Address, Max Lande, Berlin-Schöneberg, Mühlenstr. 8, Germany.

JOHN M. HOLZINGER.

SHORTER NOTES

From the list of new members of the S. M. S. for 1913, as given in the last number of the BRYOLOGIST, there was inadvertently omitted the name of Mr. Lowry Hagerman, the Middlesex School, Concord, Massachusetts.

Readers of the BRYOLOGIST will be interested to know that in December, 1913, Mrs. Annie Morrill Smith presented to the Brooklyn Botanic Garden her microscopes and botanical apparatus, and her herbarium of about twelve thousand specimens,—the work of the past eighteen years. The Garden will continue the open sets of exsiccati and anyone interested should hereafter address Dr. C. Stuart Gager, Botanic Garden, Brooklyn, New York.

There recently reached us the "First Circular" of the Fourth International Botanical Congress to be held in London, May 22-29, 1915. The unfinished work of the Brussels Congress in "(1) Nomenclature, and (2) Bibliography and Documentation" will be taken up in addition to other things and English will be the official language, if so desired the propositions to be made in English, French, and German. The General Secretary is Dr. A. B. Rendle, Dept. of Botany, British Museum of Natural History, London.

EXCHANGE DEPARTMENT

Offerings—To Members Only, For Stamped Self-Adressed Envelope

Mr. George M. Pendleton, Sisson, Siskiyou Co., California.—*Fissidens rufulus* B. and S., and *Fontinalis neo-mexicana* S. and L.

Mr. C. C. Plett, 3933 Lowndes Ave., Baltimore, Md.—*Trypethelium virens* Tuck.

Dr. H. E. Hasse, Santa Monica, California.—*Bacidium naegelii* (Hepp.) A. Zahlbr., from California.

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THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh,
Pennsylvania, under the Act of March 3, 1879."
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Bimonthly Journal of
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THE TYPE OF RAMALINA CRINITA TUCKERMAN



THE BRYOLOGIST

VOL. XVII

MAY 1914

No. 3

NORTH AMERICAN SPECIES OF THE GENUS RAMALINA.—PART V

R. HEBER HOWE, JR.

KEY TO THE *Myelopoeae* (concluded) AND TO THE *Ciliatae*.

Thallus black-ciliate.....	<i>crinita</i>
Thallus eciliate	
Thallus papillo-tuberculate	
Laciniae compressed	
Subcanaliculate	
KOH—(?).....	<i>complanata</i>
KOH+(?).....	<i>denticulata</i>
Canaliculate KOH+.....	<i>v. canalicularis</i>
Laciniae terete or torulose	
Apothecia small (entire), lateral. KOH+.....	<i>attenuata</i>
Apothecia large (radiate), subterminal.	
KOH—(?).....	<i>Willeyi</i>
Thallus not papillo-tuberculate, <i>striate</i>	<i>gracilis</i>

(A) Cortex tuberculate, compressed.

Ramalina complanata (Sw.) Ach.

SYNONYMY: *Lichen (Physcia) complanatus* Swartz, Fl. Ind. occid. 3: 1911. 1806.

Ramalina complanata Ach. Lich. Univ. 599. 1810.

TYPE: In the Acharian Herbarium, Universitetets Botaniska Institution, Helsingfors, *vide* Dr. Fred. Elfving. The type seems evidently to have been sent to Acharius, as it is not in the Riksmuseets Botaniska Afdelning, Stockholm, *vide* Dr. C. Lindman.

TYPE LOCALITY: "Jamaicensium."

ORIGINAL DESCRIPTION: "cartilagineus erectus laciniato-ramosus planus pallidus; scutellis sparsis urceolatus concoloribus; glomerulis punctiformibus marginalibus albis." *l. c.*

FIGURE: Swartz, Lich. Amer. Pl. 10, figs. A-C, a-b. 1811.

DIAGNOSIS: *Thallus* caespitose, compressed, subrigid, striate, papillate, apothecia marginal, spores curved. (KOH—?)

DESCRIPTION: *Thallus* caespitose (max. length 5 cm.), subrigid, stramineous to virescent; cortex striate and (margins) papillate; *laciniae* linear, compressed, often canaliculate (max. width 4 mm.), dichotomous, apices attenuate, subterete.

The March number of THE BRYOLOGIST was published March 24, 1914.

Apothecia common, marginal, concave at length convex, marginate (max. diam. 5 mm.), disk buff. *Spores* ellipsoid, curved (rarely a few substraight), $\frac{9-18}{3-7}$ μ .

CONTINGENT PHASES: Unobserved.

SUBSTRATA: Trees.

DISTRIBUTION: Common in the Austral Zone.

STATIONS: FLORIDA:

Jacksonville; Snake Key.

TEXAS: Corpus Christi.

BERMUDA. SANTO DOMINGO.

ST. CROIX ISLAND:

Christiansted. JAMAICA:

Malvern Hill; Mandeville.



FIG. 1.—Distribution of *Ramalina complanata* and *denticulata*.

OBSERVATIONS: This species, distinguished largely by its striate and papillate thallus, was recognized by Tuckerman, who

included *Ramalina denticulata* in his description. Nylander recognized *denticulata* of Eschweiler as a distinct species largely on chemical grounds, and his deeply canaliculate variety *canicularis* he distinguished on the same grounds. *R. complanata* and *denticulata* grow together, as proved by material before me collected in Bermuda, and cannot be separated except chemically, and the positions of the papillations are not at all characteristic, as they occur scattered over the surface and alone on the margins in plants giving the same reactions. It, moreover, is a character that we would hardly suppose to be constant. The somewhat smaller spores attributed to *denticulata* do not agree with those of plants distinguished on chemical grounds. The species is always distinguished by its compressed, papillate thallus.

NOTE: *Ramalina fastigiata* var. *lacerata* Mull. Arg. Flora 74: 373. 1891. This variety appears to be more nearly related here than with *fastigiata*. It was described from "Mexico prope San Luis Potosi" (type. no. 1025 Parry et Palmer) as follows: "thallus dense caespitosus, circ. 'pollicaris'; rami superne subpectinatum lacero lacinuligeri, costato-inaequalis et sublaeves et majores hinc inde parce et minute albedo-tuberculigeri." *l. c.*

NOTE: *Ramalina denticulata* (Eschw.) Nyl. Eschw. Flora Brasil. 1: 221. 1833.

The type locality is "arborum ad ripam fluvii Amazonum." This species, which except for its chemical reaction is inseparable from *complanata*, is included under the foregoing species. Though in most instances where the reactions differ, there are to be found correlated differentiating morphological characters, in this case no constant diagnostic points of separation have been discovered in the material examined.

This species was described as follows: "thallo caespitoso cartilagineo foliaceo erecto, e laciniis lineari-elongatis subdichotomis utrinque olivaceis longitudinaliter rugosis et lineatis margine aspero-denticulatis, scutellis subterminalibus concavis, disco rubro et carneo-pruinoso." *l. c.*

Ramalina denticulata var. *canalicularis* Nyl.

SYNONYMY: *Ramalina denticulata* var. *canalicularis* Nyl. Recog. mono. Ram. 126 (28). 1870.

TYPE: In the Nylander Herbarium, Universitets Botaniska Institution Helsingfors, *vide* author.

TYPE LOCALITY: "Mexico, Orizaba." Fr. Müller.

ORIGINAL DESCRIPTION: "Differt thallo attenuato et attenuato-ramoso, laciniis (latit. 1 millim. vel minus latis) canaliculatis." *l. c.*

FIGURE: *Pl. VII, f. 1, 2, et 5.*

OBSERVATIONS: Except the type, I have not seen any specimens from our area.

NOTE: *Ramalina subcalicularis* Nyl. Recog. mono. Ram. 138 (40). 1870. This species, the type of which is in the Museum d'Histoire Naturelle, Paris, *vide* author, was defined as follows: "Subsimilis est *Ramalinae canaliculatae* [= *Ramalina canaliculata* Tayl., *sensu* Nyl.], sed sporis curvulis vel subcurvulis (longit. 0.015–23 millim., crassit. 0.005–7 millim.) et apotheciis (calicariibus) majoribus." *l. c.* The type, from "Orizabae" . . . "Mexico," is the only specimen I have examined. The plant is marginally tuberculate and appears, except for slightly smaller spores, to approach closely *R. alludens* of which I believe it will prove to be a synonym. It also strongly suggests *R. denticulata* var. *canalicularis* Nyl., except again for its spores.

NOTE: *Ramalina leptosperma* Nyl. Flora 34: 412. 1876. This large ellipsoid-spored species was described by Nylander from Cuba. I have not seen any material and can give only his diagnosis, as follows: "thallus pallidus lineari-attenuatus (latit. 5 centimetr. vel altior, latit. 1–2 millim., crassit. circiter 0.1 millim.), canaliculatus (interdum hinc inde marginalibus conniventibus trabeculis tenuibus transversis conjunctis), nitidiusculus, nervoso-rugosus (apicem versus minus rugosus), ramosus, ramulis acutiusculus; apothecia carneo-pallida concava (latit. 1–3 millim.), receptaculo rugoso, marginalia; sporae oblongae rectae, longit. 0.008–0.010 millim., crassit. 0.0025–0.0035 millim.

Specie facie fere *R. canaliculatae*, sed mox distans thallo tenuisve nervoso-rugoso et minutie sporarum." *l. c.*

(B) Cortex terete or subterete-linear (*Teretiusculae* Wain.)

Ramalina attenuata (Pers.) comb. nov.

SYNONYMY: *Physcia attenuata* Pers. Annal. Wettau. Gesell. Nat. 2: 18. 1810.

Ramalina rigida Ach. Synop. Meth. Lich. 294. 1814.¹

Ramalina gracilis (Pers.) Nyl.

In part *Ramalina rigida* of Tuckerman.

TYPE: In the 's Rijks Herbarium te Leiden, Holland, *vide* author.

TYPE LOCALITY: "Insulae St. Domingo."

ORIGINAL DESCRIPTION: "Pallens, laciniis attenuatis tenuibus teretiusculis scutellis planiusculis sessilibus.

Ex eadem regione cum priore (*P. straminea*, St. Domingo), hanc Physciam habeo, quae Usneam *hirtam* non male refert. *Lorula* sensim attenuata, scutellis vix marginatis angustiora sunt."

¹"Thallo-glabro tereti ramoso sordide albo-pallescete, tuberculis sorediformibus adsperso, ramis complicatis tortuosis attenuatis," *l. c.*

FIGURE: Annal Wettau. Gesell. Nat. 5: Pl. 10, f. 7. 1810.

DIAGNOSIS: *Thallus* caespitose, terete, rigid, apices filiform, apothecia small, lateral.

DESCRIPTION: *Thallus* caespitose (max. alt. 4 cm.), rigid, virescent; cortex striate; *lacinae* branched, dichotomous, terete, apices filiform. Apothecia common, small (max. diam. 2.5 mm.), lateral, convex, marginate, disk buff. Spores subfusiform, straight, $\frac{18-21}{6-7.5}\mu$.

CONTINGENT PHASES: Unobserved.

SUBSTRATA: On trees and shrubs.

DISTRIBUTION: West Indies.

STATIONS: CUBA. JAMAICA. PORTO RICO.

OBSERVATIONS: This species, so long attributed to our area, was in the main elucidated by Mr. Merrill. Nylander's conception was not correct, and it seems doubtful if he ever studied the type. *R. rigida* was described by Acharius from Santo Domingo, based on Persoon's MS ("Secundum specimen olim missum") *Lichen rigidus* and called "synonymon est" by Acharius with Persoon's published *attenuata*. The words "tuberculis solediformibus adperso" of Acharius' description are not true of the Persoon type now in existence,—perhaps they were true of the "Secundum specimen." This, however, does not affect the case in lieu of Acharius' synonymy. His type locality also is as for *attenuata*. It is a loosely caespitose, slender, terete, non-papillate species with small lateral apothecia and subfusiform spores. Its reaction with KOH is positive.

NOTE: *Ramalina gracilis* (Pers.) Nyl. Pers. Gaudich. Voy. Uran. 209. 1827.

TYPE LOCALITY: "Brasilia (Rio Janeiro)." ORIGINAL DESCRIPTION: "parva, ramis tenuissimis teretibus attenuatis, scutellis lateralibus." l. c. FIGURE: Mey. et Flot. Nova Act. Nat. Curios. 19: Suppl. 1: Pl. 3, f. 2. 1843. OBSERVATIONS: This species is in my opinion identical with the foregoing species. *R. gracilentia* Fr. is not a plant of our area so far as observed. It is distinguished by fusiform spores.

Ramalina Willeyi sp. nov.

SYNONYMY: In part *Ramalina rigida* sensu Tuck.

TYPE: No. 746, in author's herbarium.

TYPE LOCALITY: Nonquitt, Mass.

ORIGINAL DESCRIPTION: Thallo solido caespitoso, cartilagineo, rigido, ramis torulosis, teretibus, tuberculariis, apicibus attenuatis; apotheciis magnis, terminalibus, calcaratis aut radiatis; sporae ellipsoidae.

FIGURE: Howe, Common and Conspicuous Lich. N. Eng. Pt. 1, Pl. 1, f. 3. 1906.

DIAGNOSIS: *Thallus* caespitose, terete or subterete, rigid, tuberculate, apices filiform, apothecia large, spurred or radiate.

DESCRIPTION: *Thallus* caespitose (max. alt. 7 cm.), rigid, virescent; cortex nitidous, tuberculate; *lacinae* branched, dichotomous, subterete, not uncommonly compressed below (max. diam. 2 mm.), often torulose-angulate, apices filiform. Apothecia abundant, large, mostly subterminal and spurred (rarely

radiately spurred like an *Usnea*), concave at length convex, marginate, finally immarginate and lacerate (max. diam. 6 mm.), disk buff. Spores ellipsoid, straight, $\frac{9-16}{6-8} \mu$.

CONTINGENT PHASES: (a) Blackening. (b) Reduced.

STRUTATA: On trees (*Juniperus*) and shrubs, rarely on old wood.

DISTRIBUTION: Not uncommon in the Austral Zone, extending just to the base of the Transition on the Atlantic seaboard and islands from Massachusetts to Mississippi.¹

STATIONS: MASSACHUSETTS: Brewster; Nantucket; Vineyard Haven; Hyannis; Fair Haven; Onset; Cotuitport; Woods Hole; Wellfleet; Wareham; Horse Neck Beach; Fort Phoenix; Clark's Point; Dartmouth; Mattapoisett; Nonquitt; West Chop. RHODE ISLAND: Middletown. CONNECTICUT: Seaside. NEW YORK: Eastport. NEW JERSEY: Alco. FLORIDA. MISSISSIPPI: Cat Island.

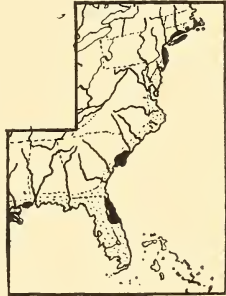


FIG. 2.—Distribution of *Ramalina Willeyi*.

OBSERVATIONS: This species, evidently a near relative of *R. complanata* as judged by cortex and spores, is distinguished by its generally terete and tuberculate laciniae and large subterminal spurred apothecia. The characteristic habit of the plant as it grows in spherical, rosette-like tufts on the twigs of *Juniperus* serves to distinguish it *in situ* from other *Ramalinas*. It has plainly never been described, through a long confusion, and, therefore, I propose for it here a new name, given in honor of Henry Willey, because of the abundance of the species in the region in which he collected; the type locality being one of his favorite collecting grounds.

*R. tenuis*² Tuck was made a synonym of *R. gracilentia*³ by Nylander, as it may be, both having fusiform spores. *R. gracilentia*, as compared with *R. gracilis*, is not a compressed species although placed by Dr. Zahlbruckner under Wainio's *Compressiusculae*. It was suggested by Mr. Merrill that *R. tenuis* should be revived for the present species, but though Tuckerman did not mention the spores in his diagnosis, material determined by him as *tenuis* shows fusiform spores $\frac{17-23}{3.5-4} \mu$ and cannot be separated from *R. Montagnei* De Not. Tuckerman later made his *tenuis* synonymous with *rigida*, but his understanding of the entire group is impossible of elucidation.

R. rigida (= *attenuata*) is the West Indian species bearing small, lateral apothecia with small subfusiform spores.

¹ BRYOLOGIST 9: 32, 48. 1906.

² Amer. Journ. Sci. and Arts 25: 423. 1858. TYPE LOC.: "Blanco, Texas."

³ NOTE: TYPE LOC.: Cochinchina ORIG. DESCR.: "crusta e granuloso leprosa cinerascens, apotheciis oblongo-globosis carnis cinerascenti-pruinosis, stiptibus longissimis gracilibus nigricantibus." Ach. in Vet. Ac. Handl. p. 289. 1816.—See Ach. Lich. Univ. 243. 1810, and Fries Lich. Europ. ref. 383. 1831. = *Coniocybe gracilentia*?

"Thallo rigido filiformi subramoso glauco, costis elevatis longitudinalibus anguloso, apotheciis ateralibus, disco lacteo." Fr. Lich. Europ. reform. 29: 1831.

Mr. Merrill states that "No American specimens of the *R. rigida* (= *R. Willeyi*) stock have yet been examined showing a medullary coloration on application of KOH." This, again, distinguishes it from the foregoing species, though I have found examples that show a distinct coloration. Dr. Herre recorded *rigida* from the California coast (Proc. Wash. Acad. Sci. 7: 335, 1906, and 12: 221. 1910), but an examination of his material does not permit me to include it here; it appears to be a rather young and as yet esoraliatè state of *R. farinacea*, the plant often determined as the variety *minutula* Ach. Dr. Eckfeldt also records it from Labrador and Newfoundland, seemingly erroneously, and records from Cuba and Jamaica are referable to the foregoing species. Mr. Merrill has remarked that *R. canaliculata* Fr. is also often mistaken for this species. Small states, otherwise typical, are frequently met with from Florida (phase b).

EXSICCATI: No. 199. Decades N. Amer. Lich. Cummings, etc. Brewster, Mass., Nov. 10, 1894. *L. A. Crocker*.

No. 129. Lich. Boreali-Amer., Cummings, etc. "Brewster, Mass." Nov. 10, 1894. *L. A. Crocker*.

No. 105. Lich. Univ. Lojka. "Massachusettsiensi Americae Borealis, 1885." *H. Willey* (topotype).

No. 51. Lich. Cuba. Wright *vide* Tuckerman (?)

No. 51. Lich. Novae Angliae. Howe. Westport Harbor, Mass., Aug. 21, 1913 (topotype).

All the above are called *R. rigida*.

NOTE: *Ramalina rigida* var. *dendroides* Nyl. Recog. mono. Ram. (14) 112. 1870. This form, or variety, has been recorded (Hue, Lich. Exoti., 261. 1890) from the Antilles. I have seen no material, and can add nothing to our knowledge of the plant from within our area, though it seems hardly separable from *R. complanata*. It was described as follows: "thallo compresso (altit. 8-12 centim., latit. basi circiter 1 millim., crassit 0.5 millim. vel tenuiore) rigente dendroideo-ramoso et ramuloso, etiam ibidum occurrit." Type No. 460. Coll. Husn. from "Martinica."

Ramalina dendriscoides Nyl. Flora 34: 412. 1876. This Cuban species I have not observed. It was defined as follows: "Thallus pallidus subnitidiusculus minor gracilis (altit. 2-5 centimetr., crassit. 0.5-0.6 millim. vel gracillior), teretiusculus, dendroideo-ramosus et ramulosus, ad axillas interdum vage impressus, ramulis saepe apicibus albo-solediosis. Apothecia non visa. Datus. No. 738.

Species videtur propria accedens ad *R. rigidam* vel saltem ejus stirpem. *R. dendroides* (Del. Nyl. *Ramal.* p. 14) differt jam thallo majore, laciniis compressis et defectu solediorum terminalium ramulosum. *R. solediantha* comparari forsàn etiam possit ob soledia, sed haec species thallum non habet teretiusculum (sed canaliculatum, etc.)." *l. c.*

Ramalina camptospora Nyl. Recog. mono. Ram. 120 (22). 1870. This species, of which I have seen only the type at Paris, was described by Nylander from Cuba as follows: "Thallus stramineo-pallidus compressus tenuis (basi latit. 1 millim. vel magis attenuatus) linearis, lineari-divisus et ramis utroque

marginē ramulosus; apothecia luteo-testacea pallida (latit. 2 millim. vel minora), receptaculo laeviusculo (marginē integro vel subcrenulato); sporae ellipsoideae vel ellipsoideo-oblongae, curvatae, longit. 0.012–17 millim., crassit. 0.006–8 millim." *l. c.*

SERIES: **Ciliatae** ser. novo.

Medulla arachnoid, cortex thick (80–105 μ) hyphae divaricate above gonidia, externally black ciliate.

Ramalina crinita Tuck.

SYNONYMY: *Ramalina crinita* Tuck. Bull. Torr. Bot. Club **10**: 43. 1883.

TYPE: In the Sprague herbarium, Boston Society of Natural History, Boston, *vide* author.

TYPE LOCALITY: "San Diego, California." *C. R. Orcutt*, March, 1863.

ORIGINAL DESCRIPTION: "Thallus caespitose, rigid, compressed, subdichotomous, linear-laciniate, at length much dilated, greenish-glaucous, the divisions smooth, interruptedly white striate, and becoming lacunose, attenuate at the summits, and clothed at the margins more or less thickly with strong, solitary or clustered, finally branched, black fibrils; apothecia middling-sized to large (3–10 mm. in width), subterminal and lateral, subpodicellate, varying as to smoothness as the thallus, the margins blackened; spores oblong-ellipsoid, $\frac{15-20}{5-6}$ mic." *l. c.*

FIGURE: *Pl. VIII, f. 1.*

DIAGNOSIS: *Thallus* caespitose, compressed, *rigid*, beset with *black fibrils*, apothecia marginal, spores straight.

DESCRIPTION: *Thallus* caespitose (max. length 8 cm.), *rigid*, virescent; *cortex* striate, sublacunose, ciliate with black fibrils; *laciniae* compressed, expanded, subdichotomous (max. width 20 mm.), apices attenuate. *Apothecia* lateral or subterminal, concave, marginate, margins black-edged (max. diam. 10 mm.), disk concolorous. *Spores* ellipsoid, straight, $\frac{15-20}{5-6}$ μ .

CONTINGENT PHASES: Unobserved.

SUBSTRATA: On trees.

DISTRIBUTION: Common in the Austral Zone in southern California and Lower California.

STATIONS: CALIFORNIA: Point Loma; San Diego. LOWER CALIFORNIA: Todos Santos.

OBSERVATIONS: This remarkable and easily recognized *Ramalina* has a very local distribution. Its black ciliate laciniae at once distinguish it from any other species.



FIG 3.—Distribution *Ramalina crinita*.

EXPLANATION OF PLATES VII AND VIII.

Plate VII.

1. The Nylander type of *Ramalina subcalicaris* at Paris (nat. size).
- 2 and 5. The Nylander type of *Ramalina denticulata* var. *canalicularis* at Helsingfors (much reduced).

3. The Swartz type of *Lichen complanatus* at Helsingfors (reduced).
4. The Persoon type of *Ramalina rigida* (*Physcia attenuata*) at Leiden (slightly reduced).

Plate VIII.

- i. The Tuckerman type of *Ramalina crinita* at Boston (nat. size).

NOTES ON MAINE HEPATICAE AND THEIR COMPARISON WITH
THE HEPATICAE OF THE SAREKGEBIRGE. (Concluded)

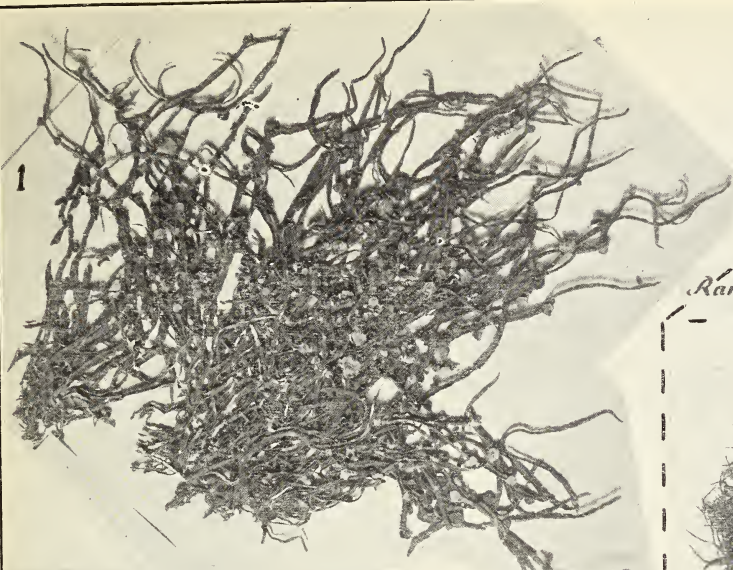
ANNIE LORENZ

The higher altitude at Round Mountain Lake, as compared with the White Mts., as well as its more northern location, is evident from a glance at some of the hepatic inhabitants. *Lophozia lycopodioides* and *L. attenuata* are abundant about the edge of the lake, whereas in the White Mts. the former does not descend below 4000 ft., and the latter fortunately is chiefly confined to 2500 ft. or more, although occasionally descending much lower. *Pallavicinia Floto-wiana* grew quite abundantly on the rocks at the water-line on Tree Island, both ♀ and ♂ plants, and it was mixed with *Pellia*.

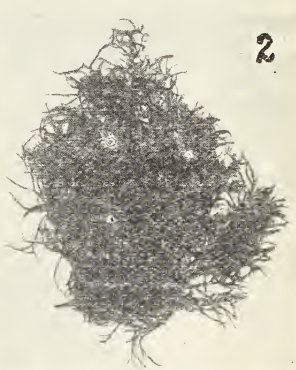
There apparently were no good sphagnum bogs in the vicinity; at least, none of the inhabitants seemed to know of any, as what they called "bogs" were what are known as "stillwaters" in the Adirondacks, although sphagnum was common enough. However, just outside Eustis, on the way in, the writer noted a most promising little bog full of *Andromeda*, which shall be investigated next time.

The most unusual feature of the region is Big Alder falls and gorge, about 3 miles from camp. Alder Stream, the outlet of Big Island Pond, flows through about a mile of cañon, with a high falls at the upper end. The gorge runs approximately east and west, and is about 75 ft. deep. The rocks forming its walls contain some magnesium; there is a seam of low-grade asbestos crossing the road just above the gorge. This region, in fact, is southeast of the Black Lake mines in Quebec. The writer has explored only about the foot of the two paths leading respectively to the head and foot of the falls, but the results were encouraging to further exploration. On the first trip, the writer, not knowing about the Mg in the rocks, made out a list of such species as grow on granite at the Waterville, N. H., cascades, and could not at first see what had become of most of them, especially of *Marsupella*. Down the first path the only species of value was *Scapania subalpina*, new to the state. Near the second path, the writer gathered a handful of something which upon examination proved to be *Lophozia heterocolpa* (Thed.) Howe, new to New England. It was growing about tree-roots on the bank, where it was rather dry.

On a second trip down this path, in search of more *L. heterocolpa*, plenty of it was found where it grew in company with *Plagiochila*, *Nardia hyalina*, *Mnium* sp., etc., but the chief find was *Lophozia obtusa* (Lindb.) Evans, on the same



Ramalina complanata



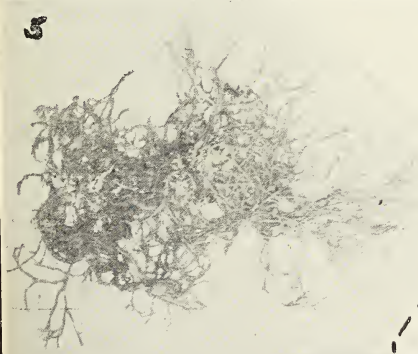
HERB. MUS. PARIS.

Ramalina subcalicularis
Nyl.

Herbar de la Comandancia de M. de M. de M.
construido por M. B. de M. de M. de M.

Orizaba

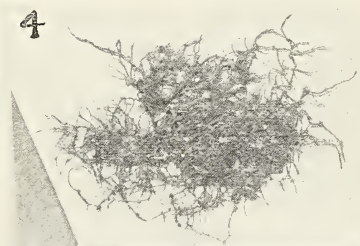
Ramalina gracilentata (Fr.)
Det.



Ramalina calicularis
Denticulata.
f. canaliculata Fr.
var. canalicularis
Nyl.

Orizaba

Fr. Müller



Herb. PERSOON.
in H. L. B. 14.
Ramalina rigida Pers.

H. Domingo

M. Pers.

Physcia
attenuata
in Act. Soc. Vetter.

bank, above the rocks, growing mixed with *Hylocomia*, *Catharinea undulata*, *Mnium*, etc. It appeared so like *L. barbata* that the writer did not even look at it until three months later, when the gibbous sinus of the leaf quickly determined its name. The whole gorge reminds one of Quechee Gulf, Vermont, and undoubtedly contains further members of the *Muelleri*-group.

Back of the camp was a wet granite ledge bearing a heavy crop of *Lophozia quinquedentata* ♂, *L. barbata* c. per., and *Marsupella emarginata*, the only station noted for the latter, which, although easily accounted for, yet seems strange to one accustomed to its ubiquitousness in the White Mts. *Sphenolobus Helderianus* c. fr. was collected near here on a tremendous old log; also *Frullania Oakesiana*, but this, while characteristically alpine, descends at Waterville, N. H., to 1550 ft.

There were no *Ricciae* noted, not even *R. Sullivantii*, but the only suitable place for that was on the Big Island Pond buckboard-road, where grew *Blasia* and *Anthoceros levis*, the only stations seen.

Of the *Marchantiaceae*, only *Marchantia* and *Conocephalum* were seen. *Fossombronia*, immature, but probably *F. foveolata*, was abundant. *Chiloscyphus fragilis* (Roth.) Schiffn. was in a cold spring, not warm still water, as Schiffrer says, although it also grew luxuriantly in the warmer water about the beaver pond. *Scapania nemorosa* was rare, on account of the lime; *S. apiculata* grew below the house spring, on a rotten log, in company with *Riccardia palmata*. Neither *Mylia Taylori* nor *Diplophyllia taxifolia* were seen at all.

The mosses were not examined, but doubtless there are plenty of equally attractive species to be found.

In looking over Arnell and Jensen's Moose des Sarekgebietes, 1907-1910, some curious comparisons with this Maine flora presented themselves. Of the 101 species collected by Arnell and Jensen on that expedition, 63 are common to New England, 51 are found in Maine, and it were not unreasonable to expect to find a dozen more. Examining the table of frequency, the *Lophozias* ran curiously parallel. There were 22 against 23 in N. E., with 14 common to Maine. Ten of these species were even in their rate of frequency, but *L. inflata*, very common there, was not collected at Round Mountain, while our ubiquitous *L. attenuata* they found only once! Arnell says of *L. obtusa*: "This curiously enough only recently better-observed species has proved itself in its Swedish distribution ever more as a boreal species."

While the Sarekgebirge are so far off the beaten track that they are not even mentioned in Baedeker, the authors obviously enjoyed themselves most thoroughly on that expedition. The Sarekgebiet is largely a granite region, with limestone in one corner, while Round Mountain has the least flavor of lime, with Mg down in the gorge. *Marsupella emarginata* was rare in both cases. Of *Sphenolobus*, only *S. minutus* was common to both, and that infrequent. *Scapania nemorosa* was lacking from this list, as it was too far north, *Scap. subalpina* was common, also a number of arctic-alpine species were reported. *Odontoschisma elongatum* (Lindb.) E., which likewise occurs in Maine, was one of the two species found, the other being *O. Macounii* (Aust.) Underw. No

Frullaniae were noted, probably because the scrub was not large enough to afford a foothold, and rotten-log species were rare, as in most European reports.

While it is perhaps hardly valuable, it may be interesting to compare the N. E. and Maine lists with some of the local north-European floras. Of the 216 species given in *Kaalaas'* Norwegian list, 111 are common to N. E., 89 to Maine, 91 to N. H. In Lindberg & Arnell's Siberian list, 96 species in all, 72 are common to N. E., 58 to Maine, 62 to N. H. In *Bernet*, Hépaticques' de la Sud-ouest de la Suisse, 142 species in all, 87 are common to N. E., 70 to Maine, 78 to N. H. In *Macvicar*, Handbook of British Hepatics, 274 species in all, 128 are common to N. E., 102 to Maine, 104 to N. H.

It is fairer to compare the Sarekgebirge and Siberian lists with Maine, as they are records of single trips, while the other lists are those of carefully-explored countries. A beginning only has been made in Maine. It will be observed that in each case, more species are credited to N. H. than to Maine. This is no reflection upon the wealth of the Maine flora, but rather to her credit, that with so little systematic collecting, the list so nearly approaches that of N. H., which has been visited and revisited by every collector for decades, especially the Presidential Range.

The notes given above show the highly boreal character of the Round Mountain Lake region, and give hope for many further species which may await enrollment upon the N. E. list.

HARTFORD, CONN., May, 1913.

AN INTERESTING MOSS

H. S. JEWETT, M.D.

On Dec. 4, 1913, in the water, and upon the limestone walls of a spring, and its overflow brook, in Neff Park, Yellow Springs, Greene Co., Ohio, I found a number of mats of moss. The entire southwest section of Ohio has been denuded to the lower beds of the Upper Silurian epoch, hence the whole region rests on limestone, and all our water, whether river, creek, brook, or spring, is strongly calcareous, and the forests are all deciduous.

Some of the moss mats were so far above the water in the spring that their water supply was derived entirely from rain and dew; these were all *Amblystegium filicinum* (L.) De Not. Seven or eight of the mats were growing on the stones at the waterline, extending four to ten inches upwards and three or more inches downwards into the water, and it is in these partly submerged mats that the interest centers. As all these mats proved to be alike in moss contents and arrangement, I shall divide them into three zones to make their description easy.

Zone I comprises all of the mats *below* the waterline; *i. e.* constantly submerged, including a few tufts growing on the bottom of the spring and having, apparently, no connection with the mats on the sides of the spring.

Zone 2, the portion, two or three inches wide, *just above* the waterline, which was kept saturated with water by capillary attraction.

Zone 3 includes all of the mats above zone 2.

I have studied fifty or more plants from each of zones 1 and 2, and many from zone 3, eliciting the following facts:

In zone 1 genetic buds are few, and I found no male buds, hence the moss is probably dioicous, but the inflorescence is not proven; and the plants of the var. *spinifolium* have few or no paraphyllia, while the plants of modified *flicinum* have many paraphyllia as in normal *flicinum*.

Zone 3 is *Amblystegium flicinum* (L.) De Not. in nearly pure culture, and, so far as I can find, contains no *Amblystegium irriguum* (Wils.) B. & S.

Zone 2 consists of *Amb. flicinum* in process of modification towards var. *spinifolium*, or, as named in Dixon and Jameson's Handbook, "var. *vallis-clausae*." This is shown by the gradual darkening of the color, as the moss approaches the waterline, where it has become indistinguishable from the moss in zone 1, and by the leaves becoming narrower and slightly longer, thus becoming less deltoid, and more lanceolate in outline, and by the costa changing to percurrent or long excurrent. In zone 2 I also find many plants of var. *spinifolium*, a few of them being modified towards *Amb. irriguum*, but no normal *irriguum*.

Zone 1 consists almost entirely of the variety *spinifolium* Schimp., mixed with occasional plants of the modified *flicinum* of zone 2; and I found one plant with a few leaves of apparently normal *irriguum*, while all the remaining leaves were var. *spinifolium*.

It is well known that both *Amb. flicinum* and *Amb. irriguum* produce a variety "*spinifolium*," and that these varieties resemble each other so closely that they can be separated only by the experts, and not always by them.

What is the moss in zone 1? *It is var. spinifolium*, but is it a derivative of *flicinum* or of *irriguum*?

I thought I had a clear case in favor of *flicinum*, as I found no normal *irriguum* in the region around the spring, while *flicinum* was common, and *all the mats growing in connection with the var. were flicinum*. The variety is also probably dioicous. The authorities all say that this var. of *flicinum* has few or no paraphyllia. The *flicinum* in zone 2 was undergoing modification towards the variety.

Two of our experts write me as follows:

Rev. H. Dupret, of Montreal, writes: "Both your Nos. 3413 and 3414 are a very interesting form of *irriguum*, the var. *spinifolium*, Schimp."

Dr. Grout writes more fully: "The moss above the spring is certainly *Amb. flicinum*. The moss in the water is to my mind certainly what Sullivant called *Amb. irriguum spinifolium*. The fact that they grow so closely associated proves nothing in itself. To my best judgment there is no doubt that your moss is *Hyp. irriguum* var. *spinifolium* of Amer. authors. . . . *Irriguum* and *flicinum* are more closely related and their forms intergrade more, here in America, than has been realized by students of European mosses. I have repeatedly expressed my disbelief in the value of the arrangement of male and female buds

on closely related mosses, particularly in the *Hypnaceae*. To sum up, I vote for *irriguum* because your plant has the habit, the leaf form and structure, and paraphyllia of *irriguum* rather than of *filicinum*. I believe these outweigh the contiguity of the forms and the inflorescence."

I have sent what I have of the variety to Dr. Grout for his Series of N. A. Musci Pleurocarpi, and shall accept his diagnosis; still the interesting question remains to be answered; how does it happen that *everyone of a number of mats of Amb. filicinum*, growing at the water's edge, is *continued below the water by Amb. irriguum var. spinifolium*, while a mat of *Entodon seductrix* growing in like situation on the wall of the same spring is not thus accompanied by the variety, nor could I find the variety growing independently of *filicinum*?

DAYTON, OHIO, 17 Jan., 1914.

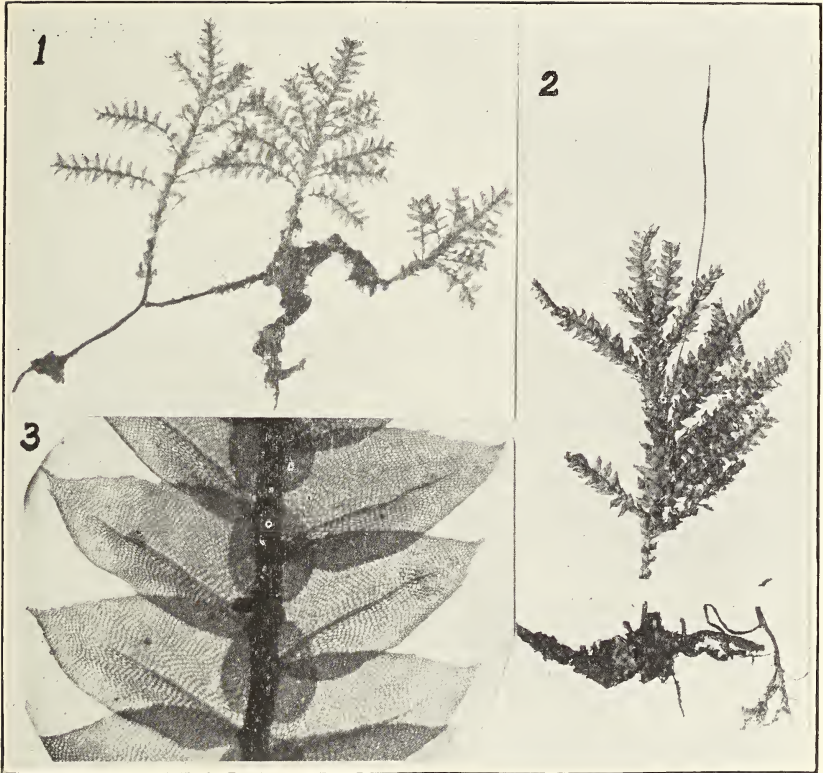
HYPOPTERYGIUM JAPONICUM IN NORTH AMERICA

JOHN M. HOLZINGER

Professor A. S. Foster recently sent me a *Hypopterygium* collected by him "on rocks among boulders, at Egg Harbor, Coronation Island, southeastern Alaska, July 24, 1913". This moss was collected at the same place also by Dr. Frye. On examination, I found it to agree perfectly with *Hypopterygium japonicum* Mitt., sent me by Prof. H. Nakanashiki from two stations, and by Prof. Shutai Okamura from two other stations, all in Japan. Both these moss students had their plants determined by Dr. V. F. Brotherus, and both sent fruiting plants. The Egg Harbor plants are not fruiting, but show quite a few archeogonial buds. On careful comparison of branch leaves, of ventral bracts, and of perichaetial leaves there is left no doubt about the identity of the Alaskan with the Japanese species. Several of the Japanese specimens are more luxuriant, and part of them show rather scant brown felt, which is quite pronounced on the Alaskan plants.

On submitting my findings to Mrs. Britton, she very kindly sent me a bit of the type of *Hypopterygium japonicum* Mitt., informing me at the same time that Prof. Foster had sent some of his plant to the New York Botanical Garden, and that both she and Mr. R. S. Williams had referred this to *H. canadense*. A comparison with Mitten's type still further strengthened my conviction that the Alaska plant is indeed *H. japonicum*.

Then the question arose: Is Dr. Kindberg's type really different, and a distinct species? Mrs. Britton here also kindly came to my assistance, and loaned me her material of *H. canadense* Kindb., comm. J. Macoun, as "type," and therefore, by inference (the label does not state locality) the very plant collected by Newcombe on Queen Charlotte Island off the coast of British Columbia in 1898, and communicated to Dr. Kindberg by Mr. John Macoun, the Botanist of the Dominion of Canada. The few plants in this pocket are somewhat smaller, and rather battered, but enable perfectly comparison of the several



HYPOPTERYCIUM JAPONICUM MITTEN

Fig. 1. Plant collected by A. S. Foster at Egg Harbor, Coronation Island, S. E. Alaska, July 24, 1913. x 2.

Fig. 2. Plant collected by Shutai Okamura on the island of Yoki, Tosa, Japan, Jan. 30, 1904. x 2.

Fig. 3. Branch from Foster's plant, showing the small ventral leaves called amphigastria. x 8.

forms of leaves: this comparison leaves no shadow of doubt as to the identity of the Canadian with the Alaskan and Japanese plant. And *Hypopterygium canadense* Kindb. becomes a synonym of *Hypopterygium japonicum* Mitt.

Dr. Kindberg published *H. canadense* in Rev. Bryol. 28: 46-48, 1899. A study of this article reveals the ground of error. Plainly, *Hypopterygium* being a tropical genus both of the Western and Eastern Hemisphere, and Canada being in the Western, the search for its allies was made by Dr. Kindberg among American *Hypopterygia*. For he enumerates fifteen species, with jottings of individual differences under each: being satisfied that it differs from each of them, and quite correctly so, he concludes to "signalize" it as a new species, quite remarkably out of its range. But here comes a new station, on Coronation Island, S. E. Alaska, several hundred miles farther north than Queen Charlotte Island, making still more questionable the association of this species of *Hypopterygium* with the American aggregation. This great extension into a far northerly region—upward of 55° N. lat. (the exact latitude of Egg Harbor is at this writing not obtainable)—is explainable only by considering the Kuro Siwo, or Japan Stream, in connection with it. This great natural phenomenon, corresponding in the Pacific Ocean to the Gulf Stream in the Atlantic, like the latter carries the heat poured by the sun on the Equatorial Current into high northern latitudes. The Pacific Stream takes its English name from the fact that in its onward course it sweeps by the Japanese Archipelago, northward past the shallow Bering Sea, and thence southeast and past our Northwest Coasts. This, it seems to me, is the explanation of the occurrence of *Hypopterygium japonicum* in the two out-of-the-way stations. Our two great marine currents (as well as our Southern Hemisphere currents) are to be reckoned with as dynamic forces for the distribution of organisms, both plant and animal.

NOTE: Previous writers have used the term *amphigastrium*, n. (pl. *amphigastria*) for the small median leaves, a term introduced for them in *Linnaea* 20: 95, by Hampe, and kept by Brotherus in *Nat. Pflzf.* 1: 3: 964. The plants of this genus have *flat* branches, with distichous, inequilateral leaves, to which is added a third row of smaller, symmetrical leaves closely pressed to the axis of the branch, a provision which seems to facilitate the retention of moisture. These are the innocent victims of our classical passion for long names, here, as usual, in the inverse ratio to their size. Why is it not sufficient to call them "ventral bracts" or "ventral leaves"? See PLATE IX.

A NEW REINKELLA FROM MEXICO,—REINKELLA PARISHII HASSE

H. E. HASSE

During October, 1913, Mr. S. B. Parish, in a flying trip to the Coronados Islands off the coast of Lower California, collected among several other interesting Lichens one that was referred to Dr. Zahlbruckner for determination, concerning which he replies: "In habit it approaches *Roccellographa* so closely that a sterile specimen could not be distinguished from that genus. The apothecia

agree, however, with the genus *Reinkella*; they are more or less stellate, at first immersed, later erumpent, and finally appressed sessile. The section of an apothecium also exhibits the *Opegrapha* character, while *Roccellographa* apothecia show the character of the apothecia of *Chiodecton*. Your lichen is, therefore, a new species of the genus *Reinkella* and may perhaps be recognized as representing a new section. But this section is weak, as the characters rest solely upon habit (thalli laciniae compressae, non teretes, non solidae, i. e., intus cavae.)"

Thallus fruticose; erect or suberect laciniae scantily branching, from 10 to 20 mm., or perhaps more, long, and about 3 mm. thick (from broken condition of specimen these measurements are approximate). Surface of younger and terminal laciniae smoothish, in the older or basal ones transversely tortuous rugose, mealy throughout. Cortex with K yellow, C red; medulla not stained by either, with jod giving a yellow reaction; cephaloid heaps of soredia not infrequent. Cortical layer of upright (to the thallus-plane) hyaline hyphae, somewhat clavate at tips and 4μ thick: this layer is 20μ to 28μ high, the gonidial layer, immediately beneath and with definite upper border, is from three to four times thicker, its lower border gradually merging into the medulla, the hyphae of this are thinner, about 2μ thick, densely interwoven and those parallel to thal-line surface prevailing: all hyphae are indistinctly, if at all, septate; the entire thickness of an apical lacinia is from 120μ to 150μ , the older basal laciniae being considerably thicker. Epithecium subcontinuous, granulose, pale to dark yellow: thecium colorless, 140μ to 160μ high, lower part with dark streaks ascending from the dark brown to black hypothecium: paraphyses branching, matted, about 2μ thick, containing numerous minute globules: asci clavate, 160μ long, 12μ thick, membrane thick throughout, 8-spored: spores colorless, fusiform, 8-locular, 20μ to 22μ long, 4μ thick. Hym. gel. with jod. yellow, soon orange, K—. Spermogones not seen.

Since Dr. Zahlbruckner most kindly has delegated the writer to partly describe and name this species, it is named for Mr. S. B. Parish, its discoverer, Oct. 19, 1913. (No. 8809.) Type deposited with Dr. A. Zahlbruckner and in herbaria of the Sullivant Moss Society and Hasse.

SANTA MONICA, CALIF.

A LIST OF HEPATICAE COLLECTED UPON ISLE ROYALE, LAKE SUPERIOR

GEORGE HALL CONKLIN

During the summer of 1901, Prof. C. E. Allen and Mr. S. C. Stuntz, of the Botanical Department of the University of Wisconsin, visited Isle Royale, Lake Superior, and made an extensive collection of botanical specimens in the vicinity of Rock Harbor and the adjacent islands. Material was collected of all the great groups. Among the bryophytes were quite a number of hepatics. Through the kindness of Prof. Allen the writer was able to examine these specimens and the following determinations were made. Of especial interest was the finding of *Riccardia multifida*, *Lophozia heterocolpa*, *Lophozia Kaurini*, and *Lophozia*

longidens. *Lophozia Lyoni* and *Lophozia barbata* appear in most of the rock collections and were by far the most common species. *Lophozia porphyroleuca* and the other log-loving species very rarely occur. The sterile *Fossombronia* is probably the species *faveolata*, which has been previously reported from the Apostle Islands, Wisconsin. In its large size the *Sphenolobus minutus* was very like the specimen distributed by Underwood and Cook in American Hepaticae, collected by J. B. Leiber, Kootenai Co., Idaho, 1890. It grew in rather pure tufts on rock edges.

The finding of 36 species representing 23 genera of hepatics in this collection shows a very rich field, inviting further study. Prof. Allen by request adds the following observations:

"Isle Royale, politically a part of Michigan, lies near the north shore of Lake Superior, only about fifteen miles from the nearest point on the Canadian mainland. The greatest length of the island from northeast to southwest, is approximately forty-five miles, its greatest width nine miles. The island consists of a series of parallel ridges, and valleys separating them. In the valleys are numerous lakes of varying size, as well as bogs and swamps. The ridges are as a rule gentle in slope on their southeast sides, but more steep and sometimes precipitous to the northwest. Continuations of the ridges form peninsulas, which in turn are continued in several cases by rows of small islands. The coast of Isle Royale is, therefore, much broken, especially at the northeastern end. There are numerous small streams, emptying either into the interior lakes or into Lake Superior.

"The collections upon which the present list is based were made between August 7th and September 14th, 1901. Camp was established near the deserted lighthouse on the point of the peninsula bounding Rock Harbor on the south. This is the lighthouse referred to in the notes. Extensive collections were made about the shores of Rock Harbor, which is the deepest and, except for two small bays, the southernmost of the numerous indentations of the coast at the northeastern end of the island. The shores of the two small indentations referred to, Tonkin Bay and Conglomerate Bay, were also fully explored, as well as the adjoining mainland and several of the chain of islands extending northeastward from the point on which we were encamped. One trip was made across the peninsula which separates Rock Harbor from Tobin's Harbor, the next indentation to the north. Several trips were made from the head of Conglomerate Bay up the valley of a small stream, the outlet of Summer Lake, to the Lake itself, and one trip to Benson and Forbes lakes, which lie in the first valley northwestward from Rock Harbor. Sumner, Benson, and Forbes lakes are among the smaller of the interior lakes of Isle Royale; the former is in process of obliteration by a Sphagnum bog, which at the time of our visit had covered perhaps one-third of the area of the Lake."

"At one time Isle Royale supported a sufficient population to maintain a separate county organization. There were two small cities on the island at that time, one of which, Ransome, was located on the northern shore of Rock Harbor, nearly opposite the site of our camp. Traces of the foundations of many of

the buildings of Ransome were still to be found in 1901. The shaft of the deserted Siskowit Mine, in whose neighborhood some of the species here listed were collected, is also close to the northerly shore of Rock Harbor and not far from the site of Ransome.

[To be concluded.]

GEORGIA GENICULATA IN NEW HAMPSHIRE

REV. FREDERICK S. BEATTIE

With reference to Miss Lorenz's note in the *BRYOLOGIST* 12: 10, Jan., 1909, under the above heading, announcing the first station of *Georgia geniculata* (Girg.) Lindb. in New Hampshire, I am glad to be able to report a second station for the species in the state mentioned. On September 26, 1912, I found the species in considerable quantity about Agassiz Basin, North Woodstock, growing on a rotted log with exposure to the northwest. The situation was very damp and very shady, the colony lying beneath the overhang of the northwestern side of a ledge. I was able to carry away only a few specimens at the time, and when next I was able to visit the locality the plants were not in good condition. My own specimens, gathered on the above date, show the fruit in all stages, and the setae, both young and old, sharply bent.

This locality is in the same general district as is Miss Lorenz's station, and so is to be considered as evidence of a probably rather wide distribution in the White Mountain range.

I would remark that the joint of the seta is of very persistent character, not being affected by the twisting attendant upon drying of the plant. In some plants the dry seta has become much distorted, either straightened or twisted, but in each case the joint has retained its very apparent character of about the same angle, regardless of the rest of the seta. On being wet the setae resume their former condition.

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Mr. Edward B. Chamberlain, 18 West 89th St., New York City.—*Bryum purpurascens* (R. Br.) B. & S. and *Myrinia pulvinata* (Wahl.) Schimp., collected in Norway, by Dr. I. Hagen.

Mr. S. Rapp, Sanford, Florida.—*Schismatomma subattingens* (Nyl.), collected in Florida.

Miss Helen E. Greenwood, 5 Benefit Terrace, Worcester, Mass.—*Pellia epiphylla* (L.) Corda, c. fr., collected in Worcester, Mass., April 10, 1914.

The biographical note on Heary Willey, because of lack of space, will appear in next issue.

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 JULY 1914
 

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
O. E. JENNINGS, Ph.D., Editor-in-Chief

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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879."
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THE BRYOLOGIST

Bimonthly Journal of

THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICIS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVI, 1898-1913, \$15.00.

TEN YEAR INDEX, \$1.00

Checks, except New York City, MUST contain 10 cents extra for collection fee. Manuscripts should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania. Forms close on the first of the month prior to that of publication. Subscriptions and advertisements should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania, or to Mr. Edward B. Chamberlain, 18 West 89th Street, New York City.

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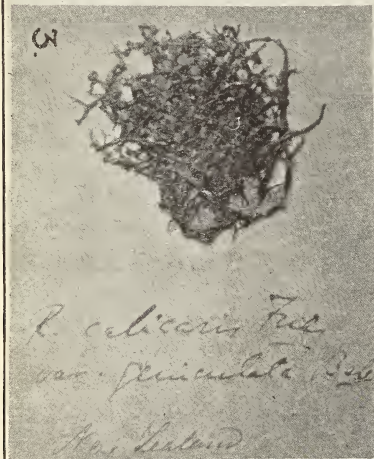
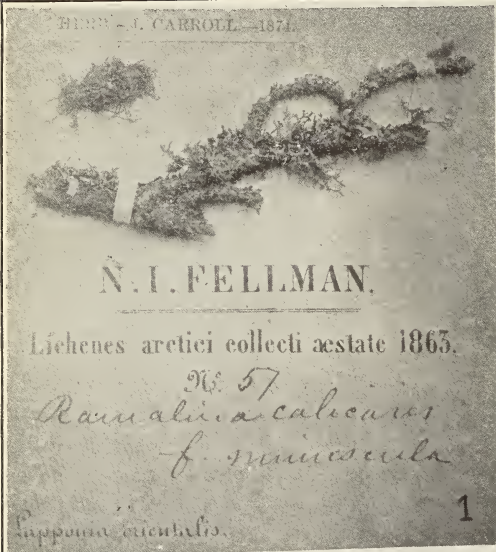
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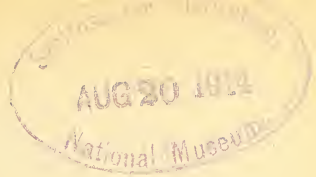
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THE BRYOLOGIST



Vol. XVII

JULY, 1914

No. 4

NORTH AMERICAN SPECIES OF THE GENUS RAMALINA.—PART VI

R. HEBER HOWE, JR.

SERIES: *Fistulariae* Wain. Class. Nat. et Morph. Lich. Bresil, 14. 1890.
Thallus foraminous or fistulous. Spermogones pale.

KEY TO THE *Fistulariae*.

Thallus over 10 mm. alt.

Apices multifid-dendroid.....*pollinariella*

Apices not multifid-dendroid.....*inflata*

Thallus not over 10 mm. alt.....*dilacerata*

Ramalina pusilla Duby.

SYNONYMY: *Ramalina pusilla* Duby, Bot. Gall. 6: 614. 1830.

TYPE: In the herbarium of the Botaniska Institution, Upsala fide Dr. O. Juel.¹

TYPE LOCALITY: "insulis Staechadum" (= Is. Hyères, France) Le Prevost.

ORIGINAL DESCRIPTION: "thallo cartilagineo pusillo dense cespitoso simplicusculo viridi-lutescente sublacunoso, ramis fistuloso-caniculatis extus glabris intus pulverulentis apice saccato-dilatatis, apotheciis terminalibus lateralibus-que subelevatis disco carneo glaucescente concavo margine elevato integerrimo." l. c.

FIGURE: *Pl. X, f. 5.*

OBSERVATIONS: This species, though included by Tuckerman as a member of our flora, has never to my knowledge been collected within our area. Mr. Merrill's remark that "Tuckerman's disposition of American representatives of the fistulous *Ramalinas* is unsatisfactory and incomprehensible" states the case fairly and fully. This species is often confused in Europe with the variety *intumescens* of *R. fastigiata* (sensu Nyl.). The American material referred here by Tuckerman should be known as *R. dilacerata*.

Ramalina dilacerata (Hoffm.) Wain.

SYNONYMY: *Lichen dilacerata* Hoffm. Deutsch. Flora 3:140. 1795.

Ramalina dilacerata Wain. Not. syn. lich. 21. 1886.

Ramalina calicaris f. *minuscula* Nyl. Prod. Lich. Scand. Supp. Lich. Lapp. orient. 114. 1866.²

¹ On orig. label: "je recommande particulièrement à votre attention ce lichen que je crois nouveau et que j'ai trouvé aux Iles d'Hyères, sur la cote de Provence." Le Prevost?

² TYPE: No. 57, Fjellman. Lich. arct. 1863 at Brit. Museum. TYPE LOCALITY: "Soukelo" . . . "Imandram." ORIG. DESCRIPT.: "accedens versus fastigiatam, quae est diminuta, sed tangit quoque *calicarem* (altitudo saepius 5-8 millimetrorum, fertiles." l. c.

The May number of THE BRYOLOGIST was published June 11, 1914.

Ramalina minuscula Nyl. Recog. mono. Ram. 164. 1870.

Ramalina pusilla (Prev.) sensu Tuckerman.

TYPE: Not traced. Dr. Wainio reported the type as in the herbarium [Botanischer Garten und Botanisches Kabinett der Kaiserl. Universitat] at Moscow in 1886.

TYPE LOCALITY: Not given: Germany?

ORIGINAL DESCRIPTION: "erecta laciniata squarrosa compressa rigida nuda."

l. c.

FIGURE: Dill. Hist. Musc., Pl. 21, f. 55 G.

DIAGNOSIS: *Thallus* caespitose, (10 mm. alt.), subterete, nitidous, foraminous, apothecia terminal, often spurred. Spores straight.

DESCRIPTION: *Thallus* caespitose (max. length 10 mm.), subrigid, stramineous to virescent; *cortex* nitidous, foraminous; *lacinae* subterete, dichotomous (max. width 2 mm.), apices furcate, attenuate. *Apothecia* common, terminal, concave at length convex, marginate finally immarginate (max. diam. 3 mm.), disk wax color. *Spores* ellipsoid, straight, $\frac{9-17}{4-7} \mu$.

CONTINGENT PHASES: Unobserved.

SUBSTRATUM: On trees.

DISTRIBUTION: In the Transition and Boreal Zones from Newfoundland and Nantucket Island westward to Yukon and Minnesota.

STATIONS: QUEBEC: Gaspé; NEWFOUNDLAND: Middle Arm, St. George's Bay; NOVA SCOTIA: Sandy Cove, Grand Manan; MASSACHUSETTS: Nantucket; ONTARIO: Nipigon River; MINNESOTA: Snowbank Lake, Rainy Lake City,



FIG. 1.—Distribution of *R. dilacerata* and *inflata*.

Beaver Bay, Gunflint, Grand Portage Island, Koocheching; YUKON: Dawson.

OBSERVATIONS: This minute species with waxy apothecia and shiny foraminous lacinae appears at first to be an immature condition of *fastigiata*. It is closely related to the following *inflata*. In fact, the range of the typical *dilacerata* does not extend west of a line running from Minnesota to Yukon and intergrades inseparably into *inflata* from this point westward.

EXSICCATI: No. 207, Lich. Boreali-Amer. Cummings. Middle Arm, Newfoundland, Apr. 3, 1897, A. C. Waghorne.

No. 3, Canadian Lichens, Macoun, Quebec, 1882-4.

Ramalina pollinariella Nyl.

SYNONYMY: *Ramalina minuscula* var. *pollinariella* Nyl. Recog. mono. Ram., 165 [67]. 1870.

Ramalina pusilla β *geniculata* Tuck. Synop. No. Amer. Lich. 1:26. 1882.

Ramalina pollinariella Nyl. Enum. Lich. Freti Behr. 7. 1888.

Ramalina dilacerata f. *pollinariella* Ann. Verh. Zool. Bot. Ges. Wien. 47:

354. 1897.

TYPE: In the herbarium of the Museum d'Histoire naturelle, Paris, fide author.

TYPE LOCALITY: "Terra Nova," Despréaux.

ORIGINAL DESCRIPTION: "Differt thallo libenteus compresso magisque diviso, ramulis tenuibus apices sorediellis; sterilis." l. c.

FIGURE: Plant World 17: 157. f. 1. 1914.

DIAGNOSIS: *Thallus* caespitose, subcompressed, subrigid, *foraminous*, apices *multifid-dendroid sorediate*. Apothecia marginal. Spores straight.

DESCRIPTION: *Thallus* caespitose (max. length 5 cm.), subrigid, pale virescent; *cortex* glabrous, foraminous; *laciniae* subcompressed, terete above, fistulous below (max. width 2 mm.) much branched, apices dendroid-multifid sorediate. *Apothecia* rare, marginal, concave, marginate (max. diam. 2 mm), disk yellowish. *Spores* ellipsoid, straight, $\frac{8-19}{3.5-7.5}\mu$.

CONTINGENT PHASES: Unobserved.

SUBSTRATA: Trees and shrubs.

DISTRIBUTION: Common in the Boreal Zone near the Coast.

STATIONS: NEWFOUNDLAND: Stevensville, Exploits; MIQUELON: QUEBEC: Gaspé; CAPE BRETON: MAINE: Rockport, Southwest Harbor, Rockland: NEW HAMPSHIRE: Mt. Monadnock?

OBSERVATIONS: This species, distinguished from *farinacea (intermedia)* by basally fistulous, foraminous laciniae and dendroid-multifid apices, has been little understood until recently. It is distinctly Boreal in its range and the *No. 179*, Lich. Boreali-Americani referred to by Mr. Merrill cannot be placed here. I have observed specimens with a few scattered apothecia and after a careful study of the plant in the field in Newfoundland believe that we must consider it a species.

EXSICCATI: *No. 105*, Lich. Exsiccati, Merrill, Warren, Me., May 25, 1909. *G. K. Merrill.*

Ramalina inflata Hook. and Tayl.

SYNONYMY: *Cetraria inflata* Hook. and Tayl. Lond. Journ. Bot. 3:646. 1844.

Ramalina geniculata Hook. and Tayl. Lond. Journ. Bot. 3:655. 1844.¹

Ramalina inflata J. D. Hook & Tayl. Lich. Antarct. 646. 1844.

TYPE: In the Royal Herbarium at Kew, London, fide author. Topotype in the Taylor Collection, Boston Society of Natural History, Boston,

TYPE LOCALITY: "Lord Auckland's group."

ORIGINAL DESCRIPTION: "thallo in caespitem orbicularem congesto pallidissime flavo divaricato-dichotomo lobis fistulosis intus stuppeis foraminulosis

¹TYPE LOC.: "New Zealand." ORIG. DESCRIPT.: "thallo laxo caespitose albido-cinereo glabro dichotomo ramosissimo, ramis intricatis lobis linearibus hinc concaviusculis acuminatis, gemmis dispersis granulatis statim linearibus, apotheciis planis concoloribus margine tenui integerrimo subtus thalli laciniam emittentibus." l. c. FIG.: l. c. *Pl. 79, f. 2.*



FIG. 2.—Distribution of *R. pollinariella*.

ultimis acuminatis, apotheciis terminalibus substipitatis concavis disco concolore pruinoso margine inflexo integerrimo." l. c.

FIGURE: *Pl. X, f. 2.*

DIAGNOSIS: *Thallus* caespitose (2 cm. alt.), subcompressed, *nitidous*, *foraminous* to *cribrate*, apothecia terminal, spurred.

DESCRIPTION: *Thallus* caespitose (2 cm. alt.), subrigid, stramineous to pale virescent; *cortex* nitidous, *cribrate*, *lacinae* subcompressed, dichotomous (max. width 3 mm.) apices attenuate. *Apothecia* common, terminal or subterminal, convex, generally marginate (max. diam. 4 mm.), disk wax color. Spores ellipsoid, straight, $\frac{14-18}{9-11}$ μ .

CONTINGENT PHASES: Unobserved.

SUBSTRATUM: Trees.

DISTRIBUTION: Not uncommon in the Transition Zone from northern California northward to British Columbia and east to Idaho.

STATIONS: CALIFORNIA: Austrian Gulch; OREGON: Clarkes, Sanviers Island, Coast Mts.; IDAHO: Atmis Mt., Kootenay County; WASHINGTON: Cathlement, Seattle, Lake Washington; BRITISH COLUMBIA: Comox.

OBSERVATIONS: This not uncommon species seems only a robust condition of the former species, more cribrate, because perhaps presenting from its size a greater extent of thalline surface for foramina. *R. inflata* and *geniculata*, after a comparison of the types, appear identical,—the former name has only page priority. This is the most satisfactory species of the series, being distinctly fistulous, and appears to intergrade eastward into *dilacerata*, though distinctly more compressed. It has been misdetermined as *R. Menziesii* by distributors (Foster).

EXPLANATION OF PLATE X.

1. The Nylander type of *Ramalina calicaris* var. *minuscule* at London (slightly reduced).
2. The Hooker fil. et Taylor type of *Cetraria inflata* at Kew (slightly reduced).
3. The Hooker et Taylor type of *Ramalina geniculata* at Kew (nat. size).
4. The Duby type of *R. pusilla* at Upsala (nat. size). Lower right-hand corner of plate not numbered.

A LIST OF HEPATICAE COLLECTED UPON ISLE ROYALE, LAKE SUPERIOR. [Concluded.]

GEORGE HALL CONKLIN

Marchantiaceae.

1. *Conocephalum conicum* (L.) Dumort. (840) Bank of small stream near site of Ransome, Aug. 23; (717) Near stream, outlet of Lake Sumner, Aug. 27; (1133) Near stream from Lake Sumner to Conglomerate Bay, Aug. 29; (12094) Mott Island, Aug. 31.

2. *Preissia quadrata* (Scop.) Nees. (292) Shore near lighthouse, Aug. 12; (433) Shore of Tonkin Bay, Aug. 15; (377) Banks of river emptying into north-west corner of Rock Harbor, Aug. 14; (937A) Head of Tonkin Bay, Aug. 25; (1037) Near mouth of Conglomerate Bay, Aug. 27; (1402A) Lake shore near Siskowit Mine, Sept. 5.

3. *Marchantia polymorpha* L. (717) Near stream, outlet of Lake Sumner, Aug. 21.

Metzgeriaceae.

4. *Riccardia latifrons* Lindb. (1539A. C.) South shore of Rock Harbor Sept. 10.

5. *Riccardia multifida* (L.) Carruth. (1137) Bog south of Lake Sumner, Aug. 29.

6. *Riccardia pinguis* (L.) S. F. Gray. (1138) Bog south of Lake Sumner, Aug. 29.

7. *Pellia Neesiana* (Gottsche) Limpr. (1265) Bank of stream, near head of Rock Harbor, Sept. 1; (1349) Shore of Lake Benson, Sept. 4.

8. *Fossombronina* sp., sterile. (1349) Shore of Lake Benson, Sept. 4.

Jungermanniaceae.

9. *Jungermannia lanceolata* L. (671A, C) Swamp, Caribou Island, Aug. 29; (903D) Swamp near Tonkin Bay, Aug. 25; (1400) Swamp north of Siskowit mine, Sept. 5.

10. *Jamesoniella autumnalis* (DC.) Steph. (903A, B) Swamp near Tonkin Bay, Aug. 25.

11. *Lophozia barbata* (Schreb.) Dumort. (8B, 13A, 11, 9) On rocks east exposure Rock Harbor near lighthouse, Aug. 7; (189A, B, 204-205) Ravine near lighthouse, Aug. 10, and (372) Aug. 13; (490A) About lighthouse, Aug. 16; (568) Rocks, ravine near lighthouse, Aug. 16; (689B) Rocks, Caribou Island Aug. 20; (1052-1053) Rocks near lighthouse, Aug. 28; (1317B, 1309, 1310B) Along shore Tonkin Bay, Sept. 3.

12. *Lophozia heterocolpa* (Thed.) M. A. Howe. (1199A, B) On Mott Island, Aug. 31.

13. *Lophozia incisa* (Schrad.) Dumort. (1539B, C) South shore Rock Harbor, Sept. 10.

14. *Lophozia Kaurini* (Limpr.) Steph. (937A) Head of Tonkin Bay, Aug. 25; (1310A) Along shore Tonkin Bay, Sept. 3, and (433) Aug. 15.

15. *Lophozia longidens* (Lindb.) Macoun. (1504 A, C, D, E, 1506) Small island east of Caribou Island, Sept. 9.

16. *Lophozia Lyoni* (Tayl.) Steph. (189B) Ravine near lighthouse, Aug. 10, and (372) Aug. 13; (489A, B, C 490A) Rocks near lighthouse, Aug. 16, and (635) Aug. 10; (917A, 977 A, B) Head of Tonkin Bay, Aug. 25; (992A, B, 994-1000) Cliffs, south shore of Conglomerate Bay, Aug. 27; (1195) North shore Mott Island, Aug. 31; (1233A) South shore Rock Harbor, Sept. 1; (1251A) Head of Rock Harbor, Sept. 1; (1317A) Rocks, south shore Tonkin Bay, Sept.

3; (1504A, E, 1506) Small island east of Caribou Island, Sept. 9; (1529, 1530, 1531B, D, 1532A) Island east of lighthouse, Sept. 9.

17. *Lophozia porphyroleuca* (Nees) Schiffn. (1532A, C) On island east of lighthouse, Sept. 9.

18. *Sphenolobus Michauxii* (Web.) Steph. (903A, B, C) Swamp near Tonkin Bay, Aug. 25.

19. *Sphenolobus minutus* (Crantz) Steph. (1529, 1530, 1532A) Island, east of lighthouse, Sept. 9; (1504) Small island, east of Caribou Island, Sept. 9.

20. *Plagiochila asplenoides* (L.) Dumort. (189B) Ravine near lighthouse, Aug. 10; (489B, C) Rocks near lighthouse, Aug. 16; (671A, C) Swamp, Caribou Island, Aug. 20; (903A) Swamp near Tonkin Bay, Aug. 25; (1133) Swamp near Lake Sumner, Aug. 29; (1233A) South shore, Rock Harbor, Sept. 1; (1307) South shore of Tonkin Bay, Sept. 3; (1402A) Lake shore near Siskowit mine, Sept. 5; (1504F) Small island east of Caribou Island, Sept. 9; (1572A) South shore of Rock Harbor, Sept. 11.

21. *Lophocolea heterophylla* (Schrad.) Dumort. (616) Woods near lighthouse, Aug. 19; (671A, C) Swamp, Caribou Island, Aug. 20; (1400) Swamp north of Siskowit mine, Sept. 5.

22. *Lophocolea minor* Nees. (13B) Rocks east of lighthouse, Rock Harbor, Aug. 7; (626) Small island, near lighthouse, Rock Harbor, Aug. 19.

23. *Geocalyx graveolens* (Schrad.) Nees. (1539D, C) South shore of Rock Harbor, Sept. 10.

24. *Cephalozia bicuspidata* (L.) Dumort. (903A) Swamp near Tonkin Bay, Aug. 25.

25. *Cephalozia curvifolia* (Dicks.) Dumort. (903A) Swamp near Tonkin Bay, Aug. 25.

26. *Cephalozia divaricata* (Sm.) Dumort. (35A, B) Rocks near lighthouse, Aug. 7; (1028A) Rocks south of mouth of Conglomerate Bay, Aug. 27; (1504) Island east of Caribou Island, Sept. 9.

27. *Calypogeia Trichomanis* (L.) Corda. (1539C, D, E) South shore of Rock Harbor, Sept. 10.

28. *Lepidozia reptans* (L.) Dumort. (903A, D) Swamp near Tonkin Bay, Aug. 25; (671B) Swamp, Caribou Island, Aug. 20; (1571) Head of Rock Harbor, Sept. 11; (1230) South shore of Rock Harbor, Sept. 1, and (1539C, D, E) Sept. 10.

29. *Blepharostoma trichophyllum* (L.) Dumort. (189B) Ravine northwest of lighthouse, Aug. 10; (433) Tonkin Bay, Aug. 15; (903A, B, C) Swamp near Tonkin Bay, Aug. 25; (997) Cliff south of Conglomerate Bay, Aug. 27; (1205) Mott Island, Aug. 3; (1572) South shore of Rock Harbor, Sept. 11.

30. *Ptilidium ciliare* (L.) Nees. (12, 13A, 30, 46) Near lighthouse, Aug. 7; (359) Tonkin Bay, Aug. 13; (903 C) Swamp near Tonkin Bay Aug. 25; (1506) Small island east of Caribou Island, Sept. 9.

31. *Ptilidium pulcherrimum* (Web.) Hampe. (616) Woods near lighthouse, Aug. 16; (681A) Rocks, Caribou Island, Aug. 20; (903A) Swamp near Tonkin Bay, Aug. 25; (1145) Near Lake Sumner, Aug. 29.

32. *Scapania curta* (Mart.) Dumort. (35A, B) About Rock Harbor, Aug. 7; (489C) About lighthouse, Aug. 16; (995B) Rocks near lighthouse, Aug. 26; (1205) Mott Island, Aug. 3; (1028A) Rocks and cliffs south of Conglomerate Bay, Aug. 27; (1532A, B) Island east of lighthouse, Sept. 9; (1233A) Rock Harbor, south shore, Sept. 1, and (1251A) Head, Sept. 1.

33. *Radula complanata* (L.) Dumort. (1199, 8B, 13B) Near lighthouse, Aug. 7; (776) Woods near lighthouse, Aug. 22; (918) Swamp near Tonkin Bay, Aug. 26; (977D) Head of Tonkin Bay, Aug. 25; (995B) Rocks near lighthouse, Aug. 26; (1000, 995, 992B) Cliff south shore of Conglomerate Bay, Aug. 27; (1588) Head of Rock Harbor, Sept. 11.

34. *Porella platyphylla* (L.) Lindb. (490B) Near lighthouse, Rock Harbor, Aug. 16.

35. *Frullania Asagrayana* Mont. (321) Rocks near lighthouse, Rock Harbor, Aug. 13; (1504A, C, D, E, H) Small island east of Caribou Island, Sept. 9.

36. *Frullania eboracensis* Gottsche. (321) Rock near lighthouse, Aug. 13; (619A) Small island near lighthouse, Aug. 18; (9770) Head of Tonkin Bay, Aug. 25.

SUPERIOR, WISCONSIN, JUNE 1, 1913.

NOTEWORTHY LICHENS FROM MAINE.—II

G. K. MERRILL

The Lichens described in the following pages, with two exceptions, were collected in Knox County, Maine.

PTERYGIUM PANNARIELLUM Nyl. Sallsk. pro F. et Fl. Not. iv, 1859, p. 236.

Thallus brownish or blackish, adnate, small or somewhat spreading, narrow-laciniate and radiant toward the circumference, microphylline, sub-coralloid, or verruculose and sometimes cracked centrally, laciniae plane or slightly convex. Apothecia small, variously plane convex or concave, margins rather flexuous, but with no visible exciple, black. Spores, eight in each ascus, ellipsoid, hyaline, three-septate, $18-20 \times 6 \mu$, paraphyses distinct, slender, septate, hymenial gel. with I + deep-blue.

On moist mica-slate, Camden.

Resembles a minute *Physcia obscura*. Tuckerman includes several species of *Pterygium* under his section *Lecothecium* sub *Pannaria*. The present is destitute of hypothallus and in no wise to be correlated with *Pannaria*. Not hitherto reported from America.

BAEOMYCES RUFUS var. *SUBSQUAMULOSUS* Nyl. Flora 1877, p. 463.

Distinguished from the species by its more squamulose thallus, and small, sessile, scattered or connate, simple or conglomerated brown apothecia. On sandy and turfy earth among mosses. South Thomaston. Previously unrecorded in America.

EVERNIA FURFURACEA (L.) Mann. Lich. Boh., p. 105, 1826.

American examples of this plant coming to my notice, include forma *nuda* (Ach.) Cromb., forma *scobicina* (Ach.) Nyl., forma *ceratea* (Ach.) Nyl. and var. *Cladonia* Tuck. The species and first two forms are found growing together in my region, in fact I have recognized all three in an individual plant. The curious fact is to be recorded that all of the Knox County material, and all the material from whatever source originating in this country that I have examined, on application of CaCl to the medulla affords a distinct rosy coloration. This is the reaction given for *Parmelia furfuracea* sub-sp. *olivetorina* (Zopf) Zahl., or *Pseudoevernia olivetorina* Zopf. If, as I believe it to be undesirable to establish a species on chemical criteria alone, the further effort to make such responsible for a genus is to be deplored.

PARMELIA TRICHOTERA Hue Caus. sur les Parmelia, Jour. de Botanique, 1898.

Thallus ashy-glaucous, slate-colored or sometimes blackish, and commonly of a deeper color than *P. perlata*, K+ tardy reddish, C=, K(C) the color vanishes, more or less expanded, orbicular, membranaceous, but somewhat rigid, lobed, the divisions medium in width, irregular in shape, contiguous and confusedly sub-imbricate, the borders ascendent, crisped, incised-crenate or even lobulate, but sometimes rounded and entire at the apices, centrally the borders of the lobes invested with sub-globose soredia seated on the tips of dentate lobules, without isidia, but sometimes marginally ciliate, above the younger lobes appear smooth and somewhat shining at the margins, but the older ones are opaque, and rarely rugulose, within white, below black, commonly with rhizoids at the centre, but sometimes destitute, here and there rugulose, toward the circumference brownish or pale, glabrous and shining. Apothecia short-pedicellate, moderate, cup-shaped, disk chestnut, margin entire, the exciple at the base rugulose. Spores 20-30 × 11-17 μ.

This is one of the plants that Tuckerman included in his conception of *P. perlata*. The separation of the plant from that species is indeed antagonized by certain of the European Lichenists. To my mind the two are distinct, for disregarding the difference in reaction, there are others of color, mode of division, and habit. In Knox County the plant is most often found growing on moss-covered rocks in shaded places. Appears to be hitherto unnoticed in the United States.

PARMELIA FARINACEA Bitter Untergatt. Hypogym., p. 174.

Spruce trunks, Rockland. No different from *P. physodes*, except that the surface of the laciniae is more or less granulate and farinose-sorediate. Not noticed in American lists.

THELOSCHISTES (*Xanthoria*) PARIETINUS var. AUREOLA forma CONGRANULATA Cromb. Grevillea, 1887, p. 78.

Thallus vitelline or sordid-yellow, spreading somewhat, with concrete laciniae, plicated, incised-crenate and naked at the circumference, but centrally granulate, the granules obliterating the thallus. Without apothecia. On elm trees, Randolph, Kennebec County. Previously unrecorded from America.

PHYSICIA STELLARIS var. LEPTALEA (Ach.) Nyl. Syn. I, p. 425. 1860. (*Physicia hispida* (Schreb., F.) of Tuck. Syn. Pt. I. p. 75, pro parte.)

Thallus white or ashy-glaucous, narrowly divided, the laciniae discrete, loosely appressed or subsaccate, imbricated; the margins provided with concolorous cilia, below pale. Apothecia blackish or brownish-black pruinose or nude, with an entire or slightly crenate margin. Spores 14-25 x 8-11 μ .

Rocks and ledges, Rockland, Camden and No. Haven. In Rockland the variation was found growing on a stone wall in the shade of an apple tree. The branches of the tree were clothed with *P. stellaris*. No *P. stellaris* was found on the wall, and no var *leptalea* elsewhere than immediately beneath the tree.

Forma **albescens** (Oliv.) comb. nov.

Thallus appressed, laciniae narrowly divided, flattened or a little convex, discrete but imbricated, white, destitute of marginal fibrils. Without apothecia. On rocks in bed of a stream and about its borders. Rockport. The plant is much discolored when found in places where it is often submerged. Apothecia pruinose in European specimens. Not previously recorded from America.

PHYSICIA STELLARIS var. TENELLA (Scop.) Schaer., Nyl. Syn. I p. 426. 1860.

The variably whitish or ashy-glaucous, laciniae narrowed, ascending, the tips hooded and more or less sorediate, marginally white-ciliate. Apoth. small, blackish or brownish, more or less pruinose. Spores of the species.

Common on tree trunks throughout Knox County.

Forma **EXEMPTA** (Ach.) Th. Fr. Lich. Scand. p. 140, 1871.

Laciniae shorter and broader than in var. *tenella*, colored as in the species and destitute of marginal cilia in our specimens.

Maple trunks, Rockport.

The specimen is remarkable for indicating a close relationship with the species, in that one half exhibited the normal development of *P. stellaris*, the other the characters of the form. Many observations have developed the belief that the var. *tenella* is a metamorphosis of *P. stellaris*.

PHYSICIA LITHOTEA (Ach.) Nyl. Flora 1877, p. 354.

Thallus appressed, commonly brownish varying toward dark brown and glaucous, here and there granulose-furfuraceous, laciniae plane, not discrete, subimbricate, beneath black-rhizose, the rhizoids sometimes showing as a dense marginal fringe from above. Apothecia like those of *P. obscura*, dark brown or black. Spores 14-24 x 9-13 μ .

On stones in a damp situation. Rockland and Warren.

Commonly without apothecia. The condition *sciastra* Ach. not yet found. Not previously recorded for the United States.

PHYSICIA LITHOTODES Nyl. Flora 1875, p. 360.

Thallus irregularly orbicular, bright green when wet, ashy or greenish-fuscous when dry, of short, much dissected imbricate or sub-imbricate laciniae, margins ragged, terminations short-digitate or flabelliform, beneath densely black rhizose, the rhizoids showing more or less at the margins. Apothecia entirely like those of *P. obscura*, with an incurved crenulate exciple, or lecanorine, the exciple scarcely exceeding the disk, black, with or without fibrils below. Spores 15-23 x 6-10 μ .

On rocks and over mosses. Common everywhere in the County.

The plant was long ago submitted to several American lichenists and was variously called *P. obscura*, *P. ulothrix*, *P. setosa* and *P. speciosa*. It is colored like *P. setosa*, sometimes has the exciple ringed with fibrils as in *P. ulothrix*, but never possesses the spreading marginal rhizoids of *P. obscura*, and in no way resembles *P. speciosa*. It is probably common throughout the Northern States, for I have examined it from widely separated localities. New by name to America.

LECANORA (*Placodium*) MURORUM var. LOBULATA (Sommerf.) Schaer. Enum. p. 64, 1850.

Thallus spreading extensively, forming patches up to 8 cent. in diameter, composed of innumerable small thalli running together, the radiant margins only here and there visible, rusty orange. Apothecia very numerous, the thallus appearing to be composed almost wholly of mature or incipient ones. Spores of *L. murorum*.

On andesitic lavas, near the tide water, North Haven.

Not previously reported from the United States.

[To be Concluded]

A COLLECTION OF HEPATICAE FROM NORTH CAROLINA

A. LEROY ANDREWS

In the herbarium of Cornell University is a considerable collection of bryophytes from North Carolina. The collection was made in 1901 by Prof. G. F. Atkinson, who was accompanied during a part of his stay by Prof. E. J. Durand. In determining the hepaticae I note so many cases of northern species representing an extension southward of the ranges given in Evans and Nichols' list of Connecticut bryophytes that it seems well to publish our list in its entirety. To make the list as complete as possible with reference to species I have looked through all the duplicate material, so that the same number will often be found under several species, while on the other hand a species ascribed to a certain number may not always occur in all duplicates of that number. With reference to the localities from which the specimens came I give below the printed data of the several labels.

I. "Collected by Geo. F. Atkinson at Blowing Rock, Watauga and Caldwell Cos., Aug. 19th-Sept. 22nd, 1901. Blue Ridge Mountains, altitude, 3500-5000 feet."

Marchantia polymorpha L. 10941.

Riccardia palmata (Hedw.) Carruth. 10931.

Metzgeria conjugata Lindb. 10951.

Metzgeria crassipilis (Lindb.) Evans. 10932, 10933, 10954.

Pellia Fabroniana Raddi. 10953.

Marsipella emarginata (Ehrh.) Dum. 10946.

Jamesoniella autumnalis (DC.) Steph. 10939, 10958.

Cephalozia curvifolia (Dicks.) Dum. 10931, 10935, 10943, 10948.

- Cephalozia media* Lindb. 10936.
Cephalozia serriflora Lindb. 10936.
Odontoschisma denudatum (Mart.) Dum. 10936.
Bazzania trilobata (L.) S. F. Gray. 10937, 10952.
Diplophyllum apiculatum (Evans) Steph. 10947.
Scapania nemorosa (L.) Dum. 10949.
Scapania undulata (L.) Dum. 10938.
Radula complanata (L.) Dum. 10930, 10932.
Radula obconica Sull. 10951.
Radula tenax Lindb. 10945.
Porella platyphylla (L.) Lindb. 10940, 10957.
Lejeunea Biddlecomiae Aust. 10951.
Lejeunea Ruthii (Evans) Steph. 10933, 10951.
Lejeunea clypeata (Schwein.) Sull. 10945.
Frullania squarrosa (R. Bl. & N.) Dum. 10951, 10955.
Frullania Brittoniae Evans. 10950, 10956.
Frullania Asagrayana Mont. 10934, 10942, 10956, 10958.

2. "Collected by Geo. F. Atkinson in Watauga Co., on trip from Blowing Rock, via Aho, Boone, return by Boone Road, Sept. 7th, 1901. Blue Ridge Mountains, altitude, 2500-3000 feet."

- Cephalozia curvifolia* (Dicks.) Dum. 11210, 11212, 11213, 11214.
Cephalozia serriflora Lindb. 11214.
Odontoschisma prostratum (Sw.) Trevis. 11209, 11215, 11218, 11220.
Odontoschisma denudatum (Mart.) Dum. 11214, 11219.
Calypogeia Trichomanis (L.) Corda. 11209, 11215, 11218, 11220, 11221.
Bazzania trilobata (L.) S. F. Gray. 11215, 11218, 11223.
Bazzania tricrenata (Wahl.) Trevis. 11223.
Lepidozia sylvatica Evans. 11209, 11218, 11221.
Diplophyllum apiculatum (Evans). 11222.
Radula obconica Sull. 11216, 11217, 11223.
Lejeunea Ruthii (Evans) Steph. 11217.
Frullania Asagrayana Mont. 11211, 11216.

3. "Collected by Geo. F. Atkinson on Grandfather Mountain, Watauga, Caldwell and Mitchell Cos., Sept. 10th and 11th, 1901. Blue Ridge Mountains, altitude, 3500-6000 feet."

- Metzgeria conjugata* Lindb. 11998.
Jamesoniella autumnalis (DC.) Steph. 11619, 11623, 11629.
Lophozia inflata (Huds.) M. A. Howe. 11604, 11622.
Lophozia incisa (Schrad.) Dum. 11626, 11628.
Sphenolobus exsectus (Schmid.) Steph. 11611, 11619, 11626.
Sphenolobus exsectiformis (Breidl.) Steph. 11590.
Sphenolobus Michauxii (Web. f.) Steph. 11611, 11623, 11629.
Plagiochila asplenioides (L.) Dum. 11579, 11995.
Plagiochila Austini Evans. 11998.
Geocalyx graveolens (Schrad.) Nees. 11626.

- Cephalozia curvifolia* (Dicks.) Dum. 11611, 11619.
Cephalozia media Lindb. 11624, 11628.
Cephalozia serriflora Lindb. 11626.
Cephalozia divaricata (Sm.) Dum. 11601.
Odontoschisma denudatum (Mart.) Dum. 11625.
Bazzania trilobata (L.) S. F. Gray. 11580, 11599, 11614, 11616.
Bazzania tricrenata (Wahl.) Trevis. 11579, 11582, 11583, 11586, 11588
11590, 11594, 11596, 11598, 11609, 11610, 11612, 11620, 11621.
Lepidozia reptans (L.) Dum. 11580, 11582, 11587, 11591, 11592, 11593,
11594, 11595, 11605, 11607, 11618, 11624, 11627.
Blepharostoma trichophyllum (L.) Dum. 11587, 11591, 11605, 11619, 11624.
Herberta adunca (Dicks.) Gray. 11420, 11501.
Scapania nemorosa (L.) Dum. 11592, 11604, 11613, 11995, 11997.
Radula tenax Lindb. 11600, 11998.
Porella platyphylla (L.) Lindb. 11602.
Lejeunea clypeata (Schwein.) Sull. 11600.
Frullania Asagrayana Mont. 11581, 11584, 11585, 11589, 11601, 11603,
11617, 11625.
4. "Collected by Geo. F. Atkinson near Shulls Mills, N. C., Sept. 13, 1901
Blue Ridge Mountains, altitude about 3,000 feet."
Herberta adunca (Dicks.) Gray. 12054.
Scapania nemorosa (L.) Dum. 12054.
5. "Collected by Geo. F. Atkinson along Caney river, on lower slope of Mt.
Mitchell, Yancey Co., Sept. 15th-16th, 1901. Black Mountains, altitude,
3000-4000 feet."
Riccardia multifida (L.) S. F. Gray. 11768.
Metzgeria conjugata Lindb. 11766.
Metzgeria crassipilis (Lindb.) Evans. 11767.
Plagiochila asplenoides (L.) Dum. 11773.
Lophocolea bidentata (L.) Dum. 11768.
Cephalozia curvifolia (Dicks.) Dum. 11772.
Cephalozia serriflora Lindb. 11772.
Odontoschisma denudatum (Mart.) Dum. 11764.
Bazzania trilobata (L.) S. F. Gray. 11765.
Trichocolea tomentella (Ehrh.) Dum. 11769.
Porella platyphylla (L.) Lindb. 11763, 11767, 11770, 11771, 11774.
Jubula pennsylvanica (Steph.) Evans. 11766.
Frullania squarrosa (R. Bl. & N.) Dum. 11763, 11767.
Frullania eboracensis Gottsche. 11762.
6. "Collected by Geo. F. Atkinson near Spruce Pine, N. C., Sept. 15th and
17th, 1901. Blue Ridge Mountains, altitude about 3000 feet."
Anthoceros laevis L. 12048.
ITHACA, N. Y.

ADDITIONS TO THE LICHEN FLORA OF SOUTHERN CALIFORNIA,
NO. 9

H. E. HASSE

Lecanora (Aspicilia) lusca Nyl. f. lignicola A. Zahlb.

Thallus crustaceous, dark gray, areolate-diffract, areoles, angular, flat-concave, KHO—. Apothecia immersed in flattish thalline warts, disk small, round, finely papillate, black; epithecium continuous, brown, gradually paling downward; thecium colorless, 108μ high; paraphyses lax, adglutinated at apices, septate, branching and intertwining; hypothecium colorless; asci saccate-clavate, nearly equalling the thecium in height; spores 8 in ascus, ovoid, simple, finely granulate, clearing after KHO, 15 to 16μ long, 10μ thick; hymenial gelatine with iodine yellowish, the asci and contents darker yellow to brownish, KHO—, NO_3 —. Spermata acicular, straight, 20 to 24μ long, situated at apices of the simple, straight sterigmata.

On dead decorticated log of *Libocedrus decurrens* near Pine Crest, San Bernardino Mts., at 1700 alt. The species is a saxicolous lichen of northern Asia and of Europe.

Lecania fructigena A. Zahlbr. sp. nov.

Thallus crustaceous, of dark gray to blackish, small, more or less dispersed warts, to flat-concave, rugose concave squamules with coarsely crenate to lobulate borders, 0.2 to 1 mm. wide, somewhat shining. Apothecia sessile to lightly elevated, 0.5 to 0.75 mm. wide; disk flat to flat-convex, brownish-black to black, the proper margin concolorous, thin, at last disappearing. Epithecium sub-continuous, reddish-brown to brown, thecium pallid yellowish; asci clavate to subinflated-clavate, 40 to 44μ long, 12μ thick; spores 8 in ascus, oblong, some lightly curved, the ends blunted, two-celled, 12 to 17μ long, 5 to 5.5μ thick; hymenial gelatine with iodine blue, KHO bleaches the epithecium almost colorless.

On Catalina Island, at the "Isthmus," on serpentine cliffs exposed to ocean spray. Type deposited with Dr. A. Zahlbruckner, in herbarium of S. M. S., and in herbarium of Hasse.

Arthopyrenia sphaeroides (Wallr.) A. Zahlbr.

Spores bilocular, ellipsoid, 14 to 16μ long to 8μ thick On oak, Catalina Island. (Syn. *Acrocordia tersa* Körb.) "Apothecia and spores smaller than in *A. gemmata*." (A. Zahlbr.) Iodine stains hymenial gelatine yellow, ascus membrane not stained, but its contents a darker yellow to orange; sterigma simple, straight, ca 28μ long, 3 to 4μ thick, spermata acicular, straight or lightly curved, 16μ long.

Arthopyrenia fallax (Nyl.) Arn.

Thallus almost white, smooth; apothecia small, shining, black; spores fusiform-ellipsoid, two-celled, 20 to 24μ long, 7.5 to 8μ thick; paraphyses and ascus membrane not stained by iodine but the ascus contents yellow.

On oak, Catalina Island.

Placolecania Hassei A. Zahlbr. n. sp. in litt.

Thallus a dark blackish-brown, squamulose crust, squamules convex, imbricate, lobulate, shining, those at the circumference more distinctly lobed. Apo-

thecia elevated, sessile, 0.5 to 1 mm. wide, disk flat-concave to flat, at times slightly rugose, with an erect, permanent, entire thalline margin, later becoming crenate. Epithecium continuous, chocolate brown and reddish brown, gradually paling downward; thecium colorless below, 80 to 84 μ high; paraphyses coherent; hypothecium pallid; asci clavate, about equalling the thecium in height; spores linear, cylindric, some slightly fusiform, colorless, simple or two-celled, septum faint, 16 to 26 μ long, 4.5 to 6 μ thick, straight or slightly curved; hymenial gelatine blue with iodine. Sterigma remotely articulated, spermatia linear straight, 8 to 10 μ long, ca 1 μ thick. On shaded sandstone boulders, Topanga Canyon, Santa Monica Mountains Type deposited with Dr. A. Zahlbruckner and in herbaria of S. M. S., and Hasse.

Acarospora Californica A. Zahlbr. n. sp. in litt.

Thallus of closely congregated, thick warts of pale chocolate color, faintly pruinose, 0.5 to 1 mm. wide. Apothecia one to three in a wart, deeply depressed, punctiform to elongate distorted. Epithecium continuous, light brown; thecium colorless, .08 μ high; paraphyses simple, medium stout, loosely coherent, the apices conglutinated; asci flask-shaped, upper part of membrane thickened, about reaching tops of paraphyses; spores numerous, colorless, globular to ovoid, 4 by 3 μ or 5 to 7 μ long, by 3 μ thick; hypothecium sordid pale straw-color; hymenial gelatine with iodine blue.

On granite at Palm Springs, at eastern base of the San Jacinto Mts. The writer is indebted to Dr. A. Zahlbrucker for the naming of the above species.

Ramalina ceruchis DeNot. var. *tumidula* (Tayl.) Nyl.

Thallus densely tufted, subterete, more slender than the species and more freely branching, repeatedly forked above and terminating in slender terete points. The only specimen seen is sterile. On Catalina Island, apparently on rocks. Collected by Blanche Trask. Determination by Dr. R. H. Howe, Jr., of the Thoreau Museum. A similar form is found on the mainland at Newport bluffs.

Ramalina linearis (Sw.) Ach.

Loosely tufted from the base, narrowly linear, smooth, somewhat channelled, distantly branching, laciniae from 2.5 cm. to 4 cm. long and about 1 mm. wide. Apothecia marginal, few and distant, 1. to 1.5 mm. wide, disk concave, pale flesh color; spores bilocular, 14 to 16 μ long, 5 to 6 μ thick, slightly curved. On twigs, San Gabriel range. Determined by Dr. R. H. Howe, Jr.

Placolecania candicans (E. Fr.) A. Zahlbr.

Thallus white, pulverulent, closely adherent to substratum, forming round patches from 1 to 2 cm. in diameter, rimose in center, round-lobed at circumference. KHO—. Apothecia elevated sessile, 0.5 to 1 μ in diameter, with a thick, entire lecanorine margin surrounding the flat dull black, slightly pruinose disk; gonidial layer of the margin extending under the hypothecium; epithecium subcontinuous, grayish-brown; thecium colorless, 90 to 100 μ high; paraphyses coherent, strict, septate or forked the tips slightly capitate and colored; hypothecium nearly colorless or tinged a faint yellow; asci clavate; spores oblong-ellipsoid, bilocular, 11 to 17 μ long 4 to 5 μ thick. Sterigma straight simple; spermatia staff-shaped 4 to 8 μ long, 1 μ thick. On calcareous rock. Catalina

Lecanora peltastictoides Hasse. n. sp.

Thallus squamulose, whitish, squamules flattened-globular, thick, from 0.5 to 1 mm. wide, pulverulent, radiately or variously fissured, KHO—, Ca(ClO)₂—. Apothecia solitary in squamules; disk at first small, depressed and dull black, later enlarging and occupying greater part of squamule, level with thalline margin, dark gray, moistened dull brick-red, from 0.25 mm. to 0.75 mm. wide with a thin gray proper margin. Epithecium sordid yellowish, subgranulose; thecium colorless; paraphyses coarse, septate; hypothecium colorless, about half the height of thecium; asci ovoid to saccate; spores ovoid or ovoid-ellipsoid simple, 2 to 6 μ long, 7 to 10 μ thick. Staining blue with iodine. Gonidia 12 to 20 μ in diameter.

On granite, Palm Springs. Type deposited in herb. Hasse. Differing from the externally very similar *Acarospora peltasticta* A. Zahlbr. in the pulverulence, less deep fissures, the minute areolae not so truncate; mature disk lighter in color and often pruinose, thallus has not the ivory-like appearance as in the *Acarospora* species.

SANTA MONICA, CALIFORNIA.

**NOTES ON THE DISTRIBUTION OF POLYTRICHUM STRICTUM AND
SOME ASSOCIATED SPHAGNA**

E. J. HILL

In the Bryologist for Sept.-Nov., 1910, O. E. Jennings writes of finding *Polytrichum strictum* Banks near Linesville, Crawford County, in the northwest corner of Pennsylvania, and comments on the southern location and low altitude of this station for a moss prevailingly of northern range, or when southern limited to alpine boggy regions. My experience with it has been of like character, it having been collected twice at a lower altitude than for the swamp in Crawford County, given as about 980 feet, but not quite so far south. In the summer of 1908 it was found in a tamarack swamp near Long Lake, in the vicinity of Fox Lake, Lake County, Illinois, the county at the northeastern corner of the state. It made dense hummocky cushions, closely associated with *Sphagnum fuscum* (Schimp.) Klingr., *S. acutifolium*, and *Aulacomnium palustre*. The altitude of the station must fall below 800 feet, that of the railroad at Long Lake, into which the swamp is drained by a stream a couple of miles long and not of rapid flow, being 754 feet. The general altitude of the valley of Fox River, in which the lake is located, in its passage through Lake County is from 700-775 feet. The latitude would place it about 75 miles or one degree farther north than that near Linesville, Pa. Several sphagnum swamps besides that near Long Lake are found in this part of the Fox River valley.

The following year the *Polytrichum* was again met with while collecting in Bergen Swamp, in Genesee County, N. Y., about 130 miles north of the station in Pennsylvania. The trees of the swamp are mainly arbor vitae, tamarack, and white pine. It is a sphagnum swamp and is botanically noted for the northern aspect of its flora. Here also the *Polytrichum* grew in hummocky cushions, in-

timately associated with *Sphagnum fuscum* and *S. subbicolor* Hampe, or the form that has gone under that name among sphagnologists. The felty coat of the stems of the *Polytrichum* bound them as closely to those of the *Sphagna* when in contact as to each other. They were so much united that a pair of tweezers was found the best means of separating the different kinds when taken in the hand for study. The altitude of this swamp is doubtless below 600 feet, to judge by that of stations on the West Shore railroad. This runs upon the higher ground along the margin of the swamp that skirts it like the rim of a basin on the south side, the level of the swamp being several feet lower. The altitudes of stations of this railroad nearest the swamp east and west are respectively 579 feet and 604 feet.

It is of interest to add in this connection that Warnstorff,¹ when giving the habitat of *Sphagnum fuscum* for the province of Brandenburg, Prussia, as chiefly highmoors of alder and pine, states that it is commonly associated with *Polytrichum strictum* and *Sphagnum rubellum* Wils. The latter was found in comparative abundance in Bergen swamp, and in four of these of Lake County, Illinois, including that of Long Lake. This coincidence in association is a little striking and ecologically instructive, and may be looked on as more than casual among mosses of so wide a distribution. They are all of a boreal range, coming southward where conditions nearest the boreal are presented in our flora. The southernmost station for *Sphagnum fuscum*, *S. rubellum*, (and I may add for one of similar range *S. Warnstorffii* Russ.) as far as I have met with them in Illinois, is a tamarack swamp near Bang's Lake, at Wanconda, Lake County, about ten miles south of the station near Long Lake. As there are no more of these swamps till some in the dune region at the south end of Lake Michigan, in Lake and Porter Counties in Indiana are reached, the swamp at Wanconda may be taken as the southern limit, as far as now known, for these species in Illinois. Röhl² who collected mosses in the dune region of Indiana in 1888 reports one of them, *S. fuscum* var. *filiforme* Roll (new var.) as found at Lake Station (now East Gary) Lake County, Ind. Though quite familiar with this region I have not yet come across it if it still persists among the changes that have gone on so rapidly in this locality.

CHICAGO, ILLINOIS.

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Dr. H. E. Hasse, Santa Monica, California.—*Lecidea parasema* Ach. var. *achrista* (Sommerf.), from California.

¹ Kryptogamenflora der Mark Brandenburg, 1: 431. 1903.

² Nordamerikanische Laubmoose, Torfmoose und Lebermoose, Hedwigia 33: 295. 1893.

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 SEPTEMBER 1914
 

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
O. E. JENNINGS, Ph.D., Editor-in-Chief

Associate Editors

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Advisory Board Officers of the Society

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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879."
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THE BRYOLOGIST

Bimonthly Journal of

THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICAS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVI, 1898-1913, \$15.00.

TEN YEAR INDEX, \$1.00

Checks, except New York City, MUST contain 10 cents extra for collection fee. Manuscripts should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania. Forms close on the first of the month prior to that of publication. Subscriptions and advertisements should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania, or to Mr. Edward B. Chamberlain, 18 West 89th Street, New York City.

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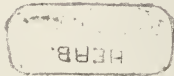
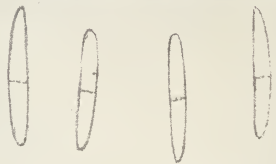
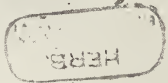
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Ramalina Montagnei interioris

esemplare mandato dal Chiariff. Montagne
qual una delle varietà dell' *R. rigida*

Cuba

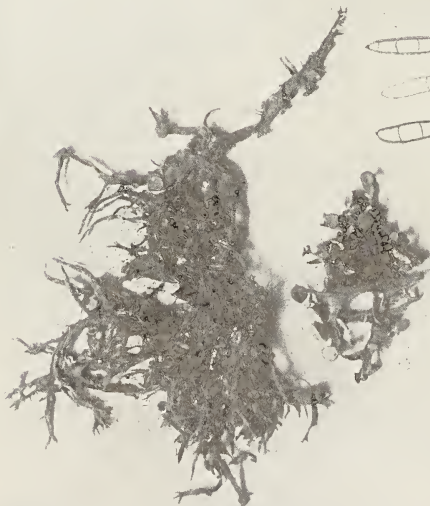


700 J.



Ramalina rigida
var. ex Montagne

Ramalina Montagnei
Gillet.



Ramalina rigida
var. ex Montagne
Gillet.



THE BRYOLOGIST

VOL. XVII

SEPTEMBER, 1914

No. 5

NORTH AMERICAN SPECIES OF THE GENUS RAMALINA.—PART VII

R. HEBER HOWE, JR.

SECTION: *Fusisporae* R. H. Howe, Class. Fam. *Usneaceae*, l. c. 18, 1912.

Asci containing 8 hyaline, fusiform spores $\frac{16-35}{3-7} \mu$.

KEY TO THE SERIES *Fusisporae*.

Laciniae subterete throughout.....*Montagnei*
Laciniae never subterete throughout (compressed).....*stenospora*

Ramalina Montagnei DeNot.

SYNONYMY: *Ramalina Montagnei* DeNot. Frammenti lich. Giorn. Bot. Ital. 2: 218. 1846.

Ramalina rigida b. *Montagnei* sensu Tuck.

(?) *Ramalina gracilentia* Fr. l. c.

TYPE: In the museum Instituto e orto Botanico, Rome, fide Dr. R. Pirotte.

TYPE LOCALITY: "Nelle Antille." Cuba.

ORIGINAL DESCRIPTION: "Thallo dense caespitoso, ramis alterne vel subdichotome ramosis, intricatis, linearibus, compressis, flexuosis, rigidis, nitidis, fulvescentibus, torulosis subindeque foraminulosis, superne sensim augustatis, ramella acutae formia sparsa, approximatae emittentibus, apotheciis thallo concoloribus, marginalibus, dorsalibusque, primum tuberculifimibus vertice impressis, demum patellaribus, convexiusculis, brevissime pedicellatis, margine thalode incumbente, crinulato, erosore cinctis, basi imbricatis, sulcoque peripherico impresso exaratis subapophysatis, sporidiis cylindracis utrinque obtusis, diametro septies longioribus." l. c.

FIGURE: Pl. XI. f. 1.

DIAGNOSIS: *Thallus* caespitose, *terete* or *subcompressed*, *rigid*, *estriate-tuberculate*, apices *filiform*, apothecia *marginal*, small, spores straight. KOH—.

DESCRIPTION: *Thallus* caespitose (max. length 9 cm.), rigid, virescent; *cortex* nitidous, tuberculate; *laciniae* dichotomous, subterete or compressed, torulose, apices filiform.

Apothecia common, small, marginal, subterminal, rarely spurred, concave at length convex, marginate, finally immarginate (max. diam. 3 mm.), disk buff.

Spores fusiform, straight or substraight $\frac{20-28}{3-5.5} \mu$.

CONTINGENT PHASES: (a) Sorediate-tuberculate.

SUBSTRATA: On trees.

DISTRIBUTION: Uncommon in the Austral Zone.

The July number of THE BRYOLOGIST was published August 17, 1914.

STATIONS: FLORIDA: Ponce, Daytona; LOUISIANA: St. Martinsville; CUBA: San Jose de las Sejas; JAMAICA.

OBSERVATIONS: This species, distinct from *R. attenuata* on account of its spores, seems rarely to intergrade with the following species. Nylander determined cotypes (Herbarium Lenorm) of Müller Arg. as this species before the latter described his wholly compressed, but otherwise superficially similar species. Until a larger series of specimens is examined the true status of the two plants is uncertain. Miss Cummings's distribution under *R. r. Montagnei* (see Exsic. with next species) KOH— may be referred to *R. stenospora* KOH + as also the material KOH— I recorded from Southampton, Long Island (Rhodora 12: 7. 1910). Tuckerman recorded the present species from South Carolina, Florida, Louisiana, and Texas. Miss Cummings's material, and two specimens sent me by Dr. A. C. Herre from San Benito and San Roque islands, California, are alike in their reaction KOH+, have lateral as well as marginal apothecia, with distinctly striate laciniae, and represent no doubt the following species. The Cotypes (KOH+) before referred to of course belong under *R. stenospora*.

EXSICCATI: No. 181. Decades No. Amer. lich. Cummings, etc. Corpus Christi, Texas, Mär. 1895, A. A. Heller.

No. 112. Lich. Boreali-Amer. Cummings, etc. the same, both called *Ramalina Montagnei* De Not.

Ramalina stenospora Müll. Arg. Flora 60: 477, 478. 1877.



FIG. 1.—Distribution of *Ramalina Montagnei* and *R. stenospora*.

SYNONYMY: *Ramalina caespitosa* Tayl. in herb.

TYPE: In Herbarium Boissier, Chambésy, Switzerland, fide author.

TYPE LOCALITY: "Nouvelle Orléans Louisianae."

ORIGINAL DESCRIPTION: "thalli laciniae 1-1½-pollicares, lanceolato-lineares, depauperato-lineari-laciniatae, plano-compressae, subinde minute lacinulatae, 1-4 mm. latae, subacuminatae, rigescentes, fusciscenti-pallidae, irregulariter et crebre albido-striato-costulatae,

caeterum laeves, v. interdum tuberculis paucis marginalibus adpersae, opacae; apothecia lateralia et terminalia; praeter juvenilia subpapillari-gyalectiformia circ. 2-3½ mm. lata, podicellata, dorso subconcentrice subsoredioso-albo-lineolata margo subinteger et tenuis, discus demum plano-convexus, albescenti-pruinosis; sporae 15-22µ. longae, tantum 3 v. 3½µ. latae, naviculares, utrinque acutiusculae, rectae v. hinc inde obsolete curvatae v. obsolete sigmoideae."

l. c.

FIGURE: Pl. XI. f. 2.

DIAGNOSIS: *Thallus* caespitose, compressed, rigid, striate-tuberculate apices compressed, apothecia lateral, spores substraight (KOH+ ?)

DESCRIPTION: *Thallus* caespitose (max. length 8 cm), rigid, stramineous to virescent; cortex glabrous, striate-tuberculate; *lacinae* compressed throughout, dichotomous, apices compressed attenuate. *Apothecia* common, lateral, occasionally spurred, concave at length convex, marginate (max. diam. 4 mm.), disk buff. *Spores* fusiform, straight $\frac{(18) 22-34}{3-6} \mu$.

CONTINGENT PHASES: (a) Stramineous.

SUBSTRATA: On trees.

DISTRIBUTION: Not uncommon in the lower Austral Zone from Massachusetts (Westport) to Texas and west to California. (phase a.)

STATIONS: CALIFORNIA: San Roque Island; San Benito Island; Madgalena Island; MASSACHUSETTS: Westport; NEW YORK: Southampton; TEXAS: Corpus Christi; Galveston Bay; FLORIDA: Jacksonville; George; Daytona; St. George Island; Green Coe Spring; JAMAICA: LOUISIANA: New Orleans; Pt. a la Hache.

OBSERVATIONS: This species suggesting the stock of *R. complanata* except for its fusiform spores is distinguished from *R. Montagnei* by its lateral apothecia, white striate lacinae, compressed apices, and generally reddish to brown reaction with KOH. It appears to intergrade into *R. Montagnei* and would be more logically classed as a variety except for its larger spores. The species was recorded from Westport, Mass., by Henry Willey under *Ramalina subfraxinea* Nyl. (Lich. New Bed. 5. 1892)¹ and I collected a specimen at Westport Harbor during the summer of 1913. From Massachusetts it is found along the coast to Texas, and a stramineous phase which may deserve a name appears on the California coast.

EXSICCATI: No. 268. Lich. Exsic. Merrill. Daytona, Fla., Mar. 7, 1911. G. K. Merrill.—called *R. Montagnei*.

NOTE: *Ramalina subasperata* Nyl. Flora 34: 411. 1876. This species described from Cuba I have not observed. Nylander defined it as follows: "Accedens versus *complanatum*, sed thallo subtereti aut subcompressiusculo et sporae tenuiores. Thallus pallidus laevis, caespitose ramosus, superficie tuberculis albidis minutis subpapillosis sparsis nonnihil exasperatus, firmus (altit. circiter 2 centimeter; latit. 0.5-0.8 millim.); apothecia carneo-pallida, saepius glaucoalbido-suffusa (latit. 1-4 millim.), concava, receptaculo laevi parce tuberculis albis evanescentibus notato et ramulo corniculiformi subtus appendiculato; sporae subfusiformi oblongae, vulgo leviter curvulae vel subrectae, longit. 0.012-18 millim. crassit. 0.0035-45 millim.—Datur no. 25 c. d." l. c. It seems quite probable that this is synonymous with the preceding species, though its spores are said to be largely curved.

Ramalina Bermudina Stirt. Jour. Linn. Soc. 14: 370. 1874. "Thallus depresso-caespitosus, sat late expansus rigescens, laciniatus, laciniis linearibus dichotome multifidis, pallidus v. stramineo-pallidus v. rufescens, subnitidus.

¹ Spores recorded as 18-25×3-4 μ . Specimen preserved in U. S. Nat. Herbarium.

Apothecia marginalia subpedicellata concava majuscula margine integro, convina v. pallide rufescentia; sporae 8-nae, 1-septatae, oblongo-ellipsoideae saepe curvulae, 1010 m. 1 g. 5 m. cv.”

“Isle Bermuda.” This species I have not observed.

EXPLANATION OF PLATE XI

1. The DeNotaris type of *Ramalina Montagnei* at Rome (nat. size).

2. The Müller Arg. type of *Ramalina stenospora* at Chambésy (nat. size).

Spores $\frac{20-24}{3-4}$ μ .

ERRATA AND OMISSIONS

PARTS I TO V

PART I.

Page 66, line 2; *after* pendulous *read* (rarely subfoliaceous = *R. Mannii* Tuck).
line 11; *after* rarely *read* monoblast.

Page 67, line 4; *for* Chapter *read* Society.
line 11; *for* 3.5-7.5 μ *read* 3.5-7.5 μ .

Page 68, line 4; *for* Elfvring *read* Elfving.
line 34; *after* chondroid *read* species.
after line 36; *add* No. 1972 Krypt. Exsic. Zahlbruckner, XX: 26:
1912.

Page 70, line 21; *for* Elfvring *read* Elfving.

Page 71, line 21; *after* mould *add* a condition also noticed once in *R. attenuata* from the Sandwich Islands and from Costa Rica.

PART II.

Page 82, line 33; *for* reticulated-rugose *read* reticulate-rugose.

Page 85, line 17; *read non* before *Ramalina*.
line 19; *read non* before *Ramalina*.
footnote 2; *after* Dec. *read* 500.

add following NOTE: Plants often distributed as *R. angustissima* (Anzi) Wain., (exception, No. 1252 Krypt. Exsic. Zahlbr.) are not *R. subfarinacea*, being only distinguishable from *R. farinacea* by a positive reaction with KOH. *R. subfarinacea* is distinctly of the stock of *R. calicaris* (L.) Fr. *emend.*, not of the *farinacea* stock. This is clearly shown in the original proposal of names; one as a morphological variety of *scopulorum*, the other as a chemical variety of *farinacea*.

Page 87, line 7; *for* lead *read* leads.

Page 88, line 17; *after* Palisades *add* Georgian Bay, Ontario.
line 34; *for* it *read*, *pollinaria*.

PART III.

Page 1, legend to Fig. 1, *after* *farinacea* *add*, and *intermedia*.

Page 2, line 4; *after* straight *add* $\frac{9-17}{4.5-7}$ μ .

Page 3, lines 35-36; *omit* The type was, however, growing on a twig.
line 40; after *Plant World* add 17: f. 1.

Page 4, line 3; for *Grant* read *grant*.
line 17; *omit* rather than a corticolous plant.

Page 6, line 14; after straight add $\frac{9-18}{4-7} \mu$.

PART IV.

Page 17, line 18; after *straight* add, spores same as last.

Page 18, line 37; after straight add spores same as last.

Page 22, line 5; under SYNONYMY add *Parmelia tenuiscapha* Tayl. Lond.
Jour. Bot. 4: 175. (1847.)

Page 24, line 40; after earlier add footnote. ¹See Cramer, Ber. der Schweiz.
bot. Gesellschaft, Bull. Soc. Suisse. 1: 1-123, pl. 1-3. (1891)., and Lutz, Sonder
Ber. deutsch. Bot. Gesellschaft. 12: 207-214. (1894).

Page 25, line 2; add at end see Herre, Bot. Gaz. 38: 218, 219. (1904.)

PART V.

Page 33, in KEY move line 11 Apothecia small (entire), lateral, KOH+
below line 14 Thallus not papillo-tuberculate, striate. Replace *gracilis* in line
14 with *attenuata*, line 11.

Page 35, line 40; for Pallens read *palleus*.

in foot note; for Thallo-glabro read Thallo glabro and add at end
of note Type of *R. rigida* Ach., does not exist, fide Elfving.

Page 36, line 27; after species add of which no type specimen exists, fide
Yongmans.

Page 37, footnote 3; *omit all from crusta*, through *gracilentata?* After ORIG.
DESCR.: read Thallo rigido filiformi . . . etc. After Cochinchina read (The
type locality was given as "China," but the original label gives Cochinchina.)

Page 39, line 40; for Plate VII read Plate VIII.

line 42; after 2 read The Fries type of *Ramalina gracilentata* preserved
at Helsingfors. *Omit* and 5 . . . reduced).

Page 40, after line 3; insert 5. The Nylander type of *Ramalina denticulata*
var. *canalicularis* at Helsingfors (much reduced).

line 4; for Plate VIII read Plate VII.

A LIST OF HEPATICAE FROM WESTERN NORTH CAROLINA

PAUL C. STANDLEY

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During August and September, 1910, the writer spent three weeks at Eagle's Nest, a hotel and post-office on Junaluska Mountain, 6 miles northwest of Waynesville, Haywood County, North Carolina. During August and September, 1913, he and Mr. H. C. Bollman camped for four weeks on Flat Creek, about two miles above Montreat, Buncombe County. On both these occasions fair-sized collections were made representing the varied vegetation of this mountain region,

one of the most attractive scenically and botanically to be found in the United States. While the writer devoted most of his time to a study of the phanerogamic flora, he collected about 250 numbers of lichens, mosses, and hepatics. Although many species were overlooked which would have been detected by a critical student of these groups, it may be of interest to record a list of the species obtained.

Eagle's Nest stands on the summit of Junaluska Mountain near the eastern end of the Balsam Mountains at an elevation of 5000 feet. This mountain is covered with a heavy forest, chiefly of oaks, chestnut, and tulip, while along the deeper gulches on the northern slopes are thick groves of hemlocks. Two streams rise at the summit of the mountain, clear, cold, and swift, one flowing towards the north and one to the south. The soil is deep on most of the slopes, but rock ledges occur here and there, and the streams flow over rocky beds.

Our camp in 1913 was on the bank of Flat Creek, a small, rushing, crystal stream, about five miles north of Black Mountain Station, at an elevation of about 3000 feet. This stream like many others of the region is a very beautiful one, with many small falls where the water tumbles over great moss-covered rocks. Along the stream the trees are chiefly hemlocks, while upon the neighboring slopes the timber is principally chestnut. Nearly all of the hepatics collected in 1913 came from the vicinity of this camp. The rocks here, as nearly everywhere in the mountains of western North Carolina, are granites, gneisses, and schists.

Montreat lies on the west side of the Blue Ridge Mountains. Just to the north of this chain lie the Black Mountains, notable for the several high peaks they include, chief among which is Mount Mitchell (6711 feet), the highest peak in eastern North America. Our camp was distant from Mount Mitchell, by trail, about eighteen miles. We made the trip to the top of the peak on September 5, spending the night at the summit and returning the next day. Only a small collection of plants was made on the peak, unfortunately, because of the unfavorable weather and the lack of adequate means of preserving material, the trip being made on foot and little more than food, blankets, and a kodak being carried. It may be stated, however, that few plants were seen which we cared to collect, the flora of the summit and the slopes along the trail being singularly monotonous and uninteresting. The upper slopes of the mountain, above the trail from Clingman's Dome, Potato Top, and Pinnacle Mountain, are covered with a deep balsam (*Abies Fraseri*) forest beneath which few plants manage to exist. There is a very small open area about the rocky summit, but even here the number of species is not large, and apparently there are nearly as many introduced weeds as native plants.

For the determinations of the specimens the writer is under deep obligations to Miss Caroline Coventry Haynes. The numbers from Eagle's Nest were collected by the writer, while all those numbered above ten thousand were collected by Mr. H. C. Bollman and the writer. A complete set is to be found in the U. S. National Herbarium.

In 1909 Dr. A. J. Grout published a list of 19 species of hepatics from the Pink Beds of Transylvania County, North Carolina.¹ Twelve of the species in the present list are not enumerated by Dr. Grout, while his list includes twelve not collected by the writer.

Marchantiaceae

Conocephalum conicum (L.) Dumort. Eagle's Nest, on damp logs (5850); Montreat, on wet rocks (10243).

Metzgeriaceae

Riccardia palmata (Hedw.) Carruth. Eagle's Nest, on damp logs (5855); Montreat, on bark of a tree (10187).

Riccardia sinuata (Dicks.) Trevis. Montreat, on wet rocks (10332).

Jungermanniaceae

Bazzania trilobata (L.) S. F. Gray. In balsam woods near the summit of Mount Mitchell, on wet soil (10399, 10401).

Calyptogeia Trichomanis (L.) Corda. Eagle's Nest, on moist soil (5822), and on a partially decayed stump (5787b).

Cephalozia bicuspidata (L.) Dumort. Eagle's Nest, on a partially decayed stump (5787a).

Cephalozia curvifolia (Dicks.) Dumort. Eagle's Nest, on decaying log (5802); Montreat, on decayed logs (10164, 10189).

Frullania Asagrayana Mont. Eagle's Nest, on logs (5842); Montreat, on bark of tree (10238).

Frullania riparia Hampe. Montreat, on decayed log (10183).

Jamesoniella autumnalis (DC.) Steph. Eagle's Nest, on logs (5860); Montreat, on wet rocks (10421).

Jubula pennsylvanica (Steph.) Evans. Montreat, on wet rocks (10122a, 10170a, 10177).

Marsupella emarginata (Ehrh.) Dumort. In deep balsam woods near the summit of Mount Mitchell, on wet rocks (10402).

Microlejeunea laetevirens (Nees & Mont.) Evans. Montreat, on moist rocks (10159).

Odontoschisma denudatum (Nees) Dumort. Eagle's Nest, on decaying stump (5787).

Plagiochila asplenioides (L.) Dumort. Montreat, on damp, shaded rocks (10170).

Porella platyphylla (L.) Lindb. Montreat, on a tree trunk (10425).

Radula obconica Sulliv. Montreat, on moist, shaded rocks (10160). Sterile.

Scapania nemorosa (L.) Dumort. Eagle's Nest, in moist soil (5820); Montreat, on wet rocks (10122); in deep balsam woods near the summit of Mount Mitchell, on wet rocks (10402a); summit of Mount Mitchell, on shaded rocks (10374).

Scapania undulata (L.) Dumort. Montreat, on submerged rocks in stream (10329).

U. S. NATIONAL MUSEUM, WASHINGTON, D. C.

¹ BRYOLOGIST 12: 54.

OXYMITRA (TESSELLINA) IN THE UNITED STATES

MARSHALL A. HOWE

The family Ricciaceae, as treated by Schiffner in Engler & Prantl, Die natürlichen Pflanzenfamilien,¹ comprises three genera, *Riccia*, *Ricciocarpus*, and *Tessellina*. Alexander Braun's genus *Ricciella*, with *Riccia fluitans* L. as the type, has been accepted as valid by Warnstorff,² by Evans,³ and by some other writers on the Hepaticae, though Schiffner, K. Müller,⁴ and perhaps the ma-

majority of the modern students of the Hepaticae prefer to consider it a subgenus of *Riccia*. Occasionally a recent student⁵ has doubted the validity of the genus *Ricciocarpus*, but no one in recent years, so far as I am aware, has had any scruples in recognizing the generic rank of the remarkable plant currently known as *Tessellina*. The groups known as *Riccia*, *Ricciella*, and *Ricciocarpus*, whether genera or not, have long been recognized as having North American representatives, but the genus *Tessellina*, with its single species, was known only from the

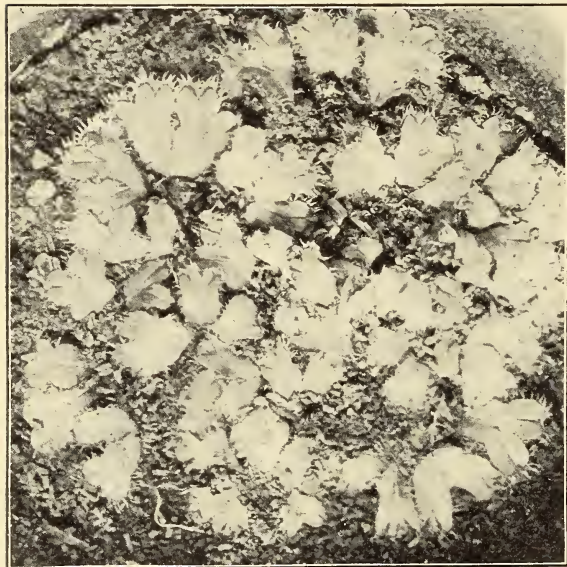


FIG. 1.—*Oxymitra paleacea* Bisch. Nat. size. Sterile. Grown at the N. Y. Botanical Garden from specimens collected near Austin, Texas, by Dr. M. S. Young, Feb. 1914.

Mediterranean region of Europe and Africa until Balansa, somewhat more than thirty years ago, found it in Paraguay. Stephani⁶ has reported it from Brazil

¹ 1³: 8-15. 1893. Schiffner spells *Tessellina* with one "l", though Dumortier, the author of the name, seems consistently and correctly to have used two "l's."

² Kryptogamenflora der Mark Brandenburg 1: 80. 1903.

³ Rhodora 9: 56. 1907.

⁴ In Rabenhorst, Kryptogamen-flora von Deutschland, Oesterreich und der Schweiz 6: 140. 1907.

⁵ See Lewis, C. E. The embryology and development of *Riccia lutescens* and *Riccia crystallina*. Bot. Gaz. 41: 109-138. pl. 5-9. 1906.

⁶ Bull. Herb. Boiss. 6: 759. 1898.

also. With the known distribution of this striking hepatic thus limited, it was an agreeable surprise last February to receive from Dr. M. S. Young, of the School of Botany of the University of Texas, some vigorous living plants labeled "Tessellina" and accompanied by the information that they were abundant in certain open spots in the "upland post-oak woods" in the vicinity of Austin. The specimens bore mature sporogonia and seemed to exhibit no characters⁷ that could be depended upon to separate them from the single recognized species of the genus, currently known as *Tessellina pyramidata*. The spores of the Texas plant average considerably larger than those of specimens from southern Europe, but it is doubtful if this difference is sufficiently pronounced and constant to justify a specific segregation. The spores, measured the longest way, show diameters ranging from 125 to 175 μ . A specimen from lower Austria (Krypt. Exsicc. 181) has spores with maximum diameters of 104–115 μ ; one from Portugal, 121–142 μ ; while one from Paraguay (*Balansa 3709*) approaches the Texas plant with spores 136–150 μ in maximum diameter. It should be added that the Texas plant is evidently dioicous, like plants of the genus elsewhere, but antheridial individuals have not been found in the two sendings thus far made by Dr. Young. It is to be hoped that these will soon be met with in Texas or that they may appear in the thriving cultures of the plant that have been established in the propagating houses of the New York Botanical Garden.⁸ The Texas specimens, it may be said, show the long conspicuous ventral scales that are characteristic of the form of the species described by Bischoff as *Oxymitra paleacea*.

It has been remarked above that the single recognized species of this genus is currently known as *Tessellina pyramidata* and this is doubtless a defensible statement, though Stephani⁹ in his Species Hepaticarum has adopted for it the name *Rupinia pyramidata*, and the name *Oxymitra pyramidata* has also enjoyed recognition within rather recent times. The nomenclature of both genus and species is somewhat involved. Under the provisions of the "American Code" it seems clear that the legal name for the genus is *Oxymitra* rather than *Tessellina* and it may scarcely be doubted that the usual interpretations of the "Vienna Rules" would lead to the same result. If the doubtful *Riccia incrassata* of Bertero is ignored, as it must be unless an authentic specimen should prove it to apply to this plant, the legal specific name of the plant, under the American Code, is apparently *paleacea*, though under the Vienna Rules the specific name *pyramidata* is probably still defensible. The main facts bearing upon the nomenclature of the genus and species, from the point of view of adherents of the American Code, may be summarized as follows:

⁷ Mr. Wm. Edw. Nicholson, of Lewes, Sussex, England, to whom I have sent specimens, has directed my attention to the fact that the radial walls of the epidermal cells bounding the pores or stomata in the Texas plant are more strongly and more abruptly thickened than are the corresponding walls in European specimens, so that the rays of the five- or six-pointed star surrounding the pore often have ovoid or dome-shaped rather than lanceolate-acuminate outlines.

⁸ As these notes are going to press, antheridia have been found in the living specimens, and their position seems to warrant a new specific name for the Texan plant. Further notes will follow.

- OXYMITRA Bisch. in Lindenb. Syn. Hep. Eur. 124. 1829.
Tessellina Dumort. Comm. Bot. 78, *pro parte minima et atypica*. 1822.
Rupinia Corda, in Opiz, Beitr. Naturgesch. 650. 1829. Not *Rupinia*
L. f. Suppl. 69. 1781.
Pycnoscenus Lindb. Öfv. Sv. Vet.-Akad. Förh. 19: 606. 1863.
- OXYMITRA PALEACEA Bisch. loc. cit.
Riccia pyramidata Raddi, Opus. Sci. Bologna 2: 350. *pl. 15. f. 3.*
1818. Not *Riccia pyramidata* Willd. (excl. syn.) Mag. Bot. 2⁴: 9.
1788.
Tessellina pyramidata Dumort. Comm. Bot. 78, *pro parte atypica*. 1822.
Hep. Eur. 165. 1874. Schiffn. in E. & P. Nat. Pflanzenfam. 1³: 15.
f. 5. 1893. K. Müll. in Rabenh. Krypt.-Fl. Deuts. 6: 217. *f. 140,*
141. 1907.
Oxymitra polycarpa Bisch. loc. cit. 125.
Rupinia pyramidata Corda, loc. cit. Steph. Bull. Herb. Boiss. 6: 759.
1898.
Oxymitra pyramidata Hüben. (excluding certain synonyms) Hepaticol.
Germ. 24. 1834. Bisch. Nova Acta Acad. Leop.-Carol. 17: 1049.
pl. 70. f. II, III. 1835. Lindenb. Nova Acta Acad. Leop.-Carol.
18: 491. *pl. 35.* 1836. Nees, Naturges. Eur. Leberm. 4: 382. 1838.
Pycnoscenus pyramidatus Lindb. loc. cit.

Tessellina has been rejected by Stephani (loc. cit.) as a *nomen nudum*, but it was hardly that under any of the modern codes of nomenclature. The original *Tessellina* Dumort., and the *Tessellina* as it remained until after Bischoff had established his *Oxymitra*, rested on the following words:

"2. *Tessellina*, fruit sortant par une fente; on doit rapporter à ce dernier, la *R. reticulata* poir. non sw. = *Tessellina coriandri* nob. et la *R. pyramidata* willd. = *Tessellina pyramidata*, nob."

The first of these two species is manifestly the plant now known as *Corsinia marchantioides* and it is scarcely open to doubt that it was Micheli's conspicuously reticulate or tessellate figure of the thallus of *Corsinia* and Micheli's diagnosis, *Riccia major, Coriandri sapore, foliorum superficie veluti tessellata*," that suggested to Dumortier the generic name *Tessellina*. It is obvious that under the American Code the first of these two species is the type of the genus *Tessellina* and the provisions of the Vienna Rules¹⁰ may possibly be interpreted as pointing to the same conclusions.

Riccia pyramidata Willd., the second of the two original species of *Tessellina*, is now generally conceded to have been intended for some true *Riccia* with elevated antheridial ostioles. Willdenow's rather detailed description is drawn

¹⁰ "Art. 45. When a genus is divided into two or more genera, the name must be kept and given to one of the principal divisions. If the genus contains a section or some other division which, judging by its name or its species, is the type or origin of the group, the name is reserved for that part of it."

from a specimen or specimens collected by him only once and in the vicinity of Halle. *Tessellina pyramidata* of modern authors is said by K. Müller and others not to occur within the boundaries of Germany. Willdenow, however, believed his plant to be the same as Micheli's *Riccia media obscure virens*, etc. and cited Micheli's description and figure and Dillenius's copy of Micheli's figure. And this incidental and mistaken reference to Micheli's work in connection with the publication of the second species of *Tessellina* mentioned by Dumortier is all that "Tessellina" in the modern sense hangs upon. In other words, the genus *Tessellina* was originally based upon two species, of which the first and the evident type was the plant for which Raddi had previously established the genus *Corsinia*, and of which the second, interpreted by description rather than by alleged synonymy, was a genuine *Riccia*. It is true that Dumortier afterwards essentially modified and reformed his genus *Tessellina*, but meanwhile the *Oxymitra* of Bischoff had been established in a manner approved by all the modern rules of nomenclature. The name *Oxymitra* is, however, unfortunately, in current use for a genus of Annonaceae, but that, as a generic name, dates from 1855, though the name appears to have been proposed by Blume for a section as early as 1829¹¹, the date of the founding of *Oxymitra* Bisch.

The great state of Texas offers an almost unexplored field so far as its less conspicuous bryophytes are concerned and from the collections being made at Austin and elsewhere by Dr. M. S. Young and Dr. F. McAllister, and at College Station by Dr. F. H. Blodgett it is manifest that the state is especially well supplied with the Ricciaceae. Peculiarly interesting species of *Riccia* proper have been found there by these botanists and it is possible that some of them may form the subject of a later communication to the BRYOLOGIST.

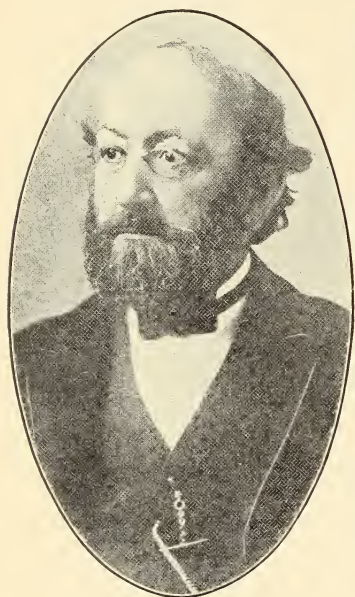
NEW YORK BOTANICAL GARDEN,
BRONX PARK, NEW YORK CITY.

HENRY WILLEY.

In connection with the publication of a new species of lichen in the May issue of the BRYOLOGIST it is fitting that mention should be made of the noted lichenist for whom this plant is named, Mr. Henry Willey. Born in Geneseo, New York, July 10, 1824, he died at South Weymouth, Massachusetts, March 15, 1907. At first a teacher in the Mattapoisett schools, he later became editor of *The Standard*, New Bedford, Massachusetts, but from his boyhood days he had been a collector and student of the lichens and was a pupil of Edward Tuckerman, whose last work he edited. As a man it is said that he was exceedingly diffident and peculiar, living mainly in seclusion with his books and collections

¹¹ Le Jolis (Mém. Soc. Nat. Cherbourg 29: 152. 1894), giving this date as 1828, has made this a ground for giving up *Oxymitra* as a genus of Hepaticae.

for his only companions, and had but few friends outside of a wide circle of botanical friends.



Mr. Willey's first paper on lichens appeared in 1867 and from that time until 1898 various publications appeared to the number of at least twenty-six. His crowning work, however, was "An Enumeration of the Lichens Found in New Bedford, Massachusetts, and its Vicinity from 1862 to 1892," spoken of by Professor Fink as "the best piece of local work ever accomplished on American lichens." Of new species Willey described but twenty-six, but it must be remembered that all his earlier finds were turned over to Tuckerman and described by the latter, while not till after Tuckerman's death did Willey describe his own finds. Willey's herbarium numbered well towards 10,000 specimens and is one of the best lichen collections gotten together by an individual student of American lichens. This herbarium, sold to the government according to his wishes, is now in the Smithsonian Institution at Washington.

In honor of Mr. Willey stands Müller's genus *Willeya* and also *Pyrenula Willeyana*, while Tuckerman named for him *Lecanora Willeyi*, and in the present issue of the BRYOLOGIST is to be found *Ramalina Willeyi* Howe.

A highly appreciative article by Dr. R. H. Howe, Jr., was published in the *New Bedford Sunday Standard*, July 20, 1913, giving among other things considerable interesting information as to the personal habits and character of Mr. Willey; and in *Mycologia* 6: 49-53, March, 1914, has appeared an article entitled "Henry Willey—A Memoir," by Professor Bruce Fink. The latter article contains a complete list of Mr. Willey's papers on lichens. The writer of the present note is indebted to both of these articles for his information and would further express his thanks to the Editor of the *New Bedford Standard* for the loan of the cut, here reproduced in a smaller size.

O. E. J.

NOTEWORTHY LICHENS FROM MAINE—II. (Concluded)

G. K. MERRILL

Lecanora (*Placodium*.) **Baumgartneri** (Zahl.) Merl. comb. nov. (*Caloplaca* (*Amphiloma*) *Baumgartneri* Zahl. in Verh. zool. bot. Ges. Wein. vol. XLVIII, 1898, S. 366.)

Thallus spreading, compounded of small thalli running together, minutely radiate-laciniate, the radii commonly obliterated centrally by numerous apothec-

cia, but toward the circumference distinct, very narrow, more or less divided and at the apices expanded and cut-crenate, rusty-orange. Apothecia small to very small, disk concolorous with the thallus and possessing a lighter colored obtuse margin. Spores, eight in each ascus, ellipsoid or fusiform-ellipsoid, bilocular with approximate sporoblasts, or polar-bilocular with connecting canal, 14-17 x 7-10 μ , paraphyses distinct, sub-discrete, asci inflated-clavate.

On rocks sprayed by the sea-water. Rockport.

Entirely like Zahlbruckner's *No. 765*, "Kryptogamae Exciccatae." I have seen no description of the plant, but the one given above is drawn from Zahlbruckner's specimen. The plant at once resembles *L. murorum* and reduced conditions of *L. elegans*. Previously unreported from America.

LECANORA (*Candelaria*) EPIXANTHA (Ach.) Nyl. Soc. Linn. Bord. t. XXV. 1864, p. 8.

Thallus in Knox County specimens obsolete. The apothecia are small, scattered, sessile, plane or slightly convex, yellowish varying to dusky, with a commonly crenulate or entire thalline margin lighter in color than the disk. Spores, eight in each ascus, simple or with polar loculi, 10-12 x 5-8 μ . On crystalline limestone. Rockland.

Near *L. vitellina*. Reported from the west coast and probably common throughout the United States, but unrecognized.

LECANORA GALACTINA Ach. Lich. Univ. p. 424. 1810.

On brick walls of an old house. Rockland.

Without apothecia. Thallus filmy, sordid-whitish and here and there greenish. Dr. Lesdain kindly supplied me with a name for this plant, and so far as is ascertainable this is the first record for America.

LECANORA GALACTINA forma VERRUCOSA Leight. Lich. Fl. G. Brit. Ed. 3, p. 190. 1879.

Thallus white, verrucose-pulvinate, somewhat incrustate. Apothecia small, crowded.

Calciferous slate, Rockport. New to America.

LECANORA SUBFUSCA var. CAMPESTRIS Schaer. Enum. p. 75. 1850.

On various rocks near the sea, or on the shores of inland tidal streams. Perfectly characteristic, except that the apothecia are larger than in the described European plant. The same thing is found in the localities visited growing on the trunks of trees near the base, and it was also found on dead decorticated wood at times inundated. On decorticated wood at the same station with the last, but high above the water, occurs a form with small apothecia. The larger apothecia developed at lower levels evidently owe their size to a moist environment. Apothecia 4 mm. in diameter have been noted.

LECANORA RUGOSA (Pers.) Nyl. Flora 1872, p. 250.

On "fish-flakes" and old fish-houses, Matinicus Island.

This is exactly the plant described in Crombie's British Lichens Pt. I, p. 412, and its erection into a species is fully warranted. On the boards of the old fish-houses the circumference of the determinate thallus is marked by a thin whitish macular ring, produced by an extension of the hyphema within the fibers of the wood. On the fish-flakes the plant grows luxuriantly, the thalli

running together and producing a continuous crust. It is commonly accompanied by *L. symmictera* Nyl. and is often and extensively suffused with the yellowish color characteristic of the thallus of that species. Much of the material identified as *L. rugosa* in the herbaria of this country, is merely *L. subfusca*.

LECANORA ATRYNEA (Ach.) Nyl. Flora 1872, p. 1872, nota 2.

Outer Green Island, Casco Bay, collected by Mr. A. H. Norton.

The specimen is that condition of the species closely simulating *L. rugosa*. The plant is almost unknown in this country, only three examples having come to the writer's notice. It may be easily mistaken for *L. subfusca campestris*, but is distinct from *L. coilocarpa*.

LECANORA CONIZAEOIDES Nyl. ex Cromb. Jour. Bot. 1885, p. 195.

Bark of ancient white pines, Warren.

Differs from *L. varia* in having a leprous thallus, and from *L. conizaea* in having shorter and broader spores. The species is doubtfully a valid one, and illustrates that tendency of Nylander's later practice, to establish new species on trivial differences.

LECANORA (*Aspicilia*) LAEVATA (Ach.) Nyl. Flora 1872, p. 364.

Rocks in bed of a stream Thomaston and Camden.

The Camden plant very obscure, and called by one lichenist to whom a specimen was sent identified as above, *Lecidea albocaerulescens*. Another authority considered it to be a *Verrucaria*. Both were mistaken, for the normally developed Thomaston example sufficiently elucidates the other.

LECANORA (*Acarospora*) FUSCATA forma SINOPICA (Wahl.) Nyl. Scand. p. 175. 1861.

On intrusive granite, Mt. Megunticook, Camden, with a contiguous-areolate bright rusty-red thallus. On metamorphosed schist at Owl's Head, So. Thomaston, the areoles are discrete in the manner of *L. fuscata smaragdula*.

PERTUSARIA WESTRINGII forma ISIDIOIDEA Anzi Lich. minus rari No. 349.

On a granite boulder, Warren.

Without apothecia. The thallus is densely isidioid-ramulose, tartareous, easily separable from the substratum. K—, C—. Extensively spreading and sordid-whitish, the plant is conspicuous.

Unrecorded from America previously.

PERTUSARIA GLOMERATA sub-sp. TROCHISCEA (Norm.) Th. Fr. Scand. p. 315. 1871.

Thallus incrusting, thin, limited, glaucous or plumbeous, the margin lighter, K—, C—. Apothecia small (about 1 mm.) compressed-globose, pale, with from one to three depressed ostioles. Spores, four in each ascus, halonate, ellipsoid, the terminations sometimes acute, 100–140 x 35–47 μ , hyaline or brown, asci inflated-clavate.

On mosses, and communicating to dead wood. Rockland.

Fries states that in the Swedish plant the apothecia are numerous and by mutual compression angular. In ours the apothecia are scattered. Spore measurements given by Fries 42–84 x 24–34 μ .

New to America.

PERTUSARIA WULFENII forma CARNEA Fr. Lich. Eur. Ref. p. 424. 1832.

Thallus of the species. Apothecia with the disk much protruded, tumid, and flesh-colored.

On trunks of beech. Thomaston and Rockland.

Previously unrecorded from the United States.

ROCKLAND, MAINE.

A LIST OF LICHENS FROM GROUT'S MILLS, VERMONT

FRANK DOBBIN

The lichens mentioned in the following list were collected by the writer July 4-10, 1913, while encamped with a party of the Vermont Botanical Club at Grout's Mills, on Stratton Mountain in southern Vermont. These lichens, which are from the bark of yellow birch, mountain ash, balsam fir, and hard maple, have been determined by Dr. H. E. Hasse, and specimens of each are in the herbarium of the Sullivant Moss Society.

<i>Alectoria jubata</i> (L.) Ach.	<i>Lecanora subfusca</i> var. <i>rugosa</i> Nyl.
<i>Alectoria jubata chalybeiformis</i> Ach.	<i>Megalospora sanguinaria</i> (L.) Koerb.
<i>Bacidia chlorantha</i> (Tuck.) Fink.	<i>Parmelia perlata</i> (L.) Ach.
<i>Bacidia rubella</i> (Ehrh.) Mass.	<i>Parmelia perlata</i> subsp. <i>ciliata</i> Nyl.
<i>Bacidia rubella</i> forma <i>porriginosa</i> (Turn.) Arn.	<i>Parmelia physodes</i> (L.) Ach.
<i>Buellia parasema</i> (Ach.) Th. Fr.	<i>Parmelia tiliacea</i> (Hoffm.) Nyl.
<i>Cetraria glauca</i> (L.) Ach.	<i>Parmelia vittata</i> Ach.
<i>Cetraria lacunosa</i> Ach.	<i>Pertusaria vellata</i> (Turn.) Nyl.
<i>Haematomma cismonicum</i> Belts.	<i>Physcia speciosa</i> (Wulf.) Nyl. var. <i>hypoleuca</i> (Muhl.) Nyl.
<i>Heterothecium pezizoideum</i> (Ach.) Flot.	<i>Thelotrema subtile</i> Tuck.
<i>Lecanora albella</i> (Pers.) Ach.	<i>Usnea dasyypoga</i> (Ach.) Nyl.
<i>Lecanora subfusca</i> (L.) Ach. var. <i>al-</i> <i>lophana</i> Nyl.	

The *Haematomma cismonicum* Belts., was determined by Dr. A. Zahlbruckner, and is probably new to North America.

SHUSHAN, N. Y.

NOTES

We regret to announce the death on July 9th of Mr. W. W. Calkins, of Berwyn, Illinois, for nearly ten years a member of the Sullivant Moss Society and a frequent contributor to the Exchange Department.

In the last issue of the *Revue Bryologique* there is a short article by M. Husnot of especial interest to American students of the hepaticae. M. Husnot, noting the differences in the figures of *Odontoschisma Macounii* given by different authors especially as regards the size of the leaf-cells and the cell walls, colored the leaves with haematoxylin. This treatment showed the cells to be actually thin-walled without large inter-cellular spaces, M. Husnot concludes that the three described European species of *Odontoschisma* are but forms of a single species due to differences in habitat. Three figures illustrate the article.

We take the following paragraphs concerning the death of Dr. C. B. Robinson, which was mentioned in the January issue, from a recent issue of the Kew Bulletin.

"It was with great regret that we learned of the murder of Dr. C. B. Robinson, of the Bureau of Science, Manila, in Amboina on December 5, 1913. Dr. Robinson had gone to Amboina in order to collect over the classic ground visited by Rumphius, and to obtain as complete a collection as possible of the species figured and described by Rumphius. Mr. E. D. Merrill, who proceeded to Amboina immediately on hearing of Dr. Robinson's death, has sent us particulars of the melancholy event, and a copy of the official report of his death, and he also informs us that he has recovered and taken to Manila the whole of the botanical collections made by Dr. Robinson.

"From the information sent to Kew by Mr. Merrill it would appear that the murder was committed largely from fear on the part of the Boetonese, perhaps also for the sake of robbery. Immediately after the murder had been committed, reflection appears to have followed, and in order to wipe out every trace of their deed the murderers threw the body into the sea without anything having been stolen. It is possible, as suggested in the official report, that Dr. Robinson was the victim of superstitious fear caused among the inhabitants by his sudden and unexplained appearance in the lonely spot to which he had walked unaccompanied. Dr. Robinson was very popular with the natives and with their children, and made frequent journeys alone, so that the true cause of the murder is somewhat obscure. His death caused general mourning among the population of Amboina. . . ."—KEW BULLETIN 1914: No. 5.

EXCHANGE DEPARTMENT

Offerings—To Members Only, for Return Postage.

Mr. Geo. B. Kaiser, 508 Locust Ave., Germantown, Penna.—*Fontinalis Sullivantii* Lindb., collected in New Jersey.

Mr. Roy Latham, Orient, Long Island, N. Y.—*Dichelyma capillaceum* B. & S., *Cladonia turgida* (Ehrh.) Hoffm. var. *conspicua* (Schaer.) Nyl., *Ramalina calicaria* (L.) Fr., and *Usnea articulata* (L.) Hoffm.

Mr. Severin Rapp, 207 First St., Sanford, Fla.—*Graphis termida* Merrill, sp. nov., and *Platygrapha subattingens* Nyl.

Dr. H. E. Hasse, Santa Monica, Calif.—*Lecania cyrtella* (Ach.) Oliv.

Mrs. H. C. Dunham, 206 Windsor Road, Waban, Mass.—*Hygrohypnum Mackayi* (Schimp.) Loeske, and *Rhacomitrium aciculare* Brid., both c. fr. from Grand Manan, N. B.

Miss Helen E. Greenwood, 5 Benefit Terrace, Worcester, Mass.—*Cephalozia curvifolia* (Dicks.) Dum., and *Cephalozia byssacea* (Roth) Warnst., both collected in Massachusetts.

Mr. Edward B. Chamberlain, 18 West 89th St., New York City.—*Oediacidium rufescens* (Hornsch.) Mitt. collected in Java by Dr. Max Fleischer.

Mrs. Alice L. Crockett, R. F. D. 1, Camden, Me.—*Solorina saccata* (L.) Ach., collected in Quebec.

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 NOVEMBER 1914
 

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
O. E. JENNINGS, Ph.D., Editor-in-Chief

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GEORGE N. BEST, M. D. JOHN M. HOLZINGER, M. S.
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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879."
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THE BRYOLOGIST

Bimonthly Journal of

THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVI, 1898-1913, \$15.00.

TEN YEAR INDEX, \$1.00

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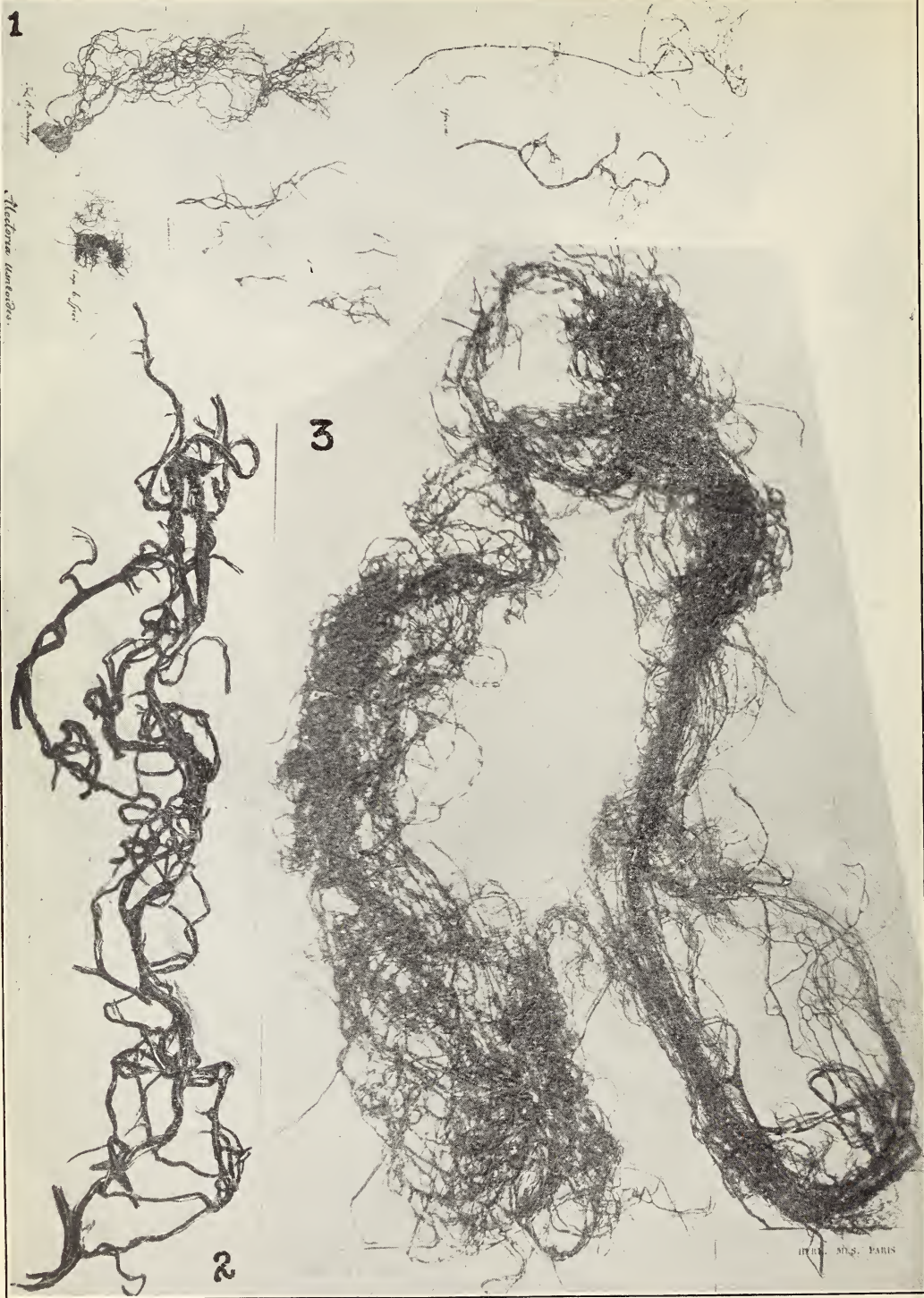
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THE BRYOLOGIST

VOL. XVII

NOVEMBER, 1914

No. 6

NORTH AMERICAN SPECIES OF THE GENUS RAMALINA.—VIII

R. HEBER HOWE, JR.

Ramalina usnea (L.) Fr.

SYNONYMY: *Lichen usnea* Linn., Mantissa I: 131. 1767.

Parmelia usneoides Ach., Meth. Lich. 270. 1803.

Ramalina usneoides Fr., Lich. Europ. reform. Add. 468. 1831.

TYPE: In the Linnean Herbarium, Burlington House, London, *vide* author.

TYPE LOCALITY: "Indiae Or. Ins. Helenae, Madagascar, Martinicae."

ORIGINAL DESCRIPTION: "filamentous pendulus compressus ramosus laevis,"

l. c.

FIGURE: *Pl. XII, f. 2.* (Dill. Hist. Musc. *Pl. 14, f. 13 & Pl. 34, f. 10.*)

DIAGNOSIS: *Thallus pendulous*, two-edged, *striate*, apothecia marginal, spores straight.

DESCRIPTION: *Thallus* pendulous (max. lgth. 30 cm.), virescent; *cortex* glabrous, white-striate; *lacinae* much branched (max. width 4 mm.), two-edged, margins sometimes digitate, apices attenuate. *Apothecia* not uncommon, marginal, subpedicellate, convex, emarginate (max. diam. 3 mm.), disk buff. *Spores* fusiform, straight or substraight, $\frac{17-29}{3-6} \mu$.

CONTINGENT PHASES: (a) *Lacinae* spirally contorted.

(b) Laterally digitate.

SUBSTRATA: On trees.

DISTRIBUTION: Not uncommon in the sub-Austral zone from Florida to Mexico.

STATIONS: FLORIDA: Ponce, Palma Sola, Daytona, New Smyrna; MEXICO: Las Palmas; JAMAICA; SANTO DOMINGO.

OBSERVATIONS: This easily recognized species, always to be distinguished from an *Usnea* by its two-edged, non chondroid-axial *lacinae*, occurs along the southern border of our area. The original Linnean spelling was modified by Acharius and under the present rules of nomenclature should be reverted to again.

EXSICCATI: No. 206. Pringle, Mex. Lich. *vide* Merrill.

No. 236. Merrill, Lich. Exsic., Daytona, Fla., Feb. 15, 1911.

G. K. Merrill.

Ramalina usnea var. *usneoidella* Nyl.

SYNONYMY: *Ramalina usnea* [*eoides*] var. *usneoidella* Nyl., Recog. mono. Ram. 122. [24.] 1870.



FIG. 1.—Distribution of *Ramalina usnea*.

TYPE: In the Museum d'histoire naturelle, Paris, *vide* author.

TYPE LOCALITY: "Mexico," Ghiesbreght.

ORIGINAL DESCRIPTION: "Tenuior, sporis brevioribus (longit. 0.012–22 millim., crassit. 0.003–4 millim.)." l. c.

FIGURE: *Pl. XII, f. 3.*

OBSERVATIONS: Of this variety I have seen no examples save the type.

Ramalina anceps Nyl.

SYNONYMY: *Ramalina anceps* Nyl., Synop. Lich. 290. 1858–60.

TYPE: In the Museum d'histoire naturelle, Paris *vide* author.

TYPE LOCALITY: "Guadalupa Antillarum."

ORIGINAL DESCRIPTION: "Thallus stramineous vel stramineo-pallescens vel pallidus nitidiusculus elongatus (1–2 pedalis) pendulous dichotome ramosissimus compressiusculo-anceps, sat gracilis, ramis valde attenuatis flexuosis intricatis." l. c.

FIGURE: *Pl. XIII, f. 2.*

OBSERVATIONS: This Nylander species, distinguished largely from *R. usnea* by its reddish reaction with KOH, paler, more terete and flexuous branches, I have seen beside the type only one specimen from Grenada, and one questionable example from Florida. Nylander reported it from Cuba and Martinique, and Mr. Merrill from Jamaica. It seems to be hardly more than a chemical species.

NOTE: *Ramalina peranceps* Nyl., Flora 34: 411. 1876. This species, described from Cuba, I have not seen. It was defined as follows: "Affinis *R. ancipiti* (etiam medulla similiter K e flavo ferruginose tincta), sed thallo magis compresso-complanato (lato. circiter 1 millim. vel tenuiore); sporae fusiformi-oblongae curvulae, longit. 0.015–21 millim., crassit. 0.004–6 millim. Thallus estriatulus (alioquin accedens ad stirpem *R. usneoidis*, implexus, in specimine viso longit. saltem 8 centimetre (sed facile longitudinis majoris obveniens).—Datur No. 23." l. c.

Ramalina subanceps Nyl., Flora 34: 411. 1876. This species, also described from Cuba, is, like the last, of questionable validity. It was described as follows: "Fere subspecies *Ramalinae usneoidis* (varietati usneoidellae proxima), sed facie *R. ancipitis*, thallo autem intus K— et sporis fusiformibus (longit. 0.012–24 millim., crassit. 0.0025–0.0040 millim.). Thallus stramineus compressiusculo-anceps latit. 0.5 millim. vel tenuior, in speciminibus visis longit. saltem 15 centimetrorum adtingens, implexus,—Datur vis 22, 24," l. c.

Ramalina dasygoga Tuck., Suppl. Enum. No. Amer. Lich., Sill. Amer. Jour. Sci. Arts 28: 203. 1859. This Cuban species, described by Tuckerman, was defined as follows: "thallo filamentoso rigidiusculo fragile tereti laevigato viridifuscenscente (palescente) ramis elongatis dichotome ramosis ultimis acuminatis nodulosis; apotheciis concavis subcrenulato disparente. Sporae ellipsoideae uniseptatae curvulae hyalinae diam. duplo longiores," l. c. I have not seen an example of this species nor the type. Owing to its spores and general characters, it perhaps would have better been placed, in the present work, following *R. attenuata*.

1

Ramalina *54*
lyellii

BGG
0.012.16
Exh. linn.

Mexico



2000 35
48 35
1895
1895

r. M.

California

Ramalina
bistorta Nyl.

37467



Alectonia anepsi Nyl.

W. Baccarat 1898

Gravelange

2

Alectonia anepsi Nyl.
Ramalina *lyellii*

Ramalina alludens Nyl.

SYNONYMY: *Ramalina alludens* Nyl., Recog. mono. Ram. 130 [32]. 1870.
Ramalina linearis ζ . *alludens* (Nyl.) Tuck., Synop. N. A. Lich.

23. 1882.

Ramalina canaliculata Tayl.* *vide* Müll. Arg.

TYPE: In the Nylander herbarium, Universitetets Botaniska Institution, Helsingfors, *vide* author.

TYPE LOCALITY: "Orizabae" Mexico. Fr. Müller.

ORIGINAL DESCRIPTION: "Thallus osseo-pallidus, compressus, lineari-attenuatus (latit. 1 millim. vel majis attenuatus, altit. circiter 9-12 centimetr.), canaliculatus, caespitose congestus, parum ramosus, apicibus longe acuminate; apothecia carnea pallida vel carneo-glaucescencia, mediocria (latit. circiter 2-4 millim.), calcaria, marginalia, receptaculo subtus laevi vel obsolete ruguloso et basi breviter constricto; sporae fusiformes curvulae (vel subrectae). longit. 0.020-35 millim., crassit. 0.0045-0.0055 millim." l. c.

FIGURE: *Pl. XIII, f. 1.*

OBSERVATIONS: This species is apparently confined to Mexico. It seems probably indistinguishable from *R. canaliculata* Tayl. The title *alludens* it seems well to retain in view of the present binomial *R. canaliculata* (Fr.) Herre, though the Taylor name has a binomial priority over that of Fries. It would seem closely allied to *R. linearis* except for its fusiform spores. I have seen it from Oaxaca Mt., 9000 ft.

EXSICCATI: *No. 193.* Pringle, Mex. Lich. *vide* Merrill.

SECTION: **Bistortae** sect. nov.

Asci containing 8 hyaline, sigmoid spores.

Ramalina bistorta Nyl.

SYNONYMY: *Ramalina bistorta* Nyl., Recog. mono. Ram. 142 [44]. 1870

TYPE: In the Nylander herbarium, Universitetets Botaniska Institution, Helsingfors, *vide* author.

TYPE LOCALITY: "California" ex hb. Lenorm, Caen.

ORIGINAL DESCRIPTION: "Thallus stramineo-pallidus compressus sublineari-laciniatus subcanaliculatus, nonnihil nervoso-inaequalis vel sublaevis minor (altit. circiter 2 centimetr., latit. circiter 2 millim.), ramis utrinque attenuato-ramulosis (laciniolis patentibus attenuato-acutis); apothecia carneo-testacea (subpruinosa), terminalia vel subterminalia (latit. 1-4 millim.), demum convexa, receptaculo basi plicato constricto (plicis sub eodem sensim versus marginem oblitteratis); sporae fusiformi-oblongae bistortae (scilicet utroque apice sensu contrario nonnihil tortae septoque saepius obliquo), longit. 0.012-16 millim., crassit. 0.006 millim." l. c.

FIGURE: *Pl. XII, f. 3.*

OBSERVATIONS: This Nylander species, distinct on account of its spores, I have seen from Jamaica, as well as the Californian type. I can add nothing further to its history.

* For description, etc., see *BRYOL.* 17: 26. 1914.

- Apices blunt..... *polymorpha*
- Apices acuminate..... *v. emplecta*
- Branches never longitudinally rugose
 - Soredia powdery..... *pollinaria*
 - Soredia subpulvinate..... *v. humilis*
- Soraliate
 - Apices simple KOH—?..... *farinacea*
 - Apices multifid-erose..... *intermedia*
 - Apices multifid-digitate KOH+?..... *subfarinacea*
- Never sorediate or soraliate
 - Branches canaliculate
 - Laciniae open-caliculate
 - Branches slender, apothecia spurred *canaliculata* Fr.
 - Branches wide, apothecia terminal *subfastigiata*
 - Laciniae connivo-caliculate
 - Papillate..... *canalicularis*
 - Epapillate
 - Slender..... *linearis*
 - Robust..... *alludens*
 - Branches never canaliculate
 - Papillate
 - Terete, torulose
 - Spores ellipsoid..... *Willeyi*
 - Spores fusiform..... *Montagnei*
 - Compressed
 - KOH—?..... *complanata*
 - KOH+?..... *denticulata*
 - Epapillate
 - Terete, torulose..... *attenuata*
 - Compressed
 - Calcareous
 - Laciniae concolorous..... *calicaris*
 - Laciniae apices black..... *cuspidata*
 - Coriaceous
 - Spores ellipsoid
 - Branches laciniate, apothecia scattered..... *fastigiata*
 - Branches wide, apothecia lateral..... *v. subampliata*
 - Spores fusiform..... *stenospora*
- Thallus never erect (pendulous)
 - Laciniae bifacial-compressed
 - Spores generally over 20 μ long..... *usnea*
 - Spores generally under 20 μ long..... *usneoidella*
 - Laciniae bifacial-terete
 - Cortex striate
 - KOH+..... *anceps*
 - KOH—..... *subanceps*
 - Cortex estriate..... *peranceps*

NOTE: *Ramalina subpellucida* Müll. Arg. Flora, 46: 492, 1888, is a species described from "prope Coamo," Porto Rico, with a variety *tuberculata* also. I have seen neither plant. Porto Rico lies out of the region covered by this paper, but the species or its variety may be looked for in Cuba.

NOTE: *Alectoria thrausta* Ach. Lich. Univ. 596. 1810. This species was described as follows: "thallo tereti-compresso ramoso albo basi nigro, ramis inaequalibus flexuosis fibrillosis flexuoso-cirrosis." l. c. The type localities given are "Helvetia," "Gallia." It was moved into the genus *Ramalina* by Fries in 1831, and was considered a *Ramalina* by Schaerer and Nylander. Until it is found in a fertile state the arguments in favor of Acharius's disposal are two-fold: terete laciniae, and cortex of simple structure. There are no good arguments for considering it a *Ramalina*, and I, therefore, am not including the species in the present paper.

In closing this paper on the Genus *Ramalina* I want to thank most heartily all those who have so graciously aided me in its preparation. It is my hope that the paper will prove of value in studying the species of this difficult genus, and that by the time I shall have embodied its text in my Monograph of the Usneaceae of the United States and Canada any errors or omissions that have been found will have been brought to my notice.

ERRATA AND ADDITIONS TO PART V AND VII

PART V

Page 35, add *Ramalina costata* Mey. et Flot. to synonymy of *R. attenuata*.

Page 36,

FOOT NOTE: Wainio gives the spore measurements of *R. gracilis* as 13-20 x 6-10 μ .

Page 38, line 31; after "Martinica," read In Flora 46: 491, 1888, Müller Arg. redescribed this species under the name *Ramalina Sintenisii* as follows: "hucusque sterilis tantum nota, nunc in Porto Rico frequenter et hinc inde fertilis lecta, species distincta est et a proxima *R. rigida* Nyl. habitu longe validiore, apotheciis omnibus lateralibus et sporis multo longioribus et ambitu multo angustioribus differt.—Thalli albidii laciniae elongatae, 4-16 cm. longae, inferne dichotome, superne racemosim ramosae, hinc inde elongato-ramiferae, compressae, 1-2 mm. latae, ad dichotomias latiores, ad margines tuberculis variis acute prominentibus albidis asperae, caeterum laeves et laevigatae, haud sulcatae nec striatae, utraque facie plano-convexae; apothecia omnia lateralialia, 2½-4 mm. lata, plana, subcarneo-pruinosa, marginata, margo tenuis, prominulus; sporae acutatae, rectae et parce curvulae v. leviter sigmoideae." "prope Hato Grande," etc. From the description the plant seems a near relative of *R. usnea*.

Page 67, line 28, after *Montagnei*, read No. 64, Lich. Novae. Angliae, Howe. New York, Southampton, Aug. 20, 1914, T. M. Carnegie.

PART VII

Page 65, add *Ramalina tenuis* Tuck.* to synonymy of *R. Montagnei*, and add

FOOT NOTE*: Orig. Descript. "thallo caespiticio cartilagineo rigido gracili plano-compresso laevigato-viridi-glaucescente, ramis linearis demum elongatis patentibus flexuosisque attenuatis, ultimis teretibus apicibus elongatis acutis; apotheciis majusculis marginalibus podocellatis disco subplano pallido-pruinoso marginem tenuem inflexum crenulatum demum excedente." Amer. Jour. Sci. & Arts 25: 423. 1858.

PLATE XII

1. The Acharian type of *Parmelia usneoides* at Helsingfors (1-3 nat. size).
2. The Linnean type of *Lichen usnea* at London (2-3 nat. size).
3. The Nylander type of *Ramalina usneoides* var. *usneoidella* at Paris ($\frac{1}{2}$ nat. size).

PLATE XIII

1. The Nylander type of *Ramalina alludens* at Helsingfors (nat. size).
2. The Nylander type of *Ramalina anceps* at Paris ($\frac{1}{2}$ nat. size).
3. The Nylander type of *Ramalina bistorta* at Helsingfors (nat. size).

NOTES ON NORTH AMERICAN HEPATICAE. V

ALEXANDER W. EVANS

Seven of the species noted in the present paper represent additions to the hepatic flora of the United States, while the other three are introduced to record extensions of range. Of the seven additions, six were found in Florida and one in California. Four of the Florida species belong to the Lejeuneae, so that thirty-three representatives of this group are now definitely known from the state.

1. METZGERIA UNCIGERA Evans, Ann. Bot. **24**: 276. f. 1-3. 1910.

Collected in December, 1913, at Robinson Spring, eight miles south of Sanford, Florida, on a tree trunk six feet above the ground, by S. Rapp (*No.* 73). New to the United States and the second recorded station for the species, the type locality being Mount Morales, near Utuado, Porto Rico, where the plant was found by M. A. Howe, in March, 1906 (*No.* 1128). The Florida specimens are apparently quite destitute of sexual organs, but show a vigorous development of the characteristic marginal gemmae with their hooked hairs. For a full description of these interesting reproductive organs, reference may be made to the paper quoted above. In the original description of *M. uncigera*, the wings of the thallus are said to lack surface-hairs altogether, and this feature is emphasized in pointing out the differential characters between the species and *M. furcata* (L.) Dumort. The Florida specimens show occasional hairs on the postical surface of the thallus-wings. This might at first throw doubt on the determination, but a re-examination of the type-material brings out the fact that surface-hairs are occasionally present even there, although much rarer than in the Florida material. The original description, therefore, should be slightly amended in this respect, so as to read, hairs few and irregularly scattered, borne on the margin, on the postical surface of the costa, and, more rarely, on the postical surface of the wings.

2. FOSSOMBRONIA SALINA Lindb. Acta Soc. Sci. Fenn. **10**: 533. 1875. Evans, Rhodora **3**: 7-10, with text-figure. 1901.

Collected in May, 1913, at Glenolden, Pennsylvania, on clay soil in an old rye field, by A. F. K. Krout. In specimens collected on May 11 the spores were in excellent condition; in specimens collected on May 19, most of the spores had been disseminated. In the note referred to above, the writer recorded *F. salina* from Connecticut, New Jersey, and Florida. In addition to the station reported

above, the species may now be cited from the following localities: Orange and Hamden, Connecticut (*J. A. Allen*)¹; Chapel Hill, North Carolina (*Coker*)²; Sanford, Florida (*Rapp*); Oakland, Tennessee (*Bain 2*); Pine Bluff, Arkansas (*Bain 1*); Pinar del Rio, Cuba, *C. Wright*); Province of Santiago, Cuba (*Pollard & Palmer 8*); near Cayey, Porto Rico (*A. W. E.*).

Lindberg's original publication of *F. salina* can hardly be regarded as adequate. He comments on the fact that the plant is parioicous and therefore distinct from *F. angulosa* Raddi, with which Austin had confused it. He states further that it probably represents a new species and gives the name *F. salina* Lindb. in parentheses. But he does not publish the plant formally under this name, and the Vienna Rules would probably interpret his statements as "incidental mention" and not as publication. Both Underwood and Stephani list *F. salina* among their doubtful species, without describing it, so that the writer's description in *Rhodora* must be considered the first valid publication of the species. In Stephani's revision of the genus *Fossombronia* in the first volume of his *Species Hepaticarum*³, he published as a new species *F. brasiliensis* Steph., quoting specimens from Brazil (*Puiggari, Ule*), Cuba (*Wright*), and Dominica (*Elliott*). This species, which the writer knows from description only, is evidently very close to *F. salina*, although the size of the plant is less. It is said to be distinguished also by its dioicous inflorescence, but there is, of course, a possibility that the species is really monoicous and that the antheridia are difficult to demonstrate at the time of the maturity of the capsules. If *F. brasiliensis* and *F. salina* should ever be proved synonymous, the name *F. brasiliensis* should stand for the species, because the adequate publication of this name was earlier than that of *F. salina*. Until this is done, however, the retention of the name *F. salina* for the species seems justifiable.

3. NARDIA GEOSCYPHUS (DeNot.) Lindb.

In the third paper of this series⁴ the present species was recorded from Nova Scotia, an extension of its range in a northeasterly direction. A few months ago it was reported from Bolton, Connecticut, the material having been collected by Miss Annie Lorenz.⁵ It is now possible to extend its range still farther to the southward, into New Jersey, on the basis of specimens collected by Miss C. C. Haynes and the writer in the township of Middletown, Monmouth County, in September, 1913.

Some time ago Stephani⁶ doubtfully included among the synonyms of *N. Geoscyphus* a species from Tallulah Falls, Georgia, originally named *Alicularia Lescurii* by Austin⁷ and afterwards called *Nardia Lescurii* by Underwood⁸. This species was first found by Leo Lesquereux in 1850 and was rediscovered by A. B. Seymour in 1901. Lesquereux's specimens were distributed by Austin in

¹ See Evans & Nichols, Conn. Geol. and Nat. Hist. Surv. Bull. 11: 46. 1908.

² Jour. Elisha Mitchell Sc. Soc. 20: 4. 1904.

³ Mém. Herb. Boissier 16: 28. 1900.

⁴ BRYOLOGIST 15: 55. 1912.

⁵ *Rhodora* 16: 76. 1914.

⁶ Bull. Herb. Boissier II. 1: 481. 1901.

⁷ Bull. Torrey Club 6: 18. 1875.

⁸ Bull. Illinois State Lab. Nat. Hist. 2: 115. 1884.

his Hepaticae Boreali-Americanae (No. 5). If Stephani's supposition could be proved correct the range of *N. Geoscyphus* to the southward would, of course, be much farther extended. Unfortunately, *N. Lescurii* is still very incompletely known. In the specimens examined by the writer, which include both Austin's exsiccatae and a part of Seymour's collection, the plants resemble *N. Geoscyphus* very closely, although the underleaves are somewhat better developed. They show, however, antheridia and archegonia on distinct individuals and not on the same shoot. The inflorescence, therefore, is dioicous and not paroicous, as it ought to be in *N. Geoscyphus*. The attempt was made repeatedly to demonstrate young archegonia at the tip of an antheridial shoot, but absolutely in vain. At the same time the leaves below the terminal clusters of archegonia were found to show no signs of the basal sacs characteristic of perigonal bracts. The absence of perianths and of capsules in all the material studied makes it impossible to establish the generic position of the plant beyond all doubt, but it seems advisable to consider it a valid species until more is known about it. The locality in New Jersey therefore must be regarded as the southernmost known station for *Nardia Geoscyphus* along the Atlantic seaboard.

4. CEPHALOZIA AFFINIS Lindb. Meddel. Soc. F. et Fl. Fenn. 17: 158. 1883 (*nomen nudum*). Stephani, Bull. Herb. Boissier II. 8: 277. 1908. K. Müller, Rabenhorst's Kryptogamen-Flora 6²: 54. f. 16. 1912.

Collected at Sisson, California, on a wet bank, growing on soil, humus, and rotten wood, by G. M. Pendleton. In his announcement of *C. affinis* as a new species Lindberg quoted specimens from two stations in Finland, from one station in Sweden, and from Austin's Hepaticae Boreali-Americanae, No. 57, in part. He published no description of the plant, and apparently it attracted no attention until formally described by Stephani twenty-five years later. K. Müller, in the place quoted above, again records the various stations originally given by Lindberg, but makes no additions. At the same time he intimates that the species ought probably to be found in central Europe. He points out its extremely close relationship to *C. media* Lindb., so close that sterile plants are practically indistinguishable. The only important differences, in fact, are that *C. affinis* is autoicous, while *C. media* is dioicous, and that the dentation at the mouth of the perianth is a little deeper in *C. affinis* than in the other species. The specimens from California are clearly autoicous, a fact which was first demonstrated by Miss Haynes. The writer, however, has failed to find any autoicous material in the number of Austin's exsiccatae which Lindberg quotes. The number is composed of a mixture of various distinct plants, without any indication of the stations where they were collected, and it is probable that there are different mixtures in different sets. For the present, therefore, the Californian specimens may be regarded as the only ones from a definite North American station, which can be safely cited.

5. LEJEUNEA SPINILOBA Lindenb. & Gottsche: G. L. & N. Syn. Hep. 770. 1847. *Potamolejeunea spiniloba* Steph. Sp. Hepat. 5: 639. 1914.

Collected in December, 1913, at Sanford, Florida, on trunk of cypress, by S. Rapp (No. 71). New to the United States. This species, originally described

from Mexican material, was recently recorded from Cuba by the writer,¹ so that the extension of its range into subtropical Florida was not wholly unexpected. Mr. Rapp's specimens are in excellent condition and show both perianths and anthridial branches. The inflorescence is clearly autoicous.

6. *TAXILEJEUNEA OBTUSANGULA* (Spruce) Evans, Bull. Torrey Club **38**: 215. *pl.* 10. 1911. *Lejeunea (Taxi-Lejeunea) obtusangula* Spruce, Hep. Amaz. et And. 221. 1884.

Collected in December, 1913, at Robinson Spring, eight miles south of Sanford, Florida, in a hammock, at base of tree, by S. Rapp (*No.* 70) mixed with a poorly developed *Plagiochila*, probably referable to *P. floridana* Evans. The range of this species is very incompletely known. It was originally described from specimens collected by Spruce in the vicinity of Pará, Brazil, and has lately been recorded by the writer from two localities in New Providence, one of the Bahama Islands. No other stations have as yet been definitely reported. The genus *Taxilejeunea* has not before been recorded from the United States.

7. *CROSSOTOLEJEUNEA BERMUDIANA* Evans, Bull. Torrey Club **33**: 132. *pl.* 6. 1906.

Collected at the following two stations in Florida: on decayed palmetto, New Hawkinsville, in May, 1912, by S. C. Hood (*Nos.* 37 & 43); on bark, in Upsala Swamp, Sanford, in May, 1913, by S. Rapp (*No.* 65). Both genus and species new to the United States. Hitherto known from Bermuda only and supposed to be endemic to the island. The original material, collected at Flatts, by W. R. Coe, grew on the ground and on rocks; the specimens collected by E. G. Britton at Paynter's Vale apparently grew on an organic substratum, but unfortunately the label throws no light on the matter. The species has since been discovered, however, on a dead stump at the mouth of a cave, Harrington House, by S. Brown (*No.* 555), in February, 1908, so that the occurrence of the Florida specimens on bark is not surprising. Both sets of specimens, which were determined provisionally by Miss Haynes and Mr. Rapp respectively, agree closely with the material from Bermuda. The underleaves, however, show a somewhat more marked tendency to be unidentate on the sides, and there is a greater prevalence of teeth two cells long on the wings of the perianths.

8. *LEUCOLEJEUNEA XANTHOCARPA* (Lehm. & Lindenb.) Evans, Torrey **7**: 229. 1908; Bull. Torrey Club **35**: 172. *pl.* 7, *f.* 12-23. 1908.

Collected on tree trunks in a hammock, at De Leon Spring, Florida, by S. Rapp, in May, 1913 (*No.* 66). A widely distributed species in tropical America and also reported from several localities in Africa. *L. xanthocarpa* was first recorded from the United States by Austin, but, as the writer² has already pointed out, this record was based on an incorrect determination, the plants in question belonging to *L. unciloba* (Lindenb.) Evans, *Archilejeunea Sellowiana* Steph. being a synonym. Mr. Rapp's specimens, therefore, represent the first definite record for the true *L. xanthocarpa* from the United States.

9. *FRULLANIA CUCULLATA* Lindenb. & Gottsche; G. L. & N. Syn. Hep. **782**. 1847.

¹ BRYOLOGIST **15**: 61. 1912.

² Mem. Torrey Club **8**: 126. 1902. See also Torrey **7**: 228. 1908.

Collected in March, 1878, at Caloosa, Florida, by C. F. Austin; also, in March, 1905, near Everglade, Florida, by A. A. Eaton. New to the United States. The species was based on material collected at Mirador and Zacuapa, Mexico, by Liebmann, and has lately been reported by Stephani from Boruca, Costa Rica (*A. Tonduz* 15523). The Florida specimens are somewhat smaller than those from Mexico and Costa Rica, which the writer has examined, so that their determination must be regarded as provisional. At the same time the species of the subgenus *Thyopsiella*, to which *F. cucullata* belongs, are so variable that a marked difference in size is often consistent with a single specific type.

Among the close relatives of *F. cucullata*, *F. brasiliensis* Raddi, and *F. intumescens* Lehm. & Lindenb. may be especially mentioned. Both of these species have a wide distribution in tropical America and may perhaps be expected in subtropical Florida. All three species are of a considerable size, all are more or less copiously branched, and all show a marked reddish pigmentation in most of their forms. The leaves are imbricated and strongly convex, tending to be acute or apiculate at the inflexed apex, and the bifid underleaves are more or less revolute along the margins. The leaf-cells are of small size and have distinct trigones; although the latter are triangular in form the sides of the triangle are often wavy and the cell-cavities in this way acquire a sinuous outline. Intermediate thickenings are rare in the middle of the lobes, but tend to be more numerous toward the margins. Coalescence between the thickenings is most strongly pronounced in the lobules and underleaves.

In the presence of perianths there is no trouble in separating *F. brasiliensis* from the other two species. The perianth is characterized by being terete or nearly so at maturity: in both *F. cucullata* and *F. intumescens* it is distinctly tri-plicate, the ventral keel being sharp and distinct. There is much more difficulty in separating *F. cucullata* from *F. intumescens*, and it is possible that they represent forms of a single variable species. There is a tendency, however, for the lobes of the bracts and the divisions of the bracteoles to be more or less toothed in *F. intumescens*, while they are entire or nearly so in *F. cucullata*.

In the various specimens of *F. cucullata* examined by the writer, the stems are at first simply pinnate, but with the appearance of the female inflorescences branches of a higher order appear and often give the fertile shoots a fastigiate appearance. The lobules on the main stem are almost always explanate, and this condition is sometimes found throughout an entire shoot-system. The ultimate branches, however, which are usually of the third or fourth rank, frequently show some or all of their lobules in the form of clavate water-sacs, as in all typical species of *Thyopsiella*, and lobules of this type are sometimes found on branches of the second rank or even on the main stem itself. Apparently the conditions under which a plant is growing has a marked influence upon the type of lobule developed. The specimens from Caloosa, which are preserved in the Underwood collection, belonging to the New York Botanical Garden, show female inflorescences but no perianths. The specimens from near Everglade, received from Miss Haynes, but likewise coming from the herbarium of the New York Botanical Garden, show perianths in abundance. Both specimens are entirely free from male inflorescences.

10. ANTHOCEROS CRISPULUS Douin.

Collected in September, 1913, on a moist bank, at Highlands, Monmouth County, New Jersey, by Miss C. C. Haynes and the writer. The third North American station for the species. The first stations to be recorded were Andover and West Hartford, Connecticut, where the plant was discovered in 1911 by Miss Annie Lorenz¹. In all probability it will be found to have a wide distribution in North America, as well as in Europe, when the characters separating it from *A. punctatus* L. are better understood.

SHEFFIELD SCIENTIFIC SCHOOL, YALE UNIVERSITY.

A NEW SPECIES OF BLASTENIA

H. E. HASSE

Blastenia (Sect. *Eublastenia*, A. Zahlbr.) **herrei** Hasse, n. sp. Thallus scaly-crustaceous, subdeterminate, pale greenish ash-color; hypothallus pale, indistinct, KHO—; disk crimson to blackening. Apothecia mostly slightly elevated, 0.5 to 1.25 mm. wide; disk flat with a concolorous, thin, slightly prominent, entire or wavy and even sinuate proper margin. Epithecium granulose, dark violet-purple; paraphyses stout, loose, slightly thickened above and with one or two sub-capitate septa, some forked above; thecium pale sordid roseate; hypothecium of same hue, but darker; asci more or less inflated clavate, their apices reaching the sharply defined colored surface of the epithecium, 8-spored. Spores ovoid-ellipsoid to oblong ellipsoid, both ends rounded, polarilocular, connected by a delicate isthmus, this and the polar cells, approximate in a few spores, are at first indicated by minute oil cells that disappear after KHO, exospore thin; spores 14μ to 19μ long, 8μ to 12μ thick (Dr. Herre's measurements are 10μ long, 5μ to 7μ thick). Hym. gel. with iodine stains a handsome blue, with KHO violet-purple. Spermogones not seen.

On bark, Ten Mile Tp., Whatcom Co., Washington. Collected by Dr. A. C. Herre, for whom it is named.

FURTHER OBSERVATIONS ON THE TEXAN OXYMITRA (TESSELLINA)

MARSHALL A. HOWE

In a recent number of *THE BRYOLOGIST* (17: 72-75) the writer announced the discovery in Texas of a Ricciaceous hepatic representing a primarily Mediterranean genus not before recorded for North America. The more or less complicated synonymy of the genus and of its single currently recognized species was there discussed, and the peculiarities of the Texan plant were there considered insufficient to distinguish it specifically from *Oxymitra paleacea*, better known as *Tessellina pyramidata*, the one recognized species of the genus. However, a

¹ See Evans, *Rhodora* 14: 16. 1912.

foot-note appended to the final paged proof of the article recorded the detection of a character that might justify the specific segregation of the Texan plant. The Texan specimens, sent in a living condition by Dr. M. S. Young, bore mature sporogonia, and, as no antheridia were discovered, the plants were at first assumed to be dioicous, like the plants of southern Europe and northern Africa. It was remarked that "antheridial individuals have not been found," and that "it is hoped that these will soon be met with in Texas or that they may appear in the thriving cultures of the plant that have been established in the propagating houses of the New York Botanical Garden."

About the middle of September it was noted that these living specimens at the New York Botanical Garden showed numerous young sporogonia and also that there were no obvious antheridial receptacles. Cross sections of the thalli showed that rather inconspicuous antheridia were present intermingled with the archegonia, the elevated cylindrical antheridial ostioles looking much like the snouts of the archegonial or sporogonial involucre, though remaining more slender. It might not be safe to prophesy what a study of the living *Oxymitra* of other parts of the world might disclose in respect to this character, but an examination of such dried specimens as are available (often not at all satisfactory for the determination of antheridia) and a perusal of the accessible literature on the subject would indicate that *Oxymitra* as elsewhere known is a dioicous plant. It may be remarked that even when, as sometimes happens, the Texan plant produces numerous antheridia and only occasional archegonia, the antheridia and their involucre remain essentially free, like the archegonial involucre, in the median sulcus, and are not imbedded in a sharply defined antheridial receptacle as is the case in the dioicous *Oxymitra paleacea*. The large spores and the somewhat peculiarly thickened rays of the "stars" bounding the stomata have been alluded to in the preceding paper. Under the circumstances, it seems best to give the Texan plant a distinctive specific name and its more important diagnostic characters are summarized below:

***Oxymitra androgyna* sp. nov.**

Thalli 1-3 times dichotomous, mostly 8-18 mm. long, loosely gregarious or closely aggregated in more or less rosette-like masses; principal segments oblong, quadrate-oblong, or subovate, 4-7 mm. broad, 2-3 mm. thick, $\frac{1}{3}$ - $\frac{1}{2}$ of this thickness occupied by the air-chamber layer, the median sulcus deep, acute, and sharply defined; latero-ventral scales numerous and conspicuous, projecting far beyond the margins, lanceolate or ovate with long-acuminate or filiform-acuminate apices, 2-4 mm. long, hyaline throughout, or reddish brown at base; rays of the stomatal stars strongly thickened, ovoid, dome-shaped, or lanceolate-acuminate in surface view; synoicous, with an occasional tendency to dioicisim; antheridia intermingled with the archegonia at the bottom of the median sulcus or often somewhat laterally disposed in relation to the archegonia, the elevated antheridial ostioles cylindrical or conic-cylindrical, mostly 0.5-0.7 mm. high and 85-110 μ broad, decolorate or light brown; sporogonial involucre rostrate, obscurely trigonous-pyramidal, conic-cylindrical, or cupulate-ovoid, 1.1-2.0 mm. high, 0.8-1.0 mm. broad, lightly 8-12-ribbed; spores finally very dark and opaque, 125-175 μ in maximum diameter, angular, the outer face bearing areolae 24-35 μ broad, exhibiting in profile a few verrucae 2-5 μ high, the inner faces smooth.

The type material is preserved in the herbarium of the New York Botanical Garden, in the Propagating House of which it was collected on September 23,

1914, this material having been grown from specimens sent from Austin, Texas, by Dr. M. S. Young, in February, 1914. A photograph of sterile specimens from the same culture was published in the former number of THE BRYOLOGIST (17: 72).

NEW YORK BOTANICAL GARDEN.

NOTES ON THE SURVIVAL OF EXTREME DROUGHT BY CERTAIN MOSSES

F. L. PICKETT

Bloomington is in the middle southern portion of Indiana, in the limestone region. For three or more miles in any direction the town is surrounded by rough country, hills and valleys and many narrow ravines, where the underlying stone is only partly hidden by a light layer of clay. This area was formerly covered with hardwood timber, but this has mostly been cut away, and the portions not fit for cultivation and grazing are covered with second growth timber and underbrush. These partly sheltered hillsides are favorite fields for many of the common mosses, especially those growing on soil and exposed stone. The following forms are found in abundance, especially on south and southwest exposures: *Polytrichum commune*, *P. Ohioense*, *Dicranum scoparium*, *Dicranella heteromalla*. A little more under the timber *Catharinaea undulata* and *Leucobryum glaucum* are common. On the exposed rocky points may always be found *Grimmia apocarpa*, *Orthotrichum Lescurii*, *Rhytidium rugosum* and *Hedwigia albicans*. Common on trees in the same localities are *Leucodon julaceus*, *L. brachypus*, *Forsstroemia trichomitria* and *Drummondia clavellata*. On the bases of the same trees the familiar mats of *Anomodon attenuatus* and *Thelia hirtella* are common. In moister, shaded places on the hill-sides *Bartramia pomiformis* and *Aulacomnium heterostichum* are abundant. All these forms except *Leucobryum glaucum* and *Rhytidium rugosum* are regularly found freely fruiting in season.

The summer of 1913 was marked by unusually severe weather conditions. March 23-27 was a flood period with 9.2 in. of rainfall. Then up to April 30 further rainfall amounting to 5.14 in. kept things in good condition. But from May 1 to September 11 only 8.7 in. of precipitation was recorded. During this time periods of specially severe conditions should be noted. There was but .53 in. of rainfall during May, 2.14 in. between May 28 and July 11, and 1.25 in. between July 25 and August 21. The slight rainfall of the summer was scattered through many short showers, mostly less than .5 in. and many between .1 in. and .15 in., leaving scarcely a trace of moisture when they had passed. Along with the drought high temperatures prevailed, as shown by the following abstract from the record of the U. S. W. B. station at Bloomington.

	Maximum	Mean maximum
May	95° F.	77.9° F.
June	103°	89.7°
July	107.5°	94°
August	101°	91.8°
September, up to 12	102°	95°

The temperature on south slopes exposed to, or, at most, but slightly protected from, the direct rays of the sun by scattered trees and bushes, was 20° to 25° higher than the above record.

The effect of such conditions on all forms of vegetation was clearly marked, but that shown by the moss flora has been of special interest to the writer. Spring fruiting mosses matured very few capsules, and the later forms promptly dried up. By the first of June all the moss beds not in places having a constant water supply had the appearance usually found in late August or September. This dead appearance continued up to and through the winter, and, in some cases, was quite noticeable in the spring of 1914. The summer and fall fruiting forms, except in most favorable localities, did not fruit in 1913. A noteworthy exception to the condition just stated was presented by *Leucodon julaceous* and *Forsstroemia trichomitra*, both of which were found fruiting abundantly in exposed places in the fall and winter of 1913.

Frequent examinations of the principal moss areas in the neighborhood have been made up to June, 1914. The findings with reference to the commoner forms are given below:

Leucobryum glaucum. A few dead plants found in most tufts, vigorous growth in 1914.

Polytrichum commune and *P. Ohioense*. The patches show 50-75% of plants dead, with many others inactive except in the production of new shoots from the base. Fruit or sex organs very rare in 1914.

Dicranum scoparium. Vegetative portions uninjured, fruit scarce, and capsules imperfectly formed in 1914.

Grimmia apocarpa. Uninjured except in the case of tufts on wholly exposed stones in walls, in which places some patches showed all plants dead. Most tufts show abundant fruit and vigorous growth in 1914.

Orthotrichum Lescurii. Uninjured and fruiting abundantly in 1914.

Rhytidium rugosum. Uninjured.

Dicranella heteromalla. Many dead patches with no new growth in exposed places, vigorous growth and abundant fruit where protected in shallow gullies.

Bartramia pomiformis. Very light crop of sporophytes in 1914, with many capsules dwarfed or sterile. Vegetative portions uninjured, but showing only slight growth.

Aulacomnium heterostichum. Uninjured and fruiting abundantly.

Tree growing species were uninjured almost without exception, although *Anomodon attenuatus* did not fruit and *Thelia hirtella* produced but few capsules in 1913. The lowland forms show the effect of drought by the presence of few fruiting or sexually mature plants, which conditions are noticeable again in 1914.

Of special interest locally is the effect of this dry summer on the two species of *Polytrichum* and on *Dicranum scoparium*. Already, midsummer, 1914, the silky tufts of the *Dicranum* are prominent among the dead *Polytrichum* plants which almost hid them before. Before the injured forms can regain their vigorous growth the *Dicranum* will have usurped most of their territory.

INDIANA UNIVERSITY, BLOOMINGTON, IND.

SULLIVANT MOSS SOCIETY NOTES

We regret to learn of the death of Dr. J. B. Leiburg, of Leaburg, Oregon, on October 28, 1913. The news has just come to hand, though very late. A further note will appear in a future number of THE BRYOLOGIST.

On the 9th of July, 1914, passed away William W. Calkins, at Berwyn, Illinois, born May 29, , of Scottish descent. The deceased was long a member of the Sullivant Moss Society. From early youth he manifested interest in natural sciences and later contributed important papers to scientific literature relating to his favorite studies. A versatile writer, he was a co-worker to a "Report on the Natural History of La Salle County of Illinois" his work covering geological, zoölogical, and botanical subjects; he also wrote a report on the Lichens of Florida, following an expedition to that state made conjointly with Dr. J. A. Eckfeldt, resulting in the discovery of interesting as well as new species that were determined by the late Dr. W. Nylander. He also published "The Calkins' Military Roster" and "The History of the One-hundred and fourth Regiment, Illinois Infantry" in which organization he had served throughout the Civil War. Kindred pursuits induced a correspondence of over twenty years with the writer, by whom the memory of the deceased is cherished as that of a brother botanist and comrade.

H. E. HASSE.

There will be a meeting of the Sullivant Moss Society, in connection with the Convocation week of the American Association for the Advancement of Science, on December 30th, in the Botanical Hall of the University of Pennsylvania. Further notice will be sent later to members.

NOTICE OF ELECTION OF SULLIVANT MOSS SOCIETY OFFICERS FOR 1915

Members are requested to send ballots *at once* to the Judge of Elections, Prof. J. F. Collins, 468 Hope St., Providence, R. I.; balloting closes on November 30, 1914.

For President—Dr. A. W. Evans, New Haven, Conn.

For Vice-President—Mrs. Annie Morrill Smith, Brooklyn, N. Y.

For Secretary-Treasurer—Mr. Edward B. Chamberlain, New York City.

A CORRECTION

In THE BRYOLOGIST for July, 1914 (Vol. 17, No. 4), on page 61, in Dr. Hasse's article, line 18, read *Lecania fluctigena*, and not *fructigena*.

EXCHANGE DEPARTMENT

Offerings—To Members Only, for Return Postage.

Miss Helen E. Greenwood, 5 Benefit Terrace, Worcester, Mass.—*Diplophylleia apiculata* Evans and *Eurynchium rusciforme* (Neck.) Milde, collected near Worcester, Mass.

Miss C. C. Haynes, Highlands, N. J.—*Targionia hypophylla* L., and *Metzgeria pubescens* (Schrank) Raddi, collected by A. S. Foster in Washington.

Dr. H. E. Hasse, Santa Monica, Cal.—*Dirina rediunta* (Stizenb.) A. Zahlbr., collected in California.

Mr. George B. Kaiser, 508 Locust Ave., Germantown, Pa.—*Cratoneuron filicinum* (L.) Roth, collected at Trenton Falls, New York.

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DEVOTED TO

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HEPATICS AND LICHENS

VOLUME XVIII

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1915



THE BRYOLOGIST

VOLUME XVIII, 1915

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ERRATA

Page 20, line 8, for *se* read *see*; line 18, for *Doelling ri* read *Doellingeri*.
 Page 23, line 10 from bottom, for *hanthoscarpa* read *xanthocarpa*.
 Page 25, line 20, for *Lopho ia* read *Lophozia*.
 Page 34, line 14, for *julaceous* read *julaceus*.
 Page 40, line 21, for 32 read 31.
 Page 41, line 31, for *pendulous* read *dichotomous*, also set this line to the

left so as to be coordinate with line 11, "Thallus erect."
 Page 64, lines 7 and 8 from bottom, for *Lobadium* read *Lopadium*; line 6 from bottom, for *Cetraris* read *Cetraria*.
 Page 79, line 7, for *Calypogea* read *calypogea*.
 Pages 81-96, September number, read 65-80.
 Page 90, line 14, insert 6. before *Dianthera* and center whole line.

JANUARY 1915

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
O. E. JENNINGS, Ph.D., Editor-in-Chief

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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh,
Pennsylvania, under the Act of March 3, 1879."
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THE BRYOLOGIST

Bimonthly Journal of
THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICAS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVII, 1898-1914, \$16.50.

TEN YEAR INDEX, \$1.00

Checks, except New York City, MUST contain 10 cents extra for collection fee. Manuscripts should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania. Forms close on the first of the month prior to that of publication. Subscriptions and advertisements should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania, or to Mr. Edward B. Chamberlain, 18 West 89th Street, New York City.

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THE BRYOLOGIST

VOL. XVIII

JANUARY, 1915

No. 1

NOTES ON NORTH AMERICAN SPHAGNUM. VI

A. LEROY ANDREWS

The Group *Cuspidata* Lindberg

The group-name *Cuspidata* was first used by Lindberg¹, though in an entirely unnatural sense. It was more naturally defined by Schliephacke² and has with the segregation of additional species and the fusion of Schliephacke's *Mollusca* (consisting of a single species) maintained itself to the present. The only changes I would make consist in the addition of the *Subsecunda* which are clearly derivative and not sharply separated and also of *Sericea* and *Mucronata* (the last not American). A character of the group based upon the resorption of membrane in stem-leaves and perichaetial leaves has already been noted. The one more commonly used is based upon the chlorophyll cells of the branch-leaves, which have normally a broader or exclusive exposure on the outer surface of the leaf, the opposite being the case in *Acutifolia*. This feature is not, however, of absolute diagnostic value, as we shall see. The cortical cells of the stem are as a rule less clearly set off than in other groups and the pores of the leaf-cells commonly reduced to something like a minimum, though certain species have evolved a more extensive pore-system, the pores being then frequently distinctive in number, size, shape and position, so that they have played a considerable role in the segregation of species. The stem-leaves average small and have a more or less distinctive appearance characteristic of the group. The branch-leaves vary much in size in the same species; they are often somewhat falcate-subsecund, in some cases undulate and with recurved tips; the pigmentation, if present, is always brown. With the exception of one species standing at the head of the group they are all dioicous, though they may occasionally be found fruiting, even abundantly. The group is characteristically boreal, but has in some of its forms achieved a more general, even cosmopolitan distribution and evidently through these developed a few distinctive non-boreal forms.

13. *Sphagnum Lindbergii* Schimper, 1858. Schimper's good description and plate of this species doubtless account in some degree for the fact that it presents no questions of priority or synonymy. It is, moreover, a quite distinct form and occupies an isolated position in its group, as did *S. Ångströmi* in the preceding one. It is immediately distinguishable from all other *Cuspidata* by the remarkably lacerate, fairly large stem-leaves, while it can be separated without difficulty from species with lacerate stem-leaves belonging to other groups by

¹ *Torfsmossornas byggnad* in Öfvers. kgl. Vet. Akad. Förhandl. Stockholm, XIX, 134f. 1862.

² Beiträge zur Kenntniss der Sphagna 413. 1865.

The November number of THE BRYOLOGIST was published November 24, 1914.

the chlorophyll cells of its branch-leaves. These will usually be found exposed only on the outer surface, although Schimper's original figure¹ shows something approaching an equal exposure on both surfaces, and the species does, in fact, show considerable variation in this particular, as do some others. Leaf-pores are not numerous nor large and are mostly confined to the ends of the cells, the most typical condition of the group, whose hyaline leaf-cells are always particularly long and narrow. Some plants show a remarkable development of pseudopores, particularly on the outer surface of the branch-leaves, but in others they are almost or entirely lacking. The leaves vary a great deal in size, also in apparent disposition on the branch, being sometimes clearly in five ranks, at others subsecund, etc., so that the plants may have a very different aspect as found in different localities, though a similarity of usually pronounced brown pigmentation combined with the characteristic habitat soon serve to render it recognizable. If there is any doubt, one can tear the branches from the stem and make out the lacerate stem-leaves with a hand-lens. The cortical cells of the stem are more distinctly set off with large cells and thin walls than in a number of species following, but may be collapsed or even eroded or resorbed, so that it is best to section well up toward the capitulum, a caution applying more or less to any species. The species is, as already suggested, the only one of the group known to be monoicous and often fruits abundantly. As early as the original description it was noted that its branches bearing antheridia may be pendent as well as spreading. This point is not of the greatest importance, however, as there is no sharp difference between the two. There are weaker and stronger spreading branches and weaker and stronger pendent ones, spreading ones that are pretty nearly pendent and pendent ones that are nearly spreading. Antheridia will not be found on the weakest branches of *S. Lindbergii* any more than on those of other species. The sterile prolongation of the branch beyond the antheridial catkin is weak, drooping, and clothed with leaves suggesting those of the weaker pendent branches. The perichaetial leaves show two kinds of cells only in their upper part and their apex is somewhat lacerate like that of the stem-leaves.

The plant is one of the far north and seems to flourish for example in Greenland, Labrador, and Alaska. Its stations in the United States are quite isolated and appear to be limited to two, the one on Mt. Whiteface of the Adirondacks of New York, where it was discovered (fruiting!) by Peck,² the other on Mt. Monroe of the White Mountains of New Hampshire, where it was collected by Faxon and distributed in the Eaton and Faxon *exsiccata* as nos. 82 and 83. A specimen in the Sullivant herbarium, which, according to label, came from the Austin herbarium and was collected on the slopes of the White Mountains of New Hampshire, appears to indicate a discovery of the White Mountain locality prior to that of Faxon, though the station is not mentioned by Lesquereux and James. It is remarkable that it has not been found on Mt. Katahdin in Maine. It might perhaps be sought also on the higher mountains of Washington or Mon-

¹ Versuch einer Entwicklungsgeschichte der Torfmoose, pl. XXVII, fig. 1. 1858.

² Cf. Lesquereux and James, Manual 15. 1884.

tana. In Europe and Asia it shows similar northern tendencies, occurring, however, in high mountain stations southward to the Alps. In Norway I have seen it on wet rocky mountain sides well up toward the tree-line or above it.

14. *Sphagnum riparium* Ångström, 1864. The record of this species is less clear than that of the one preceding, as it has, on the one hand, acquired a couple of European synonyms: *S. speciosum* (Russow) Klinggräff, 1872, and *S. spectabile* Schimper, 1876; while, on the other, many European bryologists have refused to accord it specific recognition, treating it usually as a variety of *S. recurvum*. It seems now, however, to be generally recognized and well defined, except that Limpricht as late as 1901¹ insisted upon a division into *S. riparium* and *S. speciosum* on the basis of a difference in the cortical cells of the stem together with one or two other characters. Against this procedure Warnstorf² took a vigorous stand, nor has it appealed to other botanists. The plant is quite distinct from the preceding in a number of characters, many of which have already been referred to: it normally lacks brown pigmentation; the branch-leaves when dry show strongly recurved tips, these tips when examined under the microscope displaying regularly a suppression of the empty hyaline cells in favor of uniform narrow cells with pitted walls; the pores in the side-regions differ decidedly, as will be described directly; the stem-leaves do not show extensive laceration, but have the membrane of the hyaline cells resorbed mostly on the inner surface, except as a resorption on the outer surface also in a limited middle apical part leaves the leaf with a characteristic longitudinal rent running inward some distance from the apex; most striking of all is a complete difference in stem-section, the present species showing cortical cells so similar to those next within that the cortex is usually spoken of as undifferentiated. This assimilation of cells is, be it said, a mutual one, in that not only are the cortical cells much longer, narrower and with thicker walls than usual, but the cells next within appear of greater diameter than usual, and, at any rate, do not have the very thick pigmented walls found in *S. Lindbergii* and in many other species. In this apparent homogeneity of stem-cells in *S. riparium* and the species most closely related to it I see no necessary reason to assume a primitive condition for *Sphagnum*, but rather the contrary. *S. riparium* is anyhow not very closely related to *S. Lindbergii* and it is rather from *S. recurvum*, which has the same condition of stem-cortex, that its distinction presents difficulties. These are not, however, great. Even where the two are growing together, a rare case represented in Eaton and Faxon's *exsiccata* no. 84, which, in the two sets now accessible to me, shows a good deal of *S. recurvum* and much less *S. riparium*, the plants of the two species can in the dry state be distinguished at once by the naked eye. The branch-leaves of *S. riparium* give the branches a characteristic turgescient effect, while the tips of the leaves appear very small by contrast and are simply strongly recurved without the leaf being undulate. In *S. recurvum*, on the other hand, the leaves are strikingly undulate except in the small-leaved variety which could hardly be confounded with *S. riparium*. If the leaves are examined individually

¹ Rabenhorst, Kryptogamenflora, IV, 3 621ff.

² Kryptogamenflora der Mark Brandenburg, I, 362f. 1903.

under the microscope one will see directly the reason for the different macroscopic appearance, in that those of *S. riparium* present a very concave enlarged basal part with relatively small, narrow, sharp-pointed tip in which the hyaline cells are suppressed, while in *S. recurvum* the leaves are quite lanceolate with undifferentiated tip. Even the pores show a decided difference, particularly in the middle and lower side-regions, where the hyaline cells in *S. riparium* have numerous pores much as in *S. teres* and *S. squarrosus*, this with other points of similarity suggesting a convergence of the two series *Squarrosa* and *Cuspidata* in the species *S. teres* and *S. riparium*. The stem-leaves show further a perfectly clear difference in that those of *S. riparium* are considerably larger than those of *S. recurvum* (averaging about 1.6×1.2 mm. as compared with $1 \times .8$ mm.), and the characteristic rent of the former is entirely lacking in the latter. The two species do not in any way intergrade with each other so far as I know, though the next species, *S. obtusum*, is quite intermediate between them. The perichaetial leaves of *S. riparium* differ from those of all the species hitherto discussed in being made up entirely of homogeneous narrow cells with pitted walls; the capsule is relatively small as compared with the customary robustness of the plant.

The species is perhaps rather more a swamp plant than *S. Lindbergii*, but is similarly one of the far north. It is not uncommon in Greenland, Labrador, and Alaska and might be looked for almost anywhere in British America; in the United States it has not been found elsewhere than in the White Mountains of New Hampshire, where Faxon collected it. (Nos. 86 and 87 of the Eaton and Faxon *exsiccata* are from Crawfords.) It is, however, not impossible that it may be found elsewhere in the northern tier of states. In Europe it extends southward to the Alps and it is reported from several stations in northern Asia.¹

15. *Sphagnum obtusum* Warnstorf, 1877. This species first recognized (though not at that time well described or clearly understood) by Warnstorf has become fairly well established, but its detection still presents difficulties. Its outward appearance is much that of *S. recurvum*, from which I would not undertake to distinguish it in the field. In the course of microscopic examination one may be led to suspect its identity by the lack of the rather large round pores usually found on the inner surface of the branch-leaves of *S. recurvum*. The conclusive test which we owe to Limpricht² involves the use of a stain. Since Russow the staining of *Sphagnum* for the demonstration of the leaf-pores has been rather insisted upon. As a rule I do not regard it as necessary and think that most pores can be made out as well if not better without it, though it may at times be of advantage as a check upon results. I have used for the purpose the stock laboratory solution of methylene blue in preference to the violet stain generally employed for *Sphagnum*. For the certain detection of *S. obtusum* the use of some stain appears indispensable. So stained the branch-leaves under high magnification show small round white spots on the membrane of certain of the hyaline cells, which I have referred to³ as "membrane-thinnings" because

¹ Cf. Jensen, Musci Asiae borealis, III, 14f. 1909.

² Rabenhorst Kryptogamenflora, IV, 1, 132. 1885, Cf. also Russow, Sphagnologische Studien, 103. 1819.

³ North American Flora, XV, 15. 1913.

of a difficulty in persuading myself that they were actual perforations, but Limpricht, Russow and Warnstorf are doubtless right in calling them indistinctly defined pores. These are entirely lacking in *S. recurvum* and bring the present species rather into relation with *S. riparium*, whose pores similarly appear in full detail only when the leaf is stained. Both species show the greatest pore-development in the middle side-regions; from here the pores extend over a greater or less part of the leaf's surface. *S. riparium* tends to show on the outer surface several pores in the upper part of the cell, sometimes merging to form a large elongated gap; on the inner surface the pores are numerous and rather large, particularly in the cells toward the edge of the leaf where they occur in rows along the commissures. In *S. obtusum* the pores are much smaller and generally less numerous, though they are subject to great variation in number and distribution and even in size; those on the inner surface are most difficult to make out. The specific rank of the plant seems indubitable: it lies quite midway between *S. riparium* and *S. recurvum*, but intergrades with neither, so far as my (limited) experience goes.

Although widely spread in Europe and reported from a number of localities in Siberia,¹ it seems as yet to be a decided rarity in North America. Macoun was able to report it from Algonquin Park in Ontario,² but of the scant specimen none remained behind in Ottawa, so that I am unable to confirm the identification. While examining the Greenland specimens of *Sphagnum* in the herbarium of Jensen at Hvalsö in Denmark in the summer of 1910, I noted a specimen collected by Berggren at Tessiursak in 1870 labeled *S. laricinum*³ which Herr Jensen and myself made out to be *S. obtusum*. I have since seen specimens from the same collection of Berggren in the herbaria of the museums of Stockholm and Copenhagen and note that H. Lindberg had already referred it to *S. obtusum*,⁴ along with another specimen collected by Berggren at Jacobshavn called *S. recurvum*. It is well to the northward then that this species may be looked for, but from its European distribution there is no reason to suppose that it should not occur at least as far southward as *S. riparium*.

To recur for a moment to *Inophloea*, I can record the finding of *S. erythrocalyx* in New Jersey in the summer of 1913. It was growing in quantity in the wet sand cleared of *Chamaecyparis* at the north side of Cedar Creek (Ocean County) where crossed by the automobile road near its mouth. This is the most northerly station for the species, unless Austin's station was at Manchester (Lakehurst), as is probable. It occurred in various forms from well-developed plants to stunted fruiting ones and was so distinctive in general appearance that its identity was immediately suspected. I noted plants of the same species mixed with another species collected on the shore of the same stream where

¹ Cf. Jensen, Musci Asiae borealis, III, 15. 1909. Arnell, Zur Moosflora des Lena-Tales, 25f. 1913.

² Catalogue of Canadian Plants, VII, 183. 1902.

³ That is *S. laricinum* in the sense of Ångström (= *S. Jensenii* H. Lindberg), not in the original sense of Spruce.

⁴ H. Lindberg, Bidrag till *Sphagnum Cuspidatum*-gruppen 19. 1899.

crossed by the Jersey Central railway further up. In this connection it may be of interest to note that the occurrence of *Sphagnum* species in New Jersey is likely to be fairly uniform along a given water-course, varying only insofar that some species require still water in the form of a natural or artificial pond; but it is entirely impossible to predict what will occur along a different water-course. In several days of the summer of 1913, with headquarters at Island Heights, I sectioned all of the water-courses from Toms River to Oyster Creek south of the three branches of Forked River, many of them at two and one at three points, which, added to the work in the same locality in the summer of 1911, brought out the above-mentioned facts in a striking way. These facts seem to show the difficulty of the conveyance of *Sphagnum* spores (many of the New Jersey species fruit there rarely if at all) across the stretches of dry pine-barrens, and thereby only increase one's wonder as to how such a remarkable number of species originally "got there" and what determined their present inexplicable irregularity of distribution. In the pond on the North Branch of Forked River by the Forked River railroad station *S. portoricense* was well established, but entirely without the companions, *S. Pylaesii* and *S. cyclophyllum*, in its station at Toms River.

ITHACA, N. Y.

REVISED LIST OF HEPATICS COLLECTED IN AND NEAR WORCESTER, MASSACHUSETTS

HELEN E. GREENWOOD

A preliminary list of Hepatics collected within the limits of Worcester, Massachusetts, by Miss Helen E. Greenwood, was printed in the January BRYOLOGIST for 1910. Since that time the collector, having gone farther afield, has increased the number of specimens sufficiently to make it seem worth while to print a revised list. As before, all the Hepatics listed below have been collected by Miss Greenwood, either in Worcester or in the nearby towns. The accompanying notes indicate whether the plants occur in large or small numbers.

Comparison with the former list will show that *Cephalozia serriflora*, which appeared before, has been withdrawn, not only because it has not been found a second time, but also because there has arisen some doubt as to the correct naming of the specimen in the first place. For a time it seemed certain that *Cephalozia lacunculata* and *Cephalozia macrantha* might find a permanent place on the list, one authority being sure that an authentic specimen of each had been found; but lack of agreement among those consulted makes it undesirable to include these in the main list at present. Of the 62 different species listed below there are only four that can lay any claim to rarity or distinction of any kind. Of these, *Nardia Geoscyphus* at the time it was sent into the Society Herbarium, had been collected only three times previously in the United States, thus making Worcester the fourth station.

Jungermannia pumila, *Mylia anomala*, and *Cephalozia fluitans* were new additions to the Massachusetts list.

Three very dry spring and summer seasons in succession have done much to reduce the amount of the more abundant species, so that, although the plants may be found in the same place year after year, it becomes increasingly difficult to collect enough of any one kind for distribution or for class work.

As before, hearty thanks are due to Miss Haynes and Dr. Conklin for their unfailing encouragement and painstaking assistance in determining specimens. Duplicates of all species listed below have been sent to the Society Herbarium.

The arrangement of names follows the plan of Miss C. C. Haynes's Exchange List of the Hepaticae of the United States and Canada.

Ricciaceae

1. *Ricciella fluitans* (L.) A. Br. Found only once, floating on a slow stream, Worcester near Boylston line.

2. *Ricciella Sullivantii* (Aust.) Evans. Common. Damp soil; edge of ponds from which water has receded, springy roadsides, borders of pathways. Worcester, Leicester, Auburn, Oxford, Holden.

3. *Ricciocarpus natans* (L.) Corda. Floating on ponds, growing on mud. Occurs abundantly on parts of Lake Quinsigamond, Worcester.

Marchantiaceae

4. *Asterella tenella* (L.) Beauv. Moist grassy soil by edge of drive and in open woodlot. Leicester, Auburn.

5. *Conocephalum conicum* (L.) Dumort. Quite common. On shaded banks by roadsides or along brooks, forming a thick mat over soil or stones. Worcester, West Boylston, Leicester.

6. *Lunularia cruciata* (L.) Dumort. In greenhouses. Worcester.

7. *Marchantia polymorpha* L. Fairly common. Damp soil: gardens, woods, edge of pond, bank wall of city street, especially where ground has been burned over. Worcester, Auburn, Holden.

Metzgeriaceae

8. *Riccardia latifrons* Lindb. On rotten logs, wet soil in swamp with mosses. Oxford, Holden (North Woods).

9. *Riccardia multifida* (L.) S. F. Gray. Wet swampy soil with mosses. Holden.

10. *Riccardia pinguis* (L.) S. F. Gray. Swamps: standing pools with mosses. Worcester.

11. *Pallavicinia Lyellii* (Hook.) S. F. Gray. Quite common. Swamps, forming thick mats. Worcester, Holden, Oxford.

12. *Pellia epiphylla* (L.) Corda. Very common. Moist soil along banks of brooks, springy roadsides, boggy soil in pastures. Worcester (many places), Oxford, Auburn, Holden, Princeton.

13. *Blasia pusilla* L. Damp soil by roadsides. Worcester, Oxford, Holden.

14. *Fossombronia foveolata* Lindb. Damp grassy soil in woodlot, recently cut. Leicester.

Jungermanniaceae

15. *Nardia crenulata* (Smith) Lindb. Common. Damp soil: on roadsides, shaded paths in woods. Worcester, Oxford, Holden.

16. *Nardia Geoscyphus* (DeNot.) Lindb. Damp shaded ground, pathways. Worcester (two places). Worcester, fourth station in the United States for this species.

17. *Nardia hyalina* (Lyell) Carringt. Wet boggy soil. Oxford.

18. *Jungermannia lanceolata* L. Damp shaded banks. Worcester.

19. *Jungermannia pumila* With. On stones in bed of brooks, sometimes on wet soil near edge of brook. Worcester, Leicester, Oxford. New to Massachusetts.

20. *Jamesoniella autumnalis* (DC.) Steph. Quite common. Forming a thick mat or layer on damp soil, rocks, or rotten logs. Worcester, Oxford, Shrewsbury, Leicester.

21. *Lophozia barbata* (Schreb.) Dumort. On rock, at edge of carriage drive. Mt. Wachusett, Princeton.

22. *Lophozia bicrenata* (Schmid.) Dumort. Shaded banks by roadside or pathway. Leicester, Holden.

23. *Lophozia incisa* (Schrad.) Dumort. On damp shaded banks. Worcester.

24. *Plagiochila asplenioides* (L.) Dumort. Very wet soil, shaded, rocks in bed of brook. Worcester, Leicester.

25. *Mylia anomola* (Hook.) S. F. Gray. With sphagnum in quaking bog. Holden. New to Massachusetts.

26. *Lophocolea heterophylla* (Schrad.) Dumort. Very common. On old stumps, soil of roadside banks, shaded banks, damp soil in woods, base of trees, rotten logs.

27. *Chiloscyphus pallescens* (Ehrh.) Dumort. On stones in bed of brook. Worcester, Holden.

28. *Chiloscyphus polyanthus* (L.) Corda. On wet swampy soil with mosses, in bed of brook, submerged. Worcester.

29. *Chiloscyphus rivularis* (Schrad.) Loeske. On rocks in bed of brook, submerged. Worcester, Holden.

30. *Harpanthus scutatus* (Web. & Mohr) Spruce. On rotten logs. Worcester.

31. *Geocalyx graveolens* (Schrad.) Nees. Damp soil near edge of brooks, swamps, rotten logs. Worcester, Holden.

32. *Cephalozia bicuspidata* (L.) Dumort. Damp shaded soil in woods. Worcester, Holden.

33. *Cephalozia connivens* (Dicks.) Lindb. Wet swampy soil with mosses. Worcester (several places).

34. *Cephalozia curvifolia* (Dicks.) Dumort. On rotten logs. Worcester, Auburn, Rochdale.

35. *Cephalozia fluitans* (Nees) Spruce. In quaking bog. Holden. New to Massachusetts.

36. *Cephalozia media* Lindb. Very common. Rotten logs, damp shaded ground. Worcester, Holden, Oxford, Leicester.

37. *Cephalozia pleniceps* (Aust.) Lindb. Wet swampy soil. Worcester, Holden.

38. *Cephaloziella bifida* (Schreb.) Schiffn. Decaying stumps. Worcester.
39. *Cephaloziella byssacea* (Roth) Warnst. Damp ledges. Oxford.
40. *Odontoschisma denudatum* (Mart.) Dumort. On decaying stump.
Holden.
41. *Calypogeia Neesiana* (Massal. & Carest.) C. Müll. Frib. Wet swampy
soil. Worcester, Holden.

[To Be Concluded].

LEPTOBRYUM PYRIFORME (L.) WILSON, WITH GEMMAE

A. J. GROUT



FIG. 1.—*Leptobryum pyriforme* with gemmae. Plants from Miami University. x 10

In January last C. A. Richards, of Miami University, sent me a moss from one of their greenhouses that bore numerous brood bodies in the axils of the leaves. "The plants grew on a loose sandy soil with which some cinders had been mixed. They were very plentiful, but did not grow in tufts as most mosses do. The stalks were more or less separated."

A careful study of the plants showed them to be *L. pyriforme*. So far as I know this state of the species has not been recorded in North America before, although it has been described by Correns and other European botanists and our own Mr. Heald.

Leptobryum pyriforme in its sterile state is apparently common in greenhouses, but is so different in appearance from the fruiting form as to be recognized only occasionally. Probably it will not be difficult to find the form bearing brood bodies in other localities. A photograph of the Miami plants ($\times 10$) accompanies these notes.

NEW DORP, N. Y., NOV., 1914.

FONTINALIS UMBACHII CARDOT

E. J. HILL

This water moss was described by Cardot from material found in the Des Plaines River at Romeo, Illinois, by Prof. L. M. Umbach. It was published, together with a plate, in the Minnesota Botanical Studies under the caption "Two new species of *Fontinalis*," the other being *F. Holzingeri* Card. I have never seen any mention of it in the BRYOLOGIST. The name does not appear in the Ten-Year Index by Mrs. Smith, nor do I find it in any volume not covered by it. Having collected it in the type locality and since then in two more streams in the neighborhood, some account may be acceptable to bryologists, as it is said by M. Cardot to occur in localities farther north in Minnesota and Wisconsin, and is, therefore, likely to be met with by others. Since the Minnesota Botanical Studies may not be very accessible to all readers of the BRYOLOGIST, I will include a translation of the Latin description of Cardot.

"*Fontinalis Umbachii* Cardot.* Dry plant rather rigid, dark below, lurid-green above. Stem denuded at base, 7-15 cm. long, irregularly pinnate, the branches remote, spreading or erect-spreading, the point cuspidate. Leaves somewhat rigid, erect-spreading, convolute-imbricate at the apex of the stem and branches, dimorphous; cauline large, oblong-lanceolate, gradually broadly and obtusely acuminate, entire, about 5 mm. long, 1.5-1.75 broad at base; branch leaves much smaller, somewhat close, a little curved and sub-homomallous at the apex of the branches, narrowly lanceolate, canaliculate as usual by inflexed margins, gradually obtusish-acuminate, entire, 3-4 mm. long, 0.5-0.75 wide at base. Alar cells subquadrate or subhexagonal, slightly dilated, the others linear, subflexuose, moderately chlorophyllose, the thickish walls quite firm, the upper shorter. Fruiting part unknown."

The author adds that he recognized in his herbarium some stems of the same species collected in 1895 by Prof. Conway MacMillan in northern Minnesota near the International Boundary. He also compares it with *F. Missourica* Card., which it closely approaches, but from which "it is easily distinguished by its shorter and rather rigid stems, its more shortly acuminate stem leaves, which are narrower at base and entire at apex."

Though I received from Prof. Umbach a specimen from his type collection, the type locality was not visited till June, 1906. It is at the head of an island (Isle la Cache of the early French voyageurs), which, at this point, divides the Des Plaines, the western channel of which usually becomes almost dry in summer. The shallow water of the river flows over a limestone bed with pieces of loosened rock or boulders from the bordering drift scattered over it. To these

*l. c. Third Series, Part II. 129. 1903.

and to the irregularities in the surface of the bed the moss clings, its stems frequently becoming dry and exposed as the water falls away. Some of my collection made at this time was more robust than that given in the description by Cardot, the stems running from 8–25 cm. long, the stem leaves $4.5\text{--}5.4 \times 1.2\text{--}1.6$ mm., the branch leaves $3.5\text{--}4.2 \times .85\text{--}1$ mm. Those of the stems are gradually pointed, acutish, entire; those of the branches similar, but some obscurely denticulate.

In 1911 another station for it was found in a narrow gorge made in the limestone by a stream that enters "The Sag" at Sag Bridge, about 12 miles southwest of Chicago. "The Sag" is a depression or valley that marks the course of one branch of the outlet of the Glacial Lake Chicago, when the waters of the upper lakes flowed southward through the valley of the Des Plaines and Illinois rivers. Sag Bridge is 10 miles northeast of Romeo. The little brook is commonly dry in summer, or without running water, but the bed is generally moist from the presence of occasional pools and from the deep shade of its vertical sides and overhanging trees and bushes. The moss adheres to the stones in its bed, roughened by holes and shelves in the rock, made by the rapid current. It was intimately associated with *Octodiceras Julianum* (Savi) Bridel., the two much intermixed in their growth.¹ Being a very slender form, the stems usually 4–8 cm. long (the longest noted being but 13 cm.) with correspondingly smaller leaves that were more acute and generally denticulate at the point, I was in doubt about its identity with the moss at Romeo. Some specimens were, in consequence, sent to M. Cardot, who pronounced them a form of *F. Umbachii*, differing mainly in the sharper and more denticulate leaves. Specimens were also sent to Rev. C. H. Demetrio, Emma, Missouri, to compare with *F. Missouriica*. Examples of this and of *F. filiformis* Sull. & Lesq. were kindly forwarded to me by him, so that I could make comparisons. The form at Sag Bridge quite closely approaches *F. Missouriica* in its slender stems (probably due in the main to rather starved conditions of growth), and in its more pointed, slightly denticulate leaves, but they are more canaliculate, becoming quite tubulose on the branches, so that at the tip they are long-pointed, some almost setaceous.

Soon after I came upon the moss in a third station, while examining the plants of Long Run, a creek which once flowed directly into the Des Plaines a mile or two below Romeo, but now into the Illinois and Michigan Canal which cuts it off from the river. The station is about three miles above the mouth of the creek. The stream is perennial from this point down, being fed by numerous springs. Though the bed is in limestone farther down, here it is in the drift, but well supplied with gravel and large water-worn pebbles from the morainic hills in close proximity, the mass of which is limestone or Joliet gravel. At the place where the moss was most abundant the pebbles were so numerous and heaped together as to form a little rapid. Here it clung to the stones in large wads. For a short distance below it adhered to those scattered in the deeper and more quiet waters. A careful search for a long distance below,

¹ In 1909 I found a similar close association of *Octodiceras* with *Fontinalis Novae-Angliae* Sulliv. in a woodland streamlet about a mile west of Saegerstown, Pa.

though not to its mouth, revealed no more stations for it. The stems were of unusual size, the longest noted 40 cm. long, but commonly 15-30 cm. Examples of this were likewise sent to M. Cardot, who stated in a letter that similar robust forms had been sent by Cheney from northern Wisconsin. The leaves were about the same in size as those from the type locality at Romeo, entire or slightly denticulate at the point. The stems are much divided, a single one when separated from the mass and floated so as to display its form showing a surprising number of branches to be held by the hair-like basal part. The longest and most divided were found in the most rapid current. In cross-sections the stem is broadly oval, the shorter diameter commonly from 0.2-0.4 mm., the longer from 0.25-0.55 mm. The rind is of dark brown, very thick-walled cells, their lumen often nearly closed or entirely disappearing, the outermost cells usually the more open ones. The ground-tissue consists of large, thin-walled, open cells, tinged with yellow. The central strand is lacking, or none was found as far as examined. The stem seems well constructed to bear longitudinal strain, and to yield to compression laterally as it waves about in the running water. It generally curves a little at the base so as to bring it parallel with the surface of the substratum, sometimes as much as a centimeter. This portion is also densely covered with brown rootlets, 18-30 μ in diameter, by means of which it holds to the stone. In some cases it is reenforced by one or two short branches, covered like the end of the main stem with rootlets, in this way forming a kind of foot to anchor it. Since several stems, when growing in such masses, generally start from closely adjacent points, their interlocking basal parts form a meshwork resembling a felty disk when removed from the rock, in this manner doubtless aiding one another in maintaining their hold.

From all at present known, *F. Umbachii* is of northern distribution, being found in the region of the upper Great Lakes and adjacent parts of the basin of the Mississippi. Even the localities of the three stations near Chicago may date from the time when they made a part of the lake system, and the upper lakes were drained southward through the Chicago outlet.

CHICAGO, ILLINOIS.

SULLIVANT MOSS SOCIETY

Report of the President

The President is able to report a continued interest in the work of the Sullivant Moss Society on the part of its members. Under the careful editorship of Dr. O. E. Jennings, the BRYOLOGIST has maintained the high degree of excellence which the Society has been led to expect. The current volume, exclusive of the index, numbers 96 pages and is, therefore, of the same size as the preceding volume. Twenty-five original articles and two obituary notices have been published during the year; the illustrations include thirteen plates and seventeen figures in the text. Of the original articles seven relate to the mosses, seven to the hepatics, and eleven to the lichens. The articles on the mosses were written by seven different contributors, those on the hepatics by five, and those on the lichens by four. These figures, if compared with the corresponding

figures of 1913, show an increased interest in the hepatics and lichens and a slightly diminished interest in the mosses. The President renews his congratulations to the Society and predicts that the work accomplished will continue to increase in importance.

ALEXANDER W. EVANS, *President.*

NEW HAVEN, CONNECTICUT.

Report of the Secretary-Treasurer

During the past year the following new members have been added to our lists: Mr. E. T. Cresson, Jr., Academy of Natural Sciences, Philadelphia, Pa.; Mr. Roy S. Latham, Orient, N. Y.; Mrs. J. F. Merrill, Northwood Narrows, N. H.; Miss Mildred Nothnagel, Botanical Hall, University of Chicago, Chicago, Ill.; Prof. Fermen L. Pickett, 610 California Avenue, Pullman, Wash.; Miss Edith Seymour, 23 Agassiz Avenue, Waverley, Mass.; Dr. Victor Sterki, New Philadelphia, Ohio; Mr. E. C. Wurzlow, Box 656, Houma, Terrebonne Parish, La.

There has been a loss of six members, through death or withdrawal, during the past year, making the active membership of the Society at present one hundred thirty-seven.

Through the columns of the BRYOLOGIST there have been offered twenty species or varieties of lichens, nineteen of mosses, and six of hepatics. There is, however, an apparent decrease in the demand for offerings, a decrease which does not seem in any way to be correlated with the kind of material, whether common or rare. The Secretary cannot urge too strongly upon the members the advantages of the opportunity presented to them of securing rare or interesting specimens for their herbaria, at a minimum of trouble and expense.

The Secretary also urges members and others to contribute to the columns of the BRYOLOGIST short notes, observations, and queries. Each member can surely find some one thing in the course of a year that will be of interest to others. Notes upon the time of fruiting, unusual habitats, abnormal abundance, all furnish material for notes. Short articles of especial interest to beginners will be especially welcomed.

The financial statement appended below shows a considerable increase in expense over former years, due in large part to the increase in the number of plates and to certain typographic difficulties. It is hoped that such difficulties may be avoided in the future. There has been a gratifying increase in the sale of sets of the magazine. Those who have not complete files are urged to secure them at an early date, especially the volumes I-VIII, which contain the detailed articles for the help of those who wish to begin the study of mosses, hepatics, or lichens.

Summary of Accounts

RECEIPTS

Balance on hand, Dec. 1, 1913	\$109.15
Dues for current year.....	208.38
Subscriptions for current year.....	64.38

Arrears collected, dues and subscriptions.....	12.39
Sales of back numbers, files, etc.....	107.95

\$502.05

EXPENDITURES

Bank fees.....	\$2.32
Messrs. Peckham and Little, printing and stationery.....	4.20
Postage.....	11.88
Express on shipments of the BRYOLOGIST.....	2.34
Dr. H. E. Hasse, herbarium expenses.....	6.90
Pittsburgh Photo-Engraving Co., plates.....	68.75
Intelligencer Printing Co., 7 issues BRYOLOGIST, and Index.....	363.16

\$461.13

Cash on hand at close, Nov. 30, 1914.....	40.92
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\$502.05

Respectfully Submitted,
EDWARD B. CHAMBERLAIN *Secretary-Treasurer*

Report of the Curator of the Moss Herbarium for 1914

During the past year 343 specimens have been mounted in the Moss Herbarium of the Sullivant Moss Society, adding 15 species and varieties new to the herbarium, which now contains 3,803 specimens, representing 1,160 species and varieties belonging to 253 genera.

Dr. H. S. Jewett has sent valuable collections from Ohio, while other contributors have been: E. Corti, Max Fleischer, A. H. Brinkman, H. E. Hasse, H. Dupret, S. C. Hood, Helen E. Greenwood, Mrs. E. L. Horr, S. H. Burnham, W. Gray, D. L. Dutton, F. L. Pickett, I. Hagen, Roy Latham, E. M. Dunham, Daisy J. Levy, and Brother Victorin. The Curator thanks these and all other members who have co-operated in building up the herbarium and earnestly solicits renewed activity in collecting, correspondence, and exchange during the ensuing year.

GEORGE B. KAISER, *Curator.*

GERMANTOWN, PA., DEC. 1, 1914.

Report of the Hepatic Department for 1914

Two hundred and eight specimens, representing ninety-five species, have been placed this year in the Hepatic Herbarium. These specimens were given by Miss A. Lorenz, Miss C. C. Haynes, Miss H. E. Greenwood, Dr. A. W. Evans, Dr. A. F. Krout, Dr. N. S. Young, A. S. Foster, Roy Latham, Bro. Victorin, Rev. D. Lillie, and Stewart H. Burnham. The Brinkman collections from N. W. Canada, of which several hundred specimens still remain, are not quite ready to be included in the report this year. Among the material submitted were the following new or rare species:

Riccia Lescuriana, *Ricciella membranacea*, *Oxymitra androgyna*, *Notothylas orbicularis*, *Calypogeia Sullivantii*, *C. suecica*, *Cephaloziella papillosa*, *C. Francisci*, *Chiloscyphus pallescens*, *Lophozia Marchica*, *L. Binsteadii*, *Plagiochila*

Zachuařana, *P. dubia*, *Nardia Geoscyphus*, *Fossombronia Wondraczeki*, *Pellia Fabroniana*, *Pallavicinia Flotowiana*, and *Metzgeria pubescens*.

Will the members interested in the hepatics help the Curator during 1915 to acquire as complete a representation of North American species as possible? Few realize that the Herbarium still lacks 110 of the species listed in the Society "Exchange List." Some of the species, it is true, are rare and known only from a single collection, like *Jungermannia danicola* and *J. Bolanderi*, but surely there are many on the list given below of species desired, which could be found anew, or specimens already possessed could be divided and given to the Herbarium. Some of these species are represented in the Herbarium by European material, but none from North America. This is a real need. The following species are desired:

Riccia albida, *R. californica*, *R. Campbelliana*, *R. Catalinae*, *R. dictyospora*, *R. hirta*, *Corsinia marchantioides*, *Sauteria alpina*, *Plagiochasma Wrightii*, *Grimaldia californica*, *Asterella Bolanderi*, *A. echinella*, *A. elegans*, *A. fragrans*, *A. Lindenberghiana*, *A. violacea*, *Marchantia disjuncta*, *M. aquatica*, *Thallocarpus Curtisii*, *Sphaerocarpus cristatus*, *S. texanus*, *Geothallus tuberosus*, *Riella americana*, *Metzgeria myriopoda*, *M. angusta*, *M. uncigera*, *Pallavicinia Blyttii*, *Fossombronia cristula*, *F. angulosa*, *Gymnomitrium coralloides*, *G. crenulatum*, *Marsupella sparsifolia*, *Nardia Lescurii*, *Jungermannia biformis*, *J. Bolanderi*, *J. danicola*, *J. fossombronioides*, *Anastrophyllum Reichardtii*, *Lophozia Wenzelii*, *Mesoptychia Sahlbergii*, *Sphenobolus saxicola*, *Plagiochila Smallii*, *P. virginica*, *Clasmatocolea exigua*, *Lophocolea Leiboldii*, *Chiloscyphus Webberianus*, *C. fragilis*, *Cephalozia elegans*, *Prinobolus Turneri*, *Odontoschisma Sphagni*, *O. Macounii*, *O. Gibbsiae*, *Calypogeia acuta*, *C. arguta*, *C. fissa*, *Anthelia julacea*, *Diplophylleia argentea*, *D. imbricata*, *Scapania americana*, *S. convexula*, *S. irrigua*, *S. Evansii*, *S. gracilis*, *S. heterophylla*, *S. intermedia*, *S. uliginosa*, *Radula Hallii*, *R. Lescurii*, *R. Sullivantii*, *Porella Swartziana*, *P. wataugensis*, *Cololejeunea setiloba*, *C. minutissima*, *C. Macounii*, *C. diaphana*, *Displasiolejeunea Rudolphiana*, *Lejeunea patens*, *L. piliboa*, *L. spinulosa*, *Microlejeunea Ruthii*, *M. Cardoti*, *Thelejeunea obtusangula*, *Leucolejeunea xanthocarpa*, *Rectolejeunea Berteroana*, *R. Brittoniae*, *Cheilolejeunea decidua*, *C. polyantha*, *Ceratolejeunea cubensis*, *Brachiolejeunea bahamensis*, *B. corticalis*, *Lopholejeunea Muelleriana*, *Caudalejeunea Lehmanniana*, *Leucolejeunea unculoba*, *Frullania cobrensis*, *F. arietina*, *F. Donnellii*, *F. chilcootiensis*, *F. gibbosa*, *F. Kunzei*, *F. saxicola*, *F. Wrightii*, *F. cucullata*, *Notothylas Breutelii*, *Anthoceras carolinianus* var. *occidentalis*, *A. crispulus*, *A. Hallei*, *A. Macounii*, *A. phymatodes*, *A. Ravenelii*, and *A. fusiformis* var. *stomatifer*.

GEO. H. CONKLIN.

SUPERIOR, WISCONSIN, Dec., 1914.

Report of the Lichen Department for 1914

The prosperity in this department set forth in the reports of former curators has happily not abated during the past year, due to generous contributions of material received from various members. Prof. O. E. Jennings sent valuable specimens from Ontario, Canada, collected by himself, Grace K. Jennings, and

R. H. Daily. Mr. S. Rapp has, as usual, sent interesting Florida lichens, likewise Mr. E. C. Wurzlow from Louisiana; the Northwest and North have been well represented by Prof. A. S. Foster and Bro. Victorin, as also the East by Messrs. L. D. Dutton, Frank Dobbin, R. Latham, G. B. Kaiser, and E. B. Chamberlain. Miss Mary F. Miller added a good number of named species, also Charles C. Plitt. From Scotland and England Mr. P. G. M. Rhodes and Rev. D. Lillie must be mentioned with good donations, while the present curator is immodest enough to record himself with European and Mexican species, as also native Californian, a number of which are new. The number of specimens received for identification is 492; these, with the exception of a number from Mr. S. Rapp that await a more critical investigation, have been named. The number now mounted in the herbarium is 2817. Attention is called to a fair amount of duplicates on hand available to members (for postage) or as exchanges to others. Exchanges with foreign Lichenists is desirable. In this connection it is begged to remark that in collecting, only complete, well developed, representative, and when possible, fruiting specimens, should be selected, since they represent not only the Society, but also the collector in exchanges.

H. E. HASSE, *Curator.*

SANTA MONICA, CALIFORNIA.

Report of Election of Officers for the Year 1915

Whole number of votes cast, 11.

For President—Dr. A. W. Evans received 11 votes.

For Vice-President—Mrs. Annie Morrill Smith received 11 votes.

For Secretary-Treasurer—Mr. E. B. Chamberlain received 11 votes.

Dr. Evans, Mrs. Smith, and Mr. Chamberlain are, therefore, elected to the offices designated for the ensuing year.

Respectfully submitted,
J. FRANKLIN COLLINS, *Judge of Elections, S. M. S.*

EXCHANGE DEPARTMENT

Offerings— To Members Only, for Stamped Self-Addressed Envelope.

Miss Helen E. Greenwood, .5 Benefit Terrace, Worcester, Mass.—*Porella pennata* L., from Worcester, Mass.

Geo. H. Conklin, M. D., 1204 Tower Ave., Superior, Wisconsin.—*Lophozia incisa* (Schr.) Dumort., from Lutsen, Cook County, Minnesota.

Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pa.—*Hymenostylium curvirostre* (Ehrh) Lindb., from near Pittsburgh, Pennsylvania.

Dr. H. E. Hasse, Santa Monica, Cal.—*Dirina Hassei* A. Zahlbr., from California.

A NEW edition of the Naturalists' Directory has recently been issued by S. E. Cassino, Salem, Mass. This directory is invaluable to naturalists, since it is a means of bringing together students and collectors in all parts of the world through correspondence. It contains an alphabetical list of English speaking professional and amateur Naturalists in all parts of the world, also a list of Scientific Societies and Periodicals. The price of the Directory is \$2.50 in cloth binding, and \$2.00 in paper binding. Sent postpaid. Address as above.

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MARCH 1915

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
O. E. JENNINGS, Ph.D., Editor-in-Chief

Associate Editors

ABEL JOEL GROUT, Ph.D.
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ALEXANDER W. EVANS, Ph.D. LINCOLN W. RIDDLE, Ph.D.
and the

Advisory Board Officers of the Society

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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh,
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THE BRYOLOGIST

Bimonthly Journal of
THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVII, 1898-1914, \$16.50.

TEN YEAR INDEX, \$1.00

Checks, except New York City, MUST contain 10 cents extra for collection fee. Manuscripts should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania. Forms close on the first of the month prior to that of publication. Subscriptions and advertisements should be sent to Dr. O. E. Jennings, Carnegie Museum, Pittsburgh, Pennsylvania, or to Mr. Edward B. Chamberlain, 18 West 89th Street, New York City.

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THE BRYOLOGIST

VOL. XVIII

MARCH, 1915

No. 2

THE PHILADELPHIA MEETING OF THE SULLIVANT MOSS SOCIETY

According to the announcement in the November issue of *THE BRYOLOGIST*, the Sullivant Moss Society held its eleventh public meeting in the Botanical Hall of the University of Pennsylvania on December 30, 1914, during Convocation Week of the American Association for the Advancement of Science. Over forty members and visitors were present at the two sessions.

The forenoon session was wholly informal, giving those present a chance to examine the various exhibits that had been prepared by members of the society. Mr. G. B. Kaiser had a large representation of specimens from his own herbarium and from that of the society, and Dr. H. E. Hasse sent a suite of West-Coast lichens. These were arranged upon tables around the sides of the room, so as to facilitate leisurely observation and comparison. The Worcester Moss Club sent a number of mounted specimens of species collected by the members, especially Mrs. Ella L. Horr and Mrs. Frank C. Smith, Jr., and a beautiful series of photographs of mosses and hepatics made by Miss Helen E. Greenwood. Mrs. Annie Morrill Smith sent her collection of photographs of bryologists and lichenologists, and a number of the original drawings and proofs for *THE BRYOLOGIST*. Mrs. Elizabeth G. Britton had on exhibition large drawings of Bermudian mosses to illustrate her paper for the afternoon session. There was, also, a very interesting herbarium case, once the property of William S. Sullivant, which was presented to the Society some years ago through the generosity of Dr. W. G. Farlow. This case was used by Sullivant to contain mounted specimens and is in the form of an oblong box, with a sliding back and double sides, all covered with soft, brown leather. Inside there are some of the original green genus covers, and the soft, white sheets between which the specimens were laid. These still bear the species names in Sullivant's handwriting. Miss Annie Lorenz had with her for exhibition a book of drawings, illustrating all the species of New England hepatics, and Mr. S. L. Schumo had a collection of microscopic slides showing various features of plant life, which he personally displayed and explained.

Dr. Alexander W. Evans presided at the afternoon session, which was taken up with the formal program. The first paper was by Mrs. Elizabeth G. Britton on the Mosses of Bermuda. Mrs. Britton gave a short account of the physical features of the island, deploring the rapid inroads that market gardening is making upon botanically productive localities, and outlined the recent explorations made by members of the New York Botanic Garden. The Challenger Expedition recorded eight species of mosses from Bermuda; at present the total is twenty-six species in twenty genera. Of these, *Trichostomum bermudianum* and *Campylopus bermudianus* are endemic, eight are cosmopolitan, six

North American, and ten tropical or subtropical in their relations. The paper will be published in the Bulletin of the Torrey Botanical Club. Dr. Alexander W. Evans next read a paper upon the Mexican Species of *Plagiochasma*, illustrating the main features of different sections of the genus by blackboard sketches and outlining the distribution of the species. One of these reaches Texas, the majority being Mexican or West Indian. The paper will appear in the Bulletin of the Torrey Botanical Club, under a slightly altered title.

Mr. E. B. Chamberlain then read a paper prepared by Prof. John M. Holinger giving extracts from a letter recently received from M. Jules Cardot, the eminent French bryologist, also a paper by Miss Caroline C. Haynes upon the hepatics collected in Florida by Mr. Severin Rapp. Both of these papers will appear in *THE BRYOLOGIST*. The illustrated talk upon Collecting near the Continental Divide, which had been promised by Dr. A. J. Grout, had to be omitted owing to the author being taken ill at the last moment. Mr. G. B. Kaiser gave an informal talk upon the mosses and hepatics that occur in the immediate vicinity of Philadelphia with especial reference to their distribution and abundance, following which Miss Annie Lorenz read an article enumerating the species of hepatics which are to be expected in New England, in addition to the many already known from that region. Miss Lorenz indicated the distribution as at present known, and the soil preference for each species, and showed why it was to be expected within the New England region. This paper also will appear in an early issue of *THE BRYOLOGIST*. Dr. Otto E. Jennings then exhibited a fine series of lantern slides showing the vegetation and ecological conditions in the vicinity of Pittsburgh, Pa., explaining in detail the influence that these factors have upon the moss-flora and upon the abundance or rarity of species. It is to be hoped that Dr. Jennings will some day prepare a paper for *THE BRYOLOGIST* upon the same topic. The last paper of the program, "Notes upon the Primitive Uses of Lichens," by Mr. G. K. Merrill, was read by Mr. Chamberlain. Mr. Merrill mentioned the uses of lichens as food, as illustrated by the Laplanders, the "manna" of Arabia and Northern Africa, and the "rock tripe" at times resorted to by Arctic travelers. He also mentioned the curious uses of lichens in the early pharmacopoeias and the valuable dyes that were formerly obtained from certain species, a use which still survives in the case of litmus. This paper is published in the Bulletin of the Josselyn Botanical Society of Maine, Number 5.

At the close of the formal session, those present were the guests of the Philadelphia Botanical Society at a tea in the Library of the Botanical Building, where a jolly hour was spent.

On Thursday morning, December 31, nine members gathered for a walk through a part of the Wissahickon Valley in Germantown. In spite of cool air and slippery paths, a most enjoyable time was experienced, and many interesting species noted.

In connection with the meeting especial thanks are due to Mr. G. B. Kaiser for his labor in making the surroundings so pleasant and in attending to the multitude of details. The Secretary feels this the more keenly, since it was from

his own shoulders that the burden was lifted. All present also feel that they are greatly indebted to the ladies of the Botanical Society, who, through their kind and thoughtful attention, did so much to make visiting members feel thoroughly at home. The Botanical Department of the University has also placed the Society under great obligations for the courteous loan of the lantern and operator, as well as for the use of rooms in the Botanical Hall.

EDWARD B. CHAMBERLAIN, *Secretary*.

NEW YORK CITY.

HEPATICAE COLLECTED IN FLORIDA BY SEVERIN RAPP

[MISS CAROLINE C. HAYNES]

The following list comprises sixty-four species of Hepaticae collected by Mr. Severin Rapp during the years 1903-14. Determinations were made by Dr. A. W. Evans and Herr Stephani. The richness of the Southern field is admirably demonstrated by the fact that all the specimens yielding these species came from one locality, Sanford, Orange Co., or its vicinity. Mr. Rapp is a good collector, his is the keen eye to detect the most minute of species; and while there are many rarities and several recently described species, the collection contains additional material as yet undescribed.

The numbers correspond with those of a set deposited in the Herbarium of the New York Botanical Garden. The list was arranged by Caroline Coventry Haynes, who thinks it not out of place to add a plea that botanists while in Florida collect hepatics, even though out for bigger game.

Ricciaceae

Riccia Donnellii Aust. (No. 9). On sand in ditches.

Ricciella crystallina (L.) Warnst. (No. 6). On sidewalks between bricks.

Ricciella fluitans (L.) A. Br. (No. 4). In water and ditches.

Ricciocarpus natans (L.) Corda (No. 8). Side of ditch.

Marchantiaceae

Marchantia polymorpha L. (No. 7). On ground and on bricks. New to Florida.

Metzgeriaceae

Thallocarpus Curtisii (Aust.) Lindb. (No. 12). On rich soil in ditches.

Sphaerocarpos Donnellii Aust. (No. 17). On sand in fields. For description and figures see C. C. Haynes, Bull. Torr. Bot. Club. 37: 226. Pl. 29, 30. 1910.

Sphaerocarpos texanus Aust. (No. 21). On walks mixed with *Ricciella crystallina*. For description and figures see C. C. Haynes, loc. cit. 222. Pl. 26, 27. 1910.

Riccardia multifida (L.) S. F. Gray (No. 26). On logs in wet places.

Riccardia palmata (Hedw.) Carruth. (No. 27). On rotten logs. See Evans, BRYOLOGIST 16: 50. 1913.

Riccardia pinguis (L.) S. F. Gray (No. 28). On rotten logs in swamp.

Metzgeria myriopoda Lindb. (No. 29). On magnolia in high hammock and on exposed roots. See Evans: Vegetative reproduction in Metzgeria, Ann. Bot. 24: 279. f. 6. Apr. 1910.

Metzgeria uncigera Evans (No. 73). On tree trunk. For description of this species see Evans: loc. cit. 273-277. f. 1-3. Also note BRYOLOGIST 17: 87. 1914.

Pallavicinia Lyellii (Hook.) S. F. Gray (No. 10). On sandy banks and rotten stumps.

Fossombronina salina Lindb. (No. 2). On sandy banks. For note see Evans, BRYOLOGIST 17: 87-88. 1914.

Jungermanniaceae

Plagiochila floridana Evans. (No. 30). On exposed roots.

Plagiochila ludoviciana Sulliv. (No. 31). Tree trunks and exposed roots.

Plagiochila undata Sulliv. (No. 14). On exposed roots.

Clasmatocolea Doellingii (Nees) Steph. (No. 33). On palmetto roots and logs.

Lophocolea heterophylla (Schrad.) Dumort. (No. 13). On bark and on sandy banks.

Lophocolea Martiana Nees. (No. 1). On rotten logs in hammock.

Cephalozia connivens (Dicks.) Lindb. (No. 32). On swampy ground.

Cephalozia media Lindb. (No. 34). On sandy banks.

Cephalozia serriflora Lindb. (No. 35). On rotten logs in hammock.

Odontoschisma prostratum (Swartz) Trevis. (No. 36). Growing over roots and on sandy banks.

Calypogeia Sullivantii Aust. (No. 53). On ditch bank. New to Florida.

Calypogeia Trichomanis (L.) Corda. (No. 54). On sandy banks.

Lepidozia sylvatica Evans. (No. 25). On sandy banks.

Telaranea nematodes longifolia M. A. Howe (No. 22). On sandy banks.

Radula australis Aust. (No. 24). On trunks of tree in hammock.

Porella pinnata L. (No. 3). On tree trunk near base and on exposed roots. New to Florida.

Diplasiolejeunea Rudolphiana Steph. (No. 68). On rotten trunks in swamp. For description see Evans, Bull. Torrey Bot. Club 39: 220-222. Pl. 17, f. 13-17. 1912.

Cololejeunea Biddlecomiae (Aust.) Evans (No. 76). On tree trunks.

Cololejeunea minutissima (Smith) Schiffn. (No. 15). On trunk of orange.

Cololejeunea setiloba Evans. (Nos. 27 and 59). On tree trunks. For description see BRYOLOGIST 16: 51-54. f. 1-7. 1913.

Leptocolea Jooriana (Aust.) Evans (No. 5). On shrubs.

Lejeunea flava (Swartz) Nees. (No. 18). On tree, near base and on roots.

Lejeunea floridana Evans. (No. 11). On logs in hammock. For description see Bull. Torrey Bot. Club 32: 185-188. Pl. 5, f. 15-21. 1905.

Lejeunea glaucescens Gottsche. (No. 55). On logs. Note by A. W. Evans, see loc. cit., 188.

Lejeunea spiniloba Lindenb. and Gottsche. On cypress. For notes see A. W. Evans, BRYOLOGIST 15: 61-62. 1913; 17: 89-90. 1914.

Microlejeunea bullata (Tayl.) Evans. (No. 19). On roots and on tree trunks.

Microlejeunea laetevirens (Nees and Mont.) Evans (No. 15). On bark of various trees.

Cheilolejeunea polyantha Evans. (No. 61). On trees.

Rectolejeunea Brittoniae Evans (No. 63). On bark and on exposed roots.

For description and notes see Bull. Torrey Bot. Club 38: 209-212. Pl. 9, f. 1-12. 1911; BRYOLOGIST 16: 54. 1913.

Euosmolejeunea clausa (Nees & Mont.) Evans (No. 20). On bark.

Euosmolejeunea duriuscula (Nees) Evans (No. 23). On bark.

Taxilejeunea obtusangula (Spruce) Evans (No. 70). On logs and on trunks of trees near base. For description and notes see Evans, loc. cit. 215-218. Pl. 10; BRYOLOGIST 17: 90. 1914.

Ceratolejeunea integrifolia Evans. (No. 37). On trunks of trees and exposed roots. For description and notes see loc. cit. 213-215. Pl. 9, f. 13-19; BRYOLOGIST 14: 88. 1911.

Crossolejeunea bermudiana Evans. (No. 67). On young tree in swamp. For description and notes see Bull. Torrey Bot. Club 32: 132-134. Pl. 6. 1906; BRYOLOGIST 17: 90. 1914.

Brachiolejeunea corticalis (Lehm. & Lindenb.) Schiffn. (No. 38). On trunk of live oak.

Lopholejeunea Muelleriana (Gottsche) Schiffn. (No. 40). On bark. See Evans, BRYOLOGIST 11: 45. 1908.

Mastigolejeunea auriculata (Wils & Hook.) Schiffn. (No. 19). On trunks in hammock.

Leucolejeunea conchifolia Evans (No. 39). On living trees.

Leucolejeunea uncioloba (Lindenb.) Evans. (No. 41). On trees.

Leucolejeunea xanthocarpa (Lehm. & Lindenb.) Evans. (No. 49). On bark of tree in hammock. For description and notes see Evans, Torrey 7: 229. 1908; Bull. Torrey Bot. Club 35: 172. Pl. 7, f. 12-23. 1908; BRYOLOGIST 17: 90. 1914.

Frullania Brittoniae Evans. (No. 77). On *Magnolia glauca*. New to Florida.

Frullania cobrensis Gottsche (No. 57). On maple. For note see Evans, BRYOLOGIST 16: 35. 1913.

Frullania Donnellii Aust. (No. 75). On various barks.

Frullania Kunzei Lehm. & Lindenb. (No. 42). On shrubs, trunks, and branches.

Frullania obcordata Lehm. & Lindenb. (No. 43). On tree trunks and branches.

Frullania Rappii Evans. (Nos. 44 & 18). On tree trunks and branches. For description and notes see BRYOLOGIST 15: 22-26. f. 1-9. 1912.

Frullania squarrosa (R., Bl. & N.) Dumort. (No. 45). On tree trunks.

Anthocerotaceae

Anthoceros carolinianus Michx. (No. 46). On earth and logs.

Anthoceros punctatus L. (No. 47). On sandy bank, earth, and logs.

HIGHLANDS, N. J.

**ADDITIONS TO THE LICHEN-FLORA OF SOUTHERN CALIFORNIA.—
NO. 10**

H. E. HASSE

With the exceptions of those species published by Dr. A. Zahlbruckner in *Annales Mycologici* the writer is responsible for the descriptions of the following new species:

Dermatocarpon heppioides A. Zahlbr. n. sp., *l. c.* X, 359. 1912. On rocks, Santa Monica Mts.

Arthopyrenia (Acrocordia) sphaeroides (Wallr.) A. Zahlbr. Thallus effuse, smoothish, light gray with a faint yellowish dash. Apothecia dimidiate, dull black, hemispherical, at base thinly coated with thallus. Spores 8, colorless, bilocular, ellipsoid, 14μ to 16μ long, 6μ to 8μ thick. Spermata acicular, straight or lightly curved at distal end, 16μ long. Hym. gel. with I yellow. On oak, Catalina Island.

Mycoporellum californicum A. Zahlbr. n. sp., *l. c.* X, 363. 1912. On *Quercus agrifolia*, Santa Monica Mts.

Opegrapha hassei A. Zahlbr. n. sp., *l. c.* X, 365. 1912. Rocks, Catalina Island.

Lecidea (Biatora) meiocarpa Nyl. Lich. Fr. Behr. p. 57; in *Flora* p. 577. 1876. Northern and oriental Asia (Japan), in N. Amer. (Port Clarence), Europe. Not heretofore reported from the United States, it is believed.

Lecanora lacustris (With.) Nyl. (*L. cinerea lacustris* Nyl. Lich. Scand. 55. 1861.) Tuck. Syn. Li, N. Amer. I. 199. On schistose rocks, Santa Monica Mts.; Eastern N. A., but perhaps not before reported from the west coast. Authors mention as habitat "rocks often inundated," which, however, does not hold good with our lichen whose "inundations" occur with us only during the brief rainy season.

Rinodina dirinoides A. Zahlbr. n. sp. in litt. Thallus crustaceous, dull whitish, of thick convex cushion-like squamules with lobulate border, mealy, corticate above, attached to substratum by medullary hyphae, the cushions 1.5 to 4 mm. wide. Apothecia mostly several on each cushion, appressed-sessile, 1 to 1.8 mm. in width; disk flat-convex, dark but thickly pruinose and thus appearing but little darker than the thallus; thallus with K. yellow, soon orange brown or dark saffron, C— . Epithecium granulose, light yellowish brown; thecium colorless, 100μ to 112μ high; paraphyses strict, coherent, hypothecium pale straw color; asci inflated clavate, reaching up to the epithecium, 8-spored; spores bilocular, blunt ellipsoid, 15μ to 24μ long, 8μ to 12μ thick, light umber brown, the loculi at first almost without color, in mature spores red-brown. Hym. gel.

with I deep blue turning dark violet-brown, with K the epithecium stains orange-red. This species is placed in the sect *Miscoblastia* by Dr. Zahlbruckner. On calcareous tufa near Clifton By the Sea, Los Angeles Co. Type with Dr. Zahlbruckner, cotypes in Sullivant Moss Society and Hasse herbaria.

Rinodina euryspora A. Zahlbr. n. sp. in litt. Thallus determinate, crustaceous, rimose-areolate, sordid yellowish brown, medium thick, areolae concave, 0.3 to 0.75 mm. wide; apothecia appressed sessile, 0.2 to 0.5 mm. wide; disk black and white pruinose or naked, thalline margin permanent, slightly elevated, entire or crenulate; epithecium continuous, sordid yellow; thecium colorless, 120 μ high, paraphyses stout, about 2 μ thick, septate, not furcate, tips of some slightly clavate and colored; hypothecium amber-yellow; asci inflated clavate, 8-spored; spores bluntovoid-ellipsoid, brown, bilocular, constricted, 12 μ to 15 μ long, 6 μ to 11 μ thick. Hym. gelat. stains blue with I, K—. Thallus K—, C—. On argyllaceous shale, Highland Park near Pasadena. Type with Dr. A. Zahlbruckner, cotype in herb. Hasse.

SANTA MONICA, CAL.

HEPATIC NOTE

The curator acknowledges with gratitude the gifts of the following specimens in response to the appeal for N. A. species in the January BRYOLOGIST: Dr. A. W. Farlow.—

Plagiochasma Wrightii and *Marchantia disjuncta* from Mexico. *Scapania gracilis* from Maine.

Dr. A. W. Evans.—

Sphenolobus saxicola from Gaspe Co., Quebec.

Miss A. Lorenz.—

Gymnomitrium coralloides from New Hampshire.

Collection of A. H. Brinkman from B. C.—

Sauteria alpina

Scapania uliginosa.

Asterella Lindenbergiana.

Mr. Severin Rapp from Sanford, Fla.—

Metzgeria myriopoda.

Lejeunea spinulosa.

Frullania cobrensis.

Rectolejeunea Brittoniae.

Frullania Donnellii.

Brachiolejeunea corticalis.

Frullania Kunzei.

Leucolejeunea cuneleifolia.

Thallocarpus Curtisii.

L. hanthoscarpa.

Sphaerocarpos texanus.

L. uncioba.

Cephalozia floridae.

Lopholejeunea Muelleriana.

Cephaloziella Rappiana.

Cheilolejeunea polyantha.

Cololejeunea minutissima.

Leptocolea Jooriana.

C. setiloba.

Taxilejeunea aletusangula.

Displasiolejeunea Rudolphiana.

It was an error to include the common *Scapania irrigua*. The list is now reduced to 86 species.

SUPERIOR, WIS., FEB. 1915.

GEO. H. CONKLIN.

LIST OF HEPATICAE TO BE EXPECTED IN NEW ENGLAND

ANNIE LORENZ

The following List of hepaticae not too unreasonably to be expected in New England has been in use by the writer for several seasons. Its rate of shrinkage causes its presentation for the purpose of calling the attention of collectors to the species noted below.

The presence of some of these species may seem somewhat visionary, but, judging by past experiences, it is safe to include a wide and startling range in one's prophecies. During this present month the writer has checked *Lophocolea cuspidata* off the List, having come upon it near Hartford in an agreeable, but not unusual-looking, little sandstone ravine, beside the brook.

Perhaps it may sound even more rash to assign definite stations to many of these species. However, when at Willoughby, Vermont, with Dr. Evans in 1913, the list of additional species was made out beforehand, including suitable stations for each species. Most of them were right there, except those which appeared before reaching the particular log to which they had been assigned! Four came off this List in two days.

Anyone with a week to spend upon Mt. Washington would probably find several of these.

	<i>Present Distribution</i>	<i>Look for in</i>
<i>Riccia glauca</i> L.	Northern and central Eur., Calif., Japan.	Conn.
<i>Riccia Frostii</i> Aust.	Austria, Russia. Kan., S. D., Mo., Mont., Ill., O., Idaho, N. Y.	Conn.
<i>Ricciella Huebeneriana</i> (Lindenb.) Dum.	Eur., Japan. N. J. "Clay bottom of a drained pond."	Conn.
<i>Dumortiera hirsuta</i> (Swartz) Nees.	Ireland, France, Canary Is., Italy. Penn., on dripping calcareous rocks.	Conn.
<i>Metzgeria fruticulosa</i> (Dicks.) Evans.	Germany, France. Wash., Oregon.	Vt.
<i>Pallavicinia hibernica</i> (Hook.) S. F. G.	D. C., boggy meadow. Eur. Kalkpflanze.	Vt.
<i>Pallavicinia Blyttii</i> (Morck) Lindb.	Northern and Alpine Eur., Urgesteinspflanze. Wash., Mt. Rainier, B. C., on wet rocks.	Mt. Washington
<i>Riccardia incurvata</i> Lindb.	Northern Eur., wet sandy ground.	Maine coast.
<i>Gymnomitrium obtusum</i> (Lindb.) Pears	Alps, Gr. Br., Norway. Greenland, Alaska, Vancouver, Mont.	Mt. Washington or Katahdin.
<i>Marsupella badensis</i> Schiffner.	Baden, Bohmen, France, on wet rocks.	N. H.
<i>Nardia Breidleri</i> (Limpr.) Lindb.	Alps, Gr. Br. Mt. Rainier.	Mt. Washington or Katahdin.

	<i>Present Distribution</i>	<i>Look for in</i>
<i>Nardia paroica</i> Schiffn.	Gr. Br., wet rocks.	N. H.
<i>Jungermannia atrovirens</i> Dum.	Northern Eur., Spitzbergen, Japan. Wash., Kalkpflanze.	Vt.
<i>Jungermannia biformis</i> Aust.	Delaware Water Gap, N. J., on steep wet rocks.	Conn.
<i>Jungermannia fossombronoides</i> Aust.	Englewood, N. J.; Closter, N. J., on rocks in a brook.	Conn.
<i>Jungermannia riparia</i> Tayl.	Europe, Kalkpflanze. B. C., Mt. Rainier.	Vt.
<i>Anastrophyllum Reichardtii</i> (Gottsche) Steph.	High Alps, Italy, Austria, Norway, Urgestein, wet rocks, northern exposure.	Mt. Washington
<i>Lophozia Binsteadi</i> (Kaal.) Evans	Norway. Yukon, Greenland.	N. H.
<i>Lophozia quadriloba</i> (Lindb.) Evans	Northern and alpine Europe. Arctic America, Alaska.	Maine.
<i>Lophozia Wenzelii</i> (Nees.) Steph.	Northern and alpine Europe, on wet rocks. Arctic Am.	N. H.
<i>Lophozia Muelleri</i> (Nees.) Dum.	Europe, common in limestone countries. Wis.	Conn., on the Stockbridge limestone.
<i>Lophozia Schultzii</i> (Nees.) Schiffn.	Northern Europe, not alpine. Yukon, Alaska, Minn., in limy swamps.	Vt.
<i>Sphenolobus saxicolus</i> (Schrud) Steph.	Northern Eur. to Siberia, Alps, rare Canada, Alaska, Greenland.	Maine or Mt. Washington.
<i>Sphenolobus politus</i> (Nees.) Steph.	Eur. Greenland, Alaska, Quebec, B. C., wet gravelly places.	Maine.
<i>Sphenolobus scitulus</i> (Tayl.) Steph.	Dolomites, Kalkpflanze. B. C., on earth.	Vt.
<i>Harpanthus Flotovianus</i> Nees.	Northern Eur., Siberia, in bogs. Greenland, Labrador, B. C., Alaska.	N. H.
<i>Cephalozia affinis</i> Lindb.	Finland, Sweden, old logs. Sisson, Calif.	N. H.
<i>Cephalozia ambigua</i> Massal.	High Alps, Scandinavia, on earth. Ellesmere Land.	N. H.
<i>Cephalozia Loitlesbergeri</i> Schiffn.	Hochmooren, Germany, Austria, Switzerland, England.	N. H.
<i>Cephalozia Macrostachya</i> Kaal.	Scandinavia, England, in bogs. Long Island (Howe).	Conn.
<i>Cephalozia leucantha</i> Spruce	Alps, Austria, Scandinavia, on logs, common. Alaska.	Maine.
<i>Hygrobrella laxifolia</i> (Hook) Spruce	Northern Eur., wet rocks. Greenland, Labrador, N. S., Wash., Mt. Rainier.	Maine.

	<i>Present Distribution</i>	<i>Look for in</i>
<i>Cephaloziella Baumgartneri</i> Schiffn.	Mediterranean coast, England, on walls and rocks. Kalkpfl.	Vt.
<i>Cephaloziella integerrima</i> (Lindb.) Warnst.	Central and northern Eur., clayey and sandy ground, ditches, etc.	Conn.
<i>Cephaloziella striatula</i> (Jens.) Douin.	Hochmooren, central and northern Eur. Greenland.	N. H.
<i>Odontoschisma Macounii</i> (Aust.) Underw.	Alps, northern Eur., on earth. Yukon, Greenland, Minn.	Mt. Washington
<i>Odontoschisma Sphagni</i> (Dicks.) Dum.	Hochmooren, Mts. of central and northern Eur. Greenland, Nova Scotia, Miquelon.	Maine.
<i>Pleuroclada albescens</i> (Hook.) Spruce.	Alpine Eur. Greenland, Mt. Rainier, Montana, on earth.	Mt. Washington
<i>Lepidozia trichoclados</i> K. M.	Northern and alpine Eur., on wet rocks, <i>not bogs</i> , Baden, Alps, Hartz, Gr. Br., Norway.	Mt. Washington
<i>Telaranea nematodes longifolia</i> Howe	Florida, Georgia, N. C., N. J., L. I. boggy woods.	Conn., e. shore. New London County.
<i>Herberta adunca</i> (Dicks) S. F. G.	Eur. Alaska, N. J., Catskills, wet rocks.	Mass. or Vt.
<i>Scapania aspera</i> Bernet.	Switzerland, Alps, common. England, Norway, Kalkpflanze.	Vt.
<i>Scapania Bartlingii</i> (Nees.) Hampe.	Switzerland, Kalkpflanze. B. C., N. B.	Maine, Franklin County.
<i>Scapania uliginosa</i> (Swartz) Dum.	Eur., Scand., northern sp. Wet rocks or bogs, Vancouver.	N. H.
<i>Radula Lindbergiana</i> Gottsche.	Scand., Germany, Gr. Br., on rocks, uncommon.	Vt.
<i>Lejunea patens</i> Lindb.	Ireland, west coast of Gr. Br. Newf., banks and trees.	Maine.
<i>Microlejeunea ulicina</i> (Tayl.) Evans.	Ireland, west coast of Gr. Br. N. S. on trees.	Maine.
<i>Frullania Bolanderi</i> Aust.	B. C. to Calif., common on Pacific coast. Wis.	Maine.

It may be of interest to compare this List, a few years later, with the actual stations. Additions or omissions will be gratefully received.

HARTFORD, CONN., December, 1914.

AN UNDESCRIBED SPECIES OF CETRARIA

LINCOLN W. RIDDLE

Several years ago, while working over the material of *Cetraria* in the Tuckerman lichen collection (in the Cryptogamic Herbarium of Harvard University), I came across specimens of a species of *Cetraria* which had been named in manuscript by Tuckerman, but no description of which had ever been published. Subsequently I found specimens from different localities in other herbaria. As the species is apparently not uncommon in northwestern America, it seems advisable that an account of it should be published. With the kind permission of Professor W. G. Farlow, I present the following description:

Cetraria pallidula Tuckerman in herb. **sp. nov.** Thallus foliaceus cartilagineus rigidus submonophyllus, laciniis latis rotundatisque 10–20 mm. longis, 5–10 mm. latis, adscendentibus; superne ochraceo-flavus irregulariter rugoso-plicatus vel partim lacunoso-reticulatus, sorediis et isidiis destitutus; subtus ochraceo-flavus vel paulo pallidior, rhizinis concoloribus parcissime instructus; intus albus. Thallus ad marginem cum spermagoniis sparsis tuberculiformibus nigris instructus. Apothecia marginalia applanato-cupuliformia, 3–6 mm. lata; disco fulvo vel castaneo; margine thallo concolore tenui primum crenato demum tuberculato. Sporae decolores simplices globosae, diametro 4–6 μ .

Thallus foliose, cartilaginous, rigid, submonophyllous; lobes broad and rounded, 10–20 mm. long and 5–10 mm. wide, irregularly rugose-wrinkled, or partly somewhat lacunose-reticulate, without soredia or isidia; yellow-ochraceous above, and the same color or slightly paler beneath, with occasional scattered concolorous rhizoids; medulla white. Upper cortex 28–35 μ thick, chondroid, the cells with lumina about 3 μ in diameter and much thickened walls; lower cortex 15–18 μ thick, similar in structure to the upper cortex, but less chondroid. Spermogonia in scattered, submarginal, black tubercles, not numerous. Apothecia marginal, 3–6 mm. in diameter, concave; disk fulvous to chestnut; margin ochraceous, thin, at first crenate, soon becoming tuberculate; hymenium 45–50 μ high, subtended by a colorless chondroid hypothecium 50–60 μ high; spores colorless, simple, globular, 4–6 μ in diameter. Type-specimen: "near Mt. Adams, Washington Territory, legit C. G. Pringle 1881" in the Tuckerman Herbarium.

The species is represented by two specimens in the Herbarium of Wellesley College, one from Falcon Valley, Washington, collected by C. G. Pringle, 7 Sept., 1881; the other from Mt. Hood, Oregon, collected by Mrs. Dorchester, August, 1890. The plant was also collected by Mr. R. S. Williams (*No. 17*) at Lake Lindeman in the Yukon Region, 24 April, 1898, and recorded by Dr. R. H. Howe, Jr., in the *Bulletin of the Torrey Botanical Club* 38: 292 (1911) under the name *Cetraria Oakesiana* Tuck., with the note "this plant represents a new variety, a name for which is about to be published; reference will be made to this record at the time of publication." In regard to the note quoted it should be said that contrary to my expectation at the time that Dr. Howe sent me the material for determination, circumstances have delayed the publication of this description until the present.

Cetraria pallidula is most closely related to *C. platyphylla* Tuck., being identical with that species in habit and surface of thallus, but distinct in the color. From *C. Oakesiana* Tuck. it differs in habit and in the absence of soredia. From *C. juniperina* (L.) Ach. it differs in habit, in the white medulla, and in the globose spores. According to the classification adopted by Dr. Zahlbruckner in Engler & Prantl's *Die Natürlichen Pflanzenfamilien*, Teil 1, Abteilung 1*, this species would fall in the genus *Nephromopsis*, in which case its name should be *Nephromopsis pallidula* (Tuck.) Riddle.

WELLESLEY COLLEGE, WELLESLEY, MASS.

REVISED LIST OF HEPATICS COLLECTED IN AND NEAR WORCES-
TER, MASSACHUSETTS (Concluded)

HELEN E. GREENWOOD

42. *Calypogeia Sullivantii* Aust. Damp shaded soil. Worcester, Leicester.
43. *Calypogeia Trichomanis* (L.) Corda. Common. On shaded banks in woods, by roadsides. Worcester, Leicester, Holden, Oxford.
44. *Bazzania trilobata* (L.) S. F. Gray. Quite common. On shaded banks in woods, base of cedar trees, rotten logs, swamps. Worcester, Oxford, Holden.
45. *Lepidozia reptans* (L.) Dumort. Shaded banks and damp soil in woods. Worcester, Leicester.
46. *Lepidozia sylvatica* Evans. Damp soil, shaded. Worcester.
47. *Blepharostoma tricophyllum* (L.) Dumort. Damp shaded soil, with mosses or other hepatics. Leicester, Sutton.
48. *Ptilidium pulcherrimum* (Web.) Hampe. Common. Rotten logs, base of trees, shaded rocks, damp shaded soil. Worcester.
49. *Trichocolea tomentella* (Ehrh.) Dumort. Wooded swamps with mosses. Holden.
50. *Diplophylleia apiculata* Evans. Shaded banks. Leicester, Oxford, West Boylston.
51. *Scapania nemorosa* (L.) Dumort. Found frequently. Shaded banks. Worcester.
52. *Scapania undulata* (L.) Dumort. On stones in bed of brooks. Worcester, Leicester, Holden.
53. *Radula complanata* (L.) Dumort. Frequently found. Rocks and trees, stones in bed of brook. Worcester, Oxford, Leicester.
54. *Porella pinnata* L. On sticks and stones in brooks, usually submerged. Worcester, Leicester.
55. *Porella platyphylla* (L.) Lindb. Fairly common. Bark of living trees, rocks, damp shaded soil. Worcester.
56. *Cololejeunea Biddlecomiae* (Aust.) Evans. On stones in bed of brook. Leicester.
57. *Jubula pennsylvanica* (Steph.) Evans. On wet rocks in brook. Worcester, Oxford.

58. *Frullania Asagrayana* Mont. On ledges. Oxford.

59. *Frullania eboracensis* Gottsche. Common. Bark of living trees: maple, walnut, chestnut, arbor vitae, white birch. On stones. Worcester, Holden.

Anthocerotaceae

60. *Notothylas orbicularis* (Schwein.) Sulliv. On moist shaded soil. Worcester.

61. *Anthoceros laevis* L. Damp soil by edge of brooks, damp roadsides. Worcester, Oxford, Holden.

62. *Anthoceros punctatus* L. Damp soil by roadsides and brooks. Worcester, Holden, Oxford.

WORCESTER, MASS.

SHORTER NOTES

Lecanora atosanguinea Merrill and Blastenia Herrei Hasse Identical

Dr. H. E. Hasse describes a new species of *Blastenia* in THE BRYOLOGIST, XVII, 6, p. 92, 1914, under the combination *B. Herrei* Hasse. The novelty of this lichen was pointed out by the writer in the *Ottawa Naturalist*, p. 117, 1913. It is there described as new, under the combination *Lecanora (Callopisma) atosanguinea*. Mr. A. S. Foster, of Washington State, has sent several examples of the plant, and it turns up often from Vancouver Island, the type locality.

G. K. MERRILL.

The name *Blastenia Herrei* Hasse, n. sp., published in the BRYOLOGIST for November, 1914, is void, being antedated by *Lecanora atosanguinea* Merrill, n. sp., published by Mr. Merrill in the *Ottawa Naturalist*, p. 117, 1913. I am indebted to Prof. John Macoun for a cotype specimen and to Mr. Merrill for a copy of his description. A comparison of the two specimens confirms their identity. Mr. Merrill's description was unknown to me when describing Dr. Herre's specimen. Both generic names are correct, according to the system of classification adopted: following that of Dr. A. Zahlbruckner the species is a *Blastenia* Section *Eublastenia*.

H. E. HASSE.

The January number of THE BRYOLOGIST with Grout's note upon *Leptobryum pyriforme* with gemmae reached me just as I was puzzling over the same phenomenon. Specimens were brought me a short time before by Mr. H. M. Mapes, a student in the Agricultural College of Cornell University, and consisted of two individual plants upon a glass slide. They had been growing in a greenhouse of the Agricultural College, where they had been discovered accidentally in the investigation of fern prothallia. The soil is said to have contained ashes.

A. LEROY ANDREWS.

COMPLICATED STEM-TISSUE IN POLYTRICHUM.—

Polytrichum has "a central cylinder composed of elongated cells with scanty contents, of elements resembling sieve-tubes, and of elongated cells; the three kinds of element serve respectively to transport water, albuminous substances, and carbohydrates."—Text-Book of Botany, Strasburger, etc., English Transl. 1912, p. 120.

MOSSWORTS IN BESSEY'S COLLEGE BOTANY.—In the "Essentials of College Botany," 1914, by Charles E. Bessey and Ernst A. Bessey, the "Mossworts" (Phylum VIII, Bryophyta) receive 12 of the 156 pages of systematic botany, 8%. In the Chicago "Textbook of Botany" (1910), Coulter gives the Bryophytes 11%. In Bergen and Davis's "Principles" (1906), the proportion is 13%; Campbell's "University Textbook" (1902), 12%; Atkinson's "College Botany" (1905), 14%; and Strasburger, Jost, Schenck, Karsten's "Textbook" (Engl. Edit., 1912), 5%. Although brief, the treatment in Bessey's text is clear and interesting.

Bessey's common names for many of the Mossworts will probably be new to many BRYOLOGIST readers. They are, stated in their respective order: Riccias, Hornworts (*Anthoceros*), Great Liverwort (*Marchantia*), Scale Mosses (*Jungermanniales*), Black Mosses (*Andreaeales*), Peat Mosses (*Sphagnales*), and True Mosses (*Bryales*). The True Mosses are Top Mosses (*Acrocarpi*) and Side Mosses (*Pleurocarpi*); these being Turf Mosses (*Dicranaceae*), Cushion Mosses (*Leucobryaceae*), Petticoat Mosses (*Splachnum*), Bristle Mosses (*Funariaceae* and *Timmiaceae*), Ephemeral Mosses (*Ephemerum*), Wood Mosses (*Bryaceae* and *Mniaceae*), Humpback Mosses (*Buxbaumiaceae*), Haircap Mosses (*Polytrichaceae*), Brook Mosses (*Fontinalaceae*), Tree Mosses (*Climaceae*), and Bog Mosses (*Hypnaceae*). The names, descriptive either of moss or habitat, are generally well-chosen, although "Tree Mosses" is somewhat ambiguous, and "Bog Mosses" will not appeal to most students in regions with many *Hypnaceae* but few or no bogs. The book ends with an enumeration of the 683 families recognized by Bessey, the prominent families being briefly characterized, and the important genera mentioned. There are 6 families of Liverworts and 59 of Mosses.

The systematic sequence of the families of Mossworts is still a disputed question, practically all systematists, however, placing first the forms with flat thalli, like the Riccias, in which the sporophyte is little more than a mere spore-case. For the rest of the Liverworts the classification depends largely on whether the main reliance is placed on the characters of the gametophyte or of the sporophyte, or of both together. Bessey evidently placed most emphasis upon the gametophyte. His sequence is *Riccia*, *Anthoceros* with its more compact thallus, *Marchantia* with its highly complex thallus, the thalloid and, finally, the leafy *Jungermanniales*. This is inconsistent in that *Aneurax* and *Pellia* among the thalloid *Jungermanniales* have probably the simplest known liverwort gametophytes. The rather generally accepted classification in which the sporophyte is given more prominence is probably a better one; the order then being *Riccia*, *Marchantia*, *Jungermanniales*, and ending with *Anthoceros* with its highly complex chlorophyll-bearing sporophyte.

Among the Mosses all classifications depend mainly on the sporophyte. Bessey places the *Andreaeales* before the Sphagnums, perhaps because the capsules open by four slits much as do the *Jungermanniales*. By most systematists *Sphagnum*, with its dome-shaped spore-layer, rudimentary seta, and bulbous foot, is regarded as closely related to *Anthoceros*, and so transitional between the Liverworts and Mosses. The sporophytic characters of the *Andreales* are mainly intermediate between those of *Sphagnum* and the *Bryales*, and Bessey's arrangement probably will not meet with general acceptance on this point.—O. E. J.

WANTED—SHORT NOTES. We very much need short notes, reviews, discussions, etc. There sometimes is more food for thought in a short note than in a long and detailed article, and in making up the BRYOLOGIST there are frequently places where such short notes could be used to good advantage. If you have a short bit of information that would be interesting to tell to a bryological friend then write it out and let us have it.—Ed.

H. N. DIXON, in the Journal of Botany (Nov. 1913, pp. 324-330) publishes further investigations on the mosses of the Southern Hemisphere. After extended comparison a *Ditrichum* which has passed at various times under 6 generic and 9 specific names is finally labeled *Ditrichum flexifolium* (Hook.) Hampe. The range for this variously-named moss is given as: "South Africa, Madagascar, East African Islands, India, Java, New Caledonia, Australia, Tasmania, New Zealand, Patagonia, Chile." Critical notes are given on several Thuidiums and one new species is published: *Thuidium orientale* Mitt. MS., from the Malay Peninsula; while *Astomum Levieri* Limpr., hitherto known only from Europe, is recognized from Algeria.

BRYOLOGY OF NEW ZEALAND.—H. N. DIXON, in "Studies in the Bryology of New Zealand (N. Z. Institute, Bull. 3, Pt. I, June, 1913, 1-29, and Pt. II, Sept. 1914, 30-74) is mainly devoting himself to a critical study of the generally imperfectly understood and thus neglected species of Robert Brown, of Christchurch [Not "R. Br.,"] and aims to bring together as far as known the species hitherto recorded from New Zealand. In the Introduction is given a very interesting sketch of Brown's personality, quoting from Dr. L. Cockayne: "He was the most enthusiastic naturalist I ever met—a man of but little education, intensely modest in many ways, and yet self-opinionated to no small degree. He was about seventy years of age when he first commenced to write. . . . His microscope was old and in bad repair; his drawing apparatus was self-made; he possessed hardly a book beyond the Handbook [Handbook of the New Zealand Flora—Hooker] and some ancient botanical text-books. In the field no discomfort, no toil, was too great. He would sleep in the open, perhaps without food, carry burdens for incredible distances, be wet through for weeks at a time—and all for his love of natural history. I have seen him after a long day's tramp, and when eighty years of age, walk barefoot on a stony river-bed in search of wood for the fire. He was a shoemaker by trade, but for many years did no work—not because he had much of this world's goods, for he had very little. His one love was nature in all its forms, and, get him away from mosses, his conversation was clever and his views on many points brilliant."

Unfortunately Brown's drawings and descriptions have left much to be desired and his herbarium is found to be very imperfect, many of the types even being missing, so that Dixon's task is no small one. Dixon says: "That the botanical work of a man of such enthusiasm, so true a lover of nature's works, so indefatigable and unsparing of himself in their pursuit, should stand in danger of being lost to science would be deplorable. It is in the hope of rescuing some parts at least from oblivion that I have undertaken these papers."

The two Parts thus far published deal entirely with genera of the *Dicranaceae*, there being full keys to the genera, and many of the species being illustrated on the six plates. Five new species are published in *Dicranoloma*, and one each in *Pleuridium* and *Dicranella*. These papers will prove of great value to all who wish to know of the mosses of New Zealand, or indeed of the whole Southern Hemisphere, for many of the species are widely distributed. Further papers will be awaited with much interest.—O. E. J.

NUMBER OF SPECIES OF MOSSES KNOWN.—

It is very difficult to give an exact statement in regard to the number of known species of mosses in the world. Paris, in the second edition of the *Index Bryologicus*, enumerates 14,067 species, of which 1419 are given for America north of Mexico. This was in 1900. I doubt if it is far wrong today, for many of the species listed are only synonyms and these reductions are balanced by new descriptions. In round numbers I should say we have 1500 species of mosses in America north of Mexico, including good, bad, and indifferent ones. In the United States alone I dare not say, but "guess" 1000-1200.

E. B. CHAMBERLAIN.

SULLIVANT MOSS SOCIETY NOTES

Members of the Sullivant Moss Society will be pained to learn of the death, on December 31, last, of Dr. A. F. K. Krout, of Glenolden, Penna., for twelve years a member of the society. Dr. Krout was especially interested in the study of hepatics, and was instrumental in interesting many of his botanical friends in them.

EXCHANGE DEPARTMENT

Offerings to S. M. S. Members for stamped self-addressed envelope:

Mr. Edward B. Chamberlain, 18 West 89th St., New York City.—*Camptochaete arbuscula* (Hook. f. & Wils.) Jaeg., collected in New Zealand.

Rev. H. Dupret, Seminary of Philosophy, Montreal, Canada.—*Drepanocladus aduncus* var. *aquaticus* Sanio, collected near Montreal.

Mr. Severin Rapp, Sanford, Fla.—*Frullania Rappii* Evans, *F. cobrensis* Gottsche, and *F. Kunzei* Lehm. & Lindenb., collected at Sanford, Florida.

Mr. C. C. Plitt, 3933 Lowndes Ave., Baltimore, Md.—*Cetraria Oakesiana* Tuck.

Dr. H. E. Hasse, Santa Monica, Cal.—*Rinodina succedens* Nyl. Collected in California.

A NEW edition of the Naturalists' Directory has recently been issued by S. E. Cassino, Salem, Mass. This directory is invaluable to naturalists, since it is a means of bringing together students and collectors in all parts of the world through correspondence. It contains an alphabetical list of English speaking professional and amateur Naturalists in all parts of the world, also a list of Scientific Societies and Periodicals. The price of the Directory is \$2.50 in cloth binding, and \$2.00 in paper binding. Sent postpaid. Address as above.

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MAY 1915

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
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Associate Editors

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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879."
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THE BRYOLOGIST

Bimonthly Journal of
THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICIS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVII, 1898-1914, \$16.50.

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THE BRYOLOGIST



VOL. XVIII

MAY, 1915

No. 3

SOME MOSSES FROM MONROE COUNTY, INDIANA

F. L. PICKETT

The mosses of the following list were collected in Monroe County, Indiana, from 1910-1914. Most of them were collected in territory within a radius of five miles from Indiana University at Bloomington.

There is very little record of moss collecting through this region previous to the lists prepared by the writer together with Miss Mildred Nothnagel, for the Indiana Academy of Science, and published in the Proceedings for 1912 and 1913. Since the preparation of the latter of these, considerable additions have been made to the collection. The whole list is presented now as being of possible interest or value as a check-list for this locality. The list is not nearly complete, as only few sterile forms are included. But the removal of the collectors to other fields has made improbable the addition of new material in the near future.

During the summer of 1914 the whole collection was carefully reviewed, and specimens were sent to various bryologists for verification. The writer is under special obligation to Geo. B. Kaiser for the verification of old material and identification of new material.

Attention may be called to the following observations. Such rare-fruited forms as *Leucobryum glaucum* and *Plagiothecium deplanatum* have been found fruited here. The rather rare *Orthotrichum Lescurii* or *O. Porteri* is found in great abundance wherever there are partly shaded limestone outcrops in this section. The rough country with narrow ravines, wooded or recently deforested, clay soil, and outcropping limestone, furnishes greatly varied conditions for moss growth. The rapid change in amount of available water resulting from a thin soil layer over stone, and the great temperature range, from 10° Fahr. to 100° Fahr., tend to foster the formation of peculiar xerophytic associations. The great differences in narrow areas, as in ravines with bushes and running water at the bottom and dry exposed limestone fifty feet up the side, tend to produce or bring out variant forms. In the BRYOLOGIST for November, 1914, the writer presented some notes on the effect of these radical conditions upon the distribution of particular species. To those interested in physiological forms, carefully collected material from this region would prove very interesting.

The use of the two species names of *Orthotrichum* above is due to the inability to get an exact determination of the material. Several specimens have been sent to different persons for determination, but there has been about an even split in opinions.

In the list below, “*” indicates that only sterile plants have been found:

- Aphanorhegma serratum* Sulliv.
Aulacomnium heterostichum (Hedw.)
 B. & S.
Barbula unguiculata (Huds.) Hedw.
Bartramia pomiformis (L.) Hedw.
Brachythecium campestre B. & S.
B. oxycladon (Brid.) J. & S.
B. plumosum (Sw.) B. & S.
B. rivulare B. & S.*
B. salebrosum (Hoffm.) Br. & Sch.
B. Starkei (Brid.) B. & S.
Bryhnia graminicolor (Brid.) Grout.*
Bryum argenteum L.
B. caespiticium L.
B. capillare L.
B. intermedium Brid.
Buxbaumia aphylla L.
Campylium chrysophyllum (Brid.)
 Bryhn.
C. hispidulum (Brid.) Mitt.
Catharinea undulata (L.) W. & M.
Ceratodon purpureus (L.) Brid.
Cirriphyllum Boscii (Schwaegr.)
 Grout.*
Climacium americanum Brid.*
Cratoneuron filicinum (L.) Roth.
Dicranella heteromalla (L.) Schimp.
D. heteromalla var. *orthocarpa* (Hedw.)
 E. G. B.
D. varia (Hedw.) Schimp.
Dicranum fulvum Hook.
D. scoparium (L.) Hedw.
Ditrichum pallidum (Schreb.) Hampe.
Drummondia clavellata Hook.
Entodon cladorrhizans (Hedw.) C. M.
E. seductrix (Hedw.) C. M.
Euryuchium hians (Hedw.) J. & S.
E. serrulatum (Hedw.) Kindb.
Fissidens cristatus Wils.
F. minutulus Sulliv.
F. taxifolius (L.) Hedw.
Forstroemia trichomitria (Hedw.)
 Lindb.
F. trichomitria var. *immersa* (Sulliv.)
 Lindb.
Funaria flavicans Mx.
F. hygrometrica (L.) Sibth.
Grimmia apocarpa (L.) Hedw.
Hedwigia albicans (Web.) Lindb.
Hypnum curvifolium Hedw.
H. imponens Hedw.
H. molluscum Hedw.
Leptobryum pyriforme (L.) Wils.
Leucobryum glaucum (L.) Schimp.
Leucodon brachypus Brid.
L. julaceus (Hedw.) Sulliv.
Mniobryum albicans (Wahl.) Limpr.*
Mnium affine Rand.
M. affine ciliare (Grev.) C. M.
M. cuspidatum (L.) Leys.
M. rostratum Schrad.*
Orthotrichum Lescurii Aust.
O. Porteri Aust.
O. Schimperii Ham.
Philonotis fontana (L.) Brid.*
Physcomitrium turbinatum (Mx.) Brid.
Plagiothecium deplanatum (Sch.) Grout.
P. geophyllum Aust.
Platygyrium repens (Brid.) B. & S.
Pogonatum brevicaulis (Brid.) Beauv.
Pohlia nutans (Schreb.) Lindb.
Polytrichum commune L.
P. Ohioense R. & C.
P. piliferum Schreb.*
Pylaisia Schimperii R. & C.
Raphidostegium carolinianum (C. M.)
 J. & S.
R. carolinianum var. *admixtum* Sulliv.
Rhodobryum roseum (Weis.) Limp.*
Rhytidium rugosum (L.) Kindb.*
Thelia hirtella (Hedw.) Sulliv.
Thuidium delicatulum (L.) Mitt.
T. microphyllum (Sw.) Best.
T. pygmaeum Br. & Sch.
Tortella caespitosa (Schw.) Limp.
Weisia viridula (L.) Hedw.

RAMBLES AMONG THE CANADIAN ROCKIES

A. H. BRINKMAN

Traveling westward from Calgary along the Bow River valley, we notice a different appearance in the country, hitherto flat or undulating, almost or quite treeless, and uninteresting save for its vastness. The land becomes more rolling; low, irregularly placed hills are frequent; trees come into view occasionally, usually in patches, but at times singly, and then taller, looking gaunt in their loneliness, with dead branches save at the top, where a tuft of leafy branches still proclaims the life within them. We wonder whether they are the scouts of the advancing forest, or a rearguard still showing where, but for the fires, the forest still would be. Continuing westward, we are among the foothills of the Rockies. Trees are now not infrequent, though too often only the standing skeletons remain, mute reproofs to our struggle after the material and our sorry loss of the love of nature. Before long the irregularities in the plain become valleys, the hills close in on the river, the trees, now more often living, fill the valleys and extend well up on the mountain sides. Mountains are everywhere; we look up the valleys to see only mountains and yet more mountains.

From Banff onward, we meet a succession of valleys appearing at first much alike, except that some are deeper and longer than others. All are narrow, deep valleys of trees, squeezed in between mountains which seem to close right in on them as if grudging space for the stream bed. We rarely see any sign of the wide flat lands and marshes that largely form the Bow River valley to the summit of the pass and beyond. But after a time three types of valley stand out clear. Of the first are the Spray valley near Banff, and farther west the Sundance and Brewster Creek valleys. Wide near their mouths, with a gradual rise, they narrow rapidly until in the distance the mountains leave only room for the rivers between them. Farther west, against Hector Station, O'Hara and Sherbrooke valleys differ materially from those described above. From the train one sees little more than a break in the mountains. The rise is sharp and hilly, but on reaching the top the valley is seen to widen, with meadows, swamps, and lakes, though the stream is distinctly smaller. These are hanging valleys, common throughout the Rockies. The third type is composed of the real mountain valleys. They are short, at times little more than depressions, run rapidly into the mountains, and are often traceable directly to the snowfields and glaciers. With rock-bottomed streams, waterfalls, old and new moraines, and rocky sides, they form part of the mountains themselves. The streams at times run underground among the heaps of broken rock; glacier-fed brooks come tumbling over the sides to be lost in the mass of stones and debris they themselves have carried down. These mountain valleys and beautiful mountain lakes may be called the gems of the Rockies.

To the botanist these valleys make a very strong appeal. In the higher reaches the mountains will have their way, and interest in the plants is divided with that in the mountain scenery. The moraines and the rocks seem so bare,

as though there were no room for life. Yet the blocks of rock are many-colored from the lichens. Even high up on the mountain sides, wherever slight depressions and shelves have allowed the gathering of silt, can be found a large and varied flora especially of mosses and hepatics, while the lichens know no limits save those of ice and snow. And the snow melting shows some plant struggling gamely on. In the lower levels the wonderfully colored lakes, the streams, the rich carpets of moss, and the abundant floral life make us forget everything else.

It is hard to say which among the many valleys, full of pleasant associations and memories, appeals to me most, but with the introduction above, let us go up O'Hara valley. Getting off at Hector Station we are within sound of Cataract Brook. On the station side there is a well-worn trail which mounts rapidly beside the brook. The stream is well named. It is one mass of tumbling, roaring, flying water throughout its short length, a marked contrast to the gently flowing stream that we reach immediately the climb is done. At the end of the meadow, a little beyond the crest of the ascent, there is an old and often used camping ground. Here we find ourselves at once in a subalpine flora. Near the camp on the stream side *Lophozia Schultzii* var. *laxa*, *L. quadriloba*, and *Sphenobolus politus* may be found. On earth along the little brooks that flow from the mountain side there are *Lophozia Kunzeana*, *L. porphyroleuca*, *L. longiflora*, *L. heterocolpa*, and *L. Baueriana*. The meadow itself is full of such hepatics as *Sphenobolus minutulus*, *Cephalozia pleniceps*, and the various species of *Cephaloziella*. These grow among the tufts of grass or on the dried peat, and are often difficult to find on account of the rank grass and herbage. On the muddy spots and in the peat holes, we should be on the watch for *Kantia sphagnicola* and *Riccardia major*, both of which have been found within a few miles of the lake. Days could easily be spent here, among the meadows, lakes, and streams, and collections made that would surprise us by their magnitude and give many an interesting evening afterward, in examining the rarities and placing them in the herbarium. And the plants are not confined to the places mentioned, since the woods, the lake shore, even the damp stones, will produce rare or interesting specimens.

To the right of the camp is Cathedral Mountain, its slopes climbable by those with steady nerves. Wherever there is fine earth in the line of descending moisture, among the rocks, in the crannies and cracks, and on the shelves, there is plant life. Not many bryophytes are found away from the moist spots, but the lichens are everywhere. We are sure to find the thallose hepatics *Sauteria alpina* and *Clevea hyalina* in moist crevices, and *Asterella violacea* and *A. gracilis* should reward us, since they occur in similar situations not far distant. It is worth the climb, too, aside from all botanical interest, if we ascend as high as we can reach without risk (and that is well up toward the top of the north side) to get the lovely views. Sherbrooke valley lies to the north, its snowfed lakes showing every shade of blues, greens, purples, and milky white, the colors changing with the passing shadows. Westward, down the valley of the Kicking Horse, we may see the distant Selkirks. To the east and northeast is still a vast field of mountains, snowfields, and glaciers, until we get bewildered with the vastness of it all, and wonder whether there is any room left for the plains, even though we know that they are little more than forty miles away.

It is a steady climb from the meadow to Lake O'Hara. The trail takes us along the base of Cathedral Mountain, with glimpses of Pope's Peak and, higher up, the rock walls of Wiwaxy Peak, over rock slides and old moraines. The larger part of the trip is through woodland, but we should be constantly on the watch for "finds". *Lophozia Hatcheri* and *L. longidens* occur on the earth over the rocks. *Pleuroclada albescens* is found on the stones in the small streams, and *Scapania cordifolia* on the earth beside them. On the wetter ground we should look for *Sphenobolus politus*, and, in the damp spots, *S. scitulus* and *Nardia Breidlerii*. On the debris and on the stones in the streams there are small shallow patches of *Arnellia fennica*. Approaching the lake, we pass the small meadow that leads from it, and may find *Nardia geoscyphus* and *Gymnomitrium varians* growing on grassy tufts of earth. Finally we reach what seems to be a small lake, though it is really an arm of Lake O'Hara. The latter is but a cup surrounded by mountains, some of which are among the highest and most difficult in the Rockies. Mount Hungabee, 11,447 feet, and Mount Deltaform, 11,225 feet, have the reputation of being the most difficult. Lake O'Hara is itself over 6,600 feet above sea level, so that its flora is decidedly alpine. Lake Oesa, however, which empties into it over the cliffs at the southern end, is even more arctic, being frozen nearly the year round.

We may camp near the arm of the lake, or press on along the trail to near the base of the falls from Lake Oesa. In any case, we are sure to find interesting plants. I have merely skimmed a part of it, but around the lake, on damp to wet earth, the following *Lophozias* occur:—*LL. confertifolia*, *quadriloba*, *porphyroleuca*, *ventricosa*, *longidens*, *lycopodioides*, *Lyoni*, *Floerkii*, *heterocolpa*, *incisa*, *Kunzeana*, and *Schultzii*. Wherever a stream runs, on the stones and earth, plants rarely met outside the highest regions may be found:—*Anthelia Juratzkana*, *Sphenobolus scitulus*, *S. Michauxii*, and *S. politus*, *Jungermannia sphaerocarpa*, and *J. atrovirens*. On a rock by the trail, near the lake, *Ptilidium californicum* and *Cephaloziella Brinkmani* grow associated. The feeling all along is not what we have found, but what we have missed.

All around, the mountains, with their everchanging forms and vistas, invite us to frequent rests and contemplation. Yet the height seems to have an exhilarating effect that enhances our power of enjoyment. Our eyes are cleared, our lungs strengthened, our nerves steadied, and our muscles hardened: we feel that the trip was worth while from the point of health alone. We go to rest amid the smell of the firs, thoroughly tired, and waken, however early the hour, refreshed and eager for another day of enjoyment, with an appetite for the plainest meals, possible only under some such circumstances. And the multitude of beautiful views impresses itself so on our memory that long afterward we enjoy the beauty and glory of it all, even though the feeling may be tempered with regret that we have visited only one of the many hundreds of beautiful valleys amid the Rockies.

CRAIGMYLE, ALBERTA.

THE USNEAS OF THE WORLD, 1752-1914

With Citations, Type Localities, Original Descriptions, and Keys
Part II.—South America

R. HEBER HOWE, JR.

To gather together the material for the present part has been no small task, and if through inadvertance any species have been overlooked the author earnestly hopes his attention will be called to the omissions. The former Part I of the present paper was published in the Proceedings of the Thoreau Museum of Natural History I: 15-25. 1913. So many requests have been received for it that it has been thought well to publish the future parts in a more widely known and accessible medium. Part I, North America, can be secured by addressing the author.

LIST OF USNEAS DESCRIBED FROM SOUTH AMERICA

1. *Usnea Hieronymi* var. *adusta* Kremphl.
2. " *barbata* var. *amblyoclada* Müll. Arg.
3. " *melaxantha* var. *angulosa* Müll. Arg.
4. " (*Neuropogon*) *antennarius* Nees & Flot.
5. " *arthrocladon* Fée.
6. " (*Parmelia*) *coralloides*, *aspera* Eschw.
7. " *arthroclada* var. *aspera* Müll. Arg.
8. " *bogotensis* Wain.
9. " *Bornmuelleri* var. *brasiliensis* Zahlbr.
- " *Ceruchis* Montg.
10. " (*Lichen*) *Cinchonae* Willd.
11. " *cladocarpa* Fée.
12. " *concinna* Strtn.
13. " *concreta* Montg.
14. " *coralloides* Wallr.
15. " *florida* f. *dasycera* Nyl. apud Crombie.
16. " *densirostra* Tayl.
17. " *barbata* var. *mollis* f. *denudata* Wain.
18. " *fasciata* Torr.
19. " *barbata* var. *fastuosa* Müll. Arg.
20. " *trichodea* f. *firma* Kremphl.
21. " *barbata* var. *strigosa* stat. *ferruginascens* Müll. Arg.
22. " *flexuosa* Tayl.
23. " *strigosella* var. *furfurosula* Zahlbr.
24. " *barbata* var. *dasyypoga* stat. *fusco-rufa* Müll. Arg.
25. " *laevis* var. *glacialis* Zahlbr.
26. " *barbata* f. *glaucescens* Kremphl.
27. " *cornuta* var. *gracilescens* Jatta.

28. *Usnea gracilis* Pers.
29. " *sulphurea* var. *granulifera* Wain.
30. " *Hieronymi* Kremphl.
31. " *Baileyi* f. *implexa* Zahlbr.
32. " *laevis* var. *implexa* Müll. Arg.
33. " *Bornmuelleri* var. *brasiliensis* f. *inactiva* Zahlbr.
34. " *cinchonarum* var. *inactiva* Zahlbr.
35. " *laevigata* Pers.
36. " *laevigata* Wain.
37. " *florida* var. *leioclada* Zahlbr.
38. " *maculosa* Strt.
39. " *melaxantha* Ach.
40. " *meridionalis* Zahlbr.
41. " *miliaria* Tayl.
42. " *sulphurea* var. *normalis* Wain.
43. " *barbata* var. *oxygona* Müll. Arg.
44. " *angulata* var. *paradoxa* Zahlbr.
45. " *poliothrix* Kremphl.
46. " *punctulata* Strt.
47. " *radiata* Strt.
48. " *ceratina* var. *reagens* Zahlbr.
49. " *barbata* var. *florida* stat. *rubescens* Müll. Arg.
50. " *plicata* var. *scabra* Müll. Arg.
51. " *dasyypoga* var. *plicata* f. *sorediata* Zahlbr.
52. " *plicata* var. *sorediosa* Müll. Arg.
53. " *arthroclada* var. *spinulosa* Müll. Arg.
54. " *Steineri* Zahlbr.
55. " *melaxantha* f. *strigulosa* Zahlbr.
56. " *melaxantha* var. *subciliata* Zahlbr.
57. " *barbata* var. *subcorunta* Müll. Arg.
58. " *barbata* var. *subelegans* Wain.
59. " *barbata* var. *subelegans* f. *subinermis* Wain.
60. " *trachycarpa* var. *sublaevis* Müll. Arg.
61. " *barbata* var. *comosa* stat. *subrubiginea* Müll. Arg.
62. " *Steineri* var. *tincta* Zahlbr.
63. " *trachycarpa* var. *trachycarpoides* Wain.
64. " *barbata* var. *trachyclada* Müll. Arg.
- " *tumidula* Tayl.

KEY TO THE USNEAS OF SOUTH AMERICA

—*Neuropogon*—

Branches terete

Apothecial disc ciliate

Disc black

Smooth. 39. *melaxantha*

Verrucose

Esoreciate. 42. var. *normalis*

Soralio-tuberculate. 29. var. *granulifera*

Strigose. 55. f. *strigulosa*

Apothecial disc eciliate

Disc black

KHO+. 4. *antennarius*

KHO—. 18. *fasciata*

Subciliate. 60. var. *sublaevis*

Disc concolorous. 56. var. *subciliata*

Branches angulate. 3. var. *angulosa*

Uncertain species: 63. *U. trachycarpa* var. *trachycarpoides*

—*Excavatae*—

Chondroid axis lacunose, fistulous or

arachnoid. 32. var. *implexa*

—*Leptinae*—

Chondroid axis 1-5 diameter of thalloid filament (internodal measurement)

Erect or subpendulous

Fibrils spinulose, stipate

Cortex thin, 50-70 μ

KHO—. 17. f. *denudata*

KHO+. 58. var. *subelegans*

Cortex thick, 170-240 μ

KHO—. 34. var. *inactiva*

KHO+. 10. *cinchonae* (= *cinchonarum*)

Fibrils espinulose, adventive

Branches angulate, papillate. 64. var. *trachyclada*

Branches terete

Cortex simple

Articulate, KHO+. 62. var. *tincta*

Nonarticulate, KHO—. 54. *Steineri*

Cortex double

Fibrils infrequent

Branches inflated, articulate

KHO+. 9. var. *brasiliensis*

KHO—. 33. f. *inactiva*

Fibrils frequent, branches

non-articulate. 40. *meridionalis*

Uncertain species: 27. *U. cornuta* var. *gracilescens*

—*Mesinae*—

- Chondroid axis 1-3 diameter of the thalline filament
Apothecial margin densely ciliate; cilia pinnate
Thallus prostrate, articulate, fibrils
 stipate. 11. *cladocarpa*
- Apothecial margin sparsely ciliate; cilia simple
Cortex smooth
 Espinulose; cilia articulate. 5. *arthrocladon*
 Spinulose; cilia articulate. 53. var. *spinulosa*
- Cortex asperate
Thallus erect
 Articulate, smooth. 45. *poliothrix*
 Nonarticulate, cartilaginous
 Branches evolute
 Cinereus
 Smooth. 37. var. *leicoclada*
 Verrucose or papillate
 Esorediate
 Strigose; fibrils stipate. . . . 21. *ferruginascens*
 Estrigose
 Dicroic 49. st. *rubescens*
 Non-dicroic. 14. *coralloides* (= *florida*)
 Sorediate. 61. st. *subrubiginea*
- Branches adventive (saxicolous)
Cortex smooth
 Branches intricate
 KHO— 32. var. *implexa*
 KHO+ 25. var. *glacialis*
 Branches not intricate. 35. *laevigata*
- Cortex verrucose. 6. *aspera* (= 41. *miliaria*)
- Thallus pendulous
Primary branches 1-2 mm. diameter
Thallus subarticulate, mostly smooth
 Spinulose. 24. st. *fusco-rufa*
 Espinulose
 Asperate. 50. var. *scabra*
 Sorediate. 51. f. *sorediata* (= 52. var. *sorediosa*)
- Thallus nonarticulate, papillate
 KHO+ 48. var. *reagens*
- Primary branches 0.3-0.6 mm. in diameter
Smooth. 20. f. *firma*
Cavernose. 46. *punctulata*
- Uncertain species: 35. *U. laevigata* Pers.; 8. *bogotensis*; 15. *florida* f. *dasycera*; 22. *flexuosa*; 26. *barbata* f. *glaucescens*; 43 *barbata* var. *oxygona*.

—Pachynae—

Chondroid axis $\frac{1}{2}$ diameter of the thalline filament

Branches terete

Thallus intricate

Erect

Flavous

Fibrillose.....19. var. *fastuosa*

Efibrillose.....57. var. *subcorunta*

Cinereus

KHO+.....16. *densirostra*

KHO—

Fibrils concolorous.....30. *Hieronymi*

Fibrils black-tipped..... 1. *adusta*

Prostrate

Exciple smooth.....12. *concinna*

Exciple papillate.....47. *radiata*

Pendulous.....28. *gracilis*

Branches angulate.....44. var. *paradoxa*

Uncertain species: 2. *U. barbata* var. *amblyoclada*; 13. *concreta*; 23. *strigosella* var. *furfurosula*.

1. *Usnea Hieronymi* var. *adusta* Krempfl.

“Argentina.” (Flora 61: 436. 1878.)

“Fibrilli versus apices plus minus nigricantes, quasi adusti, caetera ut in typo.” l. c.

2. *Usnea barbata* var. *amblyoclada* Müll. Arg. (Flora 72: 509. 1889.)

“Serra Ventana.” Argentina.

“thallus et ramificatio et color virescenti-flavicans ut in var. praecedente, sed tota humilior, ramilli minus copiose v. evanescentes et rami ramulique soredioso-pulverulenti, quasi pulveraceo-incrassati et obtusi facti, saepius variet incurvi.” l. c.

Type in the Boissier Herbarium, Chambésy.

3. *Usnea melaxantha* Ach. var. *angulosa* Müll. Arg.

“Patagonia.” (Flora 71: 528. 1888.)

“thallo robusta, parce ramosa, apothecia ciliata dorso et rami et podetia tota longitudine v. saltem longo tractu valide alveolatim plicato-angulosa.—Discus fuscus, v. cinerascens-fuscus, at tum decoloratus tantum, in epithecio enim pigmentum nigrum hinc inde copiose occurrit et ramilli caeterum adsunt immixti bene cum var. *sphacelata* Montg. hujus speciei congruentes.” l. c.

Type in the Boissier Herbarium, Chambésy.

= *U. dasyvogoides* var. *angulosa* Müll. Arg.

4. *Neuropogon* [*Usnea*] *antennarius* Nees & Flot.

“Andes Antucenses, Chile.” 1829. (Linnaea 9: 497-498. 1834.)

“thallo stricto erecto polito teretiusculo ramoso-fastigiato ochroleuco, ramis setaceis nigricantibus pallide-annulatis, apotheciis podicellatis concavis, disco castaneo-nigro nitido, margine i. subtus ciliato-doryphorove.” l. c.

= *Usnea antennarius* (Nees & Flot.) Mass.

5. *Usnea arthrocladon* Feé.

"Brasilia." (Supple. Essai sur les crypt. 148. *Pl.* 3. f. 4. 1836.)

"Thallo cylindraceo, prostrato, laevi, subvernicioso helvolo, articulado, articulis discretis, ramis divaricatis, bifurcationibus subarcuatis, nudis, junioribus fibrillosis, apice acutis.

"Apotheciis (orbillis) concoloribus, amplis, orbicularibus, radiatis; radiis longissimis, articulatis, laxis." l. c.

= *U. intercalaris* Wain. (non Kremphl.) (Beitr. Kennt. Lich.—Fl. Suds.—Inseln, Jour. Mus. Godeffroy 4: 96. 1873.)

= *U. laevigata* Pers. (Gaudich. Voy. Uran. 209. 1826.)

= *U. articulata* var. *dimorpha* Müll. Arg. (Flora 74: 372. 1891.)

6. *Parmelia Coralloides, aspera* Eschw.

"Minas Adamantium Brasiliae"—"Brasilia meridionali." (Martius Flora Brazil. 1: pt. 1, 227. 1833.)

"Thallo caespitoso erectiusculo aspero-tuberculoso ramuloso passim fibrilloso, ochroleuco et cinerascens, scutellis subterminalibus appendiculatis, disco carneo albescente, margine radiatim ciliato." l. c.

= *U. barbata* var. *aspera* (non Eschw.?) Müll. Arg. (Jahrb. Kgl. bot. Gart. und Museum 2: 309. 1883. Flora 71: 20. 1888.)

= *U. aspera* (Eschw.) Wain. (Etude Class. Nat. Morph. Lich. Bresil 7. 1890.)

= *U. laevis* var. *aspera* (Eschw.) Müll. Arg. (Hedw. 30: 225. 1891.)

= *U. jamaicensis* Kremphl. non Ach. (Lich. Univ. 619. 1810.) fide Wain.

7. *Usnea arthroclada* var. *aspera* Müll. Arg.

"Theresopolis" "Serra do Picu," Brazil. (Hedw. 30: 225. 1891.)

"rami vulgo esorediosi et minus longe et minus acute acuminati, verruculosos-aspera et subnodulosi, spinulis et glaucedine destituti." l. c.

Type in the Boissier Herbarium, Chambésy.

8. *Usnea bogotensis* Wain.

"prope Bogota." "Ad saxa 8000 s. m." (Hedw. 38: 121. 1899.)

"Forsan est subspecies *U. jamaicensis* Ach., thallo apicem versus bene soledioso ab ea differens. Thallus erectus, long circ. 90 mm. basin versus rigidus, ramis primariis circ. 1, 5-1 mm crassis, crebre minuteque verruculosus, glaucescenti-stramineus, ramis omnibus teretibus, ramis adventitiis raro evolutis. Stratum mycelhyphicum crebrum, jodo non reagens, KHO lutescens, dein subrubescens." l. c.

No. 40: J. Weir, in the Kew Herbarium, London.

[To be Continued]

SHORTER NOTES

I was much interested in reading of the two recent finds of *Leptobryum pyriforme* (L.) Wilson with gemmae. I collected this plant about eight years ago in an open field in Amesbury, Mass. As I sent some of the material to Dr. Best for investigation, he probably can vouch for my find. The moss was growing on a heap of muck carted from a bog to a wet field. The plants were growing separately, not in clumps, and were very delicate and pretty.

J. W. HUNTINGTON.

AMESBURY, MASS.

PRELIMINARY LIST OF COLORADO HEPATICAE

ALEXANDER W. EVANS

The published records on the Hepaticae of Colorado are exceedingly scanty. In 1874 Austin¹ listed fifteen species which had been collected in 1873 by Professor John Wolf, under the auspices of the Wheeler Exploring Expedition. In 1876 Rau² listed five species which had been collected from 1873 to 1875 by Mr. T. S. Brandegee. All subsequent records, with a single exception, are evidently based on these two early lists.

The species listed by Austin are the following: *Riccia Frostii*, *R. Watsoni*, *R. crystallina*, *R. fluitans* var. *lata*, *Marchantia polymorpha*, *Chiloscyphus polyanthus* var. *rivularis*, *Jungermannia bicuspidata*, *J. incisa*, *J. Hornschuchiana*, *J. Muelleri*, *J. cordifolia*, *J. ventricosa*, *Scapania compacta*, *S. undulata*, and *S. uliginosa*. Those listed by Rau include *Marchantia polymorpha* and *Scapania compacta* and, in addition, *Reboulia hemisphaerica*, *Jungermannia pumila*, and *J. trichophylla*.

The first two species of *Riccia* which Austin listed, *R. Frostii* and *R. Watsoni*, were manuscript species, but he published them formally the following year.³ He stated, however, that *R. Watsoni* might be nothing more than the male plant of *R. Frostii*, and at the present time it is so regarded. Another species listed by both Austin and Rau is *Scapania compacta*. In all probability the records are based on incorrect determinations because this species is not now definitely known outside of Europe, except from a single locality in Greenland. The other sixteen species listed may doubtless be accepted as correct, although it is unfortunate that full details are not given about the localities where they were found.

During the past few years the writer has received several small collections of Colorado Hepaticae for determination, and the present paper is based on these collections. It increases the number of species known from the state to forty-one. It is hoped that the publication of this list may arouse further interest in the Hepaticae among the botanists of Colorado, so that in time our knowledge of the hepatic flora of this interesting region may be more complete. The sequence adopted is that of Schiffner in Engler & Prantl's *Die naturlichen Pflanzenfamilien*. The dates given show when each species was first collected, so far as this could be ascertained.

1. RICCIA FROSTII Aust. *R. Watsoni* Aust. Along the Platte River, near Denver, 1865, *C. C. Parry*; without definite localities, *J. Wolf*; near Denver, *E. Bethel* 1.

2. RICCIA LESCURIANA Aust. Lake Eldora, 1910, *E. Bethel*.

¹ Hepaticae. In Rothrock, J. T., Preliminary report on the botany of Central Colorado 62. Washington. 1874. [Geographical and Geological Exploration and Survey, west of the one hundredth meridian, George M. Wheeler in charge.]

² List of Colorado Musci and Hepaticae, collected by T. S. Brandegee in 1873-75. Bull. Torrey Club 6: 89, 90. 1876.

³ Bull. Torrey Club 6: 17. 1875.

3. RICCIELLA CRYSTALLINA (L.) Warnst. *Riccia crystallina* L. Without definite locality, 1873, *J. Wolf*; Sulphur Springs, *F. E. Clement*; Colorado Springs, *C. C. Haynes 1507*.

4. RICCIELLA FLUITANS (L.) A. Br. *Riccia fluitans* L. Without definite locality, 1873, *J. Wolf*. No Colorado specimens of this species have been seen by the writer. The variety *lata*, which is cited by Austin, is described in the Synopsis Hepaticarum (p. 610). It is apparently an unimportant form.

5. CLEVEA HYALINA (Sommerf.) Lindb. Golden, 1899, *E. Bethel*; West Spanish Peak, *Rydberg & Freeland*; west of Ouray, *Underwood & Selby*; Fraser, Granby, and Coulter, *E. Bethel 2* (in part), 3. Already recorded from Colorado by the writer; see *Rhodora 16: 63. 1914*.

6. REBOULIA HEMISPHERICA (L.) Raddi. Without definite locality, 1873-75, *T. S. Brandegee*; Granby, *E. Bethel 3*.

7. GRIMALDIA FRAGRANS (Balb.) Corda. Five miles west of Fort Collins, 1896, *C. F. Baker 6*: foot-hills near Fort Collins, 1896, *C. S. Crandall*; Fraser, *E. Bethel 2* (in part).

8. ASTERELLA GRACILIS (Web. f.) Underw. Boulder, 1904, *E. Bethel 4*; near Tolland, *C. J. Young*.

9. CONOCEPHALUM CONICUM (L.) Dumort. Palmer Lake, 1910, *E. Bethel*; Cheyenne Canyon, near Manitou Springs, *C. C. Haynes 1509* (in part).

10. PREISSIA QUADRATA (Scop.) Nees. Cheyenne Canyon, near Manitou Springs, 1912, *C. C. Haynes 1509* (in part).

11. MARCHANTIA POLYMORPHA L. Without definite locality, 1873, *J. Wolf*; without definite locality, *T. S. Brandegee*; Fort Collins, *C. F. Baker*; Gypsum Creek Canyon, *C. S. Crandall*; Chambers Lake, *C. F. Baker 5*; Luton Creek, *T. D. A. Cockerell*; Gunnison, *N. L. T. Nelson*; Mt. Carbon, near Gunnison, *N. L. T. Nelson 2256, 2279, 2292, 2409, 2516*.

12. MARSUPELLA EMARGINATA (Ehrh.) Dumort. Pikes Peak, 1896, *J. M. Holzinger*.

13. JUNGERMANNIA CORDIFOLIA Hook. Without definite locality, 1873, *J. Wolf*; within one hundred miles of Canyon City, *T. S. Brandegee* (not listed by Rau); Pikes Peak, *A. W. Evans*; Minnehaha, *G. E. Nichols*.

14. JUNGERMANNIA PUMILA With. Without definite locality, 1873-75, *T. S. Brandegee*. No Colorado specimens of this species have been seen by the writer.

15. JUNGERMANNIA SPHAEROCARPA Hook. Pikes Peak, 1896, *J. M. Holzinger*; Minnehaha, *G. E. Nichols*.

16. LOPHOZIA BARBATA (Schmid.) Dumort. Pikes Peak, 1896, *J. M. Holzinger*; Cheyenne Canyon, near Manitou Springs, *C. C. Haynes 1511*; Minnehaha, *G. E. Nichols*.

17. LOPHOZIA CONFERTIFOLIA Schiffn. Palmer Lakes, 1913, *G. E. Nichols*.

18. LOPHOZIA FLOERKII (Web. & Mohr) Schiffn. Pikes Peak, 1896, *J. M. Holzinger*.

19. LOPHOZIA HATCHERI (Evans) Steph. Minnehaha, 1913, *G. E. Nichols*; near Tolland, *A. J. Grout*.

20. LOPHOZIA HORNSCHUCHIANA (Nees) Dumort. *Jungermannia Hornschuchiana* Nees. Without definite locality, 1873, *J. Wolf*. No Colorado specimens of this species have been seen by the writer.

21. LOPHOZIA INCISA (Schrad.) Dumort. *Jungermannia incisa* Schrad. Without definite locality, 1873, *J. Wolf*; mostly within one hundred miles of Canyon City, *T. S. Brandegee* (not listed by Rau); Breckenridge, *J. M. Holzinger*.

22. LOPHOZIA KUNZEANA (Nees) Evans. Minnehaha, 1913, *G. E. Nichols*.

23. LOPHOZIA LYCOPODIODES (Wallr.) Cogn. Mt. Carbon, near Gunnison, 1909, *N. L. T. Nelson*; near Tolland, *A. J. Grout*.

24. LOPHOZIA MUELLERI (Nees) Dumort. *Jungermannia Muellerei* Nees. Without definite locality, 1873, *J. Wolf*; west of Ouray, *Underwood & Selby*.

25. LOPHOZIA PORPHYROLEUCA (Dicks.) Schiffn. Near Pagosa Peak, 1899, *C. F. Baker*; Rolline Pass, *E. Bethel*.

26. LOPHOZIA VENTRICOSA (Dicks.) Dumort. *Jungermannia ventricosa* Dicks. Without definite locality, 1873, *J. Wolf*. The writer has seen no Colorado material of this species.

27. SPHENOLOBUS EXSECTAEFORMIS (Breidl.) Steph. Pikes Peak, 1896, *J. M. Holzinger*; White Rocks, Boulder, *E. Bethel 1*; Minnehaha, *G. E. Nichols*.

28. PLAGIOCHILA ASPLENIODES (L.) Dumort. Pikes Peak, 1896, *J. M. Holzinger*; near Manitou Springs, *C. C. Haynes 1514*; Minnehaha, *G. E. Nichols*.

29. CHILOSCYPHUS RIVULARIS (Schrad.) Loeske. *Ch. polyanthus rivularis* Nees. Without definite locality, 1873, *J. Wolf*; eight miles south of Steamboat Springs, *C. F. Baker*; near Tolland, *A. J. Grout*.

30. CEPHALOZIA BICUSPIDATA (L.) Dumort. *Jungermannia bicuspidata* L. Without definite locality, 1873, *J. Wolf*; Breckenridge, *J. M. Holzinger*; Palmer Lakes, *G. E. Nichols*.

31. CEPHALOZIELLA HAMPEANA (Nees) Schiffn. Cheyenne Canyon, near Manitou Springs, 1912, *C. C. Haynes, 1510*.

32. BLEPHAROSTOMA TRICHOPHYLLUM (L.) Dumort. *Jungermannia trichophylla* L. Without definite locality, 1873-75, *T. S. Brandegee*; mostly within one hundred miles of Canyon City, *T. S. Brandegee 49*; Pikes Peak, *J. M. Holzinger*; near Pagosa Peak, *C. F. Baker*; Minnehaha, *G. E. Nichols*.

33. SCAPANIA BARTLINGII (Hampe) Dumort. Pikes Peak, 1896, *J. M. Holzinger*. Not before recorded from the United States. Possibly the specimens listed by Austin and by Rau as *S. compacta* would now be referred to this species; they have not been examined by the writer.

34. SCAPANIA CURTA (Mart.) Dumort. Pikes Peak, 1896, *J. M. Holzinger*; Minnehaha, *G. E. Nichols*.

35. SCAPANIA DENTATA Dumort. Minnehaha, 1913, *G. E. Nichols*.

36. SCAPANIA SUBALPINA (Nees) Dumort. Near Tolland, 1914, *A. J. Grout*.

37. SCAPANIA ULIGINOSA (Sw.) Dumort. Twin Lakes, 1873, *Wolf*.

38. SCAPANIA UNDULATA (L.) Dumort. Without definite locality, 1873, *J. Wolf*; Granby, *E. Bethel 5*; near Corona, *E. Bethel*; near Tolland, *A. J. Grout*.

39. *RADULA COMPLANATA* (L.) Dumort. Pikes Peak, 1896, *J. M. Holzinger*.
40. *PORELLA RIVULARIS* (Nees) Trevis. Near Estabrook, Platte Canyon, 1896, *J. M. Holzinger*.
41. *ANTHOCEROS LAEVIS* L. Boulder, 1908, *E. Bethel*.

All of the species listed are widely distributed in North America and Europe and most of them have likewise been reported from northern Asia. This is probably due to the fact that they represent northern rather than southern genera. The total absence of the Jubuleae will be noted. If any of these are discovered in Colorado they will probably represent endemic North American species. There is little likelihood, however, that the Jubuleae are largely represented in the state, although a few species of *Frullania* ought perhaps to be expected.

SHEFFIELD SCIENTIFIC SCHOOL, YALE UNIVERSITY.

JOHN B. LEIBERG*

John B. Leiberg was born at Malmö, Sweden, October 7th, 1853. When a boy of thirteen years he came to this country and at first lived in Iowa, though later moving further West. He had most of his formal schooling before leaving Sweden, but it is more accurate to say that his education never ceased, to the last he was eager for further knowledge, and for continued investigation. From boyhood he had been interested in things out of doors, and had formed the habit of close, accurate observation which never left him. But, like many busy men, he seems to have published but little. His personal character won the respect and affection of all who came into contact with him—as one correspondent writes, "He was a *good* man; no higher praise can be given."

Before 1889 he was in correspondence with Mrs. E. G. Britton. At this time he was living at Hope, Idaho, and studying the flora of Kootenai County. The results of these collections were published by Mrs. Britton in the "Bulletin of the Torrey Botanical Club" under the titles, "An Enumeration of the Mosses Collected by Mr. J. B. Leiberg in Kootenai County, Idaho" (Vol. XVI.), and "A Supplementary Enumeration of Mosses Collected in Idaho by J. B. Leiberg." (Vol. XVIII.) Besides the annotated list of species, these papers contained the announcement of the first collection in fruit of *Grimmia torquata* Hsch., and the description of *Hypnum (Thamnum) Leibergii*, E. G. B., a species new to science.

For many years Mr. Leiberg was connected with the United States Department of Agriculture, during which time he traveled extensively in the West, collecting freely wherever he went. He also spent a year in the Philippine Islands in the employ of the Bureau of Forestry, and later spent another year there on his own account, in the study of the flora. In 1909, accompanied by Mrs. Leiberg, he made a leisurely trip around the world visiting especially the

* The following notice of Mr. Leiberg should have appeared some time since, but the news of his death was not received for nearly a year after the event and the pressure of other work has greatly delayed the collecting of even the few notes given here.

East Indies, and at the close of this trip spent some time in Washington, D. C., in the study of his collections. Following this, the remaining years of his life were spent quietly at his home in Leaburg, Oregon, where he died the 28th of October, 1913. His wife and two sons survive him. For the last few years he had become specially interested in the bacteria, and in the tropical epiphyllous lichens. Previous to his death, his large collection of flowering plants had been given by him to the University of Oregon. In accordance with his wishes, his other collections were sent to the National Herbarium at Washington.

Besides some species of flowering plants, the following mosses have been named for Mr. Leiberg: *Thamnum Leibergii*, mentioned above, and *Grimmia Leibergii* Paris, (*G. pachyphylla* Leiberg, non C. Müll.).

The following list includes the titles of all papers by Mr. Leiberg that have come to hand.

1. Some Notes upon *Tripterocladium leucocladulum* C. Müll. Bull. Torrey Club **19**: 7-9. 1892.
2. Two New Species of Mosses from Idaho. Bull. Torrey Club **20**: 112-116. *pl. cxliii, cxliv*. 1893.
Ditrichum montanum and *Grimmia pachyphylla*, spp. nov.
3. On the Carpels of *Opulaster malvacea* Greene. Bull. Torrey Club **22**: 271-272. 1895.
4. General Report upon the Botanical Survey of the Coeur d'Alene Mountains of Idaho during the Summer of 1895. Cont. U. S. Nat. Herb. **5**: 1-85. 1897.
5. *Delphinium viridescens* and *Sambucus leiosperma*. Two New Plants from the Northwest Coast. Proc. Biol. Soc. Washington **11**: 39-41. 1897.

EDWARD B. CHAMBERLAIN,
New York City.

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Miss Daisy Levy, 403 West 115th St., New York City.—*Stereodon cupressiforme* (L.) Brid., and *Hylocomium proliferum* (L.) Lindb., both collected at Fontainebleau, France.

Mr. Edward B. Chamberlain, 18 West 89th St., New York City.—*Dicranella subulata* (Hedw.) Schimp., c. fr., collected in Finland by Dr. Brotherus.

Miss Helen E. Greenwood, 5 Benefit Terrace, Worcester, Mass.—*Pallavicinia Lyellii* (Hook.) S. F. Gray, collected in Worcester, Mass., Oct. 5, 1914.

Dr. R. Heber Howe, Jr., Thoreau Museum of Natural History, Concord, Mass.—*Nephromopsis platyphylla* (Tuck.) Herre, and *Parmelia physodes* (L.) Ach., collected at Okanagan, B. C., February, 1915, by Mr. J. A. Munro.

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THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
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“Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879.”
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THE BRYOLOGIST

Bimonthly Journal of

THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICS AND LICHENS

Subscription in the United States, \$1.25 per year; in a
other countries, \$1.35., Society membership, 25 cents addi-
tional. Single copies, 25 cents. Vols. I-XVII, 1898-1914, \$16.50.

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THE BRYOLOGIST

VOL. XVIII

JULY, 1915

No. 4

RAMBLES IN THE CANADIAN ROCKIES

II.—BANFF

A. H. BRINKMAN

Banff and its surroundings have one great advantage—they are very accessible. To those who are not keen on camping, a town with numerous hotels, situated in the midst of fine scenery and good collecting and as yet nearly unspoiled by so-called civilization, should make a strong appeal. It is a satisfaction, after all, when returning from the day's excursion to find close at hand meals and other comforts not obtainable in camp.

While ten minutes' walk in any direction will take the botanist to good collecting grounds, perhaps the best start is made by a trip to the hot springs and thence to the observatory on Sulfur Mountain, since this furnishes a good idea of the "lay out" of the country. From the observatory typical main valleys may be seen in the Spray Valley to the east and the Sundance to the west, neither of them rising more than a thousand feet in fifteen miles. Rundle Mountain is opposite to the east, not difficult for a careful climber, being really much weather-worn and broken, though appearing from below to be a smooth, sloping, table of rock. By those wishing for the climb the watercourse that can be seen between the shoulder and the main mass should be noted carefully, since it furnishes a practicable route from the lower wooded slope to the main peak and abounds in interesting plants. From Sulfur Mountain it is possible to map out routes for a day or a two-day excursion, and to plan shorter trips in the woods along the Spray River or along its numerous mountain tributaries.

The trail from the hot springs to the observatory is good, so that there should be no difficulty in climbing to the latter. About midway up the mountain-side a short branch trail leads to a streamlet to the south, which should be carefully noted since it forms an excellent one-day excursion if followed from its source to the Spray River. There are good possibilities for collecting along the main trail also; *Clevea hyalina* grows in small patches close at hand, and *Sauteria alpina* has been found on the mountain. Once at the top and future excursions planned, it is possible, after the wonderful scenery on all sides has been fully enjoyed, to follow along the ridge north and so down the northwest slopes to the trail leading to Banff. On the bare ground are patches of *Leskea tectorum*; *Campyllum Halleri*, *Grimmia anodon*, *Gymnostomum rupestre*, and *Encalypta rhabdocarpa* occur on rocks lower down; *Meesia trichodes* and *Fissidens grandifrons* are found near the upper sulfur spring and, on the north side of the river path when near-

ing the bridge, *Catoscopium nigratum*, growing among the grass. Near the stream referred to above, south of the observatory trail, *Encalypta rhabdocarpa* and *Tortula mucronifolia* grow on the wet earth of the stream bank.

Most of the above species with the addition of *Hygrohypnum alpestre* grow also along the Spray River to the south. In fact, all around the base of Sulfur Mountain in the Sundance, Bow, and Spray Valleys there are many, many mosses, of which those mentioned above represent only "pickings" from limited collections. Hepatics are very abundant, especially those of the *Lophozia* group: *LL. badensis*, *barbata*, *excisa*, *grandiretis*, *heterocolpa*, *Hornschuchiana*, *incisa*, *Kaurini*, *longiflora*, *Muelleri*, *Schultzii*, and *ventricosa*, have been gathered here, nearly always on wet or damp earth, besides *Sphenolobus exsectaeformis*, *Michauxii*, *politus*, and *scitulus*. *Calypogeia sphagnicola* associated with *Riccardia major* and *Cephalozia pleniceps* is found on the peaty stream sides, with *Calypogeia Neesiana* on decayed wood; *Pallavicinia Flotowiana* grows on the wet earth, *Arnellia fennica* in or beside the small streams, and *Scapania Bartlingii* on the ledges beside them. Really it is only by considering the small area, some four square miles, covered rather imperfectly in this account, that it is possible to gain an idea of the extensive collections that may be made here. The altitude varies from 4500 to 7000 feet, between which limits there is the greatest variety of habitats: rock bluffs, cliffs, gullies, stream beds, peat bogs, river marshes, wet open land, forest—it is a paradise for the collector.

For a trip up Rundle Mountain it is necessary to make an early start, and make certain plans beforehand. As has been mentioned, there is a practicable course up the stream bed between the shoulder and the main peak, but it is well when on Sulfur Mountain to take careful notes of the position since the trail is not very distinct. On leaving the stream bed, also, careful notes should be taken or marks made to avoid difficulty on the return. Hepatics, while not uncommon, are less frequent upon the higher slopes than further down, and for the most part duplicate those already mentioned in connection with Sulfur Mountain. The mosses, however, furnish many new forms. *Tetraplodon mnioides* grows on dung in the lower wooded slopes, *Encalypta Selwyni* in rock crevices along the stream and *E. streptocarpa* on the earth, *Andreaea nivalis* on the wet rocks, *Stereodon fastigiatus* in the stream bed and *Hygrohypnum palustre* beside it, *Orthotrichum pulchellum* amid the rocks on the mountain. The summit is easy of access once the slope has been gained, and affords especially fine views of the Bow River valley, with the higher, snow-clad peaks in the distance with their snow fields and glaciers.

Two other trips that promise well, but which I have been unable to take personally, are along Forty-mile Creek, between Stony Squaw and Norquay Mountains, and around Lake Minnewanka, to which daily trips are available from Banff with a hotel at the lake that would permit of a longer stay should conditions warrant. Indeed, the great point in favor of Banff as a center for a botanical holiday is the comparative ease with which interesting collecting grounds may be reached. And, let me say in passing, the flowering plants are as numerous and as beautiful as the bryophytes.

For a longer trip, the route up the Spray River valley past the Spray Lakes, over Mt. Assinaboine Divide, is well worth investigation. While the first day's journey is rather uninteresting from the denseness of the woods, the trip after that is a rare treat. The scenery from a camp on the north side of the Assinaboine Divide is perhaps the best within reach, especially the sunrise on the snow-fields. The mountain, with its shoulders and peaks, shows out so distinctly and clearly that it completely dominates the landscape. The divide is at an altitude of about 7000 feet and furnishes a typical mountain flora. The spongy ground and stream banks and the mountains to the north, which are easily climbable, present an alpine flora that I hope later to describe in connection with an account of the Simpson Pass. In fact, the whole region is fine camping country. This trip, however, since it is expensive and means camping in the open, may not appeal to many. They may be sure that the easier, shorter trips near Banff will furnish enough botanical booty to prevent all disappointment at not being able to go further afield.

CRAIGMYLE, ALBERTA.

LICHENS OF THE MOUNT MONADNOCK REGION, N. H.—NO. 6

THOMAS DURFEE

Under the direction of Dr. R. Heber Howe, Jr., I am continuing the publication of this list, in which the following genera have already been published by Dr. Howe: *Ramalina*, *Cetraria*, *Evernia*, *Usnea*, *Alectoria*, *Teloschistes*, *Parmelia*, *Physcia*, *Pyxine*, *Baeomyces*, *Stereocaulon*, and *Cladonia*.

Genus: *Gyrophora* Ach.

123. *Gyrophora Dillenii* (Tuck.) Arn. Four specimens; three fertile and one sterile.

124. *Gyrophora Muhlenbergii* Ach. var. *alpina* (Tuck.). Ten specimens; eight fertile and two sterile. Three specimens labeled *pennsylvanica* belong here.

125. *Gyrophora erosa* (Web.) Ach. One specimen, fertile.

126. *Gyrophora hyperborea* (Hoffm.) Ach. Seven specimens, including one from Mt. Carrigan. All these are sterile.

Genus: *Umbilicaria* (Hoffm.) Fw.

127. *Umbilicaria pustulata papulosa* Tuck. Four specimens, all fertile. Two are labeled *pustulata*, one *papulosa*, and one is unlabeled.

CONCORD, MASS.

ODONTOSCHISMA MACOUNII IN ICELAND

A. LEROY ANDREWS

At the time of publication of Evans's paper on this species and its North American allies,¹ it was known from several localities in northern North America, from Greenland, Spitzbergen, and Norway. Since then its range has been

¹ Bot. Gaz., XXXVI, 321ff. 1903; cf. also Blyhn, Bryophyta in itinere polari Norvagarum secundo collecta, 42f. 1906.

extended by a single locality in Scotland,² several in Sweden,³ and in Siberia,⁴ also in the Alps.⁵ As another link in the chain of its circumpolar distribution Iceland is of passing interest. It was found during the summer of 1914 (July 18) in a single locality near Reykjavík. This city is situated on a small peninsula which runs a short distance further to the northwest terminating in a point Gróttá with lighthouse. The point is cut off as an island at high tide. Nearer the city rises a slight hill, itself perhaps at one time an island, at any rate at high tide. It is strewn with fragments of rock like the other glaciated low hills about the city and shows also outcroppings of the preglacial doleritic lava characteristic of the immediate region. Among several interesting bryophytes which had established themselves here was the *Odontoschisma* growing in small quantity mixed with other hepatics and mosses on the ground about a large rock. Though considerable search was made in various other localities no further trace of the plant was found (in fact, no other *Odontoschisma* of any species), so that it is evidently not common in Iceland.

As to the specific worth of this plant as separate from *O. denudatum* Husnot has recently⁶ expressed doubts. Without being able to contribute anything to the discussion of this question I would only record my impression that the two species are easily distinguished both in the field and under the microscope.⁷

ITHACA, N. Y.

THE USNEAS OF THE WORLD, 1752-1912

With Citations, Type Localities, Original Descriptions, and Keys

Part II.—South America

[Concluded]

R. HEBER HOWE, JR.

9. *Usnea Bornmuelleri* var. *brasiliensis* Zahlbr.

"inter Faxina et Apiahy," "Prov. Sao Paulo."

(Denksch. math. naturw. Klasse kaiserl. Akad. Wissen. 83. 187. 1914.)

"Thallus subprocumbens, subochraceo-vel sulfereo-lutescens, opacus; ramis primariis teretibus, usque 2mm crassis, parce et leviter articulatis, minute papillo-
sis, dichotome et sympodialiter ramosis, ramulis curvatis vel uncinatis, sorediis
sat crebris pallidioribus, parvis, fere verruculiformibus, demum pulverulentis et
hinc inde confluentibus ornatis, spinulis haud evolutis; strato myelohypico
albo, laxo, KHO e flavo mox ferrugineo, J vix lutescente." l. c.

Type in the Royal Botanic Gardens, Vienna.

Usnea Ceruchis Montg. (Amer. Sci. Nat. Bot. 2: 368-369. 1834.)

= *Ramalina ceruchis* Ach.

² Macvicar, Handbook of British Hepatics, 301. 1912.

³ Arnell & Jensen, Moose des Sarekgebietes, I, 78f. 1907.

⁴ Arnell, Zur Moosflora des Lena-Tales, 14. 1913.

⁵ K. Müller in Rabenhorst, Kryptogamenflora, VI, 2, 225. 1913

⁶ Revue bryologique, XLI, 71ff. 1914.

⁷ *O. denudatum* has been reported from a single station in Iceland.

10. *Lichen Cinchonae* Willd.

"America meridionali." (Römer und Usteri May Bot. 2: *pt.* 4. 11-12. f. 3. 1788.)

"filamentosus teres, erectus, ramosissimus, fulvus." l. c.

= *U. florida* var. *cinchonarum* Fée. (Essai Cryptog. Ecole Offic 133. 1837.)

= *U. barbata* var. *Cinchonarum* Müll. Arg. (Flora 70: 57. 1887.)

11. *Usnea cladocarpa* Fée.

"Brasilia." (Supple. Essai sur les crypt. 150. *Pl.* 3. f. 5. 1824.)

"Thallo pendulo, aspero, cinerascete, ramoso, sub-tere-compresso, subflaccido, ramis patulis, grossis, verruculosis, ad originem constrictis; cephalodiis carneo-rufis, rugosissimis; ramulis fibrillosis, abbreviatis, fibrillis sub-oppisito, verticillatis, rugosis, truncato-obtusis.

"Apothecis (orbillis) concoloribus, subplanis, latis; margine undulato, ramulifero; ramis fibrillosis crebris." l. c.

= *Usnea barbata* var. *cladocarpa* Müll. Arg., (Flora 70: 57. 1887.)

12. *Usnea concinna* Strt.

"Brasilia." (Scot. Nat. 6: 103. 1881.)

"Similis *U. ceratimae*, robusta (basi crassit-usque ad 2mm), erecta, rigida, ramosa, papilloso-aspera (praesertim supra [*U. radiata*]); apothecia mediocria fibrilloso-ciliata, subtus laevia (rarissime pauci-papillosa); spora, .01-.012 x .006-.0075 mm." l. c.

13. *Usnea concreta* Montg.

"Coquimbo." Chile. (Gay. Flora Chile 8: 65. 1852.)

"thallo prostrato, crasso, basi contorto, irregulariter ramoso, fulvo, sorediis minutis albo-punctata; ramis divaricatis, concretis, ultimis capillaceo-attenuatis, virgato-fibrillosis, flaccidis, intricatis; apotheciis subterminalibus, ramulo appendiculatis ciliatis, appendiculo ciliisque virgato-fibrillosis; disco concolori; sporidiis amygoalinis." l. c.

In the Museum d'histoire naturelle, Paris.

14. *Usnea coralloides* Wallr.

Type locality not given. (Naturg. Flecht. 2: 370-371. 1825.)

"bl. dendriothamnide compactili funiculari chlorophaeno; cymatus orbicularibus peltatis planis margine discum pallidum speirematophorum sublevante thamiisque plerumque proliferis." l. c.

15. *Usnea florida* f. *dasycera* Nyl. apud Crombie.

"Huite (Chiloe)." (Jour. Linn. Soc. 15: 226. 1876.)

"Thallus lutescens dense ramulosus, ramulis conferte fibrillosis, fibrillis brevioribus." l. c.

16. *Usnea densirostra* Tayl.

"Monte Video." (Hook. Lond. Jour. Bot. 6: 192. 1847.)

"Thallo caespitoso, erecto, viridi-olivaceo, abbreviato, ex basi disciformi ramoso, infra incrassato, supra acuminato, ramis subuliformibus, densissimis, subpatentibus, gemmis granulatis statim elongantibus; apotheciis terminalibus, concavis, disco albedo, margine gemmis ciliato."

Type in the Taylor Herbarium, Boston Society of Natural History.

17. *Usnea barbata* var. *mollis* f. *denudata* Wain.

"Minarum," Brazil. (Etude Class. Nat. Morph. Lich. Bresil 7: 5. 1890.)

"thallo instructam flavido-glaescente, increbre cartilagineo-verruculoso, apicem versus stramineo-soredioso, ramulis adventitiis fere nullis, medulla myelohyphica laxa contexta, KHO lutescente (jodo non reagente). l. c.

18. *Usnea fasciata* Torr.

"rocks of New South Shetland." (Anier. Jour. Sci. 6: 106. 1823.)

"thallo pendulo scabriusculo tereti glauco irrescente ramosissimo, ramis rectis nigro-fasciatis quasi articulatis ramulis ultimis capillaceo-attenuates fibrillis lateralibus nullis cephalodiis sparsis hemisphericis atris." l. c.

19. *Usnea barbata* var. *fastuosa* Müll. Arg.

"Punta de Pique." Argentina. (Flora 72: 509. 1889.)

"rami primarii validi, elati, varie ramosi varieque papilloso v. sublaeves ramillis rigide flaccidis, varie patulis et curvatis, apice nigratis et concoloribus numerosis praediti; tota flavida, rigida." l. c.

Type in the Boissier Herbarium, Chambésy.

20. *Usnea trichodea* f. *firma* Kremphl.

"Brazil." (Lich. Brasil II. 1876.)

"Thallus flavescens, glaber, ramis typo crassioribus minus fibrillosus.

Thallus subtus vel ad basim (scilic. ad ramos primarios) diam. ad usque 1.7 mm." l. c.

21. *Usnea barbata* var. *strigosa* stat. *ferruginascens* Müll. Arg.

"Congonhas do Compo." Brazil. (Hedw. 30: 224. 1891.)

"tota aut saltem partes crassiores plus minusve ferrugineo-tinctae." l. c.

Type in the Boissier Herbarium, Chambésy.

22. *Usnea flexuosa* Tayl.

"Near Quito." (Hook. Lond. Jour. Bot. 6: 192. 1847.)

"thallo pendulo, implexo, cinereo, filiformi, ramosissimo, subnoduloso, ramis brevibus, flexuosis; gemmis minutis, granulatis; apotheciis concoloribus, tenuissimis, planiusculis, pruinosis, margine ramoso-ciliatis." l. c.

= *Us. plicata* var. *flexuosa* (Tayl.) Müll. Arg. (Flora 71: 21. 1888.)

23. *Usnea strigosella* var. *furfurosula* Zahlbr.

"Trino," Brazil. (Bull. Herb. Boiss. 8: 467-468. 1908.)

"Ramis (exceptis ultimis) plus minus furfuraceis vel subpulverulentis, Caeterum cum typo quadrat. Thallus pendulus, usque 15 cm. longus, mollis." l. c.

In the K. K. Naturhistorisches Hofmuseum, Vienna.

24. *Usnea barbata* var. *dasyypoga* stat. *fusco-rufa* Müll. Arg.

"Maritimis Itajahy," Brazil. (Hedw. 30: 225. 1891.)

"tota fusco-rufa." l. c.

Type in the Boissier Herbarium, Chambésy.

25. *Usnea laevis* var. *glacialis* Zahlbr.

"Chimborazo, [Ecuador] . . . von 4000-4800 m." (Beiht. Bot. Centrbl. 19 pt. 2: 83. 1905.)

"Thallus dense ramosus, ramis intricatis, in parte superiore soralibus elevatis, caesio-cinereis vel caesio-cinerascentibus, plus minus confluentibus sat dense obsitus. Thallus usque 6 cm. altis; stratum myelohyphicum KHO e lento ferrugineum, I-." l. c.

In the K. K. Naturhistorisches Hofmuseum, Vienna.

26. *Usnea barbata* f. *glaucescens* Kremphl.

"prope Oran, Argentina." (Flora 61: 436. 1878.)

"Apotheciorum disco glauco." l. c.

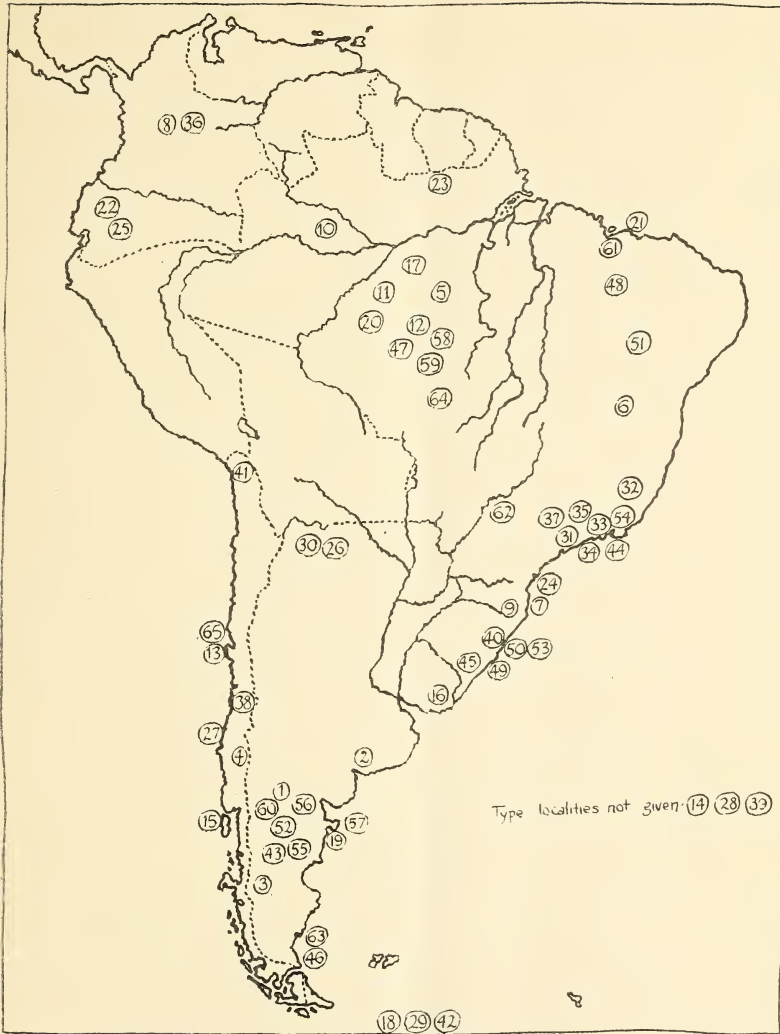


Fig. 1.—Type localities of *Usnea* in South America

27. *Usnea cornuta* var. *gracilescens* Jatta.

"Biobio (Conception)," Chile. (Malpig. 20: 3. 1906.)

"Thallus contracto-gracilescens, magis ramosus, intricatus." l. c.

28. *Usnea gracilis* Pers.

"in America?" (Annal. Wettau. Gesell. Nat. 2: 19. 1810. Pl. 10. f. 6.

"virescens, lorulis filiformibus, orbiculis sparsis setosis parvulis"

"Lorula horizontalis, flexuosa, patentia. Affinis *Usneae barbatae*." non *Usnea gracilis* Ach. (Lich. Univ. 627. 1810 though based on *Usnea gracilis* Pers. *Usnea gracilis* Ach. was described from "Insula Borbonia" as follows: "thallo pendulo laevissimo nitido filiformi albo, ramis raris conformibus rectis simplicibus subfibrillosis."

In the 's Rijks Herbarium te Leiden, Holland.

29. *Usnea sulphurea* var. *granulifera* Wain.

"Detroit de Gerlache." "l'Ile Auguste, 64° 2' de latitude sud." "l'Ile Brabant, 64° 21' de latitude sud." "Cap Anna Osterreith, 64° 33' de latitude sud, Terre de Danco." (Result. Voyage S. Y. Belgica, Bot. 6: 11. 1893. Tab. III, fig. 19.)

"Thallus partim crebre verruculosus, soraliis applanatis aut vulgo gemum tuberculiformibus, obscure cinereis, apices versus abundanter instructus, ceterum flavens aut apicibus plus minusve nigricantibus. Stratum myelohyphicum crebrum, KHO non reagens, Axis chondroideus jodo caeruleus. Excipulum ciliis destitutum subtus soraliis instructum, saepe reticulato-rugosum."

30. *Usnea Hieronymi* Krempfl.

"Prope Oran, in Sierra Tucreman," Argentina. (Flora 61: 436. 1878.)

"Planta, caespitem densum e multis speciminibus singulis compositum efformans. Specimenis singuli thallus erectus (alt. circ. 6-8 centim.), cinereo-virens vel virescens, ramoso-virgatus, stipites (rami primarii) ramulique teretes striato-aut papilloso-vel verruculoso-scabrida (papillis et striis albidis), subtus versus solum subnudi, nigricantes, crebre fibrillosi, fibrillis plus minus longis, scabridis, adscendentibus (non horizontalibus!); apothecia terminalia, lat. usque ad 1 centimet., peltiaut scutelliformia, horizontalia, disco pallido, margine receptaculari fibrilloso-ciliato fibrillis longis, excipulo subtus tenuiter nervoso vel scrobiculato; sporaer nae, ellipsoideae, simplices, hyalinae, long 0,009-011, crass 0,006-007 mm." l. c.

= *U. barbata* var. *Hieronymi* Müll. Arg., (Flora 72: 62. 1889.)

31. *Usnea Baileyi* f. *implexa* Zahlbr.

"prope S. Amaro," "Prov. Sao Paulo." (Denksch. math. naturw. Klasse kaiserl. Akad. Wissen. 83: 191. 1909.)

"Thallus erectus vel sub prostratus, usque 9 cm. altus, dense ramosus et implexus, ramis primariis cylindricis vel subcylindricis, 0,6-1 mm crassis, ad apices uncinatis vel incurvis, in parte superiore sorediis subpunctiformibus, planiusculis, albidis, demum plus minus confluentibus obsitis. Structura interna ut in planta typica. Apothecia non visa." l. c.

In the K. K. Naturhistorisches Hofmuseum, Vienna.

32. *Usnea laevis* var. *implexa* Müll. Arg.

"monte Itacolumi." Brasil. (Hedw. 30: 225. 1891.)

"thallus ut in v. aspera, at subdecumbens, e basi intricatim implexo-ramosus, rami longius filiformi-attenuati;" "varietates ambae ab *Usn. laevi* Nyl. specificè non differunt. Apothecia in iisdem caespitibus ludunt margine meda et plus minusve ciliata, dorso plus minusve papilloso-aspera; rami primarii

undeque v. longo tractu saltem valide papilloso-aspero, superne vulgo laeves, copia ramulorum eximie varii." l. c.

Type in the Boissier Herbarium, Chambésy.

33. *Usnea Bornmülleri* var. *brasiliensis* f. *inactiva* Zahlbr.

"Ad confines provinciarum Rio de Janeiro et Minas Geraes." (Denksch. math. naturw. Klasse kaiserl. Akad. Wissen. 83: 187. 1914.)

"Stratum myelohyphicum KHO—; thallus pallide ochraceus." l. c.

In the K. K. Naturhistorisches Hofmuseum, Vienna.

34. *Usnea cinchonarum* var. *inactiva* Zahlbr.

"Barra Mansa," "Prov. Sao Paulo." (Denksch. math. naturw. Klasse kaiserl. Akad. Wissen 83: 165-186. 1909.)

"A typo differt strato myelohyphico KHO non reagente, receptaculo apotheciorum extus reticulato-rugoso et scabrido. Apothecia usque 15mm. lata; sporae ut in planta typica." l. c.

In the K. K. Naturhistorisches Hofmuseum, Vienna.

35. *Usnea laevigata* Pers.

"In Brasilia (Rio-Janeiro)." (Gaudich. Voy. Uran. 209. 1826, 1830.)

"trunco subarticulato, ramis elongatis dichotomis laevibus denudatis, orbillis magnis subnudis ramuliferis." l. c.

=? *Us. articulata* (L.) Hoffm.

In the 's Rijks Herbarium te Leiden, Holland.

36. *Usnea laevigata* Wain.

"prope Bogota." (Hedwig. 38. 122. 1899.)

"Subsimilis *U. laevi* (Eschw.) Nyl., at medulla KHO lutescente, neque bene rubescente ab ea differens. Thallus erectus long 40-50 mm, sat rigides, ramis primariis circ. 1-0, 7mm crassis, laevigatis aut passim parce in crebreque minute verruculosis, glaucescenti-stramineus, ramis omnibus teretibus, ramis adventitiis nullis. Stratum myelohyphicum crebrum, jodo non reagens, KHO lutescens (siccum aurantiaco-rubescens). Apothecia disco crebre stramineo-pruinoso, margine saepe radiis paucis instructo, excipulo subtile vulgo laevigato."

On rocks.

37. *Usnea florida* var. *leioclada* Zahlbr.

"Sta. Anna prope Lapa," "Prov. Sao Paulo." (Denksch. math. naturw. Klasse kaiserl. Akad. Wissen. 83: 189. 1909.)

"Similis *U. floridae* (L.), sed rami primariis omnino laeves et stratum myelohyphicum KHO e flavo sanguineus.

Thallus lutescenti-glaucescens, usque 6 cm altus, sat dense ramosus; rami primarii teretes, laeves, usque 0.8mm crassi; ramis adventitiis sat numerosis, filiformibus, usque 4mm longis, minute et increbre tuberculatis; cortex 50-60μ crassus, uniformis, ex hyphis plus minus perpendicularibus, ramosis, pachydermaticis formatus; axis chondroideus 1-3 crassitudinis thalli attingens.

Apothecia usque 12cm lata, leviter cupuliformia, in margine ciliis usque 20mm longis ramosis tenuibusque obsita; sporis normalibus, 9-10μ longis et ad 7μ latis." l. c.

In the K. K. Naturhistorisches Hofmuseum, Vienna.

38. *Usnea maculosa* Strt.

"Chili." (Scot. Nat. 7: 75. 1883.)

"Thallus cinereus vel luride cinereus, erectus compactus, rigidus, ramosus subangulosus, lacunosus-impressus, creberriter nigro-maculatus. Axis solidus, mediocris; fibrillae medullares compactae, K-C-; J-.

= *Ramalina ceruchis* Ach.?

39. *Usnea melaxantha* Ach.

"Americae australis." (Meth. Lich. 2: 307. 1803.)

"thallo subcrustaceo fruticuloso erecto tereti scabro sordide aurantiaco, ramis divaricatis ramulosis apice simplicibus nigris; orbillis nigris subtus thallo concoloribus reticulato-scabridis, margine tenui flavicante nudo integro." l. c.

= *Usnea sulphurea* (Zoega) Th. Fr.

Type in the Acharian Herbarium, Helsingfors.

40. *Usnea meridionalis* Zahlbr.

"Neu-Wurttemberg, prope Elsenau," "Prov. Rio Grande do Sul." (Denksch. math. naturw. Klasse kaiserl. Akad. Wissen, 83: 187. 1914.)

"Thallus erectus, gompho dilatato substrato affixus, fruticulosus, erectus 3-6cm altus, viridescenti-glaucescens, opacus, molliusculus, dichotome vel sympodialiter ramosus, ramis primariis usque 2mm crassis, subfusiformibus, in parte inferiore imprimis increbre articulatis, ad fissurum leviter constrictis, in superficie papillis minutis, parum elongatis dense obsitis, KHO haud lutescentibus, ramis omnibus fibrillis patentibus, laevigatis, acutis, rectiusculis vel parum curvatis, utplurimum simplicibus, usque 5mm longis sat dense obsitis; cortice fragili, chondroideo, decolore, subduplici, in parte exteriori ex hyphis pachydermaticis, versus marginem plus minus perpendicularibus, caeterum retiformibus formato, in parte inferiore additis hyphis nonnullis axi parallelibus, 90-140μ crasso, gonidiis glomeratus, pleurococcoideis, cellulis globosis, 8-9μ latis; strato myelohyphico valde laxo, fere cavernoso, albo, KHO-, J lutescente, ex hyphis 2.6-3.5μ crassis, leptodermaticis; increbre septatis formata; axi chondroideo ¼ latitudinis thalli occupante, ex hyphis longitudinalibus, dense contextis composito, J lutescente.

Apothecia terminalia, sat parva, 3-6mm lata, modice scutellata, excipulo thallo concolore, subruguloso-inaequali, ad superficiem et ad marginem fibrillis subsimplicibus, filiformi-acutatis, 2-5mm longis munito; disco albido-glaucescente, pruinoso, KHO leviter fulvescente; epithecio crassiusculo, pulverulento, sordido; hymenio decolore, 65-80μ alto, J e coeruleo demum obscurato; paraphysibus simplicibus, eseptatis; ascis oblongo-clavatis, hymenio subaequilongis, ad apicem rotundatis, 8 sporis; sporis in ascis subbiserialibus, decoloribus, simplicibus, late ovalibus vel late ellipsoideis, 9-10μ longis et 7.5-8μ latis, membrana sat tenui cinctis." l. c.

In the K. K. Naturhistorisches Hofmuseum, Vienna.

41. *Usnea miliaria* Tayl.

"Arica." Chile. (Hook Lond. Jour. Bot. 6: 192. 1847.)

"thallo caespitoso, erectiusculo, cinereo, tereti, ramosissimus; gemmis granulatis, confertissimis; ramis ultimis acuminatis, subglabris; apotheciis sessilibus, concoloribus, pruinosis, demum planis, extus scabris, margine nudo, demum concolato." l. c.

= *Parmelia coralloides* v. *aspera* Eschw. fide Müll. Arg.

42. *Usnea sulphurea* var. *normalis* Wain.

"Detroit de Gerlache:" "l'Ile Auguste," 64° 2' de latitude sud. "l'Ile Brabant, 64° 91' de latitude sud." "Cap Anna Osterrieth, 64° 33' de latitude sud." "Cap Renard, 65° 1' de latitude sud." (Result. Voy. S. Y. Belgica, Bot. 6: 11. 1893.)

"Thallus partim crebre verruculosus papillosusque, esorediatus. Stratum myelohyphicum crebrum, KHO non reagens. Axis chondroideus jodo leviter caerulescens. Apothecia ciliis nullis instructa. Est forma typica hujus speciei. Rami steriles saepe partim articulatum nigricanti—et flavido-variegati, partim apice solo nigricantes."

43. *Usnea barbata* var. *oxygona* Müll. Arg.

"Patagonia." (Hedw. 34: 139. 1895.)

"thallus erectus, irregulariter sparsim ramosus et ramillosus, stramineo-albidus; rami primarii alveolato-inaequalis, acute angulosi et subsorediosi, minores tuberculoso-asperii." l. c.

Type in the Boissier Herbarium, Chambésy.

44. *Usnea angulata* var. *paradoxa* Zahlbr.

"prope S. Amaro," "Prov. Sao Paulo." (Denksch. math. naturw. Klasse kaiserl. Akad. Wissen. 83: 190. 1909.)

"thallus rigidus, caespitosus, subpendulus, usque 15cm longus, crebre dichotome et sympodialiter ramosus, ramis primariis sat crassis, 1.5–1.8mm latis, sordide lutescentibus, nitidulis, subteretibus, leviter areolatim impressis vel laevigatis, hinc inde transversim ruptis, punctulis sorediosis albidis obsitis, fibrillis pro maxima parte destitutis vel hinc inde fibrillis crebris, 3–8mm longis, laevibus, transversim ruptis, simplicibus vel ramosis obsitis, ramis inferioribus divaricatis, ramis supremis assurgentibus et in apicibus seriatim globoso-sorediosis, soralibus glaucescenti-albidis, pulverulentis, usque 2mm latis, ut plurimum confluentibus; strato myelohyphico albo, KHO e flavo rubente." l. c.

In the K. K. Naturhistorisches Hofmuseum, Vienna.

45. *Usnea poliothrix* Krempfb.

"Lagoa Santa," Brazil. (Lich. Brizil, Vidensk. Meddel. naturh. Foren.

Kjöbenhavn Pl. 1: fs. 5, 6, 7, 9. 4. 1873.)

"Thallus cinerascens vel cinereo-rubens, erectus, teres, varie ramosus, ramis ramulisque laxis divaricatis, efbillosis vel paucis brevibusque fibrillis horizontalibus, superficie asperula et medulla albida, pallido-cinnamomea.

Apothecia parva vel mediocria, terminalia, concoloria, margine receptaculi fibrilloso-ciliato, disco plerumque concavo; sporae 8, breviter ellipsoideae vel subglobosae, incolores, long .0,011–013, lat. 0.007–008mm."

= *Usnea rigida* Wain.

= *Usnea percava* f. *asprissima* Strn.

= *Usnea Baileyi* Strt.??

46. *Usnea punctulata* Strt.

"Prope Punta Arenas Patagoniae." (Scot. Nat. 7: 76. 1883.)

"Similis *U. cavernosae* (Tuck.) sed pallida vel pallide lutescens etiamque pallide rufescens. Axis filiformis: fibrillae medullares K–C–; J–." l. c.

47. *Usnea radiata* Strt.

"Brasilia." (Scot. Nat. 6: 103. 1881-2.)

"Similis infra *U. ceratinae* et papilloso-aspera sed supra ramosa ut in *U. florida*. Apothecia mediocria vel magna (latit. usque ad 15mm.) dense et longe fibrilloso-ciliata (fibrillis validis et ramosis), subtus hinc inde papilloso-aspera." l. c.

48. *Usnea ceratina* var. *reagens* Zahlbr.

"prope Theresiopolin." Brazil. (Sitzungsber. Kais. Akad. Wiss. Wien math-naturwiss. Klasse 3: 430. 1902.)

"Thallus pendulous, e basi ramosus, usque 14cm. altus, ramis primariis validiusculis, 2–2.5mm. crassus, papillato-asperatus, KHO extus aurantiacus, intus flavo ferrugineo-rubens; disco apotheciorum KHO e flava aurantiaco." l. c.

In the K. K. Naturhistorisches Museum, Vienna.

49. *Usnea barbata* var. *florida* st. *rubescens* Müll. Arg.
"Terra do Picu...prope Blumenau." Brazil. (Hedw. 30: 223. 1891.)
"toto ferrugineo-rubescens." l. c.
Type in the Boissier Herbarium, Chambésy.
50. *Usnea plicata* var. *scabra* Müll. Arg.
"Supra Joinville," province Catharina, Brazil. (Hedw. 30:225. 1891.)
"rami et ramuti minute et crebre verruculoso-aspera v. apice laevis, primariae hinc inde laevigati, tota olivaceo-fusca." l. c.
Type in the Boissier Herbarium, Chambésy.
51. *Usnea dasygoga* var. *plicata* f. *sorediata* Zahlbr.
"Serra do Preto." Brazil. (Bull. Herb. Bois. 8: 467. 1908.)
"Thallus cinerascens-viridescens, ramis primariis 1-1, 2mm. crassis, teretibus, crebre albo-annulatis, increbre dichotome vel sympodialiter divisus, ramis patentibus, fibrillis fere nullis, sorediosus, soredies primum punctiformibus, albidis, parum prominulis et plus minus confluentibus, demum fere semiglobosis, 1-1, 4mm. latis, glaucescentibus et pulverulentis. Medulla KHO e flavo rubens, 2-3 latitudinio thalli occupans. Apothecia non visa." l. c.
In the K. K. Naturhistorisches Museum, Vienna.
52. *Usnea plicata* var. *sorediosa* Müll. Arg.
"Patagonia." (Hedw. 34; 139. 1895.)
"abbreviata, ramis et ramillis laevibus his superne sorediosis." l. c.
Type in the Boissier Herbarium, Chambésy.
53. *Usnea arthroclada* var. *spinulosa* Müll. Arg.
"prope Joinville," Brazil. (Hedw. 30: 225. 1891.)
"rigidula, tota cinereo-v. fere caesio-pruinosa, rami laeves, ramille sparse tuberculoso-aspera et spinuligeri,—Rami crassiores tantum hinc inde crebre articulati." l. c.
On rocks.
Type in the Boissier Herbarium, Chambésy.
54. *Usnea Steineri* Zahlbr.
"St. Anna prope Lapa," "Prov. Sao Paulo." (Denksch. math. naturw. Klasse kaiserl. Akad. Wissen. 83; 186. 1909.)
"Thallus erectus, usque 5cm altus, fruticulosus, dichotome vel subdichotome ramosus, pallide carneo-lutescens, opacus, molliusculus, ramis primariis 1-1.15 mm crassis, teretibus, non articulatis nec transversim fissis, scabridis, dense verrucalis acutiusculis, minutis obsitis, sorediis destitutis, ramillis simplicibus vel plus minus ramosis, 3-5mm longis, laevibus patentibus rectiusculis, non spinuliformibus sat dense munitis; cortice chondroideo, 90-125µ crasso, decolore, simplici, ex hyphis ramosis formato, retiformi KHO leviter lutescente; strato myceliophico laxissimo, fere cavernoso, albo, KHO non vel haud reagentem J lutescente; gonidiis pleurococcoideis, globosis, 9-12µ latis; axis chondroideo tenui, 1-5 latitudinis thalli ramorum primariorum attingente, ex hyphis longitudinaliter dense contextis formato, solido. Apothecia terminalia, minora, 6-8mm lata, thallo concoloria, scutellata, excipulo subtu inaequali-subverruculoso vel fere sublaevigato, opaco, ad marginem spinulis simplicibus vel ramulosis usque 14mm longis, erectis vel suberectis sat dense obsito: disco pruinoso, lutescenti-glaescente, opaco, KHO leviter lutescente; epithecio crassiusculo, usque 9µ alto, amorpho, KHO demum dissoluto, J rufescenti-lutescente; hymenio decolore, 60-65µ alto, J e coeruleo demum fulvescenti-obscurato; paraphysibus simplicibus,

tenui-septatis, apice parum clavatis; ascis clavatis, ad apicem rotundatis, 8 sporis; sporis decoloribus, simplicibus late ovalibus vel late ellipsoideis, membrana tenui cinctis, 9-10 μ longis et 7.5-8 μ latis." l. c.

In the K. K. Naturhistorisches Museum, Vienna.

55. *Usnea melaxantha* form *strigulosa*, Zahlbr. (Annales Mycologici, 1: 360. 1903.)

"Patagonien." (Annales Mycologici, 1: 360. 1903.)

"Ramis tenuibus, densis erectisque a varietate differt."

"Mit der vorigen."

"Von der neuseeländischen Var. *ciliata* (Nyl.) Müll. Arg. unterscheidet sich die beschriebene Varietät durch die nicht glatten und nicht ringförmig zeerrissenden Lagerabschnitte; von var. *fasciata* (Torr.) A. Zahlbr. durch die bewimperten Receptakel der Apothecien. Als eigene Art abzutrennen ist *Usnea antennaria* (Nees) Mass., sie besitzt einen von *Usnea melaxantha* (Koen.) Th. Fr. verschiedenen anatomischen Bau des Lagers. Bei ersterer ist im Gegensatz zur letzteren die äussere Markschiicht, welche die Gonidien enthält, mächtig entwickelt, der innere, solide und feste Markstrang von geringer Dicke. Am Querschnitte zeigt sich der feste Markstrang als ein etwas zusammengedrücktes mehr weniger unregelmässiges, inselförmig und fast immer nicht ganz in der Mitte der lockeren äusseren Markschiicht liegendes, scharf abgegrenztes Gewebe. Ausserdem zeigt der zentrale Markstrang der *Usnea antennaria* in seiner Mitte nie Risse. Der anatomische Bau des Lagers wird sicher für die schärfere Trennung der bisher nicht scharf umgrenzten Arten des Formenkreises der *Usnea melaxantha* die besten Anhaltspunkte geben."

In the K. K. Naturhistorisches Museum, Vienna.

56. *Usnea melaxantha* var. *subciliata* A. Zahlbr. (Annal. Mycol. 1: 360. 1903.)

"Patagonien."

"Thallus sat dense dichotome divisus, ramis divergentibus, versus basim leviter scrobiculatis, caeterum plus minus verrucosis, ultimis elongatis, nigris vel annulatis nigris, laevibus vel verruculosis; cortice et zona gonidiali sat angustis, medulla crassa, totum fere thallum occupante, medio substellatim fisso. Receptaculo apotheciorum verruculoso (numquam scrobiculato), cillis paucis, sat longis, nigris vel annulatis ornato."

In the K. K. Naturhistorisches Museum, Vienna.

57. *Usnea barbata* var. *subcorunta* Müll. Arg.

"Punta de Pigue." Argentina. (Flora 72: 509. 1889.)

"omnia ut in *v. fastuosa*, sed rami primarii vulgo ramillis distituti v. paucis tantum praediti superne cum ramis simplicibus aut dichotomis longi nudi et rigido-flagellares, vulgo steriles; tota planta crebre verrucoso-aspera; ramilli, uti adsunt, cum iis var. *fastuosae* conveniunt, concolores, flaccidi." l. c.

Type in the Boissier Herbarium, Chambésy.

58. *Usnea barbata* var. *subelegans* Wain.

"Minarum," Brazil. (Lich. Brazil, Act. Soc. Fauna et flora Fenn. 7: 6. 1890.)

"*Thallus* erectus aut subpendulous, sat brevis aut longitudine mediocris, sat mollis, esorediatus aut solediosus, flavescenti-stramineus aut flavescenti glaucescens, ramis omnibus teretibus, ramis primariis sat crassis, verruculis in maxima parte thalli mox in spinulas brevissimas creberrime dispositas accrescentibus. *Stratum myelohyphicum* laxissime contextum fere cavernosum, KHO aurantiaco-rubescens, jodo non reagens." l. c.

= *Usnea mollis* var. *subelegans* (Wain.) Zahlbr. (Bull. Herb. Bois. 8: 467. 1908.)

59. *Usnea barbata* var. *subelegans* form. *subinermis* Wain.
"Carassa. . . . Minarum," Brazil. (Lich. Brazil, Act. Soc. fauna et flora Fenn. 7: 7. 1890.)
"thallo instructam flavido-glaucescente creberrime cartilagineo-verruculoso, haud spinuloso, ramis tenuioribus stramineo-soediosis, ramulis adventitiis circ. 6-1.5 millim. longis, increbris, sed sat numerosis strato myelohyphico laxo contexto, KHO rubescente, jodo non reagente." l. c.
60. *Usnea trachycarpa* var. *sublaevis* Müll. Arg.
"Patagonia." (Hedw. 34: 139. 1895.)
"rami dense papilloso et non alveolato-scaberrimi, apothecia dorso fere laevia, ramilli flagelliformes nigrati: Simillima *U. melaxanthae* v. *ciliatae* Müll. Arg., ubi autem discus apotheciorum niger." l. c.
Type in the Boissier Herbarium, Chambésy.
61. *Usnea barbata* var. *comosa* st. *subrubiginea* Müll. Arg.
"Congonhas do Campo," "prop San Antonio," Brazil. (Hedw. 30: 224. 1891.)
"tota plus minusve ferruginascens." l. c.
Type in the Boissier Herbarium, Chambésy.
62. *Usnea Steineri* var. *tincta* Zahlbr.
"monte Jarague prope Taipas," "Prov. Sao Paulo." (Denksch. math. naturw. Klasse kaiserl. Akad. Wissen. 83: 186. 1909.)
"Thallus major, usque 10cm longus, ramis primariis crassioribus, usque 2mm latis, irregulariter annulatum fissis vel hinc inde subarticulatis, verruculis setuliformibus sat dense obsitis; strato myelohyphico KHO e flavo sanguineo. Apothecia majora, usque 11mm in diam., excipulo subtus foveolato-reticulato. Sporae ut in planta typica." l. c.
In the K. K. Naturhistorisches Museum, Vienna.
63. *Usnea trachycarpa* var. *trachycarpoides* Wain.
"Argentine, Ile des Etats, Golfe St. Jean, 55° 24' de latitude sud." (Result. Voyage S. Y. Belgica, Bot. 6: 12. 1893. Tab. III, fig. 20-22, Tab. IV, fig. 31.)
"Sicut var. praecedens, sed stratum, myelohyphicum crassius, laxum, KHO lutescens et demum rubescens et stratum chondroideum tenue, jodo lutescens."
Sur le parois verticales, rocheuses, seches, ou cette variete forme des gazins tres fournis (n. 182). Fertile.
Cette espece croit a Kerguelen et dans les regions antartiques de l'Amerique du Sud.
64. *Usnea barbata* var. *trachyclada* Müll. Arg.
"Serra do Ouro Branco," Brazil. (Hedw. 30: 224. 1891.)
"thallus flavido-glaucos, implexo-erectus, 6-8 cm. altus, irregular iterramosus; rami primarii crassi, molliusculi, teretes et angulosi, superfacie scrobiculoso-inaequales v. lacunoso-impressi et simul crebre prominenter soedioso-asperi et parce subfasciculatim setulosi.—Quasi v. *hirta* crassa, ramis angulosis." l. c.
Type in the Boissier Herbarium, Chambésy.
65. *Usnea tumidula* Tayl.
"Coquimbo," Chile. (Hook. Lond. Jour. Bot. 6: 191. 1847.)
= *Ramalina ceruchis* var. *tumidula* (Tayl.) Nyl. Recog. Mono. Ram. 107. [9]. 1870.)
= *Ramalina ceruchis* var. *gracilior* Müll. Arg. (Flora 46: 20. 1888.)

ERRATA

Page 40, line 21, for 32. var. *implexa* read 31. var. *implexa*.

Page 41, line 31, *Thallus pendulosus* should be dichotomous with *thallus erect*, line 11.

SHORTER NOTES

Recent American botanical periodicals have contained a number of articles on mosses, hepatics, and lichens indicating considerable research in one line or another among these interesting plants.

NOTES ON THE LIFE-HISTORY OF SPHAGNUM SUBSECUNDUM.—In the Botanical Gazette (January 1915, pp. 40-56) Mr. George S. Bryan has contributed the first of a series of papers on the life history of *Sphagnum subsecundum*. ("The Archegonium of *Sphagnum subsecundum*.") Referring to the impression "in some quarters at least, that *Sphagnum* seldom bears sex organs," Bryan notes that in a careful study of a bog covering about twenty acres near Mineral Springs, Indiana, 40 miles south of Chicago, and also other bogs in that vicinity, the fact was disclosed that "not a single sterile head of *S. subsecundum* could be found. Sex organs were everywhere in vast numbers." . . . "and again in the autumn of 1913 the sex organs appeared in the same vast numbers." It was found that "when the sex organs are approaching maturity both male and female plants have well marked characters. The antheridial heads are decidedly globose and show variations in color from yellow brown to red brown, occasionally almost black. The archegonial heads are less globose, have a somewhat flattened aspect on top, and show no unusual coloring except the conspicuous bud at the growing point in the center of the head. This bud varies in color from a yellow brown to red brown. An analysis of the bud reveals archegonia almost mature on short side branches near the apex of the main axis, the coloring matter being in the perichaetial leaves surrounding the organs." The antheridia began to develop in August, the archegonia in September. In 1913 the oldest archegonia were almost mature on October 25 and about this time the coloring of the perichaetial leaves began to be noticeable. Some archegonia do not become mature before early spring.

The main body of this interesting contribution is given over to the study of the development of the archegonium, Bryan's conclusions being that "The archegonium of *Sphagnum subsecundum* is synthetic. The stalk, the thick venter, and the comparatively slender twisted neck are moss characters; the relatively inactive cover cell, the intercalary growth of the archegonium, and the low number of canal cells [8 or 9] are hepatic characters as we know them today." The paper is illustrated by four plates containing fifty-nine figures and is well worth reading by every bryologist.—O. E. J.

LICHENS DECOMPOSE ROCKS.—Cowles has recently called attention (Botanical Gazette 59: 77. Jan. 1915) to a couple of papers by Bachmann (Ber. Deutsch. Bot. Gesells. 29: 261-273, 1911, and 31: 3-12. 1913) relating to the action of lichens upon their substrata. The micaceous element of granite is quickly decomposed and eventually within a relatively short time the granite is broken down into a claylike substance. In the second paper noted it was

pointed out that calcareous lichens with *Chroolepus* gonidia can dissolve calcium carbonate and that a limestone will thus become perforated in a sponge-like manner by the *Chroolepus* cells.

CONKLIN'S HEPATICAE OF THE DULUTH SUPERIOR DISTRICT.—Under the title of "Preliminary Report on a Collection of Hepaticae from the Duluth-Superior District" (Trans. Wisconsin Acad. Sci., Arts, and Letters 17: 985-1010. Reprint, Oct., 1914) Dr. Geo. H. Conklin, Curator of the S. M. S. Hepatic Herbarium, has published an annotated list of the hepatics found within a radius of about fifty miles from the two towns, Duluth and Superior, at the extreme west end of Lake Superior. The first four pages of this excellent paper are devoted to a good description of the physiography and general geology of the district, while following this is the catalogue of species, eighty-two in all, with many interesting critical notes on their general characteristics and habitats.

THE TWENTIETH ANNIVERSARY OF THE NEW YORK BOTANICAL GARDEN will be commemorated at the Garden during the week commencing September 6, 1915. Botanists from all parts of North America are invited to attend. The program for the week will be a notable one, including reading and discussion of papers, inspection of buildings and grounds, and visits to study the coastal flora of Staten Island, the pine barrens of New Jersey, and the Brooklyn Botanic Garden. Readers of THE BRYOLOGIST should keep this in mind.

The veteran collector and botanist, Dr. John Macoun, is now living at Sidney, Vancouver Island, and is collecting more particularly the thallophytes and bryophytes of that interesting region.

The Editor, accompanied by his wife, is this season taking advantage of the low fares to visit Washington State for a general botanizing and collecting trip. The plan is to spend some time in each of the general floral areas, beginning in the Spokane district about June 20, and reaching the western end of the state about the middle of September. Most of the time will be spent in a tent in more or less out-of-the-way places, but first-class mail will be forwarded either from the regular address at the Carnegie Museum, Pittsburgh, Pa., or from Spokane.

Both the July and September numbers of THE BRYOLOGIST will be late on account of the inability to keep in touch with the mail, and because of distance from headquarters. We would beg the indulgence of our readers for the delay.

EXCHANGE DEPARTMENT

Offerings to S. M. S. members for stamped self-addressed envelope:

Mr. Severin Rapp, 207 First St., Sanford, Florida.—*Lobadium phyllocharis* Merrill, *Lobadium vulpinum* (Tuck.), and *Arthothelium macrothecum* (Fee).

Mr. Chas. C. Plitt, 3933 Lowndes Ave., Baltimore, Maryland.—*Cetraris Oakesiana* Tuck.

Mr. Roy Latham, Orient, Long Island, N. Y.—*Xanthoria parietina* (L.) Th. Fr., *Usnea florida* (L.) Hoffm., and *U. trichodea* Ach., all from Long Island.

Dr. H. E. Hasse, Santa Monica, Cal.—*Opegrapha vulgata* Ach., collected in California.

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 SEPTEMBER 1915
 

THE BRYOLOGIST

JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by

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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879."

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THE BRYOLOGIST

Bimonthly Journal of
THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVII, 1898-1914, \$16.50.

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JAMESONIELLA HETEROSTIPA Evans

THE BRYOLOGIST

VOL. XVIII

SEPTEMBER, 1915

No. 5

NOTES ON NORTH AMERICAN HEPATICAE. VI

ALEXANDER W. EVANS

With Plate I

Two of the species discussed in the present paper, one from Nova Scotia and the other from Florida, are proposed as new. Of the remaining eight species three represent additions to the hepatic flora of the United States, while the others are included to record extensions of range. The new species from Florida and one of the additions from the same state belong to the *Lejeuneae* and increase the number of representatives of this group now known from Florida to thirty-five.

1. *Jamesoniella heterostipa* sp. nov.

Collected on July 6, 1910, at Barrington Passage, Cape Sable Island, Nova Scotia, on stones in a stream, by J. Macoun (No. 52).

Growing in depressed and irregular mats, dark green, somewhat tinged with brown: stems about 2 cm. long and 0.6 mm. in diameter, very sparingly branched, the branches (so far as observed) of the *Frullania* type, essentially like the stem; rhizoids sometimes abundant, pale, not restricted to definite parts of the ventral region: leaves imbricated, more or less horizontal in position, but variously revolute and vaguely plicate, spreading at an angle of about ninety degrees, ovate-orbicular, the best developed mostly 1.5-2 mm. long and 1.4-1.9 mm. wide, attached by a long oblique line, shortly and narrowly decurrent at the dorsal base, rounded at the ventral base, somewhat narrowed toward the rounded, truncate, or (rarely) emarginate apex, entire; leaf-cells about 19μ in diameter along the margin, 24μ in the middle, and 34μ at the base, isodiametric, thin-walled, but with small trigones having concave sides, cuticle smooth; underleaves very variable, sometimes minute and evanescent, sometimes much larger and persistent, those of the latter type filiform to ovate, free or sometimes coalescent on one side with a leaf, the apex long-acuminate to rounded, the margin entire; some of the largest underleaves attaining a length of 1.3 mm. and a width of 0.75 mm.: inflorescence probably dioicous: ♀ inflorescence terminal on the stem or an elongated branch; bracts in about two pairs, outer bracts similar to the leaves, but a little larger (about 2.4 x 2 mm.), sometimes with a small basal lobe, innermost bract a little smaller (about 1.8 x 1.5 mm.) irregularly lobed and lacerate, with marginal teeth of various sizes; innermost bracteole (about 2 x 0.9 mm.) deeply bifid with narrow acuminate lobes and irregularly toothed or lobed margins; perianth (very immature) deeply five-plicate with a large irregularly lobed mouth, the lobes acuminate with dentate to ciliate margins: remaining parts unknown. [PLATE I.]

The specimens from which the above description was drawn are very incomplete. They show no signs of antheridial inflorescences and include but a single rudimentary perianth. In spite of these facts it seems justifiable to publish the species on account of its peculiar underleaves. These are exceedingly variable. In some cases they are so minute and so short-lived that they can scarcely be demonstrated at all. In other cases they are much larger and equal the leaves in firmness and persistency. The persistent underleaves, in turn, show all gradations between slender filiform structures and broad plates of cells, lanceolate to ovate in form and acuminate to rounded at the apex. In most cases these large underleaves are attached independently to the stem, but in exceptional cases an underleaf may be more or less coalescent with a side leaf. Another interesting feature of the species is the occasional approximation of the side leaves in pairs, so that on the dorsal surface of the stem their lines of attachment almost meet. The majority of the leaves, however, are clearly alternate.

The new species is closely related to *J. autumnalis* (DC.) Steph., which is exceedingly common in eastern North America on shaded rocks, rotten logs, and soil rich in humus. In *J. autumnalis* the leaf-cells agree in size and in structure with those of *J. heterostipa*, while the perichaetial bracts and the mouth of the perianth are essentially the same in the two species. In *J. autumnalis*, however, the plants are a little less robust, and the underleaves, although somewhat variable, are always small and do not show the great diversity in form found in the new species. The possibility of course remains that the divergent characters of *J. heterostipa* may be caused by its unusual habitat and that it may represent an aberrant form of *J. autumnalis*; but in the absence of proof to this effect the plant from Nova Scotia ought surely to be recognized as distinct.

The generic position of *Jungermannia autumnalis* DC. is far from established. Stephani transferred it to *Jamesoniella*, apparently on account of its toothed or lacerate perichaetial bracts, bracteole, and perianth. It occupies an anomalous position in this genus, however, on account of its general habit, its branches of the *Frullania* type, its cell-structure, and its distinct underleaves. In typical members of *Jamesoniella* the plants tend to be erect and the leaves to be erect and appressed; the branches seem to be invariably ventral and intercalary; the leaf-cells have large and nodulose trigones; and the underleaves of the stem are very rudimentary. Of course the large underleaves of *J. heterostipa* make it even more anomalous than *J. autumnalis*. Possibly the wisest course would be to make *J. autumnalis* the type of a new genus, as K. Müller¹ has already suggested.

2. PLAGIOCHILA SULLIVANTII Gottsche; Evans, Bot. Gazette 21: 191. 1896 (in part). *P. allegheniensis* Evans; Stephani, Bull. Herb. Boissier II. 3: 334. 1903.

Collected in a cañon at Tallulah Falls, Georgia, by J. K. Small, in April, 1893 (No. 9314). Hitherto known from only two localities: Virginia, without

¹ Rabenhorst's Kryptogamen-Flora 6: 578. 1910.

definite station, *Sullivant*; North Carolina, without definite station, specimen in the Lindenberg herbarium at Vienna. The reasons for discarding the name *P. allegheniensis* and for reserving the name *P. Sullivantii* for the species represented by *Sullivant*'s Musc. Alleg. No. 219 have been stated by the writer in another connection.¹ For a figure of *P. Sullivantii* see Evans, Bot. Gazette **21**: pl. 15, f. 19. 1896.

3. CEPHALOZIA FRANCISCI (Hook.) Dumort.

The geographical distribution of this rare species in North America is so incompletely known that the report of the following new stations seems justifiable: on moist soil in barren, mountains west of Ingonish, Cape Breton Island, Nova Scotia, *G. E. Nichols* (No. 813B); Southold and Orient Point, Long Island, New York, *R. Latham*. The last two stations, which represent a marked extension of the known range to the southward, are of especial interest and indicate that the plant ought to be looked for in eastern Connecticut and Rhode Island. In 1912 the writer² cited three stations for *C. Francisci* from Nova Scotia and Maine, no others being known from North America at that time and in 1913 Miss Lorenz discovered it in New Hampshire,³ so that seven localities in all have now been reported.

4. CEPHALOZIA LEUCANTHA Spruce.

The range of this minute species in North America is still very incompletely known. It was first collected at Columbia Fiord, Alaska, by Coville and Kearney, while members of the Harriman Alaska Expedition, and a full account of the plant, with figures, was drawn up from their specimens by the writer.⁴ It has since been reported from Hunker Creek, Yukon, *J. Macoun*;⁵ from Port Renfrew, Vancouver Island, British Columbia, *Miss Gibbs*, *S. A. Skinner*;⁶ and from Port Chatham, Alaska, *G. B. Rigg*.⁷ It is now possible to add the following stations for the species: Bay of Islands, Newfoundland, 1901, *Howe & Lang* (No. 1077) in part; valley of the Barrasois River, Cape Breton Island, Nova Scotia, 1914, *G. E. Nichols* (No. 575); Douglas, Alaska, 1908, *Miss Clark* (Nos. 7, 13); Uclulet, British Columbia, 1909, *J. Macoun* (No. 53); Westport, Washington, 1908, *A. S. Foster* (No. 766). It will be noted that some of these localities extend the known range of the species far to the eastward and considerably to the southward in the Pacific Coast region. At lower latitudes the plant grows on rotten logs, often in company with other species of *Cephalozia*; at higher latitudes it is more frequently met with in bogs.

5. HYGROBIELLA LAXIFOLIA (Hook.) Spruce.

Collected in 1914, at Smith's (North) Brook, Cape Breton Island, Nova Scotia, on flat rocks along a stream in a ravine, by *G. E. Nichols* (No. 629).

¹ *Rhodora* **16**: 68. 1914.

² *BRYOLOGIST* **15**: 58. 1912.

³ See *Rhodora* **16**: 75. 1914.

⁴ *Proc. Washington Acad.* **2**: 306. pl. 17, f. 18-26. 1900.

⁵ *Ottawa Nat.* **17**: 23. 1903.

⁶ *Postelsia* 1906: 226.

⁷ *Bull. Torrey Club* **41**: 596. 1915.

Although the authors of the Synopsis Hepaticarum, as long ago as 1845, listed the present species from Greenland it is known even now from very few localities in North America. Macoun,¹ in 1902, cites specimens from Labrador as well as from the original Greenland station, while Miss Lois Clark,² in 1909, makes the first record for the United States: namely, Paradise Valley, Mount Rainier, Washington where the plant was found by T. C. Frye in 1908. She likewise calls attention to some of the more important peculiarities of the species. The writer is unable to give any additional stations for the plant from the North American mainland, but the Cornell Party of the Peary Expedition of 1896 collected it on the Nugsuak Peninsula of Greenland. Miss Lorenz³ has already listed *Hygrobiella laxifolia* from Nova Scotia, basing her record on the Cape Breton specimens. She predicts its discovery in Maine, and it ought to be looked for also in the moister parts of the Rocky Mountains.

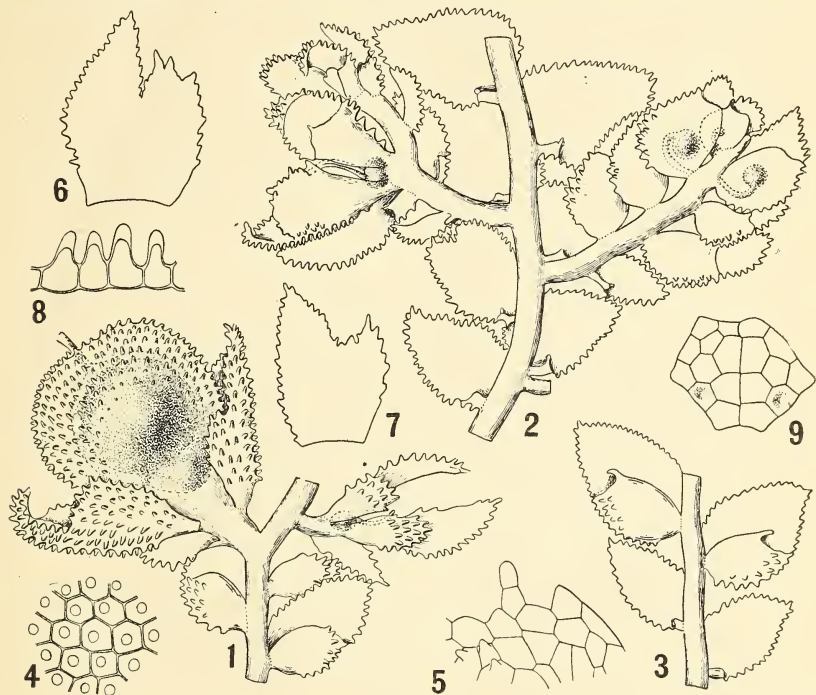
6. *Cololejeunea tuberculata* sp. nov.

Collected in March, 1915, on leaves of *Trichomanes Krausii* Hook. & Grev., on Nixon-Lewis Hammock (No. 5250), on Sykes Hammock (No. 5257), and in pinelands about Timms Hammock, Dade County, Florida, by J. K. Small, C. A. Mosier, and E. W. Small; also on leaves of *Trichomanes sphenoides* Kunze, on Hattie Bauer Hammock, Dade County, Florida, by the same collectors. No. 5250 may be designated the type.

Plants very delicate, pale green, often becoming bleached with age, scattered or growing in thin mats: stems prostrate, about 0.03 mm. in diameter, irregularly and sometimes abundantly branched, the branches widely spreading, essentially like the stem: leaves distant to slightly imbricated, obliquely to widely spreading, plane or nearly so, the lobe sometimes deflexed at the apex, ovate, when well developed 0.18-0.2 mm. long and 0.12-0.13 mm. wide, but often considerably smaller, gradually narrowed to an acute or obtuse apex tipped with a single cell, both dorsal and ventral margins rounded in the basal half and straight in the apical half, denticulate from projecting cells; lobule often very rudimentary, when well developed ovate, about 0.09 x 0.075 mm., strongly inflated throughout, apical tooth usually consisting of two cells in a row, the hyaline papilla at the base of the tooth on the inner surface, proximal tooth shorter and usually consisting of a single blunt or acute projecting cell separated from the apical tooth by a single cell, sinus shallow, two or three cells long; cells at lobe averaging about 7μ along the margin, 10 x 8μ in the middle, and 14 x 8μ of the base, each bearing a median rounded wart on the outer surface, 4-6μ long, with the wall thickened at the apex, cell-walls otherwise thin throughout; cells of lobule in the region of the keel with similar but shorter warts; stylus none; inflorescence autoicous: ♀ inflorescence borne on a more or less abbreviated branch, innovating on one side, the innovation short and sterile and often obsolete; bracts obliquely spreading, more or less complicate, the lobe ovate, 0.2-0.25 mm. long and 0.07-0.09 mm. wide, sometimes inflexed at the acute apex,

¹ Cat. Canadian Plants 7: 31. 1902.
² Bull. Torrey Club 36: 304. 1909.
³ BRYOLOGIST 18: 25. 1915.

margin and outer surface as in the leaves; lobule ovate or ovate-oblong, 0.16–0.18 mm. long and 0.06–0.07 mm. wide, acute or obtuse to truncate, irregularly denticulate, outer surface more or less roughened from projecting cells at least in the vicinity of the keel; perianth broadly obovoid, about 0.3 mm. long and 0.22 mm. wide, bluntly five-keeled in the upper part when young, strongly inflated and practically without keels at maturity, beakless, surface to below the middle strongly roughened from projecting cells: ♂ inflorescence terminal on a more or



COLOLEJEUNEA TUBERCULATA Evans

FIG. 1. Part of a plant with a perianth and an unfertilized female inflorescence, ventral view, x 100.

FIG. 2. Part of a plant with a female inflorescence and a male inflorescence, ventral view, x 100.

FIG. 3. Part of a sterile branch, ventral view, x 100.

FIG. 4. Cells from the middle of a lobe, x 300.

FIG. 5. Apex of a lobule, x 300.

FIGS. 6, 7. Bracts from a single inflorescence, x 100.

FIG. 8. Cells from the lobe of a bract, optical section, x 300.

FIG. 9. Gemma, x 300.

The figures were all drawn from the type specimen with the exception of FIG. 2, which was drawn from No. 5257.

less abbreviated branch, not proliferating (so far as observed); bracts in two or three pairs, similar to the leaves when well developed, but with less obliquely spreading lobes and poorly developed apical teeth on the lobules, monandrous: capsule about 0.15 mm. in diameter: gemmae about 0.06 x 0.05 mm., composed (normally) of sixteen cells, each apical quadrant cutting off two segments, margin with five obtusely projecting cells. [TEXT FIGS. 1-9.]

In its minute size and extreme delicacy *C. tuberculata* rivals the species of *Aphanolejeunea*, a characteristic example of which is noted below. The structure of the lobule, however, with its clearly marked teeth shows conclusively that the plant is not an *Aphanolejeunea*, and the inflated perianth with its five indistinct keels indicates that it is a true *Cololejeunea*.¹ Another species of *Cololejeunea*, *C. diaphana* Evans,² which was likewise discovered by Dr. Small in subtropical Florida, is only a trifle larger than *C. tuberculata* and is even more delicate in structure. *C. diaphana* has recently been recorded from Porto Rico by the writer, and it is probable that *C. tuberculata* also will be found in the West Indies.

One of the most striking features of the present species is the conspicuous roughness of the leaves and perianths. This is due to the development of a projection or tubercle on each cell of the lobe, and on each cell of the perianth except in the basal region. Even the cells of the lobules are more or less affected; on ordinary leaves and on the male bracts the tubercles are restricted to the neighborhood of the keel, but on the perichaetial bracts they sometimes occur on all the cells. In the tubercle the entire outer wall of the cell is involved, but the projection narrows to a rounded apex; here the wall exhibits a conspicuous thickening, which sometimes occupies about half the length of the entire tubercle. Roughness of the leaves is of widespread occurrence in the genus *Cololejeunea* and seems to be always due to projecting cells, but these are rarely so pronounced or so abundant as in *C. tuberculata*. There are, however, a few species which equal or even surpass *C. tuberculata* in roughness. One of these is *C. Rossettiana* (Massal.) Schiffn., a local European species now known from Italy, France, and the British Isles. In this remarkable plant, which is considerably larger than the new species from Florida, the tubercles show much the same structure, but they are found on all the cells of the lobules of ordinary leaves as well as on the cells of the lobes, and the apical thickening of the wall is sometimes more than half the length of the entire tubercle.

Among the species of *Cololejeunea* known from the United States the only one which resembles *C. tuberculata* very closely is *C. Biddlecomiae* (Aust.) Evans. This plant has a wide distribution from New England westward to Wisconsin and southward to Florida and Alabama. Although a small species it is not so minute as *C. tuberculata*, the leaves being about 0.35 mm. in length and the perianths measuring about 0.6 x 0.35 mm. In *C. Biddlecomiae* the ovate lobes narrow toward the apex, which may be obtuse or acute; the surface of the lobes is roughened from projecting cells, and the margin is denticulate or crenulate; the apical

¹For a discussion of the genus *Cololejeunea* and allied genera, see Evans, Bull. Torrey Club 38: 251-286. pl. 11, 12. 1911.

²Bull. Torrey Club 32: 184. pl. 5, f. 9-14. 1905.

tooth of the lobule usually consists of a row of two cells; the inflorescence is often autoicous; and the five-keeled perianth is obovoid or oblong. In all these respects it agrees with *C. tuberculata*. The roughness of the leaves, however, is due to low rounded or conical protuberances, the wall being thin throughout or only slightly thickened at the apices of the projection; it often involves only a part of the lobe, the basal region being usually quite smooth; and it never involves the lobules at all, not even those of the perichaetial bracts. In *C. Biddlecomiae*, moreover, a well-developed filiform stylus is present at the base of the lobule, and the perianth has a distinct beak; whereas in *C. tuberculata* no trace of a stylus can be demonstrated, and the perianth is destitute of a beak.

The brief account of the gemmae included in the description must be accepted with some reservation because it is based on only three examples, two of which were immature and the third (TEXT FIG. 9) somewhat deformed. One of the immature gemmae was symmetrical, showing eight cells on each side of the median line, so that the right hand side of the figure probably represents the normal structure. On the left hand side the apical cell has cut off an additional segment, which has divided in the usual way by a periclinal wall, thus increasing the number of cells on that side to ten. Nothing is said in the description about organs of attachment and none were found on the two immature gemmae. The one figured, however, showed two such organs of attachment in the basal quadrants. In all probability the upper cell on the left hand side of the median wall would have formed organs of attachment also, if it had developed normally. Under these circumstances the gemma would have been essentially like that of the Porto Rican *Aphanolejeunea exigua* Evans, a description of which, with a figure, has already been published.¹

7. APHANOLEJEUNEA SICAEOFOLIA (Gottsche) Evans, Bull. Torrey Club **38**: 277. pl. 12, f. 17-26. 1911. *Lejeunea* (*Cololejeunea*) *sicaefolia* Gottsche; Stephani, Hedwigia **27**: 290. pl. 12, f. 21-24. 1888.

Collected in March, 1915, on Timms Hammock (No. 5287) and in pinelands about Nixon-Lewis Hammock, Dade County, Florida, on leaves of *Trichomanes Kraussii*, by J. K. Small and C. A. Mosier. New to the United States; previously known Cuba, Porto Rico, and Trinidad. The Florida specimens are poorly developed, the largest leaves measuring only 0.27 mm. in length instead of 0.4 mm. as in more typical material. Probably on account of the poor development of the plants the lobes of the leaves are acute rather than acuminate, but in spite of this slight deviation from the typical condition, the agreement in habit, in cell-structure, and in the characteristics of the lobule is so complete between the material from Florida and the West Indian specimens, that they can safely be referred to the same species.

The gemmae of *A. sicaefolia* have not yet been described, although the plants from Porto Rico showed that these structures were developed by the species. In Small's specimens a very few gemmae are present. They measure about 0.07 x 0.055 mm. and agree in all essential respects with those of *A. exigua* and (presumably) with those of *Cololejeunea tuberculata*. In other words the gemma consists of sixteen cells, three of which develop organs of attachment, while five of the marginal cells project as blunt teeth.

¹ Bull. Torrey Club **38**: 281, 284. pl. 12, f. 10. 1911.

In size and general appearance *A. sicaefolia* resembles *Cololejeunea diaphana*, but the very different lobules of the two species will at once distinguish them. In *A. sicaefolia*, moreover, the surface of the lobes is more or less roughened from projecting cells, while in *C. diaphana* the surface is smooth, the cells being plane or nearly so.

8. FRULLANIA BOLANDERI Aust.

Collected at Bic, Rimouski County, Quebec, by J. F. Collins, in July, 1907 (No. 5101). The present species is widely distributed along the Pacific Coast from British Columbia to California and was supposed to be confined to that region until very recently. A few months ago Conklin¹ reported it from Lake Nebagamon, Douglas County, Wisconsin, and the station recorded above extends its known range practically across the continent. Two Asiatic stations from the island of Sakhalin, based on collections made by the Abbé Faurie in 1908, may likewise be quoted: namely, Mereya, near Korsakovski (No. 124), and Kimonai (No. 102). Specimens from these two stations were distributed in Faurie's "Hépatiques du Japon."

A full description of *F. Bolanderi*, with figures, was published by the writer in 1897.² The species can usually be at once distinguished, even where sterile, by the upright flagelliform branches, which are present in greater or less abundance. These branches are limited in growth and give rise to organs of vegetative reproduction in the form of caducous leaves (Brutblätter). After these have fallen away the branches are leafless except for the persistent underleaves and the leaves of the terminal bud. Similar flagelliform branches have been described by the writer in certain tropical Lejeuneae.³

9. FRULLANIA MEXICANA Lindenb.; G. L. & N. Syn. Hep. 425. 1845.

Collected in May, 1912, on trees, north side of Mt. Lemmon, Catalina Mountains, Arizona, by D. S. Johnson. Although this is the first record for the United States, the writer would now refer to *F. mexicana* a specimen collected in New Mexico by E. O. Wootton in August, 1899, and already recorded under the name *F. inflata* Gottsche.⁴ This specimen grew on oak, at Cloudcroft, Sacramento Mountains, at an altitude of 8500 feet. The original material of *F. mexicana* was collected somewhere in Mexico, no definite locality being given in the Synopsis Hepaticarum, and no other stations for the species are known at the present time.

Stephani, in his Species Hepaticarum (4: 329. 1910), refers *F. mexicana* to the subgenus *Chonanthelia*. Apparently, however, he is not altogether clear about the species because a few pages later in the same work he includes it among the synonyms of *F. tetraptera* Mont. As a matter of fact the plant is not a *Chonanthelia* at all but belongs to the subgenus *Trachycolea*. This fact is clearly brought out by original description of Lindenberg, who compares *F. mexicana* with *F. eboracensis* Gottsche, and by the type specimen preserved in the Lindenberg herbarium at Vienna. Through the kindness of Dr. Zahlbruckner this

¹ Trans. Wisconsin Acad. 17: 1008. 1914.

² Trans. Connecticut Acad. 10: 8. pl. 2. 1897.

³ See Bull. Torrey Club 33: 10, 13. pl. 1, f. 23. 1906.

⁴ Bryologist 13: 36. 1910.

specimen was sent to the writer for examination. It is somewhat fragmentary, but shows perianths, androecia, and weathered capsules. Unfortunately the perichaetial bracteoles are not quite so well developed as might be desired and present the appearance of having been aborted in their growth. Except for these the specimen agrees in all essential respects with the material from Arizona and New Mexico.

The inflorescence of *F. mexicana* is autoicous, and the species represents the seventh autoicous *Trachycolea* to be reported from the United States, the others being *F. Catalinae* Evans, *F. cobrensis* Gottsche, *F. inflata* Gottsche, *F. Oakesiana* Aust., *F. Rappii* Evans, and *F. saxicola* Aust. The plants are mostly 1-2 cm. long and vary in color from a pale greenish to a purplish brown. They grow scattered over the surface of the bark or form very loose tufts. The stems are irregularly pinnate and the branches are more or less subdivided, especially after the appearance of the sexual organs.

The leaves are sometimes distant, but are usually more or less imbricated. The lobes are somewhat convex, but never squarrose, and spread widely, sometimes almost at a right angle. They are broadly ovate and, on robust leaves, attain a length of about 0.75 mm. and a width of 0.6 mm. They are usually distinctly cordate at the dorsal base, arching beyond the axis, and are rounded at the junction with the keel; the apex is broad and rounded, and the margin is practically entire throughout. The lobule is of the type usual in *Trachycolea* and is almost always developed as a water-sac, rounded above, parallel along the sides, and truncate at the mouth. It lies erect or nearly so at a distance of about 0.03 mm. from the axis and measures about 0.35 x 0.3 mm. The inflation is often much more distinct in the rounded upper portion and along the outer edge, while the two lips at the mouth are often closely appressed. The stylus is a subulate process about 0.09 mm. long and 0.03-0.04 mm. wide at the base. Measured in cells it is mostly about six cells long and two to four cells wide at the base. The cells in the lobe average about 14 μ in diameter along the margin, 20 μ in the middle, and 24 μ at the base. Trigones are present everywhere; they are usually small and triangular with straight or slightly bulging sides, but the latter are sometimes wavy and give the trigones a more irregular outline. Intermediate thickening are rare near the middle of the lobe, but become more numerous toward the margin; on the lobules they are everywhere abundant and are often more conspicuous than the trigones.

The underleaves are plane or nearly so and almost always distant, although they occasionally overlap toward the tip of a shoot. They are obovate from a narrowly cuneate base and measure about 0.4 x 0.27 mm. The apical sinus is narrow and about one-fourth the length of the underleaf, while the lobes are erect and triangular, with obtuse or acute apices. The lateral margins are entire or vaguely sinuate.

The female inflorescence is borne on a more or less elongated branch and usually gives off a robust branch just behind the involucre. The bracts are in two or three pairs. Those of the innermost pair are complicate, spreading to suberect, and unequally bifid. The lobe is ovate to obovate, measuring 0.9-1 x 0.6-0.65 mm., and the apex is broad and rounded; the lobule is more lanceolate.

in shape, measuring 0.85-0.95 x 0.35-0.45 mm., and the apex is acute or even acuminate; just above the middle a slender and sharp-pointed tooth-like lobe (stylus) is situated, measuring about 0.16 x 0.06 mm. The bracteole is ovate to obovate, about 0.85 mm. long and 0.3 mm. wide, the apical sinus is one-sixth to one-fourth its length and varies from acute to rounded, while the divisions are mostly acute to acuminate. The bracteole is highly connate with a lobule on one side and slightly or not at all connate on the other. The perianth is exerted for about half its length and is obovoid in form from a cuneate base. It measures 1.2-1.5 mm. in length and 0.75-0.95 mm. in width. When well developed it shows nine or ten folds or keels in the upper part, the two lateral keels, one dorsal keel, and two ventral keels being usually higher and more distinctly compressed than the others. The short and broad apical beak is entire at the mouth and usually lies in a distinct depression formed by the rounded upper extremities of the lateral keels, the apical margin of the perianth being consequently obcordate. The keels are usually smooth throughout, but are occasionally slightly roughened by projecting groups of cells.

The androecia occupy short globose branches, and are usually at some little distance from the archegonia, either on a different branch or on the same branch. In rare instances the branch just behind the involucre is occupied by an androecium. The bracts are closely imbricated and are in only two or three pairs; they are subequally bifid with a strongly arched keel; the lobes are rounded at the apex while the lobules vary from rounded to subacute. The bracteole, which is usually single, is small and bifid.

The closest relative of *F. mexicana* is without question *F. Rappii* Evans,¹ recently described from material collected at Sanford, Florida, by S. Rapp, and known from no other localities at the present time. In fact, if the description given above is carefully compared with the description and figures of *F. Rappii*, it will be found that many characteristics are shared by both. For example, they are both autoicous; they both have lobes and lobules built up on essentially the same plan; their underleaves are very similar; their cell-structure is almost identical with respect to the measurements of the cells and the distribution of the local thickening in their walls; and their perianths are much the same in form. And yet, in spite of these strong resemblances, there are a few slight differences which seem to be constant and which apparently warrant a specific separation. In *F. mexicana* the lobes are distinctly cordate at the dorsal base, the lobules are only 0.03 mm. from the axis, the divisions of the underleaves are never rounded and are usually acute, the lobules of the perichaetial bracts and the divisions of the underleaves tend to be lanceolate in outline and acute or acuminate at the apex, and the keels of the perianth usually number nine or ten. In *F. Rappii* the lobes are rounded at the dorsal base, the lobules are about 0.06 mm. from the axis, the divisions of the underleaves, the lobules of the bracts and the divisions of the bracteoles are often broad and rounded at the apex, and the keels of the perianth usually number five, although one or two low supplementary keels are occasionally present. In *F. cobrensis*,² another

¹ BRYOLOGIST 15: 22. f. 1-9. 1912.
² See BRYOLOGIST 16: 55. 1913.

closely allied species from Cuba and Florida, the plants are smaller and each lobe bears a cluster of reddish enlarged cells at the base. In *F. eboracensis*, the commonest species of *Frullania* in the northern and eastern parts of North America, the lobules are smaller than in *F. mexicana*, and the inflorescence is dioicous.

10. *FRULLANIA RIOJANEIRENSIS* (Raddi) Spruce, Hep. Amaz. et And. 23. 1884. *Frullanoides riojaneirensis* Raddi, Mem. Soc. Ital. Modena Fis. 19: 37. 1823; 20: pl. 2, f. 4. 1829. *Frullania sebastianopolitana* Lindenb.; G. L. & N. Syn. Hep. 412. 1845.

Collected in March, 1915, on bark, at Brickell Hammock, Miami, Dade County, Florida, by J. K. Small (No. 5273). New to the United States, but widely distributed in tropical America. *F. riojaneirensis* belongs to the subgenus *Chonantheia* and is the third member of this group to be reported from the United States, the other two being *F. arietina* Tayl. (from Florida) and *F. gibbosa* Nees (from Alabama). Its relationship to *F. arietina*¹ is especially close. It differs, however, in its inflorescence, which is autoicous instead of being paroicous. The sexual branch in *F. arietina* is very characteristic on account of the saccate perigonal bracts just below the involucre. In *F. riojaneirensis* there is a gradual series from the vegetative leaves of the female branch to the innermost perichaetial bracts, and the male inflorescence occupies a short branch in the vicinity of the involucre.

The number of species of *Frullania* now known from the United States (including Alaska) is twenty-eight. Only eleven of these are definitely known from Florida at the present time, but other species may reasonably be expected, especially in the more tropical portions of the state.

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EXPLANATION OF PLATE I

FIG. 1. Tip of a stem with perianth, dorsal view, the bract on the left torn and bent back, x 15.

FIG. 2. Part of a stem with a branch, dorsal view, x 15.

FIG. 3. Part of a stem with well-developed underleaves, ventral view, x 15.

FIGS. 4-6. Underleaves, x 15.

FIG. 7. An underleaf, x 35.

FIG. 8. An underleaf, coalescent with a leaf on the left, x 15.

FIGS. 9-11. Innermost bracts and bracteole of FIG. 1, x 15.

FIG. 12. Second bracteole of FIG. 1, x 15.

FIG. 13. Cross section of perianth of FIG. 1, x 35.

The figures were all drawn from the type specimen.

¹ For a description of this species, with figures, see Evans, Trans. Connecticut Acad. 10: 5. pl. 1, f. 1-6. 1897.

ADDITIONS TO THE LICHEN FLORA OF SOUTHERN CALIFORNIA—NO. 11

H. E. HASSE

Endocarpon petrolepideum (Nyl.). Hasse. Sub *Verrucaria* Nyl. Li. Japonia p. 88. Thallus of thickish brown squamae with lobulate circumference; one or several punctiform depressions in each squamule indicating the apothecia. Spores 2, oblong with about 10 septa in short axis and 3-4 in long axis, muriform, 40μ to 52μ long, 16μ to 20μ thick, pale yellowish; hymenial gelat. and spores yellow with iodine. On quartz at "Barton's Peak," Santa Monica range.

Endocarpon pallidum Ach. Thallus of small lobed and imbricate squamules; sp. 2, muriform, 40μ to 52μ long, 16μ to 20μ thick, pale brown; hym. gel. not stained by iodine. Sandstone, Santa Monica range.

Dermatocarpon lecideoides (Mass.) Hasse. Crustaceous-areolate, finely rimose, areolae small, about 0.5 mm. wide, dark gray to blackening. Apothecia small, black, immersed, 0.1-0.2 mm. wide with sp. simple colorless, oblong-ellipsoid, 6μ - 24μ long, 8μ - 9.5μ thick. Hym. gel. blue, then sordid-vinous with iodine, K—. On quartz at Eden Hot Springs, Riverside Co., and a similar lichen at Griffith Park, Santa Monica range.

Dermatocarpon squameellum (Nyl.) Herre. Sub *Verrucaria* Nyl. in litt. Thallus of green squamae, becoming dun color in herb., 2-4 mm. wide, lobulate and imbricate, moderately thick, flat; apothecia indicated by one or several dark punctiform spots; sp. colorless, fusiform-ellipsoid, 20μ - 24μ long, 8μ wide; paraphyses absent. Shaded banks among moss, Sepulveda Canyon, Santa Monica range (type locality) and near Matilija Springs, Ventura Co. A similar lichen is found near Mayfield on base of trunks of *Quercus lobata*.

Heterocarpon ochroleucum (Tuck.) Müll. Arg. Sp. smoky, oblong-ellipsoid, 2-celled, 16μ - 19μ long, 6μ - 8μ thick. At Granite Wells, Death Valley (S. B. Parish); at Palm Springs and Elsinore, Riverside Co.

Arthopyrenia fallax Arn. On various barks, Catalina Island and Santa Monica range.

Arthopyrenia punctiformis Arn. Same substrata and localities as preceding.

Calicium Curtisii Tuck. Sp. simple, brown, ellipsoid and oblong-ellipsoid, 10μ - 15μ long, 5μ - 6μ thick; a few appear spuriously; septate with some indication of constriction. On *Rhus laurina*. Santa Monica range.

Arthonia radiata (Pers.) Th. Fr., var. *simulans* Leight. Apothecia barely or not elevated above thallus, roundish, flat, otherwise like the species. On California Walnut, Santa Monica range.

Arthothelium subcyrtoles Willey. Sp. oblong, 16μ - 26μ long, 10μ - 12μ wide. Hym. gel. blue with iodine, the sp. yellow, ascus wall not stained. On *Heteromeles*, Catalina Island and dead *Sambucus* at "Clifton by the Sea."

Arthothelium sanguineum (Will.) A. Zahlbr. On various barks, Catalina Island.

Arthothelium spectabile (Flw.) Mass. On various barks, Catalina Island and Santa Monica range.

Roccella Montagnaei Ach. Shrubs, "Clifton by the Sea," Los Angeles Co.

Lecidea Manni Tuck. Trap rock, Santa Monica range, and sand rock, Ventura Co.

Lecidea assimilata Nyl. Sp. oblong-ellipsoid, 12μ - 15μ long, 4μ thick. Simple or now 1-septate. On earth between stones, San Gabriel Canyon, San Gabriel range. Although credited by authors to arctic and alpine regions, yet it agrees well with descriptions given.

Lecidea enteroleuca Fr. (*V. pulverulenta* Fr.) Thallus crust finely granulose, light ash-gray; hypothecium yellowish brown. Santa Monica and San Gabriel ranges. It has been collected in North Dakota (Dr. J. F. Brenckle).

Lecidea griseo-atra Schaer. On black micaceous rock; San Gabriel range and Yosemite Valley.

Lecidea (Biatora) uliginosa (Ehrh.) Schaer. On dead Juniper wood from northern Arizona; it may extend to our desert region.

Lecidea (Biatora) russula (Ach.) Mont. On *Quercus agrifolia*, Santa Monica range.

Lecidea (Biatora) mutabilis (Ach.) Mont. On *Acer macrophyllum*, San Antonio Canyon, San Gabriel range.

Lecidea (Biatora) granulosa (Ehrh.) Schaer. On dead pine wood, Te-hachapi Mts. and its var. *escharoides* Schaer. on rotten sandstone, Santa Monica range.

Lecidea (Biatora) sylvana (Korb.) Th. Fr. On dead pine limbs. At Pinecrest, San Bernardino Mts.

Lecidea (Biatora) holopolia Tuck. Dead wood of conifers. San Jacinto Mts.

Toninia aromatica (Sm.) Mass. var. *acervulata* (Nyl.) Th. Fr. Thallus poorly developed and indistinct, otherwise not differing from the species.

Cladonia verticillata Hoffm. var. *phyllocephala* Flot. Shaded banks, Santa Monica range. Determination by Mr. L. Scriba.

Cladonia fimbriata (L.) Fr. var. *prolifera* (Retz) Mass. Shaded rocks among moss, Santa Monica range.

Cladonia fimbriata (L.) Fr. var. *nemoxina* (Ach.) Coem. f. *fibula* Ach. Santa Monica range.

Cladonia fimbriata (L.) Fr. var. *ochrochlora* (Flk.) Wain. Shaded earth, Santa Monica range.

Heppia psammophila Nyl. Sp. numerous in asci, about 40, spherical, 6μ - 9μ in diameter. Hym. gel. with iodine sordid blue, soon yellow to orange, especially tips of spore sacks and epithecium, with K purple or pale violet, especially asci and contents, but this reaction gradually fading. On rotten granite, Barton's Peak, Santa Monica range.

Leptogium Schraderi (Nyl.) (*Collemodium* - - - Nyl.) Sp. muriform, ovoid 28μ long, 12μ thick and smaller. Rocks, Ventura Co.

Leptogium tenuissimum (Sm.) Korb. Sp. submuriform, 24μ - 28μ long, 12μ thick. Rocks, Santa Monica range, San Gabriel Mts. (Kingman).

Leptogium minutissimum (Flk. Schaer.) Mass. Sp. submuriform, oblong-ellipsoid, the other attenuate. On sandstone, Santa Monica range.

Ramalina Menziesii Tuck. f. *sorediata* Tuck. Twigs, Santa Monica range. Det. by Dr. R. H. Howe, Jr.

Blastenia ferruginea (Huds.) Arn. var. *ammiospila* Whlbg. Sub *Caloplaca* Fr. Li. Scand. p. 183. Thallus gray, rugose warty; disk flat, bright orange with a distinct crenulate or entire thalline margin. The thallus is that of *ferruginea* while apothecia resemble *Caloplaca aurantiaca*. On *Quercus agrifolia*, Cahuenga Pass, Santa Monica range.

Physcia caesia (Hoffm.) Nyl. Sterile. Catalina Island.

Physcia pulverulenta Nyl. f. *diminuta* Cromb. On barks. Santa Monica range and Tehachapi Mts.

Theloschistes chrysophthalmus f. *denudata* (Hoffm.) Müll. Arg. Lacinae somewhat smaller than the species and devoid of fibrils. Santa Monica range.

Buellia semitensis Tuck. Thallus whitish to pale sulphur, rimose. San Bernardino Mts. at Pinecrest. Altit. about 1830 m.

Buellia subdisciformis Jatta. Thallus cracked areolate, light gray with a faint greenish tinge, areolae flat, slightly rugulose, of varying and irregular outline. K greenish yellow, C—. Apothecia sessile, disk velvety black, long, flat with a subpersistent margin to convex and immarginate; apothecia 0.5 to 1.0 mm. wide. Sp. oblong-ellipsoid, 20μ - 26μ long, 10μ - 14μ thick; hypothecium dark yellow-brown; hym. gel. with iodine blue, soon dull brown. On granite rock, Pinecrest, San Bernardino Mts. Det. by Dr. A. Zahlbruckner.

Buellia turgescens Tuck. San Antonio Canyon of the San Gabriel range, on bark of hemlock.

Buellia parmeliarum (Sommerf.) Hasse. On *Parmelia exasperata*, Eden Hot Springs, and on *P. saxatilis*, San Gabriel range.

Buellia inquilina Tuck. On thallus of *Lecanora saxicola*, which is darkened and dull brownish colored. Apothecia flat, 0.3 to 0.5 mm. wide. Sp. 12μ - 16μ long, 7μ - 8μ thick; hym. gel. with iodine blue, the asci dark coppery-red. Eden Hot Springs.

Upon old redwood shakes, encrusted with accumulated and hardened dust, was found a *Buellia* whose appearance and microscopic structures do not differ from *B. lepidastrum* Tuck.; for it *Buellia lepidastrum* forma **lignicola** is proposed.

Buellia vilis Th. Fr. Thallus light gray, cracked-areolate; apothecia appressed, disk plano-convex, margin soon disappearing; sp. ellipsoid, 1-septate 13μ - 16μ long, 7μ - 7.5μ thick; hypothecium *colorless*. On arenaceous rock, Santa Monica range; it has also been found in No. Dakota (Dr. J. F. Brenckle).

Rinodina ascosciana Tuck. Barks, Santa Monica range.

SANTA MONICA, CAL.

CALYPOGEIA ARGUTA FROM THE FAROE ISLANDS

A. LEROY ANDREWS

However one be disposed toward the various recent segregates from *Calypogeia Trichomanis*, *Calypogeia arguta* has long been recognized as a quite distinct species. Its distribution is somewhat extensive, but in northern Europe it is pretty much confined to the range of the so-called "Atlantic species," that is to the very moist coasts washed by the Gulf Stream. The most northerly sta-

tion is represented by the island Sandö on the Norwegian coast (in Söndmøre) at about $62^{\circ} 15'$ north latitude, where I found a bit of it when botanizing with Kaalaas in the summer of 1907.¹ In the summer of 1914 (Aug. 23) I found it in the vicinity of Thorshavn in the Faroe Islands nearly equally far north (62°). It appears to be new to the Faroes, as Jensen's list of bryophytes of the islands² includes only two species of *Calyptogeia*: *Kantia Trichomanis* and *Kantia calypogea* (Radd.) Lindb., which last is a synonym of what is now commonly called *Calyptogeia fissa*. The plant was growing on turfy ground in a sheltered situation in much better specimens than in Norway. I may perhaps add without any intention of questioning the value of the species that wherever I have seen it, in Norway, Scotland, or the Faroes, it grew either mixed with other species or in their proximity.

ITHACA, N. Y.

DICRANUM FULVUM WITH DOUBLE SETAE

ELIZABETH M. DUNHAM

The occurrence of *Dicranum fulvum* Hook. bearing double setae is undoubtedly of sufficient interest to be reported. The specimens were noticed by Mrs. Frank E. Lowe, of Worcester, who with the writer was recently searching for unusual plants about Little Squam Lake, Holderness, New Hampshire. *Dicranum fulvum* is one of the very common mosses about Camp Winnetaska where we were staying, many of the rocks being nearly covered with mostly sterile plants. On one large boulder where the growth was unusually fertile, about a dozen plants were found with two setae coming from the same perichaetium, while other plants had forked stems and each branch bore single fruit. The stems were short, measuring about one-half inch, and the sporophytes were very young. The moss had very little old fruit on this particular boulder, which seemed to show that the plants either had never fruited before or else had fruited sparingly. A specimen was sent to Mrs. Britton for verification, and enquiry made if the herbarium at the New York Botanical Gardens contained any *Dicranum fulvum* with double fruit, but none could be found. Mr. Kaiser has looked through the material in the herbarium of the Sullivant Moss Society and reports but one similar occurrence on a single plant of this species, collected by Dr. Grout at Plymouth, New Hampshire, in September, 1898.

WABAN, MASS.

REVIEW

J. RÖLL, DIE THÜRINGER TORFMOOSE UND LAUBMOOSE. 1915

This local moss-flora in two parts, general and systematic, both of which are published under "Mitteilungen des Thüringer botanischen Vereins," Heft 32, the second however reprinted from "Hedwigia," LVI 1915, is an important

¹ Cf. Kaalaas, Bryophyten in Romsdals Amt, 21. 1911.

² Botany of the Færöes, 126f. 1901.

and interesting one; one can only regret that the Hepaticae were not also included. The region is fortunately geographically rather than politically delimited and has been a classic one in the development of German bryology, a history of its bryological investigation naturally forming the beginning of part I. There follow a description of its physical and climatic features and in exemplary detail of its geologic structure so far as the constituent rocks and their distribution are concerned. The various parts are then described minutely with reference to their characteristic moss-species, after which a comparison with other, mostly European, regions is made. Finally several pages are devoted to the variation of the species and its significance. This first part is decidedly the interesting part of the book and reveals the author as a bryologist of astonishing field-experience, as a naturalist—with all respect be it said—rather than an oecologist. The second part is the usual list of species, localities, etc., preceded by an unfruitful discussion of phylogenetic arrangement and the tiresome reiteration of the Sphagnum-polemics with Warnstorf. Evidently as a matter of reprisal for Warnstorf's latest atrocities one notes an unusually large number of Rl. species in *Sphagnum*. Names in other groups have an entirely familiar look.

A. LEROY ANDREWS.

ITHACA, N. Y.

SHORTER NOTES

MR. CHAMBERLAIN, S. M. S. Secretary, writes to let us know that he has safely reached New York after an extended trip through western Canada, the Pacific Coast States, and return via the Panama Canal. We hope to hear more of this trip.

THE EDITOR is again at his accustomed place after a three-months botanical trip, through the great state of Washington. Accompanied by his wife he made stops at Newman Lake, along the Idaho line northeast of Spokane, mainly in an open rather arid yellow-pine district, and southwest into the treeless region; Pasco, on the Columbia River desert; Ellensburg, where the yellow-pine forest appears again; Easton, in the forest just east of the crest of the Cascades; Mt. Rainier, where two weeks were spent from the dense forest at the base up to the arctic belt at the snow-line; Tacoma, with its red fir forests, bogs, and prairies; and Pacific Beach, in the narrow belt of Sitka Spruce forest along the western coast of the state. There were brought back about seven thousand botanical specimens, including, of course, a fair proportion of bryological material and lichens.

Returning by way of California the opportunity was taken of visiting Dr. Hasse, Curator of the S. M. S. Lichen Herbarium. Dr. Hasse has done great things for the S. M. S. Lichen Herbarium and it will be unpleasant news to BRYOLOGIST readers to learn that he is at present in poor health. We know that they would express to Dr. Hasse hopes for a speedy recovery.

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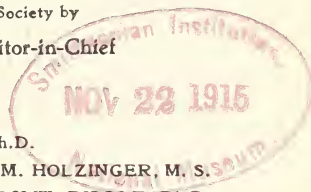
JOURNAL OF THE
SULLIVANT MOSS SOCIETY

Conducted and Published for the Society by
O. E. JENNINGS, Ph.D., Editor-in-Chief

Associate Editors

ABEL JOEL GROUT, Ph.D. JOHN M. HOLZINGER, M. S.
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"Entered as second-class matter August 21st, 1913, at the Post Office at Pittsburgh, Pennsylvania, under the Act of March 3, 1879."
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THE BRYOLOGIST

Bimonthly Journal of
THE SULLIVANT MOSS SOCIETY

DEVOTED MAINLY TO THE STUDY OF NORTH AMERICAN MOSSES,
HEPATICS AND LICHENS

Subscription in the United States, \$1.25 per year; in all other countries, \$1.35., Society membership, 25 cents additional. Single copies, 25 cents. Vols. I-XVII, 1898-1914, \$16.50.

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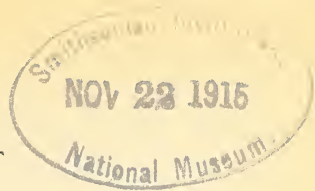
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THE BRYOLOGIST

VOL. XVIII

NOVEMBER, 1915

No. 6

HEPATICAЕ OF NEW MEXICO

PAUL C. STANDLEY

During the last few years extensive collections of phanerogamic plants have been made in New Mexico by Mr. E. O. Wootton and the writer for use in the preparation of the Flora of the state which has appeared recently.¹ It is unfortunate that more time could not be devoted to the lower cryptogams, but the writer nearly always collected specimens of those he came upon and often gave considerable time to searching specially for them. In this way there have accumulated fairly representative collections of the parasitic fungi, lichens, and mosses of the state, but in the case of the hepatics results have been less fortunate. Whether this is because these plants are more difficult of detection the writer does not know, but he is more inclined to believe that the hepatic flora is limited to a relatively small number of species and is not very abundantly represented by individuals. During the summer of 1914 over a month was spent in Rio Arriba County, in northern New Mexico, during which time repeated search was made for hepatics, yet only three species were found, while in the same locality the mosses were abundant.

The present list of seven species is absurdly short when compared with the list of 41 recently published for Colorado,² yet, in view of the fact that nothing has ever been written upon the New Mexican representatives of this group of plants, it seems worth while to record the data which have accumulated, scant though they may be. When the state has been explored by some one familiar with Hepaticae, a larger number of species will probably be discovered, but it is doubtful if the list will ever be a very long one. Mosses are far less abundant, apparently, in New Mexico than in the more eastern states, although the species are said to be very interesting. In the larger part of the state, a region of arid or semi-arid plains, conditions are wholly unsuited to a profuse development of mosses and hepatics, although in the driest situations one often finds one or more xerophilous mosses. In the numerous mountain ranges, however, most of which are heavily timbered and have a moderately high rainfall, well watered as they are by numerous springs and small streams, there is no obvious reason why these plants should not thrive. All of the species recorded in the present paper, with one exception, are confined to the higher mountains, where climatic and floristic features are similar to those of the Rocky Mountains of Colorado.

The hepatics listed have all been determined by Miss Caroline C. Haynes, for whose assistance the writer wishes to express his grateful appreciation.

¹ Contributions from the U. S. National Herbarium, Vol. 19. 1915.

² BRYOLOGIST 18: 44-47. 1915.

The September number of THE BRYOLOGIST was published October 20, 1915.

1. *Plagiochasma rupestre* (Forst.) Steph.¹ Filmore Canyon, Organ Mountains, altitude 1800 meters, July 7, 1897, *Wooton*. This is probably the most interesting of our known species of Hepaticae, for it is reported in the United States only from southern Arizona and this one station in New Mexico. The Organ Mountains lie forty miles north of El Paso, Texas, and the Mexican border. They are notable for the large number of Mexican species occurring there, as well as for their large fern flora. One fern, *Phanerophlebia auriculata*, a member of a characteristically Mexican and Central American genus, is known in New Mexico only from this range. Filmore Canyon lies on the west slope of the Organs, being a broad, open canyon with beautifully colored porphyritic sides, bearing only a sparse vegetation of xerophilous plants. High up in the canyon, however, a few pines and Douglas spruces appear, accompanied by other species typical of the Transition Zone. If the elevation given upon the label is correct, this *Plagiochasma* was collected near the base of the mountains, amid plants characteristic of the Upper Sonoran Zone.

2. *Reboulia hemisphaerica* (L.) Raddi. Gilmore's Ranch, White Mountains, altitude 2,250 meters, August 4 and 6, 1897, and August 17, 1908, *Wooton*. This locality is a very interesting one botanically. Considerable collecting has been done here, many of the plants of Wooton's 1897 set, which was widely distributed, having been gathered in the immediate vicinity. It is the type station for a long list of species of phanerogams.

3. *Conocephalum conicum* (L.) Dumort. Collected twice in the Sandia Mountains, east of Albuquerque: Placitas, August 3, 1910, *Wooton*; in limestone soil along a stream, Balsam Park, 1914, *Miss Charlotte C. Ellis*, 12.

4. *Marchantia polymorpha* L. Placitas, Sandia Mountains, August 3, 1910, *Wooton*. In wet soil and along brooks, Brazos Canyon, Rio Arriba County, August, 1914, *Standley & Bollman*, 10701, 10795. In the latter locality this conspicuous plant was abundant, growing nearly everywhere along the mossy banks of the brooks which flow through the pine and spruce timber.

5. *Chiloscyphus rivularis* (Schrad.) Loeske. Ponchuelo Creek, Pecos National Forest, altitude 2,580. meters, in running water, July 30, 1903, *Standley*. Rio Pueblo, Taos County, August 11, 1910, *Wooton*. On wet soil and in brooks, Brazos Canyon, August and September, 1914, *Standley & Bollman*, 10703, 10793, 11181. Very abundant in the last locality, growing nearly everywhere in suitable situations.

6. *Porella platyphylla* (L.) Lindb. Holt's Ranch, Mogollon Mountains, July 20, 1900, *Wooton*. Gilmore's Ranch, White Mountains, altitude 2,250 meters, August 17, 1908, *Wooton*. Rocky Canyon, Grant County, August 8, 1911, *Holzinger*. All these localities are in the southern part of the state.

7. *Frullania Brittoniae* Evans? Northward face of a cliff, Brazos Canyon, Rio Arriba County, September 4, 1914, *Standley & Bollman*, 11138. Concerning this collection Dr. Evans states, in a letter to Miss Haynes: "The *Frullania* from New Mexico is certainly very close to *F. Brittoniae*, although the underleaves are not quite typical. I wish very much that the specimen had peri-

¹ See Evans, Bull. Torrey Club 42: 279. 1915.

anths, because these would settle the matter beyond doubt. As it is, I fear the determination will have to be considered provisional." The plant was collected on the face of a granite cliff overhanging the Brazos River, associated with *Selaginella Underwoodii* and various lichens and mosses. The genus is not reported from Colorado, but Brazos Canyon is not more than 25 miles south of the Colorado line.

U. S. NATIONAL MUSEUM, WASHINGTON, D. C.

SYSTEMATIC AND ECOLOGICAL NOTES ON THE MOSSES OF WESTERN PENNSYLVANIA

O. E. JENNINGS

I. GENERAL NOTES

When the writer took charge of the botanical work in the Carnegie Museum in 1905 the need of bryological investigations in the region of Western Pennsylvania was at once apparent. Aside from the collections of Burnett in McKean County, of Linn & Simonton in Washington County, and of various scattered collections of Porter and of James, very little was known of the moss-flora of the region. In fact, the mosses of Eastern Pennsylvania, and of Ohio on the west, were much better known than those of Western Pennsylvania.

In connection with the general exploration of Western Pennsylvania for botanical specimens of all kinds, the writer has taken the opportunity for collecting much bryological material and, with the accumulation of this material, the specimens have been carefully studied and placed in the herbarium and, finally, as thesis work, there has been prepared a local manual¹ covering the mosses of Western Pennsylvania and adjacent territory. This manual was published in accordance with the requirements for a thesis, but that future investigation will add very greatly to its contents is a certainty, and that some conclusions therein reached will be found erroneous is a probability. It may be of some interest to call attention to some of the points brought out in the course of the preparation of the manual, as well as to refer to more recent finds.

In Porter's "*Catalogue of the Bryophyta and Pteridophyta found in Pennsylvania*" only 3 species of *Sphagnum* are reported for Western Pennsylvania. The herbarium at the Carnegie Museum now has 20 species and several varieties, if the writer has succeeded in properly identifying them, about as many as had been reported in the Catalogue for the whole state. It is interesting to note that, although the larger part of western Pennsylvania is unglaciated and has a rapid and thorough drainage, thus leaving few swamps or ponds, there are nevertheless a number of the species fairly well distributed in the region: *Sphagnum affine* R. & C. has now been found in eight counties, and *S. recurvum* (Beauv.) Warnst. in six. The best region for Sphagnums has been the Pymatuning Swamp in northwestern Pennsylvania, although a number of species have turned up

¹ A Manual of the Mosses of Western Pennsylvania. 1913. 375 pages of text and 54 pages of figures.

unexpectedly in moist cavities along the beds of some of the swiftly running mountain streams.

Polytrichum Ohioense R. & C. has now been collected in fourteen counties of Western Pennsylvania; *P. commune* (L.) Hedw. from seventeen. *P. strictum* (Banks) Menzies has been found in a small *Cassandra* bog in the Pymatuning Swamp and what appears to be a rather sickly specimen of the same species was collected in the midst of a large tuft of *Leucobryum* from a hill-top in Washington County. *P. piliferum* (Schreb.) Hedw. is now accredited to three counties.

The Catharinaeas proved particularly puzzling, there being apparently a couple of undescribed species rather common in the deep shaded ravines of the region. Some of these specimens have from 7 to 12 lamellae of 8 to 14 cells height and covering about two-thirds to three-fifths of the upper leaf width. In the manual the writer proposed two new species based on these forms. What was taken to be the true *C. angustata* (Brid.) Brid. is rather rare in Western Pennsylvania. Since the publication of the Manual, however, more material has been secured and it appears that there is a pretty complete series of intergradations between the plants called *C. angustata*, *papillosa*, and *plurilamellata*. (See Plate II, taken from the Manual of the Mosses of Western Pennsylvania, p. 402, Plate XXVII.)

Buxbaumia aphylla L. was sought for in vain for several years, although reported from the northern part of the region (Cameron County) in Porter's Catalogue. Finally, however, Mrs. Jennings, in 1910, located a few specimens under beech and hemlock trees on the banks of a little ravine about forty miles north of Pittsburgh, and early in May, 1913, Prof. A. R. Hillard of the Edgewood High School collected it about eighty miles northeast of Pittsburgh. On May 17, 1913, the present writer found it on bare clay banks along the roadside on the slopes of Chestnut Ridge about forty-five miles east of Pittsburgh. In the last named locality it appeared to be growing on soil covered by the protonema of *Pogonatum* and associated with *Webera sessilis* (Schmidt) Lindb. There are at least eleven localities now known for *Buxbaumia* in the state of Pennsylvania. *Webera sessilis* has now been found in about half a dozen places in Western Pennsylvania; but always on clay roadside banks in the mountains.

An interesting find of 1913 was the discovery in two places in the Pittsburgh district of *Pleuridium alternifolium* (Kaulf.) Rabenh., April 20 and 24, respectively. In both instances the moss was discovered growing in sandy-clay soil in hillside meadows. So far as known to the writer this species has not before been reported in Pennsylvania, although *P. subulatum* (L.) Rabenh. has been reported about twenty-five miles southwest of Pittsburgh.

Lesquereux's Slippery Rock Creek station for *Bryoxiphium* has been searched for in vain and it is not improbable that man's activities in that region in quarrying the excellent "Homewood" sandstone along the stream may have destroyed the habitat.

Probably the most generally distributed moss in Western Pennsylvania is *Dicranella heteromalla* (L.) Schimp. The writer's collections for this species number over ninety localities all over the region, and this represents only a small

fraction of the stations where it has been recognized. One of the next most common species of the region is *Stereodon imponens* (Hedw.) Brid., to be found in woods everywhere, on humus and logs, or even on rocks. This is called "log moss" by our local florists and is collected in quantities for decorative purposes, particularly for Christmas work.

II. ECOLOGICAL DISTRIBUTION OF THE MOSSES OF THE PITTSBURGH DISTRICT

Upon taking up the study of the distribution of plants in the Pittsburgh district it was soon found that the various ecological groups were located in habitats which could best be classified upon the basis of the physiography of the region. The Pittsburgh district, for the purposes of the following classification, has been limited to the hilly country lying within a radius of about thirty miles of Pittsburgh, Pa. The district is at the present time hilly, non-glaciated, partly forested, ranging in elevation from seven hundred to about thirteen hundred feet above the sea, and having in general a rather poor soil resulting from the disintegration and erosion of the Carboniferous shales and sandstones. There is a general lack of limestones or other rocks than the shales and sandstones mentioned, and this has considerable to do with the determination of the species occurring in the district.

The physiographic features of the Pittsburgh district are the result of a development which may be briefly summarized in the following manner: In Tertiary times the district was evidently a plain, but little elevated above the sea. Later this plain was elevated and the drainage systems began its erosion and dissection. This dissection continued until, at the beginning of the Glacial Period, the drainage system had evidently worked out a series of wide valleys about 300-350 feet below the horizon-line of the old plain. The drainage system, known as the "Old Monongahela System,"¹ flowed northward into the region now occupied by the basin of Lake Erie.

During the Glacial Period the ice moved southward to a point within about 35 miles of Pittsburgh, thus blockading and damming up the Old Monongahela. The impounded waters south of the ice finally escaped to the west over a low divide and, by subsequent erosion, the present Ohio River developed, diverging to the west and southwest from the course of the Old Monongahela at a point about 25 miles north of Pittsburgh. With the opening up of the Ohio River outlet, and possibly also a further elevation of the region, the river began again a period of erosion, cutting its channel considerably deeper. This new cycle of dissection has now resulted in a deepening of the channels of all of the larger streams to about 200 feet below the old preglacial channels. However, if one ascends the smaller streams and tributaries it is found almost invariably that the valley suddenly narrows into a ravine or gorge with swiftly-flowing and actively eroding waters, often forming rapids or falls, while above this region of active erosion the streams are still flowing in approximately the same valleys as in the time of the old Monongahela System.

¹Leverett, Frank. "Glacial Formations and Drainage Features of the Erie and Ohio Basins." U. S. Geol. Surv. Monograph 41: 88: 100. 1902.

It has been comparatively easy to recognize the larger plant societies in the Pittsburgh district by relating the vegetation to the physiographic development of the habitat. However, it has not been so easy to definitely designate ecologically the habitats and societies of the mosses of the district. This is evidently largely due to the dependence of the mosses more or less directly upon larger plants; as in bark mosses and mosses growing on decaying logs. Not only will mosses be influenced by the general ecological features of the habitat, such as heat, light, moisture, exposure, nature of the soil, etc.—such factors as are all-important in determining the major plant societies—but the very existence of the mosses may be determined by the absence or presence of certain other plants upon whose live trunks they may grow, or upon whose decaying wood they are restricted, or upon whose shade-giving moisture-conserving habits they are dependent. It would thus appear that the sum total of ecological factors which may determine the absence or presence of a moss may be even greater than is the case with most of the plants of larger size in the same habitat. On the other hand, many mosses are not so restricted as are many of the larger seed plants and ferns because of their independence of direct connection with the soil; *Stereodon imponens* being a good example of such a moss.

In the following classification of the mosses of the Pittsburgh district the attempt has been made to group them under the ecological societies determined for the larger seed-plants and ferns by the physiographic development of the habitat.¹ Those species of mosses particularly characteristic of the habitat or particularly abundant in the habitat have been indicated by an asterisk. It is fully realized that the classification as proposed is not yet perfect, and further investigations may lead to radical changes.

I. *Quercus alba* Association. White Oak Forest.

This forest covers the rounded tops and upper slopes of the hills everywhere in the district, the soil being usually rather thin, infertile, and often quite acid, so that the area has not been so largely cleared for farming purposes as have some of the lower slopes and valleys. In this forest occur several of the huckleberries (*Vaccinium*), the trailing arbutus (*Epigaea*), etc., while the following mosses are common there:

A. On the ground.

Ceratodon purpurascens (Hedw.) Jenn.

Dicranella heteromalla (Dill.) Schimp.

Leptobryum pyriforme (L.) Wils.

Leucobryum glaucum (L.) Schimp.*

Polytrichum Ohioens: R. & C.

Webera nutans (Schreb.) Hedw. (*Pohlia nutans* Lindb.)

B. On base of White Oak (and Chestnut Oak).

Anomodon attenuatus (Schreb.) Hueben.

Anomodon minor (Hedw.) Fuernr. (*A. obtusifolius* Bryol. Eur.)

¹Jennings, O. E. "A Note on the Ecological Formations of Pittsburgh and Vicinity." Science, N. S. 27: 828-830. May 22, 1908.

Anomodon rostratus (Hedw.) Schimp.*

Leskea obscura Hedw.

Pylaisia Schimperii Card. (*P. intricata* Bryol. Eur.)

2. *Acer saccharum-Fagus grandifolia*. Maple-Beech Forest.

This forest occurs locally in the old pre-glacial valley floors at the present altitude of about one thousand feet above the sea, and it probably once prevailed in this habitat. It extends up the bases of the gentle slopes to meet the slightly intermingling White Oak forest of the hill-tops and upper slopes. Most of the Maple-Beech forest has been cleared away, the soil being generally fertile and fairly well drained. So far as determined this forest has practically the same mosses as occur in the forest of the shaded slopes, mentioned below under "5," but not quite so well developed, probably because of less dense shade and less moisture.

3. *Tsuga canadensis* Association. Hemlock Forest.

This forest occupies the dark, damp, cool, rocky ravine or gorge where the stream is now actively deepening its channel, and usually is best developed in the Pittsburgh district in the upper third of the smaller "runs," at an altitude of about 950-975 feet above sea-level. The flora of this habitat is rather limited, where best developed the Hemlock being the only tree, and the lower herbaceous plants being very few. The moss flora is fairly large, although it would undoubtedly be considerably larger were the walls of the gorge of other than the usual crumbling clay shales and soft sandstones.

A. On dripping rock faces of gorge or at falls.

Dicranella heteromalla [Dill] Schimp. Not common in this habitat.

Hymenostylium curvirostre [Ehrh.] Lindb. (*Gymnostomum curvirostre* [Ehrh.] Hedw.*)

Philonotis Muhlenbergii (Schwaegr.) Brid.*

B. Damp shaly cliff of gorge.

Barbula unguiculata [Huds.] Hedw.

Grimmia apocarpa [L.] Hedw.

Webera nutans [Schreb.] Hedw. (*Pohlia nutans* Lindb.)

C. Calcareous rock cliff in gorge; very limited in extent.

Fissidens minutulus Sull.

D. Narrow non-calcareous rock ledges in gorge.

Brachythecium flagellare (Hedw.) Jenn.

E. Stones in bottom of ravines and gorge.

Amblystegium Juratzkanum Schimp.

Amblystegium varium (Hedw.) Lindb.

Brachythecium flagellare (Hedw.) Jenn.

Fissidens exiguus Sull.

Fissidens minutulus Sull.

4. *Quercus velutina-Q. coccinea* Association. Black Oak-Scarlet Oak Forest.

On the remnants of the flood-plains and terraces of the main streams of the Old Monongahela System the soil is a deep rather rich gravelly or sandy alluvium

on which the forest is mainly Black Oak and Scarlet Oak, with quite a mixture of other species. There is very little of this forest left undisturbed in the district owing to its desirability both for agricultural purposes and, in the neighborhood of the cities, for residential purposes. The altitude is about 900 feet above the sea and much of the best residential section of Pittsburgh is located here. The mosses are evidently about the same species as those listed under "5," being mainly those confined to logs, humus, or bases of trees.

5. *Betula-Acer-Fagus-Quercus* Association. Birch-Maple-Beech-Oak Forest.

Below the gorge, where the stream is eroding most rapidly, the valley widens out and, eventually, there result more or less gentle slopes, broken up here and there by side ravines and by landslides, or here and there under-cut by the stream, which may be beginning to meander in the widening flood-plain. The forest is a difficult one to briefly characterize. The nature of the slopes varies in steepness and in exposure, and this is to a measure expressed in the varying vegetation. In general the most prominent trees are the Cherry Birch, Red Maple, Beech, and Black Oak, with here and there a prominent mixture of Red Elm, Black Cherry, Locust, Sour Gum, White Ash, Tulip Tree, Basswood, and White Oak. The soil is usually quite unstable, always working down slope and thus often being a mechanical mixture of stones, clay, decaying leaves, sticks, etc. The moss flora of this forest is better developed than that of any of the other habitats:

A. Shaded clay soil on slopes.

Campylium chrysophyllum (Brid.) Bryhn.

Catharinaea angustata Brid.*

Catharinaea undulata [L.] W. & M.* and var. *allegheniensis* Jenn.*

Dicranella heteromalla [Dill.] Schimp.

Ditrichum pallidum [Schreb.] Hampe.

Ditrichum tortile [Schrad.] Brockm.

Mnium cuspidatum L., Hedw.

Physcomitrium turbinatum (Rich.) C. M.

Webera nutans [Schreb.] Hedw.

B. Woods humus or humus-covered soil on shaded slopes.

Amblystegium Kochii Bryol. Eur.

Mnium cuspidatum L., Hedw.*

Plagiothecium denticulatum [L.] Bryol. Eur.*

Plagiothecium sylvaticum [Huds.] Bryol. Eur.

Platygyrium repens [Brid.] Bryol. Eur.

Rhynchostegium serrulatum (Hedw.) Jaeg.*

Stereodon imponens (Hedw.) Lindb.*

Stereodon Haldanianus (Grev.) Lindb.

Thuidium delicatulum [L.] Mitt.*

C. Logs on shaded slopes.

Brachythecium acuminatum (Hedw.) Kindb.

Brachythecium campestre (Bruch) Bryol. Eur.

Brachythecium salebrosum [Hoffm.] Bryol. Eur.
Dicranella heteromalla [Dill.] Schimp.
Entodon cladorrhizans (Hedw.) C. M.
Tetraphis pellucida [L.] Hedw. (*Georgia pellucida* Rabenh.)
Mnium cuspidatum L., Hedw.
Platygyrium repens [Brid.] Bryol. Eur.*
Rhynchostegium serrulatum (Hedw.) Jaeg.*
Stereodon imponens (Hedw.) Lindb.
Stereodon Haldanianus (Grev.) Lindb.
Thuidium delicatulum [L.] Mitt.*
Thuidium minutulum [Hedw.] Bryol. Eur.

D. Loose sandstone blocks on shaded slope.

Hedwigia ciliata Ehrh., Bryol. Eur. (*H. albicans* Lindb.)

Dianthera Association. Water Willow Association.

6. The forest of the flood-plains of the rivers and larger tributaries is the result of a succession of ecological groups which can still be made out to a large extent from scattered remnants. This succession may best start with a sandbar or a bit of shallowly submerged bank. If for any reason the water becomes shallow beyond a certain limit the Water Willow takes possession and the vegetational succession then starts with the *Dianthera* Association. Some of the aquatic mosses might be expected here, but none have been reported from this association thus far. The *Dianthera* acts as an obstacle to slow down the water currents, thus leading to a greater deposition of sand and silt at that point, as well as directly stopping much moving material. In this way the water becomes successively more shallow and eventually conditions become suitable for the sprouting and rooting of other plants which will take possession of the habitat in place of the disappearing *Dianthera*. The plant group following the *Dianthera* may be known as follows:

7. *Platanus-Salix* Association. Sycamore-Willow Forest.

This association is rarely of any great extent and probably very rarely lasts more than one generation of willows, excepting at the edge of a rather permanent bank, where subject to severe floods. Ordinarily the level of the soil raises to some extent with the development of the plants and conditions then speedily become suitable for the next following association. The following mosses are to be counted as members of this association, more particularly along the sandy banks of the tributaries of the larger rivers:

Aphanorhegma serratum (Hook. & Wils.) Sull.

Physcomitrium immersum (Rich.) C. M.

Pogonatum pennsylvanicum (Hedw.) Paris. (*P. brevicaulis* Beauv.)

8. *Acer saccharinum-Ulmus americana* Association. Silver Maple-White Elm Forest.

This forest, with a large number of other trees besides the Silver Maple and White Elm, seems to be the prevailing type in the few scattering remnants

of the original woods of the habitat. Among the other trees to be mentioned are Hard Maple, Red Maple, Tulip Tree, Walnut, Hickory, Swamp White Oak, Red Oak, and, in fact, quite a large list of species, with also occasional old Sycamores, which may be considered as relicts of the preceding association. The indications are that the moss flora was about the same as in the woods of the ravine slope (see "5") and it was probably even richer.

There would be good reason to believe that this Silver Maple-White Elm forest would eventually give way to a Hard Maple-Beech forest, but the writer has seen no examples of such woods, even though they may have been present a century ago.

9. *Sambucus racemosa*-*Hydrangea arborescens* Association. Red-Berried Elder-Wild Hydrangea Thicket.

This thicket occurs on the precipitous talus slopes along the larger streams where extensive under-cutting has taken place. There are a number of good examples of such talus slopes along the Allegheny River above Pittsburgh. The soil is very unstable, landslides of various sizes being of frequent occurrence. The steeper slopes are usually mainly covered by a thicket with a small scattering of trees, but after the cessation of undercutting the slope may become more stable and, eventually, the thicket will give way to a diversified forest probably best characterized by Basswood and Red Elm, and this steep slope would in time become more gentle and pass into a forest of about the same character as that of the ravine slopes, the Birch-Maple-Beech-Oak forest.

On the face of the steep talus slope there are numerous small ledges and rock-crevices to which the moss flora is mainly confined. The list is usually about as follows:

- Bryum affine* (Brid.) Lindb.
- Bryum intermedium* (Ludw.) Brid.
- Bryum pallescens* [Schleich] Hedw.
- Ceratodon purpurascens* (Hedw.) Jenn.
- Dicranella varia* (Hedw.) Schimp.
- Funaria hygrometrica* [L.] Hedw.
- Leptobryum pyriforme* [L.] Wils.
- Webera nutans* [Schreb.] Hedw. (*Pohlia nutans* Lindb.)

10. *Philonotis* Association.

On the wet rock bottom of the more open ravine below the gorge, where often submerged in rainy periods, *Philonotis Muhlenbergii* and *P. fontana* so often form the most conspicuous vegetation that it has been thought best to name the association after them. The vegetation in this habitat is, in fact, mainly mosses, there being also *Marchantia* and *Conocephalus*, with a very few seed plants in the crevices. *Selaginella apus* is found here quite frequently. The moss list is as follows:

- Amblystegium orthocladon* (Beauv.) Jaeg.
- Calliergon cordifolium* [Hedw.] Kindb.

Hygroamblystegium tenax (Hedw.) Jenn. (*Amblystegium irriguum*, Bryol. Eur.)

Mnium affine var. *rugicum* (Laur.) Bryol. Eur.

Philonotis fontana [L.] Brid.*

Philonotis Muhlenbergii (Schwaeg.) Brid.*

In addition to the various associations mentioned above there are a number of ecological plant groups which, by reason of man's activities, have replaced the natural vegetation over a large part of the district. Such vegetation is ecologically termed "secondary." The main secondary vegetational groups, as far as their mosses have been noted, are as follows:

11. Roadside-bank Formation.

This formation is the one covering the clay roadside banks where not too much exposed to the sun. The Horned Liverwort, *Anthoceros laevis* L., is quite common in this habitat, together with the following mosses:

Catharinaea undulata [L.] W. & M.*

Catharinaea undulata var. *alleghehiensis* Jenn.

Pogonatum pennsylvanicum (Hedw.) Paris. (*P. brevicaulis* Beauv.)*

12. *Bryum argenteum* Association.

On paths and old camp sites on the modern flood-plains where recent use has kept down the grass and other herbaceous vegetation the most conspicuous vegetation is the moss vegetation, dominated usually by the Silvery Bryum.

Bryum argenteum (L.) Hedw.*

Dicranella heteromalla [Dill.] Schimp.

Funaria hygrometrica [L.] Hedw.

Physcomitrium turbinatum (Rich.) C. M.

13. Cultivated Field Formation.

So far as the present list of mosses is concerned this formation refers mainly to cultivated fields on the pre-glacial flood-plains and slopes at an altitude of one thousand feet or more. Meadows, pastures, and various other fields where cultivation has been more or less recent are, for sake of convenience, grouped together under this head. The moss flora here differs but little from that of the preceding group.

Dicranella heteromalla [Dill.] Schimp.*

Funaria hygrometrica [L.] Hedw.

Physcomitrium turbinatum (Rich.) C. M.

14. Meadow-Pasture Formation on the Recent Sandy Flood-plains.

This group differs from the preceding in that it occupies the sandy flood-plains along the larger streams and rivers at an altitude of about 750-800 feet.

Ceratodon purpurascens (Hedw.) Jenn.

Dicranella heteromalla [Dill.] Schimp.

Physcomitrium turbinatum (Rich.) C. M.

Webera Lescuriana (Sull.) Jaeg.

15. *Funaria-Physcomitrium* Association.

This association often occurs pure and forms a dense covering on otherwise bare ash-covered spots where there has been a recent wood fire, such as a spot where a brush-heap has been burned. Of the two mosses constituting the association *Funaria* is usually the most abundant.

Funaria hygrometrica [L.] Hedw.*

Physcomitrium turbinatum (Rich.) C. M.

CARNEGIE MUSEUM, PITTSBURGH, PA.

BUCEGIA, A NEW GENUS FOR NORTH AMERICA

CAROLINE COVENTRY HAYNES

It is a great pleasure to announce the addition to our Flora of this genus, *Bucegia*, hitherto known only in the Carpathian Mountains of Roumania.

Mr. A. H. Brinkman collected it along with many other interesting species in the sub-alpine regions of British Columbia. Dr. Conklin is naming these, the Herbarium of the Sullivant Moss Society, as well as my own, getting a very full set. I have had the pleasure of studying a great many of the specimens with

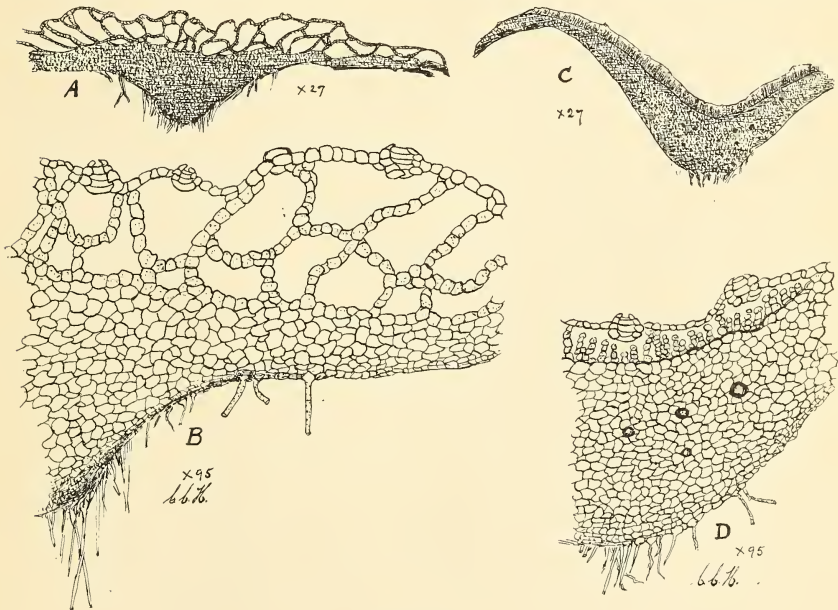


FIGURE I.

A and B, *Bucegia romanica* Radian.
C and D, *Freissia quadrata* (Scop.) Nees.

Dr. Conklin. The structure of the thallus of this plant struck me as peculiar. I began to study it with enthusiasm and made drawings; the figures looking strangely familiar, I turned to Müller "Die Lebermoose" of Europe and soon realized the reason when I came to his figures and description of the genus.

Dr. Evans, who verified my determination, has consented to give a description of this genus in the next series of his Notes.

I add figures of the cross-section of the thallus of this plant as well as of that of *Preissia quadrata*, its nearest neighbor in point of relationship. The pores, it will be noticed, are similar. Immediately beneath the epidermis, lamellae form open spaces in the air chambers, and these are quite, in *Preissia*, filled in with close-set upright chains of cells.

It is hoped that botanists will examine their specimens of *Preissia*, for it is highly probable that some of these will prove to be *Bucegia*.

The accompanying figures were drawn from specimens No. 792, *A. H. Brinkman* (figs. A and B), and 585, *A. H. Brinkman* (figs. C and D); *Bucegia romanica* Radian and *Preissia quadrata* (Scop.) Nees, respectively.

HIGHLANDS, NEW JERSEY

SHORTER NOTES

Recent issues of the Bulletin of the Torrey Botanical Club contain several articles of especial interest to readers of the BRYOLOGIST. In the January issue Mrs. Britton¹ lists the results of the study of a collection of mosses made on the island of St. Thomas and neighboring islets. No previous lists are extant, though two small collections had previously been made. For the sake of completeness these are included in the list of 28 species given. Three species are proposed as new, *Hyophila uliginosa*, *Phascum sessile*, and *Bryum microdecurrens*, of which the first two are figured. In the same issue also there is an account² with two figures of a new fossil moss recently discovered in the shale at Florissant, Colorado. This species, *Plagiopodiopsis Scudderi*, is the second occurrence known in America of a fruiting moss in the fossilized condition, though a few other species have been found sterile. Some interesting notes upon these are given in the BRYOLOGIST Vol. 6, page 93.

The interesting paper upon Bermuda mosses³ which Mrs. Britton read at the meeting of the Sullivant Moss Society last December is published in full in the February Bulletin. An abstract of this has already been given on pages 17 and 18 of this volume of the BRYOLOGIST. The plates show the details of structure in two mosses, *Syrrophodon floridanus* and *Rhacopilum tomentosum*, that occur in the extreme Southern States.

¹ Elizabeth G. Britton. West Indian Mosses—II. Mosses of the Danish West Indies and Virgin Islands. Bull. Torrey Club 42: 1-8. pl. 1. (1915.)

² Elizabeth G. Britton and Arthur Hollick. A New American Fossil Moss. Bull. Torrey Club 42: 9-10. figs. 1, 2. (1915.)

³ Elizabeth G. Britton. The Mosses of Bermuda. Bull. Torrey Club 42: 71-76. pls. 6, 7. (1915.)

Mr. H. N. Dixon¹ continues his studies of Australian mosses which have already been noticed in the BRYOLOGIST, by the description of twelve new species, and critical notes upon two others. Several of the new species were sent to Mr. Dixon by Mr. W. Gray, who has for some years been a member of the Moss Society. All the new species are beautifully figured in the accompanying plate.

The account of the genus *Plagiochasma* which Dr. Evans² contributes to the May issue of the Bulletin was presented in part at the last meeting of the Sullivant Moss Society at Philadelphia. It gives detailed descriptions, figures, synonymy, and ranges for the eight species recognized as occurring north of Central America, besides a wealth of critical notes upon each species, an account of the history and morphology of the genus as a whole, and a bibliography of 40 titles. The ranges include many extra-limital stations. One new species, *Plagiochasma Landii*, is proposed, and one new combination, *P. jamaicense* (Haynes), made.

It has been the good fortune of Mr. R. S. Williams³ to study the interesting collection of 41 mosses made by Dr. and Mrs. J. N. Rose while collecting cacti in the nearly rainless regions of Peru, Bolivia, and Chile. The region has been but little studied bryologically, and the collection contains many new or interesting species. Ten new species and one new genus (*Pseudocrossidium*) are described and figured, and one new combination made.

Lichenists will be interested in the latest issue of the Ohio Biological Survey Bulletin,⁴ which treats of the Ascomycetes of the state. In the first article Prof. Bruce Fink deals with the preliminary considerations of classification, illustrating the text by eight figures. This article outlines the reasons for treating the Ascomycetes, both lichenous and non-lichenous, as a single class of fungi, enumerates the orders and families with mention of the genera known to occur in Ohio, and lists a bibliography of 67 titles. The second article by Prof. Fink and Mr. C. Audrey Richards describes all species of Collemaceae occurring in the state, with keys to genera and species, besides ten pages of "General Considerations," and a small additional bibliography. Two new species, *Synechoblastus ohioensis* Fink, and *Leptogonium plectenphyllum* Fink & Rich., are described. Four plates, containing 25 figures illustrate the article.

E. B. C.

¹ H. N. Dixon. New and Rare Australian Mosses, Mostly from Mitten's Herbarium. Bull. Torrey Club 42: 93-110. pl. 9. (1915.)

² Alexander W. Evans. The Genus *Plagiochasma* and its North American Allies. Bull. Torrey Club 42: 259-308. figs. 1-8. (1915.)

³ R. S. Williams. Mosses from the West Coast of South America. Bull. Torrey Club 42: 393-404. pls. 21-25. (1915.)

⁴ Ohio Biological Survey Bulletin 5. Pp. 1-72. pls. I-IV. Columbus, Ohio. (June 1915)-

NOTICE OF ELECTION OF SULLIVANT MOSS SOCIETY OFFICERS FOR 1915

Members are requested to send ballots *at once* to the Judge of Elections, Dr. Otto E. Jennings, Carnegie Museum, Pittsburgh, Penna. Balloting closes on November 30, 1915.

The following candidates have been nominated by the Executive Committee; members are free to vote for any others.

For President—Mrs. Elizabeth G. Britton, New York City.

For Vice-President—Mrs. Annie Morrill Smith, Brooklyn, N. Y.

For Secretary-Treasurer—Mr. Edward B. Chamberlain, New York City.

SULLIVANT MOSS SOCIETY NOTES

Members of the Sullivant Moss Society will be sorry to learn, we are sure, that Dr. H. E. Hasse, of Santa Monica, Cal., who for the past three years has been in charge of the Lichen Herbarium, has been compelled by failing health to give up the care of the collections. Mr. C. C. Plitt of Baltimore has kindly consented to assume charge of this department, and arrangements are under way for the transfer of the now large collection.

The Secretary had the pleasure of calling upon Dr. Hasse during the past summer, and spent a very delightful time talking over the collections and the work of the department. It is a source of keen personal regret that, since the above was put in type, word has come of the death of Dr. Hasse on October 29th. We have space only to assure his family of the deep sympathy of the members of the Society, and of our deep sense of gratitude for the kindly help and service that he so freely gave.

A more extended notice will appear in an early issue.

EXCHANGE DEPARTMENT

Offerings—To Members only, for return postage.

Rev. H. Dupret, Seminary of Philosophy, Montreal, Canada. (U. S. postage accepted.)—*Fontinalis Dalecarlica* B. & S., from near Montreal.

Mr. Severin Rapp, 207 First St., Sanford, Florida.—*Ephemerum megalosporum* (Aust.) Salm. and *E. spinulosum* Schimp., both collected in Florida.

WRONG PAGINATION

Through some regrettable blunder the September number of the BRYOLOGIST received the wrong pagination. We would ask our subscribers to please renumber the pages of that issue so that they will read from 65 to 80 inclusive. The index when published will then be correct.—Ed.

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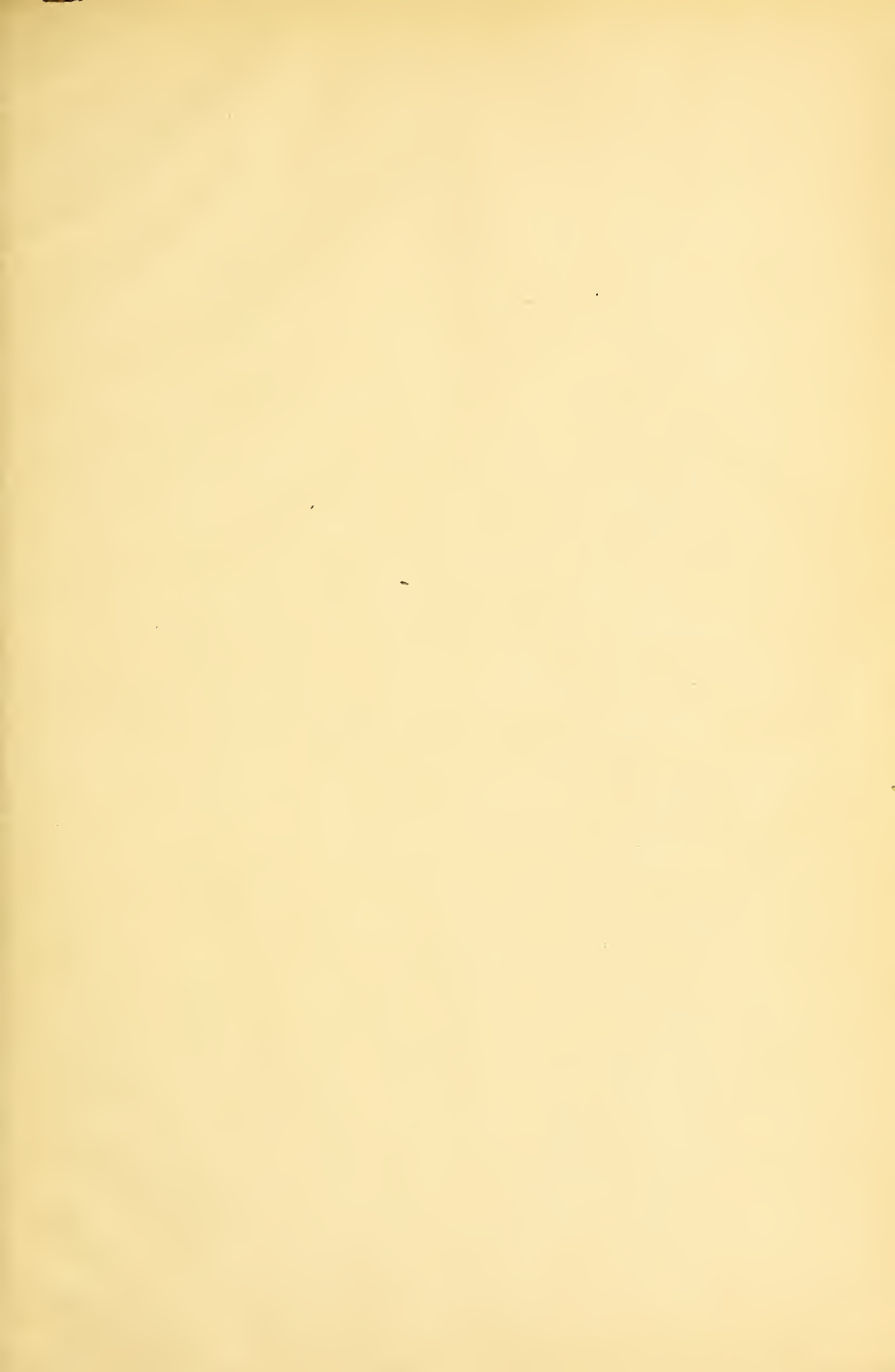
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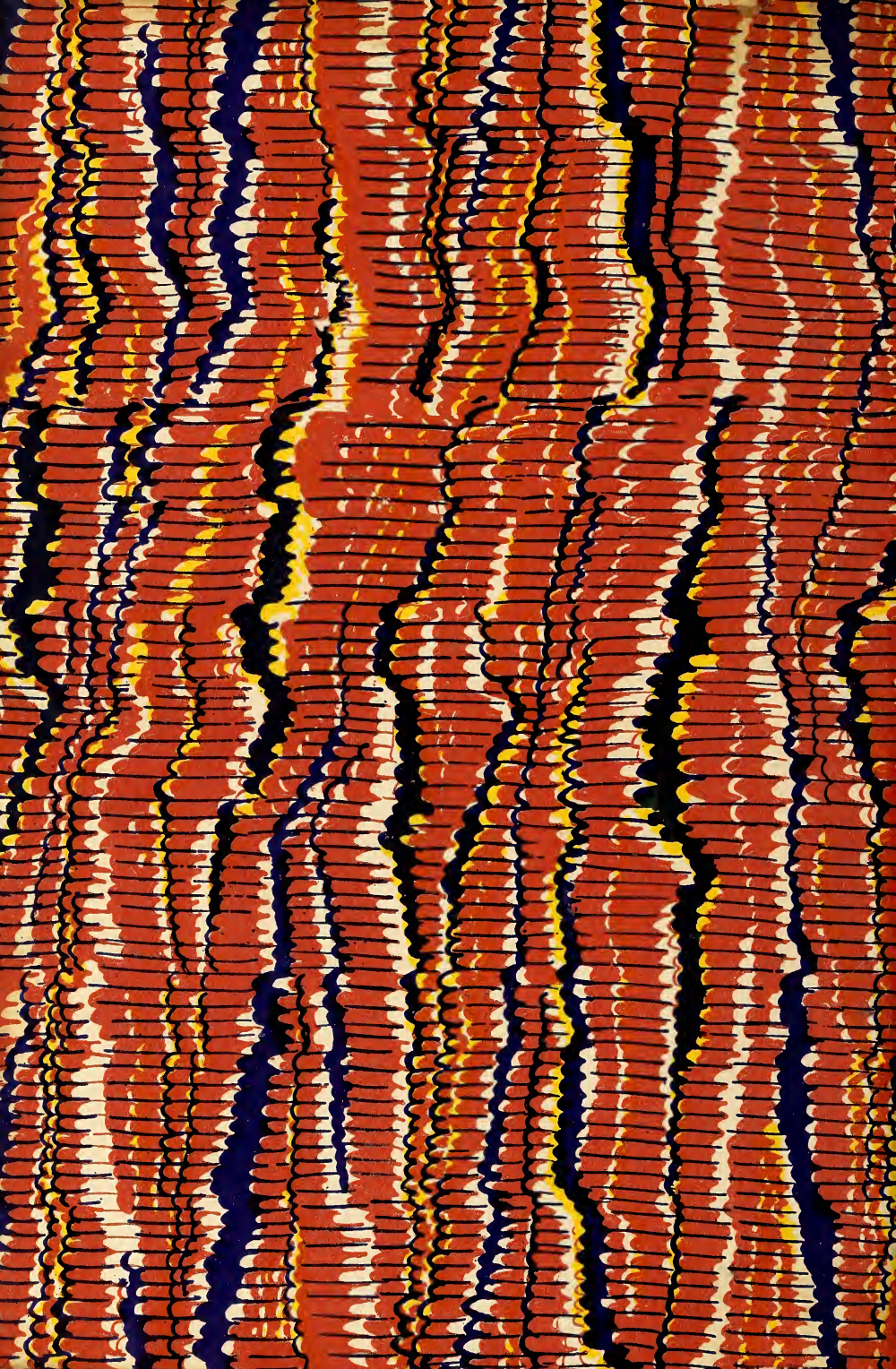
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