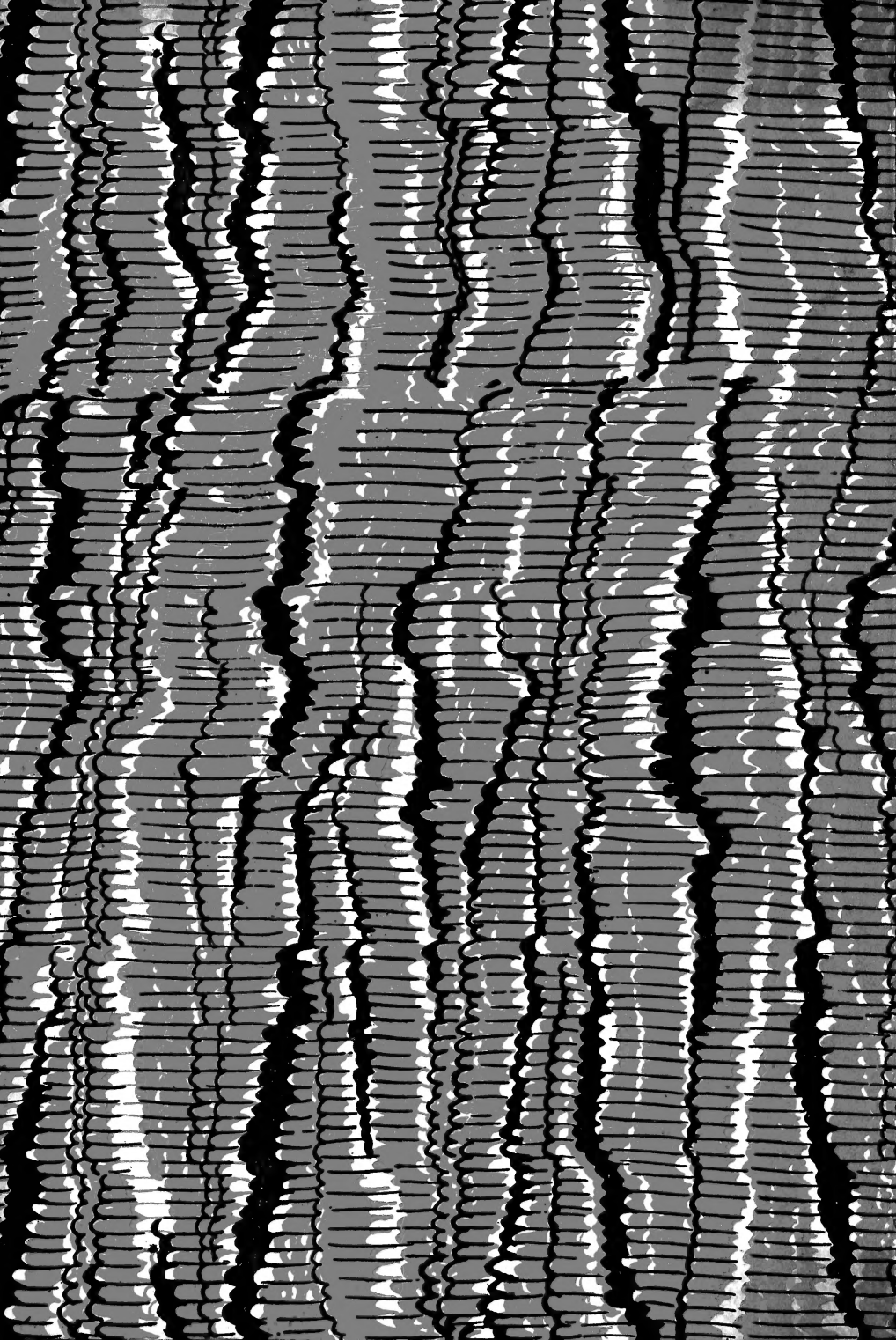

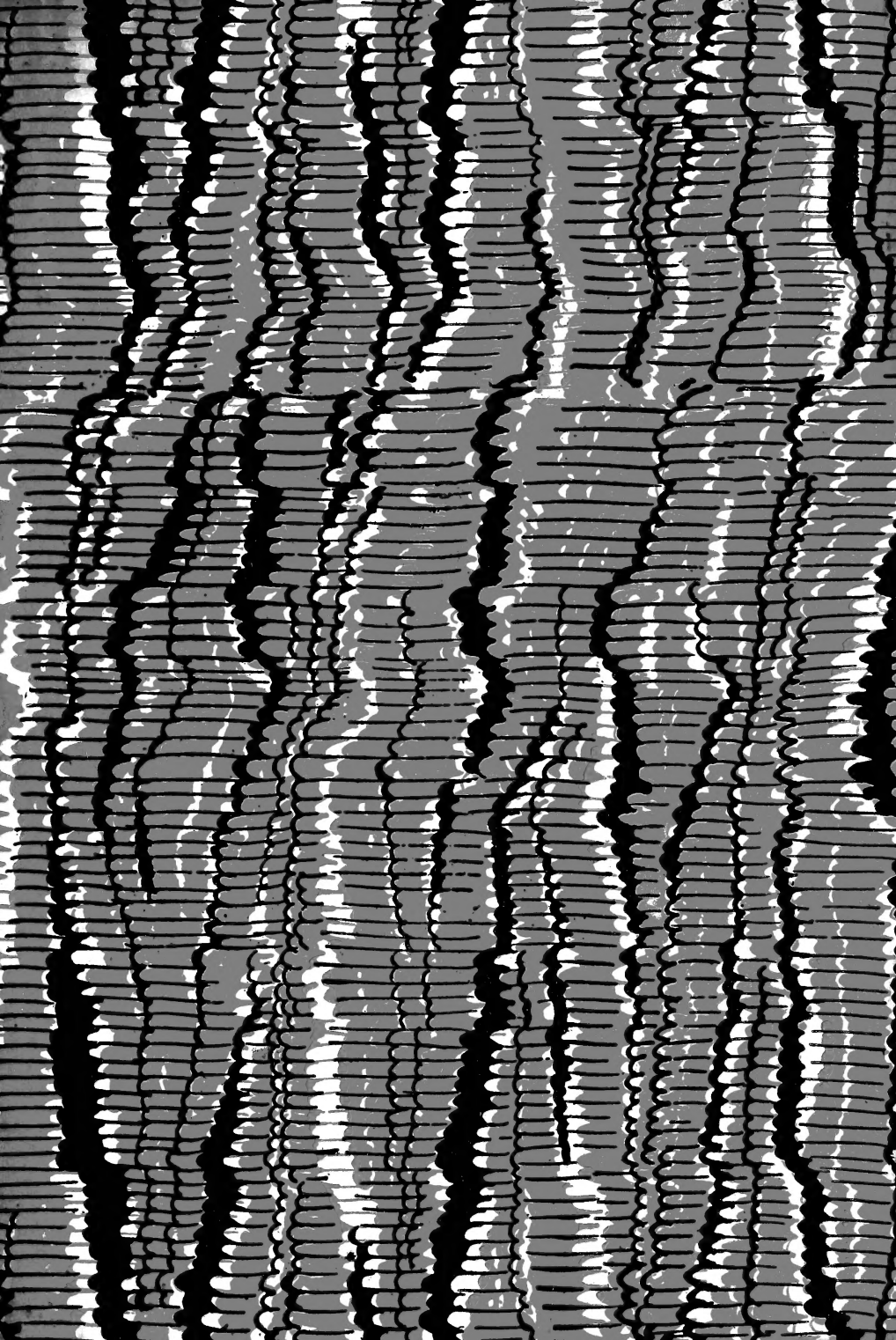

THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY

DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

VOLUME XXIII

O. E. JENNINGS, Ph.D., Editor-in-Chief

Associate Editors

GEORGE N. BEST, M.D.
ALEXANDER W. EVANS, Ph.D.
JOHN M. HOLZINGER M.S.
LINCOLN W. RIDDLE Ph D

and the

Advisory Board Officers of the Society

PITTSBURGH, PENNSYLVANIA

1920

THE BRYOLOGIST

Volume XXIII, 1920

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ERRATA

Page 5, line 27, for east read west.
Page 9, line 5, for *Barbellla* read *Barbella.*
Page 62, line 15, for *bonjeani* read *Bonjeani.*
Page 66, line 3 from bottom, for *antarctici* read *antarctica.*
Page 82, line 5 from bottom, for *Climaceum* read *Climacium.*
Page 87, line 10 from bottom, for MEGAPOLITANA read MEGAPOLITANA.

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JANUARY, 1920

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JOURNAL OF THE

SULLIVANT MOSS SOCIETY

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THE BRYOLOGIST

VOL. XXIII JANUARY, 1920 NO. 1

SOME HEPATICAE FROM MATINICUS ISLAND, MAINE

ANNIE LORENZ

A collection of hepatics from Matinicus Island, Maine, the result of a hasty trip made by Messrs, E. B. Chamberlain and A. H. Norton, August 16–17, 1916, has been kindly communicated to the writer by Mr. Chamberlain for examination. They proved to be of such interest that it was deemed advisable to write them up for THE BRYOLOGIST.

Matinicus lies 18 miles out from Rockland and is the largest of a small group of those islands farthest from the Maine coast. For a most interesting description of the island the reader is referred to W. H. McAtee's article in Rhodora for February, 1916. From a perusal of this paper, as well as the study of these specimens, the similarity of Matinicus to the small islands off Mt. Desert, as Cranberry and Baker's, is evident, and one gains a most attractive impression of the place. As the writer is at present busy with the revision of the Mt. Desert hepatic list, this collection is peculiarly opportune.

The 18 packets in the collection contained 21 species, these being either several numbers of the same species, or several species in the same packet. This was particularly the case with the material from "The Heath." (Mt. Desert nomenclature again). These packets were a mixture of *Riccardia latifrons* Lindb.; *Mylia anomala* (Hook.) S. F. Gray; *Cephalozia connivens* (Dicks.) Lindb.; *Cephalozia macrostachya* Kaal. (especially fine material); *Calypogeia sphagnicola* (Arn. & Perss.) Warnst. & Loeske, (second station for Maine, see Evans, Rhodora, September, 1919); and *Lepidozia setacea* (Web.) Mitt.

Two species in particular, the writer would be very glad to have on the Mt. Desert list, *Calypogeia Neesiana* (Massal. & Carest.) C. Müll. and, rather curiously, fine *Scapania paludicola* Loeske, in a spring-hole, between the dunes and High Head. Everything observed in a suitable station on Baker's Island was plain but good *Scapania irrigua* (Nees.) Dum.

Aside from the inhabitants of the sphagum bog, which are the same all over New England, the hepatic flora, like that of Mt. Desert, is not particularly arctic, nor even of the sub-alpine character of White Mountain regions like Waterville. It consists chiefly of the usual species that grow everywhere, every one of them being common to Connecticut.

The November number of THE BRYOLOGIST was published February 17, 1920.

There ought, however, to be some really northern things there like *Nardia scalaris* (Schrad.) S. F. Gray, and *Cephalozia Francisci* (Hook.) Dumort. A survey of the New England list gives at least 30 more species which it would not be unreasonable to expect upon a non-mountainous island lacking ravines, brooks, etc. In fact, the writer has already collected 7 of these species on Baker's Island.

As the Mt. Desert list, after considerable critical collecting, is only up to 64, this preliminary Matinicus list of 21 compares extremely favorably, and the island ought richly to repay further attention.

List of Species

Riccardia latifrons Lindb. The Heath, west of Condon Point in path through the *Sphagnum*, 5327, in part.

Nardia crenulata (Sm.) Lindb. Open boggy field, just north of Harbor, 5302.

Mylia anomala (Hook.) S. F. Gray. The Heath, west of Condon Point, in path through the *Sphagnum*, 5319, 5327.

Lophocolea heterophylla (Schrad.) Dumort. High Head, dry cut bank on shore, 10 feet above tide-line. 5340.

Geocalyx graveolens (Schrad.) Nees. Young's Woods, southeast end, on ground, 5367.

Cephalozia bicuspidata (L.) Dumort. Spring-hole, in spruce woods, between dunes and High Head, 5349.

Cephalozia connivens (Dicks.) Lindb. The Heath, in path through the *Sphagnum*. 5319, 5327.

Cephalozia macrostachya Kaal. The Heath, in path through the *Sphagnum*. 5319, in part; 5327.

Cephalozia media Lindb. In spruce swamp, Big Heath, 5321.

Calypogeia Neesiana (Massal. v. Carest.) K. Müll. In spruce swamp, Big Heath. 5321.

Calypogeia sphagnicola (Arn. & Perss.) Warnst.& Loeske, 5319. The Heath, in path through the Sphagnum.

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Bazzania trilobata (L.) S. F. Gray. Dry spruce woods, north of Harbor, 5301.

Lepidozia reptans (L.) Dumort. Young's Woods, southeast end, 5364.

Lepidozia setacea (Web.) Mitt. The Heath, in trodden path, 5320, 5319, 5327.

Blepharostoma trichophyllum (L.) Dumort. Young's Woods, on old stub, 5363.

Ptilidium ciliare (L.) Nees. Dry spruce woods, north of Harbor, 5303.

Ptilidium pulcherrimum (Web.) Hampe. On ledges near Harbor, 5394, 5399.

Scapania paludicola Loeske. Spring-hole, Spruce Woods, between dunes & High Head, 5349.

Frullania Asagrayana Mont. On spruce tree, Young's, southeast, 5360, 5361. On ledge near Harbor, 5394. On rocks, high land west of Harbor, 5399.

Frullania eboracensis Gottsche. Willow trunk, Young's 5388.

HARTFORD, CONNECTICUT

OBITUARY

LURA LAVONIA PERRINE, one of the charter members of the Sullivant Moss Society, died at Victoria, B. C., on October seventh, 1919, of a paralytic stroke. She was born at Detroit, Michigan, of Huguenot ancestry, and has been for over twenty-seven years a member of the faculty of the State Normal School at Valley City, North Dakota, first as professor of Natural Sciences, specializing in Geography and Geology, later as Curator of Museums. The last ten years she spent developing her idea of the practical school museum, and the volume of illustrative material in daily use in the class rooms of the Normal (including her private collection of over 30,000 post cards) attest the value of this work. Miss Perrine has spent her vacations collecting on both the east and west American coasts, and though her health has been failing for several years, her splendid ambition and devotion to her life-work drove her to the very end. It seems perhaps fitting that her life should go out in the tide of the ocean that she loved best.

The above has just been received from Mrs. McDonald, the sister of Miss Perrine, in response to a request for some particulars, who also adds that her's was a wonderful life of unselfish devotion, and that hundreds of old students in Valley City expressed their love and appreciation of her efforts.

For many years I carried on a rather regular correspondence with Miss Perrine, especially the winter she spent in Florida. Lately it became only an annual event, but I was always glad to get her bright and newsy letters.

The Sullivant Moss Society extend its sympathy to her family.

BROOKLYN, N. Y. ANNIE MORRILL SMITH

NOTES ON MEXICAN LICHENS

ALBERT C. HERRE

While looking over some Mexican plants, principally mosses and liverworts, though including some of the higher plants, with T. S. Brandegee, I noticed a number of lichens more or less entangled with or attached to them. A careful study of these plants revealed the following species:

1. *Cladonia ceratophylla* (Sw). Eschw. Zacuapan, Vera Cruz; also collected on Iztaccihuatl.
2. *Cladonia squamosa* (Scop.) Hoffm. Zacuapan, Vera Cruz.
3. *Cladonia fimbriata* (L.) Hoffm. Boca del Monte.
4. *Leptogium marginellum* (Sw.) Mont. Zacuapan.
5. *Leptogium foveolatum* Nyl. This is not strongly differentiated from *L. reticulatum* Mont. Zacuapan.

6. *Lobaria dissecta* (Ach.) Zacuapan, Vera Cruz.

7. *Lobaria corrosa* (Ach.). Common at Zacuapan.

8. *Sticta aurata* Ach. Zacuapan.

9. *Sticta fuliginosa* (Dicks.) S. Gray. Specimens not typical. Esperanza.

10. *Sticta tomentosa* (Sw.) Ach. Zacuapan.

11. *Sticta Weigelii* (Ach.) Wainio. On Mt. Orizaba, near the timber line.

12. *Peltigera scutata* (Dicks.) Leighton. Boca del Monte.

13. *Peltigera polydactyla* (Neck.) Hoffm. Collected by Mr. L. N. Goodding at San Pedro Springs, Chihuahua.

14. *Parmelia enteromorpha* Ach. Collected by Mr. L. N. Goodding at San Pedro Springs, Chihuahua.

15. *Parmelia perlata* (L.) Ach. f. *ciliata* Nyl. Zacuapan.

16. *Parmelia olivaria* (Ach.) Hue. Zacuapan.

17. *Parmelia cetrarioides* Del. Zacuapan.

18. *Ramalina rigida* (Pers.) Ach. On Iztaccihuatl and at Zacuapan.

19. *Theloschistes flavicans* (Sw.) Norm. Esperanza.

20. *Anaptychia hypoleuca* (?) (Muhl.) Wainio. Determination doubtful. Zacuapan.

21. *Anaptychia speciosa* (Wulf.) Wainio. On rocks at an altitude of 10,000 to 11,000 feet, on Iztaccihuatl.

22. *Anaptychia leucomela* (L.) Herre. At an elevation of 6,000 to 7,000 feet at Esperanza and on Iztaccihuatl.

23. *Cora pavonia* E. Fries. Zacuapan.

With the exception of Nos. 13 and 14 the lichens enumerated were found among material sent to Mr. Brandegee by the well known collector of Mexican plants, C. A. Purpus.

The species from Zacuapan were found at an elevation between three and four thousand feet above sea level, and are foliaceous lichens characteristic in general of the dense vegetation found in the well watered valleys of moderate elevation.

Washington State Normal, Bellingham, Wash.

RHACOMITRIUM SUDETICUM, A MOSS NEW TO WORCESTER COUNTY, MASSACHUSETTS

Rachel L. Lowe

Last winter a collection of mosses was given to our local museum, and I had the pleasure of looking them over for old friends and new. Among the mosses was one that looked like *Hedwigia* and still just enough unlike it to arouse suspicion. Microsopical examination proved it to be *Rhacomitrium Sudeticum* (Funck.) B. & S., a species new to Worcester County as far as known.[1]

[1]For references to the distribution of the moss in various other parts of New England see the following: Rhodora **2**: 180 (Maine), **4**: 241 (Mt. Greylock, Mass.), **14**: 48 and **15**: 13 (Connecticut); Grout, Cat, Moss, Vermont, p. 16; Dame & Collins, Flora Middlesex Co., Mass., p. 142.

The specimen was not large and was sterile, hence more of it and with fruit if possible, was most desirable. The locality given was "Mt. Wachusett," and as the collection had come to the museum through the death of the owner, there seemed to be nothing else to do save to hunt over the mountain from top to bottom, a rather large task, Several months later, however, I learned that Mr. Morgan, who had collected the specimen in question, in his excursions to the summit of Wachusett always used the Mountain House trail. This simplified matters immensely, so at the first opportunity, which did not come until late this fall, I started up the Mountain House trail with high hopes of success. And I was not to be disappointed. Well up towards the summit the moss was growing on the wet rocks directly in the path. There was a lot of it, and some was in fruit, though it evidently does not fruit freely there. The "path" is really a brook-bed, save in the dry summer season.

Unfortunately, I had forgotten my vasculum, and already had my hands full of *Rhacomitrium aciculare* (L.) Brid., in unusually fine fruit, so I had to make myself most unpopular with my companions by giving each the biggest oak leaf obtainable, surmounted by a cold, dripping mass of the precious moss, something which they failed utterly to appreciate. But that is a small matter. I have the moss, and I know where it grows!

Worcester, Mass., Dec. 8, 1919

SPHAGNUM IN GLACIER NATIONAL PARK, MONTANA[1]

Paul C. Standley

In the southern Rockies sphagnum bogs are of rare occurrence; consequently the writer was much interested this past summer in finding them relatively common in the northern Rockies of Montana. No sphagnum bogs were noticed on the east slope of the Park, whose flora is similar to that of the central Rockies, but sphagnum was found in wet meadows above timber line. On the ~~east~~ slope, where the flora shows a closer relationship to that of the Pacific Coast, several bogs of considerable extent were visited. About Johns and Fish lakes, near Lake McDonald, there are belts several yards wide densely covered with sphagnum into which one sinks to the knees. Great masses lie along the edge of the water, many of them floating and consequently unable to bear any considerable weight. The most abundant species is *Sphagnum teres* (Schimp.) Ångstr., a pale green plant with long stems. It fills the wetter portions of the bog, while at Johns Lake the outer, drier parts were filled with a springy carpet of *S. fuscum* (Schimp.) Klinggr., a handsome brownish plant, with short, densely crowded stems. Other species collected here were *S. squarrosum* Crome and *S. subsecundum* Nees. These sphagnum bogs yielded a large number of interesting plants, most of which are found also in the East, such as *Lycopodium selago*, *L. clavatum*, *L. complanatum*, *Scheuchzeria palustris*, *Drosera rotundifolia*, *D. longifolia*, and *Cicuta bulbifera*.

[1]Published by permission of the Secretary of the Smithsonian Institution.

On the west slope sphagnum is found occasionally also in wet places in the deep woods, but not in great abundance. *S. teres* was collected in a meadow at Granite Park, just at timber line. In wet meadows above timber line, at Iceberg Lake and Sperry Glacier, *S. Girgensohnii* Russ. was found in some abundance.

The writer is indebted to Dr. A. LeRoy Andrews for the determination of the species enumerated. The specimens were gathered only incidentally, and doubtless an experienced bryologist could have discovered a larger number of species.

U. S. National Museum

MOUNTING MOSSES FOR EXHIBITION PURPOSES

Elizabeth M. Dunham

In an exhibition of specimens the desired effect on the observer may be gained or lost by a careful or a careless method of arrangement.

The usual way of mounting mosses in envelopes for the herbarium is not at all suitable for exhibition purposes. People will not take the time and trouble necessary to open the envelopes in order to examine the specimens. Mosses dried in the natural condition without being pressed, and placed in small boxes, are at once attractive and interesting, but very inconvenient to carry around without injury. Pressed specimens may be stuck in sheets of heavy paper or cardboard, and be either hung so as to be seen to good advantage or placed on tables where they can be handled easily; but after awhile in this case they become broken from rubbing against each other.

After trying to exhibit mosses in these various ways the following method of mounting has proved most satisfactory both to the observer and to the exhibitor. I select a good specimen that has been pressed only slightly and without destroying the natural characteristics more than necessary. This is stuck on a cardboard about 5½ x 7 inches in size, preferably gray in color, just dark enough not to show fingerprints too easily, and with a surface smooth enough for writing. The moss should be placed toward the top or to one side of the card, to leave space for the name and a brief description giving habitat and pointing out leading characteristics. The specimen is protected by a piece of the thinnest celluloid, cut a little larger, which can be easily sewed to the cardboard through holes punched with a large needle. If, in course of time the moss becomes too faded to look well it may be changed easily for new material and the same cardboard and celluloid used again.

The cardboard and celluloid may be bought in large sheets and cut to the desired size. This method of mounting mosses has proved attractive and instructive to both children and adults; the mounts are very durable and are easily carried around and handled without injury to the specimen; and it requires only a little time and patience, without much skill or expense, to prepare them.

206 Windsor Road, Waban, Mass.

A LETTER FROM CARDOT TO THE SULLIVANT MOSS SOCIETY

Paris, 15 Janvier, 1920.

Aux Membres de la Sullivant Moss Society:

Mes chers Collégues:

C'est avec une vive émotion et une sincère gratitude que j'ai pris connaissance de la délibération de la Sullivant Moss Society au sujet de la perte d'une partie de mes collections et de ma bibliothèque.

Depuis plus de cinq ans déjà, par suite des tristes événements que nous venons de traverser, ma carrière scientifique se trouve à peu près complètement interrompue, et j'ignore, à l'heure actuelle, s'il me sera donné de revenir un jour à la science qui nous est chère à tous, et qui a été pendant si longtemps le but presque exclusif de mon existence.

Si je devais y renoncer définitivement, les nombreux témoignages de sympathie que j'ai reçus de toutes parts, notamment de mes collégues américains et anglais—et parmi lesquels je compte comme l'un des plus précieux celui que vient de m'adresser la Sullivant Moss Society—contribueraient du moins à adoucir pour moi l'amertume du sacrifice.

Avec l'expression émue de mes remerciements, je vous prie, mes chers Collégues, de bien vouloir agréer l'assurance de mes sentiments les plus dévoués.

(Signed) J. Cardot.

1, rue Lacuée, Paris (xii^{e}).

MISCELLANEOUS NOTES

Musci Hosts of Cyphella Muscigena Fr.—How large a range of hosts has the fungus *Cyphella muscigena* Fr. on the Musci? On Long Island the writer has collected it only on *Thuidium paludosum*. In the Southold Town Flora, which takes in most of the north fluke of Long Island, the writer has found this moss only in one locality, a brackish meadow in Orient. It is common here, but rarely fruiting. It is a frequent host for *Cyphella* in this plot. There are several other species of Musci associated with the *Thuidium*. It is interesting that the fungus should go commonly to this single species and not at all to the others.

Roy Latham

Orient, N. Y.

REVIEWS

Miscellanea Bryologica.—VI

Miscellanea Bryologica, VI, by H. N. Dixon. Extract from Journ. Bot. Vol. 57, April, 1919, pp. 73–80.

This sixth paper under the above title consists of critical notes on several species of Oceanic and Ceylonese mosses. It is a pleasure to follow the author as he proceeds with industrious care in ferreting out synonyms and finding truly valid distinctions.

Mr. Dixon spends over two pages in showing the proper relation between *Chaetomitrium Deplanchei* Duby. and its allies, *C. tahitense* and *C. Geheebii*, The conclusion is summed up in the following synonymy:

1. *Chaetomitrium Deplanchei* (Besch.) Duby.
   Syn. *Holoblepharum Deplanchei* Besch.
   Chaetomitrium Geheebii Broth.
2. *Chaetomitrium Deplanchei* var. *tahitense* (Sull.) Dix.
   Syn. *Holoblepharum tahitense* Sull.
   Chaetomitrium tahitense Mitt.

Mr. Dixon records that "Paris, Ind. Ed. ii. 343, has several errors in his citation of this species."

Gymnostomum oranicum Rehm., published by C. Mueller in Hedwigia, XXXVIII, 112, as *Weisia* (*Hymenostomum*) *oranica* Rehm., Mr. Dixon proves to have a peristome. This makes it not a *Hymenostomum* but a true *Weisia*. It is separated from *Weisia viridula* by its dioicous inflorescence. But, should it not now be written *Weisia oranica* (Rehm.) C. M.?

Anœctangium scabrum Broth., upon careful examination and comparison with *A. pusillum* Mitt., in the description of which Mr. Mitten is proved to have erred, Mr. Dixon shows to be a synonym of *Anœctangium pusillum* Mitt.

On the other hand, *Taxithelium Gottscheanum* (Hpe.) Broth., which had been by Hampe himself reduced to a synonym of *T. capillipes* Broth., as shown by his correcting his own labels of his type, is by Mr. Dixon proved to be a good species, and should stand.

Under the caption "*Hypnum scabrellum* Lac. and its allies," Mr. Dixon does a neat bit of investigating. The plant named is the *Sematophyllum scabrellum* of Par. Index for which Cardot had shown the prior name to be *Sematophyllum lamprophyllum* Mitt. The type plant was sterile. Max Fleischer issued the species as *Pungentella scabrella* (Lac.) C. M., No. 389, Musc. Frond. Archip. Ind. ser. VIII, from W. Java. Beccari's No. 37, "Crittogame di Borneo," issued as *H. scabrellum*, fruiting, and the fruit of which was described by Hampe under the name issued, is by Mr. Dixon pronounced not a *Sematophyllum*, but a *Trichosteleum*; whether described or not Mr. Dixon leaves undecided. He finally refers to a plant of C. H. Binstead, from Borneo which in Journ. Linn, Soc. Bot. XLIII, 321, he had referred to *S. lamprophyllum*. This he now recognizes as new, describing it under the name *Sematophyllum decipiens* Dix.

Under Ceylonese Mosses the author first makes some interesting corrections in his own paper on Rev. Binstead's Ceylonese mosses, the most interesting of which is that of *Trachyloma indicum* Mitt. This plant Fleischer refers to *T. tahitense* Besch. Along comes Theriot (see footnote, p. 78) and makes this Ceylonese plant a new species, *T. Fleischeri* ("Bull. de l' Acad. Internationale de Geogr. bot. 1910, p. 100").

Mr. Dixon's investigation into the merits of *Bryum erythrocarpoides* Hampe & C. M. and *Bryum erythrocarpoides* Schimp. convinces him that they are one species, so that the synonymy now stands, "—with further synonyms probably to be added later—," as follows:

Bryum erythrocarpoides Hampe & C. M.

Syn.: *B. erythrocarpoides* Schimp.
B. Bescherellii Jaeg.
B. torulosicollum C. M.
B. erythrocarpulum C. M.

Mr. Dixon's last note is on *Barbellla Levieri* (Ren. & Card.) Fleish. c. fr., which was by Renauld and Cardot described as a *Meteorium* (Bull. Soc. roy. Belg. XLI, pt. 1, p. 78) from sterile specimens collected "in the Sikkim Himalayas and from Japan and subsequently recorded from Formosa." Then Mr. Dixon had sent to him from the N. Y. Bot. Garden from Mitten's herbarium *Meteorium Pathkay* (or *Pathkoi*) Griffith in good fruit, which agrees fairly well vegetatively with the (sterile) Formosa plant. This, he states, differs in its fruit notably from most species in the genus *Barbella*, in the long seta rugulose-papillose, and in the outer peristome teeth densely transversely striolate for the most of their length. "In view of the vegetative structure, however, this character is not sufficient," Mr. Dixon thinks, "to remove the plant to any other genus." This statement seems to approve of Mr. Fleisher transferring this plant from *Meteorium* to *Barbella*, and the synonymy would then be

Barbella Levieri (Ren. & Card.) Fleisch.
Syn.: *Meteorium Levieri* Ren. & Card.
Meteorium Pathkoi (or *Pathkay*) Griffith.

The above-quoted passage is not entirely free from ambiguity, however, and Mr. Dixon may possibly mean to say that the plant should remain a *Meteorium*.

JOHN M. HOLZINGER

WINONA, MINNESOTA

Bolivian Bryophytes of Herzog's Second Journey

T. HERZOG, DIE BRYOPHYTEN MEINER ZWEITEN REISE DURCH BOLIVIA; BIBLIOTHECA BOTANICA, HEFT 87, STUTTGART. 1916.

The trip whose bryological results are here listed was made in 1910–11. The author had made an earlier one to Bolivia in 1907–08 and given some account of the mosses gathered in the Beiheft zum botanischen Centralblatt (XXVI, Abt. II, 45–102. 1909; XXVII, Abt. II, 348–358. 1910; XXVIII, Abt. II, 268–271. 1911). The second trip was devoted especially, but not exclusively to the investigation of a portion of the Cordillera Oriental, a good map (Taf. A) illustrating the topography of the region visited.

The bryological harvest was a remarkably rich one, 719 species of mosses and 474 of hepatics, a grand total of 1193 being listed. Of these there are proposed as new: of mosses 271, of hepatics 252, if I have not miscounted, a total then of 523 new species of brypohytes, or nearly 44% of the whole number distinguished. How much of the 44% rests upon the indubitably rich bryophytic flora of the region traversed and how much upon the new species point of view of the author and his two main collaborators, Stephani and Brotherus, remains for future investigations to disclose. Occasionally the author looks at things with a more synthetic eye, as for example when he (p. 13) includes the genus *Tristi-*

chiopsis C. M. with *Tristichium* C. M.[1] and elsewhere in a few reductions of species of Carl Müller and others to synonymy. Of new genera of mosses there are ten, with one exception monotypic. A cleistocarpous *Conostomum* (p. 96)[1] is remarkable. The illustrations comprise eight plates and numerous figures in the text. Not all the species are figured, and there are some figures of older species.

After the list there follows a "Geographical Part" (pp. 271ff.), in which various questions of phytogeographical interest are discussed. Much of value is here brought out and a commendable attempt made to penetrate into the significance of the tangled facts of tropical American moss-distribution. A more synthetic point of view with reference to species would perhaps have given less hazy results. A special connection between Bolivia and Mexico (p. 297 and elsewhere) in so far as it rests upon the genera *Husnotiella* and *Globulina* is of little or no value. Mr. R. S. Williams has already (Bryologist, XVI, 25. 1913) called into question the validity of the former genus and the case of the latter is no better (Cf. Cardot, Revue bryologique, XL, 34. 1913). There is little in common between the Bolivian and Mexican species comprising it.

Two descriptions of moss-formations are particularly attractive: that of the "Nebelwald" (p. 308) and that of the "immergrüne Bergwiese" (p. 311).

A. LeRoy Andrews

Ithaca, N. Y.

SULLIVANT MOSS SOCIETY NOTES

The Secretary hopes before long to issue a revised address list of the Society, but wishes to delay this until after the first of the year, that it may be more closely up to date than would otherwise be possible. In the mean time, members should note the following changes, additions, etc, in the former list.

New Member

Father A. Luisier.....Colégio de La Guardia, Pontevedra, Spain.

Deaths

Miss Lura Perrine
Rev. C. H. Waddell
Mr. E. C. Wurzlow

Changes of Address

Dr. George H. Conklin.....1924 John Avenue, Superior Wisconsin.
Mrs. Joseph M. Fox.....7913 Crefeldt St., Chestnut Hill, Penn.
Rev. P. G. M. Rhodes.....Albertinum, Fribourgh, Switzerland.
Dr. L. W. Riddle.....123 Walker St., Cambridge, Mass.
Miss Aravilla Taylor.....105 North 21st St., Corvallis, Oregon.

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[1]Both these cases had been discussed by Herzog before, in a special article in Flora, **107**: 317ff. 1914.

ANNUAL REPORTS—SULLIVANT MOSS SOCIETY—1919

Report of the President

Reprints and letters from our friends abroad indicate that some of them, at least, have found leisure and peace of mind sufficient to enable them to renew or continue their bryological studies. Dr. Brotherus has escaped the serious disturbances in Finland, and has issued three reprints in English, from specimens contributed by the Rev. W. W. Watts, on the mosses of the New Hebrides, some new species of Australia, Tasmania and New Zealand, and the mosses of North Queensland, having also described a new species *Anoectangium incrassatum* Broth. from Jamaica collected by F. Borgesen. The fifth contribution to the Bryological Flora of the Philippine Islands has also been issued with eighteen new species.

H. N. Dixon has reprinted the mosses of the Australian Arctic Expedition of 1911–1914 and continued his "Miscellanea Bryologica" (VI) with notes on *Chaetomitrium Deplanchei* and its allies, including one new species of *Sematophyllum*. M. Theriot has issued separates of the Mosses of New Caledonia (1914), a contribution to the bryological flora of Chili (1918) with descriptions and illustrations of six new species and the mosses of Annam with figures of seven species. M. R. Potier de la Varde has also contributed seven new species with illustrations to the flora of Annam. His drawings show a simplicity and clearness which are pleasing. He also contributes descriptions of some mosses from Natal and E. China, describing and figuring some species of Brotherus and Paris which have only been known by ms. names. M. Jules Amann, assisted by O. Mylan and P. Culmann, has continued his studies of the Flora of Switzerland, by issuing the first part of the "Flora des mousses de la Suisse."

Owing to the printers' strikes last summer and the greatly increased cost of publication, the BRYOLOGIST has fallen behind and is somewhat less than its usual size, but as the unsettled labor conditions readjust themselves we hope that it will be possible to maintain our usual size and schedule, and that the work of the members of the Society will continue to set as high a standard of accuracy as it has in the past.

Mr. Kaiser has taken care of the moss-herbarium. Dr. Evans and Miss Lorenz have continued their studies of New England Hepatics, and Mt. Desert has yielded some interesting species. Miss Haynes has devoted her time and studies to the Hepatic collections and Mr. Plitt to the Lichens. Mr. Rapp continues to collect mosses in Florida and the status of *Fissidens Donnellii* Aust. has at last been settled by his finding of good fruiting specimens! He has also recently distributed an interesting set of lichens, including some new species named by Mr. Merrill. Mr. Williams has been devoting much time to lichens during the war, but has had occasion to study several South American collections from the National Museum and a set of Arctic mosses from the Geological Survey of Canada. I have continued my West Indian work besides answering numerous letters and naming specimens for various members of the Club.

We welcome as our new president, one who has long had the interests of the Society at heart and devoted much time and effort to its publications.

Respectfully submitted,

ELIZABETH G. BRITTON, *President*

NEW YORK BOTANICAL GARDEN.

Report of the Secretary-Treasurer

In the Annual Report for 1918 the Secretary expressed the hope that the delays in the appearance of the BRYOLOGIST could be avoided during the forthcoming year. Unfortunately, it has not been possible to realize the hope expressed. There is a certain consolation in noting that this condition of chronic delay is apparently not peculiar to the BRYOLOGIST, but seemingly affects most of the magazines which come to the Secretary's desk. Nevertheless, the Secretary still hopes that it may be possible during 1920 to have the issues appear rather more closely on time. The period of transition through which the world is now passing is, in part, responsible for these delays; another cause, the lack of sufficient manuscript, was commented upon in the notice of the annual elections; but a third reason lies in the pressure which mere living now puts upon the time of both the Editor and the Secretary, as well as upon the time of each member. The Officers of the Society feel that now, more than ever, they must rely upon the cooperation of the individual members, otherwise the pressure of necessary work will crowd out that which for the Officers and the Editor is really a labor of love.

The changes in the membership of the Society since the last annual report are summarized as follows. There have been three deaths, Rev. C. H. Waddell, Mr. E. C. Wurzlow, and Miss Lura Perrine, the latter a charter member of the Society. Six members have either resigned, or have failed to answer communications, which under the Post Office rulings necessitates a loss of membership. To balance these losses, ten new names have been added to the lists since December 1918, so that the total membership on December 1, 1919, is 143.

The Secretary has commented in previous reports upon the matter of the Offerings to Society Members, so that at this time there is little further to be said. During the past year there have been in all eighteen species, ten of mosses, four of hepatics, and four of lichens, offered to members for the usual terms of return postage. These offerings have been put forth by seven different persons. The Secretary extends to these seven his hearty thanks for the cooperation which they have shown. Just the same, the condition indicated by the small number of the offerings and the "faithful few" is most discouraging for the continuation of this plan. Suggestions from members as to how this condition may be remedied will be most welcome. If there is any other scheme that will work better, it should surely be suggested. It is certain that the present method is not ideal.

The financial condition of the Society is shown in the statement immediately following. Taking into account that in this report there are included payments for seven issues and an index for the BRYOLOGIST (September 1918 to September

1919 inclusive) it seems fair to assume that the expenditures and the receipts have about broken even. There is still a small amount in back dues that has not been collected which is partly offset by the advance payments recorded. The cost of printing has greatly increased, and a very decided economy has been necessary in the matter of plates and the size of editions, as well as the number of pages per issue. It seems to be possible to continue for a while at the present rates for dues and subscriptions, but this may not prove possible much longer. The Secretary is free to state that the apparent costs are as low as they are only because certain members have most generously contributed without cost, materials for plates, and have refused to send in bills for expenditures in the way of postage and supplies for which they should by rights, have been reimbursed.

In conclusion, the Secretary wishes to assure the members that he will do all that is in his power to make the coming year a successful one for the Society. He also wishes to extend to each member most cordial greeting and good wishes, and regrets that the pressure of work necessitates taking this general method, instead of the personal letter which he would prefer to write

Summary of Accounts

Receipts

Balance on hand, December 1, 1918	$127.62
Dues for current year	185.70
Subscriptions for current year	68.44
Arrears collected	6.20
Advance payments	6.60
Sales of back issues and sets	43.30
Incidental receipts, advertising, etc.	27.66
Received through combinations, for Dr. Grout	8.05
Receipts from Hasse Lichens	22.85
	$496.42

Expenditures

Minor printing and stationery	$ 15.20
Postage, bank fees, and incidentals	14.82
Paid to Dr. Grout	8.50
Herbarium expenses	7.19
Purchases for members	7.20
Express and transportation charges	5.16
Plates for the magazine	14.75
Printing, seven issues Bryologist and Index	303.65
	$376.47
Balance on hand, November 30, 1919	$119.95
	$496.42

Edward B. Chamberlain, *Secretary-Treasurer*

Report of the Election of Officers for 1920

In response to the ballot sent out November 19th, 1919, to all members of the Sullivant Moss Society, sixty replies were received. The voting returns are as follows: for *President*, Mrs. Annie Morrill Smith, 59, Dr. L. W. Riddle, 1; for *Vice President*, Dr. L. W. Riddle, 59, Mrs. Annie Morrill Smith, 1; for *Secretary-Treasurer*, Mr. Edward B. Chamberlain, 59. Accordingly, Mrs. Smith, Dr. Riddle, and Mr. Chamberlain are elected.

Report of the Curator of the Moss Herbarium for 1919

During the last year noteworthy mosses from northwestern Ontario, collected by Dr. O. E. Jennings, were determined and he will later report more fully upon these specimens. Among rare species were *Splachnum ampullaceum* L. and *Tetraplodon bryoides* (Zoeg.) Lindb. Mr. H. C. Beardslee contributed mosses from the neighborhood of Asheville, N. C., which well represent the more frequent bryophytes of that region.

Among other welcome contributors and correspondents are: Mrs. E. G. Britton, Mrs. Aravilla Taylor, Mrs. R. L. Lowe, Mrs. Ella L. Horr, Mr. R. S. Nanz, and Mr. E. B. Chamberlain. A number of personal letters were sent out with the object of stimulating interest, but, notwithstanding, the year has been an inactive one in correspondence with our members. Once more we hope for a livelier bryological interest in 1920, the Curator remaining, as ever, ready to determine specimens and carry on exchanges, provided that sufficient material for exchange be sent in.

The Herbarium at present numbers 4,121 specimens, representing 1,194 species and varieties, contained in 257 genera.

George B. Kaiser, *Curator*

232 West Mt. Pleasant Ave., Mt. Airy, Philadelphia, Pa., Dec. 1919.

Report of the Hepatic Department for the year 1919

The herbarium acquired during the past year three hundred and fourteen specimens; total number, five thousand two hundred and twenty-three. Small collections were sent by the following members: Mrs. Frank E. Lowe, Rev. H. Dupret, Rev. Demetrio, and Mr. G. K. Merrill. Mr. G. M. Pendleton sent thirty pockets each of the following rare species to be distributed to important foreign and local herbaria: *Cephalozia affinis* Lindb., fruited, and *Jungermannia cordifolia* Hook., fruited. This good example should be followed. Mrs. Britton, very thoughtfully, sent several reprints of species figured and described, which can be usefully placed in our Society herbarium. Miss C. C. Haynes contributed nearly an entire set of Husnot's Hepaticae Galliae and various specimens from her herbarium.

Offerings met with a scant response. Mr. A. H. Brinkman of Dowling, Alberta, Canada, has on foot a most excellent plan of establishing exchanges, which merits quick collaboration among us.

With the return of Dr. Conklin to his old place at the helm, things will soon be bettered. Naturally the best way to welcome him will be by nearly overwhelming him with Society work.

Respectfully submitted

CAROLINE COVENTRY HAYNES, *Curator pro-tem.*

HIGHLANDS, NEW JERSEY

Report of the Lichen Department for 1919

During the past year interest in the study of Lichens has continued unabated.

The herbarium has been enriched by several quite generous contributions; two of these, however, having been received too late to be mounted this year. Of the specimens received during the early part of the year, 55 have been mounted, making the number now in the herbarium 3440.

Our list of contributors is headed by Dr. N. L. T. Nelson, Dr. O. E. Jennings, and Miss Alice Eastwood. Dr. Nelson's contribution was collected in Texas, and contains some interesting specimens from that part of the world. Dr. Jennings contributed two different collections, one collected in Ontario, and the other in Florida. Miss Eastwood's contribution is a most interesting collection from Hawaiian Islands; none of these specimens have as yet been mounted. Other contributors are: Mrs. M. A. Noble, who sent specimens from Florida; Mr. S. Rapp, who, too, sent specimens collected in Florida; Rev. H. Dupret, who sent specimens collected near Montreal, Canada; Mrs. Ella L. Horr, and Mr. P. G. M. Rhodes. Mr. Rhodes never forgets us, and this year has sent us some specimens collected in England.

Each year the curator is asked by some student contemplating the study of Lichens, what book or books, he would recommend for the beginner, and, he invariably recommends first, Dr. Schneider's "A Guide to the Study of Lichens," (the "Guide" holds a warm spot in his heart, it is the book that got him interested in the study of these interesting forms of plant life); and, second, but not least, that he get a copy of Prof. Fink's "The Lichens of Minnesota." With these two books, together with an earnest desire, of wanting to know, and the help of some sympathizing friend, willing to help, progress is bound to be made. Don't expect to master the study of Lichens in one summer, it is hard work, and only a strong interest will keep you at the work. The curator is willing to do his part as sympathizing friend, he only too well knows the value of such friends. After you begin to know somthing about Lichens, you will soon learn to value other works, and will acquire them.

Before leaving this subject, I must not forget to call the beginner's attention to the many excellent articles in THE BRYOLOGIST. and especially to the following:

First of all, to those of Mrs. C. W. Harris, twelve in number, beginning in Volume IV, and running through Volumes V, VI, and VII. They are illustrated, and are just the kind for beginners. Then by all means read Prof. Sargent's "Lichenology for Beginners," the four parts of which are to be found in Volume VIII. In the same volume will be found an article by Prof. Fink, "How to Collect and Study Lichens." Other valuable articles are Prof. Fink's "Notes on Certain Cladonias," beginning in Volume VII, and running through Volumes VII, VIII, IX, and X; Mr. Merrill's "Lichen Notes," beginning in Volume VIII, and running through several volumes; and Prof. Riddle's "A Key to the Species and Principal Varieties of Cladonia Occurring in New England" in Volume XIII.

It is to be hoped that the interest and the enthusiasm shown in the study of Lichens this year will continue unabated.

Respectfully submitted,

3933 Lowndes Ave., Baltimore, Md. Charles C. Plitt, *Curator*
Dec. 31, 1919.

EXCHANGE DEPARTMENT

Offerings—To members of the Sullivant Moss Society only. Return postage should accompany the request.

Miss Caroline C. Haynes, Highlands, N. J.—*Lepidozia sandvicensis* Lindenb. Alaska, U. S. Bureau of Soils Kelp Investigations Expedition, 1913. Collected by Prof. T. C. Frye.

Mr. A. T. Beals, 71 West 23rd St., New York City.—*Fabronia octoblepharis* (Schleich.) Schwaegr. and *Tortula pagorum* (Milde) DeNot., collected by Miss Daisy J. Levy, at Harper's Ferry, W. Va.

Mr. Severin Rapp, Sanford, Florida.—*Lecanora cupressi* Tuck., collected by Mr. Rapp, in Florida.

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Conducted and Published for the Society by

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Associate Editors

ABEL JOEL GROUT, Ph.D.

GEORGE N. BEST, M.D. JOHN M. HOLZINGER, M.S.

ALEXANDER W. EVANS, Ph.D. LINCOLN W. RIDDLE, Ph.D.

and the

Advisory Board Officers of the Society

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

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All material for identification should be sent to the respective curators. All matter relative to offerings should be sent to the Editor, or to the Secretary

THE BRYOLOGIST

Vol. XXIII MARCH, 1920 No. 2

THE MOSSES OF THE LAKE GEORGE FLORA

STEWART H. BURNHAM

The region covered by this flora includes the counties of Washington, Warren, and Saratoga. A few additional records in the county of Essex at Ticonderoga and Crown Point; and in Hamilton county, at Blue Mountain Lake, are also given. I collected my first mosses about 1892; these were determined in January, 1893, by Prof. John M. Holzinger, and my interest in the Musci was awakened.

Many specimens have been determined by Mrs. E. G. Britton; Prof. J. M. Holzinger; Mr. George B. Kaiser; and Miss Edith Warner. The Sphagna have been determined by Dr. A. L. Andrews; and by Dr. Carl Warnstorf, May 13, 1902 and April, 1903. Specimens determined by Mr. Kaiser are preserved in the moss herbarium of the Sullivant Moss Society. No attempt has been made to work over the ample collections made in West Fort Ann during 1918.

Many other botanists have collected in this region, especially about Lake George. Mrs. E. G. Britton (née Miss E. G. Knight), collected a few mosses at Blue Mountain Lake in July, 1881; also a few mosses at Ticonderoga and Crown Point in 1900 and 1901: these are preserved in the Herbarium of the New York Botanical Garden and the Columbia Herbarium. Hon. George W. Clinton collected mosses at Luzerne and Saratoga Springs,—these are recorded in New York State Cabinet Report 20, 1867, and are partly preserved in the New York State Herbarium at Albany. Mr. Frank Dobbin, since 1904, has collected many mosses near Shushan.

Mr. Wallace Greenalch, during 1900 and 1901, collected mosses near Schuylerville. Mr. Greenalch wrote me April 19, 1902, that, "most of the mosses listed in THE BRYOLOGIST for July, 1900, as collected by me 'in and near Schuylerville, N. Y.' were collected not only at Schuylerville, but in different parts of New York State, namely: Indian Lake, Hamilton Co.; Ithaca; Watkins; Portage and Pattersonville; but all were erroneously credited to Schuylerville. I have collected mosses but little about Schuylerville and have kept no list of the more common mosses." Among the mosses listed in THE BRYOLOGIST for July, 1900:

The January number of THE BRYOLOGIST was published March 24, 1920.

"*Anacamptodon splachnoides* Brid., *Hypnum rusciforme* Weis., *Dichelyma falcatum* Myrin," were collected at Indian Lake; "*Thelia asperella* Sulliv." at Hoffmans; "*Anomodon obtusifolius* B. & S." at Portage; "*Hypnum serrulatum* Hedw., *Gymnostomum curvirostrum* Hedw., *Fissidens taxifolius* Hedw." at Pattersonville; "*Hypnum hispidulum* Brid." at Ithaca. "*Pylaisia velutina* B. & S., *Hypnum cupressiforme* L., *Mnium marginatum* (Dicks.) Beauv., *M. orthorhynchium* B. & S., *Fissidens incurvus* Schwaegr., *Leptotrichum glaucescens* Hampe, *Dicranum fulvum* Hook., *Encalypta ciliata* Hedw.," are probably mostly erroneously credited to Schuylerville. Some of Mr. Greenalch's specimens are preserved in the Herbarium of the New York Botanical Garden.

Dr. Elliot C. Howe collected many mosses at Fort Edward and in Moreau from 1864–1868. Many of these were sent to Mr. Coe Finch Austin and are now preserved in the Columbia Herbarium. The Dr. Howe herbarium, which contained many mosses, was purchased by the New York Botanical Garden in 1902. Several of Dr. Howe's specimens are found in the New York State Herbarium. Dr. Geo. D. Hulst collected at Lake George, in the vicinity of Assembly Point in 1898–1899; specimens are preserved in the Herbarium of the New York Botanical Garden. Dr. Smith Ely Jelliffe collected many mosses about Huletts Landing in 1888 and 1889; these are preserved in his herbarium in New York City and a few in the Columbia Herbarium.

Mr. Leo Lesquereux, "freely communicated the names, habitat, etc., of numerous species collected by him on the Adirondack Mountains," . . . about Lake George, in the List of Mosses of the State of New York written by Charles H. Peck in New York State Cabinet Report 19, 1866. These were probably preserved in the Lesquereux herbarium. Miss Daisy J. Levy in THE BRYOLOGIST for May, 1919, publishes a "Preliminary List of Mosses Collected in the Neighborhood of Huletts Landing, Lake George, N. Y.," during the months of July–August, 1917. These specimens I have not examined. Dr. Chas. H. Peck collected a few mosses in the territory which are preserved in the New York State Herbarium.

In Geology of New York, Vol. 1, Part 1, Geology of the First Geological District, Albany, 1843, Mr. William W. Mather discusses peat. On page 12 and, on page 14, are Tables of the Localities of Peat and Marl in Washington County, with number of acres. No peat localities for Saratoga County are given. In Geology of New York, Vol. 2, Part 2, Geology of the Second Geological District, Albany, 1842, Dr. Ebenezer Emmons on pages 185–186 discusses peat and the towns are mentioned where it has been found in Warren County. It states "the depth of one of the beds of peat in Warrensburgh exceeds sixty feet, and must have been forming for seven or eight hundred years."

Peat has been cut from the marshes along the inlet stream of Glen Lake, and this fact has been stated by Dr. A. W. Holden in his History of the Town of Queensbury: 146. 1874. "There are two or three extensive peat beds in this neighborhood, one of which, at the head of an estuary stretching westwardly from Long Pond (Glen Lake) has been extensively worked during the past few

years by the Corning Iron Company of Albany." Dr. Heinrich Ries has a paper on "Uses of Peat and its Occurrence in New York" in the 21st Report of the State Geologist for 1901 (reprinted from the N. Y. State Mus. Rep. 55: r53–r90. 1903). He gives on pages r83–r84 several localities for peat in Washington and Warren counties. The paper also records that, "Mr. F. W. Wait, of Glen Falls, states that some 20 years ago the Albany Peat Works established a plant, and operated it for some years in the swamp between Glens Falls and French Mountain, on the road leading to Lake George. Work was abandoned after a time, however.

"About 10 years before this, Judge E. H. Rosecrans produced peat from what is known as Rosecrans swamp, northeast of Glens Falls, but this likewise was discontinued."

During the recent World War, sphagnum was used to a vast extent in the place of absorbent cotton in surgical dressings and was superior to the cotton. Mr. Geo. E. Nichols in THE BRYOLOGIST for July, 1918, states that in eastern United States, *Sphagnum papillosum* was regarded the best species; *S. palustre*, next; also useful, *S. imbricatum* and *S. magellanicum*, "where these appear sufficiently luxuriant."

Mr. William W. Mather in Geology of New York, page 81, speaks of Calcareous Tufa occurring "near Whitehall, as a deposit from springs" and in Saratoga county, "on the banks of the Hudson between Glens and Bakers falls. The most beautiful incrusted moss was obtained from this locality. It is said to abound at Saratoga." Calcareous tufa in this region is formed by water, carrying bicarbonate of lime in solution, trickling over cushions of *Gymnostomum* and *Cratoneuron filicinum*. The mosses become completely incrusted below, but go on growing at the apex of the stem, as the older parts of the plants die. Specimens of tufa formed on *Cratoneuron filicinum* was collected along the banks of Pond Brook, east of W. Fort Ann P. O., October 31, 1914.

An attempt, in the list of species, is made to mention the northernmost station first. The following abbreviations are used:

CH, Columbia Herbarium.
GH, N. Y. Botanical Garden Herbarium.
JH, Jelliffe Herbarium.
SH, N. Y. State Herbarium.

List of Species

1. *Sphagnum magellanicum* Brid. This is apparently not an uncommon species, particularly in upland cold bogs and about mountain ponds. Determined by Dr. A. L. Andrews, who says "some of the specimens" from W. Fort Ann "of this species are decidedly in the direction of what Warnstorf calls *S. subbicolor.*" Dr. C. Warnstorf in 1902 referred several specimens to *Sphagnum subbicolor* Hampe= *Sph. centrale* C. Jens.= *Sph. intermedium* Russ.; several other plants in the same sending he referred to *Sphagnum medium* Limpr. and a few plants to *Sphagnum medium*, var *laeve*, forma *purpurascens* (Russ.) Warnst.

2. *Sphagnum papillosum* Lindb. The var. *intermedium* (Russ.) Warnst. Bog north of Clarks Pond, west of Shushan. Determined by Dr. Andrews.
3. *Sphagnum palustre* L. Apparently not an uncommon species about mountain ponds and small bogs. Determined by Dr. Andrews, who says "the most practical means of distinction between *S. palustre* and *S. magellanicum* lies in the tendency of the latter to a really red pigmentation, while the other is brown." Many specimens determined by Dr. Warnstorf as *S. cymbifolium* Ehrh.

   Sphagnum cymbifolium, var. *subcarneum* Warnst. Three Ponds; Sly Pond; New Michigan Pond, "Talman marsh." Determined by Dr. Warnstorf.

   Sphagnum cymbifolium, var. *virescens* Warnst. Rosecrans swamp, north of Glens Falls. Determined by Dr. Warnstorf.
4. *Sphagnum imbricatum* Hornsch. Shushan (F. Dobbin) Determined by Dr. Andrews.

   Sphagnum imbricatum, var. *affine* (R. & C.) Warnst. Fort Ann mountains and southern W. Fort Ann. Determined by Dr. Warnstorf. Marsh west of stone schoolhouse, north of Tripoli; low woods north of Cambridge. Determined by Dr. Andrews.
5. *Sphagnum compactum* DC. Wet places on rocks, Curtis hill, east of Fort Ann, August 29, 1896. Dr. Warnstorf called the specimens at first *S. compactum:* but in April, 1903, he renamed the specimens *Sphagnum Garberi* L. & J., which is a synonym of *Sphagnum strictum* Sull.

   Sphagnum compactum, var. *squarrosum* Russ. Wet place, summit of Sugar Loaf Mt., Dec. 3, 1900. Determined by Dr. Warnstorf. Plants from the same station, Nov. 13, 1915, were determined by Dr. Andrews as *S. compactum.*
6. *Sphagnum Wulfianum* Girg. "Knolls and slight elevations in sphagnous swamps. Moreau." (E. C. Howe). "A species easily recognized by its rigid red stems and numerous short branches, those of the summit of the stem being crowded into a dense subglobose head." N. Y. State Cab. Rep. 22: 56. 1869. In (CH), Dr. Howe's specimens are labelled Fort Edward. Marsh west of stone schoolhouse. Determined by Dr. Andrews. Rich's swamp southwest of Shushan.

   Sphagnum Wulfianum, var. *viride* Warnst. Swamp woods south of Mud Pond, Pattens Mills. Determined by Dr. Warnstorf. This station is probably destroyed.
7. *Sphagnum squarrosum* Crome. This beautiful easily recognizable species is frequently met with in bogs and old swampy woods. Dr. Warnstorf determined several collections as *Sphagnum squarrosum*, var. *spectabile* Russ. to which variety probably most of our plants are referable.

   Sphagnum squarrosum, var. *semisquarrosum* Russ. Northeast of Fort Ann; east of Thompsons gravel-bed, southern W. Fort Ann. Determined by Dr. Warnstorf.

8. *Sphagnum teres* (Schimp.) Ångstr. Inman Pond, Bear Pond; French Mt.; Five Combine woods, east of Hudson Falls. Determined by Dr. Warnstorf. East Lake George marsh at Brayton; bog north of Clarks Pond. Determined by Dr. Andrews.

Sphagnum teres, var. *squarrosulum* (Lesq.) Warnst. Black Mt.; E. Lake George marsh. Determined by Dr. Warnstorf.

Sphagnum teres, var. *subsquarrosum* Warnst. Luzerne, Sept. 12, 1894 (D. C. Eaton). Eaton & Faxon, Sphag. Bor. Am. Exs. *64*.

9. *Sphagnum recurvum* Beauv. Pool in marsh west of stone schoolhouse; E. Lake George marsh; "Mud Pond," south of Glen Lake. Determined by Dr. Andrews.

Sphagnum recurvum, var. *amblyphyllum* Russ. Copeland Pond, "wasserform?"; marsh north of Glen Lake. Determined by Dr. Warnstorf.

Sphagnum recurvum, var. *mucronatum* Russ. Curtis hill; pool in marsh west of stone schoolhouse. Determined by Dr. Warnstorf.

Sphagnum recurvum, var. *tenue* H. Klinggr. Little swamp, below upper falls, N. Beaver creek, Vaughns; "Mud Pond," wetter margins, Glen Lake; bog north of Clarks Pond. Determined by Dr. Andrews. Podunk Pond marsh; southern W. Fort Ann. Determined Dr. Warnstorf as *Sphagnum parvifolium* (Sendt.) Warnst.

Sphagnum fallax H. Klinggr. Inman Pond. Determined by Dr. Warnstorf.

Sphagnum intermedium Hoffm. Fort Edward (Howe); Huletts Lg. (S. E. Jelliffe). Both collections are in (CH).

10. *Sphagnum subsecundum* Nees. Southern W. Fort Ann. Determined by Dr. Warnstorf. East Lake George marsh; Sugar Loaf Mt.; woods north of Cambridge. Determined by Dr. Andrews.

Sphagnum auriculatum Schimp. Wet place, Poebles Island, mouth of Mohawk River. Determined by Dr. Andrews.

Sphagnum contortum Schultz. Copeland Pond. Determined by Dr. Warnstorf.

Sphagnum contortum, var. *tenue* Warnst. Five Combine woods. Determined by Dr. Warnstorf.

Sphagnum inundatum Russ. In a small bog, Fort Edward, plants tinged with brown. (Howe). Reported in N. Y. State Cab. Rep. 20: 409. 1867, as *Sphagnum subsecundum* Nees. In the original Dr. Howe herbarium as *Sphagnum subsecundum contortum*. In the N. Y. State Herbarium as *Sphagnum inundatum* Russ.

Sphagnum inundatum, var. *squarrosulum* Warnst. Dailey's woods, north of Hudson Falls. Determined by Dr. Warnstorf.

11. *Sphagnum fimbriatum* Wils. Old logs in wet place, woods south of Sugar Loaf Mt., southwestern W. Fort Ann. Determined by Dr. Andrews.

12. *Sphagnum Girgensohnii* Russ. Hadley, Aug., 1893 (C. A. Ingersoll). Eaton & Faxon, Sphag. Bor. Am. Exs. 2. Wet woods, Fort Edward (Howe) as *Sphagnum strictum* Lindb. South of Mud Pond, Pattens Mills; woods west of Smiths Basin; woods east of Moss St., north of Hudson Falls. Determined by Dr. Warnstorf. Shushan (Dobbin); Clemons to Black Mt.; W. Fort Ann; E. Lake George marsh; near Kingsbury St.; west of Wilburs Basin. Determined by Dr. Andrews.

13. *Sphagnum robustum* (Russ.) Röll. East of Thompsons gravel-bed. Determined by Dr. Andrews. (*Sphag. Russowii Warnst.*).

Sphagnum Russowii, var. *girgensohnoides* Russ. Clemons to Black Mt.; Rosecrans swamp. Determined by Dr. Warnstorf.

14. *Sphagnum fuscum* (Schimp.) H. Klinggr.

Sphagnum fuscum, var. *pallescens* Warnst. West of All Souls church, W. Fort Ann. Determined by Dr. Warnstorf.

Sphagnum fuscum, var. *virescens* Warnst. Rosecrans swamp. Determined by Dr. Warnstorf.

15. *Sphagnum Warnstorfii* Russ. East Lake George marsh; southern W. Fort Ann; Rosecrans swamp. Determined by Dr. Warnstorf. Hague; Cambridge waterworks swamp. Determined by Dr. Andrews. Warrensburg.

Sphagnum Warnstorfii, var. *purpurascens* Russ., f. *hydrophila*. Luzerne, Sept. 10, 1894 (C. A. Ingersoll). Eaton & Faxon, Sphag. Bor. Am. Exs. *25*.

Sphagnum Warnstorfii, var. *versicolor* Russ. East of Thompsons gravel-bed; north of Glen Lake. Determined by Dr. Warnstorf.

Sphagnum Warnstorfii, var. *viride* Russ. Hollow in field north of Scotch church, Harrisena; Hunters bridge, east of Glen Lake. Determined by Dr. Warnstorf.

16. *Sphagnum capillaceum* (Weiss) Schrank. Our most abundant species found almost everywhere that sphagnum occurs. Many collections determined by Dr. Warnstorf and Dr. Andrews. (*Sphag. acutifolium* Ehrh).

Sphagnum acutifolium, var. *rubrum* Warnst. Podunk Pond marsh. Determined by Dr. Warnstorf.

Sphagnum acutifolium, var. *versicolor* Warnst. Vaughns; Five Combine woods. Determined by Dr. Warnstorf.

Sphagnum acutifolium, var. *viride* Warnst. Dark Bay, Lake George; Fort Ann mountains. Determined by Dr. Warnstorf.

Sphagnum capillaceum, var. *tenellum* (Schimp.) A. L. Andrews. Luzerne, Sept. 11, 1894 (D. C. Eaton). Eaton & Faxon, Sphag. Bor. Am. Exs. *30* as *Sphagnum tenellum*, var. *rubellum* (Wils.) Warnst.

17. *Sphagnum quinquefarium* (Lindb.) Warnst. Crosset Pond. Determined by Dr. Warnstorf. West of Hadlock Pond; rocks north of New Michigan falls; south bank of Tripoli millpond. Determined by Dr. Andrews.

18. *Andreaea petrophila* Ehrh. Huletts Lg. (D. J. Levy).
19. *Andreaea Rothii* W. & M. Huletts Lg. (Levy); Day (C. H. Peck). (*A. rupestris* of many authors.)
20. *Georgia pellucida* (L.) Rabenh. Decaying logs and stumps; common. (*Tetraphis pellucida* of many authors).
21. *Catharinea angustata* Brid. Very common in shaded places, either in sandy or moist soil of clay or loam. (*Atrichium angustatum* B. & S.).
22. *Catharinea undulata* (L.) W. & M. Growing in similar situations as the preceding species; frequent.
23. *Polytrichum commune* L. Dry woods and old fields; abundant.
24. *Polytrichum gracile* Dicks. Blue Mt. Lake (E. G. Knight).
25. *Polytrichum juniperinum* Willd. Thin rocky soil in fields and shaded places. In Rich's swamp near Shushan, this species was found on old logs and stumps.
26. *Polytrichum Ohioense* R. & C. Huletts Lg. (Levy); decayed logs and about trees in damp woods, Fort Edward (Howe); Black Mt. and vicinity; southwest of Shushan; north of Cambridge.
27. *Polytrichum piliferum* Schreb. Sandy and thin rocky soil; common.
28. *Polytrichum Smithiae* Grout. Huletts Lg. (Levy).
29. *Polytrichum strictum* Banks. Huletts Lg. (Levy); Podunk Pond marsh; New Michigan Pond marsh.
30. *Pogonatum alpinum* (L.) Roehl.

    Pogonatum alpinum, var. *arcticum* (Sw.) Brid. Moist woods and talus slopes in upland regions. Huletts Lg. (Levy), (Jelliffe); foot of Diameter precipice, South Bay, "a slender form," determined by Prof. J. W. Holzinger; W. Fort Ann.

    Pogonatum alpinum, var. *septentrionale* (Sw.) Brid. Huletts Lg. (Jelliffe) in (CH) and (JH).
31. *Pogonatum brevicaule* (Brid.) Beauv. Gravelly and clayey soils and mountain woods. Huletts Lg. (Levy); Buck Mt. (G. D. Hulst); Shushan (Dobbin); Barber trail, Black Mt.; Mt. Hope road, north; north of Bacon Pond; morainal hill south of E. Lake George marsh; east of Pattens Mills.
32. *Buxbaumia aphylla* L. Fort Edward, Apr. 1868, three plants (Howe); Schuylerville (W. Greenalch), Bryologist 3: 16. July, 1900; Shushan, May 5, 1907 (Dobbin).
33. *Webera sessilis* (Schmid.) Lindb. Moist banks in exposed places and along wood roads. It is more usually met with in elevated regions and may be readily overlooked.
34. *Fissidens adiantoides* (L.) Hedw. Wet rocks and moist banks in woods, also on rocks in brooks; frequent.

    Fissidens adiantoides, var. *immarginatus* Lindb. Trunks of trees, northern Washington county. Determined by Mrs. Britton.
35. *Fissidens bryoides* (L.) Hedw. Shaded rocks near streams, Fort Edward (Howe).

36. *Fissidens cristatus* Wils. Moist soil and rocks in woods, sometimes in low places; common. Dr. Howe's, Fort Edward 1866 plant in (CH) was determined by Dr. C. R. Barnes as *Fissidens decipiens* DeNot.
37. *Fissidens incurvus* Schwaegr. Charlton on stones (Peck).

    Fissidens incurvus, var. *minutulus* (Sull.) Aust. Huletts Lg. (Edward Ketchell) in (CH) and (JH); Shushan on sandstone (Dobbin), determined by Mrs. Britton; Baker's ledge, S. Beaver creek, east of Vaughns, determined by Mr. Kaiser.
38. *Fissidens osmundioides* (Sw.) Hedw. Moist rocks and earth. Huletts Lg. (Levy); Shushan (Dobbin); southern New Michigan, determined by Mrs. Britton; Vaughns and vicinity.
39. *Fissidens subbasilaris* Hedw. Huletts Lg. (Jelliffe); Fort Edward, roots of trees (Howe), N. Y. State Cab. Rep. 19: 46. 1866, also in (CH).
40. *Fissidens taxifolius* (L.) Hedw. Huletts Lg. (Levy); Fort Edward, "Moreau" (Howe), N. Y. State Cab. Rep. 20: 409. 1867.
41. *Pleuridium alternifolium* (Kaulf.) Rabenh. Sandy field, DeRidder hill, east of Schuylerville (Greenalch).
42. *Pleuridium subulatum* (L.) Rabenh. Huletts Lg. (Levy); Shushan in an old field (Dobbin).
43. *Ditrichum lineare* (Sw.) Lindb. Huletts Lg. (Levy) (Jelliffe) as *Ditrichum vaginans* (Sull.) Hampe.
44. *Ditrichum pallidum* (Schreb.) Hampe. Dry soil in shaded places. Huletts Lg. (Levy); southern W. Fort Ann; Shushan.
45. *Ditrichum pusillum* (Hedw.) Timm. Huletts Lg. (Levy); Warrensburg (Peck); Shushan (Dobbin); road, northwest of Hadlock Pond, determined by Mr. Kaiser as *Ditrichum tortile* (Schrad.) Hampe.
46. *Rhabdoweisia denticulata* (Brid.) B. & S. Dresden on rocks (Peck).
47. *Oncophorus Wahlenbergii* Brid. Saratoga Co., in decaying wood (Howe) in (CH).
48. *Ceratodon purpureus* (L.) Brid. Rocks, banks, sandy barrens, old roofs; abundant and somewhat variable. Frequently seen in places overrun by recent fires.
49. *Saelania glaucescens* (Hedw.) Broth. Dresden on rocks (Peck); Fort Edward (Howe) in (SH); Shushan (Dobbin). (*Leptotrichum glaucescens* (Hedw.) Hampe.
50. *Trematodon ambiguus* (Hedw.) Hornsch. Woods, Powers Ferry to North Easton.
51. *Dicranella heteromalla* (L.) Schimp. Huletts Lg. (Levy); Shushan (Dobbin); Mt. Hope road, north; Vaughns and vicinity, in part determined by Mr. Kaiser; Wilburs Basin.

    Dicranella heteromalla, var. *orthocarpa* (Hedw.) EGB. Huletts Lg. (Levy) as *Dicranella heteromalla Fitzgeraldi* (R. & C.) Grout; Lake George (Hulst); Shushan (Dobbin).
52. *Dicranella rufescens* (Dicks.) Schimp. This species "occurs as far north as Johnsburg, Warren Co." N. Y. State Mus. Rep. 24: 102. 1872, as *Dicranum rufescens* Turn.; North River (Peck); Huletts Lg. (Levy).

53. *Dicranella varia* (Hedw.) Schimp. Clay bank of stream north of Pattens Mills cemetery, determined by Mr. Kaiser; woods north of Cambridge.
54. *Dicranum Bergeri* Bland. Ballston Lake; Rich's swamp near Shushan.
55. *Dicranum Bonjeani* DeNot. Huletts Lg. (Levy); E. Lake George marsh and large marsh south of Glen Lake, determined by Mr. Kaiser.
56. *Dicranum Drummondii* CM. Huletts Lg. (Levy); Lake George (Hulst); Fred Vaughans' woods, Vaughns, clay soil under hemlocks; marshes north and south of Glen Lake. Several collections determined by Mr. Kaiser.
57. *Dicranum flagellare* Hedw. Old stumps and logs; common.
58. *Dicranum fulvum* Hook. Rocks; common.
59. *Dicranum fuscescens* Turn. Black Mt.; Anaquassacook hills, southeast of Shushan.
60. *Dicranum longifolium* Ehrh. Huletts Lg. and Cold Spring (Jelliffe) in (CH) and (JH); also (Levy); Barber trail, Black Mt.; Anaquassacook hills on rocks near Peaked Rock.
61. *Dicranum montanum* Hedw. Base of living trunks of pines and hemlocks and decaying wood. Huletts Lg. (Levy); Fort Edward (Howe) in (CH); near W. Fort Ann P. O.; vicinity of Kingsbury St.; large marsh south of Glen Lake; Anaquassacook hills.
62. *Dicranum Schisti* (Gunn.) Lindb. Huletts Lg. (Levy).
63. *Dicranum scoparium* (L.) Hedw. Earth, rocks, etc., in shaded places; abundant.

    Dicranum scoparium, var. *pallidum* (C.M.) L. & J. Fort Edward (Howe) in (CH).

    Dicranum scoparium, var. *paludosum* B. & S. Cool and swampy woods, W. Fort Ann. Determined in part by Mr. Kaiser. The stems of this moss are clothed with a white tomentum.
64. *Dicranum spurium* Hedw. "Sandy ground, Saratoga"(Lesquereux)in N. Y. State Cab. Rep. 19: 45. 1866; Fort Edward (Howe) in (CH).
65. *Dicranum undulatum* Ehrh. Old moist or wet woods and thin rocky soil; frequent specially in elevated regions.
66. *Dicranum viride* (S. & L.): Lindb. Huletts Lg. (Levy).
67. *Leucobryum albidum* (Brid.) Lindb. Huletts Lg. (Jelliffe); northern Washinton county growing with the next species, determined by Mrs. Britton.
68. *Leucobryum glaucum* (L.) Schimp. A conspicuous and common moss forming compact light-colored cushions in moist or dry shaded places, mossy coniferous woods and borders of swamps.
69. *Hedwigia albicans* (Web.) Lindb. Rocks and boulders; abundant. (*Hedwigia ciliata* Ehrh.).

    Hedwigia albicans, var. *leucophaea* (B. & S.) Limpr. Huletts Lg. (Jelliffe).

    Hedwigia albicans, var. *secunda* (B. & S.) Limpr. Huletts Lg. (Jelliffe), (Levy).

    Hedwigia albicans, var. *viridis* (B. & S.) Limpr. Huletts Lg. (Jelliffe).

70. *Grimmia apocarpa* (L.) Hedw. Dry or moist rocks. Huletts Lg. (Levy); Shushan (Dobbin); road near Wiggins iron mine, W. Fort Ann and vicinity of Vaughns, determined by Mr. Kaiser. The sterile Luzerne plants (G. W. Clinton) known as *Schistidium Agassizii* Sull. & Lesq., reported in N. Y. State Cab. Rep. 20: 405. 1867, were compared by Dr. Peck, June 23, 1902, with specimens of *S. Agassizii* from Lake Superior in the Sullivant and Lesquereux exsiccati. Dr. Peck says, "while it approaches that species closely in its small size and costa ceasing below the apex of the leaves, I conclude from the shape of the leaves that it is rather a form of *S. apocarpum.*"

(*To be Continued*)

HINTS FOR LICHEN STUDIES

Albert C. Herre

There are apparently very few people in this country actively engaged in the study of lichens. Just why this should be so is rather difficult to see, since many lichens are quite conspicuous, either from their size, color, or numbers. Perhaps the greatest obstacle has been the difficulty experienced by the isolated amateur in finding out their names, whereas the numerous manuals of flowering plants readily afford one an easy introduction to the higher plants.

In this country we have perhaps neglected most the study of the physiological activities of lichens. We know relatively little concerning the rate of growth of these organisms, and the causes which may make a given species grow to a much greater size in one region than it does in another. My personal belief, based upon observations of lichens over the region lying between Canada and Mexico, Great Salt Lake and the Pacific, is that actual amount of rainfall is only a minor factor, since *Ramalina reticulata*, easily the largest of North American lichens, reaches its maximum growth with a rainfall of but 16 to 20 inches. A greatly prolonged growing season, high atmospheric humidity but not necessarily much rainfall, and an undisturbed substratum, are probably the three most important growth conditions for lichens. It is such conditions which make possible the almost incredible length which the fibers of *Usnea longissima* attain in the mountains of Java, and the coast range of Oregon.

There is room for a thousand enthusiastic nature lovers scattered over the country to take observations for a series of years upon the increase in diameter of the thallus of our common bark- and rock-dwelling lichens. The exposure upon which growth first appears and is most rapid, the growth in sun and shade, as affected by prevailing winds, or other evident variable conditions, are all things which could be profitably recorded, and after sufficient material had been obtained the results should be collated and published.

The way in which heredity is transmitted in lichens is a field which should be investigated. As suggested by me on other occasions, Mendelian inheritance as exemplified in most organisms is an impossibility. Under the means by which lichens are usually propagated no sexual reproduction with its complex of chromosome division is involved. Lichens are in general asexually reproduced, but

they have a real and positive heredity even tho they are not species in the ordinary sense of the word. A lichen is a physiological species and not a species in the same sense as are *Linnaea americana*, *Cocos nucifera*, or *Agaricus campestris*. I have elsewhere suggested what I believe to be the controlling factors of lichen heredity and the development of new species of lichens. But the whole matter needs patient and prolonged investigation and would well repay the efforts of some students of genetics.

If a few members of the Sullivant Moss Society will take the trouble to record at stated intervals such data as readily lend themselves to exact measurement or definite experiment, they will be making a real contribution to our knowledge of these unique organisms.

Washington State Normal, Bellingham, Wash.

DR. CORREN'S INVESTIGATIONS AND STERILE MOSSES

John M. Holzinger

In the fourth volume of The Bryologist, January, 1901, the writer announced the discovery in Minnesota of *Webera proligera*, a moss which in the fall of each year develops great numbers of gemmae, or bulbils, in the leaf-axils of the sterile plants. Since that time Dr. Corren's able work, Investigations into Propagation of Mosses by Gemmae and Budding,[1] has come to hand. With great diligence and care this author investigates 915 species. It is not generally known as it deserves to be, especially by the younger moss students, that the result of these studies has more than a passing importance for systematic investigations. Dr. Correns has a chapter on the Use of Bulbils and Gemmae in Systematic Determinations (of sterile plants), which finds a happy illustration in two recent determinations; the one actually accomplished, the other verified, by the use of this book.

I had collected last summer a small, beautiful green, sterile moss, which puzzled and troubled me for quite a while. The curly leaves broke off with the greatest ease. A leaf section showed median guides. The slender leaf-points were papillose. Interspersed with the delicate plants were alga-like threads, larger than the protonema threads of *Ephemerum*. These, I have since learned, are Dr. Corren's "chloronema," formed from the protonema. The patches of this moss occurred on the bark at the bases of trees, usually birches, They frequently covered areas the size of two hands. Small patches interspersed, which looked like beautiful green velvet, on examination proved to be areas where the chloronema had completely displaced the leafy plants. These observations persuaded me that I had before me a small, sterile, *Dicranum*. On

[1]Untersuchungen ueber die Vermehrung der Laubmoose durch Brutorgane und Steckinge. von Dr. Carl Correns, Jena, 1899. pp. 1–472 + i-xxiv.

turning to Correns, I made the plant with much confidence *Dicranum montanum;* comparison with herbarium specimens confirmed the determination.

The second case was that of sterile *Encalypta contorta.* I had determined the plant, but wanted assurance. Correns, page 98, promptly furnished it, picturing the brittle, brown, thread-like, "*Brutkoerper*" found so abundantly on this plant.

Corren's notable work will aid students in the determination of many sterile mosses.

WINONA, MINN.

HYMENOSTOMUM IN NORTH AMERICA

A. LEROY ANDREWS

1. Delimitation of the genus

Amongst many uncertainties in a perplexing group of moss forms, one fact is too clear to deserve to be obscured by unjustified taxonomic partitions: namely the close natural relationship of many species which have hitherto usually been divided among the genera *Astomum*, *Hymenostomum* and *Weisia.* As represented in the north temperate zone, where their types belong, practically all of their species show gametophytes with no essential difference and only a series of sporophytes representing such a close gradation of forms that not only are the species still debatable, but the genera are in each case connected by forms which can with about equal justice be placed in either genus. This is particularly true in Europe, whose moss-flora has been most intensively studied. The species generally known as *Hymenostomum rostellatum* (Brid.) Schimp. is as good an *Astomum* as an *Hymenostomum*[1] and its recent revival as a separate genus *Kleioweissia*[2] Bayrhoffer, 1849, by Loeske[3] would make matters worse rather than better. The case is not greatly different with the species of the tropics and the southern hemisphere. On what grounds Brotherus[4] includes with *Hymenostomum* as distinct from *Astomum* the minute species *H. abbreviatum* (Thw. & Mitt.) Broth. from Ceylon and *H. subacaule* (Mitt.) Broth. from Ecuador[5] is not readily evident.[6] Before finishing his work he had apparently forgotten having thus disposed of

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[1]Cf. Limpricht in Rabenhorst, Kryptogamenflora, IV, I, 224. 1886.

[2]The above is the original spelling.

[3]Studien, 76. 1910. Bayrhoffer, Ubersicht der Moose, Lebermoose und Flechten des Taunus, 3. 1849; Bayrhoffer seems to have taken the name from Bryologia Europaea.

[4]Engler & Prantl, Natürliche Pflanzenfamilien, I, III, 386. 1902.

[5]Mitten (Journ, Linn. Soc., Bot., XII, 131. 1869) had recorded it from Bolivia as well as Ecuador.

[6]The combination *H. subacaule* seems to go back to Paris, Index Bryologicus, 596 (1895), though not so credited by Brotherus. The other combination *H. abbreviatum* is on the other hand accepted by Paris in his second edition, II, 356 (1904) after he had included the species with *Systegium* (=*Astomum*) in his first edition, 1258 (1897). The combination *Astomum subacaule* was made by Jaeger, Musci Cleistocarpi, 13 (1869).

the former, for it appears again[7] as *Astomum abbreviatum* (Mitt.) Fleisch. from Java. Fleischer[8] did not however report it from Java, but included it as to be expected in Java on the basis of its occurrence in Ceylon, outside of which island it has not, so far as I know, been found. I note also a species, *Astomum chilense*, recently described by Williams[9] which is so close to *Phascum recurvirostrum* C. M.[10] from Paraguay placed by Paris in *Hymenostomum* that even its specific validity is questionable, as Mr. Williams was inclined to admit when I called his attention to the other species. Roth had transferred this species to *Astomum* and figured it.[11] It should be added that Brotherus has not included it at all and that Paris[12] apparently incorrectly represents it as identical with *Hymenostomum Balansaeanum* Besch. The confusion is doubtless due to the fact that both were collected by Balansa. *H. Balansaeanum* is understood to be one of the more highly developed gymnostomous so-called Hymenostomums and has recently been figured as such by Felippone from new material collected by himself and evidently determined by Brotherus.[13] It may be noted in passing that *A. recurvirostrum* and *A. chilense* together with some other South American Astomums differ considerably in gametophyte characters from the uniform type of the Astomums of the northern hemisphere and are perhaps best regarded as cleistocarpous forms more immediately related to so-called Hymenostomums and Trichostomums of their general region. The case as between *Hymenostomum* and *Weisia* is perhaps not quite so bad, but European bryologists speak of the difficulty of separating *Weisia crispata* (N. & H.) C. M. and *Hymenostomum tortile* (Schwaegr.) B. & S.[14] Certainly there is no sharp generic division even with these last two species excluded from consideration. They are themselves in something of a "twilight zone" toward *Trichostomum*.

On the other hand there are some mosses, especially from the tropics, commonly included with *Hymenostomum* (so also by Brotherus) which are not directly related to *Weisia*-species, but form the gymnostomous relatives of species ordinarily placed in *Trichostomum* Hedw., as is being more and more recognized.[15] In a natural grouping these should then either be excluded from *Hymenostomum* or the genus should be extended to cover at least some of the species now assigned to *Trichostomum*. The hybridization of *Trichostomum flavovirens* Bruch with *Astomum crispum* (Hedw.) Hampe detected by Nicholson[16] shows a close relationship which might more or less justify the drawing of the broader generic lines last suggested, which would further involve the inclusion of *Tortella* (C. M.) Limpr. It is not however my intention to carry the discussion further in this

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[7]Op. cit. (Nachträge), 1189. 1909.

[8]Flore de Buitenzorg, V, I, 315. 1902.

[9]Bull. Torrey Bot. Club, XLII, 393. 1915.

[10]Flora, LXXI, 5. 1888.

[11]Auszereuropäisch. Laubmoose, I, 195. 1911.

[12]Index Bryologicus, ed. 2, II, 356. 1904.

[13]Contribution á la Flore Bryologique de l'Uruguay, I, 17. 1909.

[14]Cf. Dixon, Handbook, ed. 2, 230. 1904; Limpricht in Rabenhorst, Kryptogamenflora, IV, I, 230. 254. 1886.

[15]Cf. Fleischer, Flore de Buitenzorg, V, I, 313f. 1902.

[16]Rev. Bryol., XXXVII, 23f. 1910.

direction. For the present I shall exclude from *Hymenostomum* the several tropical North American species which have been assigned to it. It is of course well known that Lindberg[17] proposed a synthetic genus covering all the above and others under the name of *Mollia* Schrank,[18] which has been followed by a number of authors, notably Braithwaite[19] and (with the separation of *Trichostomum* including *Tortella*) under the name of *Weisia* by Dixon,[20] though the latter in his later studies in exotic mosses seems to have broken with his earlier system.[21] There is something to be said in favor of Lindberg's genus, but perhaps less in favor of its name.[22] At any rate it does not apply to the more limited group which I have included under *Hymenostomum*. Some of the groups within Lindberg's genus are not however, connected by close transitional forms and their separation as genera seemingly abundantly justified. It may be noted that Lindberg's subgenus *Hymenostomum* of his genus *Mollia*[23] corresponds exactly with the genus *Hymenostomum* as I have delimited it.

A further case of unnatural synthesis is found in the inclusion by Brotherus[24] of the genus *Tetrapterum* Hampe consisting of a species each from South Africa and Australia with *Astomum*. Jaeger in his treatment of the cleistocarpus mosses[25] regarded the two species as cleistocarpous relatives of *Hyophila* Brid. They suggest to me rather relatives of species of the *Trichostomum* type and not too closely related to each other. A would-be natural system that separates generically even European *Astomum* and *Hymenostomum* can certainly not with any claim to naturalness include *Tetrapterum* with *Astomum*.

As to the valid name of the genus as we have delimited it, *Weisia* or *Veisia* Hedw., 1782[26] is antedated by *Weissia* Ehrh., 1779[27] and must accordingly be dropped. The next available is *Hymenostomum* R. Br., 1819,[28] which also has the merit not possessed by the later *Astomum* Hampe, 1837[29] that there is no question as to its type-species, it having been proposed as monotypic (for *Gymnostomum microstomum* Hedw.). The question of the appropriateness of the name for all species may be raised, but is not validly pertinent. In the necessary transition from the old artificial grouping to something that is intended to express natural relationship it is inevitable that generic names originally descriptive should cease to be distinctively so, nor is there any occasion to worry unduly over the matter. We do not require all Smiths to be workers in metals or else

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[17]Utkast till en naturlig gruppering, 29f. 1878.
[18]Baier. Flora, II, 455. 1789.
[19]British Moss Flora, I, 228ff. 1887.
[20]Handbook of British Mosses, 203ff. 1896; ed. 2, 223ff. 1904.
[21]Cf. e. g. Journ. Linn. Soc., Bot., XLIII, 307. 1916: *Gyroweisia*.
[22]This question is discussed at length by LeJolis, Rev. Bryol., XXII, 19ff. 1895.
[23]Musci Scand., 21. 1879.
[24]Op. cit., 384f.
[25]Musci Cleistocarpi, 26f. 1869.
[26]Fundamentum, II, 83: *Weisia;* 90: *Veisia*.
[27]Hannoverisches Magazin, XVII, 1003.
[28]Trans Linn. Soc., XII, 573.
[29]Flora, XX, 285.

change their name. Schimper was guilty of some strange alterations of name on this reasoning, in our group for example substituting for *Astomum Systegium*,[30] a name which has also been employed by Mitten and others. It has even lived through the second edition of Paris' Index as the accepted name of the genus. Such a substitute name has of course no validity over the prior name for which it is arbitrarily substituted, though it may be noted in this particular case that *Astomum* had when the substitution was made ceased to be a heterogeneous group, while the original *Astomum* of Hampe was a conglomerate of cleistocarpous forms, the first of which, *A. rostratum*, is unidentifiable[31] and only the second, *A. crispum* belongs to the genus as afterwards understood. Even in the sense in which it is at present generally applied *Hymenostomum* has little appropriateness. An hymenium plays no rôle in the European *H. rostellatum* and one is hardly present in the European *H. tortile*,[32] nor in most of the tropical so-called Hymenostomums,[33] which are gymnostomous, not hymenostomous, and were in fact formerly included in the wholly artificial and heterogeneous genus *Gymnostomum*, as was for that matter *H. microstomum* itself. The hymenium of this group is hardly a structure of phylogenetic importance.

The genus thus delimited and named would naturally be divided into three subgenera: *Astomum*, *Euhymenostomum* and *Weisia*, and as these are clearly enough distinguished in our North American species their exact dividing lines need not be further discussed. *Astomum* is normally cleistocarpous, *Euhymenostomum* is normally hymenostomous, *Weisia* is normally peristomate.

Ithaca, N. Y.

REVIEW

Contributions (Beitraege) to the Mossflora of Java, the Strait Settlement and Burma, by Hjalmar Moeller

(In Hedwigia, Band LX, 1919, pp. 313–330)

This is a list of 206 species of mosses, including descriptions of the following new species:

Rhizogonium salakanum Moeller,
Stereophyllum Moelleri Broth.,
Ectropothecium ichnotocladum (C. M.) Jaeg. var. *filivaneum* Broth.,
Xanthocladium scabrifolium Broth.
All four plants are figured.

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[30]Syn., 30. 1860.

[31]It is generally assumed to be *A. rostellatum*.

[32]Limpricht (Op. cit., 229f.) says that it is ruptured before the operculum is removed and questions (224) the validity of the inclusion of this species in the genus.

[33]Cf. Fleischer, Op. cit., 313.

This list is based on collections made by the author in 1897. The determinations are largely by Dr. V. F. Brotherus, of Helsingfors, Finland.

The author has excluded species collected by him and reported by previous moss students, especially by Professor Max Fleischer, whose comprehensive work, die Musci der Flora von Buitenzorg, appeared in 1902–1908.

In its taxonomy the list follows Dr. Brotherus' treatment in Engler and Prantl's Pflanzenfamilien.

JOHN M. HOLZINGER

WINONA, MINN.

MISCELLANEOUS NOTES

Mosses and lichens exhibited at Chicago.—The exhibition of nature study material held by the Wild Flower Preservation Society of Chicago, from January 6th to 22nd, 1920, proved a valuable object lesson to the general public and especially to the school children. Besides the mounted material, there were many drawings in black and white and in color, and many photographs. The exhibit of mosses and lichens attracted more attention than any other thing. Many visitors whose botanical learning did not take them beyond the common flowering plants, became interested in the new and strange beauty of the cladonias and the feather mosses. There were fifty-six luxuriant specimens of mosses and lichens exhibited, mounted upon stiff cardboards. As often as possible during the course of the exhibit, these specimens were sprayed with water by means of a fine atomizer, so that the little garden kept as green and lovely as if in a summer rain.

Many inquiries were made concerning books and named specimens, and several small collections have been distributed by the writer, who recommended to all the books by Dr. Grout, Mrs. Dunham, and Miss Marshall. The exhibit was transferred from Chicago to Peoria, and will later visit others of the middle western cities.

MRS. ABIGAIL BUTLER

EXCHANGE DEPARTMENT

Offerings—To Members *only*. Return postage rather than a stamped envelope should be sent when asking for the specimens.

Prof. Charles C. Plitt, 3933 Lowndes Ave., Baltimore, Md.—*Nephromium lusitanicum* Nyl., collected by Mr. P. G. M. Rhodes in North Wales.

Dr. Albert C. Herre, Washington State Normal School, Bellingham, Washington.—*Pilophoron cereolus Hallii* Tuck.; *Lecanora pacifica* Tuck.; *Buellia aliena* (Nyl.) Herre; *Cyphelium inquinans* (Sm.) Trevis; and *Blastenia atrosanguinea* (Merrill) Herre. Members should indicate which offers they desire, and if they wish all of them should include sufficient postage.

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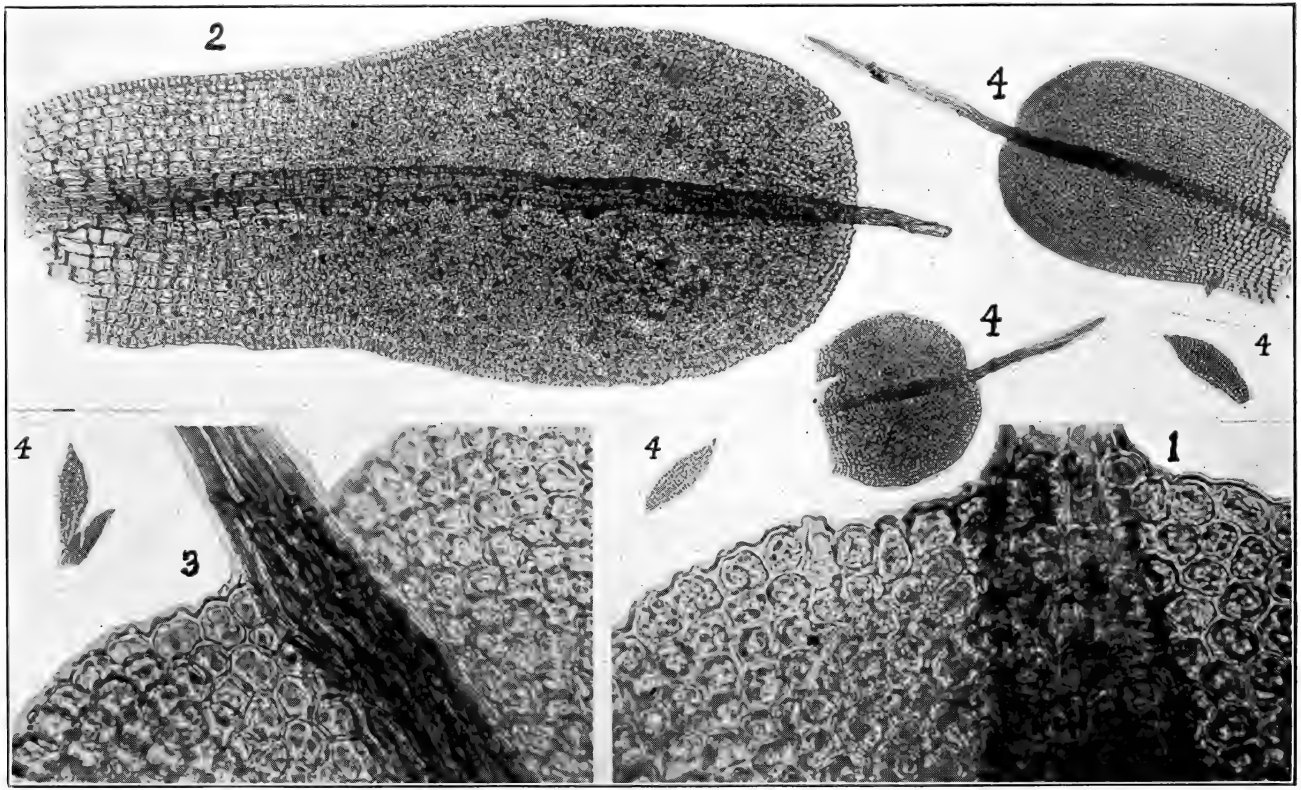

TORTULA PAGORUM (MILDE) DENOT

THE BRYOLOGIST

VOL. XXIII MAY, 1920 NO. 3

TORTULA PAGORUM (MILDE) DeNOT., NEAR HARPERS FERRY, W. VA.

A. T. BEALS

In February, 1919, after finishing a strenuous week's work photographing reconstruction methods at the Walter Reed Hospital, Washington, D. C., a

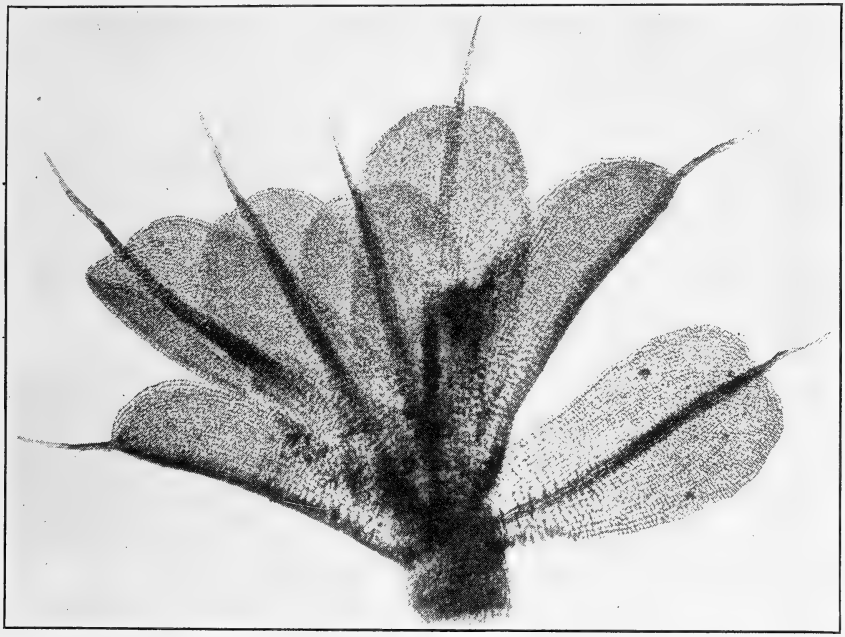

Fig. 1. TORTULA PAGORUM, collected in Italy by E. Corti. Magnification about 60 diameters. Photograph by A. T. Beals.

day in the open seemed to offer the most desirable form of rest. Harpers Ferry, with the Blue Ridge mountains, was the nearest locality that appeared to have hills and river scenery with possible brooks and wet ledges. The day was cloudy and muddy underfoot, but such things are mere details.

The train left Washington about noon and arrived at Harpers Ferry at 2 P. M. Time was limited, so the bridge over the Potomac River was quickly

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recrossed, and a dirt road running north at the base of Elk Ridge, in the State of Maryland, was followed. Between the muddy road and the river was the canal, and at the right of the road the rocks and hillside rose abruptly. Not far from the quaint old bridge was a little old unpainted building labeled "Museum of War Relics," containing mementoes of the war of 1861, but not open during the winter. A short distance from the museum the hillside became less abrupt and small trees and bushes scantily covered it. A few of the more common mosses had been gathered but none had been noted that seemed to be new to me.

It was along this part of the hillside, seventy-five feet above the road, that a patch of yellow-green color was seen on a nearly perpendicular rock. A short stiff scramble enabled me to examine with a hand-lens some of the yellow-green material and it was seen to consist of small plants with blunt-ended leaves that had a heavy costa, long excurrent and sharply pointed. The *Tortulaceae* seemed to be the most likely family and considerable of this material was carefully scraped from the rock, placed in packages and carefully stored in inside pockets, as being choice and interesting. Another moss about the same size but without the excurrent costa, was also found abundantly in this same yellow-green patch. It was not fruited but appeared to be an *Orthotrichum*.

Farther along on slate-like, dry, ledgy rocks a very small gray plant was found, too soft for a lichen, and this proved to be *Fabronia octoblepharis* (Schleich.) Schwaegr. and fairly well fruited.

After returning to New York the first-mentioned material was studied jointly by Miss Daisy J. Levy and myself, and we decided the plant to be *Tortula pagorum* (Milde) DeNot. No fruit was seen. To verify this determination a package was sent to Mr. E. B. Chamberlain, but while he favored our determination he suggested sending a specimen to a bryologist who had collected this interesting moss in its type station, Meran, South Tyrol, where also *Fabronia octoblepharis* is abundant. Consequently a package was sent to Mr. W. E. Nicholson, and in due time his reply stated that while our material varied in some unimportant details he considered our plant correctly named.

In July, 1919, Miss Daisy Levy spent a week collecting in the vicinity of Harpers Ferry and found that farther north along the river road at the base of Elk Ridge many trees and ledges carried growths of the *Tortula* as well as the *Fabronia*.

Tortula pagorum has been collected once before in the United States by Dr. J. K. Small, on elm trees at Atlanta, Ga.[1]

2929 Broadway, New York City.

[1] Grout, A. J. Tortula pagorum (Milde) DeNot. in Georgia. Bryologist **7**: 65. Pl. 8, figs. 3, 4, 5. 1904.

Nicholson, Wm. E. Tortula pagorum (Milde) DeNot. Bryologist **8**: 70. 1905. (Refers to Grout's article, cited above.)

EXPLANATION OF PLATE I

PHOTOGRAPHS OF TORTULA PAGORUM (MILDE) DENOT., BY A. T. BEALS

Fig. 1. Edge of leaf of plant from Harpers Ferry including part of costa. Note cells at left showing two papillae on each in profile. Magnification about 600 diameters.

Fig. 2. Leaf of Harpers Ferry plant. Cells at base hyaline and longer than wide; those above smaller, rounded, densely chlorophyllose and papillose. Edges slightly wavy by projecting cells. Magnification about 82 diameters.

Fig. 3. Edge of leaf from plant collected in Italy by E. Corti. Magnification about 450 diameters.

Fig. 4. Leaves and brood bodies from Italian plant. Magnification about 50 diameters.

BARTRAMIOPSIS LESCURII

JOHN M. HOLZINGER

During the war I distributed *Bartramiopsis Lescurii* (James) Kindb., Rev. bryol., 1894, p. 35, *Atrichum Lescurii* James, coll. et det. T. C. Frye, July 26, 1913.

Mr. Kindberg published his characterization of the genus *Bartramiopsis* in Rev. bry., 1894, p. 33. On page 35 he described what he considered *Atrichum Lescurii* James, evidently constructing his genus for the reception of the plant described by James. Cardot and Theriot, in Proc. Wash. Acad. of Sci., July 31, 1902, pp. 325–6, pl. XXI, figs. 2 a-1, contend that he made his description from sterile specimens collected in Japan. I cannot find their source of information on this point. But, whatever the facts are here, there is internal evidence that Kindberg's description is a composite. At the end of his description of six lines he writes "Lesq. & James"; a little over four lines are not in quotation marks, when a comparison of the descriptions shows that Kindberg really did quote these lines, with slight changes and an important omission. Then he writes in quotation marks: "capsule erect, short, cylindric ovate, *constricted below the mouth;* pedicel short." The corresponding part of the description in Lesq. & James' Manual reads: "capsule erect, cylindric-ovate, short, *enlarged at the orifice and turbinate when empty;* pedicel short and thick." Whence that "constricted below the mouth?"

Kindberg here evidently has some related plant before him: was it a *Lyellia?* See Engler & Prantl, figs. on p. 678, where both the entire plants and microscopic characters of *Lyellia crispa* and *Bartramiopsis Lescurii* are reproduced from E. S. Salmon's article in the Journal of Botany, 1902, p. 341.

James describes the cells of the lamina as "nearly round, obscure." He failed to find that they appeared "obscure" because *bistratose.* This is one of the essential because generic characters of the plant: James indicated it, accidentally; but Kindberg quite omitted it, p. 35, as he also failed to mention another striking character, the few long cilia at the base of the lamina.

Cardot and Theriot had reason for stepping in. They made their own description, which is scrupulously correct and sufficient, accepted Kindberg's generic name, and ushered the plant described by James, evidently the same

as that before them from Virgin Bay, (Trelease, 1833), into the lonely bosom of Kindberg's genus.

The characterization of "*Bartramiopsis sitkana* Kindb. nov. subsp.," on p. 35, l. c., in 3 lines, is so brief that, in determining a plant by its luminous rays would require superhuman intelligence to enable either denial or verification. Yet that name, by three lines, is saved the embarrassment of a nomen nudum, and is received, with honors, as a synonym.

One more remark. It is in regard to the generic value of *Bartramiopsis*. Cardot and Theriot, at the end of their paper on the Harriman Alaska Mosses, l. c., in Note 2, p. 347, refer to Mr. E. S. Salmon's view published in the Journal of Botany, l. c., that *Atrichum Lescurii* James belongs to the genus *Lyellia* because both have *bistratose leaves*. This seems rather a matter of taste and convenience. The authors in answer point out the difference in the capsule: in *B. Lescurii* this is erect, smooth, macrostome or flaring; in *L. crispa* it is nodding, angled and wrinkled like that of a *Polytrichum*, and microstome. The peristome is absent in both genera. It may be added that *B. Lescurii*, with the structure of its costa, and its few lamellae (5 to 8) looks toward *Catharinaea; L. crispa*, with the structure of its costa, and its numerous lamellae (24 to 33) looks toward *Polytrichum*. Above all, it is more convenient to retain Kindberg's genus.

The facts above cited require us to write the name of this plant as follows:

Bartramiopsis Lescurii (James) Card. et Ther., in Proc. Wash. Acad. of Sci., July 31, 1902, pp. 325–6, pl. XXI, figs. 2 a-1, *not Kindb.; Atrichum Lescurii* James in Bull. Torr. Bot. Club, VI (1879), p. 33, and Lesq. et James Manual (1884), p. 257; *Bartramiopsis sitkana* Kindb. nov. subsp. in Rev. bryol. 1894, p. 35.

Egg Harbor, S. E. Alaska on soil of uprooted tree (Frye, 944).

Collections: John M. Holzinger, Musci Acrocarpi Boreali-Americani, 374.

WILLIAM HOBSON

Wm. Hy. Pearson

In the Manchester Museum there is a specimen labelled "Jungermannia splachnoides, California, ex. herb. Wm. & Ed. Hobson." This is *Physiotium giganteum* (Weber), *Jungermannia sphagnoides* Rich., and, so far as I know, this species has not been recorded from California. Probably some mistake has been made as to its origin, but the specimen affords me an excuse for making from my American friends some enquiry about this said William Hobson.

We in Lancashire are very proud of our workingmen botanists, who for more than a hundred years have held their botanical meetings, pursuing their studies under extreme difficulties, and who have added no little store to our knowledge. We treasure the memory of such men as John Mellor, a working gardener, who discovered *Hymenophyllum Wilsoni;* John Nowell, a cotton operative, after whom the genus *Nowellia* was founded by Mitten and after whom

Zygodon Nowellii was named; John Whitehead, another cotton operative, who discovered *Marsupella nevicensis;* Horsfield, a postman, after whom a glorious Daffodil was named; and many others.

Amongst the most famous of them, however, was Ed. Hobson, a man in a very humble position in life, who yet had for his correspondents and friends such leading botanists as Sir William Jackson Hooker, R. K. Greville, Dr. Taylor, and others, and after whom *Lejeunea Hobsoniana* was named by Lindenberg. Edward Hobson never left this country, but his brother William went to America, and from there probably sent specimens. I have made exhaustive enquiries from some of his descendants and have searched for some notice of him in our botanical literature, but in vain.

Edward Hobson's great friend and correspondent was George Cayley, another workingman botanist, who came under the notice of Sir William Jackson Hooker. He accompanied Sir Joseph Banks on his expedition to New South Wales, from where he sent large botanical collections to Kew, amongst them being a species which bears his name, *Banksia Cayleyi.* He returned to this country in 1811. Later he was appointed Superintendent of the Botanical Gardens at St. Vincent, where he lived for 9 years. Probably Cayley sent Hobson the *Lejeunea Hobsoniana,* which Hobson would most likely send to Hooker, who corresponded with Lindenberg, hence its name. In the "Syn. Hep.", 1844, it is given as from St. Vincent, leg. Hobson, 1822, in Herb. Hooker. I think the explanation will be correct, for I doubt whether Edward's brother, William, ever left the States.

In the life of Edward Hobson, published in the Memoirs of the Manchester Literary and Philosophical Society, Vol. VI, New Series, 1842, there is also mentioned a John Bentley, "who published an account of new plants which he had found in the uncultivated parts of North America." Any information as to William Hobson will be much appreciated by the writer of this note, who is deeply interested in these old Lancashire workingmen botanists.

18 Palatine Road, Withington,
Manchester, England.

ALASKAN NOTES

Albert C. Herre

At various times I have received lichens from Alaska and I am listing here the species and localities. I am indebted to Dr. Harold Heath, of Stanford University, and Frank Hess, of the U. S. Geological Survey, for the specimens.

1. *Sphaerophorus globosus* (Huds.) Herre. Skagway.
2. *Lecidea panaeola* Ach. Eagle.
3. *Cladonia alpestris* (L.) Rabenh. Eagle.
4. *Cladonia coccifera* (L.) Willd. White Pass; Tanana.
5. *Cladonia coccifera pleurota* (Floerke) Schaer. White Pass.
6. *Cladonia deformis* (L.) Hoffm. Eagle.

7. *Cladonia crispata* (Ach.) Flot. Eagle.
8. *Cladonia gracilis* (L.) Willd. White Pass.
9. *Cladonia cariosa* (Ach.) Spreng. Eagle.
10. *Cladonia pyxidata* (L.) Hoffm. White Pass.
11. *Cladonia fimbriata* (L.) Hoffm. Skagway.
12. *Gyrophora proboscidea* (L.) Ach. Seward Peninsula.
13. *Lobaria pulmonaria* (L.) Hoffm. Skagway.
14. *Peltigera canina* (L.) Hoffm. Skagway.
15. *Lecanora gelida* Ach. Eagle. The specimens are var. *sorediosa*.
16. *Ochrolechia tartarea* (L.) Mass.
17. *Parmelia enteromorpha* Ach. Skagway.
18. *Parmelia centrifuga* (L.) Ach. Seward Peninsula.
19. *Cetraria islandica* (L.) Ach. Seward Peninsula; Eagle.
20. *Cetraria Delisaei* (Bor.). ? Eagle.
21. *Cetraria Richardsonii* (Hook.) ? Eagle.
22. *Cetraria glauca* (L.) Ach. Eagle.
23. *Dactylina arctica* (Hook.) Nyl. Nome.
24. *Alectoria bicolor* (Ehrh.) Nyl. Eagle.
25. *Alectoria ochroleuca* (Ehrh.) Nyl. Eagle.
26. *Alectoria ochroleuca rigida* Schaer. Seward Peninsula.
27. *Alectoria implexa* (Hoffm.) Nyl. Skagway.
28. *Letharia vulpina* (L.) Wainio. White Pass.

Washington State Normal, Bellingham, Wash.

THE MOSSES OF THE LAKE GEORGE FLORA

Stewart H. Burnham

(*Continued*)

Grimmia apocarpa, var. *rivularis* (Brid.) W. & M. Huletts Lg. (Levy); Glenwood brook, Vaughns, determined by Mr. Kaiser.

71. *Grimmia Dupreti* Theriot. (Bryol. 10: 62–64. July, 1907). Shushan, April 24, 1913. Determined by Mr. Kaiser who says "since this article, this moss has come to us only from Vermont once and now from you, therefore it is particularly interesting."
72. *Grimmia pennsylvanica* Schwaegr. Dresden on rocks (Peck); Huletts Lg. (Levy).
73. *Rhacomitrium aciculare* (L.) Brid. Huletts Lg. (Levy).
74. *Rhacomitrium microcarpum* (Schrad.) Brid. Huletts Lg. (Levy).
75. *Ephemerum crassinervium* (Schwaegr.) CM. Shushan on soil, Nov. 20, 1910 (Dobbin). Determined by Prof. Geo. E. Nichols.
76. *Phascum cuspidatum* Schreb. "Waste fields near Saratoga; March." (Lesquereux). N. Y. State Cab. Rep. 19: 43. 1866.
77. *Weisia viridula* (L.) Hedw. Huletts Lg. (Levy); Lake George (Hulst); Fort Edward, the mouth of the capsule very small (Howe) in (CH);

Shushan (Dobbin), determined by Prof. Nichols; Bacon hill, 2 miles west of Fort Ann, determined by Mr. Kaiser.

78. *Gymnostomum curvirostre* (Ehrh.) Hedw. Wet shale, Bakers Falls, determined by Prof. Holzinger; Cohoes Falls.
79. *Gymnostomum rupestre* Schleich. Huletts Lf. (Levy); waterfall in woods, west of Tripoli schoolhouse; wet bank of Pond brook, east of W. Fort Ann P. O., both collections determined by Mr. Kaiser; north of Vaughns on moist limestone rocks.
80. *Didymodon rubellus* (Hoffm.) B. & S. Old log west of Tripoli, with *Platygyrium repens.* Determined by Mr. Kaiser.
81. *Barbula convoluta* Hedw. Shushan (Dobbin), determined by Dr. Peck; Vaughns in meadows, in part determined by Mr. Kaiser.
82. *Barbula fallax* Hedw. Wet shaded rocks, Fort Edward, "Moreau" (Howe) in Lesq. & James, Mosses of North America: 121; also in N. Y State Cab. Rep. 20: 405. 1867. Specimens in (CH) and (SH).
83. *Barbula unguiculata* (Huds.) Hedw. Huletts Lg. (Levy); Lake George (Hulst); Shushan (Dobbin).
84. *Trichostomum cylindricum* (Bruch) CM. Northern Washington county. Determined by Mrs. E. G. Britton.
85. *Tortella caespitosa* (Schwaegr.) Limpr. Huletts Lg. (Levy); Fort Edward (Howe) in (CH); woods and ledges east of Vaughns on rocks, determined by Mr. Kaiser.
86. *Tortella tortuosa* (L.) Limpr. Luzerne (Clinton) in (SH); Fort Edward (Howe) in (CH); Wiggins iron mine, determined by Mr. Kaiser; Vaughns and vicinity, forming cushions on limestone rocks.
87. *Pottia truncatula* (L.) Lindb. Shushan in garden soil (Dobbin); near Tripoli schoolhouse; one mile east of Vaughns.
88. *Encalypta ciliata* (Hedw.) Hoffm. Dresden, rocky cliffs (Peck); Shushan on rocks (Dobbin).
89. *Encalypta streptocarpa* Hedw. Vaughns and vicinity on limestone; Big creek shales, east of Smiths Basin, determined by Prof. Holzinger.
90. *Drummondia clavellata* Hook. Huletts Lg. (Jelliffe) in (CH) and (JH), also (Levy); Peaked rock, Anaquassacook hills on trunks of *Quercus Prinus* L.
91. *Ulota americana* (Beauv.) Lindb. Huletts Lg. (Jelliffe) (Levy); Dresden on rocks (Peck); Vaughns and vicinity, determined by both Mrs. Britton and Prof. Holzinger.
92. *Ulota crispa* (L.) Brid. Trunks of trees; common. Several collections determined by Mr. Kaiser.

    Ulota crispa, var. *crispula* (Bruch) Hamm. Huletts Lg. (Jelliffe) in (CH) and (JH), also (Levy).
93. *Ulota Ludwigii* Brid. Fort Edward (Howe) in (CH); west of Tripoli cemetery on trunks of *Juglans cinerea* L. and *Quercus alba* L., determined by Mr. Kaiser.

94. *Orthotrichum anomalum* Hedw. Limestone rocks; common. Specimens from granitic rocks on Sugar Loaf Mt. grew on *Umbilicaria Dillenii* Tuck.
95. *Orthotrichum obtusifolium* Schrad. Huletts Lg. (Levy); "Trees, Saratoga Springs, sterile" (Clinton) in N. Y. State Cab. Rep. 20: 405. 1867.
96. *Orthotrichum speciosum* Nees. Huletts Lg. (Jelliffe); Fort Edward (Howe) in (CH).
97. *Orthotrichum strangulatum* Sull. Huletts Lg. and Cold Spring (Jelliffe) (Levy); Dresden on rocks (Peck); "DeRidder hill on elms near "Schuylerville (Greenalch) in BRYOL. 3: 16. July, 1900; Shushan (Dobbin); on trunks of trees, Vaughns and vicinity, determined by Mr. Kaiser.
98. *Splachnum ampullaceum* L. "In a wooded swamp on an old log," one mile north of Moreau Station. N. Y. State Cab. Rep. 20: 405. 1867. Also noted by Mrs. Britton in The Observer 7: 640. Oct. 1896. Specimens in (CH) and (SH).
99. *Physcomitrium turbinatum* (Mx.) Brid. Lake George (Hulst), determined by Mrs. Britton; Fort Edward, ground in wet places (Howe) in (CH); Schuylerville (Greenalch); Shushan (Dobbin); upland meadow in "dead furrows," north of Vaughns, determined by Mr. Kaiser.
100. *Funaria hygrometrica* (L.) Sibth. Sandy banks, moist soil, crevices of rocks and burnt ground; frequent.
101. *Meesia longiseta* Hedw. Wet places, Moreau (Howe). N. Y. State Cab. Rep. 20: 405. 1867. Specimens in (CH) and (SH).
102. *Meesia trichodes* (L.) Spruce. "Moist sandy ground and marshy places. Fort Edward. Rare." (Howe.) N. Y. State Cab. Rep. 19: 51. 1866, as *Meesia uliginosa* Hedw. Specimens in (CH).
103. *Meesia triquetra* (L.) Ångst. "Swamps and wet places. Fort Edward. Rare." (Howe.) N. Y. State Cab. Rep. 19: 51. 1866, as *Meesia tristacha* Funk. Specimens in (CH) and (SH). Big Hollow, Bakers Falls, Sept. 1892, determined by Mrs. Britton.
104. *Timmia cucullata* Mx. Shaded ground, Fort Edward (Howe) in (CH); Schuylerville (Greenalch), BRYOL. 3: 16. July, 1900, as *Timmia megapolitana* Hedw.; Shushan (Dobbin); Halfway brook between Pattens Mills and Tripoli, determined in part by Mr. Kaiser; Pond brook both east and west of W. Fort Ann P. O.
105. *Aulacomnium heterostichum* (Hedw.) B. & S. Moist soil and ledges in woods; frequent.
106. *Aulacomnium palustre* Schwaegr. Sphagnum marshes, bogs, wet grassy places and moist rocks; abundant and somewhat variable.
107. *Philonotis caespitosa* Wils., approaching var. *laxa* (Warnst.) Loeske & Warnst. Huletts Lg. (Levy).
108. *Philonotis fontana* (L.) Brid. Springy banks, bogs and moist rocks; frequent.
109. *Philonotis Muhlenbergii* (Schwaegr.) Brid. Ticonderoga (Britton); Huletts Lg. (Levy); wet sandy soil and springy places, Fort Edward (Howe)

in (CH), also reported in N. Y. State Cab. Rep. 19: 51. 1866, as *Bartramia Muhlenbergii* Schwaegr.

110. *Bartramia ithyphylla* (Haller) Brid. "Fissures of rocks. Black mountain near Lake George." (Lesquereux.) N. Y. State Cab. Rep. 19: 51. 1866.

111. *Bartramia Oederi* (Gunn.) Sw. Dresden and Horicon (Peck); Huletts Lg. (Levy); Saratoga Co. (Howe) in (CH); northwest Hartford on limestone; Bacon hill and at Vaughns on limestone ledges, determined by Mr. Kaiser; wet shaly rocks, Big creek east of Smiths Basin and at Bakers Falls, determined in part by Mrs. Britton, specimens in (CH); woods south of Shushan on rocks.

112. *Bartramia pomiformis* (L.) Hedw. Shady banks and rocks; abundant particularly in elevated regions.

Bartramia pomiformis, var. *crispa* (Sw.) B. & S. Black Mt. cliffs. Determined by Mrs. Britton.

113. *Leptobryum pyriforme* (L.) Wils. Huletts Lg. (Levy); sandy soil, Fort Edward (Howe) in (CH).

114. *Pohlia annotina* (Hedw.) Lindb. Luzerne (Clinton) in N. Y. State Cab. Rep. 20: 409. 1867, as *Bryum annotinum* Hedw.; Middle Grove (Peck).

115. *Pohlia cruda* (L.) Lindb. "Deep shaded crevices of rocks on mountains. Black Mt." (Lesquereux.) "Fort Edward." (Howe.) N. Y. State Cab. Rep. 19: 52. 1866, as *Bryum crudum* Schreb. Dr. Howe's specimens in both (CH) and (SH). Huletts Lg. and Cold Spring (Jelliffe) in (CH), also (Levy); Cold Spring, South Bay; cliffs in the forest north of Lake Pond, determined by Mrs. Britton.

116. *Pohlia Lescuriana* (Sull.) Grout. Huletts Lg. (Levy).

117. *Pohlia nutans* (Schreb.) Lindb. Moist or swampy woods and old stumps; frequent.

118. *Pohlia proligera* (Lindb.) Correns. Huletts Lg. (Levy).

119. *Mniobryum albicans* (Wahl.) Limpr. In a muddy bog, Moreau, "Fort Edward" (Howe). N. Y. State Cab. Rep. 20: 409. 1867, as *Bryum Wahlenbergii* Schwaegr. Southern W. Fort Ann and N. Beaver creek, Vaughns, in wet places, determined by Mr. Kaiser.

120. *Bryum affine* (Bruch) Lindb. Huletts Lg. (Levy).

121. *Bryum argenteum* L. Sandy fields, thin rocky soil and burnt ground; abundant. Easily recognized by its silvery gray color and often growing with *Ceratodon* and *Funaria*.

122. *Bryum bimum* Schreb. Huletts Lg. (Levy); swamps, Fort Edward (Howe) in (CH); Glens Falls on rocks in the river; falls in West brook, W. Fort Ann; swamp south of Mud Pond, Pattens Mills; Vaughns and vicinity on mossy rocks, low woods and wet limestone ledges, determined by Mr. Kaiser.

123. *Bryum caespiticium* L. Old fields and rocks; frequent.

124. *Bryum capillare* L. Huletts Lg. (Levy); shaded banks, rare, Fort Edward (Howe) in (SH). N. Y. State Cab. Rep. 19: 52. 1866. Shushan (Dobbin) in (SH).

125. *Bryum Duvallii* Voit. Huletts Lg. (Levy).

126. *Bryum intermedium* Brid. Fort Edward, woods and rocks in Hudson River (Howe) in (CH); shales of Big creek east of Smiths Basin.

127. *Bryum pallescens* Schleich. Fort Edward (Howe).

128. *Bryum pendulum* (Hornsch.) Schimp. "Crevices of rocks, Lake George" (Lesquereux) in N. Y. State Cab. Rep. 19: 51. 1866, as *Bryum cernuum* B. & S.; Fort Edward, dry woods at base of trees, rare (Howe); Haynes hill, Vaughns, on rocks, determined by Prof. Holzinger.

129. *Bryum pseudotriquetrum* (Hedw.) Schwaegr. Huletts Lg. (Jelliffe) (Levy); Dr. Grout states Sept. 7, 1906, that he finds "*pseudotriquetrum* in the Adirondack region near Ticonderoga"; South Bay on rocks; Clemons to Black Mt. on wet rocks.

130. *Bryum uliginosum* (Bruch) B. & S. "Crevices of wet rocks, Moreau" in deep shade, rarely fruiting (Howe) in N. Y. State Cab. Rep. 20: 405. 1867; "wet rocks near Fort Edward" (Howe) in Bryol. Europ. 4: t. 385. Specimens in (CH) and (SH).

131. *Rhodobryum roseum* (Weis) Limpr. Earth and thin, rocky soil in shaded places; common. Occasional in wet woods. A handsome moss and easily recognized by its stolons bearing at the summit dark green rosettes of leaves. Rarely found in fruit.

132. *Mnium affine* Bland. Damp woods on earth and thin, rocky soil, also in bogs. Huletts Lg. (Jelliffe); swampy woods south of Mud Pond, Pattens Mills, determined by Mrs. Britton; Vaughns and east of Tripoli, several collections determined by Mr. Kaiser, who says "the short cilia (1–2 cells) of the leaves would seem to indicate that your material belongs to the species rather than the var. *ciliare* in which the cilia teeth are longer."

Mnium affine var. *ciliare* (Grev.) CM. Huletts Lg. (Levy); Lake George (Hulst); Shushan (Dobbin); Black Mt.; falls, West brook, W. Fort Ann.

Mnium affine var. *elatum* B. & S. Along deep shaded creeks in mountains. Black Mt. (Lesquereux). N. Y. State Cab. Rep. 19: 53. 1866.

Mnium affine var. *rugicum* B. & S. "Same places as the former" variety (Lesquereux). N. Y. State Cab. Rep. 19: 53. 1866.

133. *Mnium cinclidioides* (Blytt.) Hüben. Rich's swamp near Shushan.

134. *Mnium cuspidatum* (L.) Leyss. Rocks and damp earth in woods and bogs; abundant. (*Mnium sylvaticum* Lindb.)

135. *Mnium Drummondii* B. & S. Huletts Lg. (Levy); woods, Fort Edward (Howe) in N. Y. State Cab. Rep. 20: 406. 1867; Hague, moist woods under *Thuja occidentalis* L.

136. *Mnium lycopodioides* (Hook.) Schwaegr. "Moist rocks in woods on mountain slopes. Black Mt. near Lake George" (Lesquereux). N. Y. State Cab. Rep. 19: 53. 1866.

137. *Mnium marginatum* (Dicks.) Beauv. Huletts Lg. and Cold Spring (Jelliffe) (Levy); Fort Edward and Saratoga Co., damp rocks and wet

ravine banks (Howe) in (CH); southern W. Fort Ann and Vaughns, determined by both Miss E. A. Warner and Mr. Kaiser. (*Mnium serratum* Schrad.)

138. *Mnium medium* B. & S. Huletts Lg. (Jelliffe) in (CH), also (Levy); moist shaded banks and ground in woods, Fort Edward (Howe) in (CH), the inflorescence hermaphrodite!

139. *Mnium punctatum* L. Damp ground in woods and stones in wet places, in elevated and undisturbed sections.

Mnium punctatum var. *elatum* Schimp. Deep shaded swamps in muddy places. Probably the common form of this species.

140. *Mnium rostratum* Schrad. Huletts Lg. (Levy); "wet rocks along rivulets and ravines, Saratoga Co." (Howe) in N. Y. State Cab. Rep. 20: 406. 1867. Dr. Howe's specimens in both (CH) and (SH). DeRidder hill woods, near Schuylerville (Greenalch).

141. *Mnium spinulosum* B. & S. Huletts Lg. (Levy); Lake George (Hulst); southern W. Fort Ann; woods northwest of Kingsbury St.; Wilburs Basin.

142. *Mnium stellare* Reich. Huletts Lg. (Levy); moist woods, Fort Edward and banks of a deep ravine, Moreau, opposite Fort Edward Institute (Howe) in (CH); Schuylerville (Greenalch); base of trees in wet places, Devines woods, Vaughns.

143. *Thuidium abietinum* (L.) B. & S. Dresden (Peck); Huletts Lg. (Levy); Willard Mt.; along Battenkill River, south of Shushan; Peaked Rock.

144. *Thuidium Blandowii* (W. & M.) B. & S. "Davis swamp near Warrensburg" (Peck). N. Y. State Mus. Rep. 53: 854. 1900.

145. *Thuidium delicatulum* (L.) Mitt. Ground, rocks and decaying logs; abundant. It rarely is found fruiting.

146. *Thuidium microphyllum* (Sw.) Best. "Ground and rotten logs in woods. Fort Edward" (Howe). N. Y. State Cab. Rep. 19: 58. 1866, as *Hypnum gracile* Bryol. Europ.

147. *Thuidium minutulum* (Hedw.) B. & S. Devines woods, Vaughns. Determined by Mr. Kaiser.

148. *Thuidium paludosum* (Sull.) Rau & Herv. Wooded swamps and low grounds. Huletts Lg. (Levy) as *Elodium paludosum* (Sull.) Loeske; Fort Edward (Howe); E. Lake George marsh; north and east of Thompsons gravel-bed; north of Vaughns schoolhouse and Devines woods; north of Kingsbury St. Several collections determined by Mr. Kaiser.

149. *Thuidium pygmaeum* B. & S. Woods southeast of Vaughns schoolhouse on boulders, Oct. 1916. Determined by Mr. Kaiser as a "fine! very desirable" moss.

150. *Thuidium recognitum* (Hedw.) Lindb. Growing in similar situations as *T. delicatulum*, but not nearly so common. "It is easy to distinguish between these two species which are so often confused. *Thuidium delicatulum* has the stem-leaves erect-spreading when moist; while in *T. recognitum* the tips of the leaves are recurved. The branch-leaves

are the same in both species. When one has fruiting material the perichaetial bracts when ciliate will show it to be *T. delicatulum;* when not ciliate, *T. recognitum.*"

151. *Thuidium scitum* (Beauv.) Aust. Huletts Lg. (Jelliffe) (Levy) as *Rauia scita* (Beauv.) Aust.

152. *Thuidium virginianum* (Brid.) Lindb. Huletts Lg. (Levy); "base of trees and prostrate trunks in woods. Luzerne" (Clinton). N. Y. State Cab. Rep. 20: 406. 1867, as *Hypnum scitum* Beauv., but in (SH) as *Thuidium virginianum.*

153. *Leskea obscura* Hedw. Old logs and base of trunks of trees, Shushan and vicinity; Wilburs Basin.

154. *Leskea polycarpa* Ehrh. Base of trees and old fences. Shushan (Dobbin); southern W. Fort Ann; Vaughns and vicinity. Determined in part by Mr. Kaiser.

155. *Lindbergia Austini* (Sull.) Broth. "Trunks of trees, Saratoga, sterile" (Clinton). N. Y. State Mus. Rep. 27: 91. 1875, as *Leskea Austini* Sull.

156. *Pterigynandrum filiforme* (Timm.) Hedw. Fort Ticonderoga, base of trees in low places (Peck).

Pterigynandrum filiforme, var. *minus* L. & J. Huletts Lg. (Levy).

157. *Anomodon apiculatus* B. & S. Rocks and trunks of trees. Blue Mt. Lake (Knight); Fort Edward (Howe) in (CH) and (GH); southern W. Fort Ann; near Peaked Rock.

158. *Anomodon attenuatus* (Schreb.) Hüben. Shaded limestone rocks and base of trees; common.

159. *Anomodon minor* (Beauv.) Fuern. Huletts Lg. (Levy); Fort Edward (Howe); Shushan (Dobbin), determined by Mr. Kaiser; Black Mt. on trees; Vaughns.

160. *Anomodon rostratus* (Hedw.) Schimp. Shaded limestone rocks and base of trees; common.

161. *Anomodon viticulosus* (L.) Hook. & Tayl. Limestone rocks; frequent.

162. *Thelia asprella* (Schimp.) Sull. Base and trunks of trees; common.

163. *Thelia hirtella* (Hedw.) Sull. Shushan (Dobbin).

164. *Myurella Careyana* Sull. Huletts Lg. (Levy); Fort Edward (Howe) in (CH); Pike brook, South Bay, determined by Prof. Holzinger; on limestone rocks, Pond brook, east of W. Fort Ann P. O., determined by Mr. Kaiser.

165. *Hylocomium brevirostre* (Ehrh.) B. & S. Barber trail, Black Mt.; Anaquassacook hills.

166. *Hylocomium proliferum* (L.) Lindb. A large handsome moss in damp evergreen woods, usually in elevated regions; common. It has not been found in fruit. (*Hypnum splendens* Hedw.)

167. *Hylocomium Pyrenaicum* (Spruce) Lindb. Crown Point gorge, Aug. 19, 1900 (Mrs. Carolyn W. Harris) in (GH). (*Hypnum Oakesii* Sull.)

168. *Hylocomium triquetrum* (L.) B. & S. Shaded banks and woods in moist or dry soil, also in wooded swamps; common. It has not been found in fruit.

169. *Hylocomium umbratum* (Ehrh.) B. & S. Shushan, July 20, 1912 (Dobbin). Determined by Mr. Kaiser.

170. *Rhytidium rugosum* (L.) Kindb. Peaked Rock.

171. *Brachythecium acuminatum* (Hedw.) Kindb. "Roots of trees and thin soil on rocks. Saratoga . . . mountains" (Lesquereux) in N. Y. State Cab. Rep. 19: 62, 1866, as *Hypnum acuminatum* Beauv. W. Fort Ann on trees; Shushan.

172. *Brachythecium campestre* B. & S. Damp clayey soil, Vaughns. Determined by Mrs. Britton.

173. *Brachythecium oxycladon* (Brid.) J. & S. Earth, rocks, roots and trunks of trees; abundant. The Fort Edward, 1866, (Howe) specimens in (CH) seemed to have puzzled Coe Finch Austin, and he placed them in a cover marked, "Intermediate between *Hypnum laetum* and *H. albicans* . . . leaf much like *H. salebrosum*, but I find no male flowers except on separate stems of No. 28." (*Hypnum laetum* Brid.)

Brachythecium oxycladon var. *dentatum* (L. & J.) Grout. Huletts Lg. (Levy). Ledges one-fourth mile north of Vaughns corners, May 10, 1908. Specimens were sent to Miss Warner as *No. 23* and she referred them to Dr. Grout who replied, "The *Brachythecium* is *B. oxycladon*, var. *dentatum* (L. & J.) Grout with uniform rough seta" and plicate leaves. "I have kept the specimen as it may be worthy of a n. sp."

174. *Brachythecium plumosum* (Sw.) B. & S. Huletts Lg. (Jelliffe) (Levy); Curtis hill on rocks, east of Fort Ann.

175. *Brachythecium populeum* (Hedw.) B. & S. "Near Lake George" (Lesquereux) in N. Y. State Cab. Rep. 19: 62. 1866, as *Hypnum populeum* Hedw.; Huletts Lg. (Levy); rocks in woods one mile north of Tripoli, determined by Mr. Kaiser.

176. *Brachythecium reflexum* (Starke) B. & S. Huletts Lg. (Levy).

177. *Brachythecium rivulare* B. & S. Moist earth and in streams on rocks; common. Several collections determined by Mr. Kaiser.

178. *Brachythecium rutabulum* (L.) B. & S. Huletts Lg. (Levy); Fort Edward (Howe) in (CH); low woods east of Tripoli; and base of trees in woods southwest of Shushan, determined by Mr. Kaiser.

179. *Brachythecium salebrosum* (Hoffm.) B. & S. Huletts Lg. (Levy); Sagamore, Lake George (Verplanck Colvin); Vaughns; Wilburs Basin; Willard Mt.

180. *Brachythecium Starkei* (Brid.) B. & S. Lake George (Hulst); falls in West brook and east of Tripoli, W. Fort Ann, in part determined by Mr. Kaiser; decaying logs, Five Combine woods, determined by Mrs. Britton.

181. *Brachythecium velutinum* (L.) B. & S. Moist soil and rocks. Vaughns; north of Clarks Pond.

(*To be Concluded in July Number*)

REVIEWS

Moeller's Distribution of Mosses in Sweden

Hjalmar Moeller. Lövmossornas Utbredning i Sverige.—V. Polytrichaceae 1. Arkiv för Botanik, utgifvet of K. Svenska Vetenskapsakademien, Band 16, No. 3. Stockholm, Almqvist & Wiksells Boktryckeri, A-B. 1919.

This paper of Herr Moeller's is a most excellent and critical study of the *Polytrichaceae* of Sweden, excluding *Polytrichum*. The author, like his Norwegian colleague Kaalaas, gives very careful descriptions of the habitats of the various species.

It is not a manual with descriptions, except for a few lines describing the varieties, but notes, of a historical, nomenclatorial, etc., character.

Times of flowering and maturity of capsules are given with great particularity, and quite complete lists of Swedish stations.

The species treated are:

Catharinaea tenella Röhl
" *angustata* Brid.
" *undulata* (L.) W. & M.
" " *minor* (Hedw.) W. & M.
" *Haussknechtii* (Jur. & Milde) Broth.
Psilopilum laevigatum (Wahlenb.) Lindb.
Oligotrichum incurvum (Huds.) Lindb.
Pogonatum polytrichoides (L.) Brockm.
" " *longisetum* (Hampe)[1]
" *nanum* (Weis)[1]
" " *minimum* (Crome)[1]
" *capillare* (Mx.) Brid.
" *urnigerum* (L.) Beauv.
" " *humile* (Wahlenb.) Brid.
" " *subintegrifolium* (Arn. & Jens.)[1]

As these are mostly common to North America, this paper is of equal interest here. *Catharinaea crispa* James does not occur in Sweden, probably because it is too cold. The frequency and distribution of the species is very similar to that of the same species over here. A couple of the Arctic species occur only in the Sarek Mts. in Lul Lappmark, where they were collected by Arnell & Jensen on that joyous expedition.

This is No. 5 of the series, and it would be of much interest to see the former as well as the future numbers.

A. Lorenz

Hartford, Conn.

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[1]Evidently new combinations by Moeller, although not so stated in the incomplete citations. —Editor.

Dixon and Watts on Antarctic Mosses

Mosses of the Australian Antarctic Expedition, 1911–14, by Mr. H. N. Dixon and Rev. W. W. Watts. Sydney, 1918. (Series C, Vol. VII, Part I).

In the introduction to this Part, Rev. W. W. Watts regrets that the rare herbarium of M. Jules Cardot has "fallen a prey to the Germans," his residence city, Charleville, being within the war zone. Coöperation was therefore sought of Mr. H. N. Dixon, the well-known British bryologist.

The material dealt with was collected in Queen Mary's Land, on the Antarctic Circle, between 90° and 100° E. longitude.

The species reported are:

1. *Ceratodon purpureus* (L.) Brid., forma.
2. *Sarconeuron glaciale* (Hook. f. & Wils.) Card. & Bryhn, a distinctive antarctic moss.
3. *Grimmia fastigiata* Card.
4. *Grimmia stolonifera* C. M.
5. *Bryum antarcticum* Hook. f. & Wils., forma.

Mr. Dixon recognizes four forms of this Bryum: one of these he refers to *Bryum austro-polare* Card.; another to *B. Gerlachei* (Card.) Card., or *B. filicaule* Broth. In a letter cited Mr. Dixon suggests, as probably other synonyms, *B. inconnexum* Card., *B. austro-polare* Card., and *B. algens* Card.

This treatment of Bryum is rather more radical than the author of most of the reduced species would allow. In his Mosses of the Expedition Antarctique Belge, Mr. Cardot has minutely described and illustrated, with exquisite skill and care, *Bryum inconnexum* and *B. austro-polare* (Pl. IX), also *B. Gerlachei* (Pl. X). While all the material is sterile and imperfect, Mr. Cardot records that, with reservations, *B. inconnexum* recalls *B. pallens*, while *B. austro-polare* seems to M. Cardot to be near *B. turbinatum*. However, he admits that certain of the plants referred to *B. austro-polare*, by their flagelliform shoots, resemble *B. Gerlachei*. And while Mr. Dixon may in this case have gone a little far afield from conservatism, the constant addition of "new species" to the already enormous list of Bryums makes this a welcome initial departure to anyone who tries to determine any, especially sterile, Brya.

John M. Holzinger
Winona State Normal School, Winona, Minn.

EXCHANGE DEPARTMENT

Offerings—To members of the Sullivant Moss Society only. Sufficient return postage should be sent.

Prof. A. C. Herre, Bellingham State Normal, Bellingham, Washington. offers the following:

Arthopyrenia halodytes (Nyl.) Wed.
Caloplaca cerina (Ehrh.) A. Zahlbr.

" *gilva* (Hoffm.) A. Zahlbr.
" *murorum miniatum* (Hoffm.) T. Fr.
Gryophora polyrrhiza (L.) Korb.
Lecanora saxicola diffracta (Ach.) T. Fr.
" *saxicola* (Poll.) Ach.
" *gibbosa* (Ach.) Nyl.
" *albella cancriformis* Tuck.
" *pacifica* Tuck.
Lecidea tessellata Flk.
Lecidea quernea (Dicks.) Ach.
Leptogium palmatum (Huds.) Mont.
Nephromopsis ciliaris (Ach.) Hue.
Opegrapha varia Pers.
Parmeliella lepidiota (Sommerf.) Herre.
" " *coralliphora* (Tuck.)
Rhizocarpon Bolanderi (Tuck.) Herre.
geographicum (L.) DC.
Rinodina radiata Tuck.
Solorina crocea (L.) Ach.
Verrucaria viridula Ach.

NOTE OF ACKNOWLEDGMENT

In view of the increased cost of publication and the consequent restrictions in the scope of matter to be published in THE BRYOLOGIST, particularly illustrations, it gives us pleasure to note that Mr. Beals has very generously defrayed the expenses of making the cuts for the illustrations accompanying his article on *Tortula pagorum*.—EDITOR.

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THE BRYOLOGIST

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ADVENTURES IN MOSSLAND

POLYTRICHADELPHUS LYALLII MITT.

JOHN W. BAILEY

It was mid-September. My son and I had driven from Seattle to Mount Rainier in the afternoon of a perfect day. The early fall rains had washed from the atmosphere the smoke and dust of a long, dry summer, leaving the air clear as crystal.

Camping for the night just below the Nisqually Glacier, we ate our supper and made our plans to spend the following day on the snowfields above Paradise Valley. The high-bush huckleberries were plentiful and while my son filled a pail with them I investigated the numerous boulders for *Rhacomitrium sudeticum* which grows everywhere on the rocks and produces numerous capsules. I gathered also *Andreaea petrophila*. On the alders beside the river there was an abundance of the ubiquitous *Pseudoleskea* that seems to defy any fixed identification, varying as it does with the place of growth and with the altitude.

Early next morning we continued our journey to the Valley. We saw the pikas busy with their haymaking and occasionally heard the shrill whistle of a marmot. The mosquitoes had gone with the disappearing snow.

Leaving our car at the ranger's cottage, we followed the trail up the Valley to the foot of the great barrier, beyond which lie the snowfields and Paradise Glacier. The path up the barrier zigzags back and forth over bare rocks and gravel. It is easy walking. However, one who is not used to climbing must go slowly. Just below the top the path runs through grass. Scattered about are a few alpine firs and hemlocks, the last outpost of the trees on this part of the mountain. Here we threw ourselves upon the grass, taking advantage of what shade we could find under the diminutive trees. A few late asters were still in bloom, but what caught my bryological eye was the splendid growth of moss—I thought it was *Polytrichum commune*—flourishing here, high up on the mountain side. You may imagine my delight when on investigation I found it not *commune*, but *Polytrichadelphus Lyallii*, a moss I had long hoped to gather. Prof. Frye had given me specimens which he had collected upon the slopes of Mount Hood, but I was not aware of the fact that it grew upon Mount Rainier. *Polytrichadelphus Lyallii* is the only representative of this genus that occurs in Western North America. It is easily recognized by its clustered and curiously irregular-angled, truncated capsules. Its stems are robust and its growth luxur-

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iant, much like *Polytrichum commune*. It does not, however, make very good museum specimens as the pedicels curl and tangle. It grows at high altitudes and, for this reason, during the winter is covered by a deep blanket of snow.

Having rested, we made a final push for the top. Just below the summer snow line, under the shelter of the rocks, I collected a *Grimmia*, belonging near *ovata*. It was fruiting nicely. Having gained the top, we turned and looked back at the wonderful view which spread out like a panorama before us. Mount Hood in Oregon, a hundred miles to the south, on whose slopes Prof. Frye had collected my specimens of *Polytrichadelphus Lyallii*, was plainly visible. The cone of Mount St. Helens was to the right, and a little to the left the snowy dome of Mount Adams appeared like a small replica of Mount Rainier. It was a memorable day, not only from a bryological, but also from the scenic standpoint.

Evening found us where we had camped the night before. Weary from our long day on the mountain, we began our preparations for the night, when suddenly the fog banks began to roll in over the Tatoosh Range and we hastily sought shelter. The next morning, leaving the mountain wrapped in heavy fog, we started for home. As we neared Tacoma the clouds broke away and, turning, we had a most gorgeous view of Rainier,—a fitting close to our happy trip.

SEATTLE, WASHINGTON.

APLOZIA PENDLETONII PEARSON, N. SP.

WM. HY. PEARSON

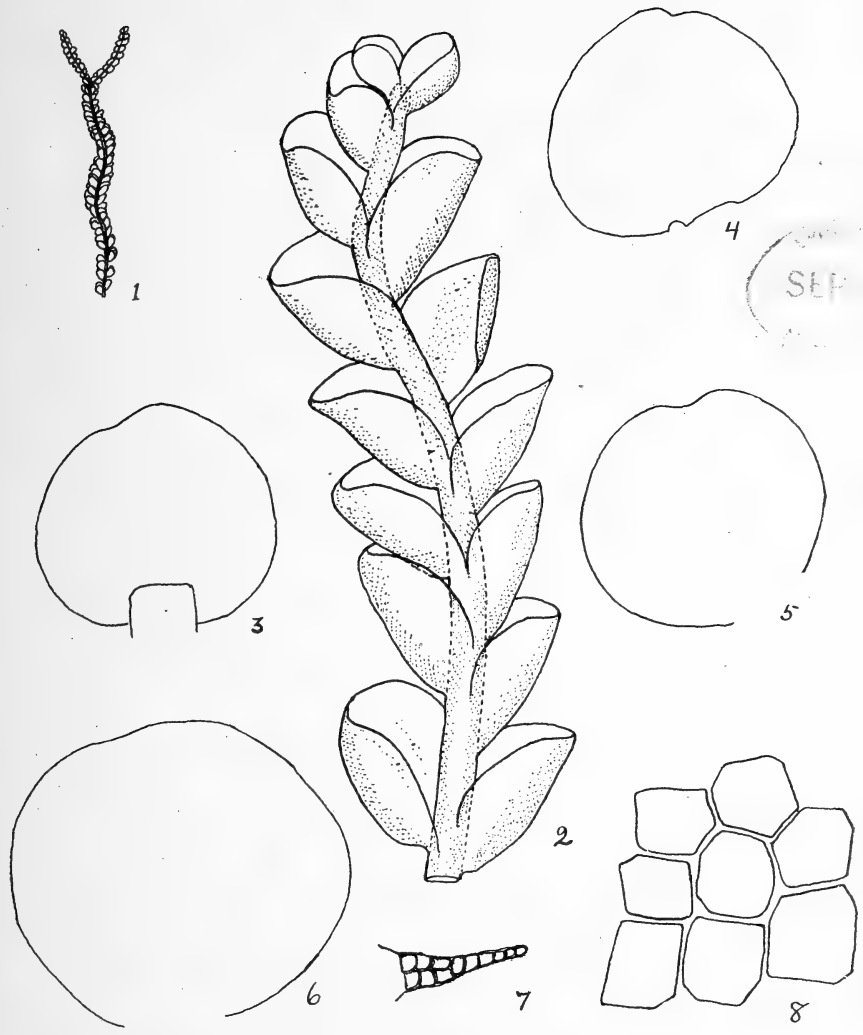
Growing in lax tufts; no flagella; medium size; dark reddish brown colour, upper branches almost black. Stem flexuose, simple or dichotomously branched; branches 2 to 5 arising from apex of stem; rootlets few, short, discoloured. Leaves imbricate, below somewhat distant, subsecund, amplexicaul, erecto-patent to erect, orbicular, some slightly retuse; texture flaccid; cells medium size, quadrate, walls thin, trigones absent or minute. Bracts similar to the leaves.

Only one immature perianth seen, free from bracts, very small, obovate, upper portion with 5 obtuse angles. No ♂ plants seen.

Dimensions: Stems 1 to 1⅓ inches long. Leaves 1.6 mm. x 1.7 mm—1.1 mm. x 1.3 mm.—1.2 mm. x 1.3 mm.; base of leaf 0.1 mm. thick; cells 0.04—0.03 mm. in diameter.

Habitat: In slow running water, 4,000 ft., Sissons, California. Collector, George M. Pendleton, 4th August, 1917.

Observations: This plant was sent to me under the name of *Jungermannia cordifolia* Hook., from which it differs in its orbicular leaves, broader than long, and larger cells with thin walls. The most remarkable character of the species is the thickened base of the leaves, the leaves being two cells thick up to four cells from the base. The two layers are not regularly arranged cell on cell, but cross each other.



W. H. P. del.

APLOZIA PENDLETONII Pearson

I have pleasure in naming this unique species after its discoverer, especially as Pendleton, a small town near Manchester, was my birthplace.

MANCHESTER, ENGLAND.

EXPLANATION OF PLATE II.

APLOZIA PENDLETONII PEARSON

Fig. 1. Plant, nat. size.
Figs. 3–6. Leaves, × 24.
Fig. 8. Portion of leaf, × 290.
Fig. 2. Portion of stem, × 16.
Fig. 7. Cross-section of leaf, × 50.

[Plate prepared for reproduction by O. E. J.]

GRIMMIA (GUEMBELIA) BREVIROSTRIS, SP. NOV.

R. S. WILLIAMS.

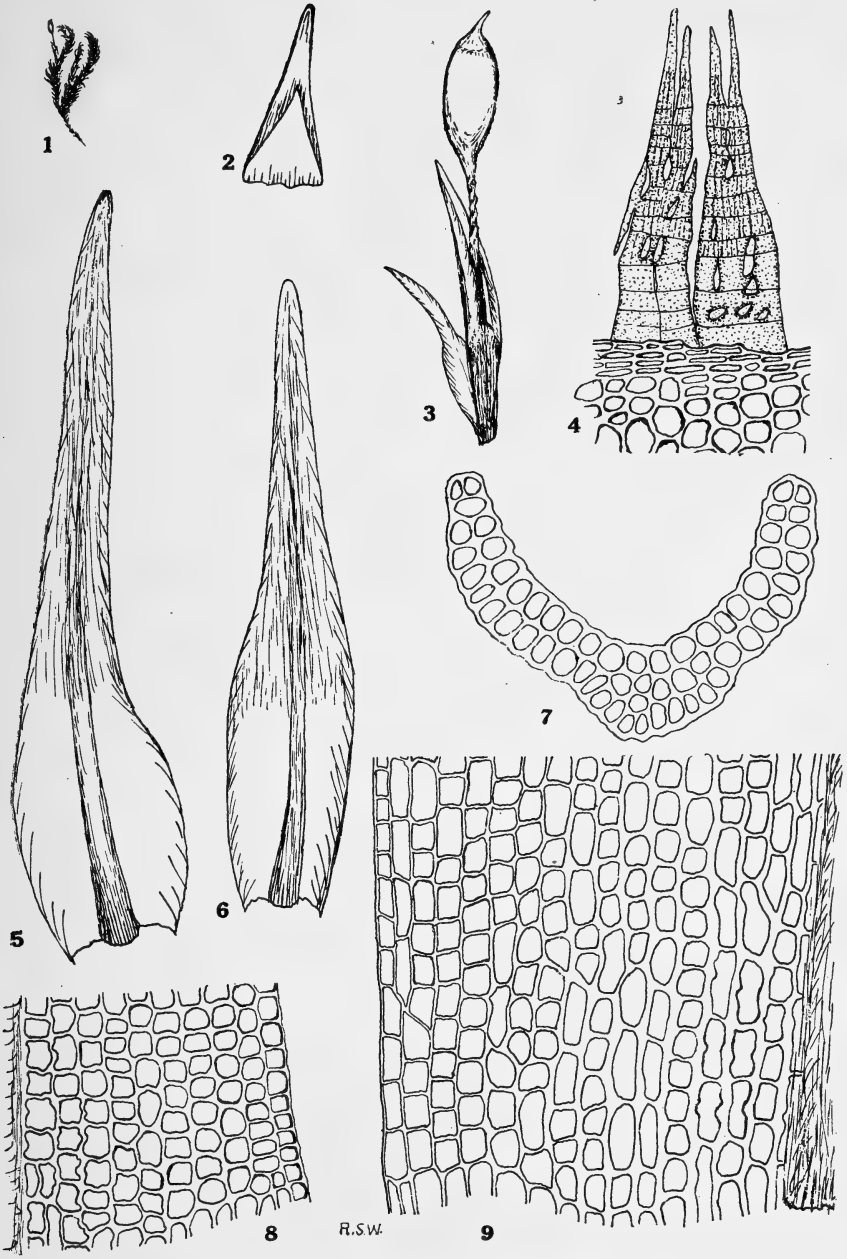
Dioicous, ♂ plants about like the fertile, with one or sometimes two widely separated flowers, the inner perigonial leaves ovate, shortly, often obtusely pointed, about 1 mm. long, the antheridia 0.6 mm. long, rather numerous, with paraphyses: in compact brownish mats darker within; stems 1 or 2 cm. high, sparingly radiculose below, with irregular branches; stem-leaves erect-spreading, somewhat flexuous when dry, scarcely changed or slightly more spreading when moist, oblong-lanceolate, about 2.5 mm. long, gradually narrowed to a stout apex without hair point, in cross-section showing a double layer of cells across upper part of leaf; costa about 50 μ wide below, indistinct above; upper leaf-cells rather obscure, somewhat roundish or quadratic, often slightly transversely elongate, scarcely differing two-thirds down leaf and mostly 6 to 8 μ in diameter, becoming toward base square or rectangular and up to about 8 μ wide and 20 μ to 40 μ long, the walls not or slightly sinuous and mostly thickened in the basal part of leaf toward the costa; perichaetial leaves about like stem leaves but slightly longer and more or less convolute, about 3.5 mm. long; seta straight or slightly curved, twisted when dry, 2.5 mm. long; capsule oblong, smooth, without stomata, slightly over 1 mm. long; annulus wanting; peristome teeth reddish or golden brown, about 60 μ wide at base and 200 μ high or more, irregularly split above and with narrow slits or paler, thinner areas, roundish to much elongate, extending nearly to base, the outer face smoothish or faintly striate, the inner minutely papillose; lid obliquely short-beaked, its height a little exceeding its basal diameter; calyptra cucullate; spores nearly smooth, about 8 μ in diameter.

Mountains near Buck's Valley, Plumas Co., Cal., at 5600 ft., on granite. Collected by J. B. Leiberg, July 1900, no. 5445.

NEW YORK BOTANICAL GARDEN.

EXPLANATION OF PLATE III.

Fig. 1. Plant about natural size.
2. Calyptra × 11.
3. Two leaves of perichaetium, seta and capsule × 11.
4. Part of peristome × 240.
5 and 6. Stem leaves × 35.
7. Cross-section above middle of leaf × 270.
8. Median leaf-cells × 270.
9. Basal leaf-cells × 270.



GRIMMIA (GUEMBELIA) BREVIROSTRIS Williams

THE MOSSES OF THE LAKE GEORGE FLORA

STEWART H. BURNHAM

(Concluded)

182. *Bryhnia Novae-Angliae* (Sull. & Lesq.) Grout. Huletts Lg. (Levy); on stones in a brook three miles south of Lake George, Oct., 1867 (Howe); Fort Edward, 1866 (Howe) in (CH), "leaves slightly papillose," also in (SH); Mt. Nebo; French Mt., determined by Mrs. Britton.

183. *Eurhynchium hians* (Hedw.) J. & S. Huletts Lg. (Levy); ground in woods, Moreau (Howe); southern W. Fort Ann, determined in part by both Mrs. Britton and Mr. Kaiser; marsh north of Glen Lake, determined by Miss Warner.

184. *Eurhynchium serrulatum* (Hedw.) Kindb. Ground in woods; frequent. Specimens have been determined by Mr. Kaiser.

185. *Eurynchium strigosum* (Hoffm.) B. & S. Ground in woods and moist rocks; common. Our plants are referable to var. *robustum* Roell.

186. *Oxyrhynchium rusciforme* (Neck.) Warnst. On rocks in streams. Huletts Lg. (Levy); Horse Heaven, west of South Bay village; W. Fort Ann; Big Hollow, Bakers Falls; Anthony Kill, Round Lake. Specimens have been determined by Mrs. Britton, Prof. Holzinger, and Mr. Kaiser. (*Eurhynchium rusciforme* (Neck.) Milde; *Rynchostegium rusciforme* B. & S.)

187. *Cirriphyllum Boscii* (Schwaegr.) Grout. Lake George (Hulst); Fort Edward, sterile (Howe). N. Y. State Cab. Rep. 20: 410. 1867, as *Hypnum Boscii* Schwaegr. Falls in Bond Creek, Moss Street, north of Hudson Falls; Willard Mountain.

188. *Cirriphyllum piliferum* (Schreb.) Grout. "Fort Edward, woods back of Institute." Exceedingly rare. (Howe). N. Y. State Cab. Rep. 19: 59. 1866, as *Hypnum piliferum* Schreb. The Fort Edward specimens in (CH) have been verified by Dr. Grout. Devines woods, Vaughns. May 10, 1913, determined by Mr. Kaiser who says, "rare and local. A desirable moss."

189. *Camptothecium nitens* (Schreb.) Schimp. Cold bogs and sphagnum swamps. Fort Edward (Howe) in (CH) and (SH). N. Y. State Cab. Rep. 19: 62. 1866, as *Hypnum nitens* Schreb. "(a) Peat bogs near Fort Edward" (Howe) in Bryol. Europ. 6: t. 622, also in Lesquereux & James, Mosses of North America, page 334. Dr. B. D. Gilbert refers to these specimens in BRYOL. 8: 94. Sept. 1905. Roadside bogs south of South Bay village, determined in part by Mr. Kaiser; Rich's swamp near Shushan.

Camptothecium nitens var. **falcatum** (Peck) n. comb. "Fort Edward. A remarkable form with curved branches and secund falcate leaves." (Howe). N. Y. State Cab. Rep. 22: 105. 1869. Dr. Howe's specimens are in the (SH). These specimens were from Moreau, Saratoga county: but in Bryol. Europ. VI: t. 622 they were erroneously referred to "(b) New Baltimore, Saratoga Co., "var. Foliis secundis subfalcatis." New Baltimore is in Greene Co., N. Y.

190. *Climacium americanum* Brid. Shaded damp places on earth, rocks and logs; abundant.

191. *Climacium dendroides* (L.) W. & M. Swampy banks in deep shade, Fort Edward, rare (Howe) in (CH) and (SH); west of Shushan, in swamps both south and north of Scotch Hill schoolhouse, Apr'l 4, 1907, fruiting (Dobbin); bog north of Clarks Pond, in fine fruit, Sept. 21, 1907, and Sept. 11, 1909, determined by Miss Annie Lorenz. Specimens from Clarks Pond are in the (GH).

192. *Climacium Kindbergii* (R. & C.) Grout. Lake George (Hulst); bogs and wet places, southern W. Fort Ann; Bacon Pond, determined by Mr. Kaiser; bog north of Clarks Pond and wet woods southwest of Shushan.

193 *Porotrichum alleghaniense* (C.M.) Grout. Northern Washington county, determined by both Mrs. Britton and Prof. Holzinger; falls West Brook, W. Fort. Ann. Horse Heaven, west of South Bay village.

194. *Drepanocladus aduncus* (Hedw.) Warnst. "Trout Lake near Lake George." (Lesquereux). "Fort Edward" (Howe) N. Y. State Cab. Rep. 19: 61. 1866, as *Hypnum aduncum* Hedw. This moss is common in wet places and dessicated bottom of ponds.

Drepanocladus aduncus var. *falcatus* Ren. f. *subpiligera* Renauld. Huletts Lg. (Levy).

Drepanocladus aduncus var. *flexilis* Renauld. Podunk old iron mine in water; Mud Pond marsh margin, south of Glen Lake. Determined by Mr. Kaiser.

Drepanocladus aduncus var. *gracilescens* (Schimp.) Warnst. Cold rill in woods, east of Thompson's gravel-bed; bog in Farley's pasture, east of Tripoli; Vaughns in pasture bogs. Specimens have been determined by Mr. Kaiser

Drepanocladus aduncus var. *intermedius* (B. & S.) Roth. Huletts Lg. (Levy).

Drepanocladus aduncus, Group *pseudofluitans* Sanio. Wet pool bottom by roadside, north of Devines woods, determined by Mr. Kaiser; wet place on earth and old sticks, foot of Bacon Hill, two miles west of Fort Ann.

Drepanocladus aduncus, Group *typicum* Reb. Vaughns. Determined by Mr. Kaiser.

195. *Drepanocladus fluitans* (Dill.) Warnst. "Swamps and low grounds about Lake Champlain, common." (Lesquereux). N. Y. State Cab. Rep. 19: 61. 1866, as *Hypnum fluitans* L.; Crown Point gorge (Britton) in (GH); cool brook south of South Bay village; along Battenkill River, north of Shushan.

196. *Drepanocladus uncinatus* (Hedw.) Warnst. Huletts Lg. (Levy); Barber trail, Black Mt. on rocks; Pond brook west of W. Fort Ann P. O., determined by Mr. Kaiser; Anaquassacook hills.

Drepanocladus uncinatus var. *plumulosus* (B. & S.) Roth. Outlet of New Michigan Pond. Determined by Prof. Holzinger.

197. *Drepanocladus vernicosus* (Lindb.) Warnst R. C. Burnham's pasture, Vaughns, in wet pool bottoms. Determined by Mr. Kaiser who says "not by any means common—a desirable moss."
198. *Cratoneuron commutatum* (Hedw.) Roth. Huletts Lg. and Black Mt. (Jelliffe). Dr. Jelliffe in speaking of his trip to the summit of Black Mt., to Mrs. Britton, June 25, 1889, says; "*Hypnum commutatum* I think grew quite near the top of the mountain, on a side ledge, covering the ledge like a large mat, at least 100 feet across. It was a beautiful sight."
199. *Cratoneuron filicinum* (L.) Roth. Moist rocks and springy bogs in limestone regions; frequent.
200. *Calliergon cordifolium* (Hedw.) Kindb. Swamps and margins of pools; frequent. Specimens have been determined by Mrs. Britton, Prof. Holzinger, and Mr. Kaiser.
201. *Calliergon cuspidatum* (L.) Kindb. Swamps and grassy ditches. Crown Point gorge and Crown Point bay (Britton) in (GH); Lake George (Hulst); Fort Edward (Howe) in N. Y. State Cab. Rep. 19: 60. 1866, as *Hypnum cuspidatum* L. Dr. Howe's specimens from Fort Edward and from "waterholes near Kingsbury" are in (CH) and (SH). Hunters bridge, east of Glen Lake; foot of Sugar Loaf Mt. and east of Tripoli, determined by Mr. Kaiser.
202. *Calliergon giganteum* (Schimp.) Kindb. Pond hole, top of Sugar Loaf Mt.; determined by Mr. Kaiser, who says, "Your *Calliergon giganteum* can be very much more pinnate and robust than your material: but it is a good find. Note the conspicuous inflated basal cells of the leaves which easily separate it from *C. cordifolium*."
203. *Calliergon Schreberi* (Willd.) Grout. Shaded ground, rocks and banks; abundant.
204. *Campylium chrysophyllum* (Brid.) Bryhn. Moist ground and rocks and decayed wood in shaded places; common. Specimens have been determined by Prof. Holzinger and Mr. Kaiser.
205. *Campylium hispidulum* (Brid.) Mitt. Roots of trees, decayed wood and rocks in moist shady places. Huletts Lg. (Levy); Lake George (Hulst); southern W. Fort Ann; Vaughns, determined by Mr. Kaiser, who says "a desirable moss"; woods north of Cambridge.
206. *Campylium radicale* (Beauv.) Grout. Huletts Lg. (Levy); Fort Edward, decayed logs and sticks in woods (Howe) in (CH) as *Hypnum Bergenense* Aust.
207. *Campylium stellatum* (Schreb.) Bryhn. Huletts Lg. (Levy); Fort Edward (Howe) in (CH); pasture bogs, north of Vaughns.
208. *Amblystegium fluviatile* (Sw.) B. & S. Huletts Lg. (Levy).
209. *Amblystegium irriguum* (Wils.) B. & S. Huletts Lg. (Levy); rocky bed of Pond brook, east of W. Fort Ann P. O., determined by Mr. Kaiser.
210. *Amblystegium Juratzkanum* Schimp. Huletts Lg. (Levy); stones, Badham's (Brown's) pasture copse, Vaughns, Oct., 1913, determined by Mr. Kaiser, who says "in fine fruiting condition."

211. *Amblystegium Kochii* B. & S. Huletts Lg. (Levy); ground and logs in shaded places, Vaughns and vicinity, determined by Mr. Kaiser.

212. *Amblystegium orthocladon* (Beauv.) Kindb. Huletts Lg. (Levy); Fort Edward (Howe) in (GH); Schuylerville (Greenalch); Shushan on stones and bushes near or in water (Dobbin); Big Hollow, Bakers Falls, determined by Mr. Kaiser.

213. *Amblystegium riparium* (L.) B. & S. Earth rocks and roots of shrubs in pools and wet places; frequent. Mr. Kaiser says "*Amblystegium riparium* is extremely variable according to its more or less aquatic habitat." *Amblystegium riparium* var. *longifolium* (Schultz) B. & S. Bog north of Thompson's gravel-bed. Determined by Mr. Kaiser.

214. *Amblystegium serpens* (L.) B. & S. Moist ground, rocks and old logs. Huletts Lg. (Jelliffe) (Levy); Moreau) (Howe); DeRidder hill near Schuylerville (Greenalch); Shushan (Dobbin): cave on Nickerson farm, west of Fort Ann; Vaughns; swamp north of Glen Lake, determined by Mr. Kaiser; woods north of Cambridge.

215. *Amblystegium varium* (Hedw.) Lindb. Decaying wood, base of trees, earth and rocks in swamps and moist woods; frequent. Several collections determined by Mr. Kaiser.

Amblystegium varium approaching var. *oligorhizon* Lindb. Huletts Lg. (Levy).

216. *Hygrohypnum dilatatum* (Wils.) Loeske. Huletts Lg. (Levy).

217. *Hygrohypnum eugyrium* (B. & S.) Loeske. Huletts Lg. (Levy); falls, West brook, W. Fort Ann.

218. *Hygrohypnum ochraceum* (Turn.) Loeske. Huletts Lg. (Levy); Fort Edward (Howe) in (CH); Johnsburg (Peck); Luzerne, between Eping (Efner?) Lake and Corinth Lg. (Clinton) in (SH).

219. *Hypnum crista-castrensis* L. Earth, rocks and decaying logs, not infrequent in elevated regions, often under the shade of evergreen trees.

220. *Hypnum cupressiforme* L. Huletts Lg. (Levy).

221. *Hypnum curvifolium* Hedw. Huletts Lg. (Levy); Bolton (Jelliffe) in (GH); Fort Edward (Howe); DeRidder hill near Schuylerville (Greenalch); Shushan (Dobbin); road north of Mount Hope, determined by Mr Kaiser.

222. *Hypnum fertile* Sendt. Huletts Lg. (Levy).

223. *Hypnum Haldanianum* Grev. Decaying wood and ground in woods; abundant.

224. *Hypnum imponens* Hedw. Rotten logs, occasionally on rocks; abundant.

225. *Hypnum molluscum* Hedw. Rocks, ground and old logs in low woods. Fort Edward and Moreau (Howe) in (CH); southern W. Fort Ann, determined in part by Mrs. Britton and by Mr. Kaiser.

226. *Hypnum pallescens* (Hedw.) B. & S. Huletts Lg. (Levy).

227. *Hypnum patientiae* Lindb. Wet meadows, swamps and decaying wood in shaded places; common.

Hypnum Patientiae var. *americanum* (R. & C.) Heald. Huletts Lg. (Levy).

228. *Hypnum pratense* Koch. "Bogs around Lake George and Lake Champlain, sterile." (Lesquereux). N. Y. State Cab. Rep. 19: 62. 1866. Huletts Lg. (Levy).
229. *Hypnum recurvans* (Mx.) Schwaegr. Base of trees, rotten logs, earth and humus in low woods and swamps; frequent. Specimens have been determined by Mrs. Britton, Miss Warner, and Mr. Kaiser.
230. *Hypnum reptile* Mx. Decaying logs, base of trees and rocks. Huletts Lg. (Levy); Lake George (Hulst); Luzerne (Clinton) in (SH); Shushan (Dobbin); southern W. Fort Ann; Vaughns; west of Smiths Basin. Several collections determined by Miss Warner and by Mr. Kaiser.
231. *Raphidostegium adnatum* (Mx.) B. & S. Huletts Lg. (Levy).
232. *Raphidostegium carolinianum* (CM.) J. & S. Huletts Lg. (Levy).
233. *Plagiothecium denticulatum* (L.) B. & S. Moist rocks and cliffs, roots of trees, decayed wood and ground; abundant.
Plagiothecium denticulatum forma *propagulifera* Ruthe. Old well, Haynes pasture, northeast of Vaughns. Determined by Mrs. Britton.
234. *Plagiothecium deplanatum* (Schimp.) Grout. Rocks and clayey soil in woods; infrequent. East of Thompsons gravel-bed; Vaughns. Determined by both Mrs. Britton and by Mr. Kaiser. Specimens are in the (SH).
235. *Plagiothecium elegans* (Hook.) Sull. Crown Point gorge (Britton) in (GH); Huletts Lg. (Levy).
236. *Plagiothecium laetum* B. & S. Huletts Lg. (Levy).
237. *Plagiothecium Muellerianum* Schimp. Huletts Lg. (Levy).
238. *Plagiothecium pulchellum* (Dicks.) B. & S. Huletts Lg. (Levy).
239. *Plagiothecium Roeseanum* (Hampe) B. & S. "Near Lake George." (Lesquereux) in N. Y. State Cab. Rep. 19; 64. 1866, as *Hypnum Sullivantiae* Schimp. Trunks of trees, lower falls, N. Beaver creek, Vaughns; and roots of pines, swamp woods north of Glen Lake. Determined by Mr. Kaiser.
240. *Plagiothecium striatellum* (Brid.) Lindb. Huletts Lg. (Levy); Shushan on rotten logs (Dobbin); falls, West brook, W. Fort Ann, determined by both Mrs. Britton and Mr. Kaiser.
241. *Plagiothecium sylvaticum* (Huds.) B. & S. Huletts Lg. (Levy); Shushan on moist rocks (Dobbin); Black Mt.; Vaughns; Round Lake; Wilburs Basin.
242. *Plagiothecium turfaceum* Lindb. Huletts Lg. (Levy); "Ground and old logs in woods. Fort Edward." (Howe) in N. Y. State Cab. Rep. 22:58 1869. Dr. Howe's specimens are in (CH). Black Mt., determined by Miss Warner; Ballston Lake; woods south of Shushan on old stumps.
243. *Amblystegiella adnata* (Hedw.) Nichols. On stones and trunks of trees; frequent. Several collections determined by Mr. Kaiser.
244. *Amblystegiella confervoides* (Brid.) Loeske. Huletts Lg. (Levy).
245. *Entodon cladorrhizans* (Hedw.) CM. Rocks, decayed wood and roots of trees. Huletts Lg. (Jelliffe); Fort Edward (Howe) in (CH); southern W. Fort Ann; Vaughns; northwest Hartford; Shushan.

246. *Entodon seductrix* (Hedw.) CM. Habitat similar to that of the preceding species. Dresden (Peck); cliffs south of South Bay village; and elsewhere with the preceding species.
247. *Platygyrium repens* (Brid.) B. & S. Huletts Lg. (Jelliffe) (Levy); Shushan on rotten wood (Dobbin), determined by Miss Warner, Dr. Grout, and Mr. Kaiser; old logs, east of Tripoli and northeast of Vaughns, determined by Mr. Kaiser.
248. *Pylaisia intricata* (Hedw.) R. & C. Huletts Lg. (Levy).
249. *Pylaisia polyantha* (Schreb.) B. & S. Huletts Lg. (Levy).
250. *Pylaisia Schimperi* R. & C. Trunks of trees, ground and rocks; frequent.
251. *Anacamptodon splachnoides* (Froel.) Brid. Knotholes and cavities of deciduous trees. Bolton (Levy); Fort Edward (Howe) in (CH); Rich's swamp near Shushan (Dobbin); Peaked Mt., determined by Mrs. Britton; Vaughns.
252. *Leucodon brachypus* Brid. Dresden (Peck); Shushan on stone wall (Dobbin); fallen beech trunk, Farley's (Vaughn's) woods, Vaughns; trees, Anaquassacook hills.
253. *Leucodon julaceus* (Hedw.) Sull. Huletts Lg. (Levy); northern Washington county, determined by Prof. Holzinger; trees, bog north of Clarks Pond.
254. *Leucodon sciuroides* (L.) Schwaegr. Huletts Lg. (Levy).
255. *Forsstroemia trichomitria* (Hedw.) Lindb. Shushan on trees (Dobbin).
256. *Homalia Jamesii* Schimp. Cold Spring opposite to Huletts Lg. (Jelliffe) in (GH). Dr. Jelliffe told Mrs. Britton, Sept. 22, 1889, "*Homalia* I cannot find in any quantities this year."
257. *Neckera pennata* (L.) Hedw. Trunks of trees, usually in upland woods. Blue Mt. Lake (Knight) in (CH); Huletts Lg. (Levy); Fort Edward (Howe); Shushan (Dobbin); Hague.
Neckera pennata var. *oligocarpa* (Bruch) Grout. Crown Point gorge (Britton) in (GH); Huletts Lg. and Cold Spring (Jelliffe). Dr. Jelliffe wrote Mrs. Britton, Sept. 22, 1889, that "the *Neckera*" was "extremely abundant, entirely covering the under sides of the rocks that make up what is called Deer's Leap just opposite Huletts Landing."
258. *Fontinalis dalecarlica* B. & S. Cold Spring, South Bay; Mt. Nebo.
259. *Fontinalis gigantea* Sull. Cold streams in elevated regions. Peaked Mt. ravine and Big Notch, north; ravine south base of Sugar Loaf Mt.; Fly Kill, south of Shushan.
260. *Fontinalis Lescurii* Sull. Crown Point gorge (Britton) and Lake George (Hulst) in (GH); Huletts Lg. (Levy); Vaughns on rocks and soil in creeks and ditches, determined by Mr. Kaiser.
261. *Fontinalis novae-angliae* Sull. Huletts Lg. (Jelliffe) in (CH), also (Levy); Shushan, rocks in Fly Kill (Dobbin), determined by Dr. Peck, also mentioned in Am. Bot. 17: 36. May, 1911; Black Mt.; rocky streams, road north of Putnam mountains, determined by Mr. Kaiser; Peaked Mt. ravine.

262. *Fontinalis Sullivantii* Lindb. Huletts Lg. (Levy).

263. *Dichelyma capillaceum* (L.) B. & S. Fort Edward (Howe) in (CH); swamp south of Shushan, on submerged bushes (Dobbin); bog north of Thompsons gravel-bed and wet place in woods south of Sugar Loaf Mt., base of shrubs in shallow water.

HUDSON FALLS, N. Y.

TWO PUBLICATIONS ON TROPICAL AMERICAN LICHENS

L. W. RIDDLE

There have come to my attention within the past year, two publications describing a large number of new lichens from Mexico and the West Indies. As neither publication is likely to have a general distribution, it seems desirable to call attention to them by means of this review.

The first is a folio brochure of 31 pages published independently in Mexico City, in 1914, with the title: "Lichens du Mexique (Etats de Puebla et du Michoacan) recueillis par le Frere Arsène Brouard" by Dr. M. Bouly de Lesdain. This is an enumeration of 226 species of Mexican lichens collected mainly by Brother Arsène, but also by Brother Nicolas and Brother Amable. Sixty-five species are described as new. Latin diagnoses are given in each case, but there are no indications of the relationships of the species, and no critical notes. The generic affinities of the new species are as follows (in cases where the nomenclature and generic limitations differ from those of Engler and Prantl, the latter names are given in parenthesis): Eight species are described as new in *Buellia;* 5 each in *Parmelia, Lecanora, Pertusaria;* 4 in *Lecidea;* 3 each in *Rinodina, Acarospora, Catillaria, Placodium* (*Caloplaca* in part), and *Arthothelium;* 2 each in *Physcia, Caloplaca, Aspicilia* (*Lecanora* in part), *Blastenia, Psora* (*Lecidea* in part), and *Staurothele;* one each in *Nephromium, Heppia, Pyrenodesmia* (*Caloplaca* in part), *Lecania, Megalospora, Bilimbia, Bacidia, Toninia, Arthonia, Arthopyrenia* and *Collema.*

The second publication forms Part 7 of the Annales Academiae Scientiarum Fennicae, Series A, volume 6 (Helsingfors, Finland, 1915). This Academy was founded in 1911, and must not be confused with the well-known Societas pro fauna et flora Fennica. So far as I am aware, the annales of the new Academy are received currently in this country only at the Smithsonian Institution. The "Parts" of the volume are paged separately. Part 7 is entitled "Additamenta ad Lichenographiam Antillarum illustrandam" by Edvard Wainio, probably the greatest living authority on the lichens of tropical America. His "Lichenes Antillarum" was published in the London Journal of Botany in 1895–1896.

The present paper is 226 pages in length and enumerates a large number of interesting species and varieties from the American Virgin Islands, Guadeloupe, Trinidad, Jamaica, St. Domingo, and a few of the smaller adjacent islands. The material was collected for the most part by C. Raunkiaer, F.

Boergesen, and H. F. A. Eggers. One hundred and eleven new species are described and also a considerable number of new varieties. Important synonymy is indicated and there are some nomenclatorial changes. The generic affinities of the new species are as follows: 12 in *Graphis* (including *Graphina*, *Phaeographis*, and *Phaeographina*); 11 in *Pertusaria;* 9 each in *Buellia* and in *Arthonia* (including *Arthothelium* and *Allarthothelium*); 7 in *Porina;* 5 each in *Placodium* (*Caloplaca*, *Blastenia*), *Thelotrema* (including *Leptotrema* and *Ocellularia*), and *Pyrenula* (including *Melanotheca*); 4 in *Arthopyrenia;* 3 each in *Parmelia*, *Rinodina*, *Lecidea* (including *Catillaria* and *Lopadium*), and *Chiodecton;* 2 each in *Lecanora*, *Pyxine*, *Leptogium*, *Collema*, *Pyrenopsis*, *Psorotrichia*, *Thelenella* (including *Microglaena*), and *Pseudopyrenula* (*Trypethelium*); one each in *Usnea*, *Eumitria* (*Usnea*), *Physcia*, *Peltigera*, *Pannaria*, *Coccocarpia*, *Physma*, *Synalissa*, *Lecanactis*, *Spirographa*, *Opegrapha*, *Bottaria* (*Anthracothecium*), *Pyrenastrum*, *Parathelium*, *Microthelia*, and *Mycoporum*.

Harvard University, Cambridge, Mass.

NOTES ON CURRENT BRYOLOGICAL LITERATURE

In a recent issue of the contributions from the National Herbarium, Dr. Evans[1] published a monographic treatment of the genus *Asterella* (*Fimbriaria*), recognizing 15 species, and discussing five doubtful ones. The paper includes a historical introduction to the genus, nine pages of morphological notes, and a full description of all species known to occur in North America, with their exact distribution, in the latter including extra-limital ranges. *Asterella saccata* (Wahl.) Evans and *A. venosa* (L. & L.) Evans are new combinations, and *A. rugosa* Evans, *A. reticulata* Evans, and *A. versicolor* Evans, are proposed as new species.

In the last two issues of Broteria to come to hand, Father Luisier[2] continues his catalogue of the Maderian mosses, covering the genera *Orthotrichum* to *Thamnium*. The accompanying plate figures species described in the previous, fourth, article of the series, the present ones being the fifth and sixth. There are no new forms described, but many valuable discussions are given under the individual species, as well as reprints of original descriptions and material from works difficult of access. Special note should be made of the treatment of *Ulota calvescens*, *Funaria Fritzei*, *Pohlia proligera*, *Bryum serrulatum*, *Pogonatum subaloides*, *Neckera intermedia*, and of the genera *Haplodontium*, *Leucodon*, *Brachymenium*, and *Echinodium*.

The two issues of the *Revue Bryologique*, noticed elsewhere in this issue, which make up the end of the forty-first volume, contain the conclusion of Mr. Ingham's Catalogue of the Mosses and Hepatics of the Magnesian Limestone

[1] Alexander W. Evans. The North American Species of Asterella. Cont. U. S. Nat. Herb. **20**[8]: 247–312. 1910.

[2] A. Luisier. Les Mousses de Madere. Broteria **17**: 49–66, 112–142. pl. 1. (1919.)

of West Yorkshire; note upon *Cephalozia* by Ch. Douin; Corbiere: Two mosses common to France and Africa (*Grimmia Pilardi* Corb. and *Fissidens Moureti* Corb.); Potier de la Varde: Observations on *Fissidens*, confined mostly to a discussion of *F. tamarindifolius*, with two illustrations; and a long list of recent publications upon European Mosses.

E. B. Chamberlain.

MISCELLANOUS NOTES

Dr. John M. Holzinger has just issued the sixteenth fascicle, numbers 376 to 400, of his Musci Acrocarpi Boreali-Americani. Among other interesting specimens we note the following: *Nanomitrium grandifolium* (C. M.) Broth., a moss originally described from Ule's collections in Brazil, and here reported for the first time from North America; *Grimmia atricha* C. M. & Kindb., from Minnesota; *Grimmia torquata* Hsch., c. fr., from Mr. Leiberg's collection at Lake Pend d'Oreille; *Dicranella squarrosa* (Starke) Schimp.; *D. subinclinata* Lorenz from Florida; *Dicranum bonjeani alatum* Barnes; *Bryum crassirameum* R. & C. from Washington; *Campylopus gracilicaulis* Mitt., and *Barbula Closteri* Austin, both of these last being due to the industrious collecting of Mr. Rapp, of Sanford, Fla. We trust that Dr. Holzinger may be able to continue to issue the fascicles of his exsiccati in the future, now that conditions are becoming more favorable. It is also to be hoped that collectors and students will keep in mind the opportunity they have of helping him by securing suitable material.

E. B. Chamberlain.

NOTICE REGARDING THE HEPATIC EXCHANGE

Mr. Brinkman desires to call to the attention of the members of the Moss Society the following:

Will all interested in an Hepatic Exchange please write Mr. A. H. Brinkman, Dowling Lake, Alberta, Canada, so that he may forward to each in turn the booklet containing the list of oblata and desiderata, for checking. It is hoped that many will make use of this opportunity, as it is probable that enough material will be sent in so that specimens may be furnished members who are not in a position to offer very much, yet would appreciate a few named packets for comparison, as a help in further study.

SULLIVANT MOSS SOCIETY NOTES

The Secretary of the Moss Society regrets very much that at the present time it should be necessary to record so many losses in the membership of the Society. Word has only recently arrived of the death of Dr. Ingebrit Hagen, the distinguished bryologist of Trondhjem, Norway, which occurred in early

June, 1917. Dr. Hagen had been a member of the Society since 1903, and had contributed several scholarly articles to the BRYOLOGIST. He had most generously shared his extensive duplicates with the members through the exchange columns. See article by Dr. Andrews in this issue of THE BRYOLOGIST.

Mr. E. C. Wurzlow, of Houma, La., whose death last October has already been noted, was County Clerk of Terrebonne Parish for many years. Mr. Wurzlow had always been especially interested in Natural History and had accumulated an extensive local collection, with especial attention to insects and plants.

It is with a sense of personal loss that the Secretary records the death in June, 1920, of Miss Mary F. Miller of Washington, who had been a member of the Society since 1902, was Secretary from 1904–05, and Curator of the Lichen Department from 1908–12, inclusive. See article in this issue by Mrs. Smith.

Another of the older members left us with the death of Mr. Frank E. McDonald, one of the Charter Members of the Society. Mr. McDonald was for more than thirty-five years a clerk in the Railway Mail Service, and endeared himself to all with whom he came in contact. The Secretary wishes that space permitted him to reprint some of the affectionate tributes that have been published by the Railway Mail Clerks' Association. Mr. McDonald had always been interested in botany and during the course of his life had accumulated a large herbarium; the flowering plants alone, numbering some 15,000 specimens, were some years ago given to the University of Illinois, whither the other portions of his collection will probably go. The Secretary recalls with much pleasure his correspondence with Mr. McDonald, whose time was always at the service of those whom he could help. By his enthusiasm and cooperation he contributed much to making the early years of the Moss Society so full of inspiration for those who were working against difficulties to keep the Society going.

The Secretary regrets very much to inform the members of the Society that, because of failing health and increasing age, Prof. John Macoun has felt it necessary to sever his connection with us. He writes: "Owing to age and the death of my eldest son, my love for the past is fast ebbing away, and I feel that it is useless for me to keep up old habits. I shall be ninety in April, and can't expect many more years to live."

The following changes in address have come to the attention of the Secretary recently:

Mr. A. T. Beals.....2929 Broadway, New York City
Mrs. Laura A. Carter.....39 McGrath St., Laconia, N. H.
Dr. Albert C. Herre.....Bureau of Science, Manila, P. I.
Rev. S. M. Newman....c. o. Mr. W. W. Cook, Winthrop Place, Englewood, N. J.

NEW MEMBERS

Mr. George L. Moxley.....1964 East First St., Los Angeles, Cal.
Mr. Charles Potter.....682 E. Burnside St. Portland, Ore.

The Secretary is very happy to notice that the Revue Bryologique, our elder sister in the bryological field, is again in course of publication. The Revue suspended at the outbreak of the war, but an issue marked "Nr. 5. 1914," appeared late in 1919, and now there comes the Number 6 for the same year, with

the notice that M. Husnot, the veteran editor, hopes to issue the full six issues for the forty-second volume before the end of 1920. It has been necessary to increase the price to 13 francs for subscribers outside of France; subscriptions should be sent, as formerly, to Mons. T. Husnot, Cahan, par Athis (Orne), France.

E. B. C.

EXCHANGE DEPARTMENT

To Society members *only*. Return postage, rather than a stamped envelope should accompany request.

Rev. H. Dupret, Seminary of Philosophy, Montreal, Canada.—*Dicranum alatum* (Barnes) R. & C., c. fr., from near Montreal.

Mr. E. B. Chamberlain, 18 West 89th Street, New York City.—*Barbula paludosa* Schleich., st., from Switzerland, coll. Rev. P. G. M. Rhodes.

Dr. Albert C. Herre, Bureau of Science, Manila, P. I.—*Dendrographa minor* (Tuck.) Darb.; *Dermatocarpon miniatum* (L.) Mann; *Diploschistes scruposus* (L.) Norm.; *Evernia prunastri* (L.) Ach.; *Letharia vulpina* (L.) Wain.; *Xanthoria lychnea* (Ach.) Th. Fr.

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GEORGE N. BEST, M.D. JOHN M. HOLZINGER, M.S.

ALEXANDER W. EVANS, Ph.D. LINCOLN W. RIDDLE, Ph.D.

and the

Advisory Board Officers of the Society

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All material for identification should be sent to the respective curators. All matter relative to offerings should be sent to the Editor, or to the Secretary

THE BRYOLOGIST

VOL. XXIII SEPTEMBER, 1920 NO. 5

CONTRIBUTIONS TO ANTARCTIC BRYOLOGY

H. N. DIXON

MOSSES OF DECEPTION ISLAND

Deception Island is a rarely visited island of the South Shetlands, in Lat. 63° S., Long. 60° 30′ W., closely adjoining the Antarctic continent (Graham Land). Up to the present century it had been very little visited, and only two plants were known from it, an unnamed moss and a lichen.

The island is about 5 miles across, and the whole of the interior is formed by a vast crater, into which the sea has irrupted; this is hidden from view except at the one point where this inland sea is connected with the Antarctic Ocean by a narrow channel; the surroundling cliffs are high, steep and rugged, so that until carefully explored it has all the appearance of being a solid mountainous island, instead of being, as it really is, a mere shell of mountain wall surrounding the great sea-filled crater. Hence the name, Deception Island. A full and interesting, albeit somewhat weird account of the island is given by Foster in his narrative of the Voyage of H. M. Sloop *Chanticleer* (1828–30), from the Journal of the ship's surgeon W. H. B. Webster.

The whole island is nothing more or less than the cone of a gigantic volcano, and traces of activity still remain. The interior of the cliffs, some 1600 ft. high, are scored with small watercourses, arising from springs, the temperature of which is about 185° F., or even higher. A small lagoon is in one place almost cut off from the main interior basin, only communicating with it by a very narrow outlet; this lagoon is over 200 fathoms in depth, and is partly or entirely filled from the water flowing from the hot springs; its temperature must therefore be considerably above that of the main body of water, which itself is of a temperature slightly but appreciably above that of the surrounding ocean. We have therefore a condition of things probably unique in phyto-geography, viz., an absolutely isolated area, partly aquatic and partly terrestrial, capable of supporting many of the lower forms of life, but one which has been separated from any adjoining regions for what must have been, even geologically, a long period, since the whole of the surrounding area is constantly under perhaps the most severely frigid conditions existing anywhere on the surface of the earth. It seems eminently desirable that the fauna and flora of this remarkable biological preserve should be studied as exhaustively as possible.

The July number of THE BRYOLOGIST was published September 17, 1920.

The Island was visited by the "Pourquoi pas," under Charcot, in the French Antarctic Expedition of 1908–10, and a certain amount of biological examination made. That this was not exhaustive, at any rate in certain directions, is, however, clear from the fact that the two biologists attached to the Expedition, MM. Gain and Gourdon, collected only two mosses, viz., *Grimmia antarctici* Card., and *Philonotis Gourdoni* Card. sp. nov., while the present collection, made by a non-botanist, and only a small portion of which has been examined, consists of eight species.

The collection was sent to me by Rev. D. Lillie, who has had numerous collections of mosses sent him from the Southern parts of S. America, by Mr. J. Hamilton. Mr. Hamilton engaged the interest of a friend of his, Mr. James Robins, who was being sent to Deception Island during the war to carry out a piece of naval work, and Mr. Robins collected what mosses he could during his stay there. Mr. Robins gives a graphic description of the surroundings, "hot water and mud spouting out of the ground, and only a few feet away eternal ice" . . . "thirty yards away from the salt water there is a lagoon about 500 yards in diameter, and we sounded this and got no bottom at 200 fathoms. This is warm water, and above this there is a mountain about 1,500 ft. high which has no ice, and it was here in the warmth and shelter I found the green piece of moss."

Mr. Hamilton forwarded the bulk of the moss collected to Mr. Lillie, but he reckoned without his submarines and the packet never arrived! Fortunately he had retained some small portions, and these being sent on later met with a happier fate and arrived safely. I found among them eight species, one being new to science, and I now give the list of these:

Didymodon gelidus Card. No. 447. I have seen no specimen of this species, which has only been recorded from its original station on the Antarctic continent (Card. in Nation. Antarct. Exped., Musci., p. 4). The present plant differs from the description and figures in one, and I think only one respect, in that the leaves are here all obtuse, in varying degrees, while in that they are "acuta obtusulave," The single difference, slight also as it is, cannot I think be held to outweigh the agreement on all other points.

Tortula grossiretis Card. forma aut var.?. No. 448.

I name this with some hesitation; it is a weak, soft, somewhat succulent plant, with fragile leaves, having plane margins, cells 13–18 μ. wide, obscure, highly papillose, with the upper margin often somewhat erose. The nerve is rather weaker than in *T. grossiretis* from S. America, but that is in accord with the generally weak state of the plant, some leaves agreeing exactly with the normal plant. On the other hand the cells are not quite so large as in *T. grossiretis*, which moreover has the margins normally recurved. I suspect that the plant recorded by Cardot with some slight doubt, as *T. monoica* Card., from Graham Land (Fl. Bryol. des Terres Magellaniques, &c., p. 270) may be the same thing. Both plants were sterile.

Grimmia antarctici Card. No. 450. Only some small tufts, but in nice fruit. It agrees well with specimens of this species sent me by Cardot from Deception I. itself.

Bryum algens Card. Two of the numbers, 449 and 453, no doubt belong here, the former being a starved form. Both were sterile.

Bryum crateris Dixon sp. nov.

§Inclinatiformia. *B. imperfecto* Card. antarctico paullo, nec arcte affine. Dense caespitosum, laete viride, vix nitidum, infra fuscum., circa 2cm. altum, gracile. Folia caulina saepius comata, innovationum autem magis aequaliter inserta; sicca erecta, adpressa, nullo modo contorta; comalia 2–2.5 mm. longa, *ovato-lanceolata*, sensim acuminata, marginibus valde recurvis, *integerrimis*, anguste haud distincte limbatis. Costa sat valida, saepe rubella, in cuspidem validiusculum acutum integrum excurrens. Areolatio leptodermica, e cellulis inanibus, pellucidis, hexagono-rhomboideis, circa 60 μ. longis 12–15 μ. latis, instructa.

Synoicum; antheridia, ut videtur, pauca. Theca *vix exserta*. Seta perbrevis, circa 1 cm. longa, *supra flexuosa*, *saepe cygneo-decurva*, tenuis. Theca circa 3 mm. longa, e collo bene distincto turgide pyriformis, pallide fusco-straminea; operculum conico-apiculatum. Exothecii rete valde leptodermicum, e cellulis irregulariter hexagono-rectangularibus, orificium versus parum minoribus instructum. Spori 18–28 μ, saturate virides. Peristomium variabile; externi dentes aurantiaci vel pallidi, inter se remotiusculi, inferne anguste hyaline marginati tenuissime striolati, striolis nunc horizontaliter, nunc longitudinaliter, nunc oblique ordinatis; linea media irregularis, lamellae *remotae*, *paucae*, *tenerae*. lamellae internae *circa 10–12*, valde prominentes; dentium apices hyalinae, laeves. Peristomium internum e membrana pallida *humili* processubus dentibus aequilongis plerumque *tenuissimis* per totam longitudinem fere *valde fenestratis*. Cilia nulla.

Nos. 451; 452; the latter sterile..

Species propria, *B. imperfecto* Card. forsan affine, sed foliis multo angustioribus, atque structura peristomii longe aliena

The processes vary considerably, being usually extremely delicate and filiform; at times they are rimose to the base.

Polytrichum alpinum L. Nos. 455, 456. Sterile.

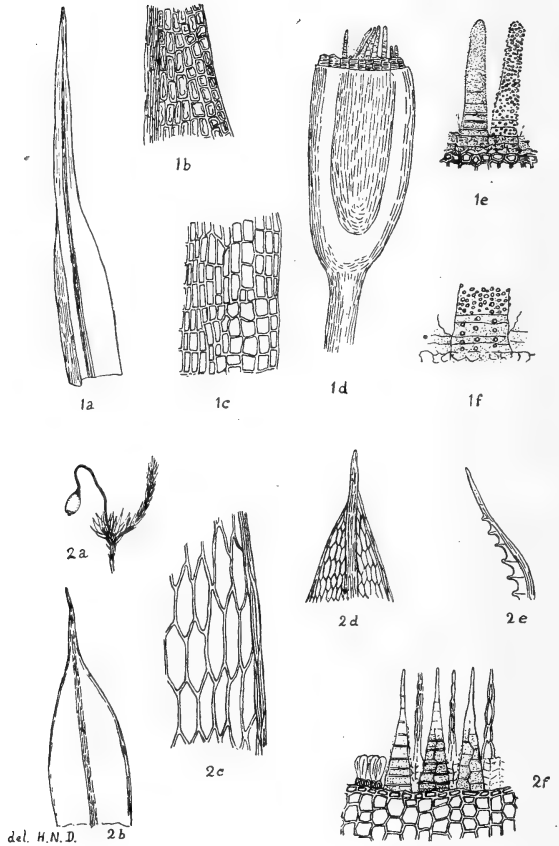
Polytrichum subpiliferum Card. No. 454.

Fragments only found, hence not showing the white tomentum at base of stems but it agrees in other respects. The short hair-point, reddish below, white above, and the smooth back of the leaf, are the principal characters separating it from *P. piliferum*.

Brachythecium Skottsbergii Card. No. 446. This seems undoubtedly to agree with the description and figures. *B. antarcticum* var. *cavifolium* Card. differs in the more concave, less plicate leaves, and wider acumen, but the two must be very near one another.

Mosses from South Georgia

The following list of mosses is drawn up from a collection sent me by Rev. D. Lillie also received by him from Mr. J. Hamilton, in 1919. The name of the



VERRUCIDENS INTERMEDIUS DIXON. Fig. 1 (1a–1f).
BRYUM CRATERIS DIXON. Fig. 2 (2a–2f).

collector is not given. Although the collection consists of less than 20 numbers, it contains two new species, one of especial interest.

Cardot enumerates 93 species for this group of islands, of which 42, or about 45%, are considered to be endemic.

Andreaea subremotifolia Dixon sp. nov.

Caespites laxi, facile dilabiles, caules 3–4 cm. alti, pergraciles, debiles. Planta *mollis* supra fusco-purpurea, interne fusca. Folia caulina *invicem laxe conferteque* ordinata, hic illic ramulis flagellaceis parvifoliis intermixtis.

Folia eis *A. remotifoliae* similia, *suberecta autem nec late patentia*, apice saepe incurvo, cellulis, *nullo modo fortiter incrassatis*, basilaribus *brevibus*, perpaucae solum juxtacostales infimae breviter lineares, marginales inferiores seriebus multis subquadratae. Cetera ignota.

No. 544. This is certainly nearest to *A. remotifolia* Dus., but equally certainly is distinct both in habit and structure. *A. remotifolia* has the leaves lax and widely spreading both moist and dry, the upper cells are highly incrassate, and the basal ones also incrassate and considerably elongate. The cells here are of quite a different character.

Ceratodon grossiretis Card. Nos. 534; 536; 537. All sterile. The cells are not quite so large as in the original plant, which has only been found on the Antarctic continent; they are there 15–20 μ. wide, while here they measure 12–17 μ; but the difference is slight, and certainly the plant is nearer to that than to any of the common forms of *C. purpureus* in the Antarctic region.

Verrucidens intermedius Dixon sp. nov.

V. turpi Card. affine, foliis autem siccis *haud crispatis*, vix mutatis, cellulis superioribus *haud transverse dilatatis, laevibus;* theca *bene exserta, seta unica* 3 mm., theca 1 mm. longa. Exothecii rete e cellulis valde incrassatis instructum; peristomii dentes 150 μ. longi, subobtusi, inferne flavidi vel aurantiaci, superne pallidi; *lamellae haud incrassatae, nec validae*, paucae; dentes dorso dense papillosi, papillis, praecipue inferioribus, grossis, verruculosis, saepe *in seriebus verticalibus* ordinatis, interne dense *tenuius* papillosi.

No. 532.

The genus *Verrucidens* was founded by Cardot in 1905 on *V. turpis*, a Fuegian plant with habit of *Blindia*, but peristome distinct in having the lamellae extremely thickened, and the whole inner surface, and the upper part of the outer surface covered with dense, coarse papillae. The seta is variable in length, from 5 to 12 mm., the upper leaf cells somewhat obscure with papillae. A year or two later, Brotherus described a second species from Kerguelen, at first published as *Dicranoweisia*, but recognized by Cardot as a species of *Verrucidens*. This differed entirely from *V. turpis* in having the capsule quite immersed, whence the name (*V. immersus*), as well as in the leaf cells quite smooth. The present plant appears to me to belong to this genus, by reason of the general structure of the peristome teeth, which show the coarse tubercular papillae characteristic of *Verrucidens;* it differs however in not having the lamellae thickened and prominent as there, on the dorsal surface, the papillae on the other

hand being continued to the base, and there frequently arranged rather remarkably in three or four vertical series; while the papillae of the internal surface, while very dense are not coarse, but rather fine. The structure is therefore by no means identical; and moreover the leaves are not crisped when dry as in the other two species, though resembling those of *V. immersus* in all other respects, so far as can be judged from the figures and description. There is therefore some little doubt as to the generic position; unfortunately only a single capsule was present, and that in a worn condition, so that it is possible that a more perfect peristome might show characters conceivably more closely identical with *Verrucidens* than those exhibited by the present specimen.

Blindia Skottsbergii Card. f. *robusta* Card. No. 527.

I had considerable difficulty in determining this plant which resembled none of the South Georgian species except *B. Skottsbergii*, and that is a much smaller plant, with shorter leaves. The present plant rather closely approached *Dicranum aciphyllum* H. f. & W. in appearance, but the nerve section differed. A comparison of Cardot's description of the f. *robusta* of *B. Skottsbergii*, (Fl. bryol. des terres Magellan., &c., p. 266), and especially his note on this form under *Dicranum Nordenskioldii* Card. however, cleared up the difficulty, and left no doubt that this was the solution of the problem. This form has been recorded only from the Antarctic Continent.

Dicranum austro-georgicum C. M. No. 530. A fine species, which has by some means been omitted by Brotherus in the "Musci."

Tortula robusta Hook & Grev. No. 529.

Tortula lepto-syntrichia (C. M.) Broth. No. 533.

Rhacomitrium lanuginosum (Hedw.) Brid. No. 538.

Conostomum australe Sw. Nos. 531, 541, The latter in fruit.

Bartramia patens Brid. Nos. 528, 540, 542. All c. fr.

Bartramia diminutiva C. M. No. 535. I judge this to be C. Mueller's plant from the small size and the subula toothed but hardly papillose. It can hardly be more than a segregate of *B. patens*.

Psilopilum antarcticum (C. M.) Par. No. 539.

Brachythecium subpilosum (H. f. & W.) Jaeg. Cum setis.

The male flowers are large, turgid, with numerous rather large antheridia. Seta stout.

17 St. Matthew's Parade, Northampton, England.

Explanation of Plate IV

Fig. 1. *Verrucidens intermedius* Dixon.
1a. Leaf × 25.
1b. Cells at shoulder, × 150.
1c. Basal cells, × 150.
1d. Capsule, × 25.
1e. Peristome teeth; left, dorsal face; right, ventral do. × 100.
1f. Peristome tooth, lower part, ventral face, × 200.
Fig. 2. *Bryum crateris* Dixon.
2a. Stem, × 2.

2b. Leaf, × 15.
2c. Upper cells, × 125.
2d. Leaf apex, × 50.
2e. Peristome tooth in profile, × 100.
2f. Part of peristome, showing three teeth; median as seen by transmitted light; right, dorsal face; left, ventral face; × 75.

NOTES ON USEFUL AND HARMFUL MOSSES

T. C. Frye

In general mosses are considered neither useful nor harmful, with the exception of Sphagnum, about whose usefulness we have heard much during the recent war. The facts concerning the effects of mosses upon man and his activities should however be recorded. Possibly this could be most successfully done in the form of short notes on observations and experience. In the hope that others may be encouraged to send such information to The Bryologist the following is presented:

Dicranoweisia cirrhata is one of the first mosses to appear on shingle roofs in western Washington. North roofs are much more readily covered than south ones, on account of the retention of the moisture. Soot and dust are held and thus soon a sort of soil is accumulated. In shade, a new roof may be covered with moss within 10 years. Washington shingles are made of cedar (*Thuja*), which strongly resists fungi and bacteria; but the dampness held by the moss and soil very greatly increases decomposition. The remedy is to creosote the roof every few years.

Ceratodon purpureus appears in the tufts of *Dicranoweisia cirrhata* on Washington roofs, but it does not take hold first on a new roof, so far as I know.

Rhacomitrium canescens ericoides sometimes takes all the other mosses on a north roof, and seems to find it one of its best habitats for the production of capsules. This was observed on quite old roofs at Friday Harbor, Washington.

Bryum argenteum was observed to be the chief moss on an old north shingle roof near Aberdeen, Mississippi. The shingles were cypress. This causes one to wonder whether the kind of wood of which the shingles are made has anything to do with the species of moss which grows on the roof.

Neckera Menziesii is used occasionally by Japanese market gardeners in the vicinity of Seattle, Washington, as a packing for asparagus and lettuce, to retain moisture. It is so far inferior to sphagnum for this purpose than it is questionable whether this is not done through ignorance.

Brachythecium albicans takes the grass in lawns in western Washington when the dampness is excessive, usually through over-watering. Shade increases the dampness and thus favors the moss. The remedy is to water less, or to scatter lime, or both.

University of Washington, Seattle, Wash.

TORTULA CAROLINIANA, NEW SPECIES

A. Le Roy Andrews

Tortula caroliniana n. sp.—Growing in extensive mats on the bark of trees. Stems somewhat matted below with radicles, with brown leaves, above simple, with bright green leaves, which readily become brown with age. Plants very short or sometimes more lengthened, up to about 1 cm. Stem in section round, with central strand; outer 2–3 rows of cells gradually smaller and thicker-walled than those within. Leaves obovate, normally about 2.5 mm. long, 1 mm. wide in widest part, borders strongly reflexed in basal ½–⅔, apex abruptly apiculate with costa only percurrent; costa slender, up to 50 μ in width in lower part of leaf, brown, smooth on back, in section with two guide-cells and two ventral cells nearly equally large adjoining them, dorsally of uniform stereid cells. Leaf-cells at base smooth, rectangular, the outer ones narrow and somewhat chlorophyllose, up to 50 x 10 μ, in region of costa larger, hyaline with brown walls, up to 70 x 25 μ; cells of upper part of leaf irregularly roundish quadrate, with fairly thick walls and distinct trigones, averaging about 14 μ in diameter, in border region slightly smaller and with thicker walls, but not giving the impression of a distinct border, papillose on both surfaces, the papillae mostly crescent shaped,[1] 3 μ or less from end to end of the crescent, normally 4 per cell on either side, rarely more than 6, in smaller cells of border region often 2 or 3. Papillae rather low in profile and quite independent of each other, the wall to which they are attached not at all thickened, the outer wall of cell very slightly bulging.

Inflorescence and sporophyte not seen. Reproduction by means of very numerous propagula, more or less cylindrical in shape, with rounded ends, produced from ventral surface of upper half of leaf blade,[2] the cells from which they originate generally slightly smaller than those surrounding them, often lacking chlorophyll and with papillae less distinct or lacking. Propagula densely chlorophyllose, somewhat roughened on outer surface, divided by parallel planes at right angles to the axis of development at intervals of 20–25 μ, these divisions often further subdivided into 2 or 4 parts by planes at right angles, the subdivision of adjacent segments in this case not necessarily conformable, the end segments usually smaller and undivided. The number of primary divisions varies with the length of the propagulum all the way up to 8, which is sometimes but not often exceeded. The width of the propagulum varies up to about 45 μ, the length is entirely variable, extending up to 200 μ or more.

---

[1]In the illustration they are represented as too irregular in shape and somewhat too large. Their shape is that of a perfectly regular crescent, except as they sometimes form a complete, but again perfectly regular ring. This last tendency is stronger on the dorsal surface and also increases with exposure of the plants to light and sun.

[2]In the illustration they are slightly flattened down by the cover-glass; when undisturbed they rise exactly perpendicular to the leaf-surface and are not at all confined to the immediate apex of the leaf. The costa is represented as too broad in the figure.

Found growing on bark of deciduous trees (beech, oak, chestnut), bank of Swannanoa River, at Swannanoa, Buncombe Co., July 9; North Fork, some 5 miles above its confluence with Swannanoa River, July 10; Grandmother Gap, Avery Co., Aug. 13; all in North Carolina, 1919.

Apparently specifically identical and to be provisionally referred to this species are specimens from Mexico: Etzatlan, Jalisco, Oct. 6, 1908 (*Pringle 10618*, in part); Cuernavaca, Morelos, Oct., 1908 (*Pringle 15308*, in part).

Several species of *Tortula* growing on the bark of trees and reproducing partly or almost entirely by means of propagula are already known, the classic type being *T. papillosa* Wils., widely spread in Europe and also known from the eastern coastal region of North America, as in fact from various parts of the world. From this the species described above differs in a great number of characters, the older species having for example leaves without recurved borders, with excurrent costa, papillose only on dorsal surface, where the number of papillae does not exceed 1 to the cell, the papilla larger, measuring about 10 μ from end to end of the crescent. The propagula originate mostly from the ventral surface of the costa or the cells immediately adjoining it, they are small, tend to be spherical or slightly oval in shape and are divided in part by oblique planes. The points mentioned are enough to show that there is no very close relation between the two species. *T. latifolia* Bruch is a distinct species sometimes producing propagula similar to those of *T. papillosa*, though apparently mostly from the ventral surface of the leaf blade. It has also a differently shaped leaf, different papillae, and in fact shows no close relationship to our species. The propagula of *T. laevipila* (Brid.) De Not. and the closely related *T. pagorum* (Milde) De Not. are modified leaves having their origin in the stem. Limpricht[3] also assigns cylindrical propagula exceptionally to the leaves of *T. laevipila* and *T. pulvinata* (Jur.) Limpr., which would suggest something more nearly resembling our species. Exception is however taken to this statement by Correns,[4] who was unable to demonstrate such propagula as actually belonging to these species. The statements of Limpricht are however so definite that it seems almost incredible that they are not based upon actual observations. The same statements are also given by Amann and Meylan,[5] whether from original observations or on the authority of Limpricht is not clear. Both species show a long excurrent leaf-costa and are also otherwise entirely distinct from the North Carolina moss. Its relations are in fact not boreal or European at all, but southern. In a specimen of Pringle's Plantae Mexicanae, No. 10618, labeled *Fabronia octoblepharis* var. *americana* Card., collected from the bark of *Ipomoea* trees in the first Mexican locality noted above I found a bit of *Tortula* which is clearly related to our species. It shows the same type of propagula, no longer attached, but loose among the plants, while its leaves clearly show the cells from which they had originated. Mr. R. S. Williams identifies this with *T.*

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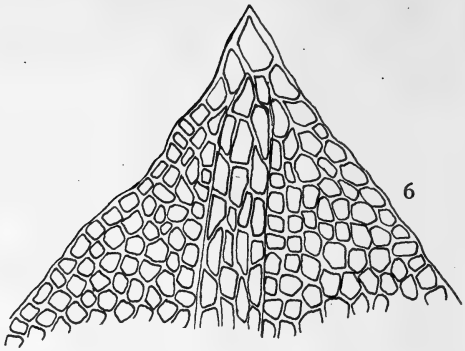
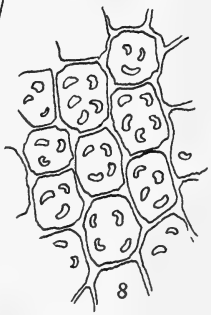
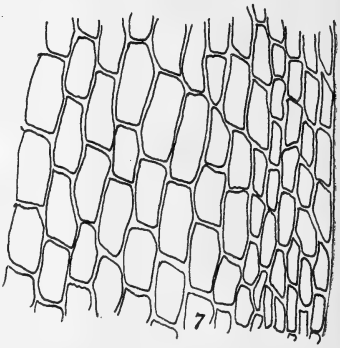
[3]Rabenhorst, Kryptogamenflora, IV, I, 680, 683. 1888.

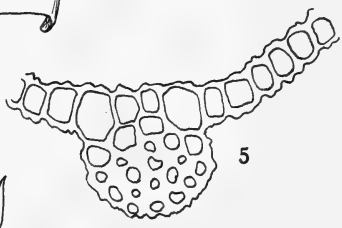
[4]Vermehrung der Laubmoose, 78, 84. 1899.

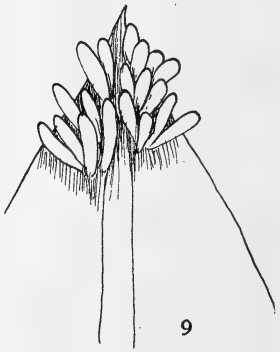
[5]Flore des Mousses de la Suisse, I, 82, 83; II, 120. 1918.











TORTULA CAROLINIANA ANDREWS, N. SP.

parva Card. from the second Mexican locality above. This identification is undoubtedly correct, except that the specimen of *T. parva* in the herbarium of the New York Botanical Garden is a mixture of a fruiting species without propagula and another with abundant propagula and no fruit.[6] Cardot's description[7] is identifiable with the former; the latter is, so far as I know, undescribed. Mr. Williams does not regard the Mexican plant as of the same species as the North Carolina one, and geographically the case is remarkable, though not without parallel. I can see only slight quantitative differences and do not at present feel justified in calling the Mexican plant a further new species. The Mexican specimens are somewhat smaller in all parts, the leaves less sharply apiculate, the cells very slightly smaller, the papillae rather more prominent and larger, especially on the dorsal leaf-surface, where the crescent-shape is generally displaced by a full ring. The propagula are short, so far as observed, of hardly more than 5 segments, often of less, but otherwise quite like the North Carolina ones. Further collections in the future may show whether these slight differences are of greater value than I have set upon them. For the present the very close relationship between the plants from the two localities is the point demanding emphasis. That the plant has not previously been collected in the United States is remarkable, but our southern states probably still contain undiscovered material of bryological interest and habitually sterile species are easily passed by. So far as my observations go the plant appears to ascend the mountains from the eastern Blue Ridge side. The case was clear at Grandmother Gap, where it had reached about 4000 feet altitude. It also occurred at somewhat lower altitudes down the eastern slope, but appeared to be entirely lacking west of the region immediately about the gap itself. The other two North Carolina localities are, it is true, along a water-system draining to the westward, but Swannanoa Gap is low and I suspect that the plants along the Swannanoa Valley may have arrived by the eastern route. The station at Swannanoa itself was within reach of high water and the plants showed much intermixture of silt; those of the North Fork were probably beyond the reach of floods and showed the longest plants; those of Grandmother Gap were remote from any water course. The propagula were relatively more detached in specimens from the two later collections. Those of the first were already partly detached, but for the greater part held their positions on the leaves. The seasonal development is naturally different in Mexico, and in fact evidently did not correspond in the two localities, as, though both were gathered during the same month of the same year, those of Etzatlan had quite shed their propagula, while those from Cuernavaca had them rather firmly attached in position of origin.

It is to be presumed that the plants are dioicous, but probably do not commonly fruit. *T. papillosa* has never been found in fruit in Europe. Even without fruit the genus of the plants can hardly be regarded as doubtful.

[6]My own set of Pringle's Mexican mosses lacks *T. parva;* a bit of the material of this species from the set in the Farlow herbarium at Harvard University, which I owe to the kindness of Prof. Riddle, shows apparently clear *T. parva* without intermixture of *T. caroliniana.*

[7]Revue Bryologique, XXXVI, 88, 1909.

Since correcting proof of the above I have noted a third Mexican locality for the moss I take to be identical with *Tortula caroliniana*. A few plants are growing with Pringle's 10449 in my set, which is labeled: "*Haplocladium microphyllum* (Sw.) Broth., det. Cardot. Cañada, above Contreras, Federal District. June 7, 1908." The latter is not, however, in my set *Haplocladium microphyllum* either as to genus or species, and the specimen obviously came from the bark of a tree.

The illustrations, for which I am much indebted, were drawn by Miss Dorothy Coker at the New York Botanical Garden.

ITHACA, N. Y.

EXPLANATION OF PLATE V

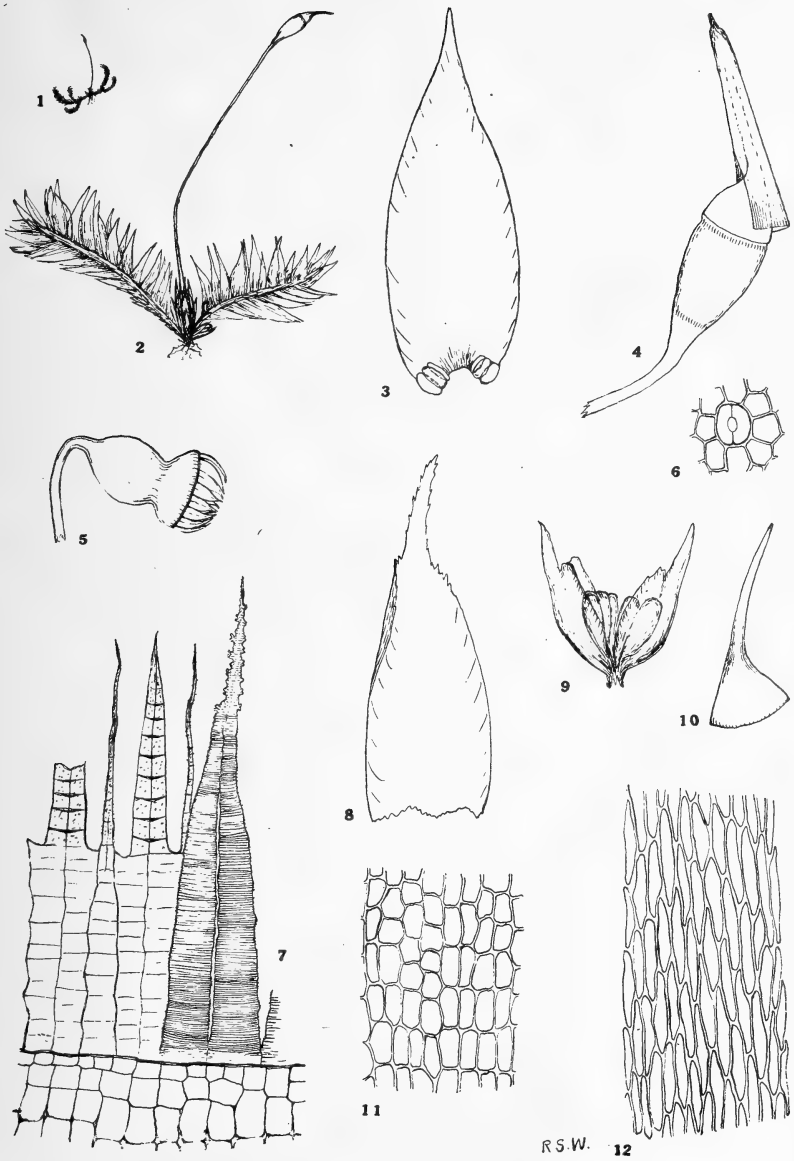
TORTULA CAROLINIANA ANDREWS

1. Plant, moist × 2.
2. Plant, dry × 4.
3. Plant, moist × 12.
4. Leaf × 40.
5. Section of costa × 360.
6. Apical part of leaf × 200.
7. Base of leaf, right side × 200.
8. Cells of upper part of leaf × 500.
9. Apex of leaf with propagula × 50.
10. Propagula × 120.

SEMATOPHYLLUM SMALLII SP. NOV.

R. S. WILLIAMS

Autoicous, a male flower often at or near the base of the perichaetium; the inner perigonial leaves short, very concave, with usually an irregular lobe on either side of the base of the short, acute, entire point; antheridia 5–6, about 0.125 mm. long, with few or no paraphyses: plants in thin mats with stems mostly 5–6 mm. long, bearing few branches and radicles, the latter chiefly at the base of the stems; stem-leaves mostly nearly straight, widely spreading, more or less complanate or slightly secund, mostly 0.8–1 mm. long, ovate-lanceolate, entire and ecostate; leaf-cells smooth, elongate-rhomboidal to more or less linear with slightly unequally thickened walls, the median cells mostly 5–6 μ wide by 25–40 μ long, the alar yellowish, enlarged and inflated; perichaetial leaves variable in length, the longer a little exceeding those of the stem, more or less serrulate with spreading, sometimes recurved teeth below the point and mostly abruptly narrowed to an acute, slightly serrulate point about one third the entire length; seta 6–8 mm. long, smooth; capsule without lid about 0.6 mm. long, inclined or nodding, somewhat obovate, contracted under the mouth when dry, the median exothecal cells nearly square to short-rectangular, the walls slightly thickened at the angles, the stomata, about 25 μ long, in one row near the base; annulus none; outer peristome with teeth 30 μ wide at base and 175 μ long, narrowly furrowed along the median line, cross-striate two thirds up, papillose above; the inner peristome from a basal membrane about one half the height of the teeth, bearing short, solid segments and solitary, papillose cilia; lid about as long as the rest of the capsule, conical, with a slender, oblique beak; spores minutely punctate, about 12 μ in diameter.



SEMATOPHYLLUM SMALLII WILLIAMS, SP. NOV.

Florida, Goodburn Hammock, Dade Co. Collected by J. K. Small and C. A. Mosier, June 1915. *No. 6242.*

This species is scarcely as large as *S. adnatum*, from which it is very distinct in its serrulate perichaetial leaves and teeth of peristome furrowed. If the furrowing of the teeth is to be considered of generic importance, this species would be neither a *Sematophyllum* nor a *Rhaphidostegium*, for the types of both of these genera, *S. auricomum* Mitt. and *H. demissum* Wils., lack the furrow. This character might well be considered as of only sub-generic importance, however, (the furrow being almost imperceptible in some cases, very broad in others) in which case *Sematophyllum* antedates *Rhaphidostegium* by two years.

New York Botanical Garden.

Explanation of Plate VI

Sematophyllum Smallii Williams

Fig. 1. Plant about natural size.
2. Plant × 10.
3. Stem-leaf × 36
4. Capsule with calyptra × 36
5. Empty capsule × 36
6. Stomata × 200
7. Part of peristome × 300
8. Inner perichaetial leaf × 36
9. Male flower × 50
10. Lid × 36
11. Median exothecal cells × 200
12. Median leaf-cells × 200

LICHENS OF THE MT. MONADNOCK REGION, N. H.—NO. 12.*

Dudley Merrill

These lichens were determined by the late Dr. H. E. Hasse.

Genus: Pannaria

209. *Pannaria tryptophylla* (Ach.) Mass. One specimen.
210. *Pannaria lanuginosa* (Ach.) Koerb. Two specimens.
211. *Pannaria microphylla* (Sw.) Delise. Two specimens.
212. *Pannaria brunnea* (Sw.) Nyl. One specimen.
213. *Pannaria lepidiota* (Sommerf.) Th. Fr. One specimen.

Genus: Conotrema.

214. *Conotrema urceolatum* (Ach.) Tuck One specimen.

Genus: Phlyctis.

215. *Phlyctis argena* (Ach.) Koerb. Two specimens.

Genus: Endocarpon.

216. *Endocarpon pallidum* Ach. One specimen.

Genus: Mycoblastus.

217. *Mycoblastus sanguinarius* (L.) Th. Fr. One specimen.

Genus: Thelotrema,

218. *Thelotrema subtile* Tuck. Four specimens.

Middlesex School, Concord, Massachusetts

*No. 11 of this series was published in the Bryologist **22**:15. 1919

INGEBRIGT HAGEN

N. Wille, Ingebrigt Hagen; Det Kongelige Norske Videnskabers Selskabs Skrifter, 1917; published in Trondhjem, 1918.

Three Norwegian bryologists of international reputation have died in three recent successive years: N. Bryhn in 1916, I. Hagen, June 8, 1917, and B. Kaalaas in 1918. The above account of the life and works of Hagen has just come to my notice through the kindness of Mr. E. B. Chamberlain. Hagen was born in Trondhjem in 1852, the son of a shoemaker. His unusual energy and mental ability made an academic career inevitable and he was from 1874–9 assistant of Professor Worm Müller at the University in Christiania, collaborating with him in the publication of a number of investigations in the field of physiological chemistry. He studied further in Sweden and Germany. In 1883 he began practice as a physician, changing his residence a number of times, until in 1899 he established himself at Opdal in the Dovrefjeld region, one of the most remarkable bryological areas known. Even earlier he had begun to transfer a great deal of his energy from medical practice to bryology and finally in 1906, an arrangement was made with the Nansen Foundation assuring him an annuity for the rest of his life and another with Det Kongelige Norske Videnskabers Selskab at Trondhjem assuring him a room for his bryological work and a small additional yearly allowance. He then settled in Trondhjem to devote the remainder of his life to the study of the Norwegian mosses. This work took the form of "Forarbejder til en Norsk Lövmosflora," which from 1908 till 1915 had covered twenty families from various parts of the moss-system. It is his principal monument, but he had besides, especially in "Musci Norvegiae Borealis," 1899–1904, and in a variety of lesser contributions, some of which have appeared in The Bryologist, made an enduring record of persistent and careful research.

If I may add to this brief abstract of the contents of Professor Wille's memoir a word of personal recollection: I was privileged to spend a day in Trondhjem in the summer of 1912, when I especially wished to discuss the northern Bryums with Dr. Hagen, who undoubtedly knew them better than any other living bryologist and correspondingly better than anyone of the previous generation. He was very generous with assistance and quite confirmed personally the impression made through his work of being an open and eager seeker of the truth without a touch of conceit of personal opinion. Some of the things he said illustrate this very well. In connection with *Bryum*, in which he had created many species, he said that if he were to revise the genus, he would treat it in a very different way, and implied that he would do it with a great reduction of species. At the same time he showed me a rather high pile of very good *Bryum* material with full new species descriptions carefully written out, to be published as he said after his death.

Another puzzling statement which I recall was that a descriptive bryologist should not concern himself with phylogenetic speculation. Hagen, as a matter of fact, in his Forarbejder showed a great deal of original thought upon phylogenetic relationships and was one of the few recent bryologists not dis-

posed to accept Die Natürlichen Pflanzenfamilien as the last word in inspired revelation. His activity here as elsewhere was mostly in an analytic rather than synthetic direction.

He was unfavorably disposed toward treating bryological history as a scrap of paper, particularly the part lying between Linné and Hedwig and expressed a lively interest for example in the work of Necker.

With reference to the exotic mosses he confided to me that he had never felt especially attracted to their study, except as he had sometimes contemplated monographing the genus *Fissidens*.

Of the little group of Norwegian bryologists only Jörgensen now remains, and he had done relatively less than the others, confined his work mostly to hepatics and has not been very active in recent years. Kaalaas sometimes expressed the fear that no one of the younger generation might feel called to continue the work.

Cornell University, Ithaca N. Y. A. Le Roy Andrews

MARY FARNHAM MILLER

The Sullivant Moss Society has lost one of its earliest members in the death in Washington, D. C., on June 2, 1920, of Miss Mary F. Miller. It was a great shock, as the last letters written in January were so hopeful of complete recovery that I never thought of such a possibility as death. Her life though short (she was born January 26, 1872) was full of activity. She thoroughly loved life, and its friendships. Miss Miller joined the Sullivant Moss Society the year after it was organized, and our acquaintance began at once in 1900. In January, 1904, Miss Miller was elected Secretary and served two years; she also took over charge of the Moss Herbarium. In December of that year our Society held a meeting in Philadelphia, in connection with the A. A. A. S., and many of us made our first personal acquaintance with Miss Miller at that time. In March, 1908, having become interested in the lichens, she was placed in charge of the Lichen Department, doing most careful work under the inspiration and guidance of Mrs. Carolyn W. Harris, and for four years carried on the large correspondence and determinations of this department.

For some years prior to 1918, Miss Miller had worked on the mosses and lichens at the National Museum, arranging the material in its Herbarium, but her health began to fail and all scientific work had to be abandoned, though in her own mind she always looked forward to regained health and to the studies she so much loved. We sincerely mourn for this dear friend who made such a brave fight for life, and whose bright friendliness endeared her to all who knew her either personally or through correspondence.

The Society extends its deepest sympathy to the family of Miss Miller and assures them of its appreciation of all her years of faithful work and continued interest in its welfare.

Brooklyn, N. Y. Annie Morrill Smith

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O. E. JENNINGS, Ph.D., Editor-in-Chief

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All material for identification should be sent to the respective curators. All matter relative to offerings should be sent to the Editor, or to the Secretary

THE BRYOLOGIST

VOL. XXIII NOVEMBER, 1920 No. 6

APPEARANCE OF MOSSES IN ECOLOGICAL HABITATS

ARAVILLA MEEK TAYLOR

In the June, 1920, number of the Botanical Gazette there appeared an article by the present writer upon the Ecological Succession of Mosses in the Chicago Region.[1] In the following table will be found an alphabetical list of mosses collected during that work, arranged according to the ecological habitats in which they were found.

In order to avoid repetition and to reduce the table to the smallest scope possible, the climax beech-maple forest habitat has been given only once, but the reader should understand that in the region east of Chicago the beech-maple seems to be the climax or ultimate forest association in all successions whether they originate on dune sand, morainal clay, rock, or in water habitats.[2] The oak forest may appear as a stage in any series and will differ little if at all in content on the various substrata.

For explanation of ecological terms the reader is referred to the work of Dr. Cowles[2], and for a detailed description of the region to the article in the Botanical Gazette. I wish also to express my greatest appreciation of the kindness of Mrs. Elizabeth Britton, Mr. George B. Kaiser, and Dr. A. LeRoy Andrews in the determination and verification of the mosses.

The south and west shores of Lake Michigan give us a unique floral habitat. We find here the meeting place of species typical of the north, the south, the east and the west. What is true of the higher plants is also true to a great extent of mosses. While the Middle West is not usually thought of as a typical moss habitat, yet of the 81 species given, all but three have been found within a radius of a few miles of Chicago. The list is by no means complete owing to the fact that it was not possible in some cases to obtain material sufficiently good for identification in the time given to the work. Many regions afford greater total quantity of moss but probably few offer greater variety within so small an area. It is hoped that publication of the present list may lead to the addition of other species by future workers in the same territory.

The succession of mosses varies in much the same way as that of herbaceous plants. Certain xerophytic types appear as pioneers on bare sand or clay.

[1] TAYLOR, ARAVILLA M. The Ecological Succession of Mosses in the Chicago Region. Bot. Gaz. **69**: 449–491. 1920.

[2] COWLES, HENRY C. The Plant Societies of Chicago and Vicinity. Chicago, 1901.

The September number of THE BRYOLOGIST was published December 2, 1920.

TABLE SHOWING ECOLOGICAL HABITATS

The letter "P" indicates that the species is present in the given habitat.

Species	Dune Sand				Moraine			Rock		Bog				Swamp					Climax Forest	
	Cottonwood	Pine	Early Oak	Late Oak	Beach Slope	Ravine	Oak Upland	Exposed	Sheltered	Fen	Shrub	Tamarack	Oak-Yellow Birch	Open Pond	Pond Margin	Early Swamp Forest	Late Swamp Forest	Iron Stream	Beech-Maple Ravine	Beech-Maple Upland
Amblystegiella adnata (Hedw.) Nichols						P			P											
Amblystegium irriguum (Wils.) B. & S.																		P		
radicale (Beauv.) Mitt.																P	P	P		
riparium (L.) B. & S.						P						P		P						
serpens (L.) B. & S.									P						P					
varium (Hedw.) Lindb.						P									P			P		
Anomodon attenuatus (Schreb.) Huebn.			P			P														
rostratus (Hedw.) Schimp.		P	P		P		P		P				P			P	P		P	
viticulosus (L.) H. & T.									P											
Aulacomnium heterostichum (Hedw.) B. & S.			P			P														
palustre (L.) Schwaegr.											P									
var. polycephalum (Brid.) B. & S.										P						P				
Bartramia pomiformis (L.) Hedw.			P			P			P											
Brachythecium acuminatum (Hedw.) Kindb.						P			P								P			
acutum (Mitt.) Sull.															P					
cyrtophyllum Kindb.			P						P											
digastrum (C. M.) Kindb.		P				P			P											
oxycladon (Brid.) J. & S.					P	P			P								P			
var. dentatum (L. & J.) Grout									P											
plumosum (Sw.) B. & S.						P														
rivulare B. & S.										P	P	P				P	P	P		
rutabulum (L.) B. &. S.									P							P	P			
Bryhnia Novae-Angliae (S. & L.) Grout						P										P				
Bryum affine (Bruch) Lindb.					P															
argenteum L.			P					P												
caespiticium L.			P																	
capillare L.		P					P													
pendulum (Hsch.) Schimp.															P					
ventricosum Dicks.	P		P												P					
Calliergon cordifolium (Hedw.) Kindb.										P	P	P					P			
Schreberi (Willd.) Grout		P				P														
Campylium chrysophyllum (Brid.) Bryhn.															P					
hispidulum (Brid.) Mitt.										P			P							
stellatum (Schreb.) Bryhn.										P	P	P			P					
Ceratodon purpureus (L.) Brid.	P	P	P	P			P	P												
Catharinaea undulata (L.) W. & M.		P	P	P			P						P							P
Climaceum americanum Brid.			P			P	P	P				P				P	P			
Kindbergii (R. & C.) Grout														P	P					
Cratoneuron filicinum (L.) Roth																		P		
Dicranella heteromalla (L.) Schimp.						P			P											
Dicranum scoparium (L.) Hedw.		P					P					P				P				

TABLE SHOWING ECOLOGICAL HABITATS

Species	Dune Sand				Moraine			Rock		Bog			Swamp					Climax Forest	
	Cottonwood	Pine	Early Oak	Late Oak	Beach Slope	Ravine	Oak Upland	Exposed	Sheltered	Fen	Shrub	Tamarack	Oak-Yellow Birch	Open Pond	Pond Margin	Early Swamp Forest	Late Swamp Forest	Iron Stream	Beech-Maple Ravine	Beech-Maple Upland
Drepanocladus aduncus (Hedw.) Warnst.										P	P	P		P	P			P		
fluitans (Dill.) Warnst.														P	P					
intermedius (Lindb.) Warnst.																P				
Elodium paludosum (Sull.) Loeske												P								
Entodon cladorrhizans (Hedw.) C. M.					P				P			P					P		P	P
seductrix (Hedw.) C. M.									P											
Fissidens cristatus Wils.		P	P						P			P								
Funaria hygrometrica (L.) Sibth[1]			P				P	P	P				P			P		P		
Grimmia apocarpa (L.) Hedw.								P	P											
Gymnostomum rupestre Schleich.									P											
Hylocomium triquetrum (L.) B. & S.		P																		
Hypnum molluscum Hedw.																	P			
Leskea obscura Hedw.							F													
Leucobryum glaucum (L.) Schimp.		P	P				P					P				P				
Mnium cuspidatum (L.) Leyss.			P			P	P		P			P			P	P			P	
Philonotis fontana (L.) Brid.									P			P		P	P					
Physcomitrium turbinatum (Michx,) Brid.							P													
Plagiothecium denticulatum (L.) B. & S.						P	P								P					
deplanatum (Schimp.) Grout						P														
Platygyrium repens (Brid.) B. & S.																			P	
Polytrichum commune L.		P	P				P				P					P	P			
var. perigoniale (Michx.) B. & S.											P									
Rhodobryum roseum (Weis,) Limpr.		P	P						P											
Sphagnum palustre L.											P	P								
recurvum Beauv.											P									
subsecundum Nees																P				
Stereodon arcuatus Lindb.															P	P	P			
Haldanianus (Grev.) Limpr.												P		P			P			
Thelia asprella (Schimp) Sull.					P															
Lescurii Sull.			P	P																
Thuidium abietinum (L.) B. & S.		P	P																	
delicatulum (L.) Mitt.		P	P		P		P	P				P				P	P			
microphyllum (Sw.) Best							P												P	
recognitum (Hedw.) Lindb.		P	P									P				P	P			
Tortella caespitosa (Schwaegr.) Limpr.			P																	
tortuosa (L.) Limpr.		P	P																	
Tortula mucronifolia Schwaegr.									P											

[1] The habitat "iron stream" in the case of the *Funaria* is really partially submerged sticks around the outlet and upon tufa mounds wet by the seepage from the spring.

These are usually followed by more mesophytic mosses which in time may be entirely crowded out in the competition with herbaceous plants. In the dune region at the head of Lake Michigan we find near the shore what is known as the cottonwood dune, because the cottonwood, *Populus deltoides* Marsh., is the first tree to make a successful growth upon the nearly bare sand. As the dune grows older, or as we go further from the lake among the older dunes, we find that the cottonwood has given place to the Jack pine, *Pinus Banksiana* Lamb. The pine dune is later replaced by an association of red, white, and black oak, the last oak succession being in some places a pure stand of *Quercus alba* L. As with the higher plants, so in like manner with the mosses, we may trace a succession in these tree habitats.

In the rock series the first plants are lichens, or, in very moist places, liverworts, which are then succeeded by pioneer mosses and these in turn by other mosses or herbaceous plants. In the water series, floating mosses may occur in open water, and along the margin, partly submerged, are the same or related species. As the surface mat is formed in the deeper lakes various types of hydrophytic mosses are abundant in the fen (sedges—bulrush—cat-tail) association. In the shrub and early tree associations new mosses take the place of the pioneers as in the other cases.

One of the most noticeable facts brought out by the entire study is the great reduction in number of species in the late oak and climax forests, which appears in marked contrast to the conditions found in many regions.[1] The forest floor in all the forests under consideration is nearly free from fallen logs; hence, any mosses must compete with herbaceous plants for possession of the ground. In the ravines, logs and stumps are more common, and here we find a somewhat greater abundance of mosses.

CORVALLIS, OREGON.

APLOZIA PENDLETONII PEARSON

WM. HY. PEARSON

Since I wrote my description of the above species[2], I have received from Mr. Pendleton several packets of the same species, with a note: "In fruit when collected." I have not been able to find any trace of fruit, which probably disappeared in the process of drying, but there are numerous perianths. What I described in my note as immature, are evidently normal-sized and perfect perianths. Their smallness, only about half the size of the bracts (perianth .75 mm. x .5 mm., bracts 1.25 mm. x .5 mm.) by which they are entirely hidden, affords another good character for this remarkable species. The folds are more

[1] COOPER, WM. S. The Ecological Succession of Mooses on Isle Royale, Lake Superior. Plant World **15**: 197–213. 1912.

[2] Pearson, Wm. Hy. *Aplozia Pendletonii*, n. sp. BRYOLOGIST **23**: 50-52. (Pl. II, including 8 figs.) 1920.

usually 4 than 5; a cross-section taken at the middle shows a row of about 100 single cells, the lower portion being 2 cells thick. The mouth is very small, constricted and entire.

Probably Mr. Pendleton will distribute specimens amongst his American friends, but I shall be glad to send specimens to any student interested in the species.

Aplozia Pendletonii Pearson

Fig. 1. Bracts, with perianth, × 24.
Fig. 2. Cross-section of perianth, about the middle, × 24.
Fig. 3. Mouth of perianth, explanate, × 50.

PORELLA RIVULARIS (NEES) LINDB.

Wm. Hy. Pearson

Madotheca rivularis Nees, Nat. Eur. Leb. **3:** 196 (1838).
Porella rivularis (Nees) Lindb. Musc. Scand. 3. (1879).

Mr. James Murray of Carlisle, England, has recently sent me a *Porella* from Portland, Oregon, which I have little hesitation in referring to the above species: it is a very fine form, stems 2 to 3 inches long, distantly bipinnate; the quadrate-oval, very decurrent underleaves scarcely wider than the stem, dentate at their base, bracteole minutely denticulate; perianths numerous, produced from the chief stem or branches, very large, with an extremely small mouth which is irregularly jagged with a few one-celled teeth. The irregular mouth of the perianth gives one the impression that it has been weathered, but young perianths show the same character.

The articles by Dr. Evans (Rhodora. **18:** 79–85, 103–120. 1916) have been particularly helpful to me in my studies of the American *Porellae*, of which we have a very fine collection in the Manchester Museum. Owing to the War, I have not seen Mueller's reasons (Rabenhorst: Krypt. Flora 6^2: 585. 1915.) for adopting the old name of *Cordeana* Hueben. for this species; seeing that Nees (G. N. L. Syn. Hep. 282) quotes *Cordeana* Hueben, as a synonym for *Porella*

pinnata, and on page 278 of the work, states distinctly that it is not the same as *P. rivularis*, one would naturally think that he had seen the plant and knew what he was writing about.

The station for the Oregon plant as given me is: found on a rock bluff with water running over it, about ten feet up a vertical wall rising from the side of the creek, which is here almost a torrent: McKleay Canyon, Oregon; Coll. Charles Potter, 16–5—1920. It gives me great pleasure to deposit half my specimen in the herbarium of the Sullivant Moss Society.

18 Palatine Road, Withington, Manchester, England.

ON OUR AMERICAN FORM OF TIMMIA MEGAPOLITANA HEDW.

John M. Holzinger

Number 47 of my exsiccati was distributed under the name of *Timmia megapolitana* Hedw. I have recently collected the plant again and have reexamined it with considerable care. Limpricht in Laubmoose[1] devotes over a page of detailed description to this plant. According to Limpricht's Key (*l. c.*, p. 577) the leaf base ought to be yellowish and not hyaline: it is yellowish in older Minnesota plants, but would even then be called *hyaline* ("wasserhell"). He describes the upper, distal part of the leaf base as "papillose on the dorsal side, with strongly thickened walls." These papillae are so insignificant that I failed to find them on my own sections. Professor Chamberlain, however, succeeded in making sections which demonstrate their presence. By his courtesy I am permitted to publish his drawings. Fig. 2 shows the best that could be found of papillae. This and fig. 1 are sections through the upper and lower part of the leaf base respectively.

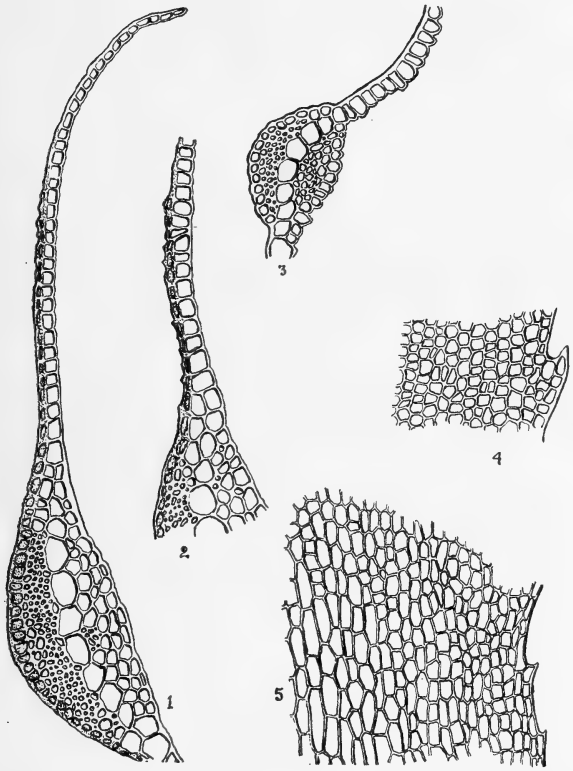
Fig. 1 also demonstrates the presence, on the dorsal surface of the lamina, of a layer of small flat cells extending from the costa toward the leaf margin, becoming thinner and disappearing, leaving the lamina at the margin of one cell-layer.

The presence of these papillae is made of first diagnostic importance, as is seen by the statement in the first line of Limpricht's key, page 577, and by the italics in the description, page 578. Barnes, in his Key[2], also uses this character. The plant is monoicous, as it needs to be. The inner perichaetial leaves are 6–8 mm. long. One or two ♂ buds stand within them at the base of the seta; they measure a little less than 1 mm., and are raised on a short stalk 0.32–0.4 mm. long; there are generally three enveloping leaves as long as the bud, which have a loose elongated areolation; the outer one is costate to above the middle, while the others are costate to near the apex, and their margin is strongly serrate above the middle; the antheridia are orange-yellow, and are raised on a short

[1] K. G. Limpricht. Die Laubmoose Deutschlands, Oesterreichs, und der Schweiz. Vol 2: 578. 1895.

[2] C. R. Barnes. Analytic Keys to the Genera and Species of North American Mosses. Revised by G. D. Heald, pp. 221. 1896.

stalk about 0.16 mm. long, the tube proper measuring about 0.56 mm.; the paraphyses are a little longer and thread-shaped. One is left uncertain whether they are yellowish, as they should be for *T. megapolitana*, or not; they appear to be hyaline.



TIMMIA MEGAPOLITANA Hedw.

Figs. 1 and 2, sections through the lower and upper part of the leaf base.
Fig. 3, section through the costa of the lamina.
Figs. 4 and 5, areolation of lower and upper parts of the leaf margin respectively, showing diminished size of teeth toward base.
(Drawings made by Edward B. Chamberlain from La Moille plants.)

The capsule, peristome, and spores have not yet been considered, Limpricht's description emphasizes also that the calyptra is fugacious, and does not remain attached to the seta; in this Minnesota plant it *does remain attached.* Two other characters of the leaf, however, agree with Limpricht's descriptions:

the reddish costa is *papillose* near the apex, and the cells of the lamina are *round-hexagonal;* also, by the strong ventral protrusion, or bulging, of the cell walls, the ventral side of the lamina is beautifully *mamillose*, as is well shown in Limpricht's figure (*l. c.*, p. 579); and the mamillose cells of the ventral side of the costa are green; the rest of the costa is yellow.

The discrepancies, then, are:

1. The papillae on the dorsal side of the leaf base are low and inconspicuous.
2. The cells of the leaf base here are only faintly yellowish.
3. The antheridia are orange-yellow instead of hyaline.
4. The stem leaves are strongly serrate only above the middle, less so from there to the base.
5. The calyptra remains attached to our plant.

This condition of things is the more interesting since Limpricht records the species "In calcareous, swampy meadows in the North German lowland, very rare, now only known from North America." After citing the few North German stations he concludes thus: "Other stations, . . . especially those from the Alpine regions, are almost all to be transferred to *Timmia bavarica*, a few to *Timmia norvegica.*"

I have seen no typical material of *Timmia megapolitana*, sensu Limpricht, and I would consider it a favor if those moss friends who have good typical material from North America with strong dorsal papillae on the leaf base, which must *not be hyaline*, with *hyaline antheridia* with stem leaves *serrate to base*, and with fugacious calyptra, would exchange some of this *good* material with me.

In conclusion, this remark: Our plant has been called *Timmia megapolitana bavarica* Brid. Limpricht places *Timmia norvegica* between *megapolitana* and *bavarica*, as a silent protest against making the latter a variety of the former. Both plants, i. e. *T. megapolitana* and *T. bavarica*, it is true, are autoicous; our plant here agrees with either. But the leaf cells in *bavarica* are "quadratisch," i. e. square, while in *megapolitana* and in our plant they are plainly hexagonal.

Winona State Normal, Winona. Minn.

LITTLE JOURNEYS INTO MOSSLAND

I. Early Bryological Experiences

George B. Kaiser

Baedeker describes the valley of the Wissahickon Creek as "a miniature Alpine gorge." This thickly wooded region, whose naturally wild aspect has been carefully preserved, offers the botanist, particularly the cryptogamic botanist of Philadelphia, a delightful field for observation and for collecting. Hemlock, oak, birch, tulip tree, beech, red maple, box elder, and ironwood border the stream, while mica-schist, hornblende, and gneiss, where garnets are found, with occasional outcroppings of quartz, are mineralogical features. Even on the warmest days in summer, grateful shade lies cool and deep beside the north-

easterly banks of the little-frequented driveway, where the automobile is happily excluded, and here the snow and ice of winter prevail longer than for many a mile around.

In the upper portion of the Wissahickon Valley began my more intensive study of the mosses. It is true: hair cap, funaria, sphagna, and other undifferentiated species just mentally grouped as "moss," had long been familiar objects, but a certain early winter's day marked a line of departure in botanical pursuits, filled with determination to intimately know the bryophytes of the Philadelphia neighborhood.

It was a cold gray afternoon with a feeling of snow in the air. The leaves of deciduous trees had fallen, to cover the earth with a russet mantle. A cardinal flashed red among the bare oaks and birches and the abundant hemlock displayed a sombre green. Green, too, were the Christmas ferns and green were many of our friends, the mosses.

The banks were evidently clothed with a number of species of which two predominated. These mosses were found to be *Dicranella heteromalla* and *Catharinea angustata*. The former in ample clumps with soft, slender, green leaves appearing as if brushed to one side, was frequently fertile. The glossy brown sporophytes were conspicuous, the capsules in general still holding their lids, although a few, of duller brown, already showed the bright red teeth of the dicranaceous peristome, so attractive under the hand-lens. What objects of never-failing interest in their fine adaptations for spore dissemination are these peristomes of the mosses! Unforgetable moments of delight may be spent in contemplating under low powers of the compound microscope their delicate colors and markings and infinite variety. Ceratodon, Bartramia, Funaria, Mnium—common genera readily collected by the amateur—all possess peristomes of rare beauty with which every student of the mosses should be familiar.

The other first acquaintance of that wintry day, *Catharinea angustata*, was perhaps even more common than the Dicranella. The plants with curled leaves, olive green to brownish red in color, appeared along the banks on every hand through the valley of the Wissahickon and, when present, the sporophytes of deep claret red stood in thick companies retaining their long-pointed opercula, which are not lost until early spring. Here is another peristome to examine. In dry weather a disk called the epiphragm is borne aloft by the thick teeth and from beneath it the spores are sifted out. There is a tantalizing impulse to pass one's hand over the mature capsules, when clouds of spores arise, resembling the fumes of nitrous oxide gas which escape from nitric acid wherein copper is dissolving. The larger *Catharinea undulata* was also seen, but only later was it clearly differentiated from its more common brother.

Dicranella and Catharinea, then, were my first real acquaintances among the mosses and, toward dusk, when I returned home, that day of long ago, amid the swirling snowflakes at last released from the dun sky, I brought with me specimens of these and memories to be treasured throughout ensuing years of moss collecting and microscopic study.

It is surprising how well one recalls the time and place where a new plant has been found. Whether the species be orchid or alga, lichen or moss, it matters little; the experience seems to have photographed itself indelibly on our mind, and, while memory lasts, the circumstances and surroundings all arise untarnished at the evocation of the charmed name, and we live again in the scenes of Nature's loveliness in which it was our good fortune to first really meet and know the living thing which was then to us a new species.

6620 Germantown Ave., Pelham, Philadelphia, Pa.

MOSSES FROM THE CASPIAN AND BLACK SEA REGIONS

Wm. Edw. Nicholson

I have recently had the opportunity of going through a small collection of mosses made by my friend Mr. W. J. Parsons, who was with the British forces in northern Persia and Transcaucasia in 1917, and, as the district is not much visited by botanists, a list of the species gathered may be of some interest to the readers of The Bryologist. The species are for the most part of general European distribution, although there are several of a definitely Asiatic distribution, such as *Barbula excurrens* Broth., *Tortula desertorum* Broth., *T. Bornmuelleri* Schiffn., and *Leucodon immersus* Lindb. The collections were made near the south shores of the Caspian, in the Elburz Mountains at the back of this, and in the neighborhood of Batoum on the Black Sea. I am indebted to Mr. H. N. Dixon for assistance in identifying some of the less well-known species in the following list:

Ditrichum pallidum Hampe. Near Batoum.

Pleurochaete squarrosa (Brid.) Lindb. Near the Caspian. Part of the gathering is considerably more robust than any form which I have seen from the British Isles, but it otherwise agrees with the type in all essential respects, and I have found a somewhat similar form in the island of Majorca.

Barbula convoluta Hedw. Near the Caspian.

B. excurrens Broth. Mr. Dixon refers a small gathering of a stunted plant from the Elburz Mountains to this species with some hesitation.

Crossidium squamigerum (Viv.) Jur. Elburz Mountains.

Tortula desertorum Broth. Near the Caspian; growing with *Pleurochaete squarrosa*.

T. Bornmuelleri Schiffn. Elburz Mountains. This plant is very closely allied to the last species, of which it has the appearance of being an undeveloped form. Mr. Dixon expressed a doubt as to whether it is specifically distinct.

Grimmia campestris Burch. Elburz Mountains.

Webera nutans Hedw. Elburz Mountains.

Bryum atropurpureum W. & M. Near the Caspian.

B. argenteum L. Near the Caspian.

Catharinaea undulata (L.) W. & M. Near Batoum.

C. angustata Brid. Near Batoum, c. fr.

Polytrichum commune L. Near Batoum.

Leucodon immersus Lindb. Near Batoum, c. fr., and near the Caspian, sterile.

Amblystegium varium Lindb. Near the Caspian.

Brachythecium populeum B. & S. Near Batoum.

B. purum (L.) Dixon. Near the Caspian.

Eurhynchium euchloron (Bruch.) Jur. & Milde. Near the Caspian; nice gatherings of this characteristic species of the district. One of them is of a very vivid green to which no doubt the plant owes its name.

E. tenellum (Dicks.) Milde. Near the Caspian.

Hypnum cupressiforme L. Near the Caspian, and also near Batoum.

The only hepatics in the collection were small fragments of *Radula complanata* (L.) Dum., and *Frullania dilatata* (L.) Dum., both from near the Caspian.

LEWES, ENGLAND, 18 OCT., 1920.

REVIEWS

I. NEW AND INTERESTING SOUTH AFRICAN MOSSES, by H. N. DIXON, M. A., F. L. S. (With plates XI and XII.)

This is a reprint from the Transactions of the Royal Society of South Africa, vol. VIII, part 3, 1920; Cape Town. Published by the Society. The paging is unchanged and includes pp. 179 to 224.

The author enumerates 180 species. Many of these are accompanied by critical notes. It is a pleasure to follow this diligent author in his gentle but relentless processes of reduction. Just as, in his Australian Antarctic Expedition report, jointly with Rev. Watts, Mr. Dixon traced the identity with *Bryum antarcticum* of *B. filicaule*, *B. Gerlachei*, *B. inconnexum*, *B. austro-polare*, and "probably *B. algens;*" so, in this paper, he has worked out in several cases the identity of African species described by different authors. In his introduction he states that while identity does not exist in very many cases between African and North Temperate species, he is "convinced it exists in a certain number of plants where it has hitherto not been recognized." In this he was confirmed by some gatherings from high mountain elevations. This furnished an interesting parallel to the entomological observation, made some years ago in the higher mountains of New England, which showed the insect life near the tops of the mountains remarkably related to the European mountain insects. Mr. Dixon thus points out the identity with *Bryum alpinum* Huds. of *B. afro-alpinum*, and probably of *B. Wilmsii*. *Bryum Muhlenbeckii* has several named African species indistinguishable from it. *Polytrichum flexicaule* and *commune* are identical. Several Tortulas described by C. Mueller are entirely identical with *Tortula ruralis*.

The author is critical in the correction of some spellings. Thus, on p. 185, *Campylopus inchangae* is shown to be the right spelling from among four.

The new species described and figured are:

Ditrichum spirale Dixon; *Dicranella Symonsii* Dixon; *Fissidens papillifolius* Dixon; *Fissidens Borgenii obtusifolius* Broth.; *Gymnostomum Bewsii* Sim MS; *Didymodon Pottsii* Dixon; *Tortula trachyneura* Dixon; *Glyphomitrium marginatum* Wager et Dixon; *Zygodon Simsii* Dixon; *Bryum pumili-roseum* Dixon; *Psilopilum afro-laevigatum* Dixon; *Psilopilum Wageri* Broth.; *Erpodium transvaaliense* Broth. et Wag.; *Erpodium distichum* Wager et Dixon; *Entodon cymbifolius* Wager et Dixon; *Lindbergia viridis* Dixon; *Sciaromium capense* Dixon; *Microthamnium ctenidioides* Dixon; *Isopterygium brachycarpum* Dixon; *Plagiothecium Hendersonii* Dixon; *Brachythecium afro-albicans* Dixon.

WINONA, MINN. J. M. HOLZINGER

NOTES ON CURRENT BRYOLOGICAL LITERATURE

Raphidostegium caespitosum.—In the Journal of Botany, March, 1920, Mr. H. N. Dixon has an article on this species, of 8 pages, at the end of which he cites no fewer than 58 synonyms. A sweeping series of reductions.

J. M. HOLZINGER

MISCELLANEOUS NOTES

Camptothecium nitens var. falcatum (Peck) Burnham.—This combination was made in the July number of THE BRYOLOGIST **23:** 54. July, 1920; but is not the correct name for this var., *C. nitens* var. *falcifolium* Ren. e Nichols, in Rhodora, Vol. 15, p. 12?

NORTHAMPTON, ENGLAND H. N. DIXON

Camptothecium nitens var. **falcifolium** Ren. (*C. nitens* var. *falcatum* (Peck) Burnham).—In connection with the preceding note Mr. Burnham contributes the following:

Mr. H. N. Dixon of Northampton, England has called my attention to the fact that the combination *Camptothecium nitens* var. *falcatum* (Peck) Burnham which was made in THE BRYOLOGIST **23:** 54, July, 1920, is superseded by the name *Camptothecium nitens* (Schreb.) Schimp., var. *falcifolium* Ren., published by Dr. Geo. E. Nichols, Notes on Connecticut Mosses, Rhodora **15:** 12, Jan., 1913. Mr. Dixon is correct. The variety *falcatum*, altho described by Dr. Peck in the N. Y. State Cab. Rep. **22:** 105, 1869, was never published, altho the herbarium name *falcatum* is written on the sheet of Dr. E. C. Howe's Fort Edward specimen in the State herbarium. Number *308* in C. F. Austin's Musci Appalachiani is Dr. Howe's Moreau plant, the variety *falcifolium* Renauld.

CORNELL UNIVERSITY, ITHACA, N. Y. S. H. BURNHAM

A Correction.—Mr. Wm. R. Maxon, of the National Museum, has called attention to an error in Mr. Standley's article, "Sphagnum in Glacier National Park, Montana," in the January (1920) number of THE BRYOLOGIST, p. 5. In the fifth line of the article the words "On the east slope" should read "On the west slope."

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ERRATA

Page 16, line 20, for *Cephalozilla* read *Cephaloziella.*
Page 25, line 11, for bak d read baked.
Page 25, ine 9 from bottom, for *Teloschistes* read *Theloschistes.*
Page 29, line 4, for *graminicola* read *graminicolus.*
Page 45, line 7 from bottom, for r read for.
Page 68, line 29, for medialsis read MEDIALIS.
Pag 70, line 3, for *natan*; read *natans.*
Page 80, line 2, for *undulatum* read *undulata.*
Page 80, line 11 from bottom, for *Odontochisma* read *Odontoschisma.*
Page 80, line 9 from bottom, for c9llected read collected.
Page 86, line 23, for *Muhlenbeckii* read *Mühlenbeckii.*

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THE BRYOLOGIST

VOL. XXIV JANUARY, 1921 NO. 1

ON THE DISPERSAL BY FLIES OF THE SPORES OF CERTAIN MOSSES OF THE FAMILY SPLACHNACEAE[1]

J. BEQUAERT

During my stay in the Adirondacks last summer (1920) I had an opportunity to observe on the summit of Mt. Skylight, above timberline, two species of Splachnaceae: *Tetraplodon mnioides* B. & S., and *T. angustatus* B. & S.[1] They were growing on the droppings of some carnivorous mammal, among the sphagnum of the boggy slopes. Both species are of course known to occur in the Adirondack region, though the smaller of the two, *T. angustatus*, is said to be much rarer than the other. The finding of these mosses, however, resulted in an interesting ecological observation, quite new to me at the time and well worth recording.

The object of my trip to Mt. Skylight was primarily of an entomological nature and, though I incidentally gathered some bryological material, the *Tetraplodons* would probably have been overlooked had my attention not been attracted by some small flies that flew up from one of the mosses as I was moving in the bog. On closer examination of the object which these insects had left, much to my surprise I found it to consist of a cushion of *Tetraplodon mnioides* with abundant, bright brown-red fructifications. That this moss could be attractive to flies struck me as most remarkable and I proceeded to watch the plants more carefully. Soon some of the insects returned to the little moss-cushion; alighting on the upper end of the capsules, they moved downward to reach the upper part of the hypophysis, going from one capsule to another. On approaching a hand lens as unobtrusively as possible, I could distinctly see the flies passing the soft labella of their proboscis over the upper part of the hypophysis, much like house-flies feeding on sugar, meat, or the perspiration of human skin. It was thus quite evident that the flies visiting the hypophyses of *Tetraplodon* lick up a secretion produced by that part of the plant. When disturbed they fly off, rest a little distance away, and shortly return to the moss capsules, so that the drawing power exercised on them by the hypophyses of this *Tetraplodon* is by no means accidental. In alighting or in leaving, the tiny creatures inevitably touch the spores at the mouth of the capsules, when these are ripe and opened. Thus some of the spores become attached to the hairs, the legs, or other parts of the flies and are eventually carried off by them.

[1] I am greatly indebted to my friend, Dr. W. H. Wiegmann, of New York City, for the identification of these mosses.

The November number of THE BRYOLOGIST was published February 8, 1921.

A more detailed examination of the capsules shows a large number of gigantic stomata of the phaneropore type crowded into the upper half of the hypophysis, in the very region so actively sought by the flies. According to Dr. Wiegmann these are the largest superficial stomata he has seen in any species of moss: they measure with their guard cells .051 × .042 mm., while their opening is .021 × .003 mm.; they can readily be detected with a × 10 hand lens. Transverse and longitudinal sections of the hypophysis show below the stomata a great abundance of cells rich in chlorophyll. It is probable that from these stomata exudates the secretion which is lapped up by the flies.

The flies captured while licking the hypophyses of *Tetraplodon mnioides* were both sexes of a small anthomyid belonging to the genus *Phorbia*.[2] I believe, however, that other muscid and anthomyid flies with short proboscis and soft labella are also attracted by the capsules of this and other *Splachnaceæ*.

The facts related above were quite new to me at the time. Meanwhile, however, I have found that N. Bryhn, in Norway, has given an account of similar relations between flies and certain European *Splachnaceæ*. Since my interpretation differs in some respects from Bryhn's, a brief abstract of his interesting paper[3] may not be out of place here. His first observations were made with *Splachnum rubrum*, an arctic species which grows on the excrement of cattle. On a sunny day he noticed that a cushion of this moss attracted a swarm of flies, some much like house-flies, also dung-flies and blow-flies,[4] which alighted on the cushion and crawled over the apophyses of the moss. In a half hour he counted over 50 visits of flies to one cushion. Some of these insects were caught and all were found to be covered with a yellow powder, which, upon microscopic examination, proved to consist of spores of *Splachnum*. The flies either were powdered uniformly over the under side, or they carried a large patch of spores on the thorax. Bryhn also noticed that the flies upon leaving the cushion of *Splachnum* often flew to fresh cow-dung nearby and wandered over it. He thus came to the conclusion that they sow the spores of this moss and further observations with other species of *Splachnum* and *Tetraplodon* confirmed this view. He also succeeded in making the spores of *Splachnum rubrum* germinate on fresh cow-dung.

The *Splachnaceæ* present in their mode of fructification many peculiarities which, according to Bryhn, greatly facilitate the dispersal of their spores through the agency of flies. In the case of *Splachnum*, for instance, a number of plants form dense and rather large cushions, which are as much as 25 cm. across and quite showy even from a distance. The seta is very long (as much as 20 cm.)

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[2] These flies were kindly identified by Mr. J. A. Aldrich, Associate Curator at the U. S. National Museum.

[3] Bryhn, N. Beobachtungen über das Ausstreuen der Sporen bei den Splachnaceen. Biologisches Centralblatt. **17**: 48–55. 1897.

[4] Bryhn's terms are "Dungfliegen" and "Schmeissfliegen." Since no scientific names are used it is difficult to know exactly what kind of flies are meant. Perhaps his "Dungfliegen" were species of *Scatophaga*, while the "Schmeissfliegen" were probably of the common *Calliphora vomitoria*.

and grows even after the spores are ripe. The neck of the capsule is swollen into a hypophysis much larger than the capsule itself; size, shape and color of this hypophysis are variable, but characteristic for each species. In all cases, however, the hypophysis becomes bright colored about the time the spores are ripe, but even thereafter it continues to grow for a time, so that the plant becomes larger and showier the longer it lives. The capsule and its peristome are very hygroscopic; its central columella is widened at the tip into a small disk. When the capsule is ripe, the operculum falls off and, in dry weather, the teeth of the peristome curve outward over the margin of the capsule, which shrivels and contracts, while the columella extends beyond the rim. The spores are thus pushed upward along the columella against its terminal disk, and drop partly outside the capsule on the expanded teeth of the peristome. Most other moss spores are dry and powdery, and easily transported by the wind, but in *Splachnum* they are sticky and form small clusters which remain attached between the columella and margins of the capsule and also on the expanded peristome. They are thus freely exposed and ready to adhere to any part of a fly that may pass over them. In a moist atmosphere the capsule swells again to its former shape and size, and takes the spores back into its cavity, while the teeth of the peristome fold back to close the mouth of the capsule as with a lid, so that rain or dew can not wash the spores away and rob the plant of their use.

In *Tetraplodon* the hypophysis is not so bright colored, but here too, it continues to grow after the spores are ripe; the seta of mature capsules, however, does not grow further. These mosses being perennial, their cushions become much larger and showier than those of *Splachnum*, The columella is crowned with the detached tips of the peristomial teeth, but does not extend beyond the margin of the shriveled capsule. Since the seta is shorter and often also thicker and stiffer than in *Splachnum*, it can support larger insects, such as blow-flies.

From my own observations and those of Bryhn we may conclude that many, if not all, *Splachnaceæ* are adapted to having their spores scattered by flies. In the first place the various members of the family are found growing only on decaying organic substances, such as excrement and dead bodies. As shown experimentally by Bryhn, their spores do not germinate on other substrata. Excrement and dead bodies, however, are comparatively scarce in nature, always considerably scattered over a wide territory, and often hidden in crevices. If, as in other mosses, the spores of the *Splachnaceæ* were carried by the wind, they would have but little chance of reaching the proper substratum. That they are not transported in this way is further shown by their stickiness. They adhere readily, however, to the muscid and anthomyid flies which are constant visitors both to the fructifications of these mosses and to dung and carrion.

Bryhn is still uncertain as to the manner in which the flies are attracted to the moss. He supposes that the beautiful cushions may serve as a "playground" for them, or as resting places between flights. "Most probably," he continues, "the flies are deceived by the bright colors and suppose that the

moss is a collection of melliferous flowers or perhaps, better still, one of the large mushrooms, some species of which possess somewhat similar, though not quite as bright colors. The shape of a *Splachnum* cushion viewed as a whole from a distance reminds one somewhat of one of the large mushrooms which are much liked by flies. On two occasions I found an ant inside the hypophysis of *Splachnum vasculosum*. These ants were undoubtedly intent upon stealing honey; they had bitten an opening, crawled inside and were fooled. And what can deceive an ant, could easily do the same with a fly."[5] Commenting upon Bryhn's observations, Goebel[6] supposes that the luster, rather than the color of the hypophysis is the main attraction, since it is known that shiny objects are very alluring to flies. Goebel further calls attention to the peculiar odor emitted by *Splachnum*, which may also invite the insects.

I have also noticed the very strong and characteristic odor of fruit-bearing cushions of *Tetraplodon mnioides*. It is my opinion that this redolence, as in the case of flowers, is the main attractive agent, at least at a certain distance. It is a well established fact that the olfactive powers of insects are very highly developed. On approaching nearer to the cushions, the flies may then be able to locate the source of the fragrance by the bright and shiny hypophyses. I do not think, however, that they are in the least "fooled" by the moss cushions, for I have observed them licking the surface of the hypophysis. Furthermore, if deceived, they would not return so readily to the same spot when disturbed. The dispersal of the spores of *Splachnaceæ* by flies is, in my estimation, the complete parallel of the cross-pollination of many flowers by insects. In both cases the plant not only possesses certain devices to allure its agents, but also offers food either for them or their young, thus causing them to be steady visitors.

The *Splachnaceæ* are thus far the only bryophytes for which a dispersal of spores by insects has been indicated.[7] Additional observations on the indigenous and exotic members of the family would therefore be welcome to the ecologist and it is hoped that students of mosses will further investigate this interesting topic.

American Museum of Natural History
New York

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[5] That the ants in this case were "fooled," as Bryhn expresses it, is by no means certain. I rather believe that they were attracted by the soft and swollen hypophysis and were enjoying a feast on its juices. These insects could, however, not be of much use in the dispersal of the spores, for it is not likely that they would transfer them to fresh dung or carrion.

[6] Goebel, K. Organographie der Pflanzen. 2d Ed. Bd. II, Heft 1, 889–890. 1915.

[7] C. C. Plitt (Bryologist **10**: 54–55, 1907) has noted that ants are fond of the spores of *Webera sessilis;* he also found the capsules of this moss gnawed on a patch growing over an ant's nest. That these insects would be effective scatterers of the spores of this moss seems extremely doubtful.

LITTLE JOURNEYS INTO MOSSLAND

II.—A February Thaw

George B. Kaiser

The winter which followed my first acquaintance with *Dicranella* and *Catharinea* was a severe one. The mantle of snow long lay deep and protective over bank and hillside, and the woods were hushed, save for the subdued twitter of the juncoes, or the occasional chatter of the squirrels far overhead in the branches of the oaks. The valley of the Wissahickon extended in frozen beauty. The stream was changed into ice, which was dark green like the surrounding hemlocks and along the driveway great ribbed icicles depended from the rocks. The tinkle of sleighbells often resounded there in the short afternoons of January.

In mid-February came a great thaw. For several days rain fell intermittently from dark, lowering skies. Town and country were deluged with slush. Then, one morning, the sun broke through the clouds and spread warm golden beams over all the earth. The air was like a breath of spring. Pulling on a pair of sturdy arctics it was little more than a half hour's journey to the Wissahickon Creek. The decaying ice of the stream, here and there broken, was submerged. Still there was plenty of snow, but enough had thawed or been washed away to expose many a mossy bank. What a Mecca for the bryologist and what a treat for the lover of the beautiful! My mind's eye this day beholds the golden green of *Cirriphyllum Boscii*, which used to be included in the important genus *Eurynchium*. The swollen stems of this pleurocarpous species had been inexpressibly freshened by the rain and warm atmosphere and peeped out at the edge of the snow like a miniature low-lying arboretum of exotic evergreens. Neither before nor since have I seen greater beauty in this *Cirriphyllum* which I came to know that day for the first time.

Then, too, here and there in bare spots the now pale green pin-cushions of *Leucobryum glaucum* studded the thawing snow. When we microscopically examine these leaves we better understand how the thin layer of chlorophyll overspread with tissue shows plainly when the plant is moist and the overlying tissue is transparent, but how the plant appears white when the tissue is dry and consequently opaque. In company with *Leucobryum* were larger clumps of the broom fork moss, *Dicranum scoparium*, with glossy secund leaves. Some of us remember this *Dicranum* in our boyhood—long before we knew its proper name—gracing the space beneath our Christmas tree, with bits of glass among the clumps of moss to look like pools, and on these bits of glass toy ducks, a sight which filled our childish eyes with pleasure.

That day three common species of *Mnium* were at their aesthetic best in vegetative luxuriance, although their sporophytes were but spears, lacking two months to maturity. *Mnium cuspidatum*, here the commonest, displayed dainty stolons with broad leaves characterized by serrations passing halfway down the margin; while the larger *Mnium affine ciliare*, with sometimes clustered fruit, also stoloniferous in growth, showed long marginal teeth prominent

under the handlens, down to the very base of the leaves. The entire-bordered leaf of *Mnium punctatum*, which was evident on only one bank, served as an introduction to this third species.

How fascinating were the perpendicular rocks, which even in midsummer drip with the water from springs! Behind the ice, like those objects the geologists have found encased in amber, appeared the hepatics: *Marchantia polymorpha*, showing behind the glassy covering the gemmae cups, whose biscuit-shaped bodies awaited distribution; and *Conocephalum conicum*, that other species which even under the handlens so well exhibits the air pores—those primitive stomata—resembling tiny craters. Behind this ice the water constantly flowed downward, the elongated air-bubbles appearing like tadpoles, ever wiggling their way in amazing sinuosities.

The base of other banks, laid bare, displayed unbroken masses of another hepatic, *Pellia epiphylla*, the globular spore-cases already visible at the edge of the thallus and the whole plant at this season clad in a hue of decided red. This assumption of a deep maroon color in winter would be a pretty problem for the physiological botanist and is only one of the many which might engage a bryologist keen for research work.

Again, already like old friends, *Dicranella* and *Catharinea* clothed many a bank, and, in moist crevices showing abundant spears of the developing sporophytes with deep red setae, was *Pohlia nutans*, that oft-present species so many times proving its identity by the serrate borders of the slender leaves when the beginner thinks he may have collected a rare *Bryum*.

But over all this world of mosses the sun emanated the dominant charm—our luminary who had been so chary of showing himself during the previous weeks. The lungs expanded with the intoxication of the vernal air, and the eyes were dazzled with contrasts of green and gold and white, sowing pictures of striking changing colors among this lovely valley of a thousand trickling thaw-made streamlets. And, in the later afternoon, when the sunbeams were growing slant, in a cozy little rift among the mossy rocks, *Bartramia pomiformis*, then first found, to be known ever afterward as a true friend, saluted the departing wayfarer with its soft pale-green cushions covered with the tiny green apples of the swelling though quite immature sporophytes. Worthy plant to commemorate our worthy John Bartram, one of the earliest botanists of Philadelphia—a fitting discovery to conclude the delightful bryological experiences of that warm February day which was a harbinger of other balmier days to come in the enchanting Maytime when the capsules of that same Bartramia would be mature, to scatter their spores and perpetuate the beauty of this delicate species as well as the memory of that estimable Friend, whose former abode and gardens may still be visited beside the Schuylkill River in West Philadelphia.

PHILADELPHIA, PA.

OCCURRENCE OF FUNARIA HYGROMETRICA (L.) SIBTH.

Aravilla Meek Taylor

One of the most interesting of mosses from the viewpoint of the ecologist is *Funaria hygrometrica* (L.) Sibth.

It is cosmopolitan, appears in great abundance in various soils, and is a prolific sporophyte producer. It is probably because of its wide distribution and ease of recognition, that we find it given as the type species in many elementary texts of Botany, and in many respects it is admirable for this purpose.

Within the city limits of Chicago we find it as a pioneer crevice-species on rocks and in cracks of the cement walks. In the vicinity of the city it can be found in cracks of stone walls and in crevices of small rock ledges. It is equally at home on cinder piles along railroad embankments and on old ash heaps. It has been found fruiting on areas on which rubbish had been burned during the previous season, and along the gravel walks in Lake Park in the city of Milwaukee.

It comes in on almost pure sand in vacant city lots, as in Chicago, or on hard clay soils as found in Corvallis, Oregon, and can be found in similar abundance on the soils of worn-out farms. As mentioned by Grout[1] it may even occur as a fireweed, and not only that, but as a fire-weed in swamps, as was the case a few years ago in a swamp forest at Thornton, Illinois, where the first new growth, a close covering of *Marchantia* was followed by a luxuriant display of *Funaria* and *Polytrichum commune* L. The former was of unusual size and developed a great quantity of spores. It is not uncommon to find *Funaria* in low depressions filled with water. Unlike most plant species, it thrives with similar ease on the Atlantic coast, in the middle west, and on the coast of the Pacific.

How shall we account for the presence of *Funaria* in such widely different habitats? It cannot be explained by a lack of competition with other plants alone. However true it may be that few plants find in these habitats their most favorable conditions for growth, back of the scarcity of herbaceous plants must be some cause which leads to their absence, but which does not prove a detriment to *Funaria*. Compared with herbaceous species this moss seems to possess a much greater toleration for unusual chemical conditions of soils, since it is able not only to live in acid soils but shows an equal toleration to alkaline conditions. Old worn out farm soils are often easily shown to give an acid reaction, while a basic reaction can be obtained from a test of cinder piles and ash heaps. That the moss should be resistant to *one* is not surprising, but that it can live as well in both acid and alkaline habitats is worthy of consideration. The same thing may be said of its ability to withstand great variation in extremes of moisture.

Added to this tolerance of soil and moisture conditions is the production of great quantities of very light spores which may be carried far afield by the wind. The well-known peculiar twisting of the seta when moistened, must

[1] Grout, A. J. Mosses With a Hand Lens and Microscope.

also aid in dispersal of spores. Another decided advantage which *Funaria* has over many other mosses is that in many regions it is an annual[2] maturing its spores not only in one season but during the early part of the season. Mature capsules were found in Chicago and Milwaukee in June and in Oregon in May.

All of these characters tend to make *Funaria* a species of wide distribution, and enable it to take entire possession of many barren areas. Its economic value lies in its pioneer character. It holds possession only until, by accumulation of waste and change in chemical content of the soil, other plants are able to exist in places previously wholly unsuited to their needs.

ELLIOTT, IOWA.

BUXBAUMIA INDUSIATA BRID., FROM BRANDON, VERMONT

D. LEWIS DUTTON

In the latter part of January, 1916, I found a capsule of a moss that was a *Buxbaumia* without any doubt, but did not look like anything that I had collected before. Upon looking up the genus *Buxbaumia* in "Mosses with Hand-lens and Microscope" I found that I had a rare moss, *Buxbaumia indusiata* Brid.

No amount of search then brought any more specimens to light, and not until April, 1920, did I find any more capsules. At that date I found five or six good specimens which have since been verified by Dr. Grout.

BRANDON, VERMONT

SOME WAR BRYOLOGY

The two following publications are so unlikely to be generally accessible that brief notice of them as illustrations of the triumph of science over warfare may not be out of place.

I

N. MALTA: BEITRÄGE ZUR MOOSFLORA DES GOUVERNEMENTS PLESKAU, MIT BESONDERER BERÜCKSICHTIGUNG DES KALKSTEINGEBIETES DER WELIKAJA-MÜNDUNG. RIGA, 1919.

This is a booklet of 78 pages, dealing both from the systematic and oecological point of view with the bryophyte vegetation of a limited area in Russia in the province of Pskov (Pleskau, Pleskow), just east of the former Baltic Provinces. The author was forced by "circumstances of war" to spend the years 1916 and 1917 in Pskov and made use of this opportunity to study intensively the moss-vegetation especially of the dolomitic limestone area about the mouth of the Velikaya ("Great River") which empties into Lake Pskov. The im-

[2] Campbell, D. H. Mosses and Ferns, p. 166.

mediate region was hitherto uninvestigated as to its bryological flora, but was naturally found to be closely similar to that of corresponding areas in the better known Baltic Provinces. A complete list of the species of bryophytes found is given with careful details as to habitat, etc. A new *Bryum androgynum* is described (by Warnstorf) and figured, and the author also includes a new variety *pleskowiensis* of *Seligeria recurvata* with figure, remarking that it is very near *S. campylopoda* Kindb. and suggesting that critical revision might reduce the number of species of *Seligeria*. The region investigated lay well behind the Russian lines through 1917, but has since been the scene of considerable fighting. That a scientific work of the sort could be published in Riga under the disturbed conditions of 1919 is remarkable, that it is printed in German is hardly less so.

II

T. Herzog: Beiträge zur Bryogeographie Südosteuropas. Kryptogamische Forschungen, herausgegeben von der Bayerischen Botanischen Gesellschaft, München, Heft IV, 274–298, 1919.

This contains two distinct papers, one on Macedonia and the other on the Transylvanian Alps. The author was actively engaged in operations at the front in the Balkan theatre of war, taking part in the campaign against Rumania and serving a year apparently with a German unit cooperating with the Bulgarian forces in Macedonia. In the latter service he was stationed in the critical sector of the Cherna bend, where he was able to study intensively a limited area, whose moss-vegetation was hitherto unknown. The flora proved to be predominantly Mediterranean, though lacking some of the latter's characteristic elements. A list of mosses (102) and hepatics (12) is given with localities and some critical notes. *Orthotrichum insidiosum* is proposed as new, also *Mielichhoferia paradoxa* found in three stations, a quite new type which is even generically hard to place. It appears to be one of those relicts of tropical or more remote relationship, of which a number have been discovered among the mosses of southern Europe within recent years. It is compared with *Bryum splachnoides* (Harv.) C. M. originally described from India, but now known from several localities in southern Europe, from which species it is said to be entirely distinct.

The Transylvanian collections were made during the active operations of the invasion of Rumania in the border mountains of the region of Roter Turm Pass, etc. The list is not meant to be complete, though a very extensive one under the circumstances. The Carpathian moss-flora was known to some extent before, and no startling finds were made, but a good idea of the essential facts is given.

A. LeRoy Andrews

Ithaca, N Y.

MISCELLANEOUS NOTES

National Parks and Monuments threatened.—Every reader of this magazine and every member of the Sullivant Moss Society should see to it that his representatives in the two houses of Congress are made aware of the fact that he is decidedly opposed to any legislation which will in any way permit invasion of the National Parks and Monuments or of the National Forests by water power or irrigation projects which will impair the integrity of such areas as preserves of natural life and natural environments. No lover of the bryophytes or lichens, or, indeed, of Nature in any form, needs further explanations than that water-power and irrigation interests are active, particularly with regard to California and the Yellowstone National Park, in trying to secure reservoir sites and other concessions from free government land rather than from other sources not so free. Legislation before the last session of Congress seriously menaced some of the finest natural environments in the parks, naturally those next the waterways or in lowlands likely to be submerged as reservoir sites.

At the present time it appears that the volume of protests from nature-lovers and upholders of the integrity of the national preserves has had its effect and that these areas will be excepted from the provisions of the Federal Water Power measure. However, the matter may not rest there, and watchfulness should be exercised. Should your Senator or Representative, or future nominees for such positions at Washington, not be in sympathy with the integrity of these areas, it is important to bring this to the attention of the Secretary of the National Parks Committee, Room 2273, Woolworth Building, New York City.

O. E. Jennings.

SULLIVANT MOSS SOCIETY NOTES

The following additions should be made to the address list of the Sullivant Moss Society; some of them have already been published.

New Members

Mrs. Frederick A. Cleveland.....70 Winter St., Norwood, Mass.
Mrs. Julia Lenington.....R. F. D. 2, Pomona, Calif.
Mr. George L. Moxley.....1964 East First St., Los Angeles, Calif.
Mr. James Murray.....2 Balfour Road, Carlisle, England.
Mr. Charles Potter.....682 East Burnside St., Portland, Ore.
Dr. P. O. Schallert.....349 Sprague St., Winston-Salem, N. C.

ANNUAL REPORTS—SULLIVANT MOSS SOCIETY—1920

Report of the President.

Few subjects of Society interest have occurred during the year. The routine has been carried on by the officers. I have written a number of letters in connection with new members, as well as for furtherance of the general work.

There is one item I would like to bring to the attention of the Society. During the war when so many journals were of necessity discontinued or prices raised, our BRYOLOGIST has been published with only the unavoidable delays caused by the printer and by transportation difficulties, and we have not raised Society membership, nor subscription to the journal. This has been due to the untiring vigilance of our Secretary-Treasurer, Mr. Chamberlain, and I am sure all will appreciate the fact when it is mentioned.

It may be that some new arrangement will have to be made if the unsettled state of affairs in the business world continues for too long a time. But this is in the future.

Just at this writing word has been received of the serious illness of our Vice-President, Dr. Riddle. This necessitates the election of one in his place. The Executive Committee has sent out the ballot for officers for 1921 with the name of Mr. C. C. Plitt of Baltimore as vice-president, and those who know him personally feel sure he will make a valuable member of the official family.

In closing let me urge each member to realize his obligation to the Society, to increase its membership, and to stimulate the study of cryptogams in every possible way. More of our young people should be directed to this fascinating branch of botanical study. Our public and private schools are doing more and more active Nature-Study work, especially here in New York in connection with our Botanic Gardens. The Brooklyn Botanic Garden has just graduated its seventh class of duly qualified Nature-Study Teachers. So far the lower orders of plants, have not figured in their instruction, but, perhaps in time, the cryptogams may be studied as well as the flowering plants, and at least our boys and girls be taught to recognize them and be able to collect intelligently so that others may have material for study. The problems of the effect on mosses and hepatics under influences of cultivation could be one branch of the work quite easily taken up at our Brooklyn Garden. Let us all do our part to make this coming year one of progress to our Society.

ANNIE MORRILL SMITH

78 ORANGE ST., BROOKLYN, N. Y.

Report of the Secretary-Treasurer.

In submitting his Report for the year just past, the Secretary-Treasurer is acutely aware that promise and performance, as regards the prompt publication of the BRYOLOGIST, have been widely at variance. Delays that were most vexatious occurred all through the year, and their causes seem to be wholly outside the control of the Editor and of the Secretary. They constantly try to bring things up to date, and still have hopes, in spite of the many difficulties.

The balloting for the election of officers for 1921 was much delayed, since it was necessary to change the ballots themselves at the last moment. The votes cast, 71 in all, were unanimous for the officers nominated by the executive committee. It is a very great sorrow to the Secretary to announce that the death of Dr. Riddle occurred between the time of the writing of this report and the printing of the magazine.

The membership of the Moss Society shows a slight decrease since the last annual report, there now being 140 members as against 143 then. The death of three members, Messrs. Hagen and McDonald, and Miss Miller, has come to the Secretary's knowledge the past year; three members have resigned; three have been dropped for failure to pay the annual dues. To partially balance these losses six new names appear upon our lists. It should be obvious that a steady increase in membership is very desirable. While it is unlikely that a very large number of persons will ever be interested in the work of the Moss Society, still our present membership should be increased by one half if the Society is to continue to do useful, active work. Greater losses may at anytime be expected among our elder members, and an increase of revenue is really most necessary. The Secretary is opposed to making any increase in the dues, feeling that it is really for the best interests of the Society and of scientific study to have these fees as low as possible. On the other hand, the cost of printing the magazine alone is more than twice what it was five years ago, and plates are still more expensive in proportion. While the financial report shows a balance on hand, and this balance will be sufficient to meet the costs of the two issues of THE BRYOLOGIST remaining for 1920, it should be remembered that the costs of postage, expressage, herbarium expense, and plates, shown by the account is merely nominal. Much of this expense is voluntarily assumed by the officers, curators, and contributors, as their individual contribution to the success of the Society. This should not be necessary.

The statements above bring the Secretary to two points that have been emphasized in all of his recent Reports: the state of the exchange department, and the necessity for short notes in the magazine. For many years the Secretary has kept a record of the material offered, and of the number of persons applying for his own offerings. The falling off has been steady. It is no longer possible for the Secretary to obtain sufficient good material to offer foreign members for exchange. He cannot ask them to give without adequate return. It is with much regret that the Secretary makes this announcement, but the results no longer are at all commensurate with the labor expended. There are still on hand specimens of many interesting species, which the Secretary will gladly distribute to any member who wishes to send good material in exchange. But, there will have to be more cooperation.

Exactly a similar situation exists in regard the THE BRYOLOGIST. To increase our membership it is necessary to have articles of interest to the beginner, and articles that have a certain popular appeal. The Secretary refers especially to articles such as those of Dr. Frye and Dr. Bailey during the past year. To increase these articles more members must take a personal interest. Neither the Secretary nor the Editor have the time to write begging letters for short notes. Neither do they like, as has been necessary the past year, to refuse articles of permanent value, because the space requirements and costs of plates are so far beyond our ability. Just as soon as the financial standing of the Society justifies it, the magazine will print 20 pages per issue. To accomplish this means active cooperation, not passive acceptance, on the part of each individual member.

The Secretary congratulates the members on the showing made by them individually in the raising of the Herbarium Fund for M. Jules Cardot. Owing to the delays in the appearance of THE BRYOLOGIST, all work in connection with this fund had to be done through individual letters, and had to be as concentrated as possible. The raising of the $250.00, however, was accomplished in time to take advantage of low rates of exchange, and hence supplement the sum to a considerable extent.

SUMMARY OF ACCOUNTS

RECEIPTS

Balance on hand, December 1, 1919	$119.95
Dues for current year	180.85
Subscriptions for current year	88.85
Arrears collected	19.30
Sales of back issues, and repayments from members	29.00
Incidental and minor receipts, advertising, etc.	28.83
Received through combinations for Dr. Grout	2.55
	$460.33

EXPENDITURES

Minor printing and stationery	$ 24.23
Postage, bank fees, incidentals	11.76
Paid to Dr. Grout	2.55
Herbarium expenses	3.00
Purchases for members	21.65
Purchase of back issues	16.00
Plates for the magazine	18.90
Printing, five issues of THE BRYOLOGIST and Index	249.00
	$347.09
Balance on hand, November 30, 1920	113.34
	$460.43

EDWARD B. CHAMBERLAIN, *Secretary-Treasurer*

Report of the Curator of the Moss Herbarium for 1920.

The Herbarium has again changed residence. In April it was moved into new quarters located less than a mile away from the old, in charge of the same Curator, who remains ready to aid those who desire determinations and who wish to participate in active bryological collection and study. If any confusion or lack of attention to correspondence occurred during the two changes of base, apology is here made. Let us hope that no further moving may be necessary for some time to come.

We wish here to emphasize the need of greater activity among our members if we are to progress and add to the numbers of specimens in our herbarium and to the general interest in our Society. Why should not more of us go forth and find, in the field of mosses? As has been repeatedly stated, the material lies within the reach of all, and the species of one neighborhood are often quite unlike those of another. With observation and care we may collect valuable

fruiting specimens of many an interesting kind which may be altogether suitable to offer in the columns of THE BRYOLOGIST to other members, with whom correspondence and exchange may be thus established and carried on. The Society, too, requires more material in quantity for the continuance of exchange work, and such material at this time would therefore be most acceptable.

In collecting we should be careful to gather, where possible, unmixed fertile specimens. Those who determine mosses know how discouraging it is to work out almost inextricably tangled mats. Such mixtures generally contain several kinds of common mosses in various states of immaturity and ill condition quite unworthy of the time involved in disentangling strands and affixing names to them. Of course, should the mosses be rare ones the time is well spent, but, unfortunately, this is seldom the case. Do your best then, please, to collect really worth-while material, clean, unmixed, and fertile.

It is a genuine pleasure to study such specimens as those which were sent a few weeks ago by Dr. Lewis Dutton, of Brandon, Vermont. Each envelope contained a single species of moss in excellent condition. Among Dr. Dutton's specimens were *Neckera complanata*, *Brachythecium acutum*, *B. reflexum*, *B. velutinum*, *Stereodon pratensis*. *Campylium stellatum*, and *Bryum Duvalii*.

Correspondence during the year with Mrs. Elizabeth M. Dunham and Mrs Rachel L. Howe of Massachusetts, who are ever alert to find new things, has been, as usual, of great interest and we look forward to the results of a collecting trip to the Chocorua neighborhood of the White Mountains which they made in October. Mrs. Britton, Mr. Chamberlain, Miss Deam, Mrs. J. F. Merrill, and others, have also been correspondents and contributors from time to time, while among our new members Dr. P. O. Schallert of Winston-Salem, North Carolina, may be credited with very enthusiastic collecting indeed during recent months. Dr. Schallert's boxes of Carolinian mosses contain many representative mosses of his region, including *Sciaromium Lescurii*, with the daintily bordered leaves which separate this species from other *Amblystegia*, and *Cryphaea glomerata*, the tree-loving moss so widely spread through the southern United States.

We should also acknowledge specimens contributed by P. G. M. Rhodes, duplicates from the herbarium of Gumbel, a bryologist of some note who lived early in the nineteenth century. Mr. Rhodes has recently been purchasing abroad a number of notable mosses and these specimens were among them. A box of mosses collected by Dr. O. E. Jennings in Florida has also been worked over during 1920.

And so, we close, again with the appeal to our members: that they go afield, collect worthy material, send it to the Curator if they wish it named, and thus really get in touch with the Sullivant Moss Society which needs their zealous co-operation to grow and adequately fulfil its aims!

GEORGE B. KAISER, *Curator*
6620 GERMANTOWN AVE., PELHAM, PHILADELPHIA, PA.

Report of the Lichen Department for 1920

Much interest has been manifested by our members in the study of Lichens during the past year, and, as a result, the Lichen Herbarium has been materially enriched.

Our list of contributors this year is headed by Mr. George L. Moxley and Dr. P. O. Schallert. Mr. Moxley sends us fine specimens from southern California and Dr. Schallert specimens from North Carolina, a state which, thus far, has been poorly represented in our Herbarium. Our other contributors are: Mrs. Ella L. Horr, Mrs. M. A. Noble, Dr. Albert C. Herre, Mrs. Anne L. Read, and Dr. O. E. Jennings.

Some work has been done on the determination of the fine lot of specimens collected in Hawaii, and sent us by Miss Alice Eastwood; it is expected that a complete report will be forthcoming this coming year. A number of these specimens, as they have been determined, have been added to the Herbarium.

But our largest source of enrichment has been a lot of over 300 specimens of Norwegian Lichens from Dr. Bernt Lynge, sent us in exchange for a complete set of the Hasse "Lichenes Exsiccati." These specimens are exceptionally fine, and we are delighted to have them.

Of the specimens received from the various sources, 410 have been mounted, making the number now in the Herbarium 3850. Our sincere thanks are herewith conveyed to those who have lent a helping hand, and we hope that the interest and enthusiasm shown will continue unabated.

Respectfully submitted,

CHARLES C. PLITT, *Curator*

Report of the Curator of the Hepatic Herbarium

Greetings to all the members of the Sullivant Moss Society!

It is a pleasure again to care for the herbarium, and to relieve Miss Haynes, who has so efficiently carried on the work of this department during my absence. The herbarium has survived two movings and two year's storage, and is rapidly getting in order again.

During the year 211 specimens have been contributed by: Miss C. C. Haynes, Dr. P. O. Schallert, H. S. Jewett, A. H. Brinkman, H. B. Dudley, Helen Greenleaf, J. Evans, H. Dupret, Geo. L. Moxley, A. Lorenz, Jos. Murray, Stewart Burnham, John Macoun, and Geo. H. Conklin.

In the collection of Dr. Schallert at Winston-Salem, N. C., *Nardia fossombronioides* was found. This makes the fourth station for this interesting plant.[1] Twenty-seven specimens from the Lake Superior region, Bayfield County, Wisconsin, were added by the writer. Among these were *Nardia hyalina*, *Lophozia Kaurini*, and *Scapania subalpina*.

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[1] See BRYOLOGIST **22**: 59–62. Sept., 1919.

It is hoped that more members interested in the Hepaticae will contribute. We have a fine lot of duplicates to distribute to students in exchange for locality specimens. The Herbarium is of value not so much for its rare specimens, but for the representation of the species found in each locality. We wish members to bear this in mind and make contributions fully covering their collecting areas.

May I again appeal to the members to contribute if possible the following specimens, which are not represented in this herbarium. These are given in the Society Exchange List and are needed for type study: *Riccia albida, R. Beyrichiana, R. californica, R. Campbelliana, R. catalinae, R. hirta, R. McAllisteri, Peltolepis grandis, Plagiochasma rupestre, P. Wrighti, Grimaldia californica, Neesiella rupestris, Asterella violacea, A. echinella, Marchantia domingensis, M. paleacea, Sphaerocarpos cristatus, Geothallus tuberosus, Riella americana, Metzgeria angusta, M. uncigera, Fossombronia lamellata, Scalia Hookeri, Marsupella arctica, M. Bolanderi, M. condensata, M. groenlandica, Nardia biformis, N. Lescurii, Prasanthus suecicus, Jungermannia Bolanderi, J. danicola, J. Rauana, Lophozia elongata, L. harpanthoides, L. Jenseni, L. murmanica, L. Vahliana, Mesoptychia Sahlbergii, Anastrepta orcadensis, Sphenolobus groenlandicus, Plagiochila alaskana, P. arctica, P. Fryei, P. virginica, Clasmatocolea exigua, Lophocolea Leiboldii, Chiloscyphus Webberianus, Cephalozia ambigua, Cephalozilla arctica, C. biloba, C. Bryhnii, C. elegans, C. floridae, C. grimsulana, C. ludoviciana C. obliqua, Odontoschisma Gibbsiae, O. Macounii, Calypogeia acuta, Pleuroclada albescens, Herberta tenuis, Diplophyllum argenteum, D. imbricatum, D. incurvum, Scapania americana, S. convexula, S. cordifolia, S. dentata, S. Evansii, S. heterophylla, S. Kaurini, S. spitzbergensis, Radula arctica, R. flaccida, R. Hallii, R. Lescurii, R. polyclada, Porella Swartziana, P. wataugensis, Cololejeunea diaphana, C. Macounii, C. subcristata, C. tuberculata, Aphanolejeunea sicaefolia, Lejeunea floridana, Microlejeunea Cardoti, M. Ruthii, Rectolejeunea Berteroana, Taxilejeunea erosifolia, Ceratolejeunea cubensis, Drepanolejeunea bidens, Frullania arietina, F. chilcootiensis, F. cucullata, F. gibbosa, F. mexicana, F. saxicola, F. Wrightii, Notothylas Breutelii, Anthoceros Donnellii, A. Hallii, A. phymatodes, A. Ravenelii.*

GEO. H. CONKLIN, *Curator*

EXCHANGE DEPARTMENT

Offerings—To Society members *only*. Return postage rather than a stamped envelope should be sent.

Miss Daisy Levy, 403 West 115th Street, New York City.—*Amblystegium orthocladon* (Beauv.) Kindb., collected at Harper's Ferry, W. Va., July, 1919.

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MARCH, 1921

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All material for identification should be sent to the curators direct; all other matter relating to the magazine should be sent to the Secretary or the Editor.

THE BRYOLOGIST

Vol. XXIV MARCH, 1921 No. 2

BAHAMA MOSSES

ELIZABETH G. BRITTON

The following is a list of the mosses, 33 species in 28 genera, contributed by Mrs. Elizabeth G. Britton to the Bahama Flora.[1] The list is printed here for convenience of reference by those who have not access to the original publication.

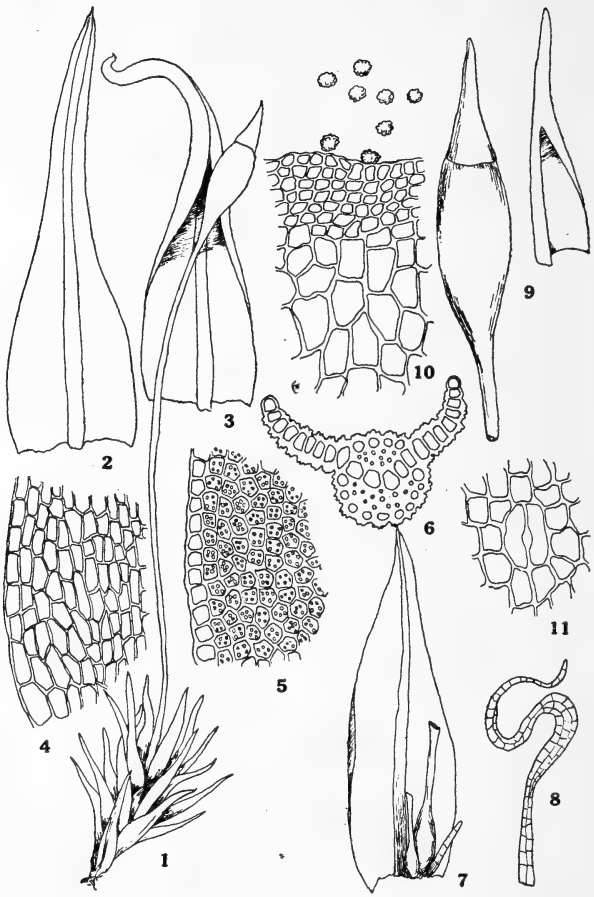
Leucobryum albidum (Brid.) Lindb., *Octoblepharum albidum* (L.) Hedw., *Fissidens monandrus* Mitt., *Fissidens Garberi* Lesq. & James, *Fissidens radicans* Mont., *Calymperes Richardi* C. M., *Syrrhopodon Gaudichaudii* Mont., *Tortula agraria* Sw., *Gyroweisia Barbula* (Schwaegr.) Paris, *Hymenostomum flavescens* E. G. Britton, sp. nov., *Hyophila Tortula* (Schwaegr.) Hampe, *Desmatodon Garberi* Lesq. & James, *Barbula Crugeri* Sond., *Trichostomum rivale* (Mitt.) Jaeg., *Macromitrium mucronifolium* (Hook. & Grev.) Schwaegr., *Schlotheimia Sullivantii* C. M., *Funaria hygrometrica* (L.) Sibth., *Funaria flavicans* Michx., *Bryum capillare* L., *Bryum coronatum* Schwaegr., *Leucodontopsis floridana* (Aust.) E. G. Britton, *Pireella cymbifolia* (Sull.) Cardot, *Papillaria nigrescens* (Sw.) Jaeg., *Stereophyllum radiculosum* (Hook.) Mitt. (*Homalia Wrightii* Sull.), *Haplocladium microphyllum* (Sw.) Broth., *Amblystegium Sipho* (Beauv.) E. G. Britton, *Isopterygium micans* (Sw.) Cardot, *Vesicularia vesicularis* (Schwaegr.) Broth., *Mittenothamnium diminutivum* (Hampe) E. G. Britton, *Taxithelium planum* (Brid.) Spruce, *Sematophyllum subpinnatum* (Brid.) E. G. Britton, *Sematophyllum admistum* (Sull.) Mitt., *Sematophyllum sericifolium* Mitt.

Hymenostomum flavescens E. G. Britton, sp. nov. Bahama Flora, p. 485. 1920.

Plants usually light yellowish-green. Stems short, 3–5 mm. high; leaves 1.5–2 mm. long; apex lanceolate, incurved and cucullate, base broader and hyaline; margins inrolled, entire; vein stout, rough above, ending in the mucronate point; lower cells clear and smooth, up to 67μ long; upper cells only 8μ long, densely papillose on both surfaces, with 3–4 small papillae. Dioicous. Pedicel slender, 10–15 mm. long, erect; capsule ovoid-cylindric, 1–1.25 mm. long with the beaked lid; calyptra cucullate, twisted; peristome and annulus

[1] The Bahama Flora. By Nathaniel Lord Britton and Charles Frederick Millspaugh. pp. 477–500. New York. 26 June, 1920.

The January number of THE BRYOLOGIST was published March 22, 1921.



HYMENOSTOMUM FLAVESCENS E. G. B., SP. NOV.

FIG. 1. Plant, × 8.
FIG. 2 and 3. Stem-leaves, × 23. Fig. 2, dry; 3, when moist.
FIG. 4. Basal cells of leaf, × 180.
FIG. 5. Margin of leaf and cells about ½ down leaf, × 200.
FIG. 6. Cross-section near middle of leaf, × 180.
FIG. 7. Perichaetial leaf with archegonia, 23.
FIG. 8. Paraphyses sometimes found enclosed in the perichaetial leaves, × 40.
FIG. 9. Capsule and calyptra, × 11.
FIG. 10. Exothecal cells at and near rim of capsule, also spores, × 180.
FIG. 11. Stoma.

none, the mouth bordered by 5–6 rows of smaller, denser, quadrate cells; walls thin; spores brown, papillose, 18–24μ in diameter, ripe in winter.

New Providence, Eleuthera, Andros, Great Bahama, Abaco and Acklin's Island. Type from Pinder's Point, Great Bahama, Britton and Millspaugh, *2515*. February, 1905. Bahama Hymenostomum.

New York Botanical Garden

LITTLE JOURNEYS INTO MOSSLAND

III.—Bryologizing in Early Spring

George B. Kaiser

Early spring is a particularly good time to go moss-hunting. Not only do many of our common species mature their spores at this season, but the as yet scant growth of grasses and other herbaceous plants allows us to more readily see and collect specimens—especially of several very small bryophytes which later more easily escape our attention.

Observe those clayey banks covered with an abundant green felt of protonema and you will see groups of sturdy gray sporophytes, two to three inches high, standing up straight as soldiers, their hair-caps mostly gone and the Polytrichum-like peristome exposed. This moss is *Pogonatum brevicaule* and, towards the South, on bare sandy banks, one may find the nearly allied *Pogonatum brachyphyllum*, whose leaves and fruiting parts have a decidedly reddish tinge.

Closely examining other clayey or marly banks one may here and there see tiny dark red dots. These dots generally prove to be male plants of *Acaulon rufescens*, showing antheridia clustered amid rosettes of minute leaves with very clear and large cells. The female plants occur far less often and I have collected them but once. This was on a day in March some years ago, when Mr. Chamberlain and I were in a party led by Dr. C. C. Abbott to view the great white oak in the Meeting House grounds at Crosswicks, New Jersey. Our way passed along the then much swollen waters of Crosswicks Creek and to avoid the muddy conditions of the streamside we entered a fallow field. Bryologically this was a fortunate move, for in that field we found three exceedingly interesting dwarfs among the mosses. We were soon upon all fours examining them.

The first one was the afore-mentioned Acaulon in fine fruiting condition, displaying round capsules of light brown immersed among the pink-tinted leaves. *Phascum acaulon* (*P. cuspidatum*), the second, was not difficult to differentiate under the handlens. The plants were longer, the capsules not quite so immersed, and the leaves distinctly pointed and twisted.

The third, *Astomum Sullivantii*, was probably the most attractive of the trio, with its evident, glossy, dark-brown capsules appearing among the beautifully twisted leaves. Both the Phascum and Astomum I have often found

elsewhere at this season and they are neither particularly rare nor hard to discover. Rather bare sandy or clayey soil along roadsides and in fallow fields are likely places to look for them and, like many another moss, when once you become familiar with their appearance and habits you may readily collect them again and again in hitherto unlooked-for places.

It is somewhat the same with *Pleuridium subulatum*, whose "emerald dewdrops," to which Dr. Grout likens their immature fruiting condition, may be picked up in many an old field hereabouts in April. The capsules in this species are immersed and the moss is small, indeed, but the clumps may be several inches square and so abundant that they are truly conspicuous. Near Mt. Gretna, Pennsylvania, one mid-May, we came across a field literally filled with fertile Pleuridium, and the dainty tiny plants in myriads, their capsules then quite brown and mature, made a sight not to be forgotten.

The cosmopolitan *Ceratodon purpureus* covers certain sandy areas in southern New Jersey and, during April, the massed purple sporophytes take the sunlight in such a way that they are genuinely colorful and impressive. lAt the end of April we may collect the ripened capsules and examine the annu us setting free the delicate teeth of the peristome, which, indeed, resemble the slender horns of some imaginary microscopic gazelle. *Mnium cuspidatum* matures at the same time, and on Memorial Day we may expect the ripe capsules of *Pohlia nutans*.

Those curious little urn-like fruits of *Physcomitrium turbinatum*, too, are a frequent vernal sight in the grassy places of our region. The capsules attain maturity irregularly and in the same clump we may see them exhibiting every shade of green, light-brown, and dark chestnut. This moss is most easily determined and it soon becomes a pleasant companion on our May-time excursions.

But of all the mosses of the spring, perhaps the most remarkable is *Buxbaumia aphylla*. I first came to know this little "hump-backed elf," as Mrs. Britton calls it, on a memorable day in April some years ago, when for the first time *Leucobryum glaucum* was found by us in rich fruiting condition. It was at the edge of an old woods near Radnor Hunt, Pennsylvania, and glancing down, I perceived what looked like small glossy brown buds on a shaded bank, accompanied by Dicranella and undeveloped plants of the lichen Cladonia. Further investigation showed that these "buds," on stalks a half-inch high, were capsules of Buxbaumia, which occurred there in considerable numbers. Subsequent finds of Buxbaumia along Wissahickon Creek and in the Pocono Mountains have always awakened a thrill, but never quite such a thrill as that first discovery.

What a strange little moss it is! Saprophytic in habit, it occupies among the mosses somewhat the position that the Indian Pipe and Pinesap do in the Heath Family. What has been its history throughout the ages? How has it become different from most of its congeners? Ample food there for thought, for theoretical meditation, and perhaps even for philosophical discussion!

6620 Germantown Ave.,
Pelham, Philadelphia, Pa.

NOTES ON A SMALL COLLECTION OF HEPATICS FROM OREGON

Wm. Hy. Pearson

I have had the opportunity of examining these specimens through the kindness of Mr. James Murray, of Carlisle, who received them from the collector, Mr. Charles Potter, of Portland, Oregon. The material was collected during October, 1920. The locality, McKleay Canyon, is, I understand, within the limits of Portland. Specimens have been deposited in the Manchester Museum, England.

Aneura latifrons Lindb.—Monoicous. Stems digitate; margin a layer of one to two single cells; branches of 2–3 cells; cortical cells small, 25 antical and 25 postical, 3 large inner cells thick at the middle, 12 cells broad; bracts surrounding the calyptra laciniate, 5–6 cells long; calyptra tuberculate. Male spikes small, narrow; bracts 4–6 pairs.—McKleay Canyon.

Chiloscyphus adscendens Sulliv.—Some leaves acutely bidentate, under leaves quadrifid, bracts bidentate.—Growing with *Calypogeia fissa*, McKleay Canyon.

Cephalozia Lammersiana (Huebn.) Spruce.—Monoicous; bracts of female flowers entire or slightly notched on one side; male bracts with very large underleaves.—On rocks, south side of McKleay Canyon.

Cephalozia media Lindb.—Dioicous; female bracts entire.—On rocks, south side of McKleay Canyon.

Calypogeia fissa (L.) Raddi.—Insertion of the leaves between patent-divergent and patent (60°); leaves 1.1×0.9 mm.; walls thick, no trigones.—On a bank in a damp location, McKleay Canyon.

Lepidozia reptans (L.) Dum.—On rocks, south side of McKleay Canyon.

Scapania Bolanderi Aust.—On rocks, south side of McKleay Canyon.

Madotheca platyphylloidea Schweintz.—Female bracts, lobe, and lobule acute, denticulate; bracteole obovate, slightly denticulate; perianth with a wide mouth fringed with 25 four-celled, hamate teeth, composed of very small cells; male spikes on chief stem or branches, bracts in four pairs, lobe-apex obtuse, lobule smaller, apex acute, upper portion reflexed; bracteole entire, apex rotundate; two large antheridia in each bract.—On dead trees, and on a damp bank; McKleay Canyon. On dry, shady soil, Clackamas Canyon.

Lejeunea cavifolia (Ehrh.) Lindb.—On dry soil in shade, Clackamas Canyon.

Frullania Californica (Aust.) Evans.—Neatly pinnate; leaves semi-cordate, lobule erect, close to stem, saccate; underleaves oval-rotund.

18 Palatine Road,
Manchester, England

HYOPHILA SUBCUCULLATA SP. NOV.

R. S. Williams

Antoicous, 1 to 3 antheridia about 0.2 mm. long, with few or no paraphyses, more or less enclosed by 1 or 2 concave, pale, smooth, costate leaves less than 0.5 mm. long, situated so close to the perichaetium as to appear at times paroicous: plants in cespitose, brownish-green mats with mostly simple stems 4 or 5 mm. long; stem-leaves incurved and more or less crispate with involute margins when dry, nearly straight and somewhat spreading when moist, the upper about 2 mm. long, oblong to oblong-linear, widest about halfway up the leaf, entire, the apex somewhat cucullate, rather broadly acute and shortly apiculate, the lower leaves very small; costa stout, nearly or quite smooth on the back, papillose on the inner face, about 40μ wide halfway up, excurrent, in cross-section near the middle showing about 4 guide-cells, stereid cells above and below them and outer cells differentiated, much larger on the upper than under side; cells of upper part of leaf distinct, mostly mamillose and papillose on both sides, more or less roundish to transversely elongate, the median 6–8μ in width, the basal cells paler, smooth, irregularly elongate to rectangular, up to 60 or 80μ long; perichaetial leaves not differentiated or sometimes a short inner leaf; seta 4 to 5 mm. long; capsule elongate-oval, a little contracted below the mouth when dry and empty, about 1.2 mm. long without the lid, the somewhat obliquely beaked lid one-half to two-thirds as long, the stomata few, in one row close to the base; peristome and annulus none; calyptra cucullate, extending halfway down the capsule, becoming somewhat twisted on falling off; spores rough, about 20μ in diameter.

San Diego River, Pinar del Rio Province, Cuba. Brothers Leon and Hioram, *number 4515*, August, 1914.

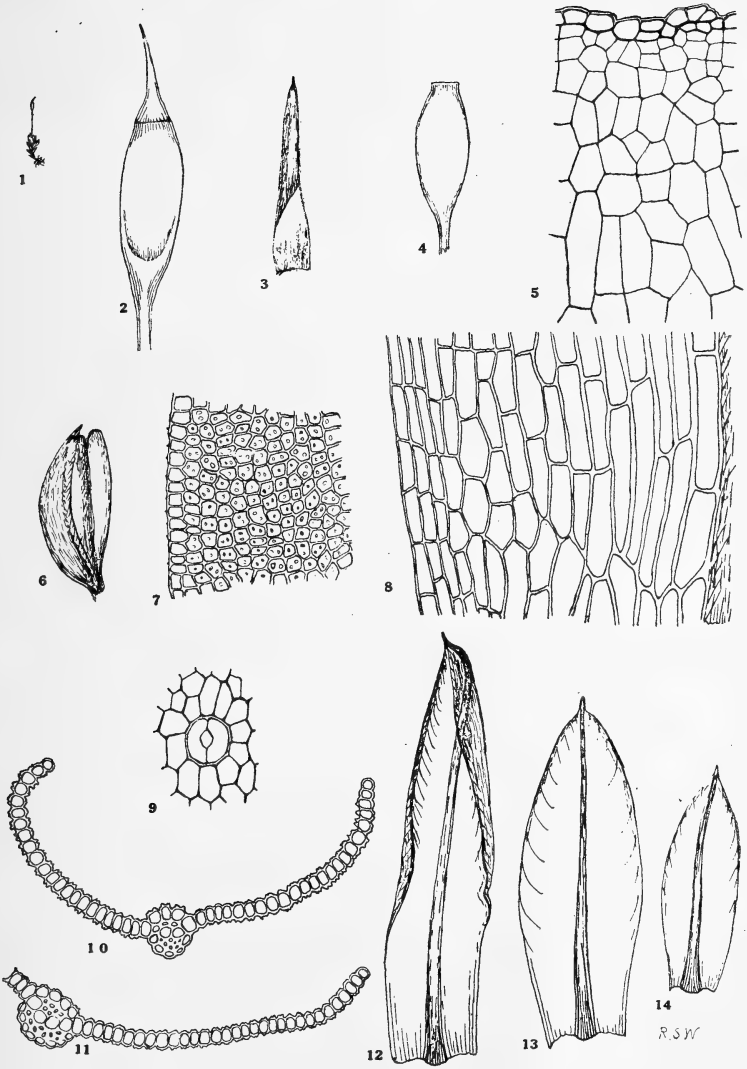
This species is perhaps nearest *H. microcarpa* but the inflorescence is different, the capsules rather larger, the leaf-cells more distinct, and the apex of leaf incurved, not somewhat recurved as in that species.

New York Botanical Garden

Explanation of Plate II

Hyophila subcucullata Williams, sp. nov.

Fig. 1. Plant about natural size.
Fig. 2. Capsule with lid, × 16.
Fig. 3. Calyptra, × 16.
Fig. 4. Empty capsule, × 16.
Fig. 5. Part of rim and upper cells of capsule, × 180.
Fig. 6. Antheridia with bract, × 100.
Fig. 7. Median leaf-cells, × 210.
Fig. 8. Basal cells, × 210.
Fig. 9. Stoma, × 180.
Fig. 10 and 11. Cross-sections of leaf above and near the middle, × 180.
Fig. 12, 13, and 14. Stem-leaves, × 35.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SOME VACATION LICHENS

George L. Moxley

Last summer I took my vacation in the latter part of August and early in September. I had for some time wanted to learn the nature of the vegetation of the Topanga region late in the season and this was a most excellent time to study it, as it was really the dry end of the third dry season. Finding very little to interest me in the way of ferns and flowering plants, I turned my attention to the collection of some of the lichens of the region.

Topanga Canyon was one of Dr. H. E. Hasse's collecting grounds and he had a ranch in the canyon at one time. About five miles from the ocean the canyon forks, Topanga Canyon proper turning somewhat to the west and Garapito Canyon, up which the paved highway goes, keeping to the north. The Camp where I stayed is about a mile up Garapito Canyon above the forks. The east wall of the canyon, at this point, is mostly of volcanic rock and the west side of a soft gray sandstone.

One plant which I wish to especially mention has intrigued me for some time. I have collected it in canyons on the north slope of Mt. Hollywood, Los Angeles, and found it in the Topanga region, always growing on *Quercus agrifolia*. In its habit of growth it is quite like a lichen, but it has no cortex and, up to 3 or 4 cm. in diameter, looks very much like a pure white mass of fungal hyphae. Larger plants are darker colored in the middle portion. Two or three years ago I sent some material of this to a correspondent for identification but had no reply. Later I sent some to Stanford University, but no one there was working with the lichens and it remained undetermined. Mr. Plitt's comment on the plant was: "Do not know. Probably a fungus. Follow it up if you can." So I sent material to Mr. C. G. Lloyd, of Cincinnati, to see what he would make of it, and his reply was: "I really think the specimen you enclose . . . is a lichen and not a fungus. I have made a section of it and find it is full of chlorophyll and chlorophyll is not supposed to occur in a true fungus." He then suggested that I send it to Dr. Bruce Fink for his opinion, which I did, including all my remaining material, but have had no reply as yet. The fresh plant very much resembles an illustration of *Radulum quercinum* in a paper on that genus by Mr. Lloyd (The Genus Radulum, p. 5, fig. 972. 1917), but the likeness may be only superficial. I shall try to secure a quantity of material of this interesting plant the coming season, and if any of the Sullivant Moss Society's specialists desire to run it down I will be glad to hear from them.

Since I wished to keep the weight of my collections as small as I conveniently could, I collected very few of the rock-loving lichens. In the accompanying list I follow the systematic arrangement in Hasse's "Lichen Flora of Southern California." I have included some later collections, but, if no locality is mentioned, the specimens came from the Topanga region. My thanks are due Mr. C. C. Plitt for the determination of most of my specimens.

List of Species.

Arthonia punctiformis Ach. On *Juglans californica, no. 772.*
Arthonia polygramma Nyl. On *Quercus agrifolia, no. 788.*
Arthothelium taediosum Nyl. On *Q. agrifolia, no. 808.*
Cladonia pyxidata (L.) Hoffm. Moss covered boulder, *no. 760.*
C. pyxidata pocillum (Ach.) Flot. On mossy earth, Mt. Hollywood, Los Angeles, *no. 838.*
C. fimbriata simplex (Weiss) Wain. Mossy boulder, *nos. 761, 792.* San Gabriel Canyon, *no. 875.*
C. fimbriata clavata Arnold. Mossy boulder, *nos. 761, 792.*
Gyrophora phaea (Tuck.) Herre. On sun-bak d volcanic rock, *no. 766.*
Acarospora xanthophana (Nyl.) Fink. On rocks, *no. 765.*
Pertusaria lecanina Tuck. On *Rhamnus crocea, no. 790.* On *Q. agrifolia, no. 804.*
P. leioplaca (Ach.) Schaer. On *Q. agrifolia, no. 775.*
Lecanora subfusca (L.) Ach. On *Q. agrifolia, no. 770.*
L. coilocarpa (Ach.) Nyl. On *Cercocarpus, nos. 784, 786.* On sandstone, *no. 794.* On *Q. agrifolia, no. 806.*
L. albella (Pers.) Ach. On *Cercocarpus, nos. 779, 784.*
L. varia (Hoffm.) Ach. On *J. californica, no. 774.* On *Q. agrifolia, nos. 801, 803.* On *Prunus ilicifolia*, Mt. Hollywood, *no. 840.*
L. saxicola (Poll.) Ach. On volcanic rock, *no. 798.*
Ochrolechia pallescens (L.) Mass. On *Q. agrifolia, nos. 764, 791.*
Parmelia soredica Nyl. On dead *Q. agrifolia, no. 777.* "Not mentioned by Hasse."
P. cylisphora (Ach.) Wain. (*P. caperata* (L.) Ach.) On various shrubs, Mt. Hollywood, *no. 842.*
P. conspersa (Ehrh.) Ach. On rocks, *nos. 776, 795.*
P. physodes (L.) Ach. On various shrubs, Mt. Hollywood, *nos. 845, 846.*
Ramalina canaliculata Fries. On *Q. agrifolia, no. 767.*
R. reticulata (Noehd.) Kremp. On *Q. agrifolia, no. 762.*
Blastenia ferruginea (Huds.) Arnold. On *Cercocarpus* and *Quercus, nos. 875, 799.*
Xanthoria lychnea (Ach.) T. Fries. On *Juglans, no. 773.* On *Cercocarpus, no. 783.*
X. lychnea polycarpa (Ehrh.) T. Fries. On various shrubs, Mt. Hollywood, *no. 844.*
Teloschistes chrysophthalmus (L.) T. Fries. On *Quercus, Ceanothus*, and *Rhamnus*, not common, *no. 781.*
Buellia myriocarpa chloropolia (Fries) T. Fries. On shrubs, Mt. Hollywood, *nos. 840, 841.*
B. parasema (Ach.) Koerb. On *Quercus, no. 800.*
Physcia stellaris (L.) Nyl. On various barks, *nos. 782, 807.* Mt. Hollywood, *no. 839.*
P. pulverulenta pityrea (Ach.) Nyl. On *Quercus, no. 805.*

Los Angeles, Cal.

THE REDISCOVERY OF PHYSCOMITRIUM PYGMÆUM JAMES

In 1894 I published a Revision of the Genus *Physcomitrium*[1] with descriptions of five new species. On plate 197, *Physcomitrium pygmæum* was illustrated "from original drawings by Sullivant" and at that time was very imperfectly known, from rather young and scant material. Since then it has been collected and distributed by C. F. Baker among his "*Plants of Nevada*," number *908*, from King's Cañon, Ormsby County, 1700–2000 m., June 1, 1902, determined by M. Cardot, and quite recently a few plants have been sent to me by Professor J. M. Holzinger, from a collection made by A. Brinkman, July, 1917, on "wet ground," Alberta, Canada, altitude 2700 feet.

It seems desirable to place these two stations on record and to supplement the original description by measurements and studies of more abundant and mature specimens.

1. *Physcomitrium pygmæum* James. Bot. King's Exp. 404. 1871; Lesq. & James, Man. 197. 1884; Bull. Torr. Bot. Club 21: 191. 1894, *plate 197*.

Plants not more than 5 mm. high; stems stout, simple or branching by lateral innovations, seldom more than 3–4 mm. high, leafy to base or leaves clustered at apex; leaves lanceolate-acuminate, the costa ending in a mucronate point, margins entire or with swollen teeth; cells lax, oblong or hexagonal, sometimes 50–80μ long by 18–24μ wide; the marginal cells narrower or inflated; perichaetial leaves longest, occasionally with the costa ending below the apex. Dioicous? Antheridial plants not seen. Seta immersed or partially exserted, variable in length from .6 to 1.5 mm. long, stout, erect, occasionally 2 to 3 on one stem; neck long and tapering, sometimes to the vaginule, with few stomata, which are immersed, closed and surrounded by 10–12 radiating cells; urn globose, becoming pyriforme, up to .66 mm. long; walls of irregular oblong or hexagonal cells, 40–50μ long; mouth bordered by 5–6 rows of transversely elongated cells, up to 40μ long, the rim of minute, cuneiform, orange colored cells up to 13μ long; lid .5 mm. long, conic with a blunt beak; spores reniform, 27–32μ in diameter, warty with sinuous lines of papillae, maturing in June and July.

Type locality: Utah, on the ground above Parley's Park, Wasatch Mountains, 6500 feet alt. Collected by S. Watson, 1869; King's Cañon, Ormsby County, Nevada, 1700–2000 m. Collected by C. F. Baker, June, 1902; on wet ground, Alberta, Canada, alt. 2700 ft., collected by A. Brinkman, July, 1917, sent by Prof. J. M. Holzinger.

Elizabeth G. Britton, *Honorary Curator*
New York Botanical Garden

Note I—Mrs. Britton kindly sent me some of Mr. Baker's Nevada plants, which enabled me to make careful comparisons. The Canadian plant has the stem uniformly naked below, the leaves being crowded close around the seta. The costa in most leaves is short excurrent. The material is rather scant, and the question of the relations of antheridia and archegonia is not fully settled,

[1] Bull. Torr. Bot. Club **21**: 189–208, *plates 197–203*.

but I found two fruiting plants, at the base of each of which arose a plant. The leafy bud at its end had a few small club-shaped paraphyses, but no antheridia. These may have disappeared, being very delicate; and the plants would thus seem to be autoicous. Re-examination is necessary.

The spores in the two plants differ considerably. Mr. Baker's plants are younger, less mature. Mrs. Britton's description of size and markings applies to the spores of the Nevada plant. In the Canadian plant the spores are of the same shape, namely, kidney-shape; but they are larger, measuring 30×45 to 50μ. Their surface is distinctly and clearly spiny, there being now no "sinuous lines of papillae," such as Mrs. Britton describes. I am persuaded that this difference in size and surface marking in the spores of the two collections is due to the difference in maturity, the Nevada plant being collected in June, the one from Canada in July.

JOHN M. HOLZINGER

WINONA, MINN., Feb. 15, 1921.

NOTE II—Under date of March 18, 1921, Dr. Holzinger writes as follows:

Since writing the remarks on Mrs. Britton's note on *Physcomitrium pygmaeum* I have found, among material not yet distributed in my herbarium, a third collection, made in Minnesota by the late Dr. J. H. Sandberg, which enables the certain determination of this species as autoicous. From a common stem arise two naked branches terminating in one leafy antheridial and one leafy archegonial bud. Only in the antheridial buds could I find the strongly club-shaped paraphyses similar to those figured in Engler & Prantl for *Funaria hygrometrica* (Die natürlichen Pflanzenfamilian, 1: 3: 204, *fig. 123*. 1909). They appear to be entirely absent in the archegonial buds.

JOHN M. HOLZINGER

NOTES ON CURRENT LITERATURE OF MOSSES

In a recently received article, M. Thériot[1] clears up the confusion that has existed regarding *Syrrhopodon Taylori* Schwaegr., *S. Gardneri* (Hook.) Schwaegr., and *Leucoloma Taylori* (Schwaegr.) Mitt. From a study of the original specimens in the Schwaegrichen herbarium, M. Thériot concludes that *Syrrhopodon Taylori* Schwaegr. is really a Leucoloma, as Mitten concluded; that the plate 132 in the Supplement. II. i. correctly represents it, save the figures of the peristome Nos. 11 and 12, which were by accident drawn from *S. Gardneri*, as was all of plate 131. The latter is a good species, founded on *Calymperes Gardneri* Hook. M. Thériot also adds that according to specimens sent him by M. Cardot, C. Mueller's *Leucoloma sarcotrichum* is wholly synonymous with *L. Taylori*. In the same article M. Thériot states that Duby's *Fabronia longidens* is identical with *Dimerodontium pellucidum* (Hook.) Mitt.

M. Thériot has also favored us with copies of the list of mosses contributed

[1] Thériot, I. Notes bryologiques. Bull. soc. Bot. de Genêve. 2me Sér. **11**: 24–29. (1919).

by him to Sarasin & Roux's Nova Caledonia.[2] The list enumerates 42 species with notes upon the localities and general distribution. *Macromitrium Sarasini* Thér. and *Isopterygium Sarasini* Thér. are described as new species, with three other new varieties or forms.

Two recent issues of the Recueil des Publications de la Société havraise d'études diverses contain bryological articles by M. Thériot. The first[3] on the Mosses of Annam discusses a small collection of 28 species made by Mr. A. Krempf. Three of the species collected are new to the Asiatic mainland, the whole collection showing strong affinities with the flora of the Sunda Islands. The new species are: *Leucoloma Krempfii* Thér., *L. annamense* Thér., *Leucobryum Krempfii* Thér., *Neckeropsis Krempfii* Thér., *Homaliodendron crassinervium* Thér., *Pinnatella (?) corrugata* Card. & Thér. and *Ectropothecium annamense* Thér., all of which are illustrated in the two plates. Two new varieties are also proposed in *Neckeropsis* and *Vesicularia*. M. Thériot raises the question of the propriety of separating the two genera *Neckeropsis* and *Himantocladium* from *Neckera*, since *Neckera flagellifera* Broth. belongs to the one genus according to its fruiting characters and to the other in its vegetative aspect; indeed, Brotherus and Fleischer respectively classify it one in one genus, one in the other. The author also concludes that *Pterobryopsis subacuminata* Broth. & Par. is far more closely related to *Pt. Wightii* (Mitt.) Broth. than to *Pt. acuminata* (Hook.) Fleisch.

The second article[4] is upon the mosses of Madagascar, 6 sphagna, 60 mosses, and 8 hepatics being listed, the last by name only. The new species proposed are the following: *Funaria delicatula* Thér., *Brachymenium argenteum* Thér., *Bryum Perrieri* Thér., *Philontis Perrieri* Thér., *Rhacopilum Perrieri* Thér., all save the last being figured. There are brief notes upon *Trematodon platybasis* C. M., *Macromitrium adelphinum* Card., and *Amblystegium riparium* (L.) Bry. Eur., a species not hitherto reported from Madagascar or from Africa south of the Mediterranean region. The description of *Leucoloma albocinctum* R. & C. is supplemented by a description of the fruit, and there are more extended notes upon *Nanomitropsis laxifolia* (R. & C.) Card. (whose generic affiliations seem doubtful), *Brachymenium capitulatum* Card. and *B. radiale* C. M., a synoicous variety of *Philonotis imbricatula*, and the forms or varieties of *Polytrichum subformosum* Besch. M. Thériot also states that after a study of the type material of *Leucomium mahorense* Besch. he is convinced that it is identical with *L. debile* (Sull.) Mitt., and that judging from the published plate Sullivant erred in describing his species as "dioicus," the plants being figured as autoicous.

Mr. R. S. Williams[5] has recently published a revision of the genera Calym-

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[2] Musci de la Nouvelle-Calédonie et des iles Loyalty. F. Sarasin & J. Roux. Nova Caledonia, Botanique, Vol. I. lfg. I. No. 4. pp. 23–32. (1914).

[3] I. Thériot. Les mousses de l'Annam. Rec. Publ. Soc. Havr. 1er trimestre, 1919. 33–47. *pl. i, ii.* (1919).

[4] I. Thériot. Contribution à la flore bryologique de Madagascar. Rec. Publ. Soc. Havr. 2me trimestre. 1920. 95–111. *pl. i, ii.* (1920).

[5] Williams, R. S. Calymperaceae of North America. Bull. Torr. Bot. Club. **47**: 367–396. *pl. 15–17.* 1920.

peres and Syrrhopodon, with illustrations of the cross-sections of the leaves. This article is an advance notice of the results obtained from the studies for the forthcoming parts of the North American Flora. Nineteen species of Syrrhopodon are recognized (*S. graminicola* being new and *S. filigerus* (Aust.) Williams a new combination) of which *SS. floridanus, texanus, ligulatus,* and *filigerus* are recorded from the United States. Twelve species are credited to Calymperes (*C. cubense, C. Nashii, C. fluviatile* proposed as new) of which *CC. Richardi, emersum, Donnellii,* and *Nashii* occur in the United States.

Monsieur J. Amann has recently published a second list[6] of additions and corrections to his Flore des Mousses de la Suisse, recently reviewed in THE BRYOLOGIST.[7] Much of the material naturally related to matters of wholly local interest, and results from a continuation of intensive study. To our mind a number of the varieties proposed as new are of distinctly minor importance, the distinguishing characters being too closely dependent upon habitat. While the study of such variations is preeminently worth while, and their mention and description an important task in an intensive catalogue, it seems hardly worth while to add to the growing number of moss names by giving them distinctive appellations. We would not imply, however, that these plants are not interesting; many of the little remarks and notes included in the article are of the greatest interest, and should serve to spur all field students to closer observation; it is just such things that make moss-study worth while. The following species are proposed as new (we do not list the many new varietal names): *Barbula poenina, Syntrichia gelida, Bryum appendiculatum, B. Britanniae, Mnium amblystegium,* all figured; in addition the original descriptions of *Ptychodium albidum* Amann and *P. pallescens* Amann are much amplified from the study of new material. Interesting also are the observations bearing upon the probable hybridity of *Grimmia Cardoti* Hér. and the occurrence of an 18-toothed peristome in *Orthotrichum speciosum* Nees. The portions of the article of most interest to American readers are probably these dealing with the size of the median leaf cells in Mnium. For each Swiss species the author gives a numerical statement showing the number of cells per linear millimeter for the median leaf region, both extreme and mean numbers being given; there are two or three pages of fine print discussing the results, which seem to afford a basis for a more accurate determination of sterile material. The comparisons between *Mn. orthorrhynchum* and *Mn. lycopodioides* are particularly detailed, and should be carefully checked upon extra-European material, as, we understand, M. Amann is endeavoring to do. M. Amann devotes nearly three pages also to a synoptic view of the European species of Hygroamblystegium Loeske. In spite of M. Amann's statement that he has studied "un specimen authentique de l'H. noterophilum (Buffalo, U. S. A., leg. Clinton)," and that it shows the species

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[6] Amann, J. Nouvelles additions et rectifications à la Flora des Mousses de la Suisse. Bull. Soc. Vaudoise des Sci. Nat. **53**: 81–125. *text figs. 1–18.* 1920.

[7] BRYOLOGIST **22**: 41–43. 1919.

to be identical with European *H. fallax* var. *spinifolium*, we should be inclined, in view of the confusion about these species in this country, to withhold judgment until actual comparison of the types is made.

EDWARD B. CHAMBERLAIN

REVIEW

Hepatics of Iberia (Spain and Portugal)

A. CASARES-GIL: FLORA IBERICA. BRIOFITAS, PRIMERA PARTE. HEPATICAS. [Pp. 775, about 400 figures (half-tones of well executed original drawings), and 4 colored plates.] Mus. Nacional de Ciencias Naturales, Madrid. 1919. [In Spanish.]

This first comprehensive work on the Hepatics of the Iberian peninsula is well published as to illustrations and general typography. The Prologue and General Introduction of several pages is followed by 174 pages of general treatment of more than twenty topics, such as Characters differentiating Hepatics from Mosses, Cells, Protonema, Frond and Thallus, Rhizoids, Vegetative and Growing Points, Branching, etc. Ecology and Geographic Distribution here take up about 40 pages, treating of the relation of hepatics to substratum, humidity, latitude, and temperature, and, finally, 9 pages are devoted to Collection, Study, and Preservation of Specimens.

In the descriptive part of the book Schiffner (Engler & Prantl: Natuerlichen Pflanzenfamilien) is followed pretty closely and many species are included which have not yet been reported in Spain or Portugal, e. g., *Neesiella rupestris*.

Apparently new combinations are: *Calycularia Flotowiana* (Nees), (*Pallavicinia Flotowii* Lindb.); *Haplozia Muelleriana* (Schiffn.), (*Nardia Muelleriana* Schiffn.); *Haplozia paroica* (Schiffn.), (*Nardia paroica* Schiffn.); *Haplozia subelliptica* (Lindb.), (*Nardia subelliptica* Lindb.).

Among the generally less familiar combinations it may be noted that *Pallavicinia hibernica* and *P. Blyttii* are treated under *Calycularia; Nardia compressa*, *N. Breidleri*, *N. scalaris*, and *N. Geoscyphus* are under the genus *Alicularia; N. hyalina*, *N. obovata*, *N. crenulata*, and *Jungermannia caespiticia*, *J. sphaerocarpa*, *J. cordifolia*, *J. riparia*, *J. atrovirens*, *J. pumila*, *J. Schiffneri*, and *J. lanceolata* are placed in *Haplozia; Jamesoniella autumnalis* D. C. [p. p.] is here *subapicalis* (Nees) Schiffn.; *Sphenolobus minutus*, *S. exsectus*, and *S. exsectaeformis* are under *Lophozia; Lophozia attenuata* is treated as *L. gracilis* (Schleich.) Steph.; *L. Baueriana* Schiffn. is used instead of *Jungermannia Hatcheri* Evans (?); *J. Hornschuchiana* is treated as a synonym of *L. bantryensis* (Hook.) Steph.; *Pedinophyllum interruptum* is placed under *Plagiochila; Mylia Taylori* and *anomala* are under *Leioscyphus; Chiloscyphus rivularis*, *fragilis*, and *pallescens* are treated as varieties of *C. polyanthus; Cephaloziella byssacea* is put under *C. Starkei* (Funck) Schiffn., with a variety *papillosa* (*C. papillosa*), and *C. bifida* becomes here *C. rubella* (Nees) Warnst; *Cephalozia curvifolia* is treated

under *Nowellia; Odontoschisma elongatum* is a variety of *O. denudatum; Calypogeia fissa, suecica,* and *sphagnicola* are retained as varieties of *C. trichomanis; Bazzania trilobata* and *Pearsoni* are placed under *Pleurochisma,* and *Porella laevigata, platyphylla,* and *rivularis* under *Madotheca. Bazzania tricrenata* is listed as a synonym of *Pleurochisma triangulare* (Schleich.) Loeske, and *Porella pinnata* is under *Madotheca porella. Lejeunea cavifolia* is treated under *Eulejeunea.* Schiffner is followed in regarding Huebener's *Jungermannia catenulata* (*Cephalozia catenulata* Spruce) as not different from *Cephalozia reclusa* (Tayl.) Dum.

In citations it is to be noted that DeNotar is uniformly given for DeNotaris, and D. C. is used for DeCandolle.

Altogether there are described, or at least critically discussed, 329 species, quite a large proportion of which also occur in North America. Both as to figures and descriptions this manual should prove useful as a reference book even for the hepatics of the United States. O. E. Jennings

Carnegie Museum, Pittsburgh, Pa.

MISCELLANEOUS NOTES

Course on Bryophytes offered at Michigan Biological Station.— Dr. George E. Nichols writes that last summer he conducted a course at the University of Michigan Biological Station on the Taxonomy of the Bryophytes and expects to give the course again this coming summer. The Station is located on a tract of 3200 acres of land owned by the University of Michigan and is located between Douglas and Burt Lakes about 17 miles south of the Straits of Mackinac. Despite unfavorable first impressions, Dr. Nichols found the region bryologically quite rich. Not all collections are yet identified but, up to date of writing, he had named 56 liverworts, 15 sphagnums (plus several varieties), and 130 mosses. These specimens include about 90 species not before recorded from Michigan. O. E. J.

Fossombronia cristula, Life History of. Arthur W. Haupt. Bot. Gaz. **69:** 318–331. 4 pls. April, 1920. The vegetative body is a minute creeping branched thallus with two dorsal rows of genuine leaves. Monoecious, with sex organs in the axils of leaves, and antheridia and archegonia may occur in the same axil. In the archegonium the cover cell is inactive; 6–8 neck canal cells are formed; and the venter is two cells thick before fertilization. The calyptra becomes 3–4 cells thick. The sporophyte is primitive; the sporogenous tissue is differentiated early; and the elaters are rudimentary, each being homologous with a single mother-cell and not with a row of them. The mature capsule is globular or nearly so and its wall is invariably two cells thick and bears rudimentary annular and half-ring fibers on the cell-walls of the inner layer. The material studied was found by the author in cracks on fine wet deposits of silt on the bottom of an almost extinct lake in the Dune Park region in northern Indiana. O. E. J.

Word has come to us that the large **herbarium of Dr. Julius Roell,** comprising some 30 "Bände" of Sphagna, 40 of Musci, and 50 of Phanerogams, besides ferns, hepatics, lichens, etc., is for sale. The material comes from all parts of Europe, besides considerable of exotic origin, duplicates, and microscopic mounts. Dr. Röll prices his collection at $5,000.

We are also informed that **Dr. Istvan Gyoerffy,** formerly of Kolózsvár, is now at Budapest. Dr. Györffy was compelled to leave all of his possessions at Kolozsvár, and is anxious to obtain publications or separates issued since 1914. His address is Budapest II, Kis Rókosgasse, Nr. 15, Hungary.

Dr. Th. Herzog informs us that he has for sale some small collections of exotic mosses, mostly from Bolivia. While details are lacking, we assume that lots of 50 or 100 specimens are meant. We shall endeavor to obtain further information, and will gladly furnish it to any North American moss student who may care to purchase specimens. E. B. C.

SULLIVANT MOSS SOCIETY NOTES

Mr. Stewart H. Burnham has recently joined the staff of the Department of Botany, New York State College of Agriculture, at Ithaca. The Herbarium of the Department has recently purchased from Dr. J. K. Small his large collection of mosses, hepatics, and lichens—some 12,000 specimens—and will ultimately own, also, the botanical collections which Mr. Burnham has brought with him. Mr. Burnham's address for the future will be as above, instead of Hudson Falls, N. Y.

We regret to announce the death last August of **Mrs. Anna B. McConnell** of Watch Hill, R. I., a member of the Sullivant Moss Society since 1902. Mrs. McConnell was a very active worker in many organizations, being especially interested in geographical exploration. She nevertheless always found time for an encouraging word for the Moss Society and for its work, though not often a contributor to the columns of THE BRYOLOGIST. The writer well remembers a chance meeting with Mrs. McConnell at Lake Louise, Alberta, on an afternoon when any collecting had to be done in the intervals of snow squalls, and the delight which she took in the plants growing beside the trails and over the terminal moraine of the great glacier. The members of the Sullivant Moss Society, we are sure, will join with the writer in extending sincere sympathy to Mrs. McConnell's family.

The announcement has already been made of the death last January of **Dr. Lincoln W. Riddle,** during the past year Vice-President of the Moss Society. The Secretary has already extended to Mrs. Riddle and family the sincere sympathy of the Society and of its officers. A more extended notice of Dr. Riddle's work will appear in a later issue of THE BRYOLOGIST.

Mr. Otto McCreary, of Geneva, N. Y., and Rev. S. M. Newman have resigned from membership in the Moss Society since the appearance of the annual report, and Miss Julia Cornelius, of 669 Holly Ave., Winston-Salem, N. C., has joined the Society. E. B. C.

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Conducted and Published for the Society by

O. E. JENNINGS, Ph.D., Editor-in-Chief

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

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LINCOLN WARE RIDDLE

THE BRYOLOGIST

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LINCOLN WARE RIDDLE, LICHENIST

BRUCE FINK

Doctor Lincoln Ware Riddle was born at Jamaica Plain, Massachusetts, October 17, 1880, and died at his home, 123 Walker Street, Cambridge, Massachusetts, January 16, 1921. He was fitted for college at Roxbury Latin School, and a private school in Boston. While at the former school he became interested in botany and decided to become a botanist. He later entered Harvard University and graduated from there in 1902. He received the doctorate in philosophy at his Alma Mater four years later and went to Wellesley College, as instructor in botany. He became a full professor in 1917. A year's leave of absence in 1913 he spent in Europe, working with several eminent men and in a number of the largest herbaria. In 1919, he was called to Harvard as assistant professor of cryptogamic botany. Doctor Riddle was vice-president of the Sullivant Moss Society in 1920. He became associate editor of the Bryologist in 1911 and remained on the board of editors until the time of his death.

In December of Doctor Riddle's first year at Wellesley, I first learned of him through a letter of inquiry regarding some matters lichenological. With this letter was begun a correspondence from which more than 40 of his letters are still on file in my office. In these letters are freely discussed the various plans of the young, well trained, and rapidly growing lichenist. Had I nothing more than this correspondence, which closed with his last illness, I would feel so well acquainted with the man and his work that I should not hesitate to make an estimate of his character and ability. As I review the letters, each one bears evidence of the courtesy, the fine sense of propriety, the painstaking care, and the good training and ability of the man who wrote them.

The first letter contains a statement of an interest in lichens extending back through several years and an expression of the hope that, with the collections of Clara E. Cummings at hand and the great collections at Harvard near by, he might be able to do some valuable work on the lichens. The early letters were for most part modest solicitations of help and advice, and there was never a failure to express the keenest appreciation, oftentimes when I felt that my attempts to give aid were weak indeed. It was my privilege in the early years of our acquaintance to determine a considerable number of species for Doctor Riddle and to verify some of his determinations. Later I was repaid

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by seeing him grow into such a broad and discriminating knowledge of lichens that I was glad to send to him my whole collections of genera which he was studying for publication. Also his nearness to the Tuckerman herbarium at Harvard made it possible for him to aid me greatly by comparing some of my doubtful specimens there. The letters which I have retained through the years bear evidence of a most cordial friendship, and I was very anxious when I learned of the serious illness of my friend and co-worker and was greatly depressed when word came concerning his untimely death. It seemed extremely sad that a man of such fine training and ability, in a position where he had excellent opportunities, and so thoroughly in love with his work, could not live to complete the task which he was so well prepared to do. It seems hardly possible to become reconciled to this misfortune for him and for us.

It is the lot of those of us who have corresponded widely with native and foreign botanists to know a considerable number of our correspondents only through exchange of letters and published papers. Added to this is sometimes an exchange of photographs. How eager we are whenever opportunity comes for meeting these erstwhile long-distance friends. These experiences are so common that botanists will realize my pleasure when it became certain that I was to spend a month at Harvard in 1915 and have the privilege of a personal acquaintance with my hitherto far-distant friend. Early in the month, there was a week-end visit to the Riddle Home in Wellesley, where Mr. and Mrs. Riddle made me feel very much at home. This visit was filled with enthusiasms such as botanists know very well, the particular field of interest varying of course. Specimens and methods were gone over, and when we were too exhausted for more of this, the town and the college were examined for diversion and information. While passing through various parts of Wellesley meeting citizens and discussing matters of local interest, I learned of Doctor Riddle's outside interests and his usefulness in the community.

He made it a point to come to Cambridge as often as possible while I was there; and it was here, and in his home where he did his microscopic work and made notes, drawings, keys, and descriptions, that my high opinion of his methods and results, obtained through his letters and his published papers, was verified by first-hand knowledge. While at Harvard, I was working on the *Graphidaceae*, and it was my privilege to determine a considerable number of specimens of this family sent to him from Mexico, Bermuda, Jamaica, Porto Rico, and elsewhere. For this I was amply repaid by the help which I received on lichens from other groups. I have regretted very deeply that I was not able to spend more time in the cryptogamic herbarium at Harvard during the lifetime of my teacher, Doctor Farlow; but I had hoped after Doctor Riddle went to Harvard that I might have the pleasure and advantage of working with him in the years when I hope for more leisure.

Here was a man eminently fitted by training, ability, and natural inclination to do work of lasting importance in a field where workers are few and needs urgent. He had a love for systematic lichenology, and this rested on a broad training in biological science and special training in the methods of modern

mycology. Several of his minor projects, revealed in our correspondence, may be passed over; but matters of larger import must be noted. In 1916, after the matter had been very strongly urged, Doctor Riddle promised to furnish the manuscript for the *Arthoniaceae* in the North American Flora. I had been working for several years on the *Graphidaceae*, and was greatly pleased that he was to work on the most closely related family. In one of his latest letters he wrote of being at work on the *Arthoniae*. He was also much interested in tropical lichens in general, and American botany has lost much along this line through his early death. Another major project mentioned in one of his letters after returning to Harvard was a manual of the lichens of eastern North America. His position where he had access to the Tuckerman Herbarium made this plan seem especially feasible, and American mycology has lost heavily through his not being able to carry this ambition to completion. Cut down in the prime of life, he still left, in the papers cited below, probably 50 new species and much in the way of critical notes and additions to distribution. Perhaps I should have added to the citations below some notes on contents, but those especially interested may find these in the bibliography of North American botany in the Bulletin of the Torrey Botanical Club.

Inclination would lead me to a more detailed account, but I must close with the question as to what man or what men will take the place of our departed friend and worker. We need both amateurs and men trained as was Doctor Riddle. Let us hope that systematic botany may soon regain some of its temporarily lost prestige and that in this happy time there may come a number of workers able and willing to carry forward the task begun by our departed lichenist.

In closing, I wish to express to Mrs. Riddle and to Mr. Edward B. Chamberlain my thanks for data which have aided in the preparation of this paper.

Doctor Riddle's Botanical Publications

Contributions to the cytology of the *Entomophthoraceae:* preliminary discussion. Rhodora **8:** 67, 68. 1906.

On the cytology of the *Entomophthoraceae.* Proc. Am. Acad. Arts. Sci. **42:** 177–195. pl. 1–3. 1906.

Notothylas orbicularis in Massachusetts. Rhodora **9:** 219, 220. 1907.

Notes on some lichens from the Gaspé Peninsula. Rhodora **11:** 100–103. 1909.

A key to the species and principal varieties of *Cladonia* occurring in New England. Rhodora **11:** 212–214. 1909.

Preliminary lists of New England plants,—XXIII. *Cladoniaceae.* Rhodora **11:** 215–219. 1909.

The North American species of *Stereocaulon.* Bot. Gaz. **50:** 285–304. f. 1–9. 1910.

"The Lichens of Minnesota," a review. Bryologist **13:** 97–100. 1910.

The rediscovery of *Parmelia lophyrea* Bryologist **14:** 35. 1911.

The lichen-flora of the Santa Cruz Peninsula, a review. Bryologist **14:** 6, 7. 1911.

An enumeration of the lichens collected by Clara Eaton Cummings in Jamaica. Mycologia **4:** 125–140. 1912.

Review: A recent contribution to the ecology of mosses. Bryologist **15:** 67–69. 1912.

Report on the lichens in N. L. Britton: The vegetation of Mona Island. Ann. Missouri Bot. Gard. **2:** 35, 36 and 51–53. 1915.

An undescribed species of *Cetraria*. Bryologist **18:** 17, 28. 1915.

The lichens of Bermuda. Bull. Torr. Bot. Club **43:** 145–160. 1916.

Report on the lichens in N. L. Britton: The vegetation of Anegada Island. Mem. New York Bot. Gard. **6:** 579, 580. 1916.

Some noteworthy lichens from Jamaica. Bull. Torr. Bot. Club **44:** 321–330. pl. 21. 1917.

The genus *Parmeliopsis* of Nylander. Bryologist **20:** 69–76. f. 1, 2. *pl. 20.* 1917.

Pyrenothrix nigra gen. et sp. nov. Bot. Gaz. **64:** 513–515. *f. 1–4.* 1917.

Some extensions of range. Bryologist **21:** 50. 1918.

Report on the lichens in N. L. Britton: The flora of the American Virgin Islands. Mem. Brooklyn Bot. Gard. **1:** 109–115. *f. 1–3.* 1918.

Chapter on lichens in N. L. Britton: The flora of Bermuda. 470–479. New York, Charles Scribner's Sons, 1918.

William Gibson Farlow. Rhodora **22:** 1–8. 1920.

Observations on the genus *Acrospermum*. Mycologia **12:** 175–181. *pl. 11.* 1920.

Miami University, Oxford Ohio.

NOTES ABOUT THE DREPANOCLADI OF THE VICINITY OF MONTREAL, QUEBEC, CANADA

H. Dupret

The *Drepanocladi* C. M., formerly known as *Harpidia* Sull., are an interesting and considerable section of the true *Hypna* with a decided preference for an aquatic habitat. The contributions of the late F. Renauld to the Revue Bryologique (1906–1909) and the works of Warnstorf and other German bryologists have of late created a lively interest in these plants. Still, one may wonder why they seem to be rarely collected, or at least rarely discussed in our reviews. May we be allowed to offer an explanation for this seeming neglect?

Drepanocladi, indeed, present peculiar difficulties to collectors, difficulties which may be due to these two reasons: the plants are difficult of access, and not very easily found. They grow, most of them, in wet meadows, marshy places, or deep peat bogs. On this account a special outfit (as rubber boots) and a

good deal of enterprise due to particular attraction toward such habitats, is required by the collector. The amateur who decides to visit such places must be ready to pass for a crazy fellow, or at the best, for an eccentric.

Next, there is the difficulty of coming to the right spot at the right time in order to secure these plants to best advantage. If one arrives too early, one is apt to find nothing save water in these ponds or marshy spots; at best only a rudimentary growth of moss will be there. If one comes too late, the grasses and other plants will have choked or replaced the aquatic mosses. The collecting of fine specimens, therefore, remains a chance affair unless one lives near enough to the spot to watch the plants and to collect them when at their best. Of course, chances are more favorable in the thick woods, yet some species prefer to grow in the open sunshine of the meadows. In the vicinity of Montreal, the best time to collect *Drepanocladi* seems to be from the first of May until the end of June; sometimes a bit sooner or later as the spring may be more or less advanced according to the season.

To the fraternity we beg to submit the following account and partial list of the *Drepanocladi* more frequently met with in the vicinity of Montreal. We shall use here the divisions and groups recommended by Renauld in his treatment of the *Harpidia* in Husnot's Muscologia Gallica.

I. *Drepanocladus aduncus* Hedw.

(a). Group *typicus* Renauld, comprises mosses of small or middling size, with strongly secund leaves, and with more or less hooked apices to the stems; the hyaline auricles clearly separated.

Var. *tenuis* R en. is a delicate moss in springy or very moist places, of a greenish-yellow aspect. It is rather local, but abundant at Oka, P. Q., in springy rivulets.

Var. *falcatus* Ren. forma *subpiligera* Ren. is a plant of middling size with a greenish yellow aspect and is quite common everywhere in moist woods and in drying ponds in meadows. It is very near the var. *gracilescens* which it seems to replace here, and from which it differs in the long, slender apex of the stem leaves. Of late this plant has been called *D. subpiligerus* (Ren.) Roth.

Var. *aquaticus* Sanio, is larger than the preceding, finely straw colored, and differs mostly in the apex of the stems, which are arched rather than hooked, and in the distant, scarcely secund stem leaves. It is found abundantly in the vicinity of Montreal in wet argillaceous meadows, but seems to require plenty of sunshine and air, and to be rather local, as it has not been reported save as above mentioned.

(b). Group *Kneiffii* Renauld, contains mosses with the leaves scarcely secund, the stem apices straight, not hooked (at least in the following varieties), the auricles not clearly defined.

Var. *polycarpon* Blandow, of a dark green aspect has stem leaves short, oval and spreading. It occurs in furrows of argillaceous meadows in the vicinity of Montreal.

Var. *intermedius* Bry. Eur., has the stem leaves longer, distant, and appressed; the stems bright yellow and firm. It is of about the same habitat as the var. *aquaticus* in the vicinity of Montreal, though both varieties seem to be local and rare.

(c). Group *pseudofluitans* Renauld. These are the largest mosses of the *adunci*, with leaves scarcely or not at all secund, the stem apices generally straight and convolute.

Var. *paternus* Sanio, (= *D. pseudofluitans* Warnst.). This is the coarsest of the group, with deep green leaves, the stem apices upright, convolute, the leaves not appressed nor secund save in dried-up ponds, the leaf apices very long and loriform, and the auricles not distinctly separated. It is common in marshy woods, often with *D. capillifolius* which it resembles somewhat, except that the costa in *paternus* is narrow and not percurrent.

Var. *flexilis* Renauld. This is more delicate than the preceding, with more the aspect of *Amblystegium riparium*, but the auricles are very distinct. It is very variable in its aspects; Dr. Roth thought it not a good variety and referred it to *Amblystegium riparium*, but this view is hardly consistent with the very distinct auricles of *flexilis*. It is rare and local.

II. *Drepanocladus capillifolius* Warnst.

(a). Forma *typica* Warnst. has very long, narrow leaves, a strong and excurrent costa, and a "woolly" aspect. It is very common in moist woods, ditches, and like places.

(b). Var. *fallax* Renauld, or forma *fallax*, as Renauld called it first, has the *upper* stem leaves secund with a hardly percurrent costa, but in the *lower* older stem leaves the costa is long-excurrent as in forma *typica*. Indeed, this moss, which is most common in open meadows, seems to be only a form brought about by the sudden and rapid dessication of the ponds and ditches. It abounds in the Montreal meadows and vicinity.

(c). Var. *brachydictyon* Renauld, is a smaller plant, with spreading shorter leaves, an excurrent or percurrent costa. It has been found so far only in a marshy brook at Oka, P. Q.; rare. According to Renauld our American *capillifolii* are much more variable than the European; the discovery of the forma *fallax* was a big surprise to him.

III. *Drepanocladus uncinatus* Hedwig. This is a very common plant with a sub-percurrent costa and circinate serrate leaves, which distinguish it at once from the preceding species in which the leaf apex is smooth. It is found in rather dry situations, on old stumps and rocks; very common. It must not be mistaken for *Hypnum Patientiae* (our American form of *H. arcuatum*) which is without a costa or with a double slender one.

IV. *Drepanocladus fluitans* L. The most common form here of the species seems to be the var. *Jeanbernati* Renauld, a fine-looking yellow moss, with leaves distinctly serrulate (more strongly at apex) and more or less secund, especially at the tips of the stems. It is rather infrequent and local, but occurs in ponds among siliceous rocks at Rigaud, P. Q.

V. *Drepanocladus revolvens* Sw. var. *intermedius* (Lindb.) Ren. a very fine looking moss with nicely curled or circinate leaves, occurs in a deep peat bog at Oka, P. Q. in company with *Hypnum stellatum*.

VI. *Drepanocladus scorpioides* L. occurs in the same habitat as the preceding, growing with *Hypnum giganteum*. It has stout stems which are slightly secund.

Seminary of Philosophy, Montreal, Canada.

JOHN MACOUN

A. LeRoy Andrews

The following biographical facts represent a brief abstract of a memoir prepared by W. T. Macoun, sole surviving son of the deceased, for publication in the Canadian Field Naturalist, for a manuscript copy of which I am indebted directly to Dr. Jennings and through him to the author.

John Macoun, long known to botanists as Naturalist to the Geological Survey of Canada, died on July 18, 1920, in his ninetieth year, his older son, James M. Macoun, for many years associated with him in the botanical work of the Canadian Geological Survey, having died a few months before him. The older Macoun was Scotch-Irish, born at Maralin in the vicinity of Belfast. In 1850 his family migrated to Canada, settling in the forest-region of Ontario, where they cleared a farm. The future botanist began his career by teaching in a country school, and after a course in a Normal School became head of the public schools in Belleville, Ontario, with which place much of his early botanical activity is associated. In 1874 he was appointed Professor of Botany and Geology in Albert College, Belleville, in 1881 Botanist to the Dominion Government, by which he had already been engaged for part of his time since 1872, in 1887 Assistant Director and Naturalist of the Geological Survey, which last position he held until his death, though he retired from active official duties in 1912.

His botanical collecting was in many respects pioneer work and has contributed in no little degree to the clearing up of facts of plant-distribution in British America. In 1872 he was botanist of the Fleming expedition, whose problem was to explore a route for the Canadian Pacific railway; in 1875 he was botanist with the Selwyn expedition to the Peace River region and the Rockies; in 1879, 1880, and 1881 he further explored the prairie region of the northwest and became an enthusiastic prophet of its future wheat-growing possibilities; in 1905 he made his way along the route of the Grand Trunk Pacific railway to the Yukon Territory. In fact in the years (1882–1912) of his residence at Ottawa he was nearly every summer engaged in collecting and exploring in some part of British America. During the last years of his life he was still busily occupied with botanical observations on Vancouver Island.

The record of his botanical collections, so far as at present accessible, is to be found in his "Catalogue of Canadian Plants," published in seven parts from

1883 to 1902. At his death he left in an advanced stage of preparation annotated lists of the floras of the Ottawa region, of Nova Scotia and of Vancouver Island.

His work as naturalist was by no means confined to plants; several species from the animal kingdom also perpetuate his name. His especial interest in birds is further attested by his "Catalogue of Canadian Birds," published in three parts from 1900 to 1904, republished in one volume with the assistance of his son, J. M. Macoun, in 1909.

It was only a part of Macoun's comprehensive activities that was devoted to bryology, and the determination of his specimens was entrusted to others. Much of his collecting activity fell between the time of the older group of American bryologists and that of the more recent one and recourse was had to Europeans. The hepatics were worked over first by Austin, then by the English hepaticologist, Pearson, subsequently by Underwood, Howe, and Evans; their study has developed normally and they are now apparently well understood. *Cephalozia Macounii*, *Odontoschisma Macounii*, *Lejeunea Macounii* and *Anthoceros Macounii* will doubtless perpetuate the memory of their collector. The *Sphagna* were mostly submitted to the German bryologist, Warnstorf, in the days of his more accurate work, and have caused little trouble.

The case with the other mosses is entirely different. They passed mostly through the hands of the Swede, Kindberg, who at first worked in collaboration with the German, Carl Müller (of Halle). Carl Müller was a specialist who received a large part of the extra-European mosses collected in his day and who developed an irresponsibility as to species from which bryology still suffers. His herbarium is now in the Museum of the Botanical Garden at Berlin-Dahlem and the "Waberlohe" with which it seemed to many of us to have been formerly enclosed appears to have been somewhat reduced, while Fleischer has also begun an apparently praiseworthy revision of its specimens.[1] Kindberg showed a still greater species irresponsibility than Müller. Macoun generously tried to defend him,[2] and his fellow-countryman, Arnell, also put in a word in his favor,[3] but could certainly not have looked very closely into his specimens. A rather interesting characterization of Kindberg as a field bryologist was given by Röll,[4] who took part with him in an excursion in Switzerland and Italy. It appears that Kindberg was an enthusiastic lover of nature and an amiable personality.

The older Macoun and, after his retirement from active service, his son were always ready to loan any specimens to American moss-students who wished light upon Kindberg's "species," and the almost inevitable reductions that followed were borne with apparent philosophical composure, with the faith that science could be depended upon ultimately to straighten out all difficulties. In frequently-arising cases of doubt as to name and duplication the authorities of the Naturhistoriska Riksmuseum of Stockholm have been extremely generous

[1] Hedwigia, LV, 280 ff., 1914, and in subsequent volumes.
[2] Catalogue of Canadian Plants, VII, p. IV. 1902.
[3] Botaniska Notiser, 1912, 119 ff.
[4] Hedwigia, LVII, 344 ff. 1916.

in the loaning of specimens from Kindberg's herbarium, as of their mosses generally. The slowly progressing moss-volume of "North American Flora" should bring final clarity as to Kindberg's names; they are on the other hand undoubtedly one of the impediments to its progress. However, light follows darkness, Macoun's moss-collecting remains a great achievement, and the call to American bryologists for more and better work is an imperative one.

ITHACA, N. Y.

LITTLE JOURNEYS INTO MOSSLAND

IV—LUMINOUS MOSS

GEORGE B. KAISER

To many of us the quest of *Schistostega osmundacea* has been fraught with frequent memorable adventurings into the pleasantest by-ways of Nature.

In THE BRYOLOGIST (Volume V, page 52) J. Warren Huntingdon tells us how he discovered this moss "on one of those splendid hillsides which we may find in any hill town of New Hampshire," saying, further, "I came to a mass of rocks tilted together in such a way as to form something like a cave; looking down this fissure into the semi-darkness, I saw a little circle of light about a foot in diameter. Thinking this might be some decaying matter that gave out phosphorescent light, I examined some of it and found I had a very delicate frond-like moss * * * * this is the way I found the 'Leuchtmoos.'"

Dr. A. J. Grout, in the same volume of THE BRYOLOGIST, on page 103, relates how he found bits of *Schistostega* in a cave known as "Devil's Den" at the top of Mt. Prospect, in Holderness, N. H., and later, "on the soil and stones of the underpinning of an old shed in Newfane, Vt., on the farm adjoining the one where I spent my youth and childhood, and in the very place where I had often played hide and seek. * * * Here were square inches, almost square feet, of the glistening protonema, whose brilliancy could only be seen by stooping until one looked in upon it at the same level as the entering rays of light.

Like many others, we long ago began eagerly to peer into every dim cave and under every overhanging rock that we encountered on our excursions in the hope that we might observe that beautiful shimmering light which is reflected from the protonema of the Luminous Moss. The search long remained a vain one. In 1909, indeed, our hopes ran high when we had the pleasure of spending several days on the summit of Mt. Mansfield, Vt. Dr. Grout, in 1906, had visited the mountain in company with the Vermont Botanical Club (THE BRYOLOGIST, Vol. X, p.6) and had then found *Schistostega* to be "abundant in the deep clefts in overhanging rocks on the northeast side of the mountain, below a point in the road about a quarter of a mile from the hotel" and, also, "in a crevice about ten feet to the left of the cave on the north side of the 'Nose'." A guest at the Summit House well remembered the bryological feats of Dr. Grout, declaring that "he would often risk life and limb to get the moss he was after." Now, whether

a picture, evoked by this statement, of our friend and author climbing chamois-like about precipice and beetling crag in pursuit of his prey, awakened undue timidity, we know not; but one thing is certain: no Luminous Moss came to light, although we looked with all our eyes. However, many other mosses characteristic of high mountains repaid our efforts until, on the morning of the third day, a severe northeasterly storm sent us back by foot to Stone, drenched to the skin.

In the following summer a fortnight's sojourn at Franconia, N. H., gave opportunity to study the rich moss flora on that side of the White Mountains. Many delightful excursions were made in the vicinity of the Notch, when the Knight's Plume, *Ptilium crista-castrensis*, is at its best, and where deep carpets of *Hylocomium proliferum* vie in beauty with soft banks of *Hypnum Schreberi* with individual plants a foot long! The ascent of Mount Cannon alone is worth the whole trip to an enthusiastic bryologist, but it was not on Mount Cannon that we found Schistostega.

In the Lesquereux and James *Manual* we read that, at the time of its publication, the species had been reported by C. H. Peck at Sand Lake, N. Y., and by Foster and James from near the Profile House and Dixville Notch, in the White Mountains, but we were not thinking of Lesquereux and James on the August morning when we began the ascent of Mount Lafayette. The trail starts at the Profile House and soon leads steeply up the mountain through the deep woods. Beside it are to be seen the almost ubiquitous *Pohlia nutans*, our old friend *Dicranella heteromalla*, *Stereodon reptilis*, and *Drepanocladus uncinatus*, with species of *Dicranum*, all in abundance. Then, as we wound higher in our climb, appeared frequent outcroppings of rocky ledges and bowlders, huge and moss-covered, standing like venerable sentinels of the mountain side. The characteristic flora of our Northern woods surrounded us with a wealth of bunchberry, Clintonia, twisted stalk, wood sorrel, species of Lycopodium, and many a graceful fern.

A little before we came to Eagle Cliff, where the wind howls past in bad weather and where so many interesting lichens and mosses are spread temptingly within reach, the trail led past a series of rocks beneath whose moist overhanging shelves the recesses were scarcely penetrated by the dim light of the forest. As was our wont, we peered within these fissures and miniature caverns. A cry escaped our lips! Here, at last, was the object of our search, here was theLuminous Moss, for, as our eyes explored the partial obscurity, a faint shimmering seemed to grow and grow until it became the glow of "goblin gold"—a soft yellow-green light that shone now steady, now wavering, ever exquisite, beneath our riveted and delighted gaze. To the touch mere earth, and in broad daylight mere earth, until through our handlens we distinguished the tiny Osmunda-like leaves of the sterile and the fruiting capsules of the many fruiting plants—but, what a charm to the eye as we lingered to admire that gleam of the radiant protonema in its dark treasure-house beneath the rocks!

Late in the day as we fared on past the timberline to the rugged summit, the weather changed and great torn rags of cloud were hurried by us and the wind blew bleak: but what mattered to us the gathering storm? We bore in our minds

and hearts a bright new memory, we had succeeded in our quest, we had found the Luminous Moss, and though, from that day to this, it has not been our good fortune to again discover this object of so many wanderings and wonderings, that one find has left us inclined to consider the word Schistostega a magical word, a talismanic word, a "name to conjure with!"

PHILADELPHIA, PA.

A HANDY METHOD FOR THE MOUNTING OF MOSSES

T. G. YUNCKER

It is believed that the method of mounting mosses and other small herbarium specimens described here has several advantages over the methods ordinarily practised in herbaria. The writer first saw it used by Professor J. P. Naylor, Physicist at DePauw University, in the mounting of the moss collections in his private herbarium and was impressed with its advantages. He has since used it with his own mosses and has found that it works admirably. It is with the hope that it may be of use to others that the method is described.

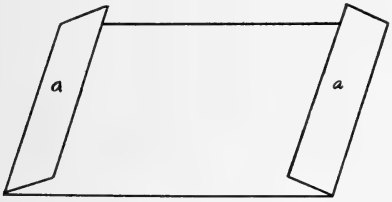

FIG. 1

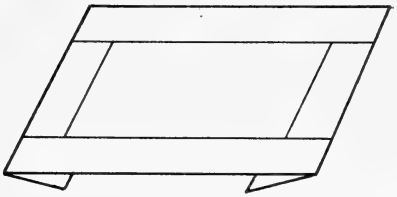

FIG. 3

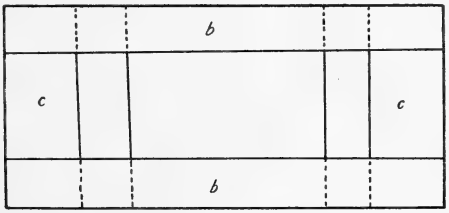

FIG. 2

The method consists of folding pieces of paper into the form of envelopes so that when mounted the specimen is held securely, is visible, and at the same time can be easily removed for further study should that be necessary. Small specimens mounted openly on herbarium sheets are frequently pried off and lost by the shuffling together of the sheets. Also, specimens mounted in envelopes are apt to be broken by frequent removal, oftentimes unnecessary if one could get a glimpse beforehand of what the envelope contained. This new method eliminates these difficulties.

To make the envelopes it is necessary to use two pieces of paper of different sizes, one being narrower and shorter than the other. The size of the pieces is determined by the size of the specimens to be mounted. The margin of the envelope should be wide enough to hold the specimen securely and at the same time leave a sufficient amount of the specimen exposed for examination purposes. The smaller piece is folded at the ends as in fig. 1,a. This piece is then placed on the larger piece and the sides of the larger piece folded over as in fig. 2,b. The ends (fig. 2,c) are then folded under giving the completed envelope as shown in fig. 3. These envelopes can then be glued to the herbarium sheet and the specimens inserted as with ordinary envelopes.

The advantages claimed for this method are in the saving of time in the examination of the specimens and, also, in the saving of the specimens from becoming broken.

Department of Botany, DePauw University, Greencastle, Ind.

REVIEW

A CATALOGUE OF PORTUGUESE MOSSES[1]

The bryological flora of Portugal has for a long time been far less well known than that of any other portion of Western Europe. How little the flora has been studied may be seen from the fact that when Messrs. Dixon and Nicholson[2] in 1911 re-traversed the ground so carefully worked by the Count de Solms-Laubach in the Algarve, out of the hundred species and varieties recorded by them twenty-three were believed to embody new records for Portugal. Indeed, Brotherus in the Natürlichen Pflanzenfamilien, writing in 1901, lists only three papers dealing with Portuguese mosses. Since then, however, active work by Messrs. Dixon, Nicholson, Kindberg, Coutinho, Machado, and Luisier, have greatly extended our knowledge, until the work now before us lists 7 species of Sphagna, 4 of Andreaea, and 313 species of Bryales exclusive of varieties, many of which latter are considered species by other authors.

Senhor Machado's work attempts to set forth the actual present day knowledge of Portuguese mosses. No form has been admitted to the list unless the author has personally examined an authentic specimen, or in a few cases, has found a printed report of the highest authenticity. Furthermore, the distributional data given are all exact, with citation of locality and collector, practically no generalizations being attempted. We cannot too strongly commend this attitude, which not only makes easy the study of geographic distribution, but renders it possible for subsequent authors to verify Senhor Machado's work at any time should differences arise in interpretation of species.

[1] Antonio Machado. Catálogo descritivo de Briologia Portuguêsa. Edicao e propriedade do Gabinéte de Botánica de Faculdade de Sciéncias da Universidade do Porto. Lisboa. 1919. pp. 1–143. 18 × 26 cm.

[2] H. N. Dixon. Results of a Bryological Visit to Portugal. Rev. Bryol. **39**: 33–50. (1912).

The *Catálogo*, however, is much more than merely an annotated list. There are analytic keys to families, genera, and species, and a four or five line description summarizes the salient features of each form. The keys seem, also, to be based upon obvious characters wherever possible. Sufficient synonyms are given to facilitate reference to standard works of bryology, and in the case of all species not mentioned in such works a footnote quotes the original description in full. No new species or varieties are proposed in the present list, Dr. Machado having followed the commendable course of describing novelties in more easily accessible journals. He has seen fit, however, to make some twenty new combinations (all listed below), and we confess that it seems to us unwise to make such changes in a publication which must by its nature be of limited circulation. These combinations are due in part to questions of priority, in part to generic changes, and in part to the reduction of species or subspecies to varieties. Concerning some of these matters opinions will ever differ, especially as regards the relative rank of forms, but we cannot see the advantage of replacing Hedwig's *Bartramia* with *Plagiopus*, without a careful discussion of the questions involved and an attempt to cover the nomenclatural changes needed for all species. The author's course compels future workers to canvass the ground afresh and means the citation of one additional title in literature for a matter of but three names. Nor do we see the advantage of subordinating Raddi's *Fabronia pusilla*, the type of the genus, to Schwaegrichen's *F. octoblepharis*.

There are an annoying number of changes of spelling and of typographic errors of other sorts, not all of which are covered by the list of errata. Such errors are responsible doubtless for indicating the following combinations as new: "*Pottia intermedia* var. *litoralis* (Mitt.)," which should be (Mitt.) Dixon; "*Bryum caespiticium* L. var. *commense* (Husn.)," which should be var. *comense* (Schimp.) Husn.; "*Eurhynchium confertum* Milde var. *brevifolium* (Milde)," which should have the parentheses omitted; "*E. rusciforme* Milde var. *atalanticum* (Brid.)," which should be var. *atlanticum* (Brid.) Milde; and "*Raphidostegium substranomulosum* (Dixon)," which should be *Rh. substrumulosum* Dixon (the spelling is corrected in the "errata"). We are keenly aware, however, of the difficulties that printing anything whatsoever, wrong or right, involves at the present time and do not wish to be understood as being critical of what a stupid compositor has made our confrère say. On the contrary, we extent to Senhor Machado our heartiest congratulations upon the *Catálogo*, and wish him all success in his further studies upon the Portuguese mosses.

The following lists includes all cases where the combinations in Dr. Machado's list have not, to our knowledge, been used previously. The authority r the new combination will in all cases be Machado. *Ceratodon purpureus* Brid. var. *corsicus* (Schimp.); *Fissidens polyphyllus* Wils. var. *Welwitschii* (Schimp.); *Grimmia trichophylla* Grev. var. *Sardoa* (De Not.); *Tortula meridionalis* (Luisier) (= *Desmatodon*, Luisier); *Trichostomum humile* (Hedw.) (= *Barbula caespitosa* Schwaegr.); *Cinclidotus mucronatus* (Brid.) (= *Dialytrichia Brebissonii* Limpr.); *Funaria mediterranea* Lindb. varr. *dentata* (Crome), *et convexa* (Spruce);

Plagiopus strictus (Brid.), *P. pomiformis* (Hedw.), *P. ithphyllus* (Brid.) (all formerly *Bartramiae*); *Pohlia elongata* Hedw. var. *longicolla* (Hedw.); *Bryum filiforme* Dicks. var. *juliforme* (Solms); *B. caespiticium* L. var. *pseudo-Kunzei* (Limpr.); *Fabronia octoblepharis* (Schleich.) Schwaegr. var. *pusilla* (Raddi); *Camptothecium Phillippeanum* (Spruce) (= *Homalothecium*, Br. & Sch.); *Eurhynchium algerianum* Kindb. var. *scabrellum* (Dixon); *E. rusciforme* Milde varr. *lusitanicum* (Schimp.), *et complanatum* (Schultz); *E. confertum* Milde var. *hercynicum* (Jaegr.) (the parenthetical authority should be Hampe); *E. megapolitanum* Milde var. *meridionale* (Schimp); *Hypnum cupressiforme* L. var *imponens* (Hedw.)

EDWARD B. CHAMBERLAIN.

NOTES ON CURRENT BRYOLOGICAL LITERATURE

B. LYNGE.—*Index Specierum et Varietatum Lichenum quae collectionibus "Lichenes Exsiccati" distributae sunt.* (Nyt. Magazin for Naturvidenskaberne. **57**: 465–569; **58**: 1–96. 1919, 1920.)—These articles are issued as supplements to the regular volumes of the Nyt Magazin. The first referred to above is the conclusion of Pars Prima of the Index, listing the contents of the various fascicles of exsiccati by number under the title of the work itself. The second reference is to the beginning of Pars Secunda, which includes an alphabetic list of the 119 different series of exsiccati indexed in part one, and begins the alphabetic list of the genera and species with reference to the exsiccati containing specimens of them. The two parts of this work by Dr. Lynge will, we understand, eventually be issued as separate volumes.

S. SORENSEN.—*Eidsvoll lövmosflora.* (Nyt Magazin for Naturvidenskaberne. **58**: 1–27. 1920)—The article, which is in Norwegian, is an annotated catalogue of some three hundred mosses collected during a five-year residence in Eidsvoll, a district of some 115 square miles situated just north of Christiana.

A. LUISIER.—*Les Mousses de Madére.* (Broteria Ser. Bot. **18**: 79–97, 99–120. 1920.)—The first article concludes the systematic account of the Madeiran mosses already noticed in our columns, covering the families Sematophyllaceae and Brachytheciaceae with critical notes on a number of species. The second article commences the detailed keys to families, genera, and species, with references to the previously published articles of the series. Father Luisier has, however, enlarged the scope of the keys so that they include all species known from the groups of Atlantic Islands adjacent to Madeira, and he has incorporated in the keys sufficient descriptive matter for the identification through the keys alone, of all save critical species. The series of articles is to be continued.

V. F. BROTHERUS.—*Contributions à la Flore bryologique de l'Ecuador.* (Revue bryologique **47**: 1–16, 35–46. 1920.)—The articles represent the fruit of the study of collections made in the provinces of Oriente and Azuay during 1909 and 1920 by Abbé Allioni. The region has been almost unknown bryologically. Dr. Brotherus's list contains descriptions of 35 new species, besides varieties and several new combinations. Localities are given with the greatest care.

R. Potier de la Varde.—*Observations sur quelques éspèces du genre Fissidens.* (Revue bryologique **47**: 17–18, 33–35. 1920)—The first contribution discusses the status of *Fissidens Lylei* Wils. The author agrees with Limpricht's first view that this plant, if not a true species, belongs with *F. exilis* rather than with *F. exiguus* Sull. The second article records the presence of *Fissidens Monguilloni* Thér. in northwestern France, and concludes that the species is a valid one which has previously been overlooked or misunderstood.

R. Potier de la Varde.— *Stereophyllum Bremondii. Thér. et P. de la V.* (Revue bryologique **47**: 19–20, *fig. 1, 2.*, and p. 35. 1920.)—This is a description and figure of a new species of moss from Cambodia, with an additional corrective note on the page cited in the second reference.

R. Potier de la Varde.—*Tératologie.* (Revue bryologique **47**: 20–21. *fig.* 1920.)—The author describes and figures a specimen of *Bryum Donianum* bearing two capsules or a single seta.

P. Culmann.—*Contributions à la flore bryologique de la Suisse et de l'Auvergne.* (Revue bryologique **47**: 21–24. 1920.)—This is a set of notes upon the presence of various species new to the floral regions mentioned in the title, or (in a few cases) notice that the reports of the species need verification. Both mosses and hepatics are included.

G. Dismier.—*Le Frullania riparia Hampe et le Marchantia paleacea Bertolini à Amèlie-les-Bains (Pyr.-Or.)* (Revue bryologique **47**: 24–26.—A report of the discovery of the two species of hepatics in southern France.

T. Husnot.—*Deux hépatiques nouvelles.* (Revue bryologique **47**: 26–27. *fig. 1–2.* 1920.)—Description and figures of *Cephaloziella subglobosa* Husn. and *Lophozia Corbieri* Husn., both new to science, from France.

R. S. Williams.—Report of the Canadian Arctic Expedition 1913–18. Volume IV: Botany. Part E: Mosses. pp. 1E–15E. *pl. 1.* Ottawa. 8 Feb. 1921.—Mr. Williams has studied the true mosses collected on the Canadian Arctic Expedition, principally by Mr. F. Johansen. The list enumerates 68 species coming from the general region between Point Barrow and Coronation Gulf and adjacent to the coast. Two species, *Barbula Johansenii* R. S. W. and *Chrysohypnum arcticum* R. S. W. are described and figured as new; and the list notes the first record for continental America of *Bryum neodamense* Itzig., and *Drepanocladus brevifolius* (Lindb.) Warnst.

Edward B. Chamberlain

MISCELLANEOUS NOTES

Fascicle Seventeen (Nrs. 401–425) of Dr. J. M. Holzinger's Musci Acrocarpi Boreali-americani, which was received by us April 1st, 1921, contains the following species: *Bryum Cruegeri* Hpe., *Campylopus subleucogaster* Jaeg., *C. angustiretis* L. & J., *Ditrichum giganteum* R. S. W., *Encalypta rhabdocarpa* Schwaegr., *Epipterygium Tozeri* Lindb., *Fissidens incurvus* W. & M., *F. exiguus* Sull., *F. Garberi* L. & J., *Grimmia Olneyi* Sull., *G. tenuicaulis* R. S. W., *Meesia*

uliginosa Hedw., *Mnium affine* Bl., *Philonotis calcarea* Schimp. *Ph. uncinata* Brid., *Physcomitrium pygmaeum* James, *Pogonatum alpinum Macounii* Frye, *Polytrichum Jenseni* Hag., *Rhacomitrium protensum* A. Br., *Seligeria calcarea* B. & S., *S. pusilla* B. & S., *Splachnum Wormskjoldii* Hornem., *Tayloria serrata* B. & S., *Tetraplodon mnioides* B. & S., *Tortula montana* Lindb. The *Polytrichum* and the *Splachnum* are Swedish, not North American, material. It is gratifying to note the large number of individual collectors that have conibuted to this fascicle, which fully maintains the high standard set by the author in the previous issues.

E. B. C.

SULLIVANT MOSS SOCIETY NOTES

The Brooklyn Botanic Garden announces to members of the Sullivant Moss Society, and to all others interested in the study of mosses that the entire herbarium and library of Mrs. Annie Morrill Smith, presented to the Botanic Garden in 1914, are available for consultation at the Garden. Both the library and the herbarium are kept separate from the general collections of the Garden, but may be consulted at any time upon application to the curator in charge. The Garden is desirous of increasing its bryological collections and library and will be pleased to enter into correspondence with bryologists and collectors with a view to exchange of publications or of specimens.

We are pleased to announce that since the publication of the last revision of the list of members Dr. W. H. Emig, Assistant Professor of Botany at the University of Pittsburgh, Pa., has joined the Moss Society.

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O. E. JENNINGS, Ph.D., Editor-in-Chief

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All material for identification should be sent to the curators direct; all other matter relating to the magazine should be sent to the Secretary or the Editor.

THE BRYOLOGIST

Vol. XXIV JULY 1921 No. 4

FURTHER BRYOPHYTES FROM NORTH CAROLINA (AND TENNESSEE)

A. LEROY ANDREWS

In the summer of 1919 I found it possible to spend about seven weeks in rather intensive search for bryophytes in the southern mountains. The field covered was as follows: one day in the low mountains (up to slightly over 3000 feet) east of Asheville in Buncombe County; two weeks from headquarters at Swannanoa in Buncombe County, from which place the northern face of the Swannanoa Mts. (up to 4400 feet) was carefully investigated and trips were made in the valley of the Swannanoa River and those of its tributaries from the north, Beetree Creek and North Fork; two weeks at Balsam in Jackson County, from which Jones Knob (6400 feet) was ascended several times and especial attention devoted to the route following Woodfin Creek and Falls, also the Balsam Range was followed from the summit of Wesner Bald to that of Dark Ridge (up to 5865 feet), the valley of Dark Ridge Creek was traversed a number of times and south of it Double Top Mt. (5540feet) was climbed and Snaggy Mt. partially examined; a week at Roan Mountain Inn in Carter County, Tennessee, from which Roan Mt. (6313 feet) on the border between North Carolina and Tennessee was twice ascended, the White Rock Mt. (4500 feet) to the northward was visited and Pardee Point and its vicinity in the canyon of the Doe River were scrutinized; ten days at Linville in Avery County, N. C., from where attention was devoted largely to Grandfather Mt. (5964 feet) and its immediate environs, including a trip down the Blue Ridge from Grandmother Gap (4000 feet) to Gragg or Cary Flat (about 2500 feet); finally part of a day at Marion (about 1500 feet) in McDowell County, where a piece of woods a short distance to the westward was botanized. The rocks were Carolina gneiss, Roan gneiss, Cranberry granite, Beech granite and Unicoi conglomerate, all in the main acid or silicious rocks; no limestone was visited.

The list of species I give will include only such as are not already contained in the lists of those collected by Atkinson and Durand,[1] though I shall precede it by a few remarks upon some of the species included there. My purpose was primarily to look for southern extension of the range of northern species and I am

[1] THE BRYOLOGIST, XVII, 58 ff. 1914; XXI, 61 ff. 1918.

The May number of THE BRYOLOGIST was published September 21, 1921

convinced by my experience that there probably remain still further interesting finds of this sort to be made. Grandfather Mt. and Roan Mt. are the most favorable localities for these species. Roan Mt. Inn is too far distant for a convenient base, and I owe it to the kindly hospitality of members of the Wilder family, owners of a large part of the mountain, who were spending the summer near the summit, that I was able to do any justice at all to this mountain's remarkable flora.

Of the species noted before it may be remarked that *Metzgeria crassipilis* (Lindb.) Evans is in all the region traversed the common species of its genus, as was rather suspected from the previous material. It grows on rocks and on bark of trees, often developes a great mass of the gemmae described and figured by Evans,[2] by which as well as by the breadth and outline of the thallus it can easily be distinguished at sight from *M. conjugata* Lindb., which is hardly so common in that region, though I saw it a few times and even colleected it fruiting on a large rock in the valley of Woodfin Creek.

The *Herberta adunca* (Dicks.) Gray of my former list has since been included by Evans[3] in his species, *H. tenuis*. I tried in vain to find fertile specimens of the plant. The conditions under which it grows were carefully noted. I found it only on mountains whose altitude reached the spruce and balsam zone, that is generally speaking on mountains of over 6000 feet. On shaded perpendicular rocks in the upper regions of such mountains it grew abundantly. Grandfather does not quite reach 6000 feet, but its great development of cliffs makes up for its lower altitude. In the Roan Mountain and the Balsam Range spruce and balsam were lacking on the summits falling short of 6000 feet and on such I saw no *Herberta*, though it occurred on the higher summit region of both Roan Mt. and Jones Knob. On Grandfather Mt. there was great abundance of it. On Roan Mt. I took a specimen from the Tennessee side, which adds a state to its distribution, but it was better developed on the North Carolina side.

The *Porella platyphylla* (L.) Lindb. of my former list is in the light of Evans' subsequent study[4] apparently all referable to *M. platyphylloidea* (Schwein.) Lindb., which seems to be our common form. It grows fairly abundantly on the bark of trees in our southern mountains.

Lejeunea Ruthii (Evans) was first described[5] from Tennessee alone, but in 1912 its author reported a station from North Carolina.[6] I subsequently recorded it from Atkinson's collections in that state on the basis of scattered plants growing among other bryophytes on the bark of trees. I found it myself in something more nearly approaching a pure culture on the slope of the Blue Ridge below Grandmother Gap, where the *Lejeuneae* were unusually richly represented.

Of further hepatics which in Atkinson's material represented extensions of

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[2] Annals of Botany, XXIV, 282 ff. 1910; cf. also Rhodora, XI, 188 f. 1909.
[3] Torrey Bull., XLIV, 219. 1917.
[4] Rhodora, XVIII, 109 ff. 1916.
[5] Evans, Lejeuneae of United States and Canada, 161. 1902.
[6] THE BRYOLOGIST, XV, 62.

range southward as compared with the ranges given in Evans and Nichols' Bryophytes of Connecticut (1908) and which have not otherwise, so far as I know, been found so far south in our eastern states the following were collected again by myself: *Lophozia incisa* (Schrad.) Dum., *Sphenolobus Michauxii* (Web. f.) Steph., *Lophocolea bidentata* (L.) Dum., *Lepidozia reptans* (L.) Dum., *Blepharostoma trichophyllum* (L.) Dum., *Frullania Brittoniae* Evans. To these might perhaps be added three or four mosses whose southern range is given somewhat vaguely by Evans and Nichols as "northern United States."

The species not recorded in the collection of Atkinson and Durand follow, accompanied by various notes and observations upon them. The localities given are in North Carolina except as Tenn. is expressly added. This is especially to be noted in the case of Roan Mt., where collecting was done on both sides of the state line. I have discussed various specimens with Prof. Evans, Mrs. Britton and Mr. Williams, to all of whom I am much indebted.

Riccardia latifrons Lindb. Rotten log near Woodfin Falls. The southern limits given by Evans and Nichols are New England and New York. It is certainly not as common in the southern mountains as *R. palmata* (Hedw.) Carruth., which I collected in several localities and which is in fact known from as far south as Florida.[7]

Riccardia pinguis (L.) Gray. Very wet rocks, Pardee Point, Tenn.

Pallavicinia Lyellii (Hook.) Gray. About a spring, near Cary Flat.

Pellia epiphylla (L.) Corda. Wet rocks, Pardee Point, Tenn. This is further south than the range given by Evans and Nichols, but it has since been reported from West Virginia and North Carolina and Prof. Evans informs me he now has it from Georgia.

Marsupella Sullivantii (De Not.) Evans. Shaded moist sloping rocks, near headwaters of Woodfin Creek in Jones Knob.

Nardia crenuliformis (Aust.) Lindb. On stones in small brook, Swannanoa Mts. Hitherto unknown south of West Virginia, where I collected it some years ago.

Nardia crenulata (Sm.) Lindb. On exposed ground at medium altitudes, collected near Cary Flat in Blue Ridge; also near Beetree Creek and near Burbank at foot of Roan Mt., Tenn. Specimens collected from rocks, not in brookbeds, near the summit of Wesner Bald and on Blue Ridge toward Cary Flat, the latter with perianths, I am unable to refer satisfactorily to either *N. crenulata* or *N. crenuliformis* and I recommend the group for further collection and study in our southern mountains.

Jungermannia pumila With. Wet rocks, valley of Dark Ridge Creek; also on stones in small brook, Swannanoa Mts. The southern range given by Evans and Nichols is to Maryland, but Sheldon has since recorded it from West Virginia.[8]

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[7] THE BRYOLOGIST, XVI, 50. 1913.
[8] THE BRYOLOGIST, XIII, 65. 1910.

Lophozia bicrenata (Schmid.) Dum. Ground in exposed places, Roan Mt., Tenn.; Blue Ridge, by road below Grandmother Gap. Evans and Nichols have it only south to Pennsylvania and New Jersey.

Lophozia ventricosa (Dicks.) Dum. Scanty specimens in crevices of rock about summit region of Grandfather Mt. The southern limit of the species given by Evans and Nichols was New England, but Sheldon later reported a West Virginia locality.

Sphenolobus minutus (Crantz) Steph. Rocks at high altitudes, Jones Knob; along Yonahlossee Road on side of Grandfather Mt.; also elsewhere at higher altitudes on Grandfather Mt. An extension of range to the southward, though Sheldon has reported it from West Virginia.

Plagiochila ludoviciana Sull. Doubtfully referred to this species by Evans. Rocks in canyon of lower course of Dark Ridge Creek; rocks in bed of stream on side of Grandfather Mt., by Yonahlossee Road.

Mylia Taylori (Hook.) Gray. Vertical cliffs, summit region of Grandfather Mt. This is a remarkable extension of range of this species; so far as I am aware it is not otherwise known south of the higher mountains of Vermont and New Hampshire.

Lophocolea heterophylla (Schrad.) Dum. On ground, Roan Mt., Tenn.; Grandmother Mt. By no means as common as farther north.

Chiloscyphus polyanthos (L.) Corda. In cold spring on Roan Mt., Tenn.; also at Woodfin Falls. The southern limit given by Evans and Nichols was New Jersey, but Sheldon later reported it from West Virginia. I have used the name *C. polyanthos* in the broad sense, as I have not been able to convince myself of the specific value of the segregated forms. So far as these are concerned Prof. Evans informs me that my first mentioned specimen is referable to *C. fragilis* (Roth) Schiffn., the second to *C. pallescens* (Ehrh.) Dum.

Harpanthus scutatus (Web. & Mohr) Spruce. On decayed stumps and logs, Woodfin Falls; Linville. The southern limit given by Evans and Nichols is Virginia.

Cephalozia bicuspidata (L.) Dum. Rotten wood, by Yonahlossee Road on side of Grandfather Mt. It is in the southern mountains much less common than the several other species of the genus. Evans and Nichols give its southern limit as New England, but Prof. Evans now informs me he has it from Georgia.

Cephaloziella papillosa (Douin) Schiffn. Ground in woods or in crevices of rock, Swannanoa Mts. and Balsam. The specimen from the first locality was named by Evans, that from the second is apparently the same.

Diplophyllum Sp. Exposed ground at medium altitudes, near Beetree Creek and near Burbank at foot of Roan Mt., Tenn. This is a distinct and apparently undescribed species.[9]

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[9] It is now under investigation and will be reported on later.

Radula Lescurii Aust. So named by Evans. On wet rocks at Woodfin Falls. This is a fine large species, quite different from our northern ones, its affinities being tropical American according to Prof. Evans.

Porella pinnata L. Wet rocks, Pardee Point, Tenn.

Lejeunea ovata Hook. Bark of trees, near Grandmother Gap and along road from there down Blue Ridge; also mixed with *Radula tenax* from rock, Dark Ridge Creek.

Lejeunea unciloba Lindenb. Bark of tree in woods, near Marion. Not found at higher altitudes, where *L. clypeata* (Schwein.) Sull. was not uncommon.

Lejeunea patens Lindb. Rocks, Grandfather Mt.; Woodfin Falls; Dark Ridge Creek. So named by Evans. This species had not hitherto been reported south of Nova Scotia[10] and is one of the "Atlantic species" reaching northwestern Europe. I have collected it in Scotland and the Faroes. The North Carolina specimens do not always have the very white color characteristic of those of Europe, but sometimes do, and otherwise agree closely, as Evans notes.

Lejeunea laetevirens Nees & Mont. Rocks, Woodfin Falls region and Swannanoa Mts. This species was left uncertain by Evans when he wrote his *Lejeunea* monograph, but he later cleared it up as having a considerable range in our southern states.[11]

Lejeunea ulicina Tayl. Bark of tree, below Grandmother Gap on Blue Ridge. This minute species Evans had not formerly recorded south of Nova Scotia,[12] as he doubted Lindberg's South Carolina record for it.[13] He now refers my specimen to it and suggests that Lindberg's record should perhaps be revised. This is like, *L. patens*, an "Atlantic species."

Frullania plana Sull. Not uncommon on bark of trees and on rocks, Roan Mt., Tenn.; Woodfin Creek; Balsam; Swannanoa Mts.

Sphagnum compactum DC. Dripping rocks, canyon of Doe River below Pardee Point, Tenn.

Sphagnum subsecundum Nees. Springy places, summit region of Roan Mt., both N. C. and Tenn.

Sphagnum Girgensohnii Russ. Below cold spring near site of old hotel, summit region of Roan Mt. This is a considerable extension to the southward of the range of this species, the most southerly station in our eastern states being hitherto Cranberry Glades, Pocahontas Co., West Virginia, where it was collected by Sheldon[14] and which was itself a long step to the southward, the species with us not usually passing the southern limits of glaciation. It should be noted however in this connection that it is not entirely a bog plant, as are most of the others limited by the area of glaciation, but occurs also in mountain-woods.

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[10] Evans, Lejeuneae of U. S. and Canada, 150. 1902.
[11] THE BRYOLOGIST, XI, 68. 1908.
[12] Cf. BRYOLOGIST, XII, 39. 1909.
[13] Lejeuneae of United States and Canada, 165. 1902.
[14] THE BRYOLOGIST, XV, 96. 1912.

Trematodon longicollis Michx. On ground, recent railroad cutting between Linville and Linville Gap; also near Beetree Creek.

Ditrichum lineare (Sw.) Lindb. On ground, in considerable quantities about summit region of Roan Mt., Tenn.

Ditrichum pallidum (Schreb.) Hpe. On ground, White Rock Mt., Tenn.

Dicranodontium asperulum (Mitt.) Broth. Vertical rocks at high altitudes, without fruit, Jones Knob; Grandfather Mt.

Dicranum montanum Hedw. A poorly developed sterile specimen from a log, Blue Ridge below Grandmother Gap. Williams[15] gives the southern limit as West Virginia.

Weisia viridula var. *australis* Aust. (= *W. longiseta* L. & J.) On earth, bank of Beetree Creek.

Amphidium Mougeotii (B. & S.) Schimp. Vertical rocks, not seen in fruit, Woodfin Falls; White Rock Mt., Tenn.; Grandfather Mt.

Trichostomum cylindricum (Bruch) C. M. On vertical rocks, usually at high altitudes, persistently without fruit, Jones Knob from summit region down to Woodfin Falls.

Tortella tortuosa (L.) Limpr. Vertical rocks, summit region of Grandfather Mt. Evans & Nichols give its southern range as "northern United States."

Tortella caespitosa (Schwaegr.) Limpr. Ground, not uncommon at lower altitudes, vicinity of Asheville and Beetree Creek.

Tortula caroliniana Andrews.[16] A sterile species with propagula growing on the bark of trees, Swannanoa; also North Fork of Swannanoa River and Grandmother Gap. Two other sterile specimens of *Tortula* are of interest: one from the historic Shelter Rock about a mile and a half south of Roan Mt. Station, Tenn., the other from an exposed rock near Swannanoa. Both were growing with or near *Fabronia* and are probably of southern rather than northern affinities. I am unable to identify either with any described species and they are apparently distinct from each other. The material is however totally inadequate to be branded with dubious new species names, and I recommend further collection and study of southern Tortulas.

Grimmia apocarpa (L.) Hedw. Rock near Balsam; also Roan Mt. Evans and Nichols give its range "from the northern U. S." The specimen from the summit region of Roan Mt. is noteworthy in having large papillae on the leaves, particularly those of the perichaetial region.

Grimmia Doniana Sm. Rock, Roan Mt. A remarkable extension of range, as it was not hitherto known south of the White Mts. of New Hampshire. It was found growing only on a single rock in the summit region near an old trail leading down the North Carolina side. The plants were a little more robust in all parts than those growing in the summit region of ths White Mts., corresponding well with the forma *elongata* of Loeske'e

[15] North American Flora, XV, 120. 1913.

[16] For description see BRYOLOGIST, XXIII, 72 ff. 1920.

treatment.[17] This form Loeske regards as characteristic of a more moist habitat, and there is no question in my mind that the summit region of Roan Mt. has a much greater summer rainfall than that of the White Mts. Terrific thunderstorms were of almost daily, or nightly, occurence and the summit area was running with water.

Rhacomitrium sudeticum (Funck) B. & S. Rocks in brooks, near Yonahlossee Road on side of Grandfather Mt.; Jones Knob including Woodfin Falls; Roan Mt.

Zygodon viridissimus (Dicks.) R. Br. Bark of trees, with propagula, but without fruit, Roan Mt., Tenn.; Swannanoa; Grandmother Gap. A specimen from a large rock near the Yonahlossee Road on the side of Grandfather Mt. was without propagula and produced fruit, but the capsules were either immature or overripe and permitted no examination of the peristome. I cannot refer it satisfactorily to any other species.

Pohlia proligera Lindb. Wet, springy places, Swannanoa Mts.; Dark Ridge. Sterile, but bearing the characteristic propagula. This is apparently the only one of the bulbiferous Pohlias reaching our southern mountains. It has not before been reported south of West Virginia, where I found it some years ago.

Pohlia albicans (Wahl.) Lindb. Wet place in mountains, Beetree Creek. Sterile.

Bryum turbinatum (Hedw.) Schwaegr. Stone in brook (Woodfin Creek), Jones Knob. A large sterile tuft. This species is common in the Rocky Mountain region, but is very uncommon or of doubtful occurrence in our eastern states, and this is a quite unexpected southeastern record.

Mnium hornum L. Bank of small brook crossing Yonahlossee Road. Sterile.

Mnium affine Bland. Collected in woods west of Linville.

Aulacomnium palustre (L.) Schwaegr. Wet, rocky places, Pardee Point, Tenn.; Grandmother Gap. This is by no means so common in the southern mountains as farther north.

Philonotis marchica (Willd.) Brid. Woodfin Falls.

Drummondia clavellata Hook. Bark of tree, near Marion.

Leucodon julaceus (L.) Sull. Bark of tree, near Marion. Not noted at higher altitudes, where *L. brachypus* Brid. everywhere prevailed.

Leskea obscura Hedw. Bark of trees, valley of Swannanoa River and elsewhere about Swannanoa.

Thelia asprella (Schimp.) Sull. Bark of tree, near Marion. The genus was not noted at higher altitudes.

Myurella gracilis (Weinm.) Lindb. A small tuft in crevice of rock, Grandfather Mt.

Anomodon minor (Beauv.) Fürn. Bark of tree, summit region of Roan Mt. Evans and Nichols give the southern limit as Virginia.

Thuidium minutulum (Hedw.) B. & S. Snaggy Mt.

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[17] Die Laubmoose Europas, 1: Grimmiaceae, 93. 1913.

Thuidium virginianum (Brid.) Lindb. On humus in woods, abundant in hills east of Asheville; also noted occasionally, but not collected, in region about Swannanoa; not observed at higher altitudes.

Anacamptodon splachnoides (Frol.) Brid. Decayed places in beech and maple trees, Roan Mt. below Carver Gap, Tenn.; Yonahlossee Road near Grandfather Mt.; Beetree Creek; Snaggy Mt.

Fabronia octoblepharis (Schleich.) Schwaegr. Noted only on rocks, dry and more or less exposed or shaded, Shelter Rock, 1½ miles south of Roan Mt. Inn in valley of Doe River, Tenn.; White Rock Mt., Tenn.; Swannanoa; Dark Ridge Creek. The plants found were sterile except for a couple of overripe capsules on the specimen from Dark Ridge Creek. They vary considerably as to teeth of leaves, etc. according as they were growing in more shady or sunny situations. Some of them might perhaps be referred to others of the species credited to our southern states, but it seems to me questionable whether the species of this genus have not been decidedly overdone.

Isothecium myosuroides (L.) Schimp. Found at two points on Grandfather Mt.: on large rocks that had rolled down a brook course and lodged by the Yonahlossee Road; also on the so-called White Rocks, the starting point of the trails from the Linville side. This moss was reported by Grout[18] as known in our eastern states only from the White Mts. of New Hampshire, where it is certainly not a common species. My specimens are sterile and the identity of the moss was suspected from acquaintance with it in Norway. I am unable to agree with Grout in including it with *Eurhynchium*.

Pylaisia intricata (Hedw.) B. & S. Bark of trees, Wesner Bald.

Platygyrium repens (Brid.) B. & S. Decaying logs, etc., frequent but sterile, Grandfather Mt.; Woodfin Falls; Roan Mt.

Entodon brevisetus (Hook. & Wils.) J. & S. Not infrequent on logs and bark of trees, Roan Mt., Tenn.; Swannanoa Mts.

Entodon compressus (Hedw.) C. M. On rotten wood, Jones Knob.

Entodon seductrix (Hedw.) C. M. On logs and stumps, Balsam.

Pterigynandrum filiforme (Timm) Hedw. Base of tree near summit ridge of Roan Mt. This is a considerable extension of range southward, the species not having been known before south of New Jersey, so far as I am aware.

Haplohymenium triste (Cesati) Kindb. Not uncommon on bark of trees, sterile, Swannanoa Mts.; North Fork; Beetree Creek; Grandfather Mt.; Marion.

Schwetschkeopsis denticulata (Sull.) Broth. Sterile and mixed with other mosses on bark of trees, Grandfather Mt.; North Fork.

Hookeria Sullivantii C. M. Springy place by lumber railway, valley of Dark Ridge Creek, sterile.

Amblystegium irriguum (Wils.) B. & S. Rocks in brooks, Woodfin Falls; Beetree Creek; Swannanoa Mts.; Grandfather Mt.; Grandmother Mt.

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[18] Torrey Bull., XXV, 251. 1898.

Amblystegium varium (Hedw.) Lindb. Bark of trees, Grandfather Mt.; Blue Ridge near Linville.

Amblystegium adnatum (Hedw.) Aust. Frequent on bark of trees and on rocks, Grandfather Mt.; Grandmother Gap; Wesner Bald; Roan Mt.; Swannanoa Mts.; Pardee Point, Tenn.

Plagiothecium Roeseanum (Hpe.) B. & S. Clefts in rocks, Roan Mt., Tenn.; White Rock Mt., Tenn.; Cabin Creek (tributary of Dark Ridge Creek).

Plagiothecium elegans (Hook.) Sull. On ground and among rocks, Roan Mt., Tenn.; White Rock Mt., Tenn.; Double Top Mt.; Grandfather Mt. In the first and fourth localities the species was fruiting nicely, in the second and third fruit was lacking, but abundant propagula were produced. In the characters of its propagula and capsules this species occupies a somewhat isolated position in the genus. I find I have specimens of it with propagula from Quarry Run in West Virginia, where I gathered it (mixed with hepatics) in the fall of 1903, but failed to include it in my list. I also have it fruited from the White Mts. of New Hampshire.

Plagiothecium Müllerianum Schimp. Crevices in rocks, sterile, Roan Mt., Tenn.; White Rock Mt., Tenn.; also a station midway between both. The specimen from White Rock Mt. was in a somewhat wetter place and more robust than the others. It produced propagula, which have not to my knowledge been observed hitherto for this species. They are small, growing from the stem clustered in the leaf-axils, where they may be detected through the leaves by careful focusing. They are individually slender filiform-clavate, up to 100 μ long, 7 μ wide, septate with up to 6 or 7 segments. They correspond closely with the propagula described by Correns for *P. sylvaticum*,[19] but are slightly more slender. I found them in my specimens in the axils of consecutive leaves some 8–10 mm. below the growing point of the stem (branch), those lower down having apparently already ripened and been detached, while none had yet developed higher up. Normal archegonial buds occurred much farther down the stems, and the species is dioicous. I found no fruit.

Sematophyllum Novae-Caesariae (Aust.) E. G. B. Occasional on wet rocks, brook descending from Grandfather Mt. near crossing of Yonahlossee Road; also near upper course of Woodfin Creek in Jones Knob. The latter specimen bears immature capsules (July 28), their period of maturity evidently being considerably later than that of *S. carolinianum*, with which the species often grows. Fruit is regarded as very rare in this plant, a single good collection of it having been made in the mountains of Pennsylvania by Wolle and Rau in 1874, from which it was described by Austin.[20] In what genus the plant should be included is perhaps still open to question.

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[19] Vermehrung der Laubmoose, 247 f.; cf. 244 ff. 1899.

[20] Bot. Gaz., 1, 30. 1876.

Hypnum eugyrium Schimp. Rather frequent on stones in mountain brooks, Roan Mt., Tenn.; Swannanoa Mts.; Woodfin Falls.

Hypnum dilatatum Wils. Stone in brook, Woodfin Creek, upper course in Jones Knob.

Brachythecium rutabulum (L.) B. & S. Wet place in wood, upper altitude of Grandfather Mt. Grout[21] gives the southern limit as New Jersey and Pennsylvania.

Brachythecium rivulare B. & S. Stones in brooks, north of Linville Gap; Woodfin Falls. Grout[22] gives the southern limit as Virginia.

Eurhynchium rusciforme (Neck.) Milde. Stones in brooks, White Rock Mt., Tenn.; Woodfin Falls.

Cirriphyllum Boscii (Schwaegr.) Grout. Ground in woods, near roads, sterile, Swannanoa Mts. The species was not noted at higher altitudes.

Hylocomium triquetrum (L.) B. & S. Ground in woods, summit region, Jones Knob.

Ithaca, N. Y.

LITTLE JOURNEYS INTO MOSSLAND

V.—The Old Genus Hypnum

George B. Kaiser

One enters the realm of hypnaceous mosses with somewhat the sensation of a timid wayfarer who, for the first time, ventures into an unexplored region, where every step is fraught with misgiving, along a confusing route which may at last lead him deep into an impenetrable jungle. At least, such were our own impressions when we first had to do with what we often characterized as "pesky Hypnums," breathing anathemas upon them and frequently relegating the specimens to the shelf for future study.

Beautiful though these pleurocarpous mosses may be, the genus Hypnum, as it used to be understood, with the one hundred and ninety-five North American species enumerated and described in the Lesquereux and James Manual, ever presented difficulties for beginners. We mentally placed it in rather the position of Carex, among the sedges, and complicated Compositae, among the higher flowering plants. Only recently has the genus been split into many sub-genera, leaving under the name of Hypnum only the single species, *Hypnum Schreberi*,—that charming yellowish-green moss which forms such rich and deep glistening cushions in many a moist corner in and at the edge of our woods.

But after all, according to the French proverb, it is only the first step which costs, and, when the threshold is once fairly crossed, where is the science that does not reveal itself quite simply to the student? One by one the species of these

[21] Mem. Torr. Bot. Club, VI, 177. 1897.

[22] Op. cit., 182.

truly attractive bryophytes became familiar to us and, today, each species in its proper place, macroscopically, microscopically, is surely impressed upon our eye and mind,—æsthetic concomitants of the forests which they adorn.

Is there a moss lover who has not seen and admired the decaying logs of our north woods endearingly spread with the soft feathery mats of *Ptilium crista-castrensis*—the Knight s Plume—whose color varies from pale primrose green to wonderfully delicate tints of fawn and russet? Many of us recall great boulders in the mountain woods, upholstered with abundant mats of the exquisite *Hylocomium proliferum* gracefully curved and dissected like the fronds of tiny ferns—plumes to deck the sylvan fairies! I have seen beds of that before-mentioned *Hypnum Schreberi* near Profile House with single plants over a foot in length. Then, those pale green or yellow cushions of *Drepanocladus uncinatus*, with slender hooked and plicate leaves—how memory of them bears us back to the fairest of woodsy scenes among our beloved White Mountains, Adirondacks, and Catskills! And we can personally picture a lovely dell near Franconia, New Hampshire—we called it the Dell of the Nine Muses, because a group of nine graceful white birch trees grew beside it—where *Rhytidiadelphus triquetrus* has never appeared in deeper, softer green luxuriance, and there the fairies of a certainty dance on Midsummer Eve!

These are some of the larger and more conspicuous of our hypnaceous mosses, but scores of other species abound and, when once known, we wonder why they seemed so difficult to determine. *Campylium chrysophyllum*, with squarrose leaves, and of a decided golden color, is at home in moist fields, especially where lime is present, and, its tiny brother, *Campylium hispidulum*, may be looked for on the base of forest trees, where its delicate light green tracery well repays examination under the hand-lens. A frequent companion of the larger Campylium is *Stereodon arcuatus*, usually palish or yellowish green, with clearly secund leaves and with branches decumbent or erect. *Stereodon imponens*, irregularly pinnate with curved leaves showing opaque brownish basal cells, is to be found on decaying wood or soil in almost every mountain forest, and, with a more southerly range, is the robust, handsome moss with leaves neatly plaited like braids of hair—*Stereodon curvifolius*. Perhaps no pleurocarpous moss is commoner in our mountains than *Stereodon reptilis*, which is covered with just-matured fruit in August, forming close, thin mats on soil, rock, and logs, but, take care that you differentiate it from *Amblystegiella adnata*, which is somewhat smaller, closer to the substratum, and microscopically with different leaf cells.

The Brachythecia, too, present a series of beautiful forms, which are moisture-loving. In early spring you will see at the edge of our streams patches of the brightest green imaginable which consist of *Bryhnia novae-angliae*, characterized by decurrent leaves with twisted apices and microscopically dense often papillose cells. At this season the banks and rocks are covered with the fresh growth of *Brachythecium plumosum* with frequent sporophytes of dark brown or even blackish color. I might lead you to perpendicular rocks where the robust tufts of *Brachythecium rutabulum* appear in glossy yellow-green profusion and to many a mountain brook filled with *Brachythecium rivulare*, the leaves showing

clearly enlarged basal cells which later in the year, when the water is lower, will form in the bed deep carpets of luxuriant green. Thick tufts of *Hygrohypnum ochraceum* are mingled with the latter species and, in deep ravines, the dark strands of *Eurynchium rusciforme* harmonize well with the forest shade, with ends swaying in the swish of clear, cool waters, where *Fontinalis* delights to dwell.

However, these are but glimpses of the world of feather mosses and the best advice we know is to grasp the key to field and woods and hasten away, no matter what the season, leaving dark care behind, to seek forest and streamside, to taste the refreshment of sweet waters in the fulness of the truest pleasure it is given man to enjoy; where you may study the genus Hypnum, in the best way of all: at first hand, close to Nature's heart.

6620 Germantown Ave., Pelham, Philadelphia, Pa.

A PRELIMINARY RFPORT, WITH NOTES, ON THF LICHENS FOUND NEAR THE CINCHONA BOTANICAL STATION, JAMAICA, BRITISH WEST INDIES

Charles C. Plitt

During June and July of 1919, it was my good fortune to spend a vacation at the Government Laboratory, on the summit of Cinchona Hill, on the island of Jamaica. This Hill has an altitude of 5000 feet, the laboratory and gardens, and residence, occupy its summit.[1] In our party were Professor Duncan S. Johnson of The Johns Hopkins University, through whose efforts the trip was arranged and made a success, Mr. William Seifriz, Mr. Louis Pessin, and the writer, members of the Botanical Seminar of the University. The four of us were comfortably housed at the residence, "Belle Vue Cottage," said to be the highest dwelling of any pretensions in the West Indies.[2] Not far away were our servants' quarters; to the rear of us, and at higher elevation were the laboratories; around us and covering many acres were the gardens with their numerous trees, shrubs, and herbs, grown here for experimental purposes. Among them were Casuarina, Grevillea, Callitris, Callistemon, gigantic Eucalyptus trees of several species, Cordyline, Gordonia, and dozens of other plants of interest to the botanist.

As I am interested in the Lichens, it was to them that I turned my attention. Scarcely a day passed that I did not go out to collect specimens. It was not long before my table was simply packed with material in various stages of preparation, some dry, and ready to be sent home, some almost so, some just collected. As soon as collected, I tried as far as possible to assort my material, and, if I could decide upon its generic name, this was appended. I thus soon had piles of Cladonia, of Sticta, of Usnea, of Leptogium, of Graphis, of Lecanora, of Parmelia, of

[1] For a detailed account of this interesting place, see, Johnson, "The Cinchona Botanical Station," Popular Science Monthly, XII, 1914, and, I, 1915.

[2] Johnson, Ibid., p. 524.

Lobaria, etc. Specimens that were alike, but collected at different times, or from different localities, were given the same number, but were distinguished from each other by different letters, for example, 69, 69a, 69b, etc. I could then keep track of the number of different species collected with the greatest ease, and took delight in the way this number increased. Each day that I went out, I brought home my collecting bag filled with specimens, many times, too, with almost as much additional material wrapped up in newspaper. In the short stay of six weeks about 200 different species of Lichens were collected. As my collecting ground was limited to the immediate vicinity of Cinchona, to Morce's Gap, to Vinegar Hill Road, to New Haven Gap, to Green River, to Clydesdale, to Latimer River, distant from two to six miles from Cinchona, and, was even further confined to areas along the trails, one may surmise, from the number of species mentioned, that the region is an especially rich one in Lichens. This, however, is not to be wondered at. It probably would be hard to find a place more favorably situated for Lichen growth. According to Shreve,[3] Cinchona has an annual mean temperature of 60.8° F., (an absolute maximum of 80°, in August, and an absolute minimum of 46°, in January); it has 105.7 inches of rainfall in a year,[4] (the minimum amount falling in July, 3.80 inches, the maximum amount in October, 17.91 inches). But besides the abundant rainfall, the mountain sides are bathed almost daily with mists. It is to them that many species owe their luxuriant growth. However, one must not get the idea, that there is here uniformity of conditions that tend to make for a sameness and which would probably become tiresome. Far from it, there are areas far more varied than can be found in most places of similar extent, ranging from treeless mountain slopes, strewn with rock, hardly supporting any vegetation, to mountain sides covered with impenetrable jungle. Here are all sorts of light conditions, and, likewise all sorts of moisture conditions, from most intensely xerophytic to very hygrophytic. Having the opportunity, thus, to study the Lichens, in such varied habitats, one soon has it brought home to him that Lichens are rather the children of light than the children of moisture; they are found on the dry barren hillsides, in the intensest sunlight, but rarely in the deeper shadow of the moist jungles. The ideal situations, are, of course, where there is a fair supply of light, and, at the same time, a liberal supply of moisture, as may be found along the trails through the forested areas. Here one finds Lichens galore, but here, one finds also Hepatics and Mosses in equal abundance. Every available inch of space is covered, and that too, whether it be the ground, rocky ledges, or even the tree-trunks themselves. What keen competition! The slightest advantage that a plant may have over another, is seized to the disadvantage, and final extinction of its competitor. In this struggle, seen on all sides in the ideal localities, the Lichens, by no means play the losing hand. Everywhere one sees that many are well able to take care of themselves. Sticta and Leptogium species, especially, spread their thalli with the least unconcern over Hepatics and Mosses, which finally succumb, their small

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[3] Shreve, A Montane Rain-Forest. Carnegie Institution of Washington, Publication No. 199.
[4] Shreve. Ibid. p. 11, & p. 15.

green leaves being completely shaded; they are, in other words, being starved to death. It is such observations that convince one that the relationship between the two components of the Lichen (Alga and Fungus) must be a most harmonious one; the Lichen behaves as an autonomous unit, a status that could be brought about only by a relationship that is mutually beneficial to the components.

To get a better understanding of the collecting region, I will state that Cinchona Hill is a spur of the main Blue Mountain Range. As already stated, the laboratories and gardens occupy its summit. Trails lead in various directions. There is one that leads right around the summit of Cinchona Hill. But our favorite trail was the one that leads to Morce's Gap, a pass in the main range, and then on to Vinegar Hill. This trail keeps practically at the same level to Morce's Gap, whence it rapidly descends to 3500 feet, and follows the contour of the mountain side, winding in all possible and conceivable directions. It, therefore, happens that there are sunny sides, and less sunny, and even almost shady sides, and, therefore, moist sides, and less moist sides. These trails are not very wide; just wide enough for the laden donkey to make his way safely. On one side, the mountain towers above one, sometimes rising in a gentle slope, 14°–25°, but oftener much steeper, 25°–45°, or even 65°[5]. On the other side one looks down the mountain, over tree tops; sometimes into some gigantic bowl, the mountain sides rising up all around; sometimes, however, across the intervening valley and off toward the distant sea. Another favorite walk was to New Haven Gap, along a trail leading up to another trail 500 feet higher than the Morce's Gap Trail, and parallel to it a great portion of the way. Then, too, there was the Latimer River trail, which went in the north east direction to the one taken to Morce's Gap. It was along this trail that we found highly xerophytic conditions, trees being absent much of the way, and the sun shining down and heating the soil almost all day. That the sun could heat up the rock to quite high temperature, even at that altitude, may be observed from the following: on a day when the thermometer registered 20°C. (68°F.) in the laboratories, it registered 40°C. (104°F.) when placed against a tree trunk on which the sun was shining, and 48°C. (118°F.) when placed on a rocky ledge on which the sun was shining. Lichens here were, therefore, subjected to wide ranges of temperature every 24 hours, for, during the night the temperature was quite low, our official lowest being 14°C. (58°F.). It probably was much colder on the ground. Along all these trails one passes deep ravines, and it was a pleasure to explore some of them.

In this preliminary report it has been deemed wise not to attempt any scientific enumeration of the species found, but to leave this rather for a later paper, when all the material collected will have been worked up, and here to classify them by their habit of growth, merely as fruticose, foliose, and crustose forms.

Fruticose Forms

In this group are various species of Usnea and Ramalina, and *Theloschistes flavicans*, which cover the branches of the trees, and the various species of Cladonia

[5] Shreve. Ibid. p. 8.

and Stereocaulon, and *Sphaerophorus compressus*, which cover the ground and the rocks and the tree trunks. In the sparsely wooded areas, in other words where there is plenty of light and sunshine, trees are literally covered with Usnea species, and *Theloschistes flavicans*, the bright yellow of the latter standing out in marked contrast to the former. It was indeed a treat to see such fine specimens of the Theloschistes, most of them many inches long; they varied in shades of color, from light yellow to some of a deep orange. Along the trails through the thickly wooded regions, Usnea is restricted to the tree tops, and one is hardly aware of its occurrence. If, however, a walk is taken on a day following a windy, rainy night, there will be evidence enough of its presence, in the bits strewn along the trail. The tree top species seems to be almost always *U. florida*, but, in the more open places, where the trees are covered, one finds not only *U. florida* but also *U. dasypoga*, *U. ceratina*, and *U. rubiginea*. Three species of Ramalina were collected, all in the garden of Cinchona: *R. linearis*, *R. denticulata*, and another still to be determined. Of species of Cladonia, more than 30 were collected; here will be mentioned only the most common and interesting ones. To me, the most interesting one was *C. aggregata*, and its variety *straminea*. This Cladonia was found almost everywhere, especially on moist, poorly illuminated slopes. Its color, size, and general appearance varied greatly; so much so, that one is inclined to think that instead of but one variety, we have here at least three or four. Its peculiar structure interested me right from the start, and I wondered if the holes in the sides of the podetia enabled the plant to absorb and perhaps retain more water than other species of Cladonia not having them can do. To see if this were so, I weighed off 1 gram of the air-dried plant, and found that it could absorb, and retain 1.10 grams of water, in other words, in case of rain, it could increase its weight 110%. The same experiment was tried with *C. pycnoclada*, which delights to grow under extreme xerophytic conditions, and I was rather surprised to learn that it could absorb and retain twice its weight of water; in other words, increase its weight 200%. No attempt was made to go deeper into this interesting problem, but enough was done to show that the holes did not assist in increasing the plant's power to absorb water. In all probability they are for aeration. *C. aggregata* is hygrophytic, the holes probably serving the plant to dispose of water.[6] While on this subject, I will add that a gram of *Sticta aurata* increased its weight 300%; that is, it absorbed and retained three times its weight of water, and *Leptogium bullatum* absorbed and retained four times its weight of water.

To return to the Cladonias, both *C. pycnoclada* f. *flavida*, and f. *exalbescens* were found, both on exposed sunny slopes, forming patches of wonderful size. Another Cladonia that is sure to attract attention, on account of its beauty, its large size, and prevalence, is *C. squamosa* f. *phyllocoma*; it was at home along the shady trails. Other Cladonias, of more or less interest are the following: *C. ceratophylla*, very common; *C. dactylota*; *C. decorticata*; *C. didyma*, quite common on rotting logs; *C. foliacea* (?), very common; *C. furcata* f. *foliolosa*; *C. hypocritica* (?); *C. peltastica*; *C. pityrea*; *C. rangiformis*.

[6] It would be worth while to study *Cladonia retipora*, in this connection.

The genus Baeomyces is represented by at least three different species, *B. absolutus*, *B. intricatus*, and *B. fungoides*. One finds them quite frequently, but patches are never of great extent, as in the case of *B. roseus* with us.

Two Stereocaulons were collected, both being found in great abundance. Both are beautiful species—I don't know which is the prettier. *S. cornutum* has a stem (podetium) several inches in length, and unbranched, and grows on slopes exposed to the sun; *S. ramulosum* is branched, is much smaller, and is inclined to grow in more shaded situations. Here, too, must be mentioned the interesting *Sphaerophorus compressus*, growing on tree trunks along the shaded trails,some with podetia of a coral-red color, some almost pure white.

[To be Concluded]

MOSSES OF A STATEN ISLAND HOUSE AND LOT

A. J. Grout

Some of my most interesting studies have been the careful investigation of the moss-flora of restricted areas, and I always find some surprises.

There are practically no mosses growing on the trees of Staten Island. This I attribute to the gases which cause us so much annoyance and I believe are responsible for a great deal of the respiratory trouble which is ascribed to the "sea air." There are, of course, mosses at the base of trees in the woods, but no Pylaisias, Orthotrichums, or Ulotas.

In view of this it was rather surprising to find a moss on the inside of an unused flue in a cement chimney, thirty feet or more above the ground. I think it was a *Bryum* or *Ceratodon*, but I can find no record and, as the flue is now in use, I can not be sure. In passing, it may be of interest that Mrs. Britton recorded many tree mosses from the Island about twenty-five years ago, more or less.

On the concrete of basement and steps I find: *Bryum argenteum* L.*†, *Leptobryum pyriforme* (L.) Wils.†, *Bryum caespiticium* L.*, and *Tortula muralis* (L.) Hedw.*

On the clay soil of garden and lawn: *Catharinea angustata* Brid.*, *Ceratodon purpureus* (L.) Brid.†, *Physcomitrium turbinatum* (Mx.) Brid.*†, *Funaria hygrometrica* (L.) Sibth.*, *Pohlia*, probably *P. nutans* (Schreb.) Lindb., *Bryum bimum* Schreb. or possibly *intermedium* Brid., *Mnium affine* Bland., *Mnium sylvaticum* Lindb., *Amblystegium Kochii* B. S., *A. varium* (Hedw.) Lindb., *Brachythecium acutum* (Mitt.) Sull.†, *B. oxycladon* (Brid.) J. & S.*†, *Eurhynchium hians* (Hedw.) J. & S.†, *E. serrulatum* (Hedw.) Kindb., *Campylium chrysophyllum* (Brid.) Bryhn., and *Hypnum Patientiae* Lindb.†

These twenty except *Funaria*, were all found in one day on a lot 87 × 150 feet.

New Dorp, Richmond Borough, N. Y.

*, With fruit.
†, Abundant.

VOLUME XXIV NUMBER 5

SEPTEMBER, 1921

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ALEXANDER W. EVANS, Ph.D. JOHN M. HOLZINGER, M.S.

and the

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THE BRYOLOGIST

VOL. XXIV SEPTEMBER, 1921 NO. 5

MOSSES FROM BRITISH GUIANA AND DOMINICA, LESSER ANTILLES, COLLECTED BY MISS E. F. NOEL IN 1914

(WITH PLATE IV)

R. S. WILLIAMS

The first eleven species listed are from Kaieteur Falls, on the Potaro river, a branch of the Essequibo and a region but little known botanically. These falls can only be reached, it is said, during the dry season when the river is low and then only with considerable difficulty. They are among the scenic wonders of British Guiana, the Potaro river being 120 feet wide in the dry season and 400 feet in the wet, and having a sheer plunge of some 740 feet into the canyon below.

FROM KAIETEUR FALLS

Leucobryum crispum C. M. *84.*
Leucobryum Martianum (Hsch.) Hampe *82 & 96.*
Calymperes leucophyllum Schwaegr. *97.*

Macromitrium trinitense sp. nov.

Evidently dioicous: primary stems creeping, bearing more or less numerous, curved branches 1 to 3 cm. high; stem-leaves narrowly lanceolate, 5 to 7 mm. long, somewhat serrulate half way down or more, the slender flexuous points often twisted when dry; costa slender, 25 to 28 μ wide near the base, not excurrent, the very narrow leaf-blade extending to the apex; cells of leaf elongate, in rows with furrows between, mostly unipapillate on both sides from near the apex to the base; the median cells variable, with prominent papillae and broad lumen or in the older leaves with papillae often indistinct and lumen very narrow; cell-walls somewhat unequally thickened throughout; outer perichaetial leaves similar to those of the stem, the 2 or 3 inner leaves one-third to one-half as long, more or less oblong, abruptly narrowed and irregularly serrulate above to a short, mostly entire point; seta smooth, 6 to 9 mm. long; capsule smooth, obovate, tapering into a somewhat ribbed neck, when dry becoming almost globose, about 1 mm. long without the lid, the slender-beaked lid of about the same length; annulus none; peristome evidently double (imperfect or very young); spores (immature) not quite smooth, 22 to 25 μ in diameter; calyptra without hairs, somewhat scabrous above, slit into numerous segments below.

[1] The July number of THE BRYOLOGIST was printed January 9, 1922.

Growing on tree trunks, El Valle to San Juan, Trinidad, Brit. West Indies, J. R. Johnston, July 6, 1903, number *163* (*Type*).

Collected also with old fruit, lacking lid and calyptra, near Kaieteur Falls by Miss Noel in 1914, number *89*.

This species is especially distinguished by the long, slender-pointed leaves, elongate cells papillose nearly throughout and by the small capsule, subglobose when dry.

Philonotis gracillima Aongstr. *83*.
Squamidium leucotrichum (Tayl.) Broth. *81*.
Pilotrichum bipennatum (Schwaegr.) Brid. *100*.
Hookeriopsis Parkeriana (Hook.) Jaeg. *88*.
Mittenothamnium volvatum (Hpe.) Card. *95*.
Taxithelium planum (Brid.) Mitt. *95 a*.
Sematophyllum subsimplex (Hedw.) Mitt. *96 a*.

From Dominica

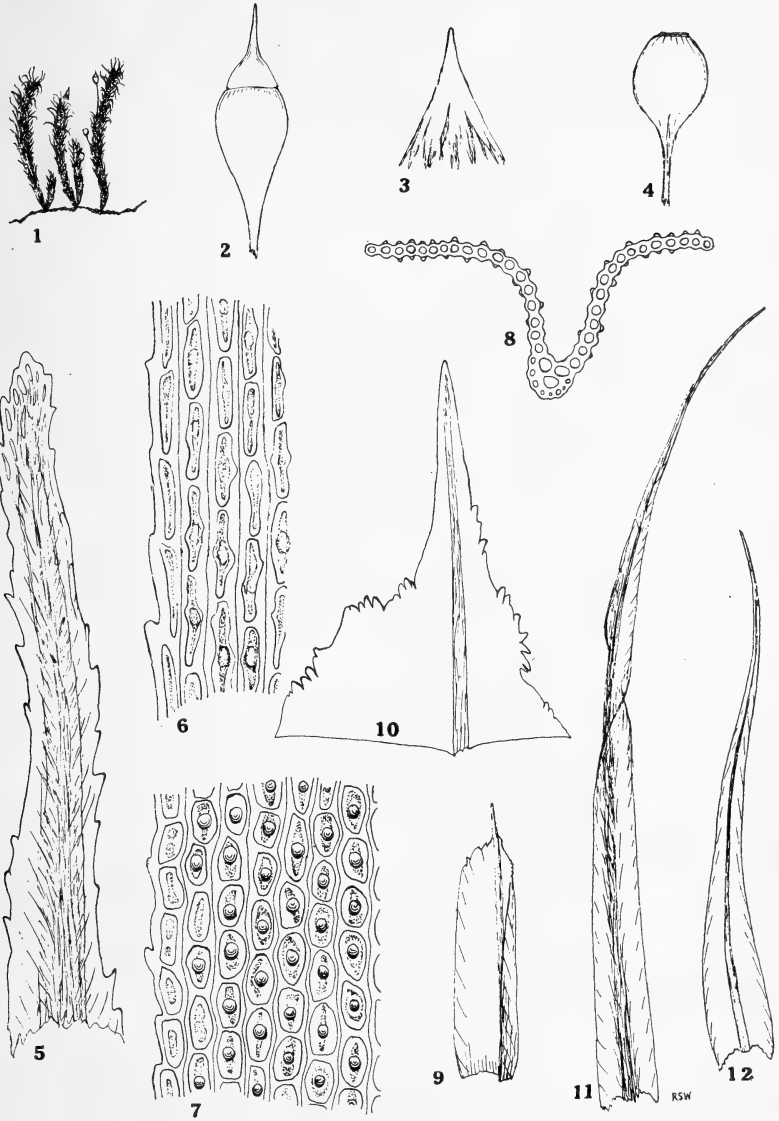
Dicranella brachyblepharis (C. M.) Mitt. Boiling Lake. *7,32* & *37*.
Dicranella crassinervis (Hpe.) Jaeg. Boiling Lake. *46*.
Leucoloma serrulatum Brid. On trees, Dominica. *56*.
Thysanomitrium Richardi Brid. Boiling Lake. *28*.
Octoblepharum albidum (L.) Hedw. Roseau. *14*.
Fissidens polypodioides (Sw.) Hedw. Boiling Lake. *51*.
Syrrhopodon flavescens C. M. Boiling Lake. *43*.
Syrrhopodon rigidus Hook. & Grev. Boiling Lake. *52*.
Barbula hymenostegioides Broth. Damp rocks, Roseau. *12*.
Rhizogonium spiniforme (L.) Bruch. Boiling Lake. *24*.
Philonotis sphaericarpa (Sw.) Brid. Roseau. *5*.
Philonotis uncinata gracilenta (Hpe.) Dism. Dominica. *3*.
Phyllogonium fulgens (Sw.) Brid. Boiling Lake. *25*.
Porotrichum insularum Mitt. A single stem only. *23*.
Pilotrichum Husnoti Schimp. Dominica. *60*.
Lepidopilum polytrichoides (Hedw.) Brid. Roseau. *16*.
Thuidium antillarum Besch. Boiling Lake. *58*.
Sematophyllum pungens (Sw.) Mitt. Boiling Lake. *47*.

New York Botanical Garden

Explanation of Plate IV

Macromitrium trinitense Williams, sp. nov.

Fig. 1. Plant about natural size.
2. Moistened capsule with lid, x 16.
3. Calyptra, x 16.
4. Old dry capsule, x 16.
5. Apex of stem leaf, x 180.
6. Median cells of leaves, x 250.
7. Median cells as often found in young leaves, x 250.
8. Cross-section near middle of leaf, x 180.
9. Inner perichaetial leaf, x 16.
10. Apex of perichaetial leaf, x 60.
11. Upper stem leaf, x 16.
12. Lower stem leaf, x 16.



MACROMITRIUM TRINITENSE WILLIAMS, SP. NOV.

LICHENES PROPE HABANAM IN INSULA CUBA ANNO 1914 A CL. FRATRE ARSÈNE BROUARD LECTI

M. Bouly de Lesdain

Physcia integrata var. sorediosa Wainio.—ad arbores.

Placodium murorum var. **radiatum** (Hue) B. de Lesd., nom. nov.—ad saxa calcaria.

Caloplaca pyracea (Ach.) Th. Fr.—ad saxa calcaria.

Caloplaca pyracea var. **cubana** B. de Lesd. var. nov.—ad saxa calcaria. Thallus albidus tenuis levis areolatus; areolae minutae planae dispersae vel contiguae. Apothecia minuta rotunda circa 0.3 mm. lata primum concava margine thallino tenui saepe subcrenulato cincta, demum evanescente, dein plana, margine tenui proprio concolore integro non prominente cincta, tandem demisso. Sporae 8-nae polocoelae loculis tubulo junctis aut demum aetate loculis approximatis, 11–13 μ longae, 6–8 μ lat.

Lecanora chlarotera Nyl.; L. cinereo-carnea (Esch.) Wainio; et L. subgranulata Nyl.—ad arbores.

Toninia granosa (Tuck.) B. de Lesd., nom. nov. *Lecidia granosa* Tuck. Observ. Lichenol. **2**: 420.—ad saxa calcaria, No. 10880. Thallus K–, C–, KC–, cinereus diffracto-areolatus; areolae circa 1–1.5 mm latae, granulis minutis numerosis conglomeratisque formatae, circa 0.4 mm crassae (aut supra lapidem plus minutusve dispersae) sat contiguae aut rimis sat latis sejunctae. Apothecia nigra nuda supra areolas adnata, 1 mm. lata primum plana, margine tenui integro concoloreque cincta, dein convexa immarginataque. Epithecium obscure olivaceum, thecium incoloratum; hypothecium fuscum; paraphyses cohaerentes articulatae apice leviter inflatae; asci clavati, sporae 8-nae hyalinae fusiformes vel cylindraceae 1–3, rarius 4–, sept. 18–24 (30) μ long., 3.5–4 (6) μ lat. Gelat. hym. I coerulessit.

Buellia subdisciformis (Leight.) Wainio—ad arbores, cc.

Bacidia albescens (Arn.) Zw. forma et B. medialsis (Tuck.) B. de Lesd. nom. nov. *Biatora medialis* Tuck.—ad arbores.

Arthonia circumtincta Müll. Arg.; A. gregaria (Weig.) Krb., *A. cinnabarina* Wallr.; et A. polymorpha Ach.—ad arbores.

Opegrapha Bonplandii Fée; et var. abbreviata (Fée) Müll, Arg.—cc. ad arbores.

Opegrapha atra Pers. var. **cubana** B. de Lesd. var. nov.—lignicola, *No. 10768*. A specie non differt nisi spermatiis rectis vel subrectis longioribus, 7–9 μ long., 1 μ lat.

Graphis (Leucographis) Afzelii Ach.—ad arbores.

Gyrostomum scyphuliferum (Ach.) Fr.—ad arbores.

Gyrostomum scyphuliferum var. **macrosporum** B. de Lesd. var. nov.—ad arbores. Thallus albidus orbicularis tenuis hypothallo tenuissimo cinctus. Apothecia sicut in typo. Epithecium fuscum granulosum, thecium et hypothe-

cium incolorata; paraphyses numerosae graciles ramoso-connexae; asci oblongi membrana sat tenui; sporae 8–nae persistenter hyalinae murales septibus transversalibus 10–13 halone indutae, utroque apice rotundatae aut obtusae 51–76 μ long., 15–20 μ lat. Gelat. hym. I dilute coerulescit, citoque fulvescit; sporae intense coeruleo-violacent.

Endopyrenium Brouardi B. de Lesd., sp. nov.—ad saxa calcaria, *No. 10774*. Thallus pallide cinereo-albus 1–2 cm. latus squamosus, squamae sat crassae leves (juniora rotundata) varie crenulatae undulatoque flexuosae circa 0.1 mm. latae dense imbricatae, subtus pallide albido-carneae basi nigricantes. Apothecia minuta atra globosa immersa apice solum prominentia in squamis plura; perithecium integre nigrum. Paraphyses indistinctae; sporae 8-nae hyalinae simplices ellipsoideae, 14–19 μ long., 5–6 μ lat. Gelat. hym. I + coerulescit deinque vinose rubet.

Endocarpon (Euendocarpon) pallidum Ach.—ad saxa calcaria.

Verrucaria sphinctrina Duf.—ad saxa calcaria (C).

Anthracothecium libricolum (Fèe) Müll. Arg., et A. ochraceo-flavum (Nyl.) Müll. Arg.—ad arbores.

Trypethelium eluteriae Spreng. (C); et var. inaequale (Fèe) Müll. Arg.; et T. tropicum (Ach.) Müll. Arg.—ad arbores.

Tomasellia Brouardi B. de Lesd., sp. nov.—ad corticem levem, *No. 10812*. Thallus albidus tenuissimus hypophleodes. Apothecia aggregata nigra deplanto-convexa nuda minutissima, primum velamine thallino tectae, maculam rotundam circa 1 mm. lat. vel ellipticam, vel irregulariter elongatam, formantia. Epithecium, thecium et hypothecium incolorata; paraphyses graciles ramoso-connexae; asci subpiriformis apice non incrassati 33–54 μ long., 19–24 μ lat.; sporae 8-nae hyalinae oblongae utroque apice obtusae vel uno apice vix attenuatae 1–sept., loculis aequalibus 18–24 μ long., 3.5–4 μ lat. Gelat. hym. I+ lutescit.

Dunkerque, France,
5 July, 1921

RICCIOCARPUS NATANS (L.) CORDA, FROM AFRICA

Wm. Hy. Pearson

In a small collection of hepatics from Belgian Congo, sent to me to be determined by Dr. R. Naveau of Antwerp, there are specimens of the above species collected by H. Vanderyst, at Misie, Belgian Congo, Sept. 1914; it is var. *terrestris*, distinguished from the type by the shorter, broader, and more rotundate apices of the scales.

Stephani says (Sp. Hep. p. 55) that the species, although of world-wide distribution—Tonkin, Japan, Brazil, Australia, New Zealand, Mexico, China—had not been recorded from Africa. In the Manchester Museum there are specimens collected by Krause, at Port Natal, in 1840.

In my study of the Congo material I had occasion to examine the rich collection of the genus in the Manchester Museum, which includes the Austin

Herbarium. According to Karl Mueller (Rabenh. Krypto-Fl. Lief. 4, p. 214), the fruit is exceedingly rare and he was only able to examine fruiting specimens from America. In Austin's "Hep. Bor-Amer. Ex." *No. 145* is *Riccia natan;* var. *terrestris* in fruit; the capsule measures 1 mm. in diam., the spores .06 mm.; Mueller says .045 mm.–.055 mm., with 40 blunt papillae round the margin but gives a figure with about 15.

Austin published his tickets for his "Exsiccatae" in book form. In my copy, by the margin of *No. 145*, he has written *Riccia terrestris* Austin. A curious character of the species is that the teeth are coloured. The rhizoids are described as being smooth, not papillose within as in *Riccia*; I have seen some that are faintly papillose and others that have delicate strands in them, some spiral.

The type specimens from Africa are deposited in the Manchester Museum.

MANCHESTER, ENGLAND

A PRELIMINARY REPORT, WITH NOTES, ON THE LICHENS FOUND NEAR THE CINLHONA BOTANICAL STATION, JAMAICA, BRITISH WEST INDES

CHARLES C. PLITT

[*Concluded from July number*]

FOLIOSE FORMS

I am placing at the head of this group *Anaptychia angustifolia* and *Alectoria Loxensis*, both really more at home among the fruticose forms. These two, however, simulate a foliose habit, growing over low mosses and hepatics, closely appressed to the ground. The two plants look very much alike; so much so, that in my first collection I gathered both, thinking at the time that I had only the Anaptychia. *A. angustifolia* grows in partly illuminated and in very sunny situations; in the former places I could not find it in fruit, but in the latter, it fruited copiously. It was quite common. *Alecioria Loxensis* is much rarer, and was found only in the more sunny places. Other species of Anaptychia collected are the following: *A. comosa*, *A. hypoleuca*, and *A. hypoleuca* f. *sorediifera*. *A. comosa* was found only occasionally, but *A. hypoleuca*, and its form *sorediifera*, are quite common, growing on ledges of rock, exposed to the brightest sunshine.

It is hard to say which of all the interesting genera belonging here interested me most, whether Cora, Dictyonema, Sticta or Leptogium. *Cora pavonia* was met at an altitude of about 4500 feet, and from that altitude on up to 5500 feet it was met with frequently. It is found on the ground and on tree trunks. It can grow in quite sunny situations, and also in moist somewhat shaded places, where it covers the ground. In the sunny places, and on tree trunks, it is less at home, although specimens can reach quite a large size, many times larger than when growing in the moist places where they are crowded.

Dictyonema sericeum is found only on decaying logs, and only in rather

shaded situations. I found it only at altitudes of 5000–5500 feet. Wherever found, it often formed patches covering many square inches. Of course, both Cora and Dictyonema interested me, both being Hymenomycetous Lichens; but Sticta, and its close ally Lobaria, and Leptogium, also attracted my attention, because of their number and variety of forms. They grew, too, in a variety of situations. It was noted, too, that the difference in form of some species was due to the difference in habitat. *Sticta damaecornis* growing in deep shaded places was inclined to have very narrow thalli, in more sunny places the thalli were broader.

I have already stated, that in the deep shaded ravines, almost no Lichen life could be discovered, although there was still enough light for many species of Hepaticae. But, of all Lichens, Sticta and Leptogium seem best able to adapt themselves to grow in the deep shade. Both have a most interesting way of accommodating themselves to the small amount of light that finds its way down to them, by extending their narrow thalli horizontally outward from the tree trunk, and growing more or less spirally around it, instead of lying closely appressed to it. This peculiarity of growth is, of course, not confined to Sticta and Leptogium, some Hepatics and Mosses behaving in the same way; and the Leptogium observed was growing on a moss.

How many species of Sticta I collected, I am not yet prepared to say. It may be only four, it may be twice that number, the variety of shape being only due to difference in habitat and environment. *Sticta aurata* and *Sticta crocata* were equally plentiful and were found in almost similar situations, always on tree trunks, and always in sunny places. *S. damaecornis*, and *S. tomentosa* grew in shady places, the latter on the ground and the former on tree trunks, varying much in width of thalli, according to the amount of illumination.

Of Lobaria, four different species were found; *L. corrosa*, *L. crenulata* (?), and *L. quercizans*, found on tree trunks, and *L. dissecta* (?), which grew on moss-covered rocks.

Species of Sticta and Lobaria were observed almost everywhere. Not a walk could be taken without finding one or more of the species covering the ground, some rocky ledge, or tree trunk. Not so however, with Parmelia, which was very much less common, notwithstanding the number of different species found. It was found much less frequently, was generally restricted to the tree trunks, and its growth was inclined to be dwarfish. The most important species of Parmelia found, are the following: *P. cetrata*, possibly two varieties; *P. cristifera*, *P. perlata*, *P. sinuosa*, *P. laevigatula*, *P. pilosella*.

Species of Leptogium were found very frequently, eight, or perhaps more, different species having been collected. They were, of course, at their best immediately after a rain, when beautiful specimens could be found even in places where one previously had failed to observe them, because the rain had swollen up the thalli, and had changed a more or less shrivelled up and perhaps unsightly crust into a thing of beauty. How wonderfully prominent would then their fruits stand out! It is hard to say which of these species impressed me most,

when thus swollen, whether *L. bullatum* with its immensely swollen apothecia, or *L. phyllocarpum* with its apothecia prettily decorated with small thalline outgrowths, or *L. marginellum* with its numerous, although rather small marginal apothecia. Other Leptogium species observed are: *L. foveolatum* (?), *L. lacerum*, *L. phyllocarpum* v. *isidiosum*, and *L. tremelloides* in several forms.

Peltigera, too, was frequently met with. All over the garden grew *P. canina*. It, too, was found in shady places along the trails, where *P. polydactyla* was also found. On an exposed rocky ledge, where the sun could shine on it much of the day, grew *P. canina* v. *laciniata*, so very different from the species, when growing in shady places, that perhaps Mr. Merrill is right in giving it a new varietal name.[7]

But one species of Physcia was found, *P. obscura* v. *endococcina*. It grew on rocky ledges in rather open places. It was not very abundant. Instead of Physcia, one here finds much Anaptychia.

Again, but one species of Dermatocarpon was found, *D. miniatum*. It was not very abundant, only one or two ledges seeming suited for its development. In this connection, I can add that I was rather surprised not to find any species of Gyrophora or Umbilicaria. Rocky ledges were there in abundance that seemed ideal habitats for these plants, but none were found.

Pannaria was also found, but I have thus far only determined *P. pannosa*, a very pretty species, not very common, which was found growing on tree trunks in shady ravines. Its interesting prothallus, persisting, and of the appearance of a thick felt-like black nap, is sure to attract attention. Closely related to Pannaria, is *Coccocarpia pellita*, which is at home on rocks exposed to the broad sunshine, and is very common.

One species of Coenogonium was found, it may be *C. Leprieurii*, but the hyphae are much broader than the diameter given for that species. One species of Calicium was also found. It seems to be *C. salicinum*. *Erioderma Wrightii* was found in several places, on tree trunks, on dead wood, and on the roof of the laboratory. Part of the material collected is sufficiently different to warrant a varietal name.

Crustose Forms

Among the crustose forms I found much that was interesting and new. In number of forms, they equalled about half the total number collected. Much work still remains to be done, before a final report can be made on what was collected.

I shall mention first *Haematomma puniceum*. It, on account of its brilliant scarlet apothecia, is sure to attract attention. It was not very abundant, and was very much at home on the cedars in the garden. It seemed to me much handsomer than our southern species.

Another Lichen that was only occasionally found, but which is sure to attract attention, is *Glyphis cicatricosa*. It was found only on trees in the garden at Cinchona.

---

[7] Merrill's Lich. Exsic. No. 49.

Species of Graphis and Arthonia were found in abundance. Almost every tree trunk, especially if it was smooth, had, among other crustose forms, one or more species of Graphis and Arthonia. Species thus far determined seem to be the following: *Arthonia complanata, A. didyma, Arthothelium macrotheca, Graphis glaucoderma, G. scripta.*

Three species of Caloplaca were found, none of which are as yet satisfactorily determined. *Chiodecton sanguineum* was found quite frequently. This pretty bark Lichen delights to expose itself to the brightest sunshine. Although so common, I found no specimen in fruit. *Cyphelium tigillare* was found. It was not common. What little was found, was growing on bark. *Diploschistes scruposus* was quite common. It grew only on rocks, or on the soil in between the rocks, on slopes devoid of trees and exposed to the hot sun. On the sunny slopes along the Latimer River trail, it was very common, being usually associated with *Coccocarpia pellita.*

Several species of Lecanora were found: *Lecanora albella, L. varia,* and *L. subfusca,* the latter on rocks, the other two on tree trunks. *L. varia* also occurs on dead wood. Species of Leptotrema, Thelotrema, Ocellularia, and Phaeotrema were also common. Superficially they look much alike, and are all found on tree trunks along the shady trails. They are readily recognized by the tiny punctures, the ostioles of the apothecia, scattered all over the thallus. With some the tiny openings are very minute, with others they are quite conspicuous.

Another common crustose Lichen was *Lopadium leucoxanthum.* It grew on the bark of various trees, and in various situations, generally, however, more or less sunny ones. *Microthelia thelena* was found on our trip to Green River, on trees, at 3500 feet altitude. I failed to find it at the higher elevations. Several species of Pertusaria were found. Some grew on rocks in the bright sunshine, others on trees. Most of them have not as yet been satisfactorily determined. *Pyrenula mamillana* was another common Lichen found on tree trunks. It was at its best, however, at slightly lower altitudes than at Cinchona, at Green River, 3500 feet altitude, and at Clyde River, 4000 feet altitude. Lecidea, too, was represented, but none of the species found have as yet been identified. Lastly, *Verrucaria calciseda* must be mentioned. One was sure of finding this wherever there was an outcrop of limestone.

Epiphyllous Lichens

I now come to a very interesting type of Lichens, the Epiphyllous Lichens. How many of these were found, I am not yet prepared to say, very few of them having been as yet determined. In this connection, I must state that their study, as also the study of all tropical American Lichens is attended with much difficulty. The literature is hard to get hold of, and considerable trouble is encountered in having one's material verified. However, progress is being made, and although much time is being consumed, the work will finally be accomplished.

My concept of an epiphyllous Lichen was considerably changed when I began their study. Here in this wonderful Lichen country, almost any Lichen may be-

come epiphyllous, and I was surprised to find such Lichens as *Usnea florida*, *Sticta aurea*, and species of Leptogium, of Parmelia, of Theloschistes, and of Lecanora growing as epiphylls. However, I do not think that anyone ever thinks of these as characteristically leaf-inhabiting Lichens. Some individuals of these Lichens, in such a favorable climate, become epiphyllous merely by accident. Many other Lichens, on the contrary, seem peculiar to leaves, and were never found anywhere else. Such Lichens I would call truly epiphyllous Lichens. The leaves of some plants evidently furnished ideal substrata, whereas the leaves of other plants never harbored a single specimen. The leaves of Podocarpus, for example, were literally covered with epiphyllous Lichens.

Only a few of these strictly epiphyllous species have thus far been determined. Among these are a Pyrenula-like species, evidently, *Pyrenula* (*Porina*) *epiphylla*, occurring on Podocarpus; an Opegrapha, which seems to be *O. phyllobia*, on Callistemon; and *Pilocarpon tricholoma*, growing on cypress.

Another interesting phase of my study of the Lichens of Cinchona, was listing the number and kinds of species growing on each of the various trees and shrubs, and on the buildings around the garden. Thus on a rose-bush near the house grew the following: *Usnea florida*, *Lecanora varia*, *L. subfusca*, *Ramalina* sp., *Parmelia* sp., *Lecidea* sp., *Usnea hirta*, *Graphis* sp., *Pertusaria* sp., *Collema* sp., and *Haematomma puniceum*.

The bamboos were singularly free from Lichens, and yet on nearly all of them grew *Opegraphela filicina*.

A comparative study was made of the Lichens found on a Cryptomeria and those found on two Junipers. One might think that the Cryptomeria would harbor practically the same species that were found on the Junipers. But there were marked differences. Cryptomeria was very sparsely inhabited by Graphis, Arthonia, Lecanora, and Pertusaria. On the other hand, it seemed to be the ideal host for a Calicium, and for a species of Lecidea. Again, Parmelia found the Cryptomeria to its liking, whereas, Sticta preferred the Junipers.

I was rather surprised to find that over 20 species of Lichens grew on the roof of our laboratory. Usnea species, and Cladonia species predominated, but it seemed that almost any Lichen might be expected; any species that could live on old wood, on rotting wood, or on humus.

University of Maryland,
June, 17th, 1921

SPHAGNUM USED AS A SURGICAL DRESSING IN GERMANY DURING THE WORLD WAR

J. W. Hotson

During the recent war much attention was given, especially in Great Britain, to the making of surgical dressings from sphagnum moss. Even before the United States entered the war these dressings were in quite general use in the

British Army hospitals on practically all the allied fronts. As a rule the American surgeons did not take kindly to the type of sphagnum pad made by the British, so that shortly after our entrance into the war the American Red Cross as well as private individuals undertook rather extensive experiments in an effort not so much to improve the efficiency of the dressings as to make them in a form that might be more acceptable to the American surgeon. A brief account of the results of some of these experiments, including the methods of gathering, storing and cleaning the moss, as well as a rather detailed account of making the dressings, has been published.[1]

In these articles it has been shown quite definitely that the value of sphagnum for surgical dressings lies largely in its power to absorb an excessive amount of fluid, which in some species is as high as twenty times the dry weight. The mechanism by which this is made possible consists of the large, empty, perforated cells in the stem and leaf, especially in the latter, as shown in figures 5–8.

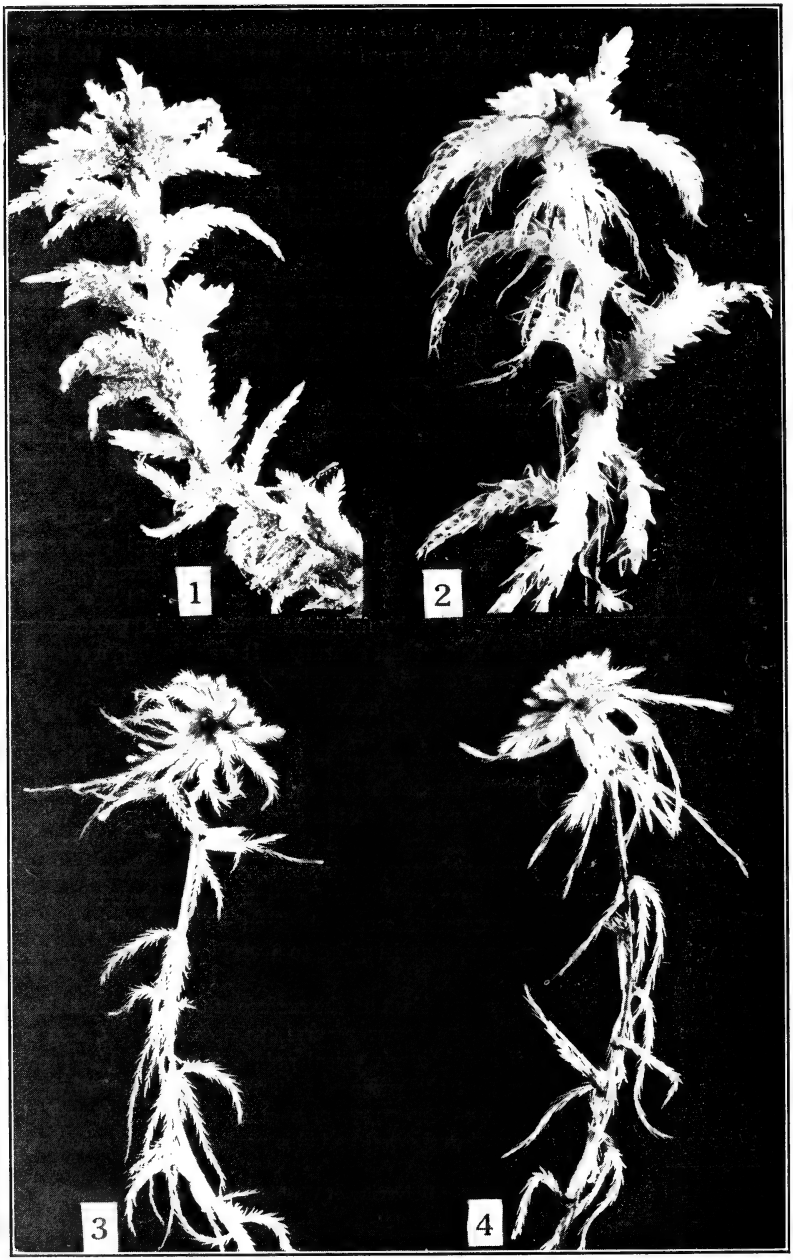
Many of us who were working with sphagnum in this country have wondered how the Germans used it as a surgical dressing. Most of the following information on the subject was obtained directly from Berlin through the kindness of the German Red Cross.

Like many great discoveries and inventions the value of sphagnum as a surgical dressing was discovered, at least as far as the medical profession of Germany was concerned, by sheer accident. Prior to this discovery sphagnum doubtless was used locally as a dressing for wounds as it was in Scotland and Ireland, but its approval and sanction by members of the medical profession was not established until the latter part of last century. It was Neuber, a surgeon at Kiel, in 1882, who published the following remarkable story.

In the early eighties of last century a workman at one of the outlying peat moors in north Germany accidentally sustained a severe lacerated wound of the forearm. In the absence of anything better to apply to the wound, his fellow-workmen wrapped it up with fragments of peat which were lying near, and after an interval of ten days he arrived at the surgical clinic at Kiel with the original dressing undisturbed. It was feared that the wound when examined would be found in a very unsatisfactory state, but, on the contrary, when the peat dressing was removed, the wound was found to have healed in a most satisfactory manner. The unexpected result obtained with a dressing material which, at first sight, seemed so unpromising led to a very careful inquiry into its nature and properties.

An investigation of the growing plant on the surface of the bog, down through the various stages of decay to the brown amorphous depths below, was made from the physical, chemical and bacteriological points of view. The practical outcome of this inquiry was that the value of sphagnum as a surgical dressing was found to be due to its marvellous power of absorbing fluids. It was found that the growing plant collected and dried had this power at the maximum, but

[1] Presented at the regular meeting of the University of Washington Chapter of Sigma Xi. Feb. 16, 1921.



EXPLANATION OF PLATE V

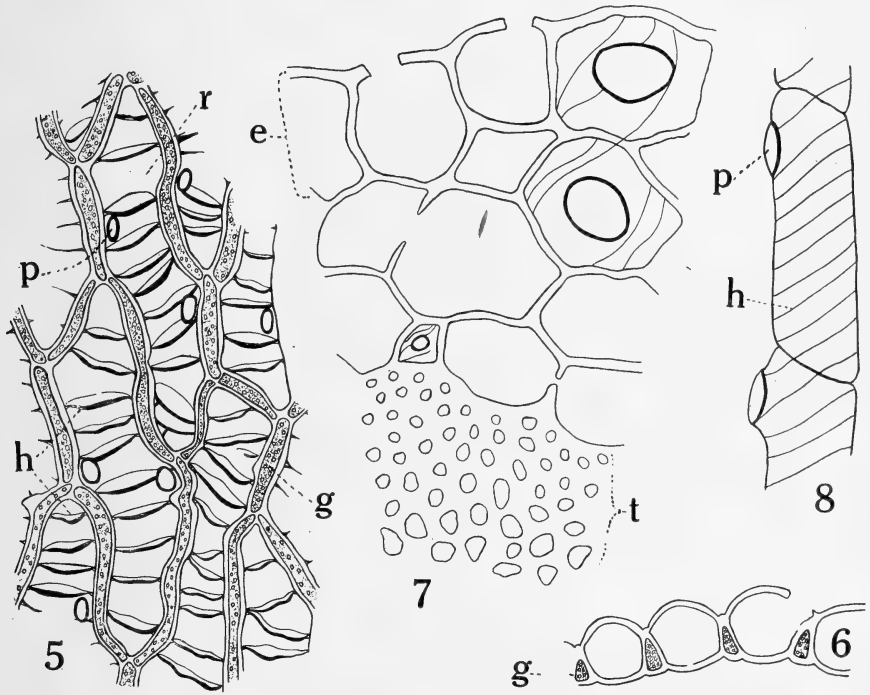
Sphagnum suitable for surgical dressings:

FIG. 1. *Sphagnum imbricatum.* FIG. 2. S. *palustre.*

Sphagnum not suitable for surgical dressings:

FIG. 3. *S. recurvum.* FIG. 4. *S. fuscum.*

the light brown layers of semi-decayed moss which lie above the peat proper retain great absorptive powers also. It is probable, however, that it was from the partly decayed material that the temporary dressing just mentioned was taken.



SPHAGNUM PALUSTRE

e, epidermis; *g*, green cells containing chlorophyll; *h*, hoop-like bands, *p*, pores or openings into the reservoir cells; *r*, reservoir cell; *t*, thick-walled cells that constitute the wiry center of the stem.

FIG. 5. Surface view of a portion of a leaf. x 300.
FIG. 6. Part of a cross-section of a leaf. x 275.
FIG. 7. Part of a cross-section of a stem. x 300.
FIG. 8. Reservoir cells from epidermis of a branch. x 225.

(From drawings made by Miss Agnes Carlson).

Thus, before the World War began, the value of sphagnum for surgical dressings was known to the majority of surgeons in Germany, although it was not used to any great extent until the war broke out. These facts were also known in a general way by the British and French surgeons, as well as to a few American surgeons.

This was practically the sphagnum situation at the outbreak of the war in

1914. Very little was known in this country as to what use the Germans were making of sphagnum during the war until after the war was over. We now know that they were quite as active, if not more so, in utilizing sphagnum for dressings and other purposes, as the Allies were. Their necessity, of course, came first and their use of this and other material as a substitute for cotton was quite general in some regions, especially on the Russian front.

During the war, Germans made surgical dressings or pads not only of sphagnum moss, but also of common moss, wood pulp, peat, sawdust, wood ashes, peat ashes, hay, straw, surgical lint mixed with different proportions of sphagnum, and even algae and any kind of cellular material that was available.

These materials were usually sewn up in small pillows or muslin sacks, disinfected and used as bandages for wounds that were discharging excessively.

[*To be concluded*]

REVIEW[1]

POTTIER, JACQUES. RECHERCHES SUR LE DEVELOPPEMENT DE LA FEUILLE DES MOUSSES. [Studies on the development of the leaves of mosses.] Pp. 1–137, figs. 1–368, pls. 2. Paris, 1920.

The major part of this work is a detailed description of the cross-sections of moss leaves, longitudinal surface views, and leaf reconstructions in plastiline. The 368 figures are more than sufficient to illustrate the essential features of the text. The indices of the figures are not explained on the various plates or in the "Explication des figures." In order to find out what the indices mean it is necessary to hunt through the text. In *fig. 193* the primordial cells of the conducting tissue are shaded gray, while in other figures gray is used for a different type of cells, an inconsistency that might easily lead to confusion. The bibliography, which includes 43 citations, appears to be incomplete for a subject so often studied, especially so when no American or English papers are included.

In the historical review it is stated that Charles Morren in 1840 was the first to study the development of moss leaves. [Brown, R. Trans. Linn. Soc. **12**: 575. 1819, describes the development of the leaves of *Fissidens*, as cited by Salmon.] From 1845–1855, M. J. Schleiden and Carl Nägeli were engaged in a controversy pertaining to the initial development of the leaf. Hofmeister, in 1851, describes the development of young leaves in *Sphagnum* with an initial cell having two faces, with which the formation of leaves in a number of other mosses are compared. In 1863, Lorentz studied the development of the midrib of moss leaves by means of cross-sections and confirms the earlier conclusions of R. Brown with regards to the early development of the leaves of *Fissidens*. [SALMON, E. S. On the genus Fissidens. Ann. Bot. **13**: 103–130. 1899, also confirms the early conclusions of R. Brown.] In 1867 Lorentz provides the first technical terms for the histological elements of the moss leaf. Leitgeb in 1874

[1] Contribution from the Department of Botany, University of Pittsburgh, No. 3.

did not agree with Lorentz that the less developed side of the duplicate leaf (vaginant lamina) of *Fissidens* is the side which is always in the shade. He thought that the inequality of the leaf parts may be due to the relative position of the leaves in the bud. This conclusion is accepted by Pottier from his studies on various mosses.

The mosses studied by Pottier were fixed in Kaiser's fluid, dehydrated, cleared, and embedded in paraffin. The stained serial sections, mounted in balsam, served as a basis for study. Reconstructions of certain leaves in plastiline or modeling wax were also made from the outlines of cross-sections.

Studies of the Andreaeales

The initial cell of *Andreaea crassinervia* Bruch has a single face, but the initial cell of *A. angustata* Lindb., with a single face, may be replaced by an initial with two faces. Leaves that have an initial cell with two faces develop a large broad leaf without a midrib; those leaves that have an initial cell of one face usually form a normal acicular leaf with a midrib. The above facts added to the observations of previous investigators indicate that these archaic plants show a tendency toward the type of leaf development found in more recent mosses. [Campbell, D. H. Mosses and Ferns p. 182, 1913, describes the two forms of apical growth of Andreaea leaves.] In all the species of mosses studied, Pottier considered asymmetry the result of pressure of one leaf upon another while in the bud. The side of the leaf which is covered reaches a less advanced stage of development.

Studies of the Bryales

The most important feature in the study of the leaf of *Mnium undulatum* and *M. punctatum* is the development of the midrib. For the first species, Pottier presents a diagram indicating a leaf cross-section with eight primordial cells arranged in one row. Upon comparing the figures of the actual cross sections of *M. undulatum* leaves figured, in no case is there a section with 8 primordial cells arranged in a single row. The author's theory of development for the midrib of *M. undulatum* is entirely at variance with the actual cross-sections of this moss. The method of development of the midrib as explained for *M. punctatum* will serve equally as well for the first species described. Here two initial cells take part in the formation of the midrib. Each of the initial cells divide by a wall parallel to the surface of the leaf so that in cross section the midrib now shows a group of four cells. The two dorsal cells are divided by a periclinal wall into an outer and an inner cell. From the inner cells by further division is formed the group of small conducting cells, tracheids or stenocysts, that traverse the center of the midrib. The two ventral cells from the group of four cells resulting from the division of the initials, also divide by a periclinal wall into an inner and an outer cell. From the two inner cells by further division is formed a group of large much thickened cells, eurycysts, which serve for strengthening the leaf.

The development of the leaf in *Funaria hygrometrica* is comparable to that

of *Mnium punctatum*. In *Dicranum scoparium* the dorsal protuberances are formed by the swelling of dorsal cells. In *Catharinea undulatum* the margin of the leaf in cross-section consists of 4 cells. In the 2-cell stage the dorsal and ventral cell each divides by an anticlinal wall, perpendicular to the surface of the leaf. The leaf margin is not comparable to the midrib. In *Barbula ruralis* two-thirds the length of a young leaf measuring .05 mm. is the hair point which in cross section is more or less a quadrant of cells. The greatest development of the hair point takes place at the beginning of leaf development. In the cross-section of a *Leucobryum glaucum* leaf a green cell situated more to the dorsal side than the other chlorophyll cells marks the plane of symmetry of the leaf.

The apex and the margin of moss leaves are differentiated first. The process of cell division in moss leaves is transferred from the apex to the base during the progress of development.

W. H. Emig,
University of Pittsburgh

DUPLICATE SPECIMENS FOR EXCHANGE

Among Members of the Sullivant Moss Society *only*. Return postage, rather than a stamped envelope, should be sent with the request for specimens:

Dr. W. H. Emig, Dept. Botany, University of Pittsburgh, Pittsburgh, Pa.—*Plagiochasma Wrightii* Sull., collected by W. H. Emig, on travertine, Price's Falls, Arbuckle Mts., Okla. (*See* The Bryologist **20**: 17, March, 1917).

Dr. John W. Bailey, 4541 Fourteenth Ave., N. E., Seattle, Wash.—*Gymnomitrium obtusum* (Lind.) Pears., Cascade Mts., Snohomish Co., Wash.

Miss Daisy J. Levy, 403 West 115th St., New York City.—*Sphagnum magellanicum* Brid., collected at Farmingdale, N. J., by Miss Daisy J. Levy.

Mr. D. Lewis Dutton, Brandon, Vermont.—*Anthoceros laevis* L., *Umbilicaria pustulata* var. *papulosa* (Ach.) Tuck., and *Sphagnum subsecundum* Nees.

Miss Helen E. Greenwood, 12 Hudson St., Worcester, Mass.—*Odontochisma denudatum* (Mart.) Dum., collected near State College, Pennsylvania, and *O. prostratum* (Sw.) Trev., collected near West Barrington, R. I., both by Miss Helen E. Greenwood.

A CORRECTION

While noticing for The Bryologist the second list of Additions to the Flore des Mousses de la Suisse, published by Dr. J. Amann, I regret to have made an awkward error. In the tenth line from the foot of page 29 (Volume 24. 1921.) the statement should read *number of cells per square millimeter*, and not "linear' as printed.

Edward B. Chamberlain

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All material for identification should be sent to the curators direct; all other matter relating to the magazine should be sent to the Secretary or the Editor.

THE BRYOLOGIST

VOL. XXIV NOVEMBER, 1921 No. 6

NOTES ON NORTH AMERICAN SPHAGNUM, IX

A. LEROY ANDREWS

The Group Cuspidata Lindberg (Continued)*

21. *Sphagnum Fitzgeraldi* Renauld, 1884. The species was originally accredited exclusively to Renauld, though Cardot later[1] asserted that his name should have been added as joint author. For some time after its discovery and description a romantic halo hung over the plant as having been found on decaying palm-leaves in Florida. In late years it has, however, been collected in a number of localities, especially in Florida, and its habitat does not appear to differ greatly from those of other *Sphagna* in the same region. In fact Warnstorf in 1911[2] denies it species right, though he had earlier[3] figured and described its large spores as something quite unique among *Sphagna*[4]. It is not at all impossible that he is right in his latest verdict that it is hardly more than a form of *S. trinitense* C. M., that is, *S. cuspidatum* var. *serrulatum*. It is certainly a derivative of this phase of *S. cuspidatum* and agrees with it in all its important characters. It belongs, however, to a region which has evolved several independent species, and differs in its general macroscopic appearance and some minor quantitative features in such a way that I do not feel it should be entirely relegated to synonymy without further study in the field. It is for one thing a much softer, more delicate plant than *S. cuspidatum* normally is and is often rather suggestive of some other group. This is particularly true because of the shape of its leaves, which are not so slender and elongated, but short and broad, ovate with broadly truncate apex, or sometimes nearly rectangular. The terminal bud then becomes round or at any rate plumper than in the other forms of *S. cuspidatum*, and is often more suggestive of a delicate form of *S. subsecundum*. It was doubtless for this reason that Warnstorf described it from its Alabama locality as a separate species, *S. Mohrianum* Warnstorf, 1892, which he now however also[5] reduces to a variety of *S. trinitense*. I have seen the type material of *S. Mohrianum* from the National Herbarium at Washington and would

* For Notes on North American Sphagnum.—VIII, see THE BRYOLOGIST **22**: 45–49. Sept. 1919.—Ed.

[1] Répertoire sphagnologique, 295. 1897; cf. Rev. Bryol., XII, 46. 1885.

[2] Pflanzenreich **51**: 218.

[3] Verh. d. bot. Ver. d. Prov. Brandenburg, XXXII, 178, fig. 54–58. 1891.

[4] Cf. also Bot. Gaz., XV, 222f. 1890.

[5] Pflanzenreich **51**: 219. 1911.

The September number of THE BRYOLOGIST was published February 15, 1922.

unhesitatingly refer it to *S. Fitzgeraldi*; other specimens in the Mohr herbarium collected at different times in the type locality are *S. subsecundum*. Corresponding to its macroscopic features the leaf-cells will often be found to be shorter and broader than in other forms of *S. cuspidatum*, with more bulging walls, especially on the inner surface, while the chlorophyll cells are more nearly equally exposed on both outer and inner surfaces. The stem-leaves tend to be large and like the branch-leaves. The cortical cells of the stem and the retort-cells of the branches are rather large and thin-walled. None of these characters are, however, sharply marked and all tend to vary more or less in the direction of *S. cuspidatum* var. *serrulatum*. Even the large spores (35 μ or slightly more) with their somewhat irregular sculpturing I cannot entirely correlate with other characters, as I find specimens from Florida apparently otherwise referable to *S. cuspidatum* var. *serrulatum* that show spores quite equal to those of *S. Fitzgeraldi* (35μ). In fact Warnstorf[6] gives the spores of *S. cuspidatum* as 25–35 μ. The spores in *Sphagnum* do not show strongly marked species characters either in size, color or marking. The distinctive sculpturing of those of *S. Fitzgeraldi* was perhaps somewhat illusory, as Warnstorf makes no mention of it in his latest work and I find in a good Florida specimen collected by Rapp only low and rather large warty protuberances, a condition quite intermediate between those of two specimens of *S. cuspidatum* var. *serrulatum* also collected by Rapp in the same general region. Warnstorf's figure is apparently to be interpreted in the same way, as is evident from study of the type material.

The plant is now known from North Carolina,[7] Georgia, Florida and Alabama, which places it clearly as one of the new developments of our southern Atlantic and Gulf coasts. The serrulate forms of *S. cuspidatum* do not elsewhere show similar tendencies and whoever has reasonable scruples about maintaining *S. Fitzgeraldi* as a distinct species must at least give it taxonomic standing as no casual form, but a strongly marked variety of definite range in a region characterized by a number of such independent Sphagnum forms.

22. *Sphagnum Dusenii* Jensen, 1890. This species was first distinguished as var. *majus* of *S. cuspidatum* by Russow in 1865.[8] There is only one clear diagnostic character to separate it from *S. cuspidatum*, viz., the very large pores appearing usually in considerable number on the outer surface of the branch-leaf, a feature entirely foreign to typical *S. cuspidatum*. One wishing to deny the moss species-value could point to the fact that in submerged specimens these pores have a troublesome tendency to reduction and even disappearance with the narrowing of the leaves and their empty cells characteristic of submerged forms. I am convinced, however, that the species is better founded than many others.

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[6] Pflanzenreich **51**: 264. 1911.

[7] The North Carolina locality though not indicated in literature before 1913 shows apparently the oldest collection of this species. The specimen is in the Sullivant Herbarium labeled "*Sphagnum* ? Swamps near Wilmington, N. C., collected by A. Gray, Oct., 1843." It is mixed with fragments, of *S. macrophyllum*.

[8] Beitr. z. Kenntn. d. Torfm. 58.

Its macroscopic appearance is so distinctive that in regions where it occurs it is generally collected, even by collectors not especially familiar with Sphagnum species. These macroscopic features are, as in most cases, easier to recognize than to describe. It shows almost always more of a brown pigmentation than *S. cuspidatum* does, giving a snuff-colored effect, which may be weakened by submergence and lack of exposure to sunlight, but is usually different from the green to washed out whitish of *S. cuspidatum*. With much variation in size it tends to have broader leaves and a more robust appearance than typical *S. cuspidatum*, while its leaves lack the undulations more or less evident in the dried state of var. *Torreyi* of the latter. In fact its general aspect would much sooner lead to confusion with forms of such species as *S. Lindbergii* and *S. pulchrum*, from which however it is more easily separated microscopically. Specimens which seem to lack the characteristic leaf-pores will usually, if looked over carefully, show them to be present, at any rate in some parts of the tuft. They are peculiar not only in their large size, but in the fact that many of them, even if not large enough to occupy nearly the whole width of the empty cell, are at any rate placed quite midway between the walls, not in the corners or elsewhere near either wall, as is usual in Sphagnum species.

The history and distribution of this species in North America I have in considerable part given in a note of several years ago.[9] It was first collected by Peck at Sand Lake, N. Y. in 1867 and called by Austin[10] *S. laricinum* Spruce. Sullivant[11] figured it accurately as an unnamed variety of *S. cuspidatum* and denied its identity with *S. laricinum* Spruce, which has generally been considered a form of *S. subsecundum* in its broader sense. Warnstorf at one time confused *S. Dusenii* with *S. mendocinum*, as will be noted in the discussion of the latter species. Its southern distribution so far as known at present, and it may be regarded as probably final east of the Mississippi, is represented by points in northwestern Connecticut, New York, Michigan, Wisconsin, the Rocky Mt. region of British Columbia, with a station reported from Cape Nome, Alaska.[12] This last station I had not noted in my earlier treatment, but attention was called to it later by Frye.[13] It is possible that west of the Mississippi stations will be found somewhat further southward, but it is not a species extending to the full southern limits of glaciation. It may be looked for in any favorable locality further northward and, though found in very wet places, is by no means confined to the coastal region, but is one of the few species probably more frequent inland. In Europe it extends southward to the Alps and in Asia is known from Siberia.

23. *Sphagnum mendocinum* Sullivant & Lesquereux, 1874. This species was named from Mendocino City or County, California, which represents its type-locality and at the same time the southern limit of its range. It is our

[9] Bryologist, XIX, 37. 1916.
[10] Musci Appalach., 8. 1870.
[11] Icones Muscorum, Suppl., 11, Plate 2. 1874.
[12] Univ. of Calif. Public. in Bot., II, 313. 1907.
[13] Bryologist, XXI, 41. 1918.

only *Sphagnum* endemic to that Pacific coast area distinguished by so many endemic bryophyte species. It has acquired no real synonyms, though several times confused with other species, so by Lesquereux at first with *S. auriculatum* Schimper, a form of *S. subsecundum* in its broad sense.[14] Warnstorf for a time included with it *S. Dusenii*[15] and so accredited it to Europe and other localities where it does not occur. In herbaria he also for a time named specimens of it *S. propinquum* H. Lindberg and *S. annulatum* H. Lindberg. It has however maintained itself and is unquestionably a distinct species.

Its general aspect is suggestive of *S. cuspidatum*, but it more commonly has a peculiar yellowish green color, at least in relatively fresh specimens. Its leaves may also be slightly undulate. Its microscopic features are also mostly those of *S. cuspidatum*. Like *S. Dusenii* it is peculiar in its leaf-pores, having them on the outer surface of the branch-leaves rather numerous in rows near the side-walls of the empty cells. In this respect it resembles *S. subsecundum*. The pores however are rather larger, less strongly ringed and in more irregularly interrupted rows than is normally the case in *S. subsecundum*, though the latter varies greatly. The chlorophyll cells of the branch-leaves in section have not the equal exposure on either surface and the oval, more or less central lumen normally characteristic of *S. subsecundum*, but are of the type of *S. cuspidatum*. The empty cells of the branch-leaves have also the narrower, more elongated form of *S. cuspidatum*. On the other hand the stem-cortex deviates markedly from *S. cuspidatum*, being in section composed of one row of large cells with thin walls, often with a second row partially developed, as is well shown in Sullivant's original figure. This feature shows astonishing agreement with *S. subsecundum* and serves effectually to separate our species from *S. balticum* and *S. annulatum*, with which it shares most of its other microscopic characters. It is perhaps with *S. balticum* that it is most closely related, though it is not easy to convince oneself that it is a direct derivative of any one of the species now existing. The marked difference between the cortical stem-cells of *S. annulatum* (agreeing in this respect with *S. balticum*) and *S. mendocinum* is well brought out by the figures given in juxtaposition by Warnstorf in his comprehensive monograph.[16]

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[14] Evidently Lesquereux did not even later understand *S. mendocinum* adequately. Specimens from his herbarium which I have examined through the kindness of Mrs. Britton show three different specimens collected by Bolander near Mendocino City and referred to *S. auriculatum* and later to *S. mendocinum*, of which only one, the type-specimen, really represents the last species; the others are forms of *S. subsecundum*. The Sullivant herbarium seems to show that Sullivant understood the three specimens correctly. The specimen of the second set of Sull. & Lesq. exsiccati (No. 23. 1865) collected by Brewer in the Sierra Nevada of California issued as *S. auriculatum* and referred to *S. mendocinum* in the original publication of the latter species is also a form of *S. subsecundum*. The inclusion of it is however probably due to Lesquereux, who completed and edited the text of the posthumous work of Sullivant. There is no question as to what Sullivant's plate represents, and this together with the name fixes sufficiently the type. Lesquereux's original conception of *S. auriculatum* was apparently based upon two specimens collected in Sweden by Ångström which are now in the Lesquereux herbarium. They represent clearly enough that form of *S. subsecundum* which Schimper described and figured as *S. auriculatum*.

[15] Bot. Gaz., XV, 222. 1890; Verh. bot. Ver. Prov. Brandenburg, XXXII, 210. 1891.

[16] Pflanzenreich **51**: fig. 44. 1911.

The question of distribution touches the broader question of the limits of a bryologically interesting plant-geographical area. The classical California station was "near Mendocino City" (Bolander). M. A. Howe has also since collected it in Mendocino County. This county represents the southern limit, so far as known at present. Brewer's station from the Sierra Nevada near King's River, evidently in Fresno County farther south and east, is still included by Warnstorf (1911), but the plant is as we have seen, *S. subsecundum*. There is little probability that it extends much, if any, further southward or inland than Mendocino County. Northeastward it has been collected in northern Idaho. In Oregon and Washington it is frequent and apparently characteristic The same is true of Vancouver Island. Its range inland in British Columbia is entirely vague. An *S. alaskanum* Warnstorf occurs in literature as more or less of a *nomen nudum*,[17] only to be finally reduced to synonymy by its author[18] with var. *gracilescens* of *S. mendocinum*. As however he cites no Alaskan locality it must be inferred that the name rested upon some original misunderstanding of the locality in which the specimen was found, and there is no authority to include Alaska in its range, though it may perhaps yet be found that the species extends into the southern panhandle of that territory. The earliest collection of it is probably that of Douglas, a specimen of which in the Mitten herbarium is labeled only "Northwest America."[19] It probably does not fall without the geographical limits otherwise known. *S. cuspidatum* seems to be entirely lacking within its range, while *S. subsecundum* is hardly as common as one might reasonably expect.

The working out of my notes on *S. mendocinum* brings out an interesting additional fact in connection with a species treated before. Some years ago while examining rather hurriedly the Sphagnum specimens of the James herbarium at Harvard University I noted a specimen named *S. cuspidatum* collected by John Macoun at Portage La Loche, Northwestern Territory, in September, 1875, which was irregular and which I thought might be *S. mendocinum*, though the locality undoubtedly lies outside the range of the latter species. Macoun's lists do not record even *S. cuspidatum* from Portage La Loche, but do include *S. recurvum*[20] with several other less closely related species from there. Through the kindness of Mr. M. O. Malte, Honorary Curator of the Ottawa herbarium, I have recently seen the specimen of *S. recurvum*, originally labeled *S. cuspidatum*, from Portage La Loche, collected Sept. 15, 1875. Most of the tuft, including the fruiting plants, is *S. recurvum*, as named. There is a single plant of *S. squarrosum* adhering to the outside of the tuft, while intimately intermixed with the *S. recurvum* is another species, which is evidently the same that I had thought might be *S. mendocinum*. Staining of the leaves and section-

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[17] Kryptogamenflora der Mark Brandenburg, I, 356. 1903.

[18] Pflanzenreich **51**: 197. 1911

[19] Cf. also Warnstorf, Pflanzenreich **51**: 197. 1911.

[20] Catalogue of Canadian Plants, VI, 5. 1892. Portage La Loche at latitude 57° N. is, I assume, in the vicinity of Fort La Loche in what is now northern Saskatchewan, not far from the boundary of Alberta.

ing of the stem clears up the identity of the plant, which is undoubtedly *S. oblusum* Warnst. As will be recalled, I had not previously seen specimens of this plant from the North American continent, the only report of it being represented by a stem or two found by Macoun in Ontario and now in the Berlin herbarium. I had seen a specimen of it from Greenland.[21] It will probably be found in greater quantity in British America and Alaska, but it is unlikely that it reaches the United States.

To revert for a moment to *S. recurvum*, I have now a specimen of it from Panama, the first I have seen from North America south of the United States. The specimen is labeled "*S. pulchricoma*," which species I had included among the synonyms of *S. recurvum*, and was collected by Hélion in August, 1912, in the "Bois de Boquote, près David (Prov. de Chiriqui)."

Ithaca, N. Y.

ADVENTURES IN MOSSLAND.— A HUNT FOR DESMATODON LATIFOLIUS (HEDW.) BRID.

John W. Bailey

Some six years ago, Prof. Holzinger sent me a small package of moss which bore the following legend: "*Desmatodon latifolius* (Hedw) Brid. On trunks of old greasewood bushes, Ellensburg, Wash. (with *Orthotrichum tenellum*, which proves to be *O. sordidum*, with some misgivings). Can Dr. Bailey possibly find a lot of this thing next season?"

Prof. Holzinger possesses the uncanny faculty of often finding things I never send him. Some time ago, in a large package of *Grimmia Muhlenbeckii*, he picked out two little bits which he wrote were *Rhacomitrium Flettii*, and asked me to obtain some for him. This moss was first gathered in the crater of Mt. Rainier. Prof. Frye was contemplating a trip to the summit, so supposing it was plentiful there, I asked him to bring down some of the moss that grew in the steam jets. He collected a pocketful but we found it to be only *Philonotis fontana*. Therefore, when the good Professor asked me to find him *Desmatodon latifolius* I naturally supposed that I was following another will-o-the-wisp.

It was my good fortune to find myself this summer again in Ellensburg and in the vicinity of the place where six years ago I had inadvertently gathered the bit of *Desmatodon* referred to above.

Ellensburg is in a large valley just to the east of the Cascade Mountains. The Yakima River flows through it. It is in an irrigated region and has an altitude of about 1,500 feet. It is an offshoot of the Great American Desert and the flora and fauna of the valley are characteristic of the northern part of the Desert. The location where this bit of *Desmatodon* grew was in a dry farming area adjacent to unbroken land covered with the original growth of greasewood. Last winter had been exceptionally favorable for dry-farming operations. There had been heavy snowfalls on the hills and copious rains in the spring. It seemed an excellent time to find the *Desmatodon* if it were to be found.

[21] Bryologist, XVIII, 5. 1915. Through the kindness of Prof. Thaxter I have reexamined the Harvard specimen and find it is also *S. obtusum*.

Donning a big straw hat, I spent one afternoon looking over and under the greasewood growth covering three or four acres. I discovered two or three patches of what seemed to be the *Desmatodon*, none bigger however than a ten cent piece. Moreover, none of these were growing on the greasewood, but always on the ground and located at the northeast corner of the bushes.

This would never do. Where was the mother lode of this interesting little moss? Across the county road is a large stretch of wild pasture land, and the next day, in the hot sun and ever-blowing wind, I tried again to locate more of the moss. There were plenty of jack rabbits under the bushes but no *Desmatodon*. Getting well into the field, in my search I lifted the branches of a large bush and there blinking at me in the bright sunshine, that I had let in on him, sat an immense horned toad. He must have been the great grandfather of all the horned toads in the vicinity. He was as surprised as was I. I took him by the tail and pulled him out into the sunshine. He lay still for a moment and then, "Zip!" he was gone. But, I had found where a rare moss grows. Water had stood here earlier in the season and from its favorite location in relation to the bushes I was able to collect quite a quantity of the moss. However, until I had met with my good friend the horned toad, "Lady Luck" was not with me.

Prof. Holzinger recently informed me that what I had found after my diligent search was not a *Desmatodon*, but *Encalypta leiomitra* Kindb. This is related to *Encalypta rhabdocarpa* and was first collected by Macoun in 1888, growing on rocks beside the Clearwater River, Lat. 57°, Athabasca, Canada.

It is a long way from the Clearwater River in Athabasca to Ellensburg, Washington, and I consider myself fortunate in finding this interesting moss. I shall not, however, give up the search for *Desmotodon latifolius*, which evidently grows upon wood rather than upon the ground. The leaves resemble those of *Tortula*, curl slightly, are bent inward, and show the mid-rib prominent on the back of the leaf. The rosette of leaves is about a sixteenth of an inch in diameter and the plant is scarcely more than a little head of leaves. The capsules are long for the size of the plant. Under the microscope, the point is the beautiful part of the leaf, appearing as though a piece of crystal had been dovetailed into the apex by some master workman.

Lesquereux and James give the range of *Desmatodon latifolius* as the Rocky Mountains and west to the Cascade Mountains. I have never gathered it on Vancouver Island or seen any that has been collected on the Coast. Dr. Grout makes no mention of it in his mosses of the North Eastern United States. Dixon, in his manual, refers to it as common on the continent, but not occurring in the British Islands.

None of the moss collected was found on greasewood, all grew on little peaty knobs of dried grass, that were elevated above the general surface of the ground. Had not the *Desmatodon* which Prof. Holzinger found with the *Orthotrichum* chanced to have grown on the greasewood we should not have discovered the *Encalyptra leiomitra*, and the pleasure and satisfaction of finding it would not have been mine.

The hunt for the *Desmatodon* gave me an introduction to the little community of mosses which grow under the protection of the greasewood. *Orthotrichum sordidum* was plentiful on the old trunks in the interior of the bushes. *Tortula*

montana fruits freely on the ground under its protecting branches. *Bryum argenteum* occurs between and near the bushes,—it does not produce capsules.

It was my good fortune to find a little tuft of *Pterygoneurum cavifolium* (Ehrh.) Jur. The long white hair-points of the leaves form a mesh, like a spider web, close to the ground. It must occur universally throughout our arid country, as I collected it a number of years ago at Blackfoot, Idaho, where it grew near the railway track. I also found *Grimmia tenerrima* R. & C. It grows plentifully everywhere on the basalt. This bit, however, I found on the soil. It was unquestionably out of its habitat

As I review the experience, it is brought home to me what a wonderfully good time I had those two hot afternoons of my holiday spent in investigating Desert bryology.

SEATTLE, WASH.

SOME RARE MOSSES FROM NORTHEASTERN PENNSYLVANIA

EDWIN B. BARTRAM

In the extreme northeastern corner of Monroe County, Pennsylvania, the Delaware River bends sharply to the east, below Bushkill, along the base of a series of limestone ledges and cliffs locally known as "Indian Rock." The exposure being almost due north and the densely wooded slopes steep or even vertical and overhanging in places, an ideal sanctuary seems to have been formed for many rare species of mosses, particularly of the calciphilous types.

Since *Didymodon rubellus* (Hoffm.) B. & S. has not been definitely reported from Pennsylvania before, it is interesting to note its abundance here and on similar ledges several miles farther north in Sussex County, New Jersey, where it is really one of the characteristic plants. The capsules seem to be fully formed in June but are not ripe and deoperculate until August. Sterile colonies are readily distinguished in the field, however, by the bright rufous color of the lower portion of the plants. Associated with the foregoing on some of the drier ledges and maturing its spores at about the same time, or maybe a trifle earlier, is *Distichium capillaceum* B. & S., while within arm's length a vigorous colony of *Encalypta ciliata* (Hedw.) Hoffm. helps to confirm the feeling that this is, indeed, a favored locality.

Nearer the river-level, where the rock faces are moister, dark olive-green tufts of *Blindia acuta* (Huds.) B. & S. contrast strongly with the surrounding mosses and particularly with some feathery yellowish cushions of *Dicranella Schreberi* (Sw.) Schimp. in the nearby crevices. The drier and more exposed pockets of the same rocks are carpeted with *Oreoweisia serrulata* (Funck.) DeNot., but, unfortunately, this distinguished trio have proved to be utterly sterile, or at least so during the present season.

A nearly vertical wall of limestone, thirty feet or more high and at least a quarter of a mile long, proves to be as productive as it looks, for, besides *Gymnostomum curvirostre* (Ehrh.) Hedw. and *G. rupestre* Schleich, the clefts show here and there vigorous colonies of *Pohlia cruda* (L.) Lindb., easily recognized

by the lustrous pale green color of the leaves. A form of *Pogonatum alpinum* which Prof. Holzinger thinks closely resembles var. *Macounii* (Kindb.) T. C. Frye[1] forms thick deep mats over portions of the dry shaded ledges and, if one has patience and a microscopic eye, what at first glance seems to be a stain on the back of some shallow niche in the limestone face will, upon close inspection, prove to be *Seligeria pusilla* (Ehrh.) B. & S., one of the exceedingly minute mosses that is no less rare than it is attractive.

Just a short distance east of the cliff, where a small spring trickles over the rocks, a dripping curtain of *Didymodon tophaceus* (Brid.) Juratz with the lower portions of the stems so thickly encrusted with lime as to be noticeably brittle, brings to a close what seems to be rather a noteworthy aggregation of rare mosses from one restricted locality within less than one hundred miles of New York City. Further search will no doubt reveal new finds, but when one can supplement the above list with such species as *Timmia cucullata*, *Pohlia Lescuriana*, *Barbula fallax*, *Trichostomum cylindricum*, *Bartramia Oederi*, etc., it is easy to imagine what a perennial source of pleasure such a place may be, especially when it is within sight of one's front door.

I am under obligation to Prof. Holzinger and Mr. R. S. Williams for their kind and patient assistance in the determination of many of the above-mentioned mosses.

Bushkill, Pa.

SPHAGNUM USED AS SURGICAL DRESSING IN GERMANY DURING THE WORLD WAR

J. W. Hotson

[*Concluded*]

Sources of Sphagnum Moss in Germany

Sphagnum bogs containing the best moss for surgical dressings are found in cool, humid regions; consequently few bogs are found in France or Belgium, while in Germany as in Scotland and Ireland, they are very abundant, especially in the Bavarian Alps, Bavarian Forest, in Spessart, Rhön, etc., where extensive "raised bogs" frequently occur. These bogs are somewhat dome-shaped, something like an inverted saucer, so that the center of the bog is often ten or fifteen feet higher than the edge and all built up of sphagnum and plants associated with it. Extensive bogs, often with an open lake in the center, also occur in eastern and northeastern Germany, so that the Germans had at their disposal an inexhaustible supply. Kronacker writing from München in 1916 on the subject of moss dressings says "The lack of sphagnum moss can never be felt. Everywhere in the beautiful German forests it stands at our disposal, growing luxuriantly,—no blockade can present itself as an obstacle here." It was through

[1] *cf.* Exsic. Holzinger, Musci Acro. Bor.–Amer. *No. 417.*

one of the open bogs of Poland that a German officer ordered his men to attack the retreating Russians, when practically the whole regiment sank out of sight. The officer himself escaped but became mentally unbalanced as a result of this catastrophe.

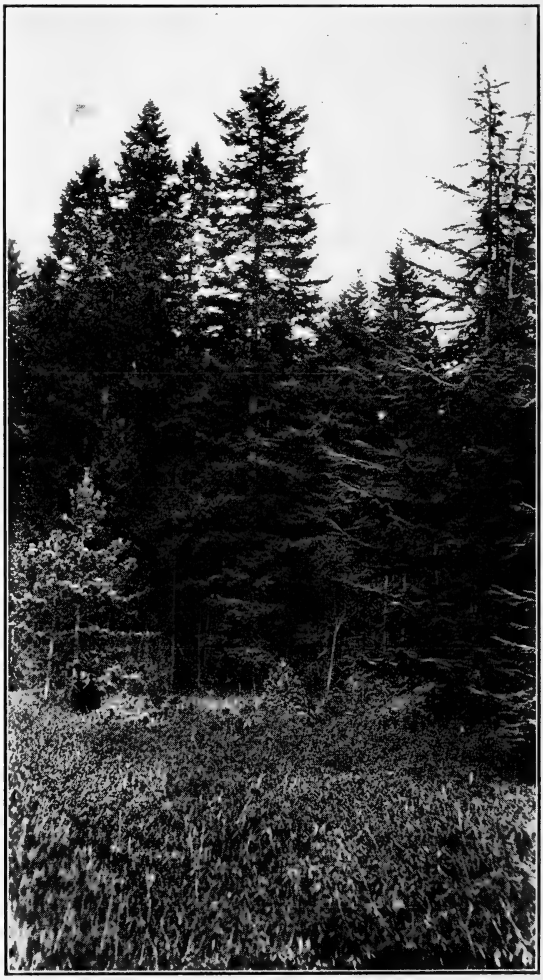

FIG. 9. In the foreground are Sphagnum, Labrador Tea (Ledum), Cranberry, and Swamp Laurel (Kalmia). In the background are Conifers with certain deciduous shrubs between.—From photograph by Prof. G. B. Rigg.

In collecting and cleaning the moss the Germans do not seem to have used the same care that we did. There is little doubt, as we found out later, that we were too particular in the process of cleaning. Both the Germans and British put less time on its preparation than we did. It is not necessary to remove absolutely everything from the moss as we tried to do. Such soft pliable materials as small pieces of leaves of trees or grass are not detrimental to the absorbing power of the moss unless the quantity is enough to separate the particles of moss so that they are not in contact. Anything harsh, however, like twigs or pine needles that are apt to penetrate the dressings and irritate the wound are decidedly objectionable.

After the moss was cleaned, that is, freed from all the woody material, the Germans recommended that it be washed at wells or streams. The moss was then dried in the sun, at stoves, or in a kiln. With our moss we did not feel that washing was necessary or even desirable as it required additional trouble in drying.

It is interesting in looking over the work done with sphagnum by the Germans, British and Americans to see how closely they have followed each other. It is natural to expect that the methods of the Americans and British might be similar because besides being allies, the methods of the one were known to the other. In fact, practically all the information we had concerning sphagnum used as a surgical dressing was obtained from the British. The Germans, however, were practically isolated with little or no communication with us, and yet they have followed along almost the identical lines of the British and Americans, with, of course, slight modifications which will be noted as we come to them.

After a general survey of the work done with sphagnum, one might divide the dressings or pads into two broad groups; those made of the loose moss and those made of compressed moss, the so-called sphagnum compresses. There are several modifications within each of these groups, both as to size and method of making the dressing, especially with those made of loose moss. The size of the pads was determined in general by the need, but the width of the muslin for the encasements was taken into account in order that there would be no waste.

Dressings Made of Loose Sphagnum Moss

The commonest dressing seems to have been made of loose moss much like the ones described as the British type of pad.[2] After all the foreign material was removed from the moss it was dried and an appropriate amount put into muslin sacks which were then sewed up. These were made of various sizes according to the specific need. The very large ones were quilted or knotted at definite and suitable intervals in order to keep the moss from shifting. It will be remembered that this was the type of pad that was first made at the University of Washington when the faculty and their wives were making dressings for the French relief, but was replaced by the second type when they began work under the direction

[2] J. W. Hotson. Sphagnum as a surgical dressing. Published by the Northwestern Division of the American Red Cross. A copy of this article may be had by writing to the author, University of Washington, Seattle, Wash.

of the American Red Cross. By far the greatest number of sphagnum dressings made in Great Britain and Germany during the war was of this type. It was this type of dressing to which many American surgeons objected.

The second type made from loose moss might be designated as the American type,[3] although both the British and Germans made similar ones, but not nearly as elaborate as the ones made by the American Red Cross. Certain modifications of this type of pad are distinctly American.

Hasenbalg, writing shortly after the war broke out in 1914, describes the German method of making this type of dressing about as follows: Over a flat frame, resembling a photographic developing frame a correspondingly large piece of muslin is placed. The frame is then filled with a mixture of moss and surgical lint. It is pressed together as firmly and equally as possible. The free ends of the muslin are then folded together over the frame and fastened with a few stitches. Wounded soldiers were employed to great advantage in making these pads.

The American method of making this type of pad is somewhat different from the German, being much more elaborate. In making this dressing a piece of Scottissue (thin wood-pulp paper) of appropriate size is placed on the table and on it a wooden frame corresponding to the particular size of dressing to be made. The frame is filled evenly with moss but not packed. Over this a thin layer of non-absorbent cotton is placed and the frame removed. The margins of the Scottissue are then folded over the cotton and sphagnum. A thicker layer of non-absorbent cotton is put on the back of this incomplete dressing and the whole encased in a piece of gauze of appropriate size, which may or may not be stitched at the back. The pad is then passed through an ordinary clothes-wringer in order to press the sphagnum into the cotton and thus tend to keep the moss from shifting.

Sometimes, as described by Korach, the moss plants were broken up into a coarse powder. A quantity of this material was filled into small muslin bags of very fine weave so that the fine particles would not escape as dust. These were used as daubers in operations instead of the much dearer muslin ones. It was found, however, that for daubers sphagnum is less suitable than cotton and almost entirely useless for plugs, especially for the ears and nose. It was also found to be of little value as a dressing for the eyes.

Large, thick pads made of loose moss were used and did excellent service for invalids who were suffering from diarrhœa or involuntary discharge of the urine. When pads of this kind were changed frequently the disagreeable odor of the urine was hardly noticeable. Although, in general, sphagnum dressings were used only once, yet at times they were dried, treated with formaldehyde or other disinfectant and used repeatedly as an absorbent.

Quite serviceable pillows were also made from loose sphagnum. The moss

[3] J. W. Hotson. Sphagnum from bog to bandage, Publications Puget Sound Biological Station, **2**: 211–247, No. 47, 1919.

was cleaned, the coarser, foreign material removed, then washed and dried. Coarse muslin or cotton sacks, used as pillow cases, were well filled with this material and sewed up. These pillows were used to good purpose as couch pillows after being sprinkled with some mild disinfectant, like boric acid, dried and then covered with cambric linen. These couch pillows were used for different purposes; first, for very sick persons as rests under the hips and in the small of the back instead of rubber or straw pads; second, as supports or for bolstering up the arms and legs of wounded people, particularly when the limbs were broken; third, they were especially serviceable in hospital trains for rests for the head and neck.

Moreover, large, absorbing, quilt-like pads made of loose sphagnum, as well as the smaller surgical dressings, were found very valuable in maternity cases. This moss was also used as napkins and diapers for infants and young children. This was also a common practice among our North American Indians. In Alaska they still use it in this way. It was also adopted quite generally by Dr. Walton Haydon during his six years (1878–1884) medical experience at Moose Factory on the Hudson Bay while in the service of the Hudson Bay Company.

Dressings made of Compressed Sphagnum Moss

The Germans were very skilful at making sphagnum compresses or pasteboard compresses as they were sometimes called. In preparing the moss for this purpose all foreign material was removed and the stems and leaves of the moss more or less broken up or pulverized. These were packed into a frame structure and subjected to a heavy pressure, thus pressing the moss particles into flat cakes resembling cardboard. These compresses were cut into different sized pieces according to the dimensions of the pad needed, wrapped in muslin and sterilized. The compresses were not applied directly to the wound, but usually used as an outer dressing, a thin layer of gauze or cotton being first applied. As one would naturally expect, the compresses were somewhat hard and stiff, but they became soft and pliable after sterilization with steam heat, so that they fitted closely to the body and absorbed excellently. If these dressings were large, however, the particles composing them tended to separate, thus making the dressing less effective. To avoid this disintegration it was often advisable, after the cardboard had been cut into pieces of desirable size, to sew them into the muslin encasements before sterilization. Dressings made in this way were shown to absorb ten times their weight of fluid.

Because the surface of these dressings was somewhat hard they were frequently sprinkled slightly just before application with sterile water, weak solution of sodium chloride or some other mild disinfectant. These compresses were usually placed between pieces of gauze just the same as the cotton compresses were.

When an extra heavy pressure was applied these compresses became like pasteboard, stiff and hard. Such material was used as splints for binding up broken arms or legs.

The American Red Cross had just begun to experiment with these compresses when the armistice was signed so that none were sent over seas. The British, however, made a great many sphagnum compresses of this type during the war, both for dressings and for splints. The following account has been sent me by Miss Margaret Leechman, supervisor of sphagnum compresses at Edinburgh, Scotland.

Compressed Moss Dressings as made in Edinburgh, Scotland

Compressing sphagnum moss was a new experiment to Scotland and even at the end of three and a half years we could not make compressed moss dressings anything like the German ones, to give the devil his due.

Of course, all the moss sent to our department was supposed to be cleaned. Our first process was sublimating it, unnecessary, I believe, as it was always sterilized before it was used, but it was a precautionary measure. For sublimating we had a large porcelain bath with a wringer and a traveling band attached to one end. The sublimate was the usual mixture of perchloride of mercury. The worker who soaked the moss had also to spread it evenly over the band, so that in going through the wringer it all got an equal pressure. As only 28 ozs. of sublimate to a pound of moss was allowed to remain in after it had been through the wringer, we had to be fairly particular. At the other end of the band it fell off into a sack fixed there for the purpose. Another worker's job was to remove these sacks when full and pass them on into the drying room. This was just a long room with drying trays on either side, as high up as we could manage them. These trays were wooden frames with wire netting across the bottom; the lowest one had a piece of mosquito netting over the wire to prevent the smaller pieces of moss falling through to the floor. The heat in this room was anything from 80° to 118° F. We tried not to work in it when it was the latter. When the moss was dry it was emptied into long deep boxes on castors, also known as tanks, and these when filled, were pushed into the next room where the dressings were actually made.

In this room the moss was first weighed out, 4½ oz. or 4 oz. into basins, then it was taken over by the first of four workers, who emptied it into a wooden frame three inches deep, covered over with a thin piece of cloth, 4½ oz. of moss into a frame 12″ x 14″, 4 oz. into a frame 10″ x 14″. The next worker smoothed out the moss, packed it well into the corners, then slid it on to the next. We found that the firmness of the compressed cake depended almost entirely on how it was packed. The third worker pressed it firmly down with a compressed air machine (weight 300 pounds) made for the purpose, while the fourth folded the cloth tightly over the moss, but still keeping it in shape, then lifted away the frame and laid the cake on a zinc tray. There it remained until nine others were laid very exactly on the top of it, making a pile about 20 inches high. This pile was then put under a hydraulic press and compressed to the height of about three inches. We tried various different machines for compressing, from 80 tons to 200 tons pressure, and we found 160 tons about the best. After compressing, the cloths were taken off the cakes, their edges trimmed and cut into our various sizes

of dressings. The sizes were usually as follows: 12″ x 14″ cakes into 6″ x 7″ or 4″ x 7″; 10″ x 14″ cakes into 7″ x 10″. Sometimes we were asked for whole cakes but in such cases they were mostly used for pads, being too large for an ordinary dressing. We sewed our dressings into muslin bags, one inch larger all around than the dressing, to allow for swelling.

Sterilization

Moss used for surgical dressings must be thoroughly disinfected or sterilized. The common method of sterilization used by the Germans was steam heat. At first the method recommended was to expose the moss to steam heat for 24 hours. This was found to be injurious to the moss so that, as a result of further experimentation by Korach in 1915, it was changed, limiting the time of sterilization to one-half hour, by which the ability of the moss to absorb water was not impaired.

In some cases where the dressings were used as bed pads the sterilization was considered less necessary, and was sometimes omitted. These pads were, however usually saturated with an antiseptic and then dried before using. At other times the moss was washed with an antiseptic, such as corrosive sublimate (1–1000) or with potassium permanganate (1–1½) and then thoroughly dried and made into pads.

Application of Sphagnum Dressings

The application of these dressings was very simple. They were used almost entirely as outer dressings. The wound was covered with a thin gauze dressing first and the moss pad placed on it and bound up. They were usually fastened over the wound with a bandage or the smaller ones with adhesive tape. These remained unchanged for one, two, or three days, or even longer—much longer than the fine muslin or cotton dressings could be left. As soon as the moss began to absorb the liquid it became soft and pliable, fitting closely to the body.

What are some of the things for which sphagnum may be used other than surgical dressings?

Sphagnum is the only moss for which any very important economic use has been reported, and the more it is studied and experimented with the more varied and extensive are found to be its uses. The last word has not yet been said about sphagnum and the economic uses to which it may be applied. It makes an excellent insulator, much better than sawdust or even cork. Many Germans used it during the war in their homes for keeping milk warm or cool. The inside of a wooden or paper box was well lined with it, thus acting as an insulator, and bottles of milk put in the center.

In Sweden some of the coarser kinds of paper, like wall-paper, wrapping paper and building paper are made from this moss, while in Germany a fairly good and cheap cloth is made by mixing it with wool and weaving them together.

It is well known the part this moss plays in the formation of peat, as well as the common use nurserymen make of it in packing plants, especially where moisture is required for a considerable time about the roots. Varieties of orchids are known to thrive as well in sphagnum as in their native haunts.

What are some of the advantages of sphagnum moss dressings as recorded by German writers?

(1) Its high absorptive power.

The results of careful experiments carried on at Hamburg by Korach in 1915 have re-demonstrated the superiority of the absorption of sphagnum. These results show that peat absorbs six times, wood pulp seven times, and sphagnum ten times its dry weight of fluid. You may recall that the result of similar experiments in America show that absorbent cotton absorbs four to six times its weight according to the quality, and sphagnum as high as twenty times its dry weight. Any moss absorbing ten times its weight or less was discarded by the American Red Cross. Not that this was unsuitable for dressings, but because sufficient material with an absorbency from sixteen to twenty was available.

(2) It is cool and soothing.

Because the moss is so porous it dries rapidly. This evaporation keeps the wound cool and the cooling soothes. This drying of the secretion takes place so rapidly that even after an operation where the wound has bled quite freely the dressing was found comparatively dry after 24 to 36 hours. In consequence of this ability to dry quickly, which is dependent on the porous quality of the sphagnum, the moss dressings are peculiarly fitted for permanent bandages, such as are desirable in the transportation of wounded people considerable distances.

(3) The dressings can remain a long time without changing.

This fact saves much time and work for the surgeon and pain for the patient. Not infrequently soldiers wounded on the field were transported to the home hospital in the first dressing.

(4) Its behavior in not being subject to disintegration even when it is dead or permitting this disintegration to take place in its surroundings.

(5) It is a produce of the home land, where "no blockade can present itself as an obstacle."

(6) It is abundant and cheap.

What are the possibilities for the manufacture of these dressings becoming a commercial enterprise?

The manufacture of sphagnum dressings on a commerical scale should be a very profitable one if some cheap method of cleaning the moss could be devised and thus avoid doing it by hand. Both the northern Atlantic and Pacific coasts, where the moss is abundant and of a high grade, should be very promising localities for carrning on this work. There are two firms manufacturing these dressings in Portland, Oregon, and at least one, possibly more, prospective one in the New England States, while in Detroit efforts are being made to perfect machinery for cleaning and preparing the moss for dressings. In Scotland such an apparatus has already been invented by the Rev. Adam Forman of Beattock near Edinburgh, and these moss dressings are being made and sold by at least one large firm in London. In Germany there are several such firms.

University of Washington,
Seattle, Wash.