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THE BRYOLOGIST

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AN ILLUSTRATED BIMONTHLY

DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICAS AND LICHENS

VOLUME V. 1902

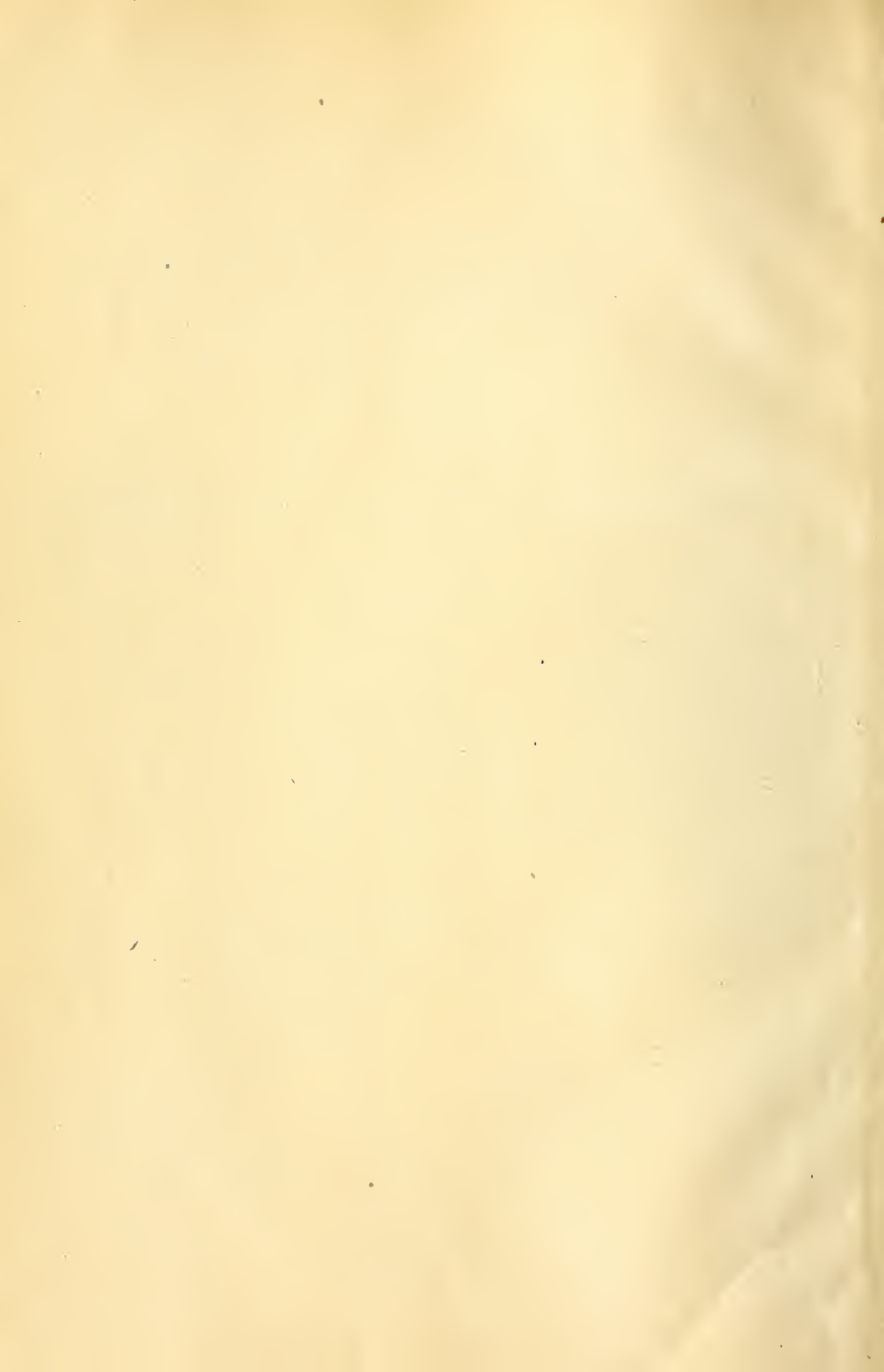
EDITORS

ABEL JOEL GROUT AND ANNIE MORRILL SMITH



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78 ORANGE STREET, BROOKLYN, N. Y.



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EDITORS:

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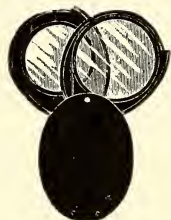
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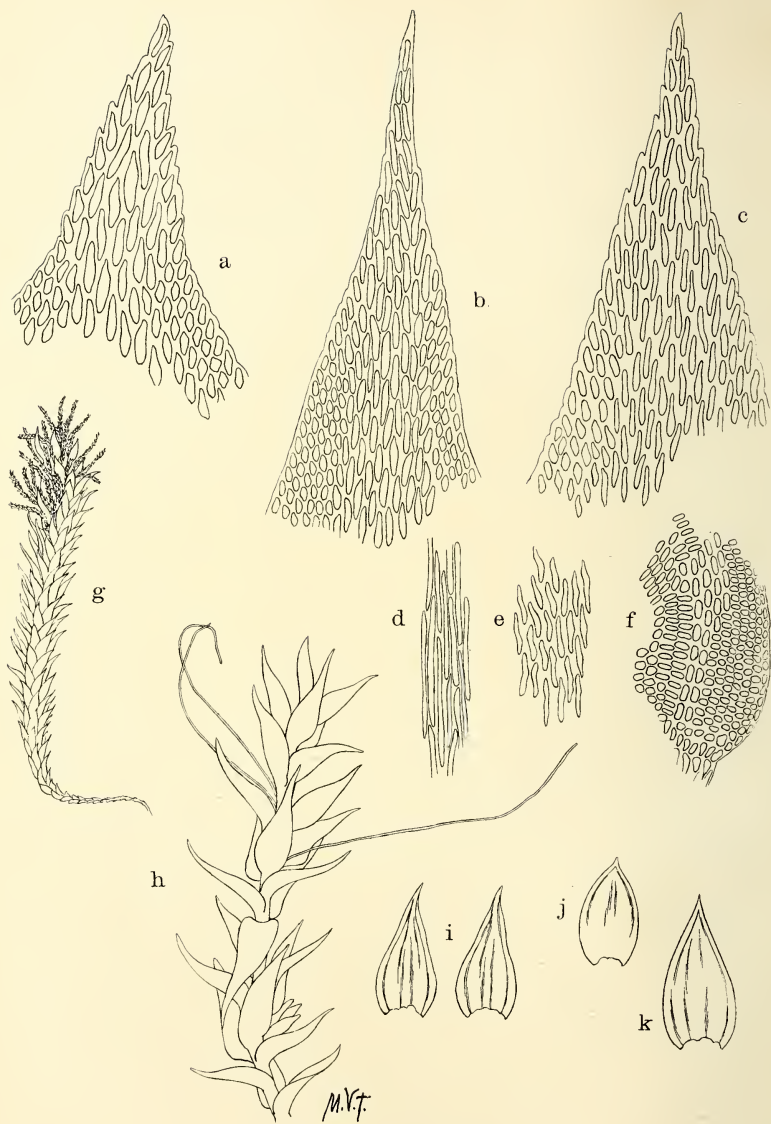


PLATE I. LEUCODON.

a, b, c.—Apices of leaves of *Leucodon julaceus*, *L. sciuroides* & *L. brachypus* respectively $\times 250$. *d, e, f.*—Upper-median, median-basal, and alar cells respectively of *L. brachypus* $\times 250$. *g.*—Secondary stem of *L. sciuroides* having flagella. $\times 50$. *h.*—Flagella of *L. sciuroides*, $\times 50$. *i.*—Leaves of *L. sciuroides*, $\times 10$. *j.*—Leaf of *L. julaceus*, $\times 10$. *k.*—Leaf of *L. brachypus*, $\times 10$.

THE BRYOLOGIST.

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No. 1.

LEUCODON SCHWAEGR. Suppl. 1. pt. 2:1, 1816.

By A. J. GROUT.

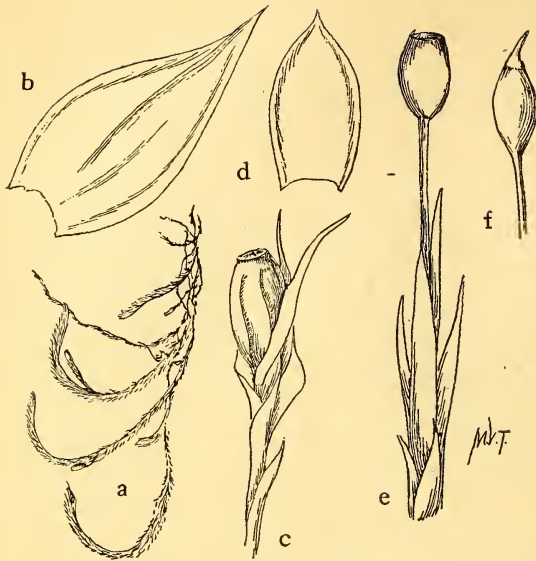
The various species of *Leucodon* grow almost exclusively on the bark of deciduous trees, very rarely are any found on dry rocks. The *Leucodons* are seemingly able to do without moisture for considerable periods as they rarely or never grow at the base of trees, but at a height of five or six feet and above. The main stems are long, slender, branching, almost filiform, with minute leaves and abundant rhizoids. The secondary stems are numerous, suberect, horizontal, or hanging downward and curved outward, usually julaceous and nearly simple; paraphyllia lacking. Leaves many ranked, concave, with margins recurved below, ecostate, entire or slightly serrulate at apex, closely appressed when dry, spreading when moist; leaf cells strongly incrassate; several rows of marginal cells are roundish-quadrate; the lower median, linear, gradually changing to oval at the apex; basal cells often brownish or reddish yellow. Dioicous. Calyptra cucullate, often attached below the capsule by the connate base. Capsules exserted or emergent, erect and symmetrical; peristome apparently simple, teeth 16, articulate and papillose, bifid or occasionally trifid; inner peristome reduced to a narrow inconspicuous membrane.

We have three species, only one of which, *L. sciuroides*, is European. There is considerable difference of opinion as to what other genera of mosses should be grouped with *Leucodon*. *Cryphea* and *Antitricha* are apparently closely related genera. More careful study of its development and structure is needed to determine whether its natural relationship is with the *Neckeraceæ* or the *Hypnaceæ*.

LEUCODON JULACEUS (Hedw.) Sulliv. This species is typically southern, extending north to Southern New England and corresponding latitudes of the Eastern United States. The secondary stems are typically shorter than in the other two species, the branches very terete, julaceous when dry; the leaves closely appressed and imbricate, not at all secund, ovate-elliptical, abruptly short acuminate, very concave, scarcely plicate, serrulate at apex. Upper median leaf cells markedly shorter and broader than in the other two species. Capsule long exserted as in *L. sciuroides*; annulus none; teeth bifid at apex.

Easily recognized by its perfectly terete stems and smaller, scarcely plicate, abruptly acuminate leaves.

LEUCODON SCIUROIDES (L.) Schwaegr. Forming tufts or mats of brownish green, lighter green at the tips of the secondary stems, which are terete and julaceous, more or less drooping and curved upwards at the ends, rarely 5cm. long, usually not over 3cm., frequently producing such a great



a.—Plant of *Leucodon brachypus* $\times 1$. b.—Leaf of *Leucodon brachypus* $\times 20$. c.—Sporophyte of *Leucodon brachypus* $\times 10$. d.—Leaf of *Leucodon julaceus* $\times 20$. e.—Sporophyte of *Leucodon julaceus* $\times 10$. f.—Capsule of *Leucodon julaceus* $\times 10$.

The acumination of the leaves is much longer and more slender than that of *L. brachypus* and is also entire. The upper median cells are also usually a little more elongated. The secondary stems also much shorter than those of well developed *L. brachypus*. Probably common in North-Eastern United States and Eastern Canada but not often collected or else confused with *L. brachypus*. Collectors should be on the lookout for it. In examining leaves for serration, several should be examined, as the leaves of *L. brachypus* and *L. julaceus* are sometimes nearly entire.

LEUCODON BRACHYPUS Brid. Secondary stems averaging longer and larger than in the preceding species, less frequently branched. Leaves more strongly secund, plicate but with fewer folds than in *L. sciuroides*; the acumination is serrulate and not nearly so slender and pointed as in *L. sciuroides*. Seta 3-4mm. long, wrapped up in the perichaetial leaves, which over-top the emergent capsule; annulus lacking, teeth bifid at apex. Spores maturing in winter.

Having about the same ranges as the last but extending farther south. Abundant and frequently fruiting in the mountain regions of North-Eastern United States. It extends to Georgia along the mountains but is rare south of New York. A form from Stone Mountain, Georgia, (J. K. Small) is much more slender than the usual Northern form.

number of flagelliform small-leaved branches as to cause the plant to appear deformed. Leaves of secondary stems slightly secund, ovate-lanceolate, somewhat decurrent, very long and slenderly acuminate, entire, plicate with several folds. Seta about 8mm. long; capsule exserted; annulus present; teeth entire or split toward the base. Very rarely fruiting.

Easily distinguished from *L. julaceus* by the different shape of its leaves. It fruits so rarely that it has to be differentiated from *L. brachypus*, which it closely resembles, by its leaf apices.

FRULLANIA.

WM. C. BARBOUR.

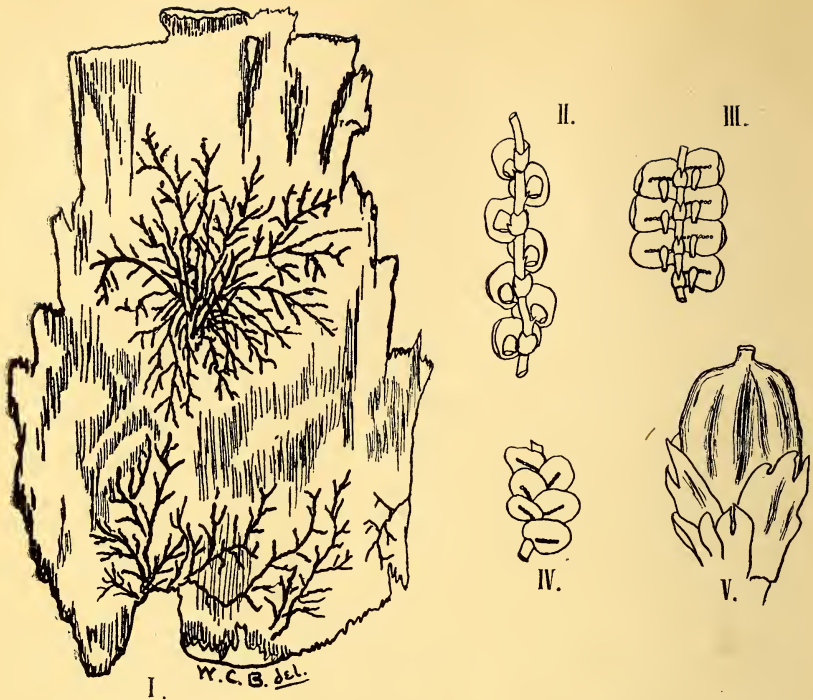
Of the twenty or more Frullanias which are reported from North America, about ten are to be found in the eastern or north-eastern part of the United States. Six more are known from the Southern States, and six others from the Pacific coast from California to Alaska. The genus is well represented in both temperate and tropical regions, and furnishes some of the most beautiful objects for the microscope known to botanical science. The majority of species are of various shades of brown or even black, to the eye, and show varied and beautiful browns and reds when viewed by transmitted light. Again, some species are brown in some situations and green in others, so that color cannot be taken as a very reliable guide to the species. There is only one genus (*Jubula*) which at all resembles it.

From this it is distinguished in that in *Jubula* the branches are lateral and have a leaf borne partly upon the stem and partly upon a branch, while in *Frullania* the branches are intra-axillary and the leaves are free. The best characters for distinguishing the species are drawn from the perianth and the surrounding bracts, but an effort has been made to form a key based upon other structures as far as possible. Most of it has been adopted from the splendid monograph on *Frullania* by Dr. A. W. Evans, of Yale University. The student should have this monograph at hand for reference in the study of the genus.

The leaves in *Frullania* are incubous, complicate-bilobed, with an inflated, long or roundish lower lobe (called *lobule* in distinction from the upper *lobe*.) The underleaves are round or oval in shape, strongly bifid in most species, otherwise entire or unidentate at the side. Rootlets are borne upon the underleaves. Species are monoicous or dioicous. Perianth 3-4 angled, mucronate. Elaters unispiral. Antheridia on a short branch.

KEY TO SPECIES.

1. Lobule as long as broad.....2.
- Lobule longer than broad.....8.
2. Underleaves not cordate at base.....3.
- Underleaves plainly cordate at base.....*F. plana*.
3. Lobule *more* than half the size of lobe.....*F. Oakesiana*.
- Lobule *less* than half the size of lobe.....4.
4. Leaves strongly squarrose when moist.....*F. squarrosa*.
- Leaves little or not at all squarrose when moist.....5.
5. Lobule usually explanate.....*F. riparia*.
- Lobule inflated.....6.
6. Lobule inflated in upper part, compressed in lower, underleaves dentate or crenate.....*F. Brittoniæ*.
- Lobule inflated throughout, underleaves entire.....7.
7. Perianth with roughened ridges, usually southern....*F. Virginica*.
- Perianth smooth, usually northern.....*F. Eboracensis*.
8. Plants small, to ½ or ¾ inch long.....*F. Selwyniana*.
- Plants large, to 1 or 1½ inches.....9.
9. Underleaves bifid but ⅙ their length.....*F. Tamarisci*.
- Underleaves bifid ⅓ to ½ their length.....*F. Asagrayana*.



- I. Plant of *Frullania Eboracensis* growing upon birch bark.
- II. Under side of same magnified, showing lobules and underleaves.
- III. Under side of *F. Asagrayana*, showing as in II., also row of discolored cells.
- IV. Upper view of same.
- V. Perianth of *F. Eboracensis*.

F. OAKESIANA Austin. This is a small local species found in the mountains of New Hampshire and Vermont. It is usually reddish-brown in color, and is readily distinguished by its reddish color and its large lobule. Rare.

F. RIPARIA Hamp. (*F. aolotis* Nees). On trees and rocks, growing in depressed tufts, usually green. Its distinguishing feature is the usually explanate lobule, which is small and lanceolate. Underleaves distant, bifid about $\frac{1}{2}$, entire or nearly so. From New England westward to Minnesota and southward to Gulf of Mexico.

F. SQUARROSA (Bl. R. et Nees.) Dumort. Plants usually in wide, loose mats, but sometimes closely appressed to the tree or rock on which it grows. When dry the leaves are closely imbricated and appressed to the stem. When moist the leaves are strongly squarrose, a condition found in no other American species. The lobule is inflated in its outer and upper parts, but not at the base. Underleaves close together, orbicular, entire or nearly so. Perianth compressed, with short beak, and bearing numerous tubercles. Connecticut to Ohio and southward.

F. BRITTONIÆ A. W. EVANS. (*F. dilatata* of Gray's Man., 6th Ed.). In wide tufts on rocks and trees. Leaves imbricated, strongly cordate at base. Lobule close to stem, inflated in outer and upper part, but compressed at base. Underleaves distant, roundish, bifid $\frac{1}{3}$, "irregularly dentate or crenate on the sides above the middle." Perianth obovate, truncate, with long slender beak, compressed at sides, tuberculate especially upon the several ridges. New York, Conn., Ohio, Penn., & Virginia.

F. VIRGINICA Gottsche. (*F. saxicola* Aust.). Plants green, varying to brownish, closely growing on trees or rarely on rocks. Lobule inflated throughout, about $\frac{1}{6}$ its width from stem. "Underleaves distant, rhombic ovate, bifid $\frac{1}{3}$, entire or rarely unidentate at the sides." Perianth obovate, abruptly narrowed into a short, broad beak; distinctly keeled on the lower side, with two or more supplementary ridges, tuberculate. This species resembles *T. Eboracensis*, but is rare in the North and common in the South, while just the opposite is true of the other species. The main differences lie in the perianths. Canada to the Gulf. Common South.

F. EBORACENSIS Gottsche. Green or brown, usually on trees but sometimes on rocks. Leaves imbricate. Lobule galeate, truncate at base, $\frac{1}{6}$ its width from stem. Underleaves as in *F. Virginica*. Perianth obovate, somewhat compressed, with short, broad beak, distinct sometimes two-angled keel on the underside, smooth, no supplementary ridges. Very common in the North.

F. PLANA Sulliv. Grows on shaded rocks in wide tufts, usually greenish. Leaves cordate at base, decurved at rounded apex. Lobule close to stem, inflated especially in upper and outer parts. "Underleaves distant, reniform, *cordate at base*," bifid $\frac{1}{4}$, with obtuse lobes and sinus. Perianth smooth, with short, broad beak. The species is uncommon, but has been found in Connecticut, New York, New Jersey and Tennessee.

F. ASAGRAYANA Mont. In tufts on rocks, sometimes on trees, usually reddish brown. Lobule $\frac{1}{2}$ its width from stem, clavate or elongated obovoid. Underleaves distant, round-ovate, bifid a little less than $\frac{1}{2}$, usually plane, rarely reflexed at apex. Leaves with a long distinct median line of discolored cells. Perianth oval or obovate, with short beak, compressed on the sides, smooth. Common East, especially in the mountains.

F. TAMARISCI (L.) Dumort. In depressed tufts, brown, rarely greenish, on rocks and trees. Leaves cordate at base, with decurved apex sometimes acute, with indistinct row of discolored cells. Lobule short clavate, contracted toward base. Underleaves distant, round, bifid $\frac{1}{6}$, with broad sinus, reflexed at apex and sides, crispate-auriculate at base. Perianth oblong, keeled on underside, short beaked, smooth. Rare and sterile, the underleaves serving as a guide to identification.

F. SELWYNIANA Pearson. On trees, small, reddish-brown or purple. Lobule close to stem and parallel to it, short clavate. Underleaves distant, bifid $\frac{1}{3}$, entire or unidentate at sides. Leaves with line of discolored cells. Perianth obcuneate, compressed, keeled on underside, with short broad beak, minutely setulose at mouth. Rare. Collected in Ohio and Canada.

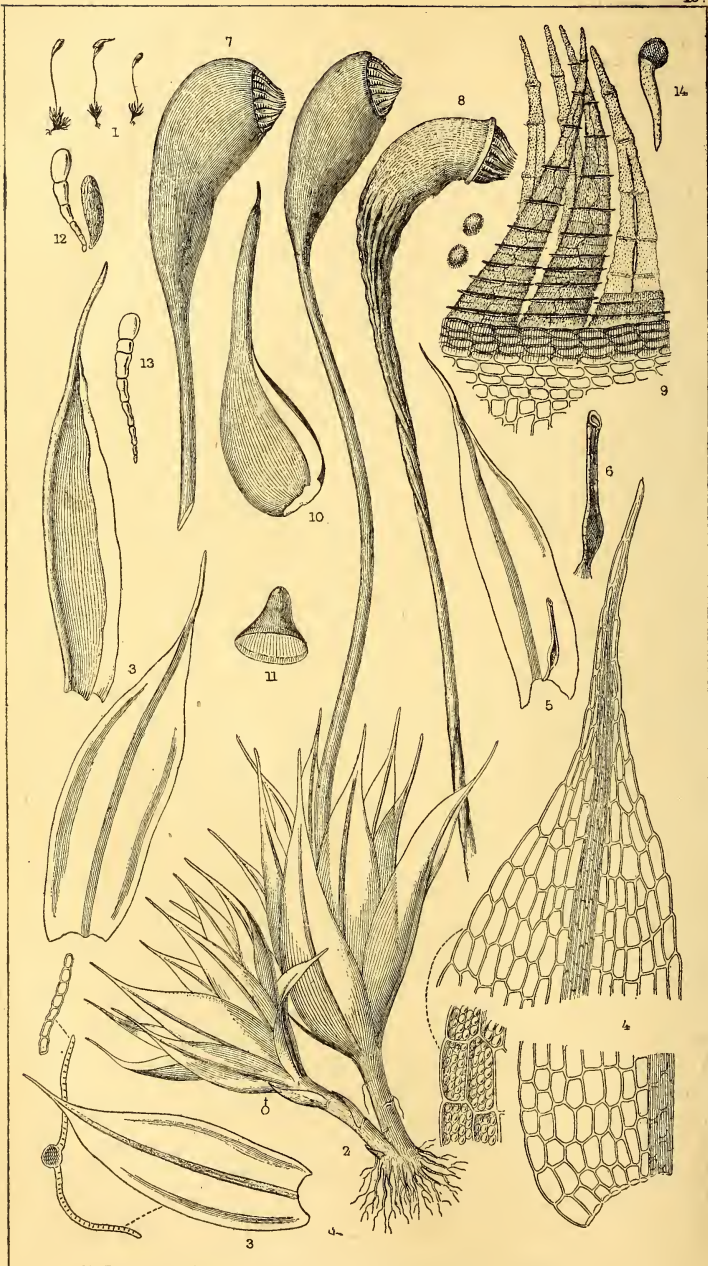


Plate II. *Funaria Americana* Lindb.

FUNARIA AMERICANA LINDB.

JOHN M. HOLZINGER.

After fifteen years of collecting around Winona I found this beautiful species for the first time this spring (1901). It occurs abundantly on a bluff 400 feet above the level of the Mississippi, at the base of north-facing limestone exposures, on rich leaf mould among grass. The young plants with pedicels hardly yet raised above the leaves were found the middle of April, and were with some confidence referred to *Pyramidula tetragona*, for the parts figured for this species in Husnot "Musc. Gall." seemed to agree well with these young plants. Fortunately the station is not distant—is in fact in sight of my study window, so that I was able to watch the maturing of the plants which takes place about the middle of May. Though I had no material of this species the certain determination was possible by the aid of Sullivant's excellent plate and description (Icones Muscorum Suppl., 30, Plate 19).* Sullivant there also gives an interesting account of the naming of this plant. From Mrs. Britton I learn that since Muhlenberg and James collected it in Pennsylvania, Lesquereux found it in the mountains of Georgia and Mrs. Spence near Springfield, Ohio. Minnesota becomes the fifth station.

SELIGERIA TRISTICHA B. & S.

BY JOHN M. HOLZINGER.

This rare little moss is so far reported from Ohio only, outside of Europe and Siberia. A plant collected by Dr. G. G. Kennedy in Connecticut, and at first referred to *Seligeria calcarea*, seems to belong rather to this species. It is a more luxuriant plant than European specimens in my herbarium. I take it that this accounts for the homotropous leaves on the fruiting stems, which here frequently reach almost to the capsule and are quite soft, not at all rigid as is uniformly the case in this genus. This laxness also tends to obscure the tristichous leaf arrangement. Yet with these exceptions it undoubtedly agrees with a plant collected by Schlegel and Arnell in Sweden, which has the capsule exactly as hemispherical as in Dr. Kennedy's plant. In both, the thick seta is little over twice as long as the large cylindrical vaginule, and is *distinctly curved*. This absence of straightness I had supposed to be accidental till I examined the Swedish plant. A plant collected by Reinsch in the Franconian Jura has the seta also not quite straight, but a distinct neck below the more elongated capsule. On a plant collected by Bruch in Oberhessen, however, the seta seems quite straight and a little longer than in the other plants examined, while the capsule is as in Reinsch's plant. This Eastern United States plant thus seems to be connected with the South German by the Swedish plants. A close scrutiny of the descriptions in the European manuals as well as of the available herbarium material suggests the possibility that two forms of this species exist, one with more elongated capsule and straight seta, the other with hemispherical capsule and bent seta. Boulay in "Muscinées de la France, p. 537, when he says "capsule nearly as in *S. calcarea*," has the first form in

*Reproduced as Plate II of this issue slightly reduced. By permission.



- 1—A capsule of *Seligeria calcarea*, enlarged.
2—A plant of *Seligeria tristicha laxa*, enlarged. (Vaginule 0.5mm., seta alone 1.3-1.5mm.)
3—Antheridial bud, enlarged, showing tristichous leaf arrangement.
4—A leaf, enlarged; a, b, c, Apex, margin and base of leaf, much enlarged; d, e, f, Leaf sections from near apex, middle and base, all much enlarged.
5—Portion of peristome, enlarged.

mind, (see fig. B, plate 10.). Braithwaite in "British Moss Flora," p. 119, refers to the latter form when he says "capsule.....subspherical." He adds "with a swollen neck." This is very short in the Swedish plant and hardly perceptible in the plant under consideration.

Among the discrepancies in the description two points are worthy of record. Limpricht in "Laubmoose p. 467," says "the spores are 24-32 μ , yellowish-green, *delicately wrinkled*," our own plant has the spores only 20-24 μ , yellowish-brown (quite ripe) and sparingly, but distinctly, minutely papillose. A character not given anywhere and which is found also on the Swedish plant is the *papillose apex* of the calyptra.

The lax character of the leaves, their homotropous tendency, as well as the departure in the character of the spores seem to justify the making our plant a variety, and the most appropriate name would be *Seligeria tristicha laxa*, n. var. If Lindberg's revival of Bridel's name is followed the plant becomes *Seligeria trifaria laxa*.

P. S.—Since writing the above, Dr. G. G. Kennedy kindly loaned some material of this plant in unusually good condition, from which a pocket lens inspection furnishes the following additional data: 1—The lid remains over the mouth of the capsule, attached to the long collumella, as in *Schistidium* and *Gymnostomum*, the latter projects as a whitish stalk after the lid falls. 2—The mouth of the deoperculate capsule widens, and the dark-red peristome teeth become revolute. 3—The capsule below the mouth shrinks slightly but shows even now no appreciable neck at the junction with the seta. Its dark green color persists, and forms a pretty contrast with the color of the peristome.

NOTES ON RARE OR LITTLE KNOWN MOSSES.

BRYUM CAPILLARE FLACCIDUM B. & S.

Sterile plants of this species were collected by me near Taylor's Falls, on the St. Croix River, Minn., August 15th, 1896. It was not possible to determine it till recently, when Mr. Schliephacke sent me a plant collected by him near Naumburg a/d Saale, Germany, named as above. The Minnesota plant is exactly identical with it. Both are sterile, yet both Limpricht (*Laubmoose* II. p. 377) and Boulay (*Muscinées de la France*, p. 263) describe the fruit. The plants seem very different from *Bryum capillare* being dark green and of a succulent-brittle texture, and one gets a strong impression that it is really well worthy of specific rank. Of course intermediate forms may be known. Lesq. & James' Manual, p. 236, credits the plant to the Eastern States and the White Mountains, but I have not seen any other American specimens.

JOHN M. HOLZINGER.

CYNODONTIUM SCHISTI (Wahlenb.) Lindb.

Plants of this species with both old and immature fruits were collected near Taylor's Falls, Minn. The undivided teeth of the peristome and the texture and appearance of the plant led me to refer it to *Rhabdoweisia*; but it evidently agreed with neither of the two species which occur in our territory. The structure and areolation of the leaves as well as the slightly strumose capsule bring the plant under *Cynodontium*. The leaf sections show strong papillæ on both sides of the cell walls. Limpricht says the spores measure 10-14 μ , but I find that spores from Scandinavian plants communicated by Dr. Bryhn measure 14-16 μ , while those from the Minnesota plants measure 16-20 μ . The fruits of the latter were fully ripe and this may account for the discrepancy in spore dimensions. The plant is known from Greenland, Newfoundland, and the Rocky Mountains, Siberia and Europe.

JOHN M. HOLZINGER.

CLIMACIUM KINDBERGII (R. & C.) Grout.

The three species of *Climacium* are quite common in northern Massachusetts, at least in that section of the state that is watered by the Merrimac River, as there is an abundance of swamps and wet meadows just fitted for the growth of this genus. There is a very marked difference between the superficial appearance of the two species *C. Americanum* and *C. Kindbergii* from the fact that the branch leaves of the former are subimbricate, while those of the latter are widely open. In their compact method of growth and patent leaves they remind one strongly of *Mnium hornum*, as the dendroid character of the genus is not apparent. I think the blackened appearance to be due to submersion, as greener plants are found in less wet situations.

J. W. HUNTINGTON.

NOTES ON NOMENCLATURE.

BY ELIZABETH G. BRITTON.

PLATYGYRIUM REPENS (Brid.) Br. & Sch.

HYPNUM PALATINUM Neck. Act. Acad. Theod. palat. 2:454. t. l. f. l. 1770 pp. Neck. Meth. Musc. 182. 1771.—Dill. Hist. Musc. 2:320. t. 41, fig. 55. B. C. 1741.

ENTODON PALATINUS Lindb. Musc. Scand. 39:1879.

ENTODON REPENS (Brid.) Grout. Bull. T.B.C. 23:227. 1896.

Recent European authors have followed Schimper in the name of this moss. Dr. Grout in his Revision of the Isotheciaceæ, has followed Lindberg generically but not specifically. In a genus so marked in its natural character as *Entodon*, I fail to see how this species belongs there. As to the specific name, Lindberg stated in his *Musci Scandinavici* that there are numerous and perfect specimens of *Hypnum palatinum* collected by Necker, preserved at St. Petersburg, which are identical with *Platygyrium repens*. Le Jolis, in his remarks on Nomenclature, fails to appreciate the points that Lindberg made and attempts to elucidate the species by reference to subsequent authors, instead of consulting the original place of publication of *H. palatinum*. The original citation is given correctly above, and the volume is to be seen in the Astor Library. We have Necker's *Methodus* and Dillenius' *Historia*, and the three references show very conclusively what Necker meant. He referred to plate 41, fig. 55, of Dillenius, and in the *Methodus* says figures B and C absolutely illustrate his plant. Figures A and D are undoubtedly *Pterogonium gracile*, and it is unquestionably true that Necker included both species under *H. palatinum*, in his description as well as his synonymy; but in t. l., fig. 1, of the *Acta*, he figured *Platygyrium*, and in the *Methodus* he excluded the Dillenian figures of *Pterogonium gracile*. At first he evidently thought that *Platygyrium* was the young "germinating plant" of *Pterogonium*, and described the gemmæ on the apex of the branches. He

stated that the capsule was exannulate, but considering that the description was probably drawn without a compound microscope, this is not surprising and is equally untrue of *Pterogonium gracile*. It will be seen by consulting the synonymy of this species, that there is also confusion in the older names, and that *H. palatinum* is cited by Limpricht as one of its synonyms. As shown above, this is only partially true and t. l., fig. 1, and part of the description would have been omitted. Under the circumstances it seems best to maintain the specific name of *repens* (Brid.) for *Platygyrium*.

PLATYGYRIUM BRACHYCLADON (Brid.) Kindb. Br. Eu. & N. Am. 1:31. 1897.
 PTERIGYNANDRUM BRACHYCLADON Brid. Mant. Musc. 130. 1819, & Bryol.

Univ. 2:185. 1827.

PTEROGONIUM ASCENDENS, Schw. Süssp. 3:1:2, t. 243. 1828. Card. Bull.
 Hb. Boiss. 7:375. 1899. t. 8.

PLATYGYRIUM REPENS VAR. ORTHOCLADOS. Kindb. Mac. Cat. 6:172. 1892.

The above is the synonymy as indicated by Kindberg and Cardot, but in order to be sure that *P. brachycladon* Brid., is the same as *P. ascendens* Schw. it will be necessary to compare the specimens, as Bridel cited (Bryol. Univ. 2:185) Schwagrichen's plate 110 and not 243. Both plates have been cited by Sullivant in the Icones as *Homalothecium subcapillatum*, but I agree with M. Cardot that this cannot be true. *P. ascendens* Schw. seems to be closely related to *P. repens* as Cardot has stated, differing from it in the smaller size of the plants, the shorter, less acuminate leaves with denser, smaller, transversely elongated, alar cells, the short seta (1 cm. long) shorter more cylindrical capsules ($\frac{1}{2}$ mm. long), with the peristome much smaller and narrower teeth, the markings are different. The parenthetical additions are my own.

It is evident in studying *Platygyrium repens* that the differences noted by Kindberg and Cardot hold true in some specimens. In our set of Sull. & Lesq. Musci. bor. Am. No. 259 would agree with *P. ascendens* and part of 385, but there is a long-pedicelled portion of 385 in which the leaves and teeth are quite different. That there are great differences in the European specimens seems also evident, so that the question of whether to separate this species, as Kindberg has done, or to describe the varieties under one species as Limpricht does, requires more study, and Bridel's types will have to be seen before we can take up either one of the old names. The original description of *P. repens* calls for a short pedicel and ovate-lanceolate acuminate leaves. In the Bryologia Universalis it is further stated that the perichetial leaves are serrate at the apex and the pedicel 6-8 lines long.

The Muhlenberg collection contains three specimens of *Platygyrium repens* but none of them are named *P. ascendens*, as this was not described till 1828, so that we cannot help elucidate the uncertainty as to whether it is *monoicous*. It will be noted that Kindberg states of *P. repens* that it is "dioecious or pseudo-monoecious and of *P. brachycladon* that it is *monoecious*." These points also should be determined from Bridel's types. Therefore I have sent duplicates of critically studied specimens to Berlin for comparison, and hope to be able to clear up this matter at some future time. Any notes and specimens of *Platygyrium repens* will be welcome.

Anomodon Toccoæ Sull. & Lesq. 1856.

A. devolutus Mitt. 1859; Neckera sciuroides Hpe. 1879.

A. robustus Rehm. 1893; A. flagelliferus C. M. 1897.

Thamnum Toccoæ Kindb. 1897.

In the November number of the Journal of Botany (39:360. 1901) Mr. E. S. Salmon has given us the results of some very interesting studies and comparisons, which have shown that five supposedly distinct species prove to be forms of *A. Toccoæ*, and that like *Fissidens grandifrons*, the only locality where it is known to fruit is N. W. India, in the Himalaya Mountains. This extends the range of this species from Georgia to Brazil, India, Ceylon, Java, Sumatra, Celebes, China, Japan, and Africa. Mr. Salmon cites only the type locality at Toccoa Falls, Georgia, to which should be added, Falls of the Yadkin, N. C., J. K. Small, 1892.

NECROLOGY.

Professor Alonzo Linn died at Washington, Penn., on September 28th, 1901, at the age of 74 years. He was connected with Washington and Jefferson College from 1847 to the present, having taught History, Political Economy, Latin and Greek. In recent years he had devoted some time to mosses and with the assistance of Professor Simonton printed a "Preliminary List" of those of Washington County, Penn. They were fortunate in discovering several stations for *Fissidens hyalinus*. Professor Linn had prepared a list of the generic names of the mosses with their derivations and meanings, which might be helpful to the readers of THE BRYOLOGIST.

ELIZABETH G. BRITTON.

Data regarding the death early in the year of Mr. D. A. Burnett received too late for this issue. A suitable note will appear in the March number. *Eds.*

Any having imperfect copies of the October number will receive perfect ones in exchange by returning same to Mrs. Smith.

CORRECTIONS. On page 58, under *Parmelia perforata* (Plate VI, read 1, instead of 3). Page 59, under *P. Borreri v. reducta* (Plate VI, read 3 instead of 1). On page 64, In description Plate VII, 2.—*Hypnum*, read *pleurostramineum*. Page 65 in Key, under 3. read *pleurostramineum*, bottom of page 65 the same. Page 67, seventh line from top read "Lindberg *et* Arnell." Page 70 in description Fig. 1, insert "d" before *T. abietinum* and omit "o" in first word bottom line same page.

Dr. Best offers reprints of his article on "Thuidium" from the October BRYOLOGIST, at ten cents each, or 3 for 25c. Apply to Mrs. Smith, 78 Orange street, Brooklyn, N. Y.

The series on Lichens by Mrs. Harris begun in the January, 1901, issue will be continued during 1902, though we regret to say, omitted for January. The four groups so far treated include the *Usneas*; *Alectoria*, *Evernia* & *Ramalina*; *Cetraria* and *Parmelias*.

NEW OR UNRECORDED MOSSES OF NORTH AMERICA.*

BY J. CARDOT AND I. THERIOT.

Condensed from Bot. Gaz, 30, July, 1900.

FISSIDENS BRYOIDES Hedw., var. *GYMNANDRUS* Ruthe. Hedwigia 9:178, 1870.

Limpr. Laubm. 1:430. (*F. gymnandrus* Buse Musc. neerl. exsicc. fasc. 4, No. 77). Northwestern Montana: in the vicinity of Lake MacDonald, Flathead Co. (J. M. Holzinger and J. B. Blake, 1898).

A peculiar form distinguished from the type by the antheridia naked in the axils of the stem leaves.

FISSIDENS SUBBASILARIS Hedw., var. *BUSHII* Card. & Ther.

Differs from the typical form by broader, shorter, obtusely rounded leaves; costa extending nearly to the apex; more opaque areolation and thicker cell walls.

Missouri: Eagle Rock, on gravelly ground (C. F. Bush, 1897).

GRIMMIA PSEUDO-MONTANA Card. & Ther.

Dioicous, dark green, in rather thick cushions. Stems erect, forking, about 1mm. high. Leaves erect when either dry or moist, subimbricate, 1.75–3mm. long, 0.75–1mm. broad, ovate-lanceolate, margins plain, entire, lower leaves mucous; upper with a rather short finely denticulate hair-point, slightly decurrent at the base; costa rather strong, 0.06–0.08mm. broad at the base, channeled above, indistinct toward the apex; lower cells next to the costa linear, yellowish, toward the margin quadrate or short-rectangular, hyaline; the others small, obscure, quadrate or subrotund, bistratose. Perichaetial leaves similar, areolation laxer at base. Capsule exserted, erect, 1.5–2mm. long, short-oblong, subcylindrical when dry, on a rather thick straight seta; annulus none; operculum convex-rostrate. Teeth of the peristome bright red, about 0.35mm. high, entire or slightly perforated, subulate from a broad triangular base, minutely granulose above, articulations 16–25.

Idaho: near Moscow, on dry rocks (L. F. Henderson, 1894). Closely allied to *G. Montana* B. & S., but sufficiently distinct by the larger leaves, with a stouter nerve and a shorter and thicker hair, and chiefly by the peristomial teeth almost entire, not divided and scarcely perforate, with more numerous articulations.

GRIMMIA MONTANA B. & S. var. *IDAHENSIS* Ren. & Card.

* Differs from the typical form in the larger more exserted capsule on a little longer seta, which is flexuous and subgeniculate when dry. Leaves often wanting the hair point.

HYMENOSTOMUM MICROSTOMUM R. Brown, Trans. Linn. Soc. 12:572 (*Gymnostomum microstomum* Hedw., Musc. frond. 3:71, pl. 30 B).

According to Lesquereux and James, Manual 56, this species is not known from North America, and all the specimens that have been communicated under the generic name *Hymenostomum* are to be referred to the *Weisia viridula* var. *gymnostomoides* D. Muell. Yet the No. 54 of Sullivant and Lesquereux Musci. Bor. Am. belongs undoubtedly to the *Hymenostomum microstomum* R. Br., at least in our set.

* [Translated by Miss Warner.]

Quite inseparable from *Weisia viridula* as to the vegetative organs and differing only by the capsule closed with a membrane finally perforated in the center.

Weisia Wimmeriana B. & S., Bryol. Eu. 33-36:4, pl. 1. (*Gymnostomum Wimmeriana* Sendt. in Flora 23:59. 1840. *Hymenostomum murale* Spr. Musc. Pyr. No. 236. *Gymnostomum murale* Sch. Syn. 37. 1860. [Ed. 1.]. Minnesota: Taylor's Falls (J. M. Holzinger, 1895).

Resembling the slender forms of *W. viridula* in size, habit, shape, and areolation of the leaves; distinct chiefly by the inflorescence, which is parocious or sometimes as in our Minnesota specimens, synoicous. The teeth are rather perfect, with 4-5 articulations.

GRIMMIA SUCSULCATA Limpr., Laubm. 1:757.

Idaho (J. B. Leiberg, 1892; J. H. Sandberg, 1883. Northwestern Montana: in the vicinity of Lake MacDonald, Flathead County (J. M. Holzinger and J. B. Blake, 1888).

A long time confused with *G. alpestris* Schleich. The distinctive characters quoted by Limpricht are: for *G. alpestris*, pedicel straight, capsule without stomata, leaves not plicate; and for *G. subsulcata*, pedicel somewhat curved, capsule with stomata, leaves with two longitudinal folds in the upper part. The last character is the best, for the pedicel of *G. subsulcata* is sometimes nearly straight and the capsule without stomata, while the folds of the leaves are always distinct, especially on a transverse section.

It is to be noticed the Limpricht cites erroneously *G. lamellosa* C. Müll. as a synonym for *G. alpestris*: on the contrary, from an original specimen Müllers plant is proved identical with *G. subsulcata*. The true *G. alpestris* Schliech. has been gathered by Messrs. J. M. Holzinger and B. Blake in the same region of Northwestern Montana where they have collected *G. subsulcata*.

ORTHOTRICHUM IDAHENSE Card. & Ther.

Monoicous, in loose depressed cushions, fuscous below, yellowish-green above. Stem decumbent at the base, leafless for some distance, irregularly branching, 2-3cm. high, branches ascending. Leaves erecto-patent when wet, erecto-appressed when dry. 1.75-2.05mm. long, 0.50-0.75 broad, oblong lanceolate, subobtusate, entire, margins revolute from near the base to below the apex, costa subpercurrent; cells unistratose throughout, strongly incrassate, rectangular below, linear next to the costa, quadrate or short-oblong towards the margin, the rest round, covered on both sides with thick bi- or trifurcate papillæ. Perichaetial leaves closely resembling the leaves but areolation laxer at base. Vaginule bare. Capsule scarcely emergent on a very short seta or semi-emergent, ovate when moist, tapered to a short neck, sub-cylindrical when dry, slightly constricted below the mouth, eight striate, the striæ of four rows of longer yellowish cells with thicker walls; stoma superficial. Operculum unknown. Teeth of the peristome eight bigeminate, or sixteen, reflexed when dry, more or less perforated, minutely granulous, linear above; cilia none

or fugaceous. Calyptra yellowish, fuscous at apex. Covered with numerous long, toothed, papillose hairs. Spores papillose, 20-22 μ in diameter. Male flowers unknown.

Idaho: Moscow Mountains, on rocks (L. F. Henderson, 1893).

By the superficial stomata and the peristome reflexed when dry and finely papillose, this species belongs to the group of *O. arcticum* Sch., but is easily distinguished from all the other species of this group by its lax tufts, emergent capsule, and peristomial teeth less opaque, covered with less dense papillæ.

ORTHOTRICHUM LYELLII H. & T. var. HOWEI Ren. & Card. var. nova.

Differs from the typical form in the exerted capsule on a seta equalling it in length, and in the leaves revolute from near the middle. Distinguished from *O. papillosum* by the less flexuous leaves, strict when dry and longer revolute, with shorter and less narrow acumen. Calyptra very hairy. Papillæ of the leaves not very prominent. Leaves often furnished with several gemmæ.

California: region of the upper Sacramento, Sisson, on trunks of *Quercus Kelloggii* (Marshall A. Howe, 1884. Ren. & Card. Musci Amer. sept. exsicc. No. 291).

WEBERA CARINATA Limpr., Laubm. 2:261. (*Bryum carinatum* Boul., Musc. de la France 280, *B. naviculare* Card., Rev. Bryol. 13:27, 1886, et *B. cymbuliforme* Card., loc. cit. 14:22. 1887. *Webera cucullata* var. *carinata* Husn., Muscol. Gall. 229).

Northwestern Montana: in the vicinity of Lake MacDonald, Flathead County, (J. M. Holzinger and J. B. Blake, 1898).

By the habit and dioicous inflorescence this moss approaches *W. commutata* Sch. from which it differs in the more slender stems, the leaves always plane on the borders, distinctly carinate on the back, imbricate in five rows, and the cell walls thinner.

BRYUM EURYLOMA Card. & Ther., sp. nova.

Dioicous, densely caespitose, lurid green. Stem erect, tomentose, 2-3cm. high. Leaves crowded, erecto-patent when wet, subappressed when dry, lanceolate from a narrow decurrent base, 3-4mm. long, 0.65-0.75mm. broad, gradually and finely acuminate, entire or very slightly denticulate at the apex, narrowly revolute on the margins, sometimes nearly plane on one side; costa excurrent in a very short, acute, subentire or toothed point which is often hyaline at the apex. Areolation as in *B. pseudotriquetrum* but the border wider, composed of 5-6 rows of cells. Inner perichaetial leaves smaller, triangular-lanceolate gradually cuspidate, margins plane. Seta 15-20mm. long, dark purple at base. Capsule abruptly pendulous, narrow, subcylindrical, constricted under the mouth when dry, with a long neck tapering gradually into the seta, 2.50-4mm. long, 0.75-1mm. thick. Operculum convex apiculate. Peristome as in *B. pseudotriquetrum*. Male inflorescence discoid.

Puget Sound, Orcas Island, Mt. Constitution, Lake border (L. F. Henderson, 1892). Distinct from *B. pseudotriquetrum* Schw. and allied species

by the smaller size, the narrower leaves entire or scarcely denticulate at apex with broader margin and the capsule smaller, narrower and more abruptly pendulous.

BRYUM CRASSIRAMEUM Ren. & Card. var. COVILLEI Ren. & Card., var. nova.

Differs from the typical form in the denser mats, in the more slender and stricter stem and branches, in the leaves more closely appressed, in the seta which is commonly thicker in proportion to the size of the leaf, in the fuscous-red capsule and in the wider openings on the back of the segments of the inner peristome.

Rocky Mountains (Death Valley Expedition, No. 1358; F. V. Coville and F. Funston, 1891).

BRYUM TORQUESCENS B. & S. Bryol. Eur. 6-9:49, pl. 20.

Washington: Pullman, Whitman County, moist banks (L. F. Henderson, 1892).

Nearly allied to *B. capillare* L., but distinct by the synoicous inflorescence and the capsule deep red when mature. The American form differs from the European type by the leaves being erecto-patent and not spirally contorted in the dry state.

OFFERINGS.

To Chapter members only. For postage.

Miss C. H. Clarke, 91 Mt. Vernon street, Boston, Mass. *Dichelyma capillaceum* B. & S. cfr.

Miss M. F. Miller, 1109 M street, N. W., Washington, D. C. *Polytrichum commune* var. *perigoniale* Mx. cfr.

Mrs. J. D. Lowe, Noroton, Conn. *Entodon seductrix* (Hedw.) C. M. cfr.

Mrs. C. W. Harris, 125 St. Mark's Ave., Brooklyn, N. Y. *Parmelia saxatilis* (L.) Fr. *Plagiothecium striatellum* Lindb. cfr.

Mr. W. C. Barbour, Sayre, Pa. *Frullania Asagrayana* Mont. *F. Eboracensis* Gottsche. *Hylocomium brevirostre* (Ehrh.) B. & S. *Hypnum cristacastrensis* L.

Mrs. Smith, 78 Orange Street, Brooklyn, N. Y. *Leucodon sciuroides* (L.) Schwaegr.

REPORT OF JUDGE OF ELECTIONS.

Mrs. Annie Morrill Smith, Secretary:

I submit the report of the election of Sullivant Moss Chapter officers for 1902, as follows:

Whole number of votes.....	22
For President: Dr. G. N. Best.....	21
Professor J. M. Holzinger.....	1—22
For Vice-Pres: Miss Warner.....	16
Mr. J. W. Huntington	6—22
For Sec.-Treas: Miss Wheeler.....	14
Miss Crockett.....	5
Mrs. Smith.....	3—22

Dr. Best, Miss Warner and Miss Wheeler are elected.

Respectfully submitted,

JOSEPHINE D. LOWE, Judge of Elections.

THE PRESIDENT'S REPORT.

During the past year the Sullivant Moss Chapter has performed its mission of mutual helpfulness to the satisfaction of those having it in charge, and also, judging by the number who have availed themselves of the privileges it affords, to the satisfaction of the membership at large.

Important as it is, an increase in members is not the only ground for encouragement and congratulation. We have at present 106 members. The zeal and intelligence of those actively engaged in the collection and study of mosses must reflect credit on American bryology.

Our official organ, *THE BRYOLOGIST*, is conducted with ability and judgment and merits our confidence and support. While many of the articles that have appeared in it were prepared especially for the beginner and the amateur, the advanced worker, so far as space would allow, has not been neglected. The editors have wisely directed their efforts to the rendering of the best of assistance, that which enables one to help himself, and in so doing to help others.

During the year two auxiliary departments have been instituted. One for the study of Lichens, under Mrs. Harris; the other for the study of Hepatics, under Mr. Barbour: both of whom are fully competent to do the work entrusted to their care. Each department has already an enthusiastic following from whom much is to be expected. The study of mosses, however, will continue to be the leading feature of Chapter work.

With this number as a beginning, the editors of *THE BRYOLOGIST* propose to issue it as a bi-monthly. The favorable responses given to their letter of inquiry fully warrants, it is believed, the taking of this step. It is, therefore, confidently hoped that each member will show his appreciation of the efforts made in his behalf by continuing his membership, and by inducing others to become either members or subscribers. Every occasion brings with it the possibility of making *THE BRYOLOGIST* still better.

The free distribution of specimens is worthy of encouragement since by it those having small collections can enlarge them with but little expense, and that too with authentic material. Nearly every locality furnishes plants that are rare or absent in some other localities.

The thanks of the Chapter are due Mrs. Smith, our efficient secretary-treasurer of the past, for the unflinching courtesy and faithfulness with which she has performed the important duties of her office. By her usefulness the work and the cares devolving on the president have been so reduced as to make her retirement a source of personal regret, relieved however by the knowledge that her mantle has fallen on a worthy and competent successor.

In concluding this report I beg to assure each member that I am not insensitive to, nor ungrateful for, the partiality that elected me your presiding officer last year and continued me for the present year.

Your obedient servant,
G. N. BEST,
President Sullivant Moss Chapter.

REPORT OF THE SECRETARY.

The report of our President so fully covers the ground of the Chapter work for the past year that only a few more words are needed. It has been thought best to divide the Chapter Herbarium, placing it where it would be the most likely to grow; the Hepatics with Mr. Barbour, 19 genera, are so far represented; the Lichens with Mrs. Harris, 44 species mounted. The mosses with over 250 sheets, representing 80 genera, will pass to the new Secretary, Miss Wheeler. It is urged in every instance when possible to send enough material not only for identification but enough to have a good sized specimen left for the Chapter Herbarium.

There has been but one death among our membership since writing the last report, namely that of Mr. Thomas A. Williams, Takoma Park, D. C. Only a few weeks before his sudden death he had promised to give us all the aid in his power in presenting the Lichens. He was an acknowledged Lichenist and not only the Chapter but THE BRYOLOGIST and all botanists unite in mourning his loss. It may be well in order to avoid confusion that the statement be made explicitly that Chapter members are requested to send their dues, now raised to \$1.10, to Miss Wheeler, Chatham, N. Y. This covers subscription to THE BRYOLOGIST. Respectfully, ANNIE MORRILL SMITH,

REPORT OF THE TREASURER.

The following statement for the year 1901 is respectfully submitted:

RECEIPTS.	DISBURSEMENTS.
By dues from members,.....\$64.70	To Bryologist.....\$37.10
“ Glossary Acc..... 1.60	“ Printing, 1900 Report 4.15
“ Cash on hand Jan. 1, 1900, 1.13	“ Glossary Acc... .. 4.65
	“ Postage..... 5.00
	“ Labels (C. B. S. Co.)..... .60
	“ Circular Letter (McB. & S.) 2.75
	\$54.25
	Cash on hand..... 13.18
	\$67.43

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MARCH, 1902



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICIS AND LICHENS

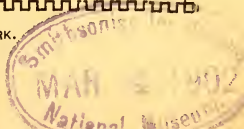
EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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THE BRYOLOGIST

A BIMONTHLY JOURNAL DEVOTED TO THE STUDY OF NORTH AMERICAN MOSSES
HEPATICS AND LICHENS.

ALSO OFFICIAL ORGAN
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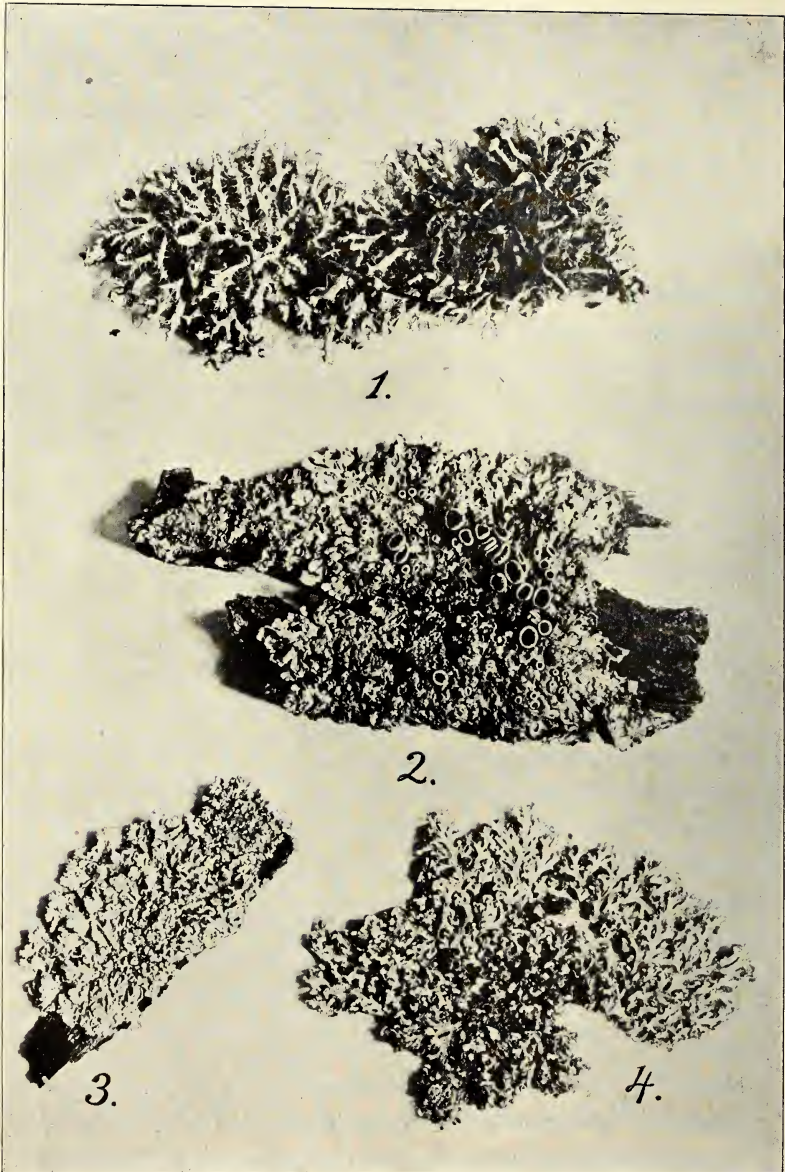


Plate III. 1. *Physcia comosa* 2. *P. hypoleuca*
3. *P. crispa* 4. *P. speciosa*.

THE BRYOLOGIST.

VOL. V.

MARCH, 1902.

No. 2.

LICHENS—PHYSCIA.

BY CAROLYN W. HARRIS.

(WITH PLATE III.)

While the Physcias are found in the Northern States they are more abundant in the South, especially the higher and more beautiful forms. They are quite generally distributed, having been collected in all parts of Europe, and in Japan.

The thallus varies from nearly crustaceous, through foliaceous to fruticose. The foliaceous type resembles very closely the Parmelias, but the thallus is thinner and clings more closely to the substratum. The lobes are not so blunt and leaf-like, but are finely cut and delicate. In most species of *Parmelia* the under side of the thallus is shining, as if varnished, while in *Physcia* it is dull and pale. The color is usually gray, tinged with green. The under side is pale, often white, but appearing in some species black on account of the thick mat of black rhizoids. Often the lobes of the thallus are terminated by long, stiff cilia. Some species are rarely found in fruit but are covered with whitish soredia upon the upper surface and along the turned over margins of the lobes of the thallus. The apothecia are smaller than in *Parmelia* and are almost sessile; the margin entire or crenulate, the disk round and dark in color. In *Parmelia* the disk is quite thin, in *Physcia* it is thick. The thin paper-like thallus of many species renders them difficult to collect satisfactorily from the tree trunks on which they are so generally found. Some species grow on mossy rocks, and in damp weather are easily detached.

By the earlier lichenists the Physcias were combined with *Parmelia*; while the thalli are much alike in general appearance, their spore characters are quite different, and on close observation their thalli will be found to differ very much, both in appearance and habit of growth. The name, *Physcia*, was given to this genus in 1824 by Fries, in allusion, it is said, to its delicate thallus, the name being derived from a Greek word meaning breath or wind.

PHYSCIA SPECIOSA. (WULF., ACH.) NYL. (PLATE III. 4). This is one of the Physcias most generally found in the Eastern States, and is also one of the prettiest, often forming complete, round, star-like mats of a delicate silvery green. The thallus is very thin and brittle, much branched, with obtuse strap-shaped lobes, which have deep wavy margins. These are flat with rolled over powdery margins, especially toward the centre. Beneath, the thallus is white with fibrils of the same color. The apothecia are small, almost sessile, with cup-shaped disk, the margin of which is entire when young, crenulate and curved inward when older. *P. speciosa* is found on trees, but more frequently on mossy shaded rocks. It grows close to the sub-

stratum but when damp is easily removed. It is found in the Eastern and Southern States, but is not common in the West.

PHYSICIA HYPOLEUCA (MUHL.) TUCKER. PLATE III. 2.) Thallus large and smooth, light gray-brown, the lobes rather flat with crenate margins, which are sometimes powdery. Beneath the thallus is either white or light brown, densely covered with tufts of black bristle-like fibrils, with which it adheres closely to the substratum. The apothecia are rather large, crowded at the centre, cup-shaped, the disk black with crenulate folded over margin. *P. hypoleuca* is usually found on trees, and oftener in the South than at the North.

PHYSICIA COMOSA (ESCHW.) NYL. (PLATE III. 1.) This very pretty lichen is found throughout the Southern States. The thallus is erect and smooth, and the narrow lobes are covered with grayish white fibrils. The apothecia, which are large, are on the ends of the lobes, the disk is blue-gray or pruinose, surrounded by a thin white border from which extends white cilia. Underneath, the lobes of the thallus are convex, pale gray, thickly covered with long white fibrils. It adheres lightly to the trees on which it grows. After a rain large specimens are often found on the ground.



Fig. 1. *Physcia leucomela*.

While much like *P. comosa* it can readily be distinguished from it by the color of the fibrils; in *P. comosa* they are light gray or white, in *P. leucomela* they are dark brown or black. Apothecia, which are very abundant in *P. comosa*, are rare in *P. leucomela*. They are of medium size, pedicellate, the disk almost white, the border beset with lobules. It is found on trees, and is very abundant in the mountains of North Carolina.

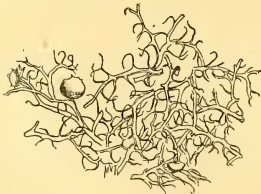


Fig. 2. *Physcia ciliaris*. disk, which has a toothed border. *P. ciliaris* much resembles *P. leucomela*, but the ribbon-like lobes are firmer, the color of the thallus is light brown, that of *P. leucomela* is grayish white. *P. ciliaris* is found on rocks, a small variety grows on the earth. While typically a Northern lichen it has been collected in New England and Minnesota.

PHYSICIA LEUCOMELA (L.) MICHX. (Fig. 1.) Thallus ascendant and elongated, smooth with long ribbon-like lobes, which become much intertangled and are irregularly divided. Beneath, these lobes are very white, and the margins are covered with strong black fibrils. The edges are rolled over giving the thallus a channeled appearance.

PHYSICIA CILIARIS (L.) DC. (Fig. 2). Thallus somewhat downy, the lobes long and narrow, many cleft and much intertangled. Their edges, especially toward the tips, are beset with spine-like fibrils. The thallus is light brown above, beneath a brownish white. Apothecia are medium in size, cup-shaped, with a dark gray

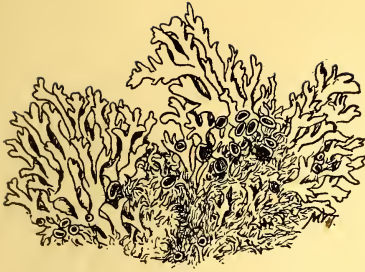


Fig. 3. *Physcia aquila* var. *detonsa* $\times 2$.

white with black fibrils, which form a thick black mat. The apothecia are rather small and are sessile, the disk is flat, dark brown, with a toothed, rough looking margin. The apothecia are numerous and are crowded in between the isidioid lobules, giving the surface a very rough appearance.

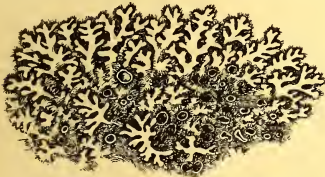


Fig. 4. *Physcia obscura*.

light at the margin. The apothecia are a very dark brown, the disk flat, the margin thickly beset with spine-like fibrils. It is found on mossy rocks and on trees.

PHYSICIA SETOSA (ACH.) NYL. This lichen belongs to the *obscura* group, and resembles it very closely. The thallus is larger, the lobes are not so finely cut, and the color is not so dark. The lobes are fringed with black fibrils as are those of *P. obscura*, but not so densely. The apothecia are larger and are not surrounded by the stiff black fibrils but have a crenulate margin. With some lichenists this is not made a distinct species, but a variety of *P. obscura*.

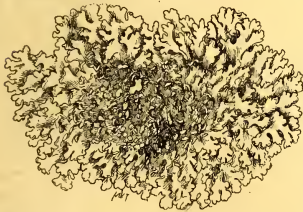


Fig. 5. *Physcia pulverulenta*, nap. The apothecia are of medium size, sessile, the disk flat, darker than the thallus, with the same silvery bloom; it is bordered with a thick lobulate or leaf-like margin.

PHYSICIA AQUILA (ACH.) NYL., var. *DETONSA* TUCKM. (Fig. 3.) This interesting lichen is found on rocks, occasionally on trees. In favorable localities it grows in round patches, the outer ring lighter and smoother than the inner part, which gives it the specific name, "detonsa," meaning shaved. The thallus at the margin is olive in color, but soon grows brown. The lobes are linear, fringed on the margins with cilia, toward the centre are thickly covered with isidioid lobules. Beneath, the thallus is

PHYSICIA OBSCURA (EHRH.) NYL. (FIG. 4.) The thallus of this interesting and variable lichen is brownish, the lobes are linear, many-cleft, and flat, fringed with short dense black bristle-like fibrils. The under side is so thickly covered with short black bristles that it looks black, and in some specimens it really is, in others it is

PHYSICIA PULVERULENTA (SCHREB.) NYL. (Fig. 5). Thallus covered with a fine white powder or dust which gives it a roughened, silvery appearance. The lobes are crenate with rounded tips. *P. pulverulenta* resembles *P. speciosa* but can be distinguished from it by the pruinose surface. Beneath the thallus is covered with black fibrils which form a close



Fig. 6. *Physcia stellaris* $\times 2$.
 The thallus is pale with short gray fibrils. The apothecia are small to medium in size, are sessile and usually very crowded. When young the disk is gray pruinose, when older it is brownish-black, with an entire margin, which is rolled over.

PHYSICIA CRISPA (PERS.) NYL. (PLATE III. 3). Thallus greenish gray, sometimes with a pink tinge. The lobes are rather wide, palmately cut and flat, the turned over edges are covered with pale soredia which form a crust at the centre. Beneath, the thallus is light brown with short, dark brown fibrils. Apothecia, which are not common, are of medium size, sessile, the disk dark brown, the margin incurved and often granulate. *P. crispa* is found in the Southern States, especially along the coast.

SELIGERIA CAMPYLOPODA, KINDB.

BY ELIZABETH G. BRITTON.

**S. campylopada* Kindb. Mac. Cat. 6; 41, 1862. Bryin. Eu. & N. A. 2:213.
 1897. *S. recurvata* (Hedw.) Br. & Sch., Mac. Can. Musci. no. 60.

This species was originally collected on limestone rocks, September 16th, 1890, at Owen Sound, Ontario, mixed with *S. Donii*. It was described as resembling *S. recurvata*, but differing in its shorter leaves, without the subulate point of that species, and with the vein ending below the apex in the perichaetial leaves: it was also stated that "the male flower is fixed on the side of the female." Prof. Macoun has again collected this species, on May 11th, 1901, on limestone rocks, Niagara River, and as the specimens are in much better condition than type material, it seems desirable to amend and supplement the original description.

In spite of its small size the species is conspicuous, because of the tufts it makes, abundantly fruiting, with the young bright green leaves held and matted together by the blackened, older plants. They would also attract attention at once by the light yellow, curved pedicels, the pale color of the capsules, and the red peristome and lid. In some plants the red of the latter is quite brilliant, contrasting with the pale slender beak. The teeth are dark red, spreading when dry, and are inserted below the mouth of the capsule, which is bordered by three or four rows of narrower, transversely elongated cells. The walls of the capsule are thin, with oblong cells below,

gradually becoming shorter and rounded as they near the mouth; the neck is short and stomatose, giving the capsule a pyriform shape. The seta is 2-3mm. long, twisted, with spiral cells above, and arcuate below. The plants seldom measure more than 3mm. in height, the leaves from 1-1.5mm., spreading or recurved. The antheridial buds have 3-4 leaves, and several are found around the base of the fruiting plant; only 2-3 antheridia are formed. The spores are smooth and measure .08-0.10mm. The stems are shorter and less leafy than those of *S. recurvata*, and differ from No. 171, Rab. Bryoth. Eu. in the leaves, as described. Kindberg has credited this species to Europe, Arnell and Blytt, and added Waghorne, presumably from Newfoundland.

P. S.—The last part of Limpricht's Laubmoose (Pt. 37: 680, 1902) just received, refers *S. campylopoda* Kindb. to *S. recurvata* var. *pumila* Lindb., comparisons having been made from original specimens.

*NOTE.—The following is the description as given in Macoun's Catalogue, Part 6: p. 41 (149.) *S. campylopoda* Kindb. (n. sp.) Canadian Musci, No. 60 in part.

Agrees with *Seligeria recurvata* in shape of capsule and the arcuate pedicel, but differs considerably in the leaves being broader, very much shorter, sublinear, obtuse, rarely short-acuminate and subacute, and the costa not excurrent, the perichaetial leaves ovate-oblong, thin-costate, the peristome darker red. The male flower is fixed on the side of the female.

On damp and shaded limestone rocks at Owen Sound, Ont., Sept. 16th, 1890.

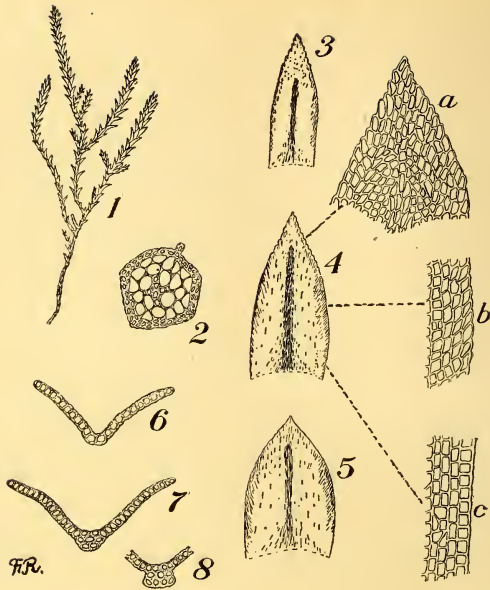
SECTIONING STEMS AND LEAVES OF MOSSES.

A handy method of sectioning stems and leaves of mosses is a desideratum with most working bryologists. The one about to be described will be found, with patience and practice, to answer the purpose quite well in most cases.

Take a strip of heavy writing paper, say $\frac{3}{4}$ of an inch wide and $1\frac{1}{2}$ inches long; on the middle of this spread a drop of glycerine so as to cover a space about $\frac{1}{2}$ an inch long and $\frac{1}{4}$ of an inch wide; put the part to be sectioned on this space, the end to the right; place the paper on the stage of a dissecting microscope and clamp it fast; with a pair of curved forceps in the left hand to steady the part, and with a sharp scalpel in the right, commence the cutting, watching the process through the lens; when a sufficient number of sections have been made scrape them with the dull blade of a pen-knife to a dry part of the paper; if carefully done the sections will adhere to the blade, and may be easily transferred to a slide on which a drop of water has been placed; pick out the coarser sections, cover with a glass cover, and the remainder are ready for the compound microscope.

It is important not to have too much glycerine and to spread it evenly; a knife blade answers the purpose. The scalpel should have a keen edge; a knife will do if sharp enough. The parts to be sectioned should be soaked in warm water for two hours at least and longer if possible. G. N. BEST.

A CORRECTION—In a recent letter to the Editors, Prof. Charles H. Peck calls attention to the fact that the perichaetial leaves of *Leucodon brachypus*, while reaching the capsule in nearly every case, do not "overtop" it in a large proportion of cases.



Amblystegium Montanæ Bryhn.

Fig. 1, A plant, $\times 1$. Fig. 2, A stem, cross section. Figs. 3, 4, 5, Leaves (these and Fig. 2 enlarged). Figs. 4a, 4b, 4c, Leaf cells from near apex, middle and base, respectively of Fig. 4. Figs. 6, 7, 8, Leaf sections much enlarged.

A PUZZLING MOSS FROM NORTHWESTERN MONTANA.

BY JOHN M. HOLZINGER.

Among the mosses brought back from Montana in 1898 was one collected at the base of Sperry Glacier at the altitude of about 3000 m., which has been a puzzle to some of the best moss students both in Europe and in this country. From its leaf areolation (it was found only sterile), and from its occurrence on the ground it seems most likely to belong to the genus *Amblystegium*. But Prof. L. S. Cheney, who has monographed this group, and to whom it was therefore referred, returned it with the remark that he did not recognize it as any *Amblystegium* he knew. Cardot and Theriot then tackled it and referred it to *Amblystegium varium orthocladon*. Under this name the writer sent out a number of duplicates, and the determination was recognized, by letters, to be correct "though the form is remarkable," by men from both sides of the Atlantic specially interested in this group. Yet Dr. Kindberg has from the first insisted that the plant is straight *Leskea polycarpa*, and in this view he is supported by Mr. R. S. Williams. Dr.

Bryhn, who from the first considered it to be a new species of *Amblystegium*, was for a while led to hold that it was a new *Leskea*, but has finally concluded to go back to his original proposition. In a recent letter he transmitted the MS. description in Latin, which is translated below. The fact that this moss was collected only sterile linked with other interesting scientific considerations has led the writer for two years past to make a strenuous, but so far ineffectual effort, to revisit that very profitable but rather far-off collecting ground around Lake McDonald in Northwestern Montana.

Following is Dr. Bryhn's description of this *Amblystegium*, translated from his MS.

AMBLYSTEGIUM MONTANÆ N. Bryhn. n. sp. In appearance reminding of *Amblystegium fluviatile* or *irriguum* and *Amblystegium varium*, this plant also suggests *Leskea polycarpa*. It forms rather dense bright or deep green cushions, of dull color, not shining. Plant 2-4cm. long, fragile, prostrate, but at the apex ascending, below stripped of leaves by age, or bristling with persistent leaf-ribs, irregularly divided into generally simple ascending or erect branches usually 1cm. long, beset by few scattered radicles and by a considerable number of subulate-lanceolate paraphyllia, which occur especially on the branches. Stem in cross section round-five-angled, here and there winged, .16-.2mm. thick, with a thin central strand .02mm. in diameter, and two layers of brown cortical cells. Stem leaves 1.2-1.25mm. long and .5-.6mm. wide, distinctly and long decurrent, ovate, abruptly narrowing into an obliquely lanceolate apex which measures in length one-third or one-fourth of the entire leaf, the very entire margins revolute from the base to about the upper one-fifth. Costa at the base .4-.45mm. broad, projecting on the back .02mm., dark or dark-green, not excurrent, disappearing in about the upper one-sixth of the leaf. Branch leaves .8mm. long and .32-.35mm. wide, shortly and narrowly decurrent, obliquely lanceolate, the margins at base narrowly revolute, at the apex indistinctly serrate but otherwise entire. Costa below .3-.4mm. wide, extending three-fourths of the leaf.

All the leaves are rather thin, neither striate nor furrowed, crowded, concave-keeled, with flat apex, when moist open, spreading, when dry little changed. The leaf cells are parenchymatous, usually .009-.01mm. wide, angular and at the base quadrate, along the middle and above rhombic-rectangular or hexagonal-rounded, about twice as long as wide, those of the margin and apex rhombic, all very smooth, strongly incrassate, without pores, the primodial utricles strongly sinuous. Other parts are unknown.

Habitat: Montana, Western North America, where Mr. J. M. Holzinger collected the plants in July, 1898, near Lake McDonald at an altitude of about 3000 m. He sent it to me under the name "*Amblystegium varium orthocladon* (Det. Cardot) *forma alpina mirabilis* (Holzinger)."

This plant is closely related to *Amblystegium orthocladon* and *varium* as well as to *Amblystegium fluviatile* and *irrigum* from which species it appears to be sufficiently distinct by the characters above set forth.

Honefoss, Norway, November, 1901.

**MOUSSES ET COUP D'OEIL SUR LA FLORE BRYOLOGIQUE DES
TERRES MAGELLANIQUES. PAR J. CARDOT.**

J. M. HOLZINGER, WINONA, MINN.

This is one of the scientific reports published under the auspices of the Belgian government on the antarctic Belgian expedition in 1897, 1898, and 1899, in a fine quarto work entitled, "Resultats du Voyage du S. Y. Belgica." The author had published a "Note preliminaire" in the *Revue Bryologique* t. 27, pp. 38-46 (1900), where he reports 26 species from the Strait of Magellan and Terra del Fuego, 5 of which are new, and 26 species from the Strait of Gerlache, 14 of which are new. In the final report before us both regions are credited each with 30 species. The Strait of Gerlache is between 64° and 65° S. Lat., and 61° and 62° W. long. and the the expedition spent in its exploration from Jan. 24th to Feb. 12th, 1898, making during that times 20 landings.

The final report now before us covers 48 pages of printed matter, illustrated by 14 plates executed in the author's superb style. Following are the 25 species and varieties figured: *Andreaea pycnotyla*, *A. pygmaea*, *A. depressinervis*, *Cynodontium Fuegianum*, *Dicranum Magellanicum*, *D. laticostatum*, *Ceratodon antarcticus*, *Webera cruda imbricata*, *W. nutans forma*, *Rhacomitrium flavescens*, *Orthotrichum antarcticum*, *Dissodon mirabilis*, *Webera Racovitzæ*, *Bryum imperfectum*, *B. inconnexum*, *B. austropolare*, *B. Gerlachei*, *B. amblyolepis*, *Pseudoleskea antarctica*, *Polytrichum subpiliiferum*, *P. antarcticum*, *Brachythecium antarcticum*, *B. antarcticum cavifolium*, *Amblystegium densissimum*, and *Bryum inclinatum Magellanicum*.

The printed portion of this report, covering 48 pages, falls into three parts: 1. A Survey of the Moss-flora of the Magellanic Lands. 2. The Mosses of the Straight of Gerlache. 3. Systematic Catalogue of the Species of the Belgian Expedition.

In the last part the author supplements by full Latin descriptions the brief characterizations in the *Revue Bryologique* of 1900. The second part deals with the geographical affinities of this, the *first considerable* collection of antarctic mosses, J. D. Hooker in 1843 having brought back only 3 mosses from that far south latitude. These affinities are shown to be *less* close with the mosses of the Magellanic Lands in the latitude of southern S. America, than they are with the circumpolar moss flora of the northern hemisphere: as if these cold-region floras had been wedged apart, in geologic time, by the intrusion of the tropical and temperate zonal floras.

In the Magellanic Lands the author includes not only the territory of Patagonia and the islands included in Terra del Fuego but also the islands along the Pacific coast of S. America as far north as the Chonos Group in about 42° S. lat., and the Falkland Islands in the Atlantic Ocean. The number of species known from these lands including those of the present report is 227, four-fifths of which, curiously enough, are acrocarpous mosses. The first part of the report makes a detailed analysis of the geographical affinities, with interesting results, presenting with his discussion four lists as fol-

lows: 1. A list of 148 endemic species. 2. A list of 38 species common to them and to other parts of South America. 3. A list of 50 species common to them and to the islands of the South Pacific Ocean, including especially New Zealand, Tasmania and Kerguelen Island. 4. A list of 24 species common to them and to Kerguelen Island alone. A comparison of lists 2 and 3 impresses the fact that the Magellanic Flora has in fact greater affinities with the Pacific Islands than with the rest of South America.

BEITRÆGE ZUR LAUBMOOSFLORA OSTGRÖNLANDS UND DER INSEL JAN MAYEN, BY
P. DUSÉN, STOCKHOLM, 1899.

This is a "Bihang till Svenska Vet. Akad. Handlingar, Band 27, Afd. III, No. 1." It is in German, and comprises 71 pages of printed matter, and four plates. One of these constitutes the map of the region visited by the Swedish expedition in 1899 led by Dr. A. G. Nathorst, which covered the east coast of Greenland from about 70° to 75° N. Lat. The first part of the treatise deals principally with the ecological conditions at the 17 stations where the collections reported on were made. In the second part the author enumerates the 134 species collected. The determinations were made by Mr. Dusén, in cooperation with Mr. C. Jensen and Dr. H. W. Arnell, both able students of arctic mosses. For the sake of uniformity the nomenclature adopted is that of Lindberg in "Musci Scandinavici," which is also followed in other reports on arctic explorations.

While of great interest to American moss students in its entirety, this paper is especially valuable to them by reason of the elaboration of the genus *Bryum* by Dr. Arnell, including numerous helpful notes on some little known species, illustrative drawings, and five new species. Thus *Bryum obtusifolium* Lindb. is here for the first time fully described and figured, *B. teres* Lindb. is illustrated, *B. elegans elongatum* Arnell is described and the following five new species are described and figured: *B. subnitidulum* Arnell, *B. Dusenii* Arnell, *B. minus* Arnell, *B. Groenlandicum* Arnell and *B. Jan-Mayense* Arnell.

JOHN M. HOLZINGER.

GRIMMIA PACHYPHYLLA LEIBERG (1893). In his Mossflora of the Magellanic Lands in the "Resultats du Voyage du S. Y. Belgica," Mr. Cardot mentions a *Grimmia pachyphylla* C. M. Inquiry about this *Grimmia*, the publication of which must have antedated that of Leiberg's species, resulted in the generous information from Mr. Cardot that Gen. Paris in his "Index Bryologicus" had changed Leiberg's plant to *Grimmia Leibergii* Paris, but that since the publication of this second name of this Idaho moss, Dr. Brotherus had discovered that Carl Mueller's plant is an *Andreaea*. Now the question arose: Should Leiberg's first name be resumed for this Idaho plant, or, should Paris' name stand? Not having access to the "Paris Code" nor to the "Rochester Code of Botanical Nomenclature," I asked the judgment of my friend Dr. G. B. Sudworth on this problem. The following is the statement of his view: "You have quite a puzzle; but it seems to me perfectly plain. *Grimmia pachyphylla* C. Mueller (1880-1890) becomes a synonym of *Andreaea*. *Grimmia pachyphylla* Leiberg (1893) falls with *G. pachyphylla* C. M. which is preoccupied as a synonym of *Andreaea*. According to the principles of the Paris Code *Grimmia Leibergii* Paris stands. The Rochester Code would also hold this name on the ground that *G. pachyphylla* Leiberg is a homonym and therefore inadmissible. In my judgment the Idaho plant can be maintained only as *G. Leibergii* Paris."

Since this is a matter of general interest to moss students the facts above stated are offered for publication.

J. M. HOLZINGER.

SOME ADDITIONS TO THE ALASKEN MOSSFFORA.

Among some mosses collected June, 1900, by Mr. J. B. Flett in Alaska near Nome, lat. 66° N., I have the pleasure of reporting the following as of special interest:

1. *Polytrichum Jensenii* Hagen.
2. *Dicranum Groenlandicum* Brid.
3. *Dicranum Bonjeani* polycladon Br. Eur.
4. *Webera carinata* (Brid., Boulay) Limpr., which I had collected sterile in N. W. Montana.
5. *Psilopilum Tschutschicum* C. Muell. in Bot. Centralbl. Bd. 16 (1883), p. 93.

This last plant agrees well with Carl Mueller's description of the Siberian plant, kindly furnished to the writer by the courtesy of Miss Josephine Tilden from the library of the University of Minnesota. Mr. R. S. Williams' plant collected on the "Left bank of Klondike below Bonanza Creek, June 18th, 1899," and distributed as No. 682 is also this species. J. M. HOLZINGER.

NECROLOGY.

Mr. D. A. Burnett was so well known to all advanced students of North American mosses that a brief account of his life will be of interest to all our readers. There is probably no man living who knew mosses in the field better than he did, and his collections now presented to The Museum of the Brooklyn Institute of Arts and Sciences, by Mrs. Smith, form a valuable addition to the botany of North America. Personally, Mr. Burnett was one of the most lovable men I have ever met and his death was in every sense a personal loss.

David Alexander Burnett was born in Searsbury, Orange Co., New York, August 2d, 1839. At five years of age his father removed to a farm in Orange Co., between Coldenham and Little Britain. He attended the public schools for a few years, then the Academy at Montgomery, N. Y., and Warnersville Seminary. He graduated from Union College, Schenectady, N. Y., in 1862; taught in the Academy at Middletown, N. Y., and Greenville and Moravia, N. Y., and in Charleston, S. C. Was married in 1864. In 1869 he removed to the oil regions, Pa., to engage in the oil business. He lived in Bradford, Pa., for the past twenty-five years.

In November, 1900, Mr. Burnett went to the Museum of the Botanical Gardens at Bronx Park, New York City. Ten months previous to this his physician discovered a valvular affection of the heart, but no serious trouble was anticipated very soon. He worked seven weeks at the Museum, and on Christmas morning went to his brother-in-law, Dr. D. T. Millspaugh, at Paterson, New Jersey, to meet his wife, who arrived there from Bradford, Pa., on that day, and to enjoy a large family gathering. The next day he had a severe attack of heart trouble, and in another week was confined to his room. He died early on the morning of Jan. 31st, 1891, at Riverlawn Sanitarium, Paterson, N. J. He was buried on February 3d, 1901, in the church at Little Britain, N. Y.

A. J. GROUT.

HYPNUM FLUITANS VAR. ATLANTICUM REN.

From the Journal of Botany, August, 1901. By H. N. DIXON.

"A plant collected somewhat extensively by Mr. J. A. Wheldon and Mr. A. Wilson in Lancashire, on elevated moorlands and again by Mr. W. Ingham in Yorkshire has for some time given rise to discussion. Its short nerve, the secund, wide leaves, shortly and broadly pointed, the loose areolation and very indistinctly defined auricles, gave it a very different character from that usually obtaining in this species. Under his somewhat heterogeneous group 'a *obsoletum*,' Sanio has described a var. *Holleri* having very nearly the same characters, and M. Renauld at first referred our plants to this, ranking them under var. *Jeanbernati* as f. *Holleri* Sanio. In a letter recently received from him, however, he writes: 'This determination is strictly correct; however, as the var. *Holleri* Sanio is badly conceived and described, and as the group *obsoletum* Sanio is, besides, very confused, I prefer now to make a new variety which should be placed beside, the var. *Jeanbernati* Ren.' For this variety M. Renauld proposes the name *Atlanticum*, and has drawn up the following description:

"HYPNUM FLUITANS L. (*amphibium*) var. ATLANTICUM Ren. A form similar to the var. *Jeanbernati* Ren., from which it differs in the *green* color, chlorophyllose cells; larger oval leaves abruptly narrowed into a short acumen; nerve a little broader (58-64 μ instead of 46-48 μ); basal areolation looser, medium cells broader and shorter."

"Habitat: England: R. Wyre, West Lancs., coll. Albert Wilson, 1900, (Weldon, No. 9) Summit of Pendle Hill, Lancs., alt. 600m. coll. J. A. Weldon, July, 1898." "France: Meymac (Corrèze), alt. 900m. coll. Lachenaud, 1901."

"Forma *gracilis* Ren. Plants more slender, leaves smaller but of the same shape as the type, nerve narrower and areolation looser than in the var. *Jeanbernati*." "Habitat: England: Arncliffe, Wood, Yorkshire, 1900,

* * *

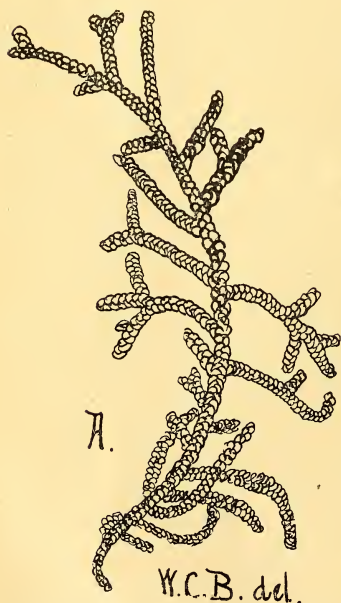
In August last I collected a variety of *Hypnum fluitans* on the ground under the spruces on the summit of Mt. Mansfield, Vt. Specimens were sent to M. Renauld who at once pronounced them to be the var. *Atlanticum*. It will be issued as no. 103 of N. American Musci Pleurocarpi. A. J. GROUPE.

In Prof. Holzinger's article in the January BRYOLOGIST on *Seligeria tristicha* B. & S. he says: "A plant collected by Dr. G. G. Kennedy in Connecticut at first referred to *Seligeria calcarea* seems to belong rather to this species." I collected the plant June 13, 1896, on the ledges of Willoughby Mountain, Vermont, and suppose that my label must have misled Prof. Holzinger. I find that I write Vt. with a very round V instead of an acute-angled V and therefore my Vt. was read Ct. I sent a packet of the moss to General Paris in Dinard, France, and he listed *Seligeria calcarea* (Dicks) Bry. Eur. in the Index Bryologicus as found in Vermont. For fear that some student of the distribution of our mosses may think that it has also been found in Connecticut, I hasten to say that my specimen was from Vermont and I do not know of any Connecticut specimen. GEO. G. KENNEDY.

PORELLA. L. Sp. Pl. 2:1106. 1753.

By WM. C. BARBOUR.

One of the first hepatics to be found by one who is beginning the study of the group is a dull brownish-green mass, usually growing at or near the foot of a tree, on the bark. It was the first hepatic species to be identified by the present writer, and in the packets sent to him for identification by Chapter members and readers of the *BRYOLOGIST*, it figures prominently and often. This species is *Porella platyphylla*. Like *Frullania* the leaves are incubous and deeply bilobed, the lower lobe (lobule) being smaller than the upper. In Northeastern America there are five genera whose leaves answer to this general description, viz.: *Frullania*, *Jubula*, *Lejeunea*, *Radula* and *Porella*. Of these, *Frullania* and *Lejeunea* can be readily distinguished from *Porella* by their smaller size. Again, the lobule in *Porella* is ligulate, while in *Frullania* and *Jubula* it is usually inflated, in *Lejeunea* it is simply incurved, and in *Radula* it is subquadrate or nearly rotund.



The plants are large, dark-green to yellowish-brown, mostly 2-3 pinnate; root hairs few, these at base of the underleaves. Lobes very deeply two-parted, the dorsal large, orbicular-ovate, and in most species entire. Ventral lobes are much smaller, sometimes nearly separate from the dorsal, varying in different species from ovate or oblong to lanceolate. Underleaves large, entire or dentate, sometimes long decurrent at the sides. The male inflorescence is in the form of spherical antheridia in the axils of densely imbricate leaves, which form short spikes or branches having somewhat the appearance of a pine cone. They are very readily recognized with the naked eye, and are noticeably abundant in some species, as, for example, *P. navicularis*.

The perianth is oval to obovate, flattened dorso-ventrally at the mouth, which is ciliate, dentate or sometimes nearly entire.

Fig. 1. A. *Porella platyphylla*
(L.) Lindb. Plant $\times 1\frac{1}{2}$.

The following key to the species is taken from Dr. M. A. Howe's Monograph, "The North American Species of the Genus *Porella*." Bull. Torr. Club. 24: 517, 1897, by the kind permission of the author.

KEY TO THE SPECIES.

Stems subsimple or somewhat fasciculately branching, short, tumid; underleaves caudate-lacinulate at base.....8. *P. Bolanderi*.

Stems more or less regularly 1-3 pinnate.

Ventral lobes lingulate-oblong to linear-oblong, often somewhat falcate, closely appressed to stem or to dorsal lobes.

Dorsal lobes and underleaves entire, length of ventral lobes $\frac{1}{3}$ – $\frac{2}{3}$ the width of the dorsal.....1. *P. pinnata*.

Dorsal lobes entire, underleaves ciliate dentate at base, length of ventral lobes $\frac{1}{2}$ – $\frac{2}{3}$ the width of the dorsal.....2. *P. Swartziana*.

Leaves and underleaves repand-dentate.....3. *P. Wataugensis*.

Ventral lobes broadly ovate to oblong.

Usually glossy.

Ventral lobes more or less spurred outwardly at base, mostly linguiform or ovate-oblong, margins plane or lightly recurved.....7. *P. Roellii*.

Ventral lobes regularly rounded outwardly at base, ovate, margin recurved.....6. *P. navicularis*.

Usually dull.

Rather flaccid, dorsal lobes subimbricate, ventral lobes long decurrent, underleaves distant.....4. *P. rivularis*.

Somewhat rigid, dorsal lobes rather densely imbricate, ventral lobe scarcely decurrent, underleaves approximate or subimbricate.....5. *P. platyphylla*.



Fig. 2. A. *Porella Bolanderi* (Aust.) Pears. Plant with perianth, $\times 1$.

The capsule is nearly or quite spherical, on a short stem, yellowish brown, opening by four irregular valves. The spores are more or less echinulate and the elaters 1-3, usually 2 spiral. The general appearance of the plants is shown in figures 1 and 2, and perianths in figures 2 and 5. Antheridial branches are shown at G. in figure 5.

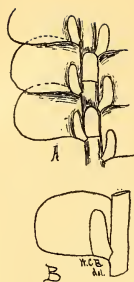


Fig. 3. *Porella pinnata* L.
A, Underside of stem, showing ventral lobes and underleaves.

B, Leaf with ventral lobe.

subject to inundation, throughout eastern North America. Usually sterile.

2. *PORELLA SWARTZIANA* (Web.) Trevis. (*Madotheca Swartziana* Lindenb.) Sordid green, dull; procumbent, irregularly pinnate, 3-5cm. long; branches mostly short. Leaves subimbricate, dorsal lobes ovate, entire or a little wavy, lower margin decurved; ventral lobes linear-oblong, erect or nearly so, margins plane, obtuse, nearly or quite entire, bearing 1-3 cilia at base on inner margin, length $\frac{1}{2}$ - $\frac{2}{3}$ the width of the dorsal. Underleaves oblong, rarely exceeding stem in width, obtuse or truncate, margins plane, entire above, ciliate-dentate at base, slightly decurrent. Collected in low ravines at Opelousas, Louisiana, by Rev. A. B. Langlois (No. 228 and in part No. 229). Type specimen is supposed to have been collected in Jamaica.

3. *PORELLA WATAUGENSIS* (Sulliv.) Underw. (*Madotheca Wataugensis* Sulliv.) Similar to *Porella pinnata*, but differs in being smaller and more delicate, and in the leaves, both dorsal and ventral lobes being subrepandenticulate. Collected by Sullivant on decayed logs on bank of the Watauga River in North Carolina. The only collection known.



Fig. 4. *Porella rivularis* (Nees.) Trevis.

A, Stem, showing underleaves and leaves.
B, Leaf, showing ventral lobe.

1. *PORELLA PINNATA* L. (*Madotheca por- ella* Nees.) Fig. 3. Usually dark green (sometimes yellowish-green), dull, somewhat flaccid. Stems 2-3 pinnate, and loosely matted together. Leaves distant or slightly imbricate, curled or rolled in drying; ventral lobes small, closely appressed, lingulate oblong, margins plane or nearly so, length $\frac{1}{3}$ - $\frac{2}{5}$ the width of the dorsal lobe. Underleaves subquadrate, distant, scarcely decurrent, nearly same width as stem, sometimes broader, margins plane and entire. Perianth obovate-pyriform, crenulate at mouth.

At base and on exposed roots of trees subject to inundation, throughout eastern North America. Usually sterile.

4. *PORELLA RIVULARIS* (Nees.) TREVIS. Fig. 4. (*Madotheca rivularis* Nees. *Porella dentata* Lindb.) Dull, dark green, flaccid; irregularly pinnate, 3-10cm. long, prostrate or ascending, forming rather loose mats; dorsal lobes of leaves subimbricate, obliquely ovate, with rounded obtuse apex, entire or slightly denticulate, flat or nearly so; ventral lobes are small, obliquely ovate, length $\frac{1}{3}$ - $\frac{2}{5}$ width of the dorsal, half as broad as are the underleaves, the outer margin being mostly broadly revolute giving it a twisted appearance, long decurrent, usually dentate or ciliate at the inner base; underleaves distant, nearly or quite orbicular, usually about twice the width of the stem, apex rounded, margins undulate, very

long decurrent, the wing sometimes longer than the free portion, and usually sharply dentate. Perianth ovate, the lips subentire, and usually plane. On moist rocks, and base of trees in deep woods. Common on the Pacific Coast, but rare in the East. Has been collected in Connecticut, Ohio, Texas, New Mexico, Montana and Idaho. Our illustration does not show the decurrent wings of the underleaves.

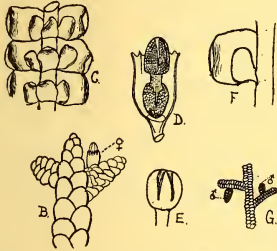


Fig. 5. *Porella platyphylla* (L.) Lindb.

B, Stem, upper side, showing perianth and emerging capsule.

C, Stem, under side, showing ventral lobes and underleaves.

(The leaves are shown too far apart. They should be more closely imbricated.)

D, Section of perianth lengthwise.

E, Capsule:

F, Leaf, showing lower lobe.

G, Part of plant, showing male branches.

5. *PORELLA PLATYPHYLLA* (L.) Lindb. Fig. 5. (*Jungermannia platyphylla* L. *J. platyphylloidea* Schwein. *Madotheca platyphylla* Dumort. *Porella thuja* Lindb.) Dull or with a slight lustre, yellowish to dark green, rigid; 1-3 pinnate, 3-8cm. long, in dense mats; dorsal lobes of leaves closely imbricate, usually appressed, obliquely-ovate, obtuse, upper margin subentire; ventral lobes ovate to oblong, obtuse, length about $\frac{3}{5}$ the width of the dorsal, margins recurved, scarcely decurrent; underleaves close together, nearly orbicular to oblong, margins reflexed, long decurrent; perianth oval, narrowed above, the mouth dentate or ciliate. At base of trees and sometimes on logs and rocks. Very common east of the Mississippi, and has been collected in Idaho, Wyoming and British Columbia. The American plants are mostly of the form known as *Porella thuja*, though the European form, *P. platyphylla*, is also found.

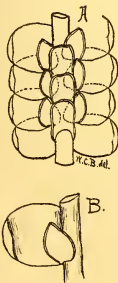


Fig. 6. *Porella navicularis* (Lehm. and Lindenb) Lindb.

A, Underside showing leaves and underleaves.

B, Leaf, showing dorsal lobe.

6. *PORELLA NAVICULARIS* (L. and L.) Lindb. Fig. 6. (*Madotheca navicularis* Nees.) Glossy, brownish or yellowish-green, large; stems bipinnate, procumbent in mats or subpendulous; dorsal lobes *densely imbricate*, closely wrapped about the stem when dry, giving the dried plant something of a cord-like appearance, apex recurved; ventral lobes ovate, obtuse or rarely acute, margins entire and decidedly recurved, length about $\frac{1}{2}$ the width of the dorsal lobe, sometimes a little more than half; underleaves imbricate, quadrato-oblong, margins entire, recurved, long decurrent; perianth broadly obovate, lips denticulate to crenulate-dentate becoming

nearly entire with age, strongly revolute, giving it a truncate appearance. Spores bright yellow-green. On trunks and branches of trees on the Pacific Coast as far north as Alaska.

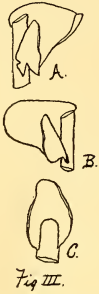


Fig. 7. *Porella Roellii* Stephani.

- A, Underside of leaves.
B, Ventral lobe.
C, Lobule.

sterile plants may be confused unless care be taken.

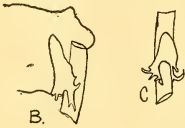


Fig. 8. *Porella Bolanderi* (Austin.) Pearson.

- B, Part of leaf, showing ventral lobe.
C, Underleaf.

to conceal the stem; ventral lobes ovate-lanceolate, usually rather acute, long decurrent, nearly separate, length $\frac{2}{5}$ – $\frac{3}{5}$ the width of the dorsal lobe, caudate-lacinulate on inner side at base; underleaves ovate-lingulate, wider than stem, long decurrent, wings caudate on either side near the base, undulate-repand above; perianth broadly ovate, narrowed at the mouth, which is ciliate and subtruncate.

On stones, shelving rocks, and bark of trees. California.

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OFFERINGS.—[To chapter members only—for postage.]

- Mrs. J. D. Lowe, Noroton, Conn. *Raphidostegium recurvans*—*Amblystegium varium*—*Climacium Americanum* *Kindbergii*.
Miss H. B. Bailey, 830 Amsterdam Ave., New York City. *Hypnum imponens*—*Bryum bimum*—*Grimmia apocarpa*.
Mr. Ed. B. Chamberlain, Cumberland Center, Maine. *Trematodon ambiguus*—*Hedwigia albicans*.
Mrs. C. W. Harris, 125 St. Mark's Ave., Brooklyn, N. Y. *Physcia obscura*—*Physcia pulverulenta*.

7. *PORELLA ROELLII* Stephani. Fig. 7. Green or yellow-brown, glossy; procumbent, flaccid, caespitose, subdichotomous, the primary branches simply and distantly pinnate; dorsal lobes densely imbricate, appressed, ovate, apex narrowed, subtruncate; ventral lobes ovate or linguiform, much narrowed toward the apex, about half as wide as the underleaves, length $\frac{2}{3}$ the width of the dorsal, margins plane, spurred at the base, especially on the outer angle; underleaves close together, ovate-linguiform, obtuse and rounded at the apex; perianth large, obovate, truncate, with dentate mouth.

Under shelving rocks and on cliffs, along the Pacific Coast. The species is closely related to the European *Porella laevigata*, and

8. *PORELLA BOLANDERI* (Austin.) Pearson. Fig. 8. (*Madotheca Bolanderi* Aust.) Dark green, dull; stems subsimple or somewhat fasciculately branched; dorsal lobes densely imbricate, ovate to oblong with obtuse apex, strongly deflexed or rolled when dried, with margin of inflated cells, upper edge repand or sometimes caudate-dentate, the base reaching beyond the stem; the ventral lobes and underleaves often so close as to

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MAY, 1902



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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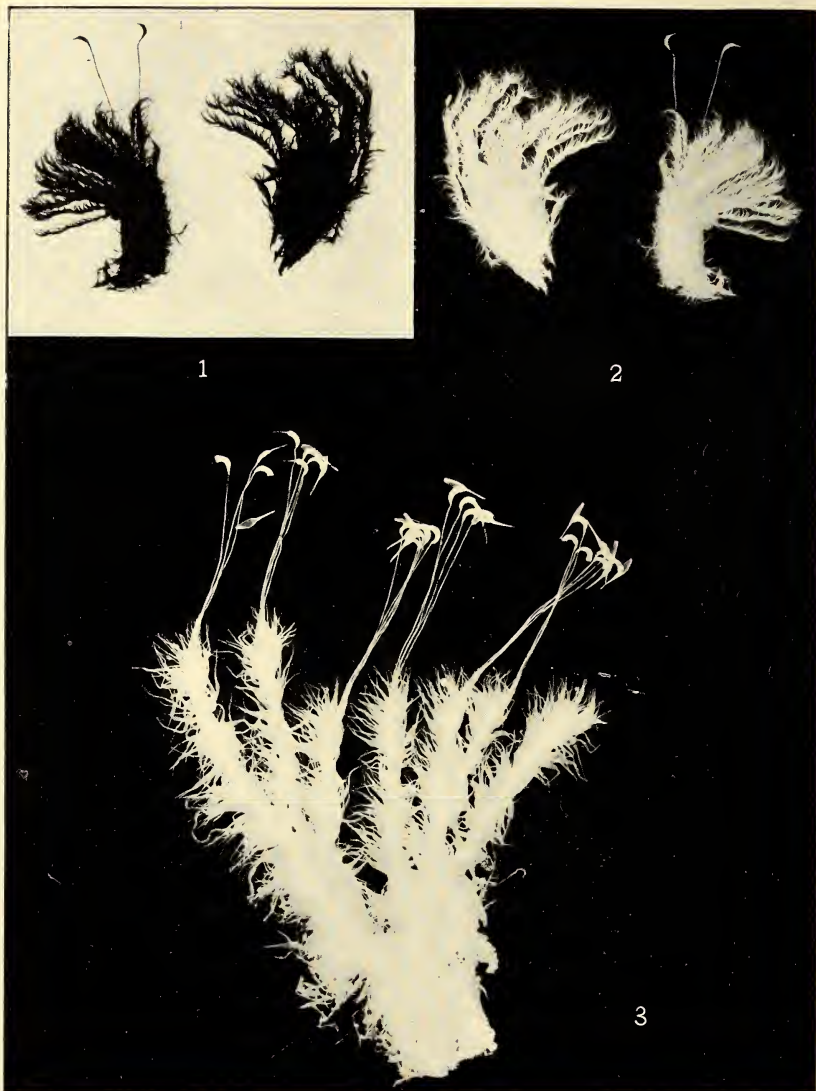


PLATE IV.

1. Positive print of *Dicranum falcatum* Hedw.
2. Negative print of same specimen used in preparing figure 1.
3. Negative print of *Dicranum undulatum* Ehrh.

THE BRYOLOGIST.

VOL. V.

MAY, 1902.

No. 3.

SUN PRINTS IN BRYOLOGY.

DR. RODNEY H. TRUE.

During the past ten years the writer has been engaged in the study of the genus *Dicranum*, and, in casting about for some method of illustrating a contemplated paper on the subject, has experimented with a number of methods. Special difficulty has been encountered in finding some method of placing before the reader an accurate representation of the general habit of the plant. The somewhat costly service of the professional artist, while satisfactory in many respects, was found to present financial obstacles.

At length it occurred to him that perhaps the method described by Dr. Halsted, under the name of Solandi process of printing, applied by him to leaves of flowering plants, might here be capable of adaptation. The anticipation proved well founded, and at the suggestion of the editors of *THE BRYOLOGIST*, the writer has presented here a brief statement of the method as used by him, and also illustrations (Plate IV, and Fig. A.), which will serve to indicate the kind of results obtained.

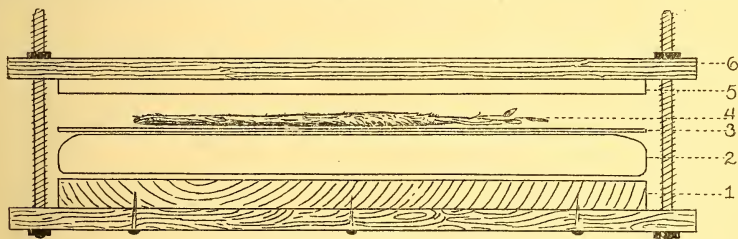


FIG. A.

1. Board at back nailed to frame.
2. Pad of cotton covered with tissue paper.
3. Sheet of photographic paper.
4. Moss.
5. Piece of glass.
6. Frame.

The method may be described briefly. The moss to be used should be carefully chosen and prepared for the purpose. The tuft should not be so thick as to wholly exclude light. The individual plants should be readily distinguished. This tuft, dried under considerable pressure, is laid upon the surface of some smooth sensitive paper, (solio is good,) and pressure applied sufficient to give a close contact. This is obtained by the writer in the following manner: A board of proper size, (Fig. A.) perhaps six inches by four inches, furnishes a solid backing (1). On this is laid a pad, made by

covering a properly formed body of loose absorptive cotton with the thinnest rice tissue paper (2). On top of the pad is laid the sensitive paper (3), of course face up. On this follows the moss (4), and over all a piece of thin (one-fourth inch) plate glass, very carefully cleaned (5). By means of a framework, which passes across ends of the glass (6) and bolts with nuts, the board at the back and the glass are drawn closely together. By tightening the nuts sufficiently with a bicycle wrench, a very close contact may be obtained. The apparatus is then placed in the sun, great care being taken that the glass intercepts the rays of light at exactly right angles.

The printing is allowed to go on until a sufficiently sharp print of the moss is made on the solio paper. Some care is necessary at this stage, since over-exposure leads to the "printing out" of the thinner parts of the plant and a consequent obscuring of the form of the more delicate parts. By a little practice one is able to decide just how long a given specimen should be printed. This is a matter which concerns the individual specimen, and no two subjects can be treated exactly alike.

After the print has been made, the usual toning and fixing takes place, the result being a negative print. In order to obtain a positive print, this negative may be soaked in some clearing agent (the writer usually uses kerosene) and used as a negative, as if it were a glass negative. Of course, care must be taken to avoid a surplus of kerosene. Thus from the paper negative any number of positive prints may be made.

As will be readily seen, this method is adapted for the reproduction of labels, autograph notes, plates, and anything which is printed on but one side of the paper. The writer has found this method extremely useful in reproducing plates from rare works and in multiplying drawings of various structures or other features desired. Some may chose the positive print, in which case, as is usual in illustrations, the object appears dark against a light background. (Plate IV. 1). The writer, however, prefers the negative print as having greater sharpness. (Plate IV. 2 and 3)

The accompanying plate illustrates the two types of prints, and it will be noted that, while the positive print reminds one of the usual illustrations more strongly than does the negative print, the latter is perhaps a trifle sharper in its details.

As the reader will observe, this method is capable of adaptation in almost an endless number of ways, and will be found applicable not only to solio paper but also to blue-print paper, and other kinds of printing paper. It is extremely useful as furnishing to the worker a rapid method of making an accurate record of the habit and size of rare specimens which he may be able to see occasionally. It is perhaps as a means of making such a record that this method finds its greatest usefulness to the working bryologist.

Should readers of *THE BRYOLOGIST* desire further information than this outline sketch furnishes, the writer would be very glad to communicate with any such and explain further such points of difficulty, as he may be able.

Bureau of Plant Industry, Washington, D. C.

ECOLOGIC DISTRIBUTION AN INCENTIVE TO THE STUDY OF LICHENS.

BY BRUCE FINK.

Until quite recently the study of Lichens in America has been wholly confined to taxonomic problems. With the reaction in other fields of botanical activity it seemed for a time that the "golden age of lichenology" had surely passed. In this transitional stage lichens have been neglected, but with the change of front in botany has come the work of Dr. W. C. Sturgis upon the reproductive processes, and quite a number of very illuminating physiological and morphological papers by Dr. Albert Schneider, culminating in his Text-Book. Also the writer has made a beginning of the study of ecologic distribution of Lichens.

In the revival of interest in the study of lichens ecologic researches are surely to be a dominant factor. It has not escaped notice that lichens are of extreme interest ecologically. Yet the prerequisite knowledge of species is not possessed by ecologists generally, and for this reason lichens have been for the most part neglected in their studies. Moreover, I am well convinced as a result of extended study in the field and in the laboratory that these plants can scarcely receive adequate consideration from an ecologic point of view in any general paper. Whether this is true of any other plants below the spermaphytes I am not prepared to give an opinion, but there surely must appear a number of workers who will seriously study *lichens* ecologically before the matter will receive proper attention.

I have already hinted at a good knowledge of species as a prerequisite. A systematic study of the lichens of a region may be accomplished in a reasonably short time, and this, supplemented by keen powers of observation, is absolutely necessary in field work. To these qualifications should be added some acquaintance with structural geology and with the species of trees bearing the lichens. The workers must also become familiar with the late literature of the subject of ecology or phyto-geography. Armed thus the close observer will find such a multiplicity of interesting questions arising in the field that he will frequently be compelled to avoid too great an amount of detail. Local conditions as to light and moisture must be constantly kept in mind, nor should the more strictly *edaphic* conditions be lost to view, that is, the conditions of environment substratic, rather than climatic. Fortunately lichen formations as a rule need not be studied at different seasons of the year, nor need they generally be studied through a series of years for the purpose of noting the succession of species, as this comes about so slowly that little will be gained by such investigation except where the work may be continued for two or three decades. Again, lichens are commonly more widely distributed than the spermaphytes, and general climatic conditions need not receive so great an amount of attention in studying their distribution. The fact that one may continue his studies through a whole season, always finding his plants in good condition, and may confine his attention for most part to local conditions rather than widespread climatic ones, simplifies the work quite materially.

I have outlined in a previous paragraph something of the prerequisites to good work in the field, and with these alone one may obtain results that will prove of great interest and value. But there are other phases of the subject which need attention. These are morphological and physiological, and through such studies only can we hope to solve completely the adaptation of lichens. Albert Schneider's Text-Book will furnish Americans much of value in such investigations, and the writer's Minnesota papers attempt to discuss to some extent the relation of structure and function to environment. I have suggested a knowledge of the literature as a prerequisite to the study of the distribution of lichens without citing names of authors or works. In the less generally known field of structural and physiological studies of lichens it may be well to make mention of some European authors. In giving a short list one must omit much of value. However, I shall venture to refer to the works of G. Bonnier, M. Funfstuck, H. Jumelle, G. Krabbe, G. Lindau, J. Reinke, S. Schwendener, and H. Zukal. These men have not had ecologic distribution chiefly in mind in their studies, but one will find much of value bearing upon the subject in their writings.

In such studies as I have suggested one may well confine his researches to a limited area with most excellent results. It is possible to do good work in an area of moderate size in a single season only after one has had years of experience in observing and studying lichens both in the field and in the laboratory. Indeed there is room for extended study of lichen formations of a given type, as those of the smooth bark, those of the rough bark, those of the boulders, those of the earth, those of the calcareous rocks, or those of a given genus or even species of tree. In fact it is only when we confine ourselves within reasonably narrow limits that very minute details can receive attention. Thus while working a number of years in the same area and even on the same formation new problems will constantly arise to renew the worker's zeal. I am certain that my papers recording ecologic studies in Minnesota can not be more than suggestive of what may be accomplished. The field is a most fascinating one, and I confidently look for the day when it will be sufficiently occupied. Let me urge those who have or are able to acquire a knowledge of the lichens of a limited area to turn their attention to ecologic studies.

Fayette, Iowa.

CURRENT BRYOLOGICAL LITERATURE.

A. J. GROUT.

In the Bulletin of the Torrey Botanical Club for February, 1902, Mr. R. S. Williams describes two new mosses, or rather describes two mosses as new—*Eurhynchium Taylorae* and *Brachythecium Pringlei*.

The first is the extreme development in point of size of that extremely variable species, *E. fallax* (R. & C.) Grout. This species is about as variable and perplexing as *E. stoloniferum* (Hook) J. & S. which has given rise to so many "new species." Size alone can scarcely be used as a character on which to base a new species when all intermediate gradations are frequent. It may be that this form is entitled to varietal rank as an aid to the

study of this species. In this case the largest plants in my No. 83a of N. Am. Musci Pleurocarpi should be labeled *E. fallax* var. *Taylorae* (R. S. Williams). These plants with branch leaves fully the size of Mr. Williams' type (1.5mm long) and other dimensions to correspond, grow inextricably intertangled with forms of the ordinary size. Mr. Williams' statement that "in size this plant most nearly approaches *E. Oregonum* of any of our North American species," is a clue which will readily enable the collector to recognize it. Mr. Williams type is Leiberg's No. 172 from the Traille River Basin, Idaho.

Brachythecium Pringlei is most certainly a mere variety of *B. plumosum* and differs from the var. *homomallum* only in its larger size and broader and less slenderly acuminate leaves. Except for a slight difference in these respects it agrees almost exactly with Edition I, No. 332b of the Musc. Bor. Am. of Sullivant and Lesquereux.

The only possible reason for giving this varietal rank [*B. plumosum* var. *Pringlei* (R. S. W.)] lies in the fact that the European authors describe the var. *homomallum* as more slender than the typical form and with smaller leaves. But on the other hand the American form of the *species* averages considerably smaller than the European. My own opinion is that the plant described by Mr. Williams should be regarded as a mere form of var. *homomallum*. Mr. Williams' type is from the Huachua Mts., Arizona, collected by Mr. C. G. Pringle.

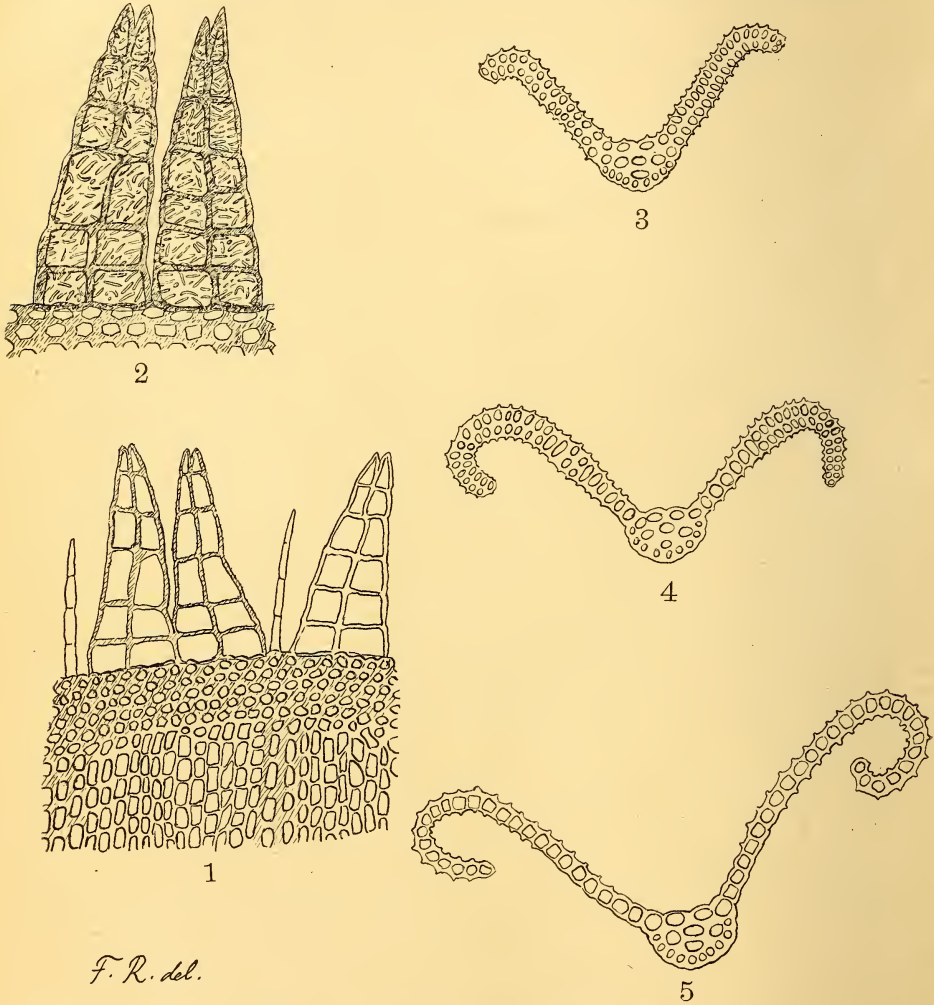
In the Bulletin of the New York Botanical Garden, Vol. 2, No. 6, May 27, 1901, Mr. Williams describes *Brachythecium petrophilum* from Dawson as new. This moss belongs in the difficult and variable *Collinum* group which is not well understood by any one as to its American forms. Mr. Williams' plant is not just like any other known to me yet it is so near some of the already too numerous species of this group that I think it unfortunate that it should be given specific rank until the whole group is better understood. If typical *Brachythecium erythrorrhizon* var. *Thedenii*, had ever been found in that part of the world I should refer it to that variety, from which it differs in its more crowded, less longly acuminate, less falcate leaves; with which it agrees in general form and areolation of leaves and slightly scabrous seta.

Mr. Williams says that his plant is nearest to *B. suberythrorrhizon* from which it differs "in the rough pedicel, leaves narrower, less serrate and plicate and cilia appendiculate."

A close examination of a seta of the type of *suberythrorrhizon* shows several low papillæ. I was unable to make out the difference in the serration of the leaves; the amount of projection at the nodes of the cilia in this group is notoriously variable. I do not think *suberythrorrhizon* is as distinct from *erythrorrhizon* as is the var. *Thedenii*, but if it be held a good species, then Mr. Williams' plant should be regarded as a poorly marked variety.

Thanks to the courtesy of Mrs. Britton and the New York Botanical Gardens, I have had access to the types, which I have carefully studied.

In the same number of the Bulletin of the New York Botanical Gardens Mr. Williams gives a very interesting report on the other mosses which he collected in the Yukon region in 1898-99. In this account he describes several new species, including two new Bryums, a genus even more difficult than *Brachythecium*. In our next issue I hope to give a full review of this paper.



F. R. del.

PLATE V.—*ORTHOTRICHUM HALLII*.

Figs. 1 and 2. Peristome with part of capsule.

Figs. 3, 4 and 5. Cross sections of leaf, from near apex, middle and base, respectively.

ORTHOTRICHUM HALLII SULLIV. & LESQ.

JOHN M. HOLZINGER.

Among some Wyoming mosses recently received from Professor Aven Nelson for determination was an *Orthotrichum* which proved to be typical *O. Hallii*. The plant was sent *sub numero* 125, and was collected by Mr. Leslie Gooding "on bare dry rocks" in Platte Canyon, S. E. Wyoming. The habitat at the type station (Rocky Mountains, E. Hall) is given as "on trees." Yet there seemed little doubt, judging from both the description and the plate in *Sulliv. Icon. Musc. Suppl.*, t. 45, that this rock moss was the same species. So it was sent to Mrs. E. G. Britton for comparison with the type, if possible. She sent it to the Harvard Herbarium. From there it was learned that "the type is in poor condition, only old and incomplete capsules left, without calyptras, lids or peristome." Mrs. Britton's suggestion that "evidently Sullivant sent the best he had to his draughtsman" is but too true. Under the circumstances it is of interest to find new material in as perfect condition as is this from Wyoming.

Through the mediation of Mrs. Britton I have been able to examine closely a sterile stem from the Harvard type material. A comparison of the leaf sections leaves no doubt whatever regarding this Idaho plant being typical *Orthotrichum Hallii*. The strong unbranched papillæ, standing over the lumen of the cells; the two cell layers which begin below the leaf middle, where they usually do not extend across the lamina, reaching to the apex, where they are characteristic of the *entire* lamina: these are characters exactly identical in the Wyoming and in type material. I therefore have thought it proper to supplement Sullivant's illustrations of this beautiful species by the accompanying figures of leaf sections, and also of the upper part of the capsule, with part of the peristome. It will be observed by comparing Sullivant's figure 10, representing the peristome with a part of the mouth of the capsule, and the accompanying figure 1, that an attempt has been made in the latter to emphasize a second characteristic feature, namely the five or six rows of roundish isodiametric cells at the mouth of the capsule. These, as well as the three or four longitudinal rows of cells which alternate with the eight pairs of teeth, assume a darker yellow color than the rest of the capsule.

The material in hand shows a stage of the capsule not indicated in the description and figures of this species. Several freshly deoperculate capsules retained their bulging shape and their green color while dry, but were even at this stage marked by eight strongly projecting costæ or ridges. These are omitted in Sullivant's figure 6; and comparing this with his figure 8, one is led to expect that these costæ do not appear till the capsule assumes the form shown in figure 8. The fragile whitish peristome stands erect as given for the type, which causes the teeth to be easily broken; but occasionally a tooth persists till old age, and then turns back against the capsule.

It thus appears that this moss is well distinguished from all our North American *Orthotricha* by its fruit as well as leaf characters; and where the fruit is absent or immature, the leaves alone are still sufficient for determina-

tion. My thanks are due Mrs. Britton for her kind assistance which made it possible to make comparisons with type material. (See also Mrs. Britton's statements in Bull. Torr. Club., 1894, p. 156.)

NOTE. The writer discovers that among undetermined Colorado mosses collected by him in 1896, *O. Hallii* is abundantly represented. All of that material was, like that from Wyoming, collected on rocks. This adds to the doubt that *O. Hallii* was originally collected "on trees."

CURRENT LITERATURE.

Musci Norvegiæ Borealis. Pars prima. J. Hagen.

This appears in the Tromsø Museums Aarsfeftir Trondhjem, 1899, in German, the descriptions in Latin; 112 pages. It is not merely a list, being replete with critical notes which show the experienced master in Bryology, ingenuous, painstaking, plain spoken, exact. The descriptions uniformly go into the greatest detail. Quality is here secured with unstinted labor. Most of the descriptions and discussions are of direct value and interest to American students. The following species and varieties are described:

Gyrowesia tenuis compacta Hag., *Cynodontium polycarpum lævifolium* Hag., *Cynodontium polycarpum scabrius* Hag., *Oncophorus Wahlbergii elongatus* Hag., *Dicranum angustum fertile* Hag., *Seligeria tristichoides* Kindb., *Distichium Hagenii* Ryan, *Barbula convoluta filiformis* Hag., *Schistidium apocarpum irregulare* Hag., *Schistidium angustum* Hag., *Orthotrichum cupulatum luridum* Hag., *Orthotrichum microblephare* Schimp., *Orthotrichum Blyttii* Schimp., *Orthotrichum Groenlandicum* Berggr., *Orthotrichum mitigatum* Hag., *Encalypta mutica* Hag., *Webera cruda alpina* Hag.

Finally it is to be noted that the discussions under *Orthotrichum* and *Webera* are especially valuable.

Musci Norvegiæ Borealis. Fasciculus secundus. J. Hagen. (=Pars secunda.), pp. 113-240.

This was issued in 1901 and came into the hands of the writer of this note Feb. 24th, 1902. Considering the large number of new species described it seems very desirable to determine and record the exact date of its issue.

This paper is occupied almost exclusively with the genus *Bryum* proper, of which the author enumerates 108 species and varieties, 26 of them new to Bryology. When we consider that in the first part of this series the author enumerates 16 species and varieties of *Webera*, we have nearly 150 species of *Bryum* in the wider sense, all belonging to northern Norway, a comparatively small area of the Scandinavian peninsula. Truly this shows a wonderful wealth of Brya!

Dr. Hagen proposes some changes in the treatment of the genus *Bryum* and his discussion of this matter deserves treatment in a separate note; here only the salient points of excellence in the author's treatment are mentioned. With the great majority of species are found critical notes discussing their value and affinities. The author's generous communication to his fellow workers of his method of treating and examining spores, of observing leaves and areolation, and his estimate of the relative merits of

older and newer diagnostic characters are refreshing to note. Not less charming is his treatment of the errors of fellow workers which he brings out in a frank way yet devoid of acrimony and above all without giving offense or humiliation. In differences of opinion he is evidently forbearing and allows the other man full right of private judgment.

Following is the list of new species described, including several for the first time adequately described:

Bryum mutilum Hag. n. sp., *B. lacustre phæodon* Hag. n. var., *B. inclinatum rimosum* Hag. n. var., *B. trichopodium* Hag. n. sp., *B. Lorentzii* Schimp., *B. proprium* Hag. n. sp., *B. lapidum* Hag. n. sp., *B. stenodon* Hag. n. sp., *B. furvum* Hag. n. sp., *B. acutiforme* Limpr. n. sp., *B. gilvum* Hag. n. sp., *B. amblystegium* Ryan, n. sp., *B. saxatile* Hag. n. sp., *B. nigricans* Kaur. n. sp., *B. limosum* Hag. n. sp., *B. misandrum* Hag. n. sp., *B. aristatum* Hag. n. sp., *B. pallescens cylindricum*, Hag. n. var., *B. subrotundum clavatum* Hag. n. var., *B. pumilum* Ryan n. sp., *B. subrutulum* Limpr. n. sp., *B. ventricosum arcticum* Hag. n. var., *B. crispulum* Hampe. mss., *B. tomentosum* Limpr., *B. oxystegium* Hag. n. sp., *B. Fridtzii* Hag. n. sp., *B. dolomitricum* Kaur. mss. n. sp., *B. sinuosum* Ryan n. sp., *B. boreum* Hag. n. sp., *B. arctogæum* Hag. n. sp.

Without doubt a considerable number of these species will be found to occur also in the northern parts of our own North American continent.

The Bryophyta of the Faroes. By C. Jensen.

This is a treatise in English of 78 pages of printed matter in a report from the "Botany of the Faroes," Pt. I. Copenhagen, 1901, pp. 120-197. It is accompanied by a map of the Islands made on the scale of four miles to the inch, and by five plates. The islands lie in lat. 62° N., and are about equidistant from Norway, Ireland and Scotland. Their mossflora is of corresponding interest to American students.

The list of 338 species enumerated on pages 122-181, including 95 species of Hepaticæ, takes account not only of the author's own collection made on these islands in 1896, but of all the materials accumulated from various expeditions during the 19th century and earlier, in the Museum of the Botanical Gardens at Copenhagen. Of the eight works cited in the Bibliography (1. J. Landt's, 1800; 2. W. C. Trevelyan's, 1835; 3. J. W. Harnemann's, 1837; 4. E. Røstrup's, 1870; 5. N. C. Kindberg's, 1887; 6. F. Borgensen and C. Ostfeld-Hansen's, 1896; 7. H. G. Simmons's, 1897; 8. C. Jensen's, 1897.), four give lists of mosses namely Nos. 4, 6, 7, & 8. Corrections in determinations and changes of nomenclature in these lists are given on pp. 181-184.

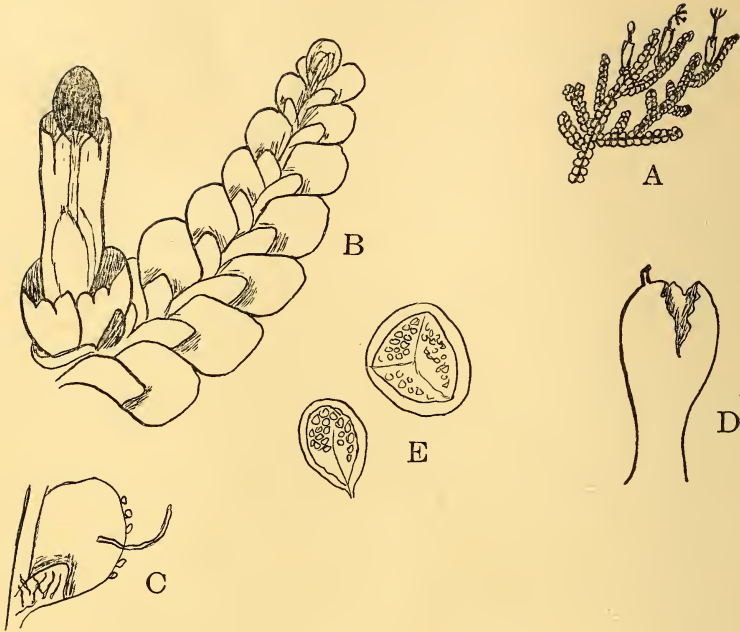
Pages 185-196 take up the phyto-geographical studies based upon the bryophyta of the islands, in which the author makes exhaustive and interesting comparisons with all the outlying mossfloras.

The plates illustrate *Radula complanata* Jack., *Philonotis Ryani* Philib., *Pohlia Faroensis* Jensen, n. sp., and of *Dicranum Andersonii* (Wich.) Schimp. from both the original specimen from Lapland and from the Faroese specimen. This last is a contribution from Prof. Harold Lindberg.

JOHN M. HOLZINGER.

RADULA.

WM. C. BARBOUR.



RADULA COMPLANATA. Dumort.

A. Plant natural size. B. Branch with perianth and capsule. C. Leaf with gemmæ. Also shows root-hairs from the lower lobe. D. Calyptra. E. Spores.

RADULA Dumort. *Comm. Bot.* 112. 1822. (Martinellius S. F. Gray. *Stephanina* O. Kuntze.)

The members of the genus *Radula* somewhat resemble the *Porellas* in outward appearance, but are apt to lie more closely upon the substratum of bark, or sometimes rock.

The plants are rather large, green, and form spreading mats. The stems usually branch in a loosely pinnate manner. The leaves are alternate and incubous in arrangement, the upper margin of each leaf lying over or upon the lower margin of the leaf next above it. As in *Frullania* and in *Porella* the leaves are two-lobed, with the lower lobe smaller than the upper, lying beneath it and along the stem at the lower side of the leaf. It may be readily distinguished from the other genera with lower lobes smaller than the upper, by the fact that the root-hairs are borne upon the lower lobes of the leaves, while in the others (*Frullania*, *Jubula*, *Porella*, and *Lejeunea*) they are borne upon the stem and the underleaves. The lobule is seldom much, in-

flated and then only at the fold at the lower edge of the leaf. The free margin is pressed close to the main lobe of the leaf. The genus has no underleaves.

Most of the species are dioicous. In these the antheridia are in androecia having the form of catkins and are found at the end of the stem or the principal branches. The archegonia occur in similar positions. The calyptra is somewhat pear-shaped, whitish, and nearly opaque. In most species the perianth is strongly compressed from above, as though it had been "flattened" by a heavy weight. This "dorso-ventrally" flattened perianth occurs in but one other genus of Northeastern America, *Scapania*. This is easily distinguished from *Radula* by its bilobed leaves, which have the lower lobe larger than the upper. The lips of the perianth are truncate and nearly or quite entire. The spores are rather large and have a granular surface.

RADULA COMPLANATA (L.) Dumort. *Comm. Bot.* 112. 1822. (*Jungermania complanata* L. *Sp. Pl.* 1133. 1753.)

This is the common species of the Eastern United States and is found also on the Pacific slope, but not so abundantly.

It occurs as yellowish green, depressed mats at the base, or on the lower part of the trunks of trees. Where the plants have not yet formed these mats, they cling closely to the substratum. This species is also found on rocks in the Eastern region of the United States. The leaves are closely imbricate, and sometimes bear gemmæ upon the margins. The upper (dorsal) lobe is nearly round, and the lower (ventral) lobe is rather quadrate, and about a quarter the size of the dorsal. The walls of the leaf cells are thickened at the angles.

The species is paroicous, the perianth long-obconic, strongly compressed, two lipped, entire or nearly so. The capsule is ellipsoidal or obovoid, exserted from the perianth only a short distance.

Sayre, Pa.

(To be continued.)

NEW OR UNRECORDED MOSSES OF NORTH AMERICA.

By J. CARDOT AND I. THERIOT.

Condensed from *Bot. Gaz.* 30, July, 1900. Translated by Miss Warner.

PTEROGONIUM GRACILE Sw. var. *CALIFORNICUM* Ren. & Card.

Differs from the typical European form in the longer and more acuminate leaves and in the smaller alar cells.

California: "Ad rupes Californiæ, perfrequens; Bolander" (Sulliv. & Lesq. *Musci Bor. Amer. Exsicc.*, ed. 2, no. 349); Sansalito (Marshall A. Howe, 1892); Coast Range Mts., San Mateo Co., on trees (M. A. Howe 1895; Ren. & Card., *Musci Amer. Sept. exsicc.* no. 316). All the Californian specimens of *P. gracile* that we have examined belong to this variety.

PYLAIASIA POLYANTHA Sch. var. *DREPANIOIDES* Ren. & Card.

A peculiar form, similar in habit and size to *Hypnum pallescens*. The second leaves usually faintly toothed to the base of the acumen, the al

cells less numerous and less obscure, and less chlorophyllose. Capsule smaller. Peristome normal.

Minnesota: Without locality or name of collector, mixed with a small form of *Hypnum uncinatum*, Hedw. (Herb. Univ. of Wisconsin).

PSEUDOLESKEA PATENS Linpr. Laubm. 2:806. (Leskea ? patens Lindb. in Soc. pro Fauna et Fl. fenn. 1880. *Lesquereuxia patens* Lindb. in Meddel. af Soc. pro Fauna et Fl. fenn. 14:75. 1887.

Newfoundland: Deer Lake (Rev. A. C. Waghorn).

This species differs from *P. atrovirens* in its more slender stems, the leaves erecto-patent (not secund), symmetric (not falcate), and the papillae being set on the middle of the cells and not on the angles.

TRIPTEROCLADIUM LEUCOCLADIUM (C. Muell.) Jaeg. var. CAMPTOCARPUM Card. & Ther.

Differs from the typical form only in the short, subhorizontal arcuate capsule resembling that of *Brachythecium*.

Idaho: Latah County (L. F. Henderson, 1894).

AMBLYSTEGIUM SERPENS Br. Eur. var. SUBNERVE Ren. & Card.

Differs from other small forms of *A. serpens* in the leaves which are either costate or ecostate. Distinguished from *A. subtile* by the more robust habit, much larger and broader leaves with shorter acumen.

Newfoundland: Bay-of-Islands (Rev. A. C. Waghorn).

AMBLYSTEGIUM FLUVIATILE Br. Eur. var. BREVIFOLIUM Ren. & Card.

Distinguished from the typical European form by the more regularly pinnate branches, shorter and smaller leaves and a costa thicker in proportion to the size of the leaf.

Minnesota; Lanesboro (J. M. Holzinger, 1894. Ren. & Card., Musci Amer. Sept. exsicc. no. 327).

AMBLYSTEGIUM RIPARIUM Br. Eur. var. LONGIVERVE Card. & Ther.

Distinguished from the typical form by the costa extending farther into the acumen.

Arkansas: Varner, in water (B. F. Bush, 1898).

Resembles *A. vacillans* Sull. in the long-nerved leaves, but in this species the branch leaves have a short obtuse acumen, while in our moss they are narrowly and acutely acuminate, like the stem leaves.

HYPNUM HALLERI Linn. fil. apud Swartz Meth. Musc. 34.

Labrador: L'Anse-au-Mort (Waghorn, 1894) Cook's Brook (Waghorn, 1897). Newfoundland: Middle Arm, on rocks (Waghorn, 1896).

A very distinct species of the subgenus *Campylium*, at once characterized by the very dense tufts, the stems entirely prostrate and divided into pinnate branches, the leaves much crowded, recurved-squarrose from a more erect base, minutely denticulate all around, and with a much shorter point than in the allied species.

HYPNUM CUPRESSIFORME L. var. RESUPINATUM Sch. Coroll. 133. (*H. resupinatum* Wils., Bryol. Brit. 398).

Newfoundland: Chance Cove (Rev. A. C. Waghorn, 1891).

This variety considered by many authors as a distinct species is charac

terized by the leaves not falcate-secund, imbricate or homomalous and pointing upward, and the capsule erect and symmetrical or very slightly curved or inclined. It is connected with the type by many intermediate forms.

HYPNUM MOLLE Dicks. var. SCHIMPERIANUM Sch., Syn. 775 (ed. 2) (*H. Schimperianum* Lorentz. Moost. 123. *pl.* 5, *fig.* c).

Northwestern Montana: In the vicinity of Lake MacDonald, Flathead Co. (J. M. Holzinger and J. B. Blake, 1898).

Differs from the type by the longer and more slender stems naked below and by the leaves smaller and with a shorter acumen.

DICRANOWEISIA SUBCOMPACTA Card. & Ther.

In densely tufted cushions. Stems simple or sparingly branched, 6-8mm. high, densely foliate. Leaves suberect when wet, crispulate when dry, 1-1.5mm. long, oblong-lanceolate, acuminate, subacute or somewhat obtuse, slightly channeled above, nerve attenuate at base, extending to the apex or vanishing a little below. Margin pale below, inflexed above, very entire, cells irregularly quadrate or subrectangular, the lower ones laxer, linear next to the costa, the alar cells distinct, subinflated, fuscous. Other parts unknown. *Plate XI.*

Very nearly allied to the European *D. compacta* Sch. from which it differs by the leaves being more narrowly acuminate and generally subacute, the cells of the areolation larger and with thinner walls and chiefly by the costa narrower, attenuate below (16-25 μ broad; it is 55 μ in *D. compacta*). Along the trail from Holzinger's Basin to the Rim.

BARBULA RUFIPILA Card. & Ther.

In habit and shape of leaves closely resembling *B. aciphylla*, differs only in the cells which are twice as large and more distinct (the upper 20-30 μ in *B. rufipila*, 12-15 μ in *B. aciphylla*) and in the hair point which is often less toothed and sometimes entire. Described from sterile specimen.

Avalanche Basin; Holzinger's Basin.

GRIMMIA MOLLIS B. & S.

This European alpine moss is reported from Greenland, and should be found at intermediate stations in Canada. Base of Sperry Glacier.

GRIMMIA SUBSULCATA Limpr. in Rabenh. Cryptog. Fl. Laubm. 757.

New to North America. Cardot det. Mt. Trilby.

WEBERA CARINATA (Brid.) (*W. cucullata carinata* Husnot; *Bryum naviculare* Card.)

New to North America. Cardot det. Base of Sperry Glacier.

BRYUM ALPINUM L. var. DENTICULATUM Card. & Ther.

Differs from the typical form in the more slender habit, shorter ovate-acuminate leaves, with scarcely revolute margins, distinctly sinuate-denticulate above and in the costa vanishing in the apex.

On the way from Holzinger's Basin to the Rim.

PSEUDOLESKEA RADICOSA (Muell.) Lesq. & James.

This species was distributed as *P. rigescens* Lindb: it is the *P. atrovirens* of European authors. Best det. Holzinger's Basin; Mt. Trilby.

SCIENTIFIC NAMES AND THEIR CHANGES, WITH SPECIAL REFERENCE TO THE MOSSES.

A. J. GROUT.

To the amateur botanist, especially if he be a beginner, the Latin names of plants are a fearful and tongue-twisting mystery. This mystery is deepened and rendered more hopeless by the fact that in every new book published some of the old favorites appear in brand-new names. This article is written for the purpose of rendering the mystery intelligible so far as the nature of the subject and the ability of the author will permit.

First, we have Latin names because Latin is the universal language of scientific nomenclature to-day, as it was once the universal language of all learning. *Polytrichum commune* L. is the same to every man of every nation.

We have binomial names, names of two words, e. g., *Polytrichum commune*, for convenience. If we said *commune* alone we would be obliged to have as many names as species, a very difficult matter, as the number of species, both animal and plant, more than outnumber the entire Latin vocabulary. By using the binomial we require a new name for each genus only, and can use specific names over and over, once with each generic name if need be.

Thus in the index to the Lesq. & James Manual we have *Aulacomnium palustre*, *Bruchia palustris*, *Dicranum palustre*, *Hypnum palustre*, *Minium palustre*, etc.

Besides this it fixes in our minds a kind of classification; the generic term being of the same rank and value as the word rose in Moss Rose, Briar Rose, etc. The species name corresponds to the adjective part of the common name and is written without a capital initial unless derived from a proper name.

An attempt has been made, and the writer pleads guilty, to give common, or English, names to plants that lack them by translating the Latin names, e. g., the Awned Hair-cap, the Erect Hair-cap, etc. It would be much better in most cases of this sort to learn the Latin name, which is just as easy to learn and remember, and much more satisfactory in the long run.

After the binomial is placed the initial or abbreviation of the name of the man who christened the plant, e. g., the L. after the name *Polytrichum commune* signifies that Linnaeus christened the plant and that its name has not been changed since. An abbreviation is used instead of the initial when the initial alone is not sufficient to identify the author of the name.

If this were all, the matter would be very simple and satisfactory, but it not infrequently happens that two men have christened the same plant with two entirely different names. Sometimes this happens because the man who gives the second name is ignorant of the fact that the plant was already named; or again he may wish for some reason to disregard the first name.

The first was often an excusable error in early times when libraries and scientific literature were scarce, and even in the present day the greatest care

is required to prevent this mistake. Before one can with certainty name a new moss from America he must look up all the species of that genus from Europe and eastern Asia, as many species of mosses grow on these three continents with little variation.

To name again a plant that one knows to have been named before is an unpardonable sin in these days, unless for some reason the first name belongs to another organism.

As an illustration of the repeated rechristening let us take the case of *Polytrichum commune*, so named by Linnaeus in 1753. In 1789 it was named *Polytrichum serratum* by Schrank; in 1791 *P. yuccaefolium* by Ehrhart, and in 1824, *P. propinquum* by Robert Brown. From the fact that they all used the generic name *Polytrichum* one would certainly infer that this multiplication of names was not due entirely to ignorance although it is of course possible that each thought his plant a different species from that already described.

In such cases the first name published with a reasonable description, would seem to be the one that should be universally adopted, and this is the contention of a large school of American botanists headed by Dr. N. L. Britton of the New York Botanical Gardens, whose watchword is PRIORITY even to the position of two names on the same page. Yet this is not as simple a matter as it seems at first, for it not infrequently happens that the first name given to a plant was published in some obscure pamphlet that no one except a bibliophile ever heard of, while the name by which the plant has been commonly known for years was published a little later in a well known and standard work. Of course this describes an extreme case and there may be all gradations.

An illustration of such a case is the moss commonly known as *Pogonatum brevicaulis* which was named by Beauvois in his *Prodromus* in 1805. The moss continued to pass by this name until 1894, a period of eighty-nine years, when Mrs. Britton called attention to the fact that the same plant was described as *Polytrichum tenue* by Menzies in the *Transactions of the Linnaean Society* for 1798. Of course the fact that it was named as a *Polytrichum* does not affect the case as we are now discussing the species names. But in such cases the name is written thus, *Pogonatum tenue* (Menz.) E. G. Britton, which being interpreted means that the name *tenue* was first given to the species by Menzies but that it was first published as a *Pogonatum* by Mrs. Britton.

The inconvenience caused by changes of this sort have led many to favor the Berlin rule formulated by a congress of botanists at Berlin some years ago. According to this rule names in use for fifty years are not to be displaced by the discovery of an older but previously little used name. Of course this leaves room for a difference of opinion as to the proper name to use and consequently to a lack of uniformity, the goal of the sticklers for absolute unqualified priority; but the author thinks that a new race of human beings will have to be developed before a uniform system of nomenclature, with no chance for difference of opinion or usage, will be universally adopted.

(To be continued.)

SULLIVANT MOSS CHAPTER NOTES.

HOW I FOUND SCHISTOSTEGA OSMUNDACEA.

BY J. WARREN HUNTINGTON.

I count my find of this little "cave-dweller" as one of the best that I have ever made, and I found it entirely by accident, as many of my best finds have been. It was on one of those splendid wooded hillsides which we may find in any hill town of New Hampshire. I explored that morning a little brook that trickled down the hill over boulders covered completely with mosses like *Hypnum rusciforme* and various forms of *Fissidens* and *Fontinalis*. On each side rose ledges of granite shaded by clumps of Mountain Maples. I climbed the bank to the left and searched awhile on the ridge for lichens and hepatics. Taking my way back towards the brook 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 which proved to be *Schistostega osmundacea*. Dr. Best, to whom I sent a specimen, put me right as to its luminous appearance, as I had mistaken its light as due to phosphorescence instead of its cells being constructed so as to focus the light rays and then reflect them. So this is the way I found the "Leuchtmoos."

The note about *Gymnostomum curvirostrum scabrum* Lindb. in the October BRYOLOGIST, calls to mind a collection of this moss which I made at Winslow, Maine, on September 3, 1898. The banks of the Kennebec river here are formed of slate containing considerable lime. The moss grew quite abundantly in crevices along the almost perpendicular banks, wherever the drip from above furnished sufficient moisture. At times the deep green tufts with their chestnut capsules, would be a yellowish white, owing to the limey incrustation.

Growing with the *Gymnostomum* were many plants of *Preissia commutata*, Nees, but always provokingly sterile. A careful comparison of the *Gymnostomum* was made with plants, in the herbarium of Mr. J. F. Collins, of Providence, collected by Mr. J. W. Holzinger at Rollingsstone, Minn., September 2, 1889.

EDWARD B. CHAMBERLIN.

Miss Harriet B. Bailey has collected at Kentville, Nova Scotia, fine specimens of *Bryum proligerum*. They were found growing on a hard wet sandy bank with abundant propagulae. One fruiting specimen was found which she has presented to the New York Botanical Garden. Duplicates have been sent to Prof. Macoun and the Sullivant Moss Chapter. She also collected at the same locality fine specimens of *Raphidostegium Jamesii* growing on spruce trees.

ELIZABETH G. BRITTON.

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Miss Wheeler, Chatham, N. Y. *Hypnum chrysophyllum*, *Dicranum Drummondii*.

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JULY, 1902



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AN ILLUSTRATED BIMONTHLY DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

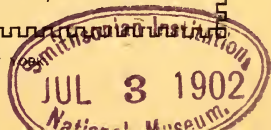
EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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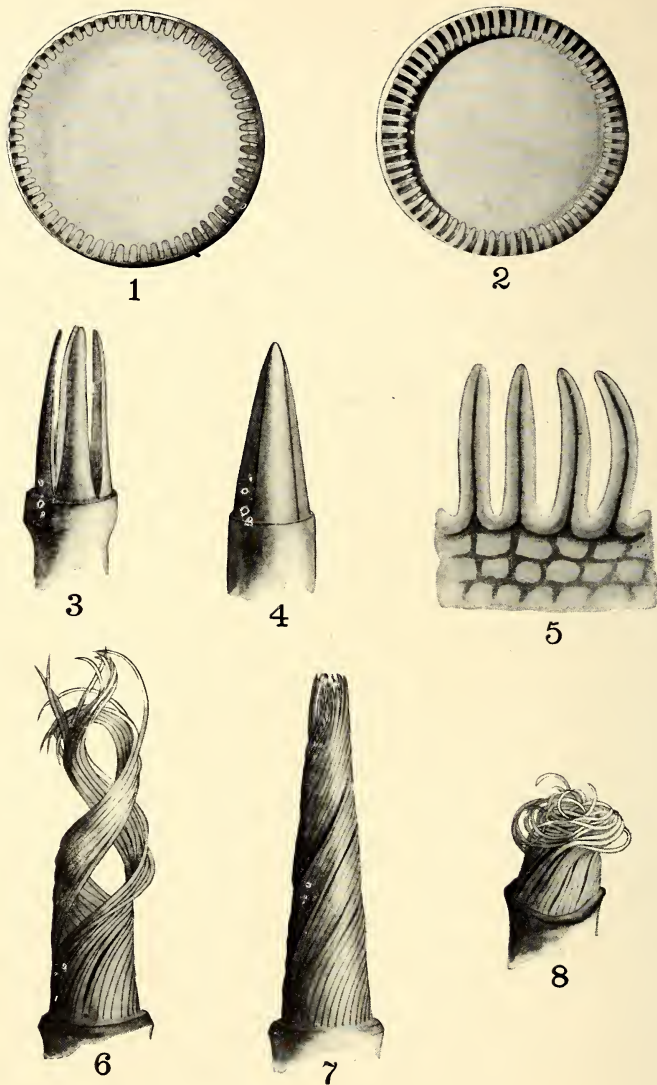


PLATE V.

1. Moist peristome of *Polytrichum Ohioense* R. & C. 2. The same dry. 3 Dry peristome of *Geotrichum*. 4. The same wet. 5 Four teeth of the peristome of *Catharinea undulata* (L.) Web. & Mohr. 8. Dry peristome of *Barbula amplexa* Lesq. 7. A perfect peristome of the same moistened 6 An older peristome of the same moistened.

THE BRYOLOGIST.

VOL. V.

JULY, 1902.

No. 4.

THE PERISTOME. II.

By A. J. GROUT.

In the article in the April, 1901, BRYOLOGIST the structure of the peristome in Georgia was discussed and some mention was made of its function. Since writing that article the hygroscopic activities of various types of peristome have been investigated with considerable care, necessitating a few further statements with reference to Georgia.

It has long been recognized that moss peristomes are strongly hygroscopic, *i. e.*, respond by active motions to any changes in the amount of moisture in their tissues. It has also been recognized in a general way that the peristome played some part in the distribution of the spores and that its hygroscopic activity aids in this work, but very little attention seems to have been paid to the details or to the extreme nicety with which the peristome in different species has been adapted to do its work.

The spores of mosses must depend upon currents of air for distribution, hence they must be securely protected from rain or dew, which would mass and clot them together so that they would fall directly to the ground as soon as liberated, to say nothing of the danger of premature germination and decay.

Then, again, the spores must be liberated in small quantities so that they will not all be discharged at once, but take advantage of breezes from different directions and be sown at various seasons. They must also be well separated or sifted so as to be as widely separated as possible when they finally alight. This sifting of the spores is accomplished by various interesting devices which are specially prominent in mosses with pendent or horizontal capsules. In mosses with a double peristome the inner peristome is usually the sieve while the outer protects from water by closing hygroscopically in wet weather. In mosses with a single peristome both functions are often performed in a very interesting manner by the single row of teeth.

In mosses with upright capsules there is less need of a so finely meshed sieve, as the spores will not fall out but will be shaken out after the manner of lily seeds. To assist in this shaking the seta is often almost as elastic when dry as a steel wire and if bent to one side flies back when released with a jerk which scatters a small cloud of spores. In wet weather not only do the peristomes close, much after the manner of Chickweed pods, but the seta become soft and flaccid. As the highest development of this sifting arrangement is of no special advantage to mosses with an erect capsule, the inner peristome has become more or less vestigial in those mosses which have erect capsules, although they may be most closely related to species having cernuous or pendent capsules with a highly developed inner peri-

stome. *Philibert in his masterly treatment of the structure of the peristome calls attention to this correlation of symmetric erect capsule with a degenerate peristome but gave no explanation for the very evident facts. In this connection he mentions *Anomodon viticulosus*, *Habrodon Notarisii* and *Pylaisia polyantha*, calling attention not so much to the inner peristome as to the disappearance of the fine horizontal lines which mark the lower outer lamellæ of the typical hypnaceous peristome. Most striking illustrations of the correlation of the erect capsule with an imperfect developed inner peristome are furnished by *Brachythecium acuminatum* and its allies, *Plagiothecium latebricolor*, and the genera *Pylaisia*, *Entodon*, *Orthothecium*, *Isothecium* and *Homalothecium*. This also explains why Thuidium and its allies have a perfectly developed inner peristome while most of the Leskeaceæ, having erect capsules, have also imperfectly developed peristomes. I am inclined to think that this principle, modified by an annual habit of growth, or a very low minute growth, or both, will explain the lack, partial or complete, of a peristome in *Physcomitrium*, *Pottia*, *Pleuridium*, *Mollia viridula*, and other species of a similar habit and structure. It will also explain the degenerate condition of the peristome in *Orthotrichum* and its allies. However, it seems very probable that we not yet fully understand why mosses like *Pleuridium* do not seek the assistance of a peristome in their spore distribution and I would suggest that this question offers a fascinating field for investigation.

To return to *Georgia*; its capsules are erect and its four teeth well separated when dry as seen in Plate 5, Fig. 3. Dip one of the dry capsules in warm water for a moment and see the peristome close like a tiny vise, giving an almost comical impression of grim determination. (Pl. 5, Fig. 4).

In *Polytrichum* the teeth are 64 in number and of themselves are usually so short that they would have little effect upon spore distribution, but they are all attached by their tips to the expanded membranous upper end of the columella, forming a most effective and ingenious pepperbox, entirely automatic in action. When the weather is dry the teeth become shrunken in width and strongly incurved, the columella also shrinks, pulling the ends of the teeth inwards (Pl. 5, Fig. 2). This leaves ample room for the spores to be shaken through the openings between the teeth. The columella shrinks more at the margin than in the central portion, causing it to assume the shape of a pieplate. This upturned margin of the columella also enables the teeth to remain attached to its edge in their changed position. In species of this family with more nearly erect capsules the teeth are longer and often fewer in number, making the escape of the spores easier.

If you take a capsule in the condition represented in Fig. 2 and place it in warm water for a few minutes it will assume the appearance shown in Fig. 1 and no spore can be shaken out, although a careful examination of the contents of the capsule will show that the spores are not wetted, as when mounted in water they are still surrounded by an envelope of air.

The pepperbox is closed, but how? Kerner von Marilaun† states that

*Rev. Bryologique, 11: 51, 1887. †Nat. Hist. plants, 2: 814.

the teeth when wet curve inwards so strongly that the columella is pressed against the mouth of the capsule, closing it effectually. Five minutes study, however, will show any one that the teeth do not curve in when wet but instead straighten up and outwards; the columella also expands and becomes of nearly the same diameter as the capsule. This makes the openings lateral instead of terminal. The teeth expand enough laterally so that not a single drop of water can enter or a spore escape. In addition the spores seem to be protected by the nature of their outer surface, for it takes a very long soaking to wet the spores so that they can be satisfactorily mounted in water for microscopic study.

In those species of *Polytrichum* whose ripe capsules become horizontal or pendent (*P. commune*, *P. juniperinum*, *P. strictum*, *P. piliferum*) there is a crest down the inner face of the teeth which bears cells which are free at their outer ends, or these cells may be united to each other by their extremities. Lindberg, who was the first to accurately describe these structures, compares them to a minute stag's horn attached to the inner surface of each tooth. I do not consider it proven that these crests are accessories developed to prevent a too free delivery of spores in species with pendent capsules, but I do consider the suggestion one worthy of serious consideration

The peristome teeth of the *Polytrichaceae* like those of *Georgia* have none of the joints or articulations which are so conspicuous in the teeth of most mosses. For this reason Mitten has united these two orders into a group which he calls NEMATODONTEÆ in contrast to the ARTHRODONTEÆ or jointed-toothed mosses. As in *Georgia* the teeth of the Hair-caps consist of a solid mass of cells as is well shown in Fig. A, which shows a cross-section

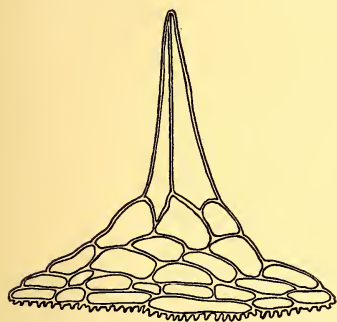


Fig. A. Cross section of a tooth of *Polytrichum commune*.

illustrated in cross section in our figure. These lines can be easily seen by examining the peristome under the compound microscope. The continuous fibres are best seen near the edge of the tooth.

Plate 5, Figs. 6, 7 and 8 represent different positions of the peristome of *Barbula amplexa* Lesq.* As the peristomes were drawn by reflected light the basal membrane was scarcely noticeable. Fig. 7 shows the peristome immediately after the removal of the operculum. Fig. 8 shows the ap-

*As the peristomes were drawn by reflected light, the basal membrane was scarcely noticeable.

pearance of the operculum of a dry capsule from which the spores are escaping. The loosely twisted mesh of the narrow teeth forms a perfect sieve to control the escape of the spores. If you place a peristome in this condition under the microscope without mounting medium or cover glass and breathe upon it the teeth will straighten perceptibly. If you dip it in warm water it will assume the original position shown in Fig. 7, if it be comparatively fresh; if it be rather old and somewhat broken it may look like Fig. 6. The perfect cone in Fig. 7 is of course a waterproof covering for the spores inside.

In a succeeding paper the structure and development of the peristome of *Barbula* will be taken up.

FISSIDENS GRANDIFRONS, ITS HABITS AND PROPAGATION.

By E. J. HILL.

In July, 1901, *Fissidens grandifrons* Brid., was obtained from the face of a cliff along the Illinois River, near Utica, Ill. It forms part of the ledge famed in Indian legend as "Starved Rock." The bed of moss was kept wet by water oozing from the rock. The stems were uncommonly short, 1.5-4 cm., the average but 2 or 3 cm. long. The leaves were about $3 \times .4-.5$ mm., or about the size of those in specimens from Boyne Falls, Mich. They are smaller than those of robust plants from a creek near Bear Lake, Manistee Co., Mich. (1880), which are $4 \times .6-.7$ mm. These plants were as usual without fruit, but a careful search disclosed a couple of female flowers, one of which is shown (Fig. 1.). There were 10 or 12 archegonia, .6-.8 mm. long. Authorities generally give them as numerous, 30-60 by some. No paraphyses were seen. The perichætical leaves taper rather abruptly from a broadly oval base to a point of variable length, the point in the longer ones similar to the vertical lamina of an ordinary leaf, but relatively narrower. Flowers in *F. grandifrons* are rare. Schimper mentions them as occurring on specimens from Niagara Falls; Boulay, as noticed by Spruce and one or two others on plants from the region of the Pyrenees Mts.; Limpricht, for the territory embraced by his Mossflora, Germany, Austria, and Switzerland, gives only male flowers as occurring. The fruit, as already stated by Mrs. Britton in THE BRYOLOGIST for July, 1900, has been found but once, in plants from the N. W. Himalayas.

The plants make compensation for this by asexual propagation. Those from "Starved Rock" produce axillary buds which grow into rooting shoots. They are found in all stages of development from those just beginning, to shoots with several pairs of leaves (Fig. 3-6). The rhizoids start when the buds are very small and the leaves scale-like, as short blunt brown processes. They spring from the edges and base of the leaves as well as from the base of the bud-stem and lengthen as the shoot grows. In all cases observed these shoots take the place of branches and ultimately become a rooting branch. Owing to the conditions under which the plants were growing on the cliff, they do not generally become detached but strike root and remain in place, forming new stems to replace the old ones, which are brown

and decaying at the base. The stems lie close on one another and are freely provided with tufts of rhizoids along the under surface. The leaves also form rhizoids from the base of the costa, as shown in Fig. 2. The bed of moss was dirty, being well filled with sand from the disintegrating rock and inwashing by rains of finer material from the soil above. The shoots are thus furnished with a soil in which to root without a change of place, but as their hold on the parent stem is slight, when grown to the size shown in Figs. 5 and 6, they easily become detached and in running water would serve for much wider distribution. This is shown in specimens from Boyne River, on which minute shoots with basal rhizoids are seen. Some of them show but slight adhesion to the stems when but 2 or 3 mm. high. The tufted rhizoids, though present in other places, are more abundant at the base of branches and the beginning of new or annual growths. At points where such growths start the stems are most readily broken, and would most likely divide.

The asexual propagation of *F. grandifrons* does not appear to have been recorded. That of all the Fissidentaceæ, at least through the medium of brood-organs, is stated by Correns* to be either rare or as yet unobserved; probably the latter. He cites the case of *F. (Conomitrium) Metzgeria* (C. Müll.) Par., a semiaquatic species of the eastern Soudan, whose leaves when old bear little tufts of rhizoids on their point and other parts, out of which,



Description of figures of *Fissidens grandifrons* each $\times 13$. 1. Female flowers. 2. Leaf with basal rhizoids. 3. Very young bud. 4. Bud more advanced. 5. Branch shoot with short axis. 6. Branch shoot ready to be detached.

*Vermehrung der Laubmoose durch Brutorgane und Stecklinge, p. 54.

Müller thought, plants could probably spring. The cases given by Correns where bits of stems, leaves, and brood-bodies form a protonema, are chiefly concerned with plants under cultivation. *F. bryoides* (L.) Hedw. was shown to produce resting branch-primordia (Astanlagen), which he regards as greatly reduced leaves, consisting of a modified costa, and are called brood-leaves. An example familiar to moss-students is that of the brood-bodies on the pseudopodia of *Aulaacomnium palustre*. *F. grandifrons* doubtless partakes of this property, as seen in its ability to form rhizoids on the costa (Fig. 2). As Fig. 4 shows them springing from the leaf-margin, it also partakes of the leaf characters of *F. Metzgeria* as seen by Müller. Heald*, experimenting with *F. bryoides*, found buds borne in the region of the leaf-axils, "which in course of time were detached from the stems." This is more like the incipient form of the buds in *F. grandifrons*, though no protonema may anywhere intervene in the latter. The case of *F. taxifolius* (L.) Hedw., where the brood-bodies are root-bulbils formed of rhizoids and are borne on the stems, does not show its analogue in my specimens of *F. grandifrons*. The striking case observed by Schimper and by Goebel, in which *F. (Conomitrium) julianus* (Sav.) Schimp. bore shoots on the calyptra, may be given in this connection for completeness. Those cultivated by Schimper† bore them on the outer surface without the previous formation of a protonema; those observed by Goebel‡ sprang from the inner surface "with the intervention of a short piece of protonema." But the case of this species multiplying by leafy branches, which become detached from the stem, as noticed by Schimper and mentioned by Goebel (p. 147), is like that of *F. grandifrons*. Here branches are isolated by decay at their base, and break off from the stems to form new plants.¶ Correns, in an enumeration of mosses possessing brood-organs in the region of Limpricht's flora, mentions this (as *Octodicerus julianum*) as one having brood-branches.

The substratum on which I have found *F. grandifrons* differs from those usually given. Nearly all authorities mention limestone. Mrs. Britton says, "in water saturated with lime, or in mud." At "Starved Rock" it was on sandstone. This is the outcropping rock, but it overlies the calciferous formation which comes to the surface not far below in the river valley. But the presence of lime carbonate in the water passing through the bed is shown by quite a thick incrustation on some of the older stems and leaves. The moss in both stations in Michigan was attached to sticks and logs, and the stems mostly immersed. The specimens from Boyne River indicate the presence of lime on the older parts of the stems, chiefly as a thin plate in the fold made by the upward conduplication of the leaves. Those from Barr Creek, Bear Lake, are very clean and quite free from all foreign matter. A slight effervescence from some most favorable bits of stems placed in acid showed the presence of lime. These streams are usually the outlets of little lakes and ponds whose bottoms are often whitened by decaying molluscan shells.

Chicago, Ill.

*Botanical Gazette, 26: 200, 1898.

†Synopsis Mus. Eurp. p. 123. ‡Outlines of classification, etc. p. 174.

¶Goebel in Schenk's Handbuch der Botanik, 2: 389.

LICHENS.—THELOSCHISTES—PYXINE.

BY CAROLYN W. HARRIS.

Following the classification of Prof. Tuckerman, who is still the authority on North American Lichens, *Theloschistes* and *Pyxine* complete the family of *Parmeliei* which we have been studying in *THE BRVCOLOGIST*, with the exception of one rather doubtful and little known genus, *Speerschneidera*, represented by only one species *S. euploca*.

Theloschistes is still included in the genus *Physcia* by many lichenists in Europe. Several species are found growing with *Physcia*, and the contrast between the yellow thallus of the *Theloschistes* and the gray of the *Physcia* is very effective. All the species of *Theloschistes* which are described in this article, have a yellow or greenish-yellow thallus, which is either foliaceous or fruticose. The underpart is always white, or light gray, with clusters of darker rhizoids with which it is attached to the substratum.

Placodium elegans is much like some species of *Theloschistes*, but the thallus is crustaceous, and a much deeper orange; the apothecia are also smaller and darker; the underside, while pale, is much appressed or wrinkled and is free from rhizoids.

In *Theloschistes* the apothecia are usually quite large, in several species are very crowded. They are cup-shaped as in *Parmelia* and *Physcia*, but the disk is flatter and the thalline rim is thinner. This genus is found on living trees, old fences and on rocks. The yellow color of the thallus is said to be due to the large amount of the gold-colored crystals of chrysophanic acid.



Fig. 1. *Theloschistes chrysophthalmus*.

a bright orange color with an entire margin; they are often so numerous as to cover almost the entire thallus. Found on trees in the United States, also in the South and West.

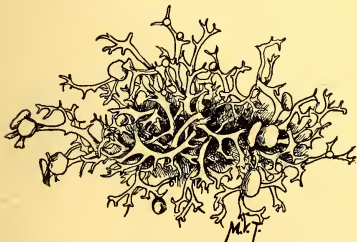


Fig. 2. *Theloschistes chrysophthalmus* var. *flavicans* $\times 2$.

THELOSCHISTES CHRYSOPHTHALMUS (L.) NORM.

(Fig. 1.) Thallus fruticose, yellow or yellowish-gray, ascendant and tufted. The narrow, linear branches terminated by fibrils. The underside is a pale gray, appressed, with mats of rhizoids toward the middle which serve as hold-fasts to the substratum. This lichen, except in color, resembles *Ramalina calicaris* var. *fastigiata*. The apothecia are large, subterminal, the disk is

THELOSCHISTES CHRYSOPHTHALMUS (L.) NORM., VAR. *FLAVICANS*, WALLR.

(Fig. 2.) This beautiful lichen is in color and general appearance much like *T. chrysophthalmus*, but can be distinguished from it by its much divided branches which are long and linear, giving it a more delicate appearance, somewhat resembling *Physcia ciliaris*, except in color. The thallus is yellow, sometimes with a grayish tinge. The

pothecia are medium, have a yellow or orange disk with cilia on the margin. Found fertile in the Southern States, and sterile in the North, where it is not common.

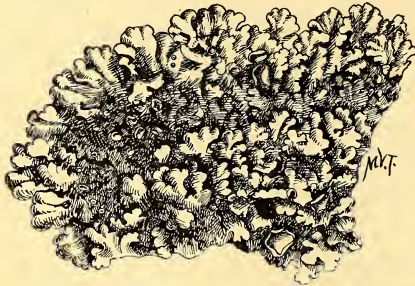


Fig. 3. *Theloschistes parietinus* $\times 2$. orange, with a thin, wavy margin; they are chiefly toward the centre and are crowded. This is one of the commoner species and resembles *Parmelia* in habit of growth. Is found on trunks and branches of trees, stone walls and rocks, is especially fine near lakes of any size.

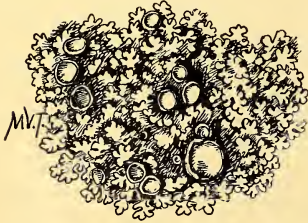


Fig. 4. *Theloschistes polycarpus*. The underside much wrinkled and covered with short white rhizoids. The apothecia are medium, the disk is concave, bright orange with crenulate margin. They are often so numerous as to almost cover the lobes of the thallus, except at the outer edge. This species usually occurs in small, orbicular patches, but occasionally larger specimens are found; it grows on trees, dead wood and on rocks.

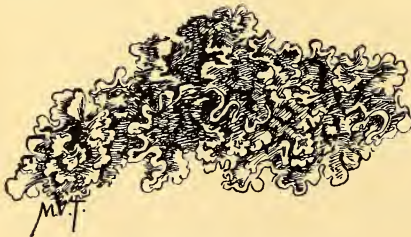


Fig. 5. *Theloschistes lychneus*. *THELOSCHISTES POLYCARPUS* (Ehrh.) Tuckm. (Fig. 4.) Thallus foliaceous, reduced, with narrow, many cleft divisions, which are short and rounded. In color greenish-yellow, turning darker with age. The underside much wrinkled and covered with short white rhizoids. The apothecia are medium, the disk is concave, bright orange with crenulate margin. They are often so numerous as to almost cover the lobes of the thallus, except at the outer edge. This species usually occurs in small, orbicular patches, but occasionally larger specimens are found; it grows on trees, dead wood and on rocks.

THELOSCHISTES LICHNEUS (Nyl.) Tuckm. (Fig. 5) This species is sometimes confused with *Cetraria juniperina* var. *pinastri* which it resembles, but from which it can be distinguished readily, as the thallus of the *Cetraria* is larger, more leaf-like, the underside is always yellow, the soredia are sulphur color, while in *T. lychneus* the thallus is flatter, more appressed, light gray underneath and covered with fine rhizoids; the soredia are light lemon color. The lobes of the thallus of *T. lychneus* are broader than in *T. polycarpus*, and are not quite

so deep a yellow or orange. Apothecia are not common, but soredia are frequent, covering the curled over margins of the lobes so that they are very granular. Found on rocks, but more frequently on living trees, especially on old elms.

THELOSCHISTES CONCOLOR (Dicks.) Tuckm. Thallus foliaceous with very narrow, finely dissected, branching lobes of uniform width, adhering closely to the substratum. Greenish-yellow in color, white on the underside, with short, white rhizoids. The apothecia are small, sessile and not very numerous, occasionally fibrillose; disk the same color as the thallus, with an entire margin. This is a very common species, found in all parts of North America on trees and rocks.

THELOSCHISTES CONCOLOR (Dicks.) Tuckm., var. **EFFUSE** Tuckm. This species is a reduced form of *T. concolor*. The thallus is more squamulose and scattered, with powdery margins, appearing very much like a very small form of *T. lichneus*. It is found on trees, usually in little scattered yellow patches.

PYXINE resembles *Physcia* in general appearance, as well as *Parmelia*, but the thallus is much thinner and clings more closely to the substratum. There are only a few species of *Pyxine*, and many lichenists do not consider it a separate genus. We have only two species which are common in North America. The apothecia are small and sessile, with a pruinose or black disk whose margin is wavy.

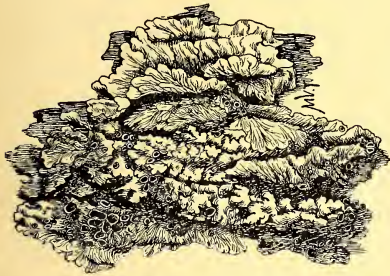


Fig. 6. *Pyxine picta*.

PYXINE PICTA (Sw.) Tuckm. (Fig. 6.) Thallus closely adnate to the substratum, with thin, confluent, flattened lobes, the older portion wrinkled and warty; gray or greenish-white on the upperside, and black underneath. The apothecia are small and sessile, with a pruinose or black disk, and thick thalline border, which is crenate. Found on trees and dead wood in the Southern States.

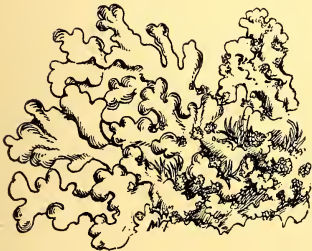


Fig. 7. *Pyxine sorediata* $\times 2$.

PYXINE SOREDIATA Fr. (Fig. 7.) This species resembles closely *Physcia speciosa*, but has two well defined differences in appearance. In *P. speciosa* the cilia are white, in *P. sorediata* they are black. In the former the underside of the thallus is white with grayish fibrils, in the latter the under part is black, with a thick mat of black fibrils. If the thallus of *P. sorediata* is broken it will be found to be yellow within. The lobes of the thallus are many cleft, round and regular, with

short black cilia on the under margins. Toward the middle it is well covered with gray soredia forming usually a powdery crust; apothecia are rare. This attractive lichen is found on trees and rocks, the finest specimens on the latter; it is common in the Eastern States. Although semi-crustaceous, in damp weather it can be collected readily if growing on rock; that on trees must be taken with the bark.

SELIGERIA TRISTICHOIDES KINDB.

This species is described in Rev. Bryol., 1896, p. 20, as follows:

“Leaves broader than in *Seligeria tristicha*; costa not distinctly excurrent. Perichæatial leaves abruptly narrowed; costa percurrent or short-excurrent.

Norway, northern district. Arnell and Schlegel; E. Nyman.”

In his “Species of European and North American Bryineæ,” part 2, published in 1897, the author, on p. 213, ranks his new species with “*S. tristicha* Bridel,” [which should be *S. tristicha* (Brid.) B. S.] under “Capsule piriform, with straight pedicel.” Trusting implicitly in this characterization as correct, I never suspected that the Schlegel and Arnell plant in my hands, and referred to in the January, 1902, BRYOLOGIST, p. 7, in connection with the plant collected by Dr. G. G. Kennedy in Vermont (not in “Connecticut,” as stated erroneously then), *could* be the type—as it appears to be from several considerations—of Dr. Kindberg’s *S. tristichoides*. For this Norwegian plant has not “capsule piriform,” nor “straight pedicel.” The Vermont plant, as I have endeavored to set forth in my note and drawings, agrees essentially with the Norwegian plant, having the capsule *hemispherical*, as shown, and the seta *curved*, as stated. Thanks to the generosity of Mr. H. N. Dixon, who shared with me his specimen of this Norwegian plant collected by Dr. I. Hagen in 1896, I have been able to make another minute comparison, which tends to confirm my view as to the specific identity of the two plants. This is the more important since to Dr. Hagen, the collector, belongs the credit of describing for the first time adequately Kindberg’s *Seligeria tristichoides* (in Musci Norvegiæ Borealis, part I. p. 32, 1899) so that it may hereafter be recognized.

Dr. Hagen’s statements at the end of his description are of sufficiently general interest to be quoted in full. He says: “This species is the same as has passed since Sommerfelt for *S. tristicha*; neither the author of Bry. Eur. nor Lindberg in his ‘Utredning af de Skandinaviska Seligeriæ’ have separated it from this species, which is not strange, in view of the scant material available at the time. In 1894 I recognized it as a good new species and have since distributed it frequently as *S. uncula*, although I had a suspicion that the *S. tristichoides* mentioned by Kindberg in Rev. Bryol., 1896 and in Bot. Not. might be identical with it. But the descriptions given there were so incomplete that his species could not be distinguished from *S. calcarea*, wherefore I ignored his name. It is only at the place above cited (Bot. Not.) that he has given a diagnosis which, while still very incomplete,

is satisfactory in so far as its identity with *S. uncula* may be considered established."

"From all other species of the genus, *S. tristichoides* is distinguished by the exothecium of the capsule being *pustulose* in the dry state (as e. g., in *Mniobryun carneum*,) and by the projecting columella, which latter character is apparently entirely new in this genus. Further, it is an intermediate form between *S. tristicha* with which it shares the sterile branches with *tristichous leaves*, and *S. calcarea* with which it shares *leaf form*. From the former it is distinguished, besides the above cited characters, by its much shorter leaves and the entire structure of the fruit, by the color, thickness, length and bend in the seta, by the absence of the neck and the form of the capsule, by the longer teeth and smaller spores; from the latter it stands distinct by the tristichous leaves, the curved seta, the absence of neck on capsule, the longer teeth and somewhat larger spores."

"*S. tristicha* is not found in Norway, and must be struck from the Flora."

It is thus clear that the Vermont Seligeria by misunderstanding referred to *S. tristicha*, the Norwegian plant so-called up to a recent date, must with it be referred to *S. tristichoides* Kindb., as var. *laxa*: *Seligeria tristichoides laxa*.

In a letter from Dr. Hagen received since writing the above, this author expresses his judgment that this plant is *specifically* distinct from *S. tristichoides* "because of the longer, distant, and scabrous leaves, peristome teeth shorter and inserted nearer the mouth, etc. (Columella not elongated!)" He urges that it has been described before as *S. trifaria patula* Lindb. in Oefv. af K. Vet. Skand. Foerh. 1864, p. 189: "Leaves and perichætical bracts erect-open, narrowed into a rather long subrecurved, minutely crenulate subula, with cells smaller, filled with chlorophyll, those of the subula quadrate." Dr. Hagen states that this rare plant is known only from a single locality, the Swedish Island of Gotland in the Baltic Sea. He generously sent me a few sterile stems of it, with the note that "the pedicel is much shorter than that of the true *S. tristicha*, and the capsule seems to be shorter and broader." He also enclosed an abundant specimen of *S. tristichoides* Kindberg, collected by himself.

From all this it is clear that Lindberg, when he referred the Gotland plant to *S. trifaria* (*S. tristicha*) had before him the Norwegian plant, not the one from other parts of Europe. For with that it is evidently related as a variety, it seems to me. And he would doubtless have written *S. tristichoides patula*, had he recognized the specific distinctness of the Norwegian Seligeria from *S. tristicha*.

After a close comparison of leaves from this var. *patula*, with those from the American plant in question, I admit that there is good ground for Dr. Hagen urging the identity of the two plants: shape, areolation, and disposition of leaves on the stem is strikingly similar. I note, however, a slight difference in the leaf apex: the American plant has a *shorter* apical cell, and the costa runs *clear up* to it; the Swedish plant has a *longer* apical cell, and

the costa ceases some little distance below, leaving the apex clearly of one cell layer. And, so far as I have been able to ascertain, this difference has seemed constant. I therefore suggest deliberation before finally uniting the two varieties in question. This seems the more desirable when we consider the wide separation of the stations, and also the fact that both have been collected but once, leaving only scant material for a complete comparison.

In closing I desire to make again grateful acknowledgment both to Mr. H. N. Dixon and to Dr. I. Hagen for helpful suggestions and material for this note.

JOHN M. HOLZINGER.

CALLIERGIDIUM *vice* PSEUDO-CALLIERGON Ren.—By an oversight I duplicated Pseudo-calliergon Limpr. (Laubmoose III., p. 547) in THE BRYOLOGIST of Oct., 1901, p. 63. I therefore propose the name Calliergidium, transferring to this new subgenus *Hypnum Tundra* Arnell, *Hypnum Bakeri* Ren., *Hypnum pseudostramineum* C. Muell., and *Hypnum plesiostramineum* Ren.

F. Renauld, Nice, France, March, 1902.

THE GENUS SEMATOPHYLLUM.

BY ELIZABETH G. BRITTON.

Part 21 of Dr. Braithwaite's British Moss-flora has just arrived, having been issued in April, 1902. It will be found that he adopts the genus *Sematophyllum* Mitt, in its original sense, to include three European species, of which *S. demissum* and *S. micans* are described. In a foot-note Dr. Braithwaite gives his reasons for using the specific name of *micans*, instead of transferring *H. Novæ-Cesareæ*, as he should have done. We cannot agree with his argument, as *H. micans* Sw., 1829, has priority over *H. micans* Wils. 1833, even though both are referable to other genera.

On consulting the original place of publication of *Sematophyllum*, it will be found that Mitten was guilty of an act of injustice, as he recognized *S. auricomum* and *S. demissum* as typifying his genus, yet concluded his remarks by saying—"Their affinity is remote from *Rhynchostegium* Schimp. of which his *Raphidostegium* was made a section, to include *Hypnum demissum* Wils." He should have taken up Schimper's name, as he had clearly characterized the subgenus, even though he did not raise it to generic rank, as will be seen by the following synonymy:

SEMATOPHYLLUM, Mitt. Journ. Linn. Soc., 8: 5. 1864.

Hypnum (subsect.) *Aptychus*, C. M. Syn. Musc. 2: 325 1851.

Rhynchostegium (subgen.) *Raphidostegium*, Br. & Sch. Br. Eu. fasc. 49-51. 1852.

Raphidostegium De Not. Cronaca 2: 31. 1867.

Rhynchostegium (sect.) *Raphidorhyncha*, Sch. Syn. Musc. Ed. 2, 678-680. 1876.

Carl Müller founded the subsection *Aptychus* to include those mosses of the genus *Hypnum* having ecostate or bicostate leaves and vesicular alar cells, and described *H. Kegelianum*, *H. Hampeanum*, *H. microcarpum*, *H.*

demissum, *H. Carolinianum*, *H. Marylandicum* and eleven other exotic species. But he recognized a second group of species in this section having quadrate alar cells of which *H. acuminatum*, was the first species named. Schimper characterized *Raphidostegium*, as distinguished by the glossy leaves, vesicular alar cells, exannulate and long-beaked capsule, and lamellate inner face of the teeth. He named *H. demissum*, *H. flavescens* Sull., *H. Rugelianum* Sch. m. s. *H. loxense* and *Leskea caespitosa* Hedw. Of these *H. flavescens* and *H. Kegelianum* are manuscript names which have proved to be synonyms.

On comparing the literature it will be found that there is great diversity of usage in the various European standard works. Jaeger and Sauerbeck in the *Adumbratio* recognized 134 species of *Raphidostegium* and 53 of *Sematophyllum*, but the type species of the latter were included in the former, as well as many species subsequently referred to *Sematophyllum* by Mitten in his *Musci Austro-Americani*. In Paris' Index there are 264 species of *Raphidostegium* and 92 of *Sematophyllum* with the types of the latter in the former, and including 24 species of *Pungentella* C. M. Carl Müller, up to the time that he died, continued to use the names *Aptychus* and *Pungentella* as synonymous to the usual use of *Raphidostegium* and *Sematophyllum*. It will also be found that Müller recognized *H. demissum* as a European species only, and named its American equivalent *H. Carolinianum*. Limpricht in his *Laubmoose* figured the stomata of *H. demissum* as composed of four cells. I have found those of American specimens invariably normal, with two guard cells, and the inner face of the teeth much more deeply lamellate. Therefore I have adopted Müller's opinion of 1851, and also agree with him in considering his *H. Marylandicum* distinct in the longer pedicel, stouter plants and leaf differences. The synonymy of our species is as follows:

1. SEMATOPHYLLUM ADNATUM (Michx.).

Leskea adnata Michx. Flor. Bor. Am. 2: 311. 1803. Schwaegr. Supp. t. 84. 1816.

Hypnum minimum Beauv. Prod. d Aetheog. 66. 1805.

Leskea caespitosa var. *adunca* Hpe. Linn. 13: 47. 1839.

Leskea microcarpa Brid. Mant. Musc., 144. 1819, Br. Univ. 2: 289. 1827.

Hypnum microcarpum CM. Syn. Musc. 2: 326. 1851. Sull. Icon. 175, t. 110. 1864.

Raphidostegium microcarpum Jaeg. & Sauerb. Adumb. 396. 1877-78.

Raphidostegium adnatum Br. & Sch., Sull. & Lesq. Musci bor. Am. 299. 1856.

2. SEMATOPHYLLUM RECURVANS (Michx.).

Leskea recurvans Michx. Fl. bor. Am. 2: 311. 1803?

Leskea squarrosa Michx. Fl. bor. Am. 2: 312. 1803?

Leskea arcuata Brid. Spec. Musc. Supp. 2, 64. 1812?

Hypnum recurvans Schwaegr. Suppl. 1: 2, 289. 1816. 2: 1, 163, t. 146. 1824.

Raphidostegium recurvans Br. & Sch., Sull. & Lesq. Musci bor. Am. 301. 1856. Jaeg. & Sauerb. Adumb. 400. 1877.

3. SEMATOPHYLLUM NOVAE-CESAREAE (Aust.).
Hypnum micans Wils. Hook. Brit. Fl. 2: 86. 1833, non Sw. 1829.
Hypnum Novae-Cesareae Aust. Musci App. no. 440. 1870.
Raphidostegium Novae-Cesareae Ren. & Card, Musci Am. Sept. 54. 1893.
4. SEMATOPHYLLUM TENUIROSTRIS (Br. & Sch.).
Leskea tenuirostris Br. & Sch. Gray Man. Ed. I. 668. 1848.
Hypnum cylindricarpum CM. Syn. Musc. 2: 308. 1851.
Raphidostegium cylindricarpum Jaeg. & Sauerb. Adumb. 401. 1877.
5. SEMATOPHYLLUM CAROLINIANUM (CM.).
Hypnum Carolinianum CM. Syn. Musc. 2: 327. 1851.
Raphidostegium Carolinianum Jaeg. & Sauerb. Adumb. 388. 1877.
Hypnum demissum Br. & Sch. Br. Eu. 1852, not Wilson.
Hypnum demissum var. *Carolinianum* Sull. & Lesq. Musci bor. Am. no. 298. 1856. no. 441. 1865.
6. SEMATOPHYLLUM MARYLANDICUM (CM.).
Hypnum Marylandicum CM. Syn. Musc. 2: 328. 1851.
Raphidostegium Marylandicum Jaeg. & Sauerb. 388. 1877.
Hypnum demissum var. *Marylandicum* Sull. & Lesq. Musci bor. Am. no. 298, b. 1856. no. 442. 1865. Lesq. & Jas. Man. 356. 1884.
7. SEMATOPHYLLUM DELICATULUM (James.)
Rhynchostegium delicatulum James Sull. Icon. Suppl. 93, t. 69. 1874.
Hypnum laxepatulum Lesq. & Jas. Man. 358. 1884.
Raphidostegium laxepatulum, Ren. & Card, Musci Am. Sept. 55. 1893.
Raphidostegium delicatulum Paris Index Bryol. 1092. 1894.
Raphidostegium Whitei Kindb. Bryin. Eu. & Am. 1: 63. 1897.
Isopterygium delicatulum Jaeg. & Sauerb. Adumb. 438. 1877.
8. SEMATOPHYLLUM ROELLII (Ren. & Card.).
Raphidostegium Roellii (Ren. & Card.) Bot. Cent. 44: 423. 1890.
Hypnum Roellii Mac. Can. Mosses no. 444.
Hypnum Jamesii (Sull.) Lesq. & Jas. is a true *Hypnum* of the *Stereodon* section, related to and probably the same as *H. pallescens* (Hedw.) Br. & Sch. But there is still some doubt as the synonymy of this species as will be seen in the diverse usage between Limpricht and Kindberg.
Raphidostegium subadnatum CM. & Kindb. equals *H. reptile*, Michx.
Raphidostegium pseudo-recurvans Kindb. equals *H. circinnale*, Hook.
Raphidostegium subdemissum Kindb. was described from sterile specimens from Alaska, which do not belong to this genus.

NOTE ON A LONG ISLAND MOSS.

BY E. G. BRITTON.

In the April number of Torrey, Dr. A. J. Grout has listed "*Raphidostegium admistum* (Sull.) from peaty soil near swamp at Jamaica." The name was printed in heavy faced type and intended to be a new combination, but this combination had already been made by Kindberg, (Bryin. Eu. & N. A. I: 64. 1897) and also by Renauld and Cardot in 1900 in Heller's Plants of Porto Rico, (nos. 4356 and 4496.). Dr. Grout has furnished me with

specimens from Long Island, which have been compared with *H. admistum* Sull. (C. Wright, Cuban Mosses no. 121). They are quite unlike, and the Long Id. species seems to be referable to one of the smaller *Plagiotheciaceæ*, on account of the absence of the large inflated, alar cells of the leaves, so characteristic of *Raphidostegium*. They apparently agree with no. 429 Austin's Musci Appalachiani from swampy bog near Closter, N. J., Sept. 1865.

According to my understanding of this species it is referable to *Isopterygium*, Mitt. and the synonymy is as follows:

ISOPTERYGIUM MICANS (Sw.).

Hypnum micans Sw. Adnot. Bot. 175. 1829.

Hypnum micans Sw. Muhl. Cat. 100, 1813. Nomen nudum.

Hypnum albulum CM. Syn. Musc. 2:280. 1851.

Hypnum (Raphidostegium) albulum Sull. Mosses U. S. 671. 1856.

Hypnum albulum CM. Sull. Icon. Musc. 179, t. 112. 1864.

Rhynchostegium micans, Aust Bot. Gaz. 1: 30. 1875.

Rhynchostegium micans Sull. Rau. & Herv. Cat. 45, 1880.

Isopterygium albulum, Jaeg. Adumb. 436. 1876-1877.

Raphidostegium micans Ren. & Card. Musc. Am. Sept. 54. 1893.

Raphidostegium albulum (CM.) Br. & Sch. Sull. & Lesq. Musci bor.

Am. 302. 1856.

As Sullivant and Lesquereux issued their labels for the Musci Boreali Americani in book form, this last citation constitutes publication.

I have not seen types of either *H. niveans* Sw. or *H. albulum* C. M.

[This species has since been collected at Lawrence, L. Id., on rotten wood in wooded swamps. Det. G. N. Best.—A. J. G.]

CURRENT LITERATURE.

In the Bulletin of the New York Botanical Gardens, No. 6, May 27, 1901, Mr. R. S. Williams presents an enumeration of the mosses collected by him in Yukon territory in 1898-99. This list is very interesting, both from the number of species and the extension of range as well as from the number of new species described. Our space, however, will permit our reprinting only the species new to North America and those of special interest for other reasons. These are reprinted verbatim. Judging from Mr. Williams' work on Brachythecium as noted in the last BRYOLOGIST he is somewhat liberal in his views as to what constitutes a new species; otherwise his work seems wholly commendable and is presented in a clear, careful manner.

A. J. G.

Andreaea petrophila acuminata Schimp. Lake Lindeman. All the specimens examined seemed to be dioicous. The papillæ vary greatly on different leaves, often being very prominent on young leaves and scarcely visible on old specimens (523).

Andreaea petrophila parvifolia (Muell.) Sheep camp, Dyea Creek. These specimens are from the original locality of *parvifolia* and agree with a bit of the original collection from Herb. Mueller. They differ from *petro-*

phila in having rather smaller leaves and mostly dioicous flowers, the ♂ plants being more branching than the ♀ and bearing three or four antheridial buds; paroicous plants occur, however, and there seems to be no reason for considering it other than a variety as above given (519).

Cynodontium torquescens (Bruch) Limpr. Lake Lindeman, on thin earth over rock. Dawson, on rock. Leaves papillose, up to 3 mm. long, twice longer and much narrower-pointed than in *alpestris*. Inner perichæial leaves longer-pointed and less clasping than in *gracilescens*, foliage leaves also narrower above. The perigonium, of two leaves, close under the perichætiium or almost at its side (526).

Cynodontium strumiferum (Ehrh.) DeNot. Lake Lindeman. In crevices of rock (528).

Oncophorus virens nigrescens (Schimp.). (*Cynodontium virens nigrescens* Schimp.) A depressed, blackish variety growing on the margin of an alpine pond just below snow banks about 1000 ft. above Lake Lindeman (791).

Dicranum angustum Lindb. Sterile specimens collected at Lake Lindeman in swamps and found in good fruit at Dawson in July. This is a more slender plant than *scoparium* with erect-spreading, nearly straight, smooth and entire leaves, giving a somewhat bristly appearance to the stems. The leaf-cells are elongated throughout often from 4 to 8 times longer than wide in upper leaf, with walls strongly porose, at least below. Nerve indistinct and narrow a short distance above base. Perichæial leaves abruptly narrowed to a smooth subula about $\frac{1}{2}$ the length of blade. Capsule short, curved, furrowed. Annulus of one or two rows of cells. Spores slightly roughened, up to about .023 mm. Kindberg gives this as a plant of northern Europe, occurring principally in Norway, Finland and Lapland (539).

Dicranum majus orthophyllum Al. Br. Fruiting specimens collected at Lake Lindeman. This variety with nearly straight, erect-spreading leaves bears little resemblance to the beautiful falcate-leaved *majus*. The leaves of the Lindeman specimens measure up to $8\frac{1}{2}$ mm. long, with margins serrulate in upper $\frac{1}{3}$ and vein somewhat rough on back with low papillæ. Leaf-cells elongated throughout and porose nearly to apex, costa percurrent, .045 to .080 mm. wide a little above the broadened base. Capsules clustered, up to 5 in the same perichætiium (544).

Ditrichum giganteum R. S. Williams, sp. nov.

Dioicous. Growing in large cushions up to 12 cm. high, usually of a yellowish-green color. Upper stem leaves up to 7 mm. long, narrowly subulate above, sharply denticulate at apex and more or less serrulate or crenulate on border about $\frac{1}{2}$ down, also often rough on back above. Inner perichæial leaf truncately narrowed to a denticulate subula about equaling the broad part in length. Cell walls thickened throughout except in and near margin at base. Cells in upper leaf 3-5 times longer than wide with rounded ends, in middle near margin, short and irregular, often not or scarcely elongated, toward base several rows in margin narrowly rectangular, 8-10 times longer than wide, with thin walls, within the cells become

much wider, thick-walled and near costa, mostly pitted. Capsule oblong-cylindrical, not quite symmetrical, with conical lid $\frac{1}{3}$ its length and broad annulus of 3 rows of cells. Three or 4 rows of elongated cells about mouth of capsule, below the cells becoming irregularly oblong to rectangular, mostly 2-4 times longer than wide. Teeth pale, very papillose, rather broad and irregular, without distinct articulations. (Plate 15).

This plant is closely related to *flexicaule* with which it has been associated both in this country and Europe, and some of the larger forms of *flexicaule* approach it very closely but I have not yet seen any with such long, slender, serrulate leaves with inner perichæatial leaf truncately narrowed to so dentate a subula. The color and size alone are usually sufficient to separate the plant. Macoun's no. 66 is this species, also Leiberg's 232. In European collections, "485 Jack, Leiner and Sitzenberger Kryp. Badens," "a" is this and "c" is *flexicaule*. 1307 Rabenhorst, Bry. Eur. looks much like this but is *Dicranodontium*. "111 Bryotheca Silesiaca" and "111 Wilson, Musci Brit." are this species.

Sterile specimens only were collected at Dawson. The description is drawn up from specimens collected at Columbia Falls, Mont., July, 1892. In the plate the teeth are probably figured too short, the only available specimen being in poor condition. The plant grows on both earth and rock and rarely fruits (568).

Bryobrittonia R. S. Williams, gen. nov.

Closely related to *Tortula* and *Desmatodon* from which it is distinguished by the mamilllose leaves, the exposed surfaces of the distinct cells being highly convex. From *Trichostomum* and *Timmiella* it is distinguished by the costa with only one steredid band; the first of these also has the leaves smooth or papillose and the second has a leaf lamina of 2 layers of cells, mamilllose on the upper surface only.

This genus is dedicated to Mrs. Elizabeth G. Britton, by whose aid so many American students of our mosses have been encouraged.

Bryobrittonia pellucida S. R. Williams, sp. nov.

With much the habit of *Tortula latifolia* but leaves much longer and narrower above. Stems mostly simple, radiculose below, in loose, rather dark green tufts up to 2 cm. high, in cross-section irregularly oval (about .320 mm. long) with walls of 2 or 3 rows of slightly thickened irregular cells, ground tissue of large thin-walled cells, surrounding a distinct central strand of numerous small thin-walled cells. Terminal leaves (often enclosing numerous long paraphyses-like hairs) oblong lanceolate, up to 7.5 mm. long and 1.5 mm. broad, plicate and somewhat crispate when dry or rarely nearly straight, mamilllose on both faces except dorsal side of costa, crenulate-serrate on flat borders in upper half, obtusely or somewhat acutely pointed, with stout costa (.140 mm. wide near base) long-decurrent on stems and vanishing several cells below apex. Lower leaves ovate-oblong (about 3 mm. long). Leaf-cells above rhomboidal to hexagonal, about .016 mm. in diameter, becoming gradually elongated below and hyaline, the cells near margin a little above base .004-.006 mm. wide and up to .160 long, toward

costa .020-.025 mm. wide and up to .100 mm. or more long. Cross-sections of costa show in the ventral half about 4 guide-cells with a few accessory cells or even 1 or 2 rows of accessory cells nearly as large, in addition to the row of mamillose cells on ventral surface. The dorsal half of costa consists of a stereid band, the outer row of cells a little larger than the others with a distinct central strand of small, irregular, thin-walled cells. (Plate 16.)

Yukon River bluff, just below Dawson. Collected April 6, 1899, on rock (587).

Funaria hygrometrica arctica Berggrn. Lower Klondike River. The specimens are mostly from 12 to 20 mm. high. Spores up to .024 mm. The spores of *hygrometrica* run up to .016 or .018 mm. (691).

Bryum Dawsonense R. S. Williams, sp. nov.

Synoicous and autoicous. Tufts low, 1.5 cm. high, and dense. Stems branching. Outer perichaetial leaves ovate-lanceolate, upper stem leaves ovate, about 2.5 mm. long with costa excurrent the length of 2 or 3 short cells. Lower stem leaves much smaller and costa not quite percurrent. Leaves entire, or sometimes minutely serrulate towards apex with revolute margins from base to near apex or in very young or lower leaves margins scarcely revolute. Marginal cells $\frac{1}{2}$ down in upper leaves narrowed and much elongated in 3 or 4 rows but only slightly changed toward apex. Inner perichaetial leaves small, lanceolate pointed, with percurrent costa. Median leaf-cells rhomboidal to hexagonal, mostly 2 or 3 times longer than broad, about .050 mm. long. Lower cells sometimes pitted. Capsule with lid up to 2.5 mm. long. Sporangium oblong, scarcely or not contracted below mouth and rather abruptly narrowed when dry to the shorter collum. Peristome yellowish below, the lower plates of teeth mostly twice wider than high, gradually becoming nearly square above; lamellae 16-18, irregularly connected by 1-3 cross walls between adjoining lamellae; segments narrow and narrowly perforated, separated by mostly 2 cilia, a little shorter and often long appendiculate. Annulus broad, of 3 rows of cells. About 3 rows of transversely elongated cells about mouth of capsule, the cells near middle becoming somewhat rectangular and in collum scarcely elongated and sinuous walled, with oblong stomata about .040 mm. long. Spores smooth or nearly so, up to .025 mm. (Plate 17.)

Dawson, on damp earth. In good fruit Aug. 28, 1898. This plant is undoubtedly close to *pendulum* differing in the short pointed leaves, more distinctly bordered and in the long cilia, some of which are finely appendiculate (585).

M. Philibert left me in doubt as to just what he considered this plant and I have finally ventured to describe it as a distinct species rather than a variety of *pendulum*.

Bryum conditum R. S. Williams, sp. nov.

Diocious. Male plants discoid. Tufts up to 3.5 cm. high. Stems and branches more or less radiculose. Outer perichaetial leaves oblong-lanceolate, with a gradually narrowed base, up to 4.5 mm. long. Upper stem leaves a little shorter with broader base, all entire, with costa excurrent for

a length of 3 or 4 cells and a brown revolute border of thick-walled cells in double layer, confluent with the costa. Lower stem leaves much smaller with costa vanishing. Inner perichaetial leaves very broad, the width very often equal to $\frac{1}{2}$, or more, of the length and costa percurrent. Median leaf-cells mostly hexagonal, 2 to 4 times longer than wide, up to .070 mm. long. Cell walls rather thick, scarcely pitted or sometimes distinctly so both above and below. Capsule with lid up to 5.5 mm. long. Sporangium not contracted below mouth, mostly somewhat gradually narrowed to collum and about equalling it in length. Lid low-convex, not mamillate. Annulus of 3 or 4 rows of cells. Exostome pale golden-yellow below with dorsal plates near base 3 to 4 times wider than high and 26 to 28 lamellae on ventral side not joined by cross walls. Endostome free, with basal membrane extending $\frac{1}{2}$ up, segments broadly pointed with 8 to 10 narrow perforations, well developed cilia broad, solitary, 2 or 3 rows of cells wide, with apex sometimes slightly split or shorter and imperfect. About three rows of transversely elongated cells about mouth of capsule, the cells toward middle becoming rectangular (3 or 4 to 1) and near base short and irregular with oblong stomata about .040 mm. long. Spores smooth, up to .024 mm. (Plate 18.)

On rocky hillside between Cañon City and Sheep Camp, on Dyea Creek, March 28, 1898. This plant comes nearest *uliginosum*, I believe, but differs in the more pointed leaf with more distinct and revolute border, pitted leaf-cells, blunt lid, more developed inner peristome and dioicous inflorescence (578).

This plant was wholly unnamed by M. Philibert, and I should have been greatly pleased to have given his name to the species, but it does not seem to be available in this connection.

Bryum submuticum Philibert, sp. nov.

Dioicous. Male flowers bud-like with leaves ovate and more or less spreading but not reflexed near middle, abruptly much smaller on stem below. Plants growing in extensive mats 2 or 3 cm. thick, stems scarcely branched, felted together with a dense mass of radicles below. Outer perichaetial leaves $2\frac{1}{2}$ mm. long, ovate, somewhat acutely pointed with costa percurrent or excurrent the length of 1 or 2 short cells, upper stem leaves a little shorter and costa vanishing just below apex, all entire or nearly so with a distinct revolute border of about 3 rows of long narrow cells near middle, towards apex the margins flat and cells not much elongated. Inner perichaetial leaves ovate-lanceolate with costa vanishing just below apex. Median leaf-cells about .035 mm. long and $\frac{1}{2}$ as broad, lower cells short rectangular (about $1-1\frac{1}{2}$ or 2). Cell walls all somewhat thickened but not pitted. Capsule with lid up to $2\frac{1}{4}$ mm. long, slightly narrowed under the mouth, the sporangium gradually narrowed to a shorter collum. Exostome pale yellow below. Plates of teeth narrow (about 1-3) near base, lamella from 25-30. Basal membrane of endostome extending $\frac{1}{2}$ up, the segments broadly perforated and separated by mostly 3 appendiculate cilia. Two or 3 rows of transversely elongated cells about mouth of capsule, the cells near middle broad, often scarcely elongated with somewhat sinuous walls, at base very irregular and sinuous walled. Oblong stomata about .035 mm. long. Smooth spores up to .014 mm. Annulus of 4 rows of cells. (Plate 19).

This species is quite near the preceding variety but still smaller and more slender. The leaves are broader, shorter pointed, more entire, and costa more frequently vanishing just below point (584).

In the Bulletin of the Torrey Botanical Club for April, 1900, pp. 202-211, Mr. Stephen Conrad Stuntz publishes a Revision of the North American Genus *Eleutera* Beauv., which is the name he gives to our old friend *Neckera*. He adds no new species to our list (for which we thank him) and reduces *N. oligocarpa* to a variety of *pennata*. With this reduction almost any one will agree who has ever had the opportunity to carefully compare the two. Mr. Stuntz changes the specific name of two species, *complanata*, 1763, to *ornithopodioides* (Scop.), 1760, and *undulata* to *Jamaicensis* (Emel.), 1791. As Hedwig's *undulata* dates from 1792 and has been in general use for 108 years we hope that these 108 years of use will ultimately outweigh the single year of priority.

Two varieties described since the publication of the L. & C. Manual are included, *Neckera Menziesii limnobioides* R. & C. and **N. pennata pterantha** (C. M. & Kindb.). Descriptions of both these varieties are printed in Barnes and Heald's Keys. *N. Menziesii amblyclada* Kindb. and *N. Douglasii Macounii* Kindb. are both reduced to their species.

"No North American specimens of *E. Fontinaloides* (*N. pumila*) have been seen and it is likely that Bruch and Schimper were wrong in crediting it to North America. *N. Ludovicæ* and *N. cymbifolia* are referable to *Pilotrichum*, as is probably *N. Floridana* also, although all the specimens examined bearing this name in herbaria are really *E. disticha*."

The work of revision appears to have been well and carefully done and will be welcomed by every working Bryologist for its descriptions and notes on distribution, which are much superior to any previously accessible.

A. J. G.

1. ATRICHUM LESCURIJ James.

Mr. E. S. Salmon, in No. 15 of Bryological Notes (Journal of Botany, October, 1901), shows that this species referred by Mitten to *Oligotrichum*, made by Kindberg the type of his new genus *Bartramiopsis* (Rev. Bry. 1894) and referred by Hagen and Jensen to their new genus *Philocrya* (Meddel. am Groenland, XV., 1898), belongs certainly to R. Brown's older genus *Lyellia*, coming close to *Lyellia crispa* R. Br. Its right name becomes therefore *Lyellia Lescurii* (James) E. S. Salmon, both *Bartramiopsis* and *Philocrya* being merged in *Lyellia*.

2. HYPNUM LENTUM Mitt.

In No. 24 of his Bryological Notes (Journal of Botany, January, 1902), having seen Mr. Mitten's material, Mr. Salmon shows that this is identical with *Scleropodium caespitosum* (Wils.) and so must become a synonym of it, a condition which Dr. Grout surmised in his Revision of North American species of *Scleropodium* (1899). Mr. H. N. Dixon adds his weight of conservative judgment to Mr. Salmon's in recognizing not even varietal rank for *H. lentum*.

JOHN M. HOLZINGER.

OFFERINGS.— [To chapter members only—for postage.]

Thomas A. Bonser, Carey, Ohio. *Hedwigia albicans*, *Drummondia prorepens*, *Hyp. imponens*, *Porella platyphlla*.
Mrs. J. D. Lowe, Noroton, Ct. *Hyp. uncinatum*, *H. fertile*, *H. Haldanianum*, *Amblystegium adnatum*.
Miss A. L. Crockett, Camden, Maine. *Andreaea petrophila*, *Polytrichum juniperinum*.
W. C. Burbour, Sayre, Pa. *Ditrichum tortile*.
A. J. Grout. *Catharinea crispa*, *cfr.*

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SEPTEMBER, 1902



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AN ILLUSTRATED BIMONTHLY DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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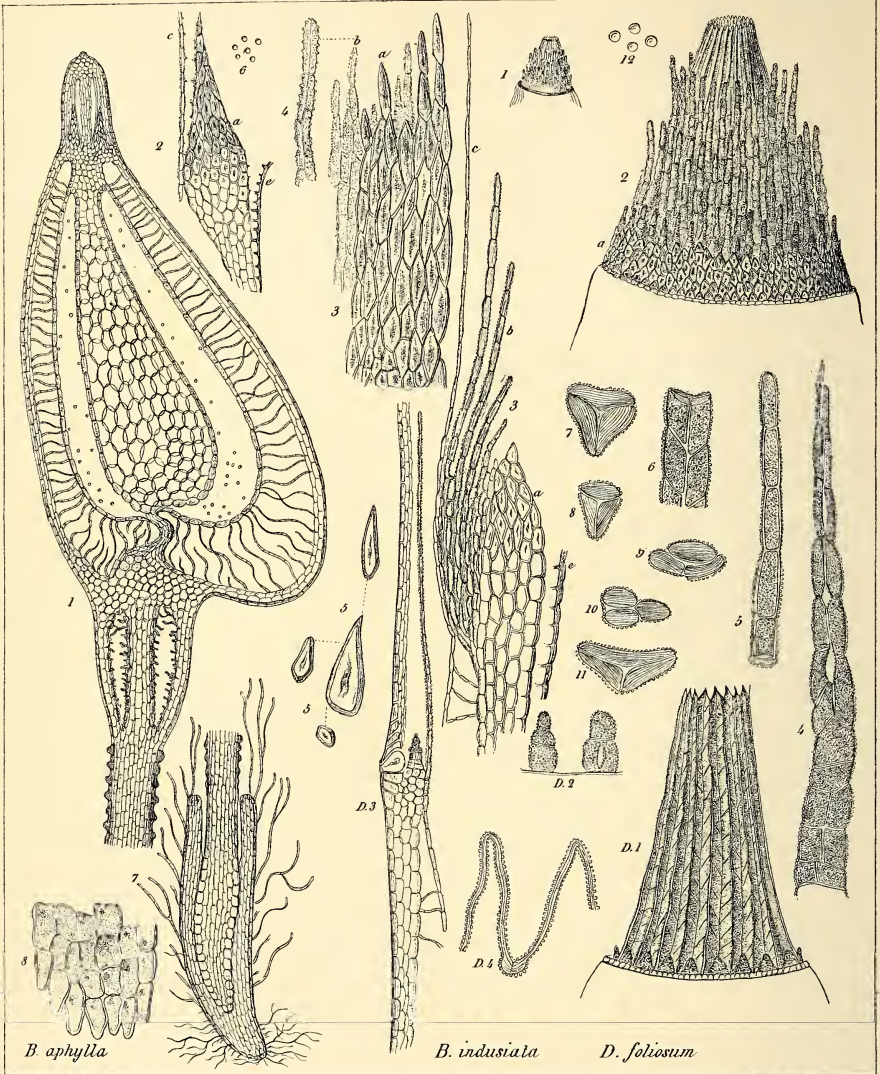
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B. aphylla

B. indusiata

D. foliosum

Bot. Jahrb. 1888, vol. 10, p. 176

Bot. Jahrb. 1888, p. 176

Explanation of Plate VI. (Reduced from the Bryologia Europea)
B. aphylla: 1, magnified vertical section of the capsule; 2, pseudannulus in vertical section more highly magnified, c, lower part of internal peristome, e, epidermis of capsule; 3, greatly magnified portion of pseudannulus showing the rudimentary peristome at b and also at fig. 4; 5, cells of the pseudannulus.

THE BRYOLOGIST.

VOL. V.

SEPTEMBER, 1902.

No. 5.

THE PERISTOME. III.

BY A. J. GROUT.

There can be no doubt that there is no exact homology between the peristomes of the Nematodonteae and those of the Arthrodonteae, for the teeth of the former are composed of masses of cellular tissue while those of the latter are composed of the thickened tangential cell walls (i. e., the cell walls parallel to the walls of the operculum) of one or more layers of cells. The joints or articulations from which this type of peristome takes its name are the places of intersection of these tangential walls with the horizontal cell walls forming the top and bottom of the cells. The rest of these horizontal walls and the entire vertical radial walls (i. e., those forming the sides of the cells) have been absorbed. If one were to take a pyramid consisting of a single row of rectangular boxes of graduated sizes and after fastening one side of them together in a straight line should knock away the other walls he would get a good idea of the formation of the arthrodont peristome. A narrow strip of the tops and bottoms must be left between the remaining sides to represent the articulations and the result would be comparable to only one-half a tooth of the outer peristome of *Hypnum*. Then if both sides be covered with a layer of plaster it will represent the thickenings laid on the original cell wall to form the lamellae.

While the arthrodont and nematodont types of peristome seem very distinct, there seems to be something of a connecting link in the peristomes of the Buxbaumiaceae as typified by the peristome of *Buxbaumia indusiata*. This peristome consists of an inner and an outer peristome, the inner of a plaited cone, truncate and with a narrow opening at the top, apparently for the gradual escape of spores, but Braithwaite quotes Zukal to the effect that the spores cannot escape through this narrow opening. This may be so in *Buxbaumia*, I have not had sufficient suitable material to decide for myself, but in the closely related *Webera sessilis* the spores certainly are dispersed through this narrow opening, though some of them may remain until the capsule decays as in *Buxbaumia*.

This inner cone is composed of a thin membrane made of the thickened tangential cell walls of one of the layers of cells and is plaited or folded like

B. indusiata: 1 and 2, peristome; 3, pseudannulus (a) and peristome (b) in vertical section, c, internal peristome; 4 and 5, teeth of external peristome; 6, portion of the same more highly magnified; 7-11, different transverse sections of the teeth of the external peristome. *D. foliosum* (*Webera sessilis*): D1, peristome magnified; D2, a single tooth; D3, vertical section of the peristome, operculum, and capsule wall; D4, folds of the internal peristome in transverse section.

a half opened fan. The structure of this cone is most easily understood by consulting Plate VI, Fig. D1. The structure of this is almost exactly like that of *Buxbaumia* shown on a smaller scale at 2 under *B. indusiata*. It corresponds very closely in structure and development to the basal membrane of the inner peristome of Bryum and Hypnum and their allies, only in *Buxbaumia* the upper part is continuous instead of being broken up into segments and cilia.

The teeth of the outer peristome are constructed much like those of the ordinary arthrodont type. They are well illustrated in figs. 4, 5 and 6 under *B. indusiata*, and are shown in cross-section in figs. 7, 8, 9, 10 and 11. In these last figures the original cell walls are indicated by the lighter T shaped central portion while the remainder consists of the thickening added on and forming the plates or lamellae. The top of the T is the tangential wall while the stem is a portion of a vertical radial wall included between the lamellae. But instead of a single row of these teeth there are several as shown in fig. 2 under *B. indusiata*. Outside of these teeth and between them and the outer wall of the capsules is a mass of cells which is called the crown or pseudannulus, which may perform the functions of an annulus but is in no way homologous with it (*B. ind.* 3). M. Philibert considered these cells and the several rows of teeth as homologous with the outer rows of cells in the teeth of the Nematodonteae, the several rows of teeth being composed of the thickened papillose tangential walls of a portion of the peristomial tissue while the pseudannulus corresponds to the outer layers of the same.

This view is borne out by *B. aphylla* in which the outer teeth are almost lacking and the pseudannulus is much thicker and is thickened and papillose on its inner cell walls. According to this view then, the peristome of *Buxbaumia* is formed of tissue homologous to that of the teeth of *Polytrichum* by the thickening of the tangential walls of a few rows of cells and the absorption and disappearance of the rest of the tissue. Apparently these outer teeth in *Buxbaumia* have no function and consequently have not become fixed by natural selection. At any rate they are immensely variable in all the species. In *B. aphylla* the outer teeth are scarcely present at all. In the closely related *Webera sessilis* the inner peristome is essentially the same as in *Buxbaumia* except that the folds are but 16 and there is but one rudimentary outer row of teeth, thus approximating to the arthrodont type. How Lindberg, C. Mueller, and Braithwaite can deny the close relationship of these two genera in the face of Schimper's figures reproduced here is a mystery to me.

While this type of peristome is evidently intermediate between the nematodont and the arthrodont types, M. Philibert's conclusion that it represents a primitive type needs to be considered with a good deal of caution in view of its evident functional and structural degeneracy. The variation which Philibert notes as probably preceding the fixed types of the Arthrodonteae may as well be explained by degeneracy. When we consider how many other species of mosses with a similar habit, e.g. *Pottia*, *Physcomitrium*, *Pleuroidium*, and *Mollia viridula*, have degenerated in respect to their peristomes, it lends added weight to the theory of the degeneracy of the peristomes of the *Buxbaumiaceae*.

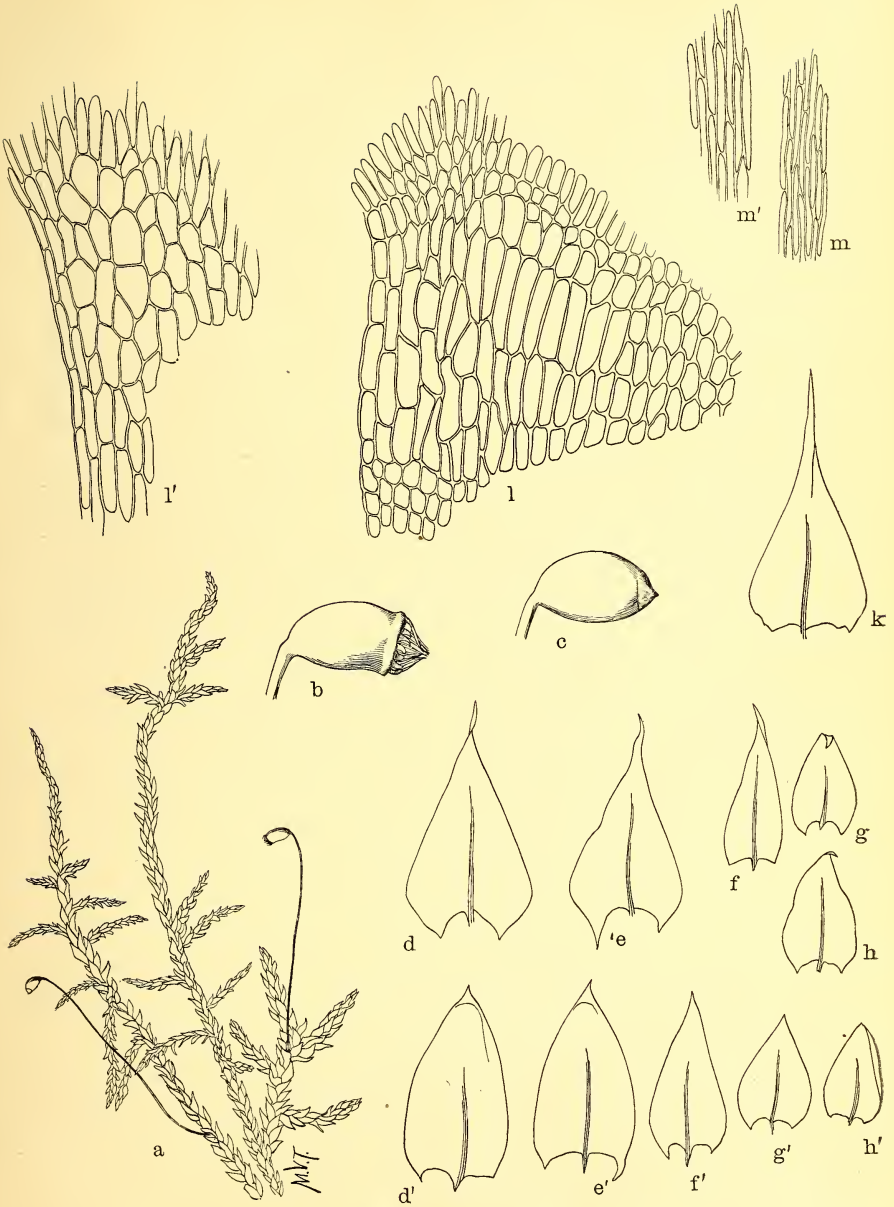


PLATE VII.—BRACHYTHECIUM NELSONI n. sp.

BRACHYTHECIUM NELSONI n. sp.

By A. J. GROUT.

Plants with the facies of undersized *Brachythecium rivulare*, but not dendroid. Stems 5-8 cm. long, irregularly to subpinnately branching. Stem leaves erect-spreading, triangular-ovate, long and slenderly acuminate, 1.5-2 x about 0.6 mm., slightly concave with margins turned inwards towards the apex, slightly serrulate at extreme apex. Branch leaves similar to the stem leaves but smaller and usually proportionately narrower, the upper often serrate above, decurrent, with a large area of abruptly enlarged and inflated alar cells which are separated from the ordinary cells by a narrow band of much smaller oblong cells. These alar cells are much like those of *B. rivulare*, except that they occupy a larger area; median and apical cells much as in *B. rivulare*, costa stout at base, rapidly narrowing in the lower portion, extending about two-thirds the length of the leaf. Perichaetial leaves slightly costate.

Apparently dioicous. Sporophyte not differing essentially from that of *B. rivulare*.

La Plata Mines, Wyoming, Aug. 25, 1898. Coll. Elias Nelson, no. 5172. Com. J. M. Holzinger. Apparently growing on humus. Type in herb. A. J. G.

This plant is very close to *B. rivulare* but differs distinctly in its triangular long acuminate leaves, which are different from any I have ever seen on any of the hundreds of specimens of *B. rivulare* which I have examined. The inflated alar cells are also much more numerous, extending well toward the costa.

DESCRIPTION OF PLATE VII.

a, Plant of *B. Nelsoni* x 1½. b & c, Capsules x 8. d & e, Stem leaves of *B. Nelsoni*: d' & e', of *B. rivulare*. f, g, & h, Branch leaves from upper middle, lower middle, and base respectively of branch of *B. Nelsoni*: f', g', & h', same of *B. rivulare*. k, Large branch leaf of *B. Nelsoni*. l, Alar cells of *B. Nelsoni*: l', of *B. rivulare*. m, Median cells of *B. Nelsoni*: m', of *B. rivulare*.

LUNULARIA CRUCIATA IN FRUIT.

By JULIA T SHINN.

Although described as always sterile in America, *Lunularia cruciata* has yielded to the "glorious climate of California" and quantities of the tiny white tufts that conceal the young archegonia were to be seen during this last April and May in the great lath-house of the California Nursery Company at Niles. There, as in many large American greenhouses, the *Lunularia* is a great nuisance, rapidly covering the surface of the half-buried pots and of the earth between them. The air of the lath-house is of course fresher than in a glass house, the ground is kept damp and it is rather darker than under glass. This house is used principally as a shelter for camellias, azaleas and the more tender conifers such as araucarias. Possibly the conditions suitable to these plants approach those of the European habitats of the *Lunularia*.

While in the damper parts of the house this hepatic grows with ordinary luxuriance, in the higher, more nearly dry parts, the thallus is a little smaller, the characteristic, crescent-shaped gemmae cups less numerous. In this dryer portion, the first week in April I found many of the little white tufts, until then quite new to me.

Examination under a microscope showed a tiny green center so small that I could not be sure of its nature, though Dr. Howe's descriptions,—“♀ receptacle arising from a deep sinus of the thallus, surrounded when young and sessile by a tubular-ovate sheath, consisting of numerous scales, the inner of these membranous, hyaline, ciliate-fimbriate”—suited exactly.

Two weeks later I again visited the lath-house. By this time the tufts had doubled in size and there were many androecii, full sized but not quite mature. In another week the young archegonia were distinctly four-parted and rounded. Evidently many of them had been fertilized. Some of those that I had taken home and put under glass had grown, but not nearly as much as the undisturbed ones.

On the 9th of May I found eleven perfected “fruits” in the lath-house, and many approaching perfection. Of one, indeed, the capsules had burst, the spores were gone, and only a few brown threads of elaters still clung to the ends of the valves.

It is a beautiful thing,—the “delicate, pellucid, pilose peduncle” with the four or five tubular segments each tipped with a pendant brown capsule—infinitely more lovely than any printed description or dried herbarium specimen could tell.

Niles, California.

BRYOLOGICAL MILLINERY.

BY CORA H. CLARKE.

I wonder if the members of the Sullivant Moss Chapter have seen bonnets and hats made of real moss? An enterprising member of a Boston Botanical Class went to Jordan and Marsh's to investigate the matter, and found, on the counter where fancy braids of various material were sold for the composition of hats and bonnets, two styles of moss braid. One was in the shape of a green band, nearly three inches wide, the price of which was 25 cts. a yard. Examining this at our Botany Group, we discovered it to be composed of sprigs of moss two or three inches long, with short side branches. These sprigs were evidently laid side by side and then fastened together by nine rows of coarse stitching, running the length of the band, and done with coarse cotton thread. (I wonder that green thread was not used for this purpose). When we picked some bits out and examined the moss, we found that it resembled *H. Schreberi*, but without the red stem—it agreed very nicely with the description of *Hypnum purum*, a species which does not occur in this country, but we found it described in “Dixon.” In a yard of the band, we found but two fruits.

The other preparation of moss looks like a long cord of green chenille, not quite half an inch in diameter. It sells for ten cents a yard. The bits of brown moss mixed with the green are a darker brown than those of the

Hypnum, and the whole effect is a darker green. The stiff little moss sprigs radiate from a central axis of white cotton stitches which makes a core to the cord; after they were thus fastened together, the surface was evidently clipped all around, to make an even cylinder. A few little fruit pods showed among the moss branches, and one bore a nice lid, the rostrum of which was unfortunately cut off by the ruthless clipping machine. The leaves of this "moss-of-the-cord" (not Cord-Moss) show the unmistakable undulations or crispiness of *Neckera*, while their peculiar shape and the pedicelled capsules agree with none of our American species, and we again looked in Dixon, and decided that it is the species—*Neckera crispa*. There were a few bits of *Dicranum* in with the *Neckera*, but the bulk of the cord was composed of the same species of moss. Boston, Mass.

In connection with Miss Clark's article it seems apropos to note that in California *Alsia abietina* and *Antitricha Californica* are used to pack vegetables. Dr. J. W. Bailey has sent me from Seattle specimens of these mosses taken from vegetables shipped there from California. Dr. Bailey adds that the mosses are reported to come from Boulder's Island.

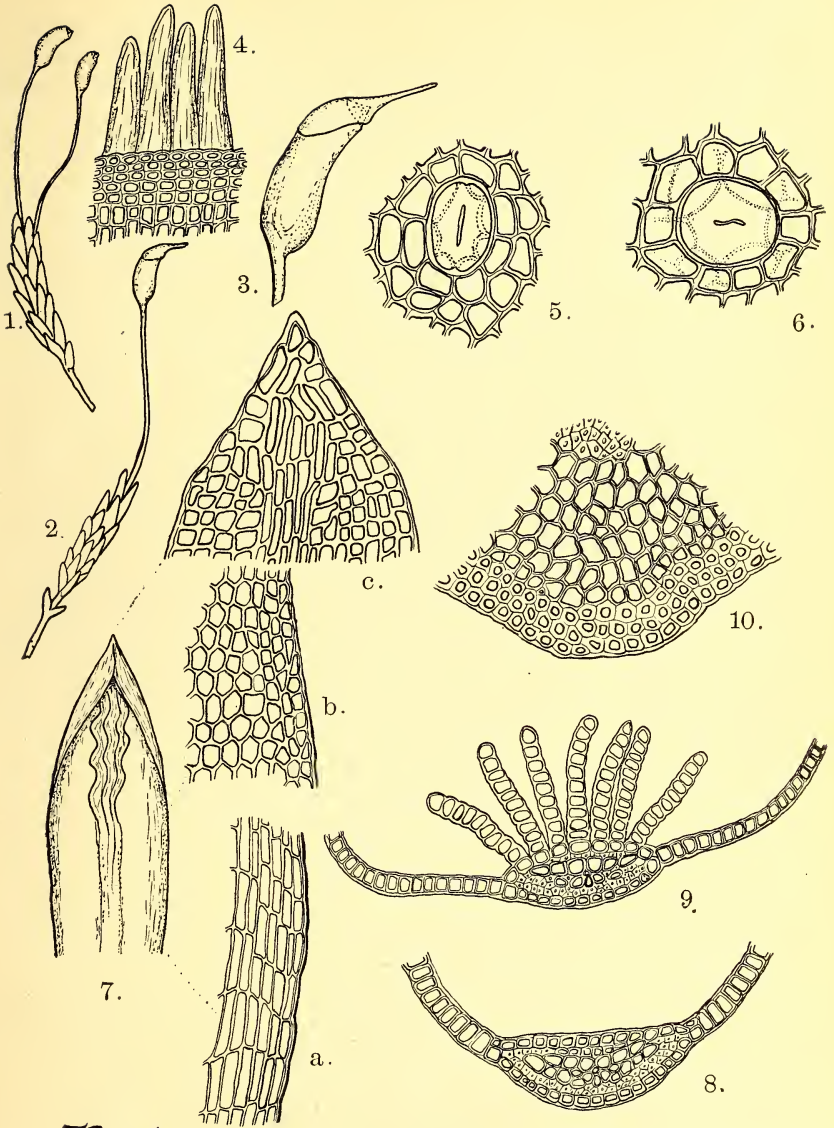
We hope some of our Californian friends will give us more information on this matter. A. J. G.

A GOOD COLLECTING GROUND.

BY W. C. BARBOUR.

Last spring the writer spent a part of two very rainy days in the eastern part of Wyoming County, Pennsylvania, in quest of mosses, hepatics and lichens. Probably three or four hours of each day were spent in active work, with the result noted below. Under the circumstances only the most superficial collecting could be done, but the number and fine condition of the species obtained, leads one to think it worth the while of any one interested to give the county a thorough botanical exploration. It is in the mountain region of north-eastern Pennsylvania within easy distance of either Wilkesbarre or Scranton. The nearest stations are LaGrange, on the Lehigh Valley Railroad, and Factoryville, on the Delaware, Lackawanna and Western Railroad. These stations are only ten miles apart, so that the botanist may start from one and cross to the other, without having to retrace his steps, to reach his train again. It is to be hoped that some one who spends the summer and autumn at one of the cities named will take up an examination of the territory indicated; which, it is believed, will yield fine results. In this very short time the writer collected 55 species of mosses including *Brachythecium acuminatum*, *Fissidens osmundioides*, *Mnium rostratum*, and *Thelia asprella*. Also 64 species of Lichens and 25 species of Hepatics.

There are needed for distribution to the Chapter, specimens of the various species of *Lejeunea*, of *Scapania*, and any species of *Radula* except *complanata*. Any member who can furnish material of these genera (or others) for distribution please communicate with Mr. Barbour. *Sayre, Pa.*



F.R. del.

PLATE VIII.—*PSILOPILUM TSHUCTSCHICUM*, C. M.

(Explanation of Plate.)

1, 2. Two plants slightly enlarged. (Nat. size 1.6 to 2 cm., including seta and capsule).

3. A capsule with calyptra, enlarged.
4. Peristome teeth with adjacent cells of exothecium.
- 5, 6. Two stomata, phaneropore (60 to 75 μ in diameter, showing the confluence of the guard cells).
7. A leaf entire, showing the wavy edges of the lamellae. (Leaves are 2 to 4 mm. long).
- a, b, c. Cells from near leaf base, middle and apex respectively. (Cells near base measure 14 to 16 μ wide, and 3 to 4 times as long as wide. The irregular, usually isodiametric, sometimes square cells about the middle of the leaf are 16 to 20 μ in diameter).
8. Section of costa near leaf base, showing the complete disappearance of the lamellae.
9. Leaf section about the middle.
10. A part of a stem section. (Stem is round-triangular, and about 350 μ in diameter).

CATHARINEA (PSILOPILUM) TSCHUCTSCHICA.

Carl Müller in Botanisches Centralblatt, Band 16 (1883), p. 93.

BY JOHN M. HOLZINGER.

“Dioicous; very close to *Psilopilum glabratum* (= *P. arcticum* Brid. *Vide*, Limpr. Laubm. 2: 602), and similar to it, but larger, stouter, and blackish; stem leaves less closely appressed, open, longer, *very entire*, the areolation at base consisting of wide rectangular cells with thin walls (not of elongated irregular cells with delicately membranaceous walls); strongly convolute at the apex, ending in a short-incurved apex, the perichaetial leaves very similar to the stem leaves (not longer, nor at base more membranaceous); capsule larger, less curved, pale, membranaceous, with longer teeth.

“Type locality: the peninsula Tschuctschica, St. Lorenz Bay, Aug. 12, 1881; Pooten, Aug. 28, 1881; Lütke Harbor, Aug., 1882.

“This plant differs at the first glance so considerably from *Catharinea glabrata* that it is at once felt to be different from it, and this partly because of larger cohering cushions, the diverging larger leaves, and the larger pale fruit with thin walls. The essential differentiating character however is in the basilar part of the leaf, and is quite distinctive, as above described. It is certainly an interesting addition to the arctic mossflora.”

In this translation *Catharinea glabrata* is another name for *Psilopilum arcticum* Brid. Limpricht, in Laubmoose 2: 602, writes for this plant *Psilopilum laevigatum* (Wahlenb.), citing curiously enough the following synonymy:

1. *Polytrichum glabratum* Wahlenb. (1803).
2. *Polytrichum laevigatum* Wahlenb. (1812).
3. *Catharinea glabrata* Hook. (1813).
4. *Catharinea laevigata* Brid. (1819).
5. *Psilopilum arcticum* Brid. (1827).
6. *Oligotrichum laevigatum* Bryol. Eur. (1844).
7. *Oligotrichum glabratum* Lindb. (1879).

Limpricht considers the genus *Psilopilum* well founded, and would therefore not refer the plants in question to either Catharinea or Oligotrichum. But in deciding upon the specific name, he considers the fact that Wahlenberg ignores the name imposed upon the plant by himself in 1803 sufficient ground to do so himself. Here Lindberg had the right view when in 1879 he restored Wahlenberg's first name, ranging the plant, however, under Oligotrichum. We cannot but agree with Limpricht in accepting the genus *Psilopilum*; but must differ from him when for so unacceptable a reason he rejects the oldest specific name. The *Psilopilum arcticum* of Lesq. & James' Manual should certainly be called *Psilopilum glabratum* (Wahlenb.). Carl Müller, following Hooker and the earlier view of Bridel, referred the plant to Catharinea, which explains the above synonyms. Naturally, in describing the second species, this same author wrote Catharinea (*Psilopilum*) *Tschuctschica*. But, under the influence of the other view this plant is simply *Psilopilum Tschuctschicum* C. Müll., as the author himself writes it in his Genera, p. 165.

The absence of the *crenulate margin* toward the apex of the leaf was the first intimation to the writer that this plant might be something different from *Psilopilum glabratum*. Next it was noted that the spores vary from 24 to 36 μ in diameter, while Limpricht records 18-22 μ as the size of the spores in the old species. Through the courtesy of Mr. W. R. Maxon the writer was able to see several specimens of authentic *Psilopilum glabratum*. And through the especial kindness of both Miss Josephine Tilden and Mr. W. R. Maxon the original description of the second plant was made accessible. From this the above translation was made.

It will be noticed that Carl Müller emphasizes the distinctive character of the cells near the leaf base; these are *wider, rectangular* in the new species; narrower, ending in *oblique* walls, in the old species. In addition, the cells of the exothecium are different in the two species: these are elongated *throughout* the capsule in the new plant, but are mostly isodiametric, at least near the *middle* of the capsule, in the old. Finally, the leaf costa shows a characteristic difference: in the new plant there is a broad band of several rows of *stereid cells* under the dorsal band of thin walled large cells; this is absent or quite inconspicuous in leaf sections of the old species. Stem sections show no appreciable difference.

While it was quite reasonable, and indeed to be expected, that a plant occurring immediately on the west side of Bering Strait should also be found on its east side, the writer decided, if possible, to make sure this determination by actual comparison with type material. This he was able to do by the courtesy of Dr. S. Engler, who communicated a few plants of C. Müller's material from the herbarium of the Bot. Museum at Berlin. The comparison proves the North American plants typical *Psilopilum Tschuctschicum* in structure and size of parts. They show one unimportant difference, being on the whole a little more compact than the type.

Mr. Wm. R. Maxon, of the National Museum, furnishes the following interesting data regarding the type locality, first collections, etc.

"*Musci Tschutschici* (auct. C. Müller) is a paper which appeared in three parts as follows :

Bot. Centralbl. **16**: 57-65. (1883).

" " **16**: 91-95. (1883).

" " **16**: 121-127. (1883).

A good many new species are described. The collection reported on in this paper was made under the auspices of the Bremen Natural History Society, by which the two brothers, Dr. Arthur Krause and Dr. Aurel Krause, were commissioned to make a journey of discovery to the Tschuktisches Peninsula (also spelled Chukches Peninsula). Accordingly these two explorers spent the summer of 1881 in the vicinity of St. Lawrence Bay, Emma Harbor, and Lütke Harbor, collecting both geological and botanical data and materials. The mosses of this expedition were entrusted for elaboration to Dr. Carl Müller of Halle, whose report on them appears under the above title."

The pocket containing the plants sent by Dr. Engler bears with the name the following data: "Peninsula Tschutschica, St. Lorenz Bay, Geb. A. & A. Krause, 12 Aug. 1881."

Prof. J. B. Flett collected the plant in Alaska at two stations: first on the tundra near Rodney, on July 13, 1900; second, on the tundra 16 miles west of Nome City, on July 20, 1900. He kindly furnishes the following data: "Nome is in latitude about $64\frac{1}{2}^{\circ}$ N. and longitude $165\frac{1}{2}^{\circ}$ W. It is about 12 miles N. W. of Cape Nome. Rodney river is a creek about 20 miles N. W. of Nome City, along the coast." It thus appears that this American station is in nearly the same latitude as is the type locality, separated only by Bering Strait. But to Mr. R. S. Williams seems to belong the honor of being the first to find this plant in North America, if the plant collected by him on the "Left Bank of Klondike below Bonanza Creek, on June 18, 1899," is rightly referred here. The plants kindly communicated from the National Herbarium by Mr. W. R. Maxon are sterile, with leaves entire, but of different shape than in either of the two species of *Psilopilum*. The *rectangular* basal leaf cells bring it rather to Carl Müller's species; but they are much shorter. The lamellae also are much more scant. And it is not impossible that Mr. Williams' plants may prove to be a third species of *Psilopilum*. But this can not be established with certainty without more abundant and fruiting material, which so far is lacking.

Winona, Minn.

FOR DISTRIBUTION.

(For postage, to chapter members only).

Mrs. J. D. Lowe, Noroton, Ct. *Dicranum fulvum* cfr, *Dicranella heteromalla* cfr, *Anomodon attenuatus*, *Plagiothecium turfaceum* cfr, *Brachythecium oxycladon* cfr, *Eurhynchium strigosum robustum* cfr, *Polytrichum Ohioense*.

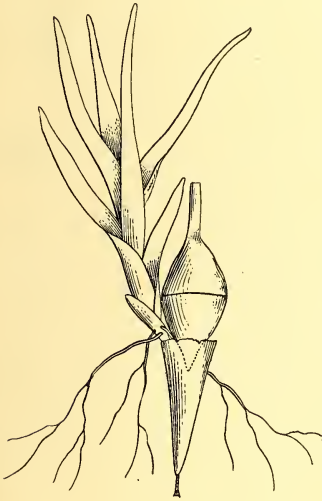
Mrs. Carolyn W. Harris, Chilson Lake, Essex Co., New York. *Thelochistes parietinus*, *Pyxine sorediata*.

OCTODICERAS JULIANUM, ITS PROPAGATION, DISTRIBUTION AND HISTORY.

BY E. G. BRITTON.

In the July number of this Journal, Mr. Hill has called attention to the propagation by shoots from the calyptra in this species as recorded by Schimper and Goebel. This may be more common than is generally supposed, as it is well known that the fruits of this species fall off, just before maturity, and float on the surface, many of them being quite green, with the calyptra still attached.

In November, 1891, Prof. D. C. Eaton sent me a slide from which the accompanying illustration has been made, showing a shoot arising from the inner part of the calyptra. The specimens had been kept in an aquarium, and were collected at Hamden, Connecticut, where this species was "abundant in a bricked-up spring and also in a barrel fed by a pipe from this spring." Evidently it lives many years in one place for it had been collected in 1877 by Prof. Eaton at the same station.



The habitat of this species is more varied than is indicated by the Manual, and it may be looked for not only "on stones and branches in wooded creeks and swamps," but also in "rocky streams," and in still waters of lakes and ponds, on the border of rivers and in wells and fountains. It has been collected in the Delaware, Ohio, and Tennessee Rivers, and is represented in our collections in eighteen states, ranging from Ontario to Florida, from Minnesota to Louisiana, and from Texas to California. There is only one record from the Rocky Mountains, in Montana, R. S. Williams, though it was collected by E. Hall, probably in Colorado.

It was first distributed in 1841 in Drummond's Mosses of the Southern States, as *Fissidens semicompletus*, and it has since been issued in Exsiccatae by Sullivant and Lesquereux, Austin and Macoun.

Fissidens semicompletus Hedw. (Musc. frond. 3: 34, t. 13, 1792) was described and figured from specimens sent to Hedwig by Dickson, without locality, which Hedwig supposed to be the same as specimens figured by Dillenius (Hist. Musc. 259, t. 33, Fig. 4, 1741) from Patagonia, and which Dillenius states he had also seen in the herbarium of Wm. Sherard from New Providence, Bahamas. The name has been applied to a Chilian species by Mitten. Montagne called attention to the differences between the figures given by Dillenius and Hedwig, and stated that all doubts could only be removed by restudying the types. As far as can be determined this has

never been done. Bridel founded the genus *Octodiceras* in 1806 on Hedwig's plate, concluding that the peristome had only eight teeth, as Fig. 6 showed half the peristome with only four teeth, but he overlooked the fact, since noted by Montagne, that Fig. 7 has at least twelve. Mitten has perpetuated this mistake in his *Musci Austro-Americani*, by citing in his key, two species with eight teeth, *F. semicompletus* and *F. Mexicanus*, but the latter is known only from sterile specimens. To remedy this mistake, Montagne founded the genus *Conomitrium*, including *C. Julianum* and three South American species, which he named for Dillenius, Hedwig and Bertero, referring *F. semicompletus* Hedw. to *C. Hedwigii*. Jaeger and Sauerbeck recognized both genera in the *Adumbratio*, including several species of *Fissidens* under *Conomitrium*, notably *F. osmundioides* and *F. hyalinum*, and five South American and three North American species under *Octodiceras*. Schimper in the *Bryologia* and Limpricht in the *Laubmoose* used *Octodiceras* for *O. Julianum* but Limpricht does not make clear the priority of the specific name, as he omits the original place of publication. Lindberg by mistake took up the name of *O. fontanum* as will be seen by the following synonymy :

Octodiceras Julianum (Savi) Brid. Bryol. Univ. **2**: 678. 1827.

Fontinalis Juliana Savi, Fl. Pis. **2**: 414. 1798.

Skitophyllum fontanum La. Pyl. Journ. Bot. Desv. **5**: 52, t. 34, Fig. 2, 1813.

Fissidens debilis Schwaegr. Suppl. **2**: 11. 1816.

Conomitrium Julianum Mont. Ann. Sci. Nat. **8**: 246. t. 4. 1837.

Fissidens Julianus Sch. Flora **21**: i. 271. 1838.

Octodiceras fontanum Lindb. Bidrag Moss Syn. 23. 1863.

Our other species, *O. Hallianum*, is much smaller and more slender, with a more perfect peristome, and has been found growing with *O. Julianum* by Hall, on the stems of *Cephalanthus occidentalis* in a sunken hole at Athens, Illinois, the type locality. A note in Austin's herbarium shows that the habitat given by Austin, "in wells" is incorrect. It has also been collected on rocks moistened by spray at Little Falls and Ogdensburg, N. J., by Austin. At Caloosa, Florida, it was collected on the under side of logs in a Cypress swamp by J. D. Smith, and it grows on rocks at the water line in Lake Pend d'Oreille, Idaho, where it was collected by J. B. Leiberg. It is evident that it has almost as great an Eastern range as our more common species, and on account of its size, may have been often overlooked. Its synonymy is as follows:

Octodiceras Hallianum (Sull. & Lesq.) Jaeg. & Sauerb. Adumb. **1**. 33. 1874.

Conomitrium Hallianum Sull. & Lesq., Aust. Musci App. p. 20, no. 108 b. 1870.

Fissidens Hallianum Mitt. Journ. Linn. Soc. **21**: 551. 1885.

BRYUM PROLIGERUM (Lindb.) Kindb.

The study of this moss at Chilson Lake, Essex Co., N. Y., was brought to a sudden close in 1901 by the "wet crumbling roadside bank" giving way during a heavy rainfall, burying our treasure as we feared for all time, as

repeated search during the rest of the season failed to unearth even a single plant.

It is my good fortune, however, to find this summer on almost the identical spot a loose mat possibly a foot square. The weather so far this year has been cold and rainy and the plants examined under the microscope July 23rd show abundant gemmæ. See illustrations, etc., in *BRYOLOGIST* for October, 1901; also January, 1901, p. 12, and July, 1901, p. 50. There is evidence of a number of fertile plants in the mat, and it is hoped these will prove to be on the *Bryum* in which case a limited amount of material will be available for distribution.

A. M. S.

A NOTE

BY ANNIE MORRILL SMITH.

In company with other journals *THE BRYOLOGIST* comes in for its share of criticism without which it would be impossible to keep fully in touch with its subscribers and thereby modify and adjust its policy from time to time. The idea in starting this journal was to help a body of would-be students of the mosses; their number was unknown but it was felt to be sufficient to justify a beginning, so in January, 1898, a modest start was made with four pages. Before the year was out its place was assured and its growth and progress since then a matter of history.

The Editors have from the first enjoyed the cooperation of the advanced workers, as our pages testify, and when these friends counsel the printing of more technical articles it is hard not to fill our limited space with matter beyond the range of the beginner. This problem is very clearly set forth by Charles E. Bessey in a recent number of *Science* (July 25, 1902, No. 395, p. 157) and we are glad to record his endorsement of our policy. It is just because we have never been able to forget the ladder by whose help we mounted the first hard rounds that we have kept to the original idea of helping the beginner. We feel sure that the issues of the first four years of *THE BRYOLOGIST* constitute a very helpful handbook for those taking up the study of the mosses, hepatics and lichens, and that this ground need not be covered again by us. There still remains, however, a large gap between this elementary work which we have done and the *Manual of Lesquereux* and *James*. This was brought home very forcibly to me the past two weeks. During the exigencies of travel I was separated from my own copy of the *Manual* and obliged to use the spotless one of a friend and I realized then for the first time what a wealth of material exists only in such annotated copies as a few own who have had exceptional opportunities to correct, make additions, cross references and notes to the extent often of pages interleaved. Many of these notes and additions have been given from time to time in our pages by the various authors, but we do need one or more books leading one up to the place where intelligent use of the larger works of reference is possible. In the meantime *THE BRYOLOGIST* will continue a certain amount of elementary work, at the same time giving generous space to those further advanced.

CURRENT LITERATURE.

Reprint from Bulletin of the N. Y. Bot. Gardens, No. 6, May 27, 1901. (Continued.)

Bryum ventricosum compactum (B. & S.) Williams. (*B. pseudotriquetrum compactum* B. & S.)

Dawson, July 17, in fine fruit. A much smaller plant than the species, in very compact tufts. The leaf-cells and spores seem to be rather smaller also. The median cells measure .008 mm. wide and .016 to .025 mm. long, the spores up to .014 mm. The dorsal plates of teeth are rather narrow, about 1 to 3 near base, lamellae 30. Cell walls of the leaves usually seen to be distinctly pitted under a magnification of 300 dia. or more (583).

Bryum suborbiculare Philibert, sp. nov.

Apparently dioicous, no male flowers found. Tufts up to 2½ cm. high. Stems seldom branching. Leaves in 3 or 4 rosettes with innovations starting from their bases. Outer perichaetial leaves oblong, somewhat acutely pointed, 2 mm. long, upper stem leaves a little shorter, very broadly ovate, often obtuse, all entire with costa percurrent or mostly so. Borders revolute below and of about 3 rows of elongated cells, toward apex becoming flat and cells scarcely elongated. Lower leaves small, obtuse, often nearly as broad as long, with costa vanishing. Inner perichaetial leaves very broadly ovate-lanceolate, small, with costa vanishing. Median leaf-cells rhomboidal to hexagonal, from scarcely elongated to twice longer than broad, up to .025 mm. long. Cell walls not pitted. Capsule with lid up to 3 mm. long, broadly obovate, the sporangium gradually narrowing to a very short collum. Lid low-convex, papillate. Seta up to 2½ cm. high. Exostome with lower dorsal plates narrow (1-3) and 25-30 lamellae on inner face. Endostome free with basilar membrane extending over ½ up, the segments slender above and widely perforate with mostly 3 long, finely appendiculate cilia between. Annulus of 3 rows of cells. Exothecal cells about mouth of capsule transversely elongated, in 2 or 3 rows, near middle the cells about twice longer than wide, toward base irregular, sinuous walled, with stomata about .035 mm. long. Spores nearly or quite smooth, up to .016 mm. (Plate 20.)

This small moss is peculiar in having the broad, mostly obtuse leaves clustered in 3 or 4 rosettes along the stem. It does not seem to be related very closely to any other American species.

Dawson, growing in swamp with *Cinclidium* and apparently rare. Collected in good fruit. July 2, 1899 (577.)

Plagiobryum argenteoides R. S. Williams sp. nov.

With the appearance of *Bryum argenteum*. In dense tufts up to 1 cm. high. Stem simple or branching, vineous red, radiculose below, in cross section showing an outer wall of one layer of irregular, somewhat thick-walled cells, with ground tissue of very large, thin-walled cells, becoming smaller toward center and enclosing a distinct central strand. Leaves concave, appressed, broadly ovate, with short abrupt point, entire, mostly ½ mm. long or less or occasionally the terminal leaves lanceolate pointed and up to 1

mm. long. Costa vanishing from $\frac{1}{3}$ to $\frac{2}{3}$ up. Upper $\frac{1}{3}$ of leaf usually hyaline. Alar cells and most basal cells square (sides 12 to 16 mm.) to short rectangular (1 to 2). Median cells irregularly rhomboidal to oblong-linear, up to .040 or .050 mm. by .012. Cell walls somewhat thickened, especially above. (Plate 21.)

This species is distinguished from the preceding by its small size and nerve vanishing far below the apex as well as by the short, square alar cells. Found on bare rock in dry places on the Yukon River, just below Dawson, March 19, 1899, (659).

Karl Mueller described in Flora, 70: 221. 1887, a *Bryum bullatum*, which he compares with small *Plagiobryum Zierii*. As this comparison well fits my plant I was in some doubt as to the two being distinct, but having lately received a specimen of *bullatum* from the Mueller collection, through the kindness of the Berlin authorities, the two plants prove to be perfectly distinct, *bullatum* being an *Anomobryum (Sclerodictyon)* as described.

Polytrichum hyperboreum R. Br. Lake Lindeman. This plant has a white hair-point like the preceding, but grows up to 8 cm. high or more, with abundant branches. The hyaline lower cells average somewhat narrower and about twice longer than in *piliferum*. They are .008 to .012 mm. wide and up to .160 mm. long (686).

Polytrichum inconstans Hagen.

Stems slender, up to 8 cm. high, rather uniformly leaved above with a felt of dark red radicles below. Leaves somewhat distant, irregularly spreading, up to 6 mm. long, lanceolate with costa scarcely or short excurrent and margins minutely serrulate. Lamellae up to about 24, the median from 5 to 9 cells high, terminating in 1 or sometimes 2 cells, transversely oblong in section, about twice wider than high and not or scarcely depressed. Blade of leaf-bearing lamellae on either side of costa of only two layers of cells thick with cell walls on back of leaf not thickened. Leaf-cells in blade between base of lamellae and margin of leaf mostly from .012 by .016 mm. to .016 by .020 mm. (Plate 22.)

These specimens have been compared with specimens of *inconstans* Hagen in litt., collected by C. Jensen at Lilleelvedal, Norway, lately received from Harold Lindberg, fil., and are without doubt the same. The species is peculiar in the broad terminal cell of the lamellae, often doubled, the thin cell walls on back of leaf, very small teeth of margin and short excurrent nerve.

Collected at Lake Lindeman, in swampy places, May 26, 1898 (690).

Pterigynandrum filiforme decipiens (Web. & Mohr.) Limpr. Lake Lindeman. On rock. This variety is darker colored and grows in larger, looser tufts than the species with the tips of the stems and branches more curved (697).

Leskea tectorum (A. Braun) Lindb. Lake Leberge and Dawson. On rock in rather dry places. Determined by Dr. G. N. Best. This species has smooth, broadly ovate leaves, with short-lanceolate point. The leaves are very concave, entire, with margin flat above and recurved below. The leaf-

cells are mostly oval to rhomboidal seldom more than twice longer than broad and in margin below slightly transversely elongated. The vein is broad below and extends $\frac{1}{2}$ up the leaf or sometimes shorter and forked above. Sterile (702).

Hypnum amblyphyllum, R. S Williams sp. nov.

Dioicous. Growing in water up to 3.5 dm. high, with mostly short, sub-pinnate branches hooked at apex. Cross sections of stem 5-sided with distinct angles, a poorly developed central strand of 3 or 4 small cells and outer walls of 1 or 2 rows of thickened cells. Leaves below more or less spreading, flexuous and twisted, toward the tops of the stems and branches falcate-secund with the tips often abruptly incurved. Stem leaves about 2.25 mm. long, serrulate all round, distinctly long-decurrent, ovate-lanceolate with broad, obtuse point, not plicate, somewhat concave, especially toward apex. Costa extending $\frac{2}{3}$ up, slightly convex on back. Alar cells often inflated nearly to costa and some small, nearly quadratic cells at margin just above the alar cells. Median leaf-cells .005 or .006 mm. wide and mostly .035 to .060 mm. long. Younger branch leaves narrowerly lanceolate with very short costa. Perichaetial leaves not plicate, closely sheathing, but little larger or more pointed than stem leaves, entire, with faint costa extending up $\frac{2}{3}$ or more. Seta up to 6 cm. long. Capsule 2.5 by 1 mm., with short upright collum, but much curved and nodding above. Lid acutely conical, its height less than basal diameter. No annulus. Peristome teeth broadly hyaline bordered above, outer plates finely punctate below. Basal membrane at endostome scarcely $\frac{1}{2}$ the teeth in height with solid segments and 2 or 3 nodose cilia between. Transversely elongated cells about mouth of capsule in 3 or 4 rows, the cells below roundish to oblong. Stomata roundish to short oblong, up to .040 mm. long. Minutely roughened spores up to .016 mm. (Plate 24.)

This species is intermediate between *exannulatum* and *pseudostramineum*. From the first it differs in the short, broadly-pointed leaves, the angular stem with fewer thickened cells in the outer walls and leaf-cells not pitted. The second differs in being monoicous, with entire, not decurrent leaves and not angular stems.

Dawson, in swamp water, in fine fruit July 17, 1898 (746).

Hypnum subplicatile (Lindb.) Limpr. Lake Lindeman, on damp rock and earth. This plant is very close to *callichroum* but differs in being rather smaller with regularly pinnate branches, leaves wider just above the base and abruptly narrowed to the insertion and capsule shorter. Cross sections of stem show an indistinct central strand and walls of a row of thin outer cells next about 3 rows of thick-walled cells. Median leaf-cells slightly vermicular, about .005 mm. wide and .040-.060 mm. long, alar cells mostly forming a small but distinct, convex, pale cluster. Stem leaves entire, borders flat, terminal branch leaves minutely serrulate, perichaetial leaves gradually narrowed to long, serrulate, slender point.

According to Limpricht this species has been previously collected on the island of Sachalin and in eastern Russia (751).

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NOVEMBER, 1902



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AN ILLUSTRATED BIMONTHLY DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

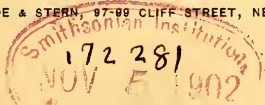
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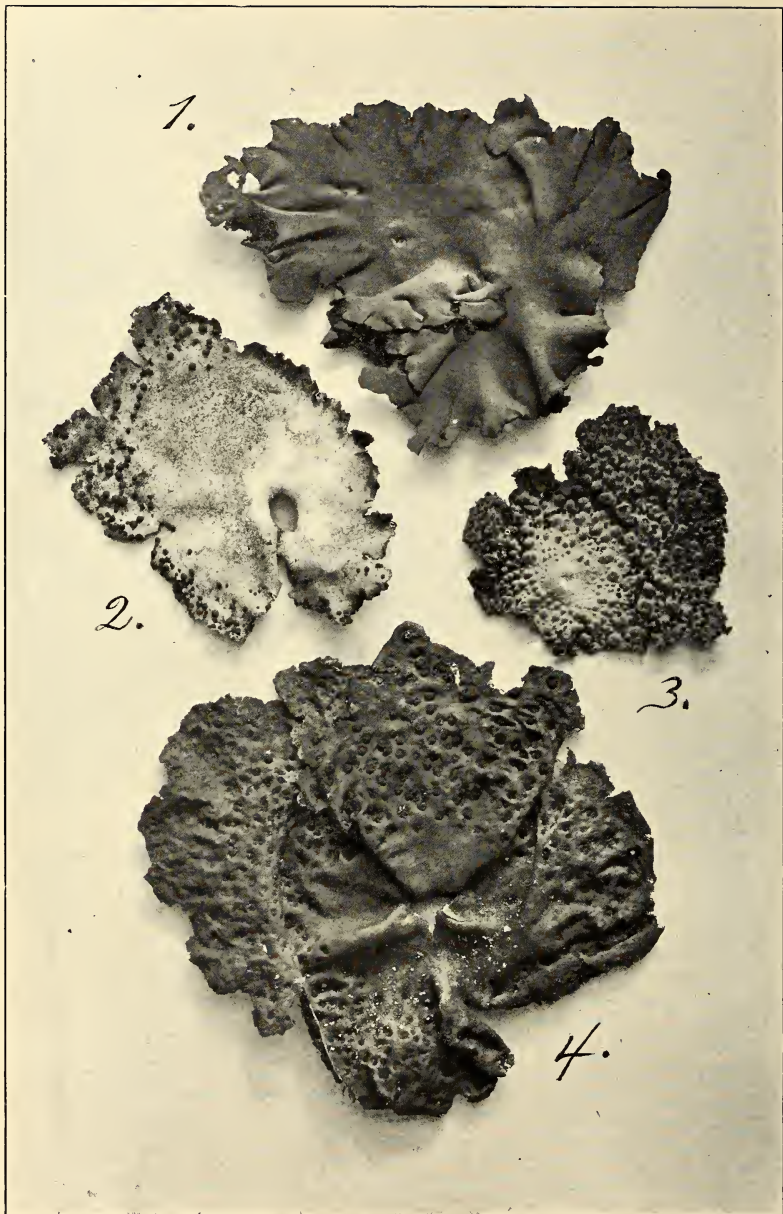


Plate IX. 1. *Umbilicaria Dillenii* 2 *U. vellea* 3. *U. pustulata*
4. *U. Muhlenbergii*.

THE BRYOLOGIST.

VOL. V.

NOVEMBER, 1902.

No. 6.

LICHENS—UMBILICARIA.

BY CAROLYN W. HARRIS.

This is a genus of which some species are familiar to almost every one. The large, leathery looking "Rock Tripe" is one; this name is applied to several species.

It is said that many of the early explorers to the North Pole ate of this rather unpleasant looking plant and were made ill by it. Like many of the lichens it contains a small amount of nourishment.

At Chilson Lake, Essex Co., New York, five species of *Umbilicaria* are found, only one of which is at all rare, *U. vellea*. The others *U. Dillenii*, *pustulata*, *Muhlenbergii* and *Pennsylvanica* are common on granite rocks where there is a good deal of moisture. The family Umbilicariei has only the one genus, *Umbilicaria*, which by some lichenists has been divided, and certain of the species have been placed under the name of *Gyrophora*; this division goes back to an early date. The structure of the thallus really has very few important differences, the fruit still less, so at present it seems wise to include all the species under the name of *Umbilicaria*. Fries says "it is the secret of all systematic study adequately to apprehend the distinction between close affinity and superficial or subtle differences." Many important questions relating to the lichens are unsettled, just as it is with the mosses, only the difficulties seem more numerous, as less systematic work has been done on the lichens. Much can be learned regarding them nevertheless; some genera are clear and settled for the present, at least. So conscientious work on the lichens will not be lost time, and all will help to decide some of the unsettled problems. In many lines of work if we wait until the last question is settled we shall find that our chance for helping in the working out of the problems is past.

The specimens of *Umbilicaria* vary greatly in size, some are an inch in diameter, others nearly a foot. The thallus is horizontal and foliaceous, and is always fastened at one point to the substratum by a stalk-like disk or umbilicus. The margin is frequently torn or ragged. The prevailing color of the upper surface is brown or grayish-brown, the lower side is a very dark-brown or black, with black rhizoids or scaly layers. The apothecia are sessile upon the upper surface of the thallus and are very interesting in appearance, as well as in structure. On examination with a hand lens the disk presents a convoluted appearance; it is convex and black, the lengthwise folds or plaits are unusual looking.

The *Umbilicarias* are Northern in their range, but are common in the mountains of the Southern states and even in the torrid zone. When collecting them, if the atmosphere is moist they will be soft and pliable, and can be put under a light pressure until dry, then will be ready for mounting.

If they are dry they are very brittle, and must be well dampened before being put in the press. When moistened the Umbilicarias are deep green, or olive-green, becoming dark gray, brown or black when dry.

The economic uses of Umbilicaria are of some importance; several species yield a useful dye. Linnaeus says "some of them are superior in nutritive qualities to the 'Iceland Moss.'" They contain a bitter purgative quality which makes the use of them for food unwise.

UMBILICARIA CYLINDRICA (L.) Delis. Thallus many leaved with round lobes, smooth and of medium size. The color is bluish or smoke-colored gray, the margin is thickly fringed with black fibrils, giving the plant a very attractive appearance. Beneath, the thallus is a pale brown, usually smooth, but some specimens have soft fibrils. The apothecia are medium, at first sessile but as they mature are elevated; they are sooty-black, orbicular, plicate or composed of tiny folds. This pretty lichen is found on alpine rocks, both in this country and Europe. In Labrador and Newfoundland it is common and usually fertile.

UMBILICARIA PROBOSCIDEA (L.) Stenh. Thallus one-leaved, flat and rather thin, with few lobes, which are crenate: it is rugose above, especially at the centre. In color it is blackish brown, turning blue-gray at the centre. Beneath, the thallus is smooth, naked and pale gray or pruinose; it is closely appressed to the substratum and is somewhat rigid and brittle. It is generally fertile, with numerous, small apothecia which are round.

UMBILICARIA FLOCCULOSA Hoffm. The thallus is dark-brown in this species, with a rough, sooty appearance, is medium, one-leaved, thin with a scalloped margin. Some specimens are slightly papulose or squamulose, reflexed at the margin. Beneath, the thallus is lighter in color, more or less reticulated, especially at the center; it has no fibrils. The apothecia are small, flat and sessile, more numerous toward the margin of the thallus. Found on high mountains in North America, as well as in Europe.

UMBILICARIA HYPERBOREA Hoffm. Thallus usually one-leaved with jagged edges, rugose and occasionally perforate; in color brownish-black. Beneath, the thallus is dark brown, usually smooth, but some specimens are slightly pitted. The apothecia are small, oblong and plicate, with a flat, black disk. This lichen is found on rocks on high mountains and varies a good deal according to age; is common in the Rocky Mountains. The specimens are always small, and quite free from the substratum except at the one point of attachment.

UMBILICARIA PHÆA Tuckm. Thallus small or medium, one-leaved and smooth, especially toward the centre; it is reddish-brown with few lobes and uneven edges. Beneath the thallus is a pale brown, growing darker with age; it is very granulate except at the margin where it is usually smooth, has no fibrils. The apothecia are small and sunken in the thallus; they are very numerous especially near the margin. Found on rocks of the Pacific Coast and in the Rocky Mountains.

UMBILICARIA EROSA (Web.) Hoffm. Thallus medium in size, one-leaved, with few rounded lobes, which are filled with cracks, the edges are ragged,

the entire upper surface is reticulated, the color is dark brown, almost black. The lower surface is very rough and fissured, sometimes with root-like fibrils; in color it is paler than the upper side. The apothecia are small and uneven in shape, and close to the surface of the thallus; the disk is convex and plicate. This species of *Umbilicaria* is not a common one, but is found in the mountains of the Eastern and Western states, also in Europe.

UMBILICARIA MUHLENBERGII (Ach.) Tuckm. Plate IX. 4. Thallus varies very much in size, is sometimes very large, with one leaf which is more or less folded, and torn at the margin; it is quite rigid even when damp; color ash-gray, darker toward the margin. Beneath, the thallus is very dark, and shaggy, with open net work, which at the margin divides into very short, stiff fibrils. The apothecia are very numerous except at the centre; they are rather large and situated in pits; disk black, convex and plicate, in finer folds than in the apothecia of some other species. This is one of the lichens which bears the popular name of "Rock Tripe."

UMBILICARIA VELLEA (L.) Nyl. Plate IX. 2. This is the most attractive in appearance of the *Umbilicarias*, and when found in fruit is really beautiful; its popular name is "Velvet Moss." The thallus is usually quite large, but many specimens are small, especially those in fruit. It is one-leaved, with a very irregular margin, sometimes in small scallops; the surface is smooth and powdery, is from light to dark gray in color. The lower surface is a very dark brown or black, has many rigid cilia crowded together, these cover the whole surface from centre to margin. The apothecia are in slight depressions of the thallus, very numerous near the margin, are smaller and rounder than the fruit in most of the species of *Umbilicaria*. This lichen is found on granite rocks in the mountains, and is not often found fertile. Fine specimens in fruit have been collected at Chilson Lake, Essex Co., New York.

UMBILICARIA DILLENII Tuckm. Plate IX. 1. This is the largest species of *Umbilicaria*; it is found on rocks throughout the United States. Some specimens grow to be nearly a foot in diameter, they are usually found near water and growing closely together, often over-lapping each other. The thallus is one-leaved, leathery, with an entire margin; the lobes are somewhat wrinkled. The upper surface is smooth and raised toward the centre; the color is a sooty-brown. Beneath, the thallus is very black, closely covered with stiff hair-like fibrils. The apothecia, which are rare, are medium and attached at the centre, are round and ridge-like.

UMBILICARIA CAROLINIANA Tuckm. This species is unlike the other *Umbilicarias* in appearance, as it is not so flat and has many leaves, the rounded lobes of which are very crowded; the surface is usually papulous; in color it is a dark, dull brown. Beneath it is very black, rough and uneven; at the margin it is smooth except for a few coarse fibrils. The apothecia are small but are so crowded together that they appear large. Found on rocks in the mountains of North Carolina and other Southern states.

UMBILICARIA PENNSYLVANICA Hoffm. Thallus medium to very large, one-leaved, leathery and very papulous, from dark gray to smoky-brown,

lighter at the centre and sometimes powdery. The margin is irregular, and in the older specimens is torn. Below it is a sooty-brown or black, very granulate and deep pitted, has no fibrils. The apothecia are small and clustered in the spaces between the pustules, near the margin of the thallus. This species is found on rocks throughout the Eastern and Southern states, especially in the mountains.

UMBILICARIA PUSTULATA (L.) Hoffm. Plate IX. 3. Thallus small to medium, one-leaved, very papulous; in color ashy becoming brown, lighter at the centre and more or less powdery. In young specimens the margin is entire and slightly waved, as the plant grows older the margin breaks and appears ragged. The under surface is brown, growing lighter toward the centre; is finely granulate with deep pits. The apothecia are small and numerous, situated between the pustules of the thallus and toward the margin. The variety, *papulosa*, is so nearly like the specimens in appearance and internal structure that many lichenists include it with *pustulata*.

U. pustulata resembles *U. Pennsylvanica* very closely on the upper surface, except that in the latter the pustules are more irregular in outline, and are depressed at the centre. Beneath they are easily distinguished. *U. Pennsylvanica* is a sooty-black and is much more granulate than *U. pustulata* and the pits are not so marked.

RADULA.

BY WM. C. BARBOUR.

(Continued from page 47. May, 1902.)

KEY.

- 1. Leaves closely imbricate (somewhat distant in *R. tenax*).....2.
 Leaves loosely imbricate.....7.
 Leaves distant.....*R. obconica*.
- 2. Stems dichotomously branching.....*R. tenax*.
 Stems more or less pinnately branching..... 3.
- 3. Mouth of perianth entire or nearly so.....4.
 Mouth of perianth emarginate or crenate.....6.
- 4. Perianth compressed, not noticeably narrowed at apex.....5.
 Perianth subinflated, narrowed at apex.....*R. Hallii*.
- 5. Perianth short, oblong-quadrate.....*R. Caloosiensis*.
 Perianth long, obconic.....*R. complanata*.
- 6. Perianth compressed cylindric.....*R. australis*.
 Perianth funnel-form, mouth compressed.....*R. Xalapensis*.
- 7. Leaves flaccid, rotund oval, subrepand-dentate....*R. Sullivantii*.
 Leaves subascending or semivertical, broadly obovate, entire.
R. Bolanderi.

RADULA TENAX Lindb. (*R. pallens* Sulliv.)

This species is found mostly in mountain regions, ranging from the Catskills of New York to the mountains of North Carolina. It is dioicous, with firm, rigid stems; the leaves rather remote, slightly, if at all, decurrent,

elliptic ovate. The cells are rounded and very full of chlorophyll. The lower lobe is round-ovate, hardly half as wide as the stem. The antheridial spike is long-linear, obtuse, and is borne on the side of the stem below the fold of the leaf. The species occurs on rotten trunks, and is not often found.

RADULA AUSTRALIS Austin.

This is a small species occurring in the South (Georgia and Florida). The plants are prostrate, sparingly branched and loosely caespitose. The leaves are somewhat decurrent, and the lower lobe is adnate to the stem along its inner margin. The perianth is long, compressed, and cylindrical with an obconic or pear-shaped base. The mouth is bilabiate and emarginate or crenate. The antheridial spikes are short and broad, and are found on the branches.

RADULA CALOOSIENSIS Aust.

This species was found by Austin himself near Caloosa, Florida, and accordingly has received its specific name from this place. The stems are short and sparingly branching. The leaves are entire or sometimes obscurely crenate, the margins very often bearing gemmæ. The lower lobe is large and either acuminate or obtuse, and has its inner margin adnate to the stem. The perianth is short, broadly oblong-quadrate from an obconic base; and is strongly compressed. It is bilabiate, with the lips entire, their margin decurved. Antheridial spikes are long and loose.

RADULA HALLII Aust.

This species was very briefly described by Austin from material collected by Hall at Salem, Oregon, and named for the collector. In many ways, such as size, perianth and general appearance, it is much like *R. complanata*, but has its perianth larger, elliptic-oblong instead of obconic, and narrowed at the apex. The mouth of the perianth is sometimes fleshy.

RADULA XALAPENSIS Mont.

This is another species which occurs in the South, collections having been made on wet rocks at Tallulah Falls, in Georgia, by Sullivant and Lesquereux, and at Toccoa Falls, Georgia, by Underwood. The stems are closely pinnately branched, and somewhat flaccid. Leaves are orbicular, obtuse, and closely imbricated. The lower lobe is broad, nearly round, and has an undulate margin. The base is somewhat adnate to the stem. The perianth occurs either on terminal or lateral branches, and is long funnel-form with mouth compressed and slightly crenate.

RADULA SULLIVANTII Aust.

Again a Southern species, having been collected in Georgia by Sullivant, Lesquereux, and Underwood.

The stems are closely caespitose, with short, spreading branches. Leaves loosely imbricate, round-oval, more or less decurved at the apex, with subrepand-dentate margin. The lower lobe is somewhat inflated at the apex, usually obtusely triangular, with the inner margin adnate to the stem, and parallel to it.

RADULA BOLANDERI Gottsche. (*R. spicata* Aust.)

Plants slender, becoming cæspitose. Stems are short, with short, pinately-arranged branches. The leaves are loosely imbricate, obovate, with obtusely rounded apex. Lower lobes $\frac{1}{3}$ the size of the upper, inflated, rhomboid ovate, with apex usually appressed to upper lobe. Antheridial spikes numerous, linear, and directed downward.

The perianth is obconic, bilabiate, with margin of lips entire. *R. Boland-eri* is found in the Coast Range Mountains from San Francisco to Vancouver Island. Dr. M. A. Howe states (Mem. Torr. Bot. Club, 7:159, 1899,) that there seems to be little or nothing in the description or figure of *R. arctica* Steph. to distinguish it from young plants of *R. Boland-eri*.

The species is figured in Pearson's List Can. Hep. 4. *pl.* 4. 1890, as *R. spicata*.

RADULA OBCONICA Sulliv.

This is a Northern species, occurring rarely from Ohio to New Jersey, on trees in cedar swamps. The stems branch undeterminately; the leaves are distant, round-ovate. The perianth is rather obconic to clavate, with mouth obliquely truncate and entire. The genus *Radula* occurs more abundantly in the tropics than in temperate regions. Schiffner (Conspectus Hep. Arch. Indici, 1898) reporting twenty species from the islands of Java and Sumatra alone. Much work needs to be done in collecting American forms and determining the range of species.

Sayre, Pa.

THE PERISTOME. IV.

BY A. J. GROUT.

So much space in this issue is taken by the concluding article on nomenclature that only a few additional notes on species previously treated will be given here.

Prof. F. E. Lloyd, of the Teachers' College, New York City, showed the author an unusually pretty experiment with the spore distribution of *Polytrichum*. He took a fully matured capsule from which the operculum had recently fallen and which was still nearly filled with spores; holding this up to the light with the mouth of the capsule toward him and the lower end of the seta grasped in the left hand, he twangèd the seta *a la guitar* so as to give the capsule short, sharp shakes. The epiphragm then appears as a translucent membrane and the mass of spores can be seen rolling up against its lower edge like sawdust in a drum, while they escape in clouds from the openings between the teeth.

With respect to spore distribution in the Buxbaumiaceae, Prof. Lloyd calls attention to the statements of Prof. Goebel that in *Webera sessilis* the flattening of the capsule on the dorsal side is useful, not alone for light absorption but also for spore dispersal. Drops of rain strike this flattened upper surface and by their impact force out a puff of spores from the nozzle-like peristome. The capsules are really minute powder guns all set for action. If a fresh mature deoperculate capsule be given a slight tap with

finger or pen a similar result can be obtained. The adaptation of the narrow inverted-funnel-shaped peristome is evident. If the opening were larger the puff of air caused by the pressure on the capsule would not be sufficient to carry out the spores and it would also admit water. Prof. Lloyd thinks that this impeaches my statement that spores depend on wind for distribution. I do not believe that the spores will be normally ejected from the wet capsules, and surely the wind must play a considerable part in the scattering of the dry spores after they are ejected.

I hope some of our readers will try to make observations which will answer the following questions:

Will rain drops cause the ejection of the spores? I have not actually seen this and Prof. Goebel does not state that he has, but the inference is that he speaks from observation. It seems to me that insect footfalls and other causes may be as potent as raindrops. Possibly spores may adhere to the bodies of the animals which cause their discharge, and be still farther distributed in this manner.

Will the spores continue to be ejected after the capsules are wetted?

Will the spores of *Buxbaumia* be ejected in a similar manner in any of the species? I am particularly anxious to have this third question carefully investigated because European bryologists state that the spores can not escape through the peristome because of their large size. If this be true it seems conclusive proof of the degeneracy of *Buxbaumia*, for surely the highly developed peristome had a function at some time in the phylogenetic history of the species.

Members of the Sullivant Moss Chapter are specially requested to investigate and report.

SCIENTIFIC NAMES AND THEIR CHANGES. II. (Concluded).*

BY A. J. GROUPE.

Two or more names which may have been applied to the same plant are known as synonyms and whichever is adopted for the plant in question, none of the others should be applied to any new species of that same genus. This in order to avoid confusion.

It sometimes happens that the same specific name is given to two species in the same genus. Thus the moss which Schimper named *Pylaisia velutina* has been found by Cardot to be the moss which Hedwig called *Pterigynandrum intricatum* and which should be called *Pylaisia intricata* (Hedw.) Cardot.

Then the moss which has been passing as *Pylaisia intricata* (Hedw.) Schimp. has to have a new name, and M. Cardot proposes to call it *P. Schimperii* in honor of Schimper. In this case the confusion was caused by Schimper's failure to determine just what Hedwig's *Pterigynandrum* was. In the more common case the man who uses the name the second time is ignorant of its first use.

*Dr. M. A. Howe calls my attention to the fact that the Berlin rule referred to in Part I. was promulgated by the botanists of the Berlin Museum and not by a "Congress." This rule, however, has been widely adopted.

In cases of this sort it is greatly to be regretted that the error was not corrected earlier as the names have been in use for nearly fifty years, and the change must occasion considerable temporary confusion. There is almost no dissenting opinion, however, on the desirability of such changes.

The matter of deciding upon the correct specific name is, however, exceedingly simple as compared with the determination of the proper generic name. The selection of generic names which shall stand every scrutiny is respectfully offered to the logicians of to-day as a worthy substitute for a discussion of the famous syllogism proving motion impossible, or perhaps it would prove as effective in promoting learned argument as the discussion of how many angels can stand on the point of a needle.

Frequent cause of change in generic names is the fact that the same generic name has been used for entirely different genera, often in different subkingdoms. For instance, the moss genus *Thamnum* had to be changed to *Porotrichum* because *Thamnum* was used for a genus of lichens and also for a genus of flowering plants before Bruch and Schimper used it for the mosses. *Porotrichum* is chosen because it is the second oldest generic name applied to any member of the genus. The genus *Homalothecium* and the subgenus *Limnobium* will have to be replaced for the same reason. The name *Pleuropus*, which Mr. Dixon uses in his Handbook, is as untenable as *Homalothecium*.

Sometimes, however, this apparently reasonable ruling appears to be more honored in the breach than in the observance. The proposed change of *Neckera* to *Eleutera* furnishes an excellent illustration of such a case. *Neckera* (then written *Neckeria*) was first applied to the genus of mosses by Hedwig in 1782, one hundred and twenty years ago. Recently it has been discovered that in 1777, five years earlier, Scopoli applied the name *Neckera* to the flowering plant which has long been known as *Corydalis*. Now, if it were possible or desirable to use this name for *Corydalis* a change would be necessary, but as *Neckera* is antedated for this purpose by fourteen years by *Capnoides*, and *Corydalis* has been in common use for almost one hundred years it seems extremely unlikely that *Neckera* will ever cause confusion. This position may be illogical but scientific names are supposedly, at least, made for men, not men for scientific nomenclature.

One of the most fruitful causes of changes of names as well as the most legitimate is the splitting up of old genera as knowledge advances.

Thus, the genus *Hypnum* of Linnaeus included pretty nearly all the Pleurocarpous mosses, *Anomodon*, *Leskea*, *Thuidium*, *Neckera*, *Homalia*, *Leucodon*, and many others. As the knowledge of mosses increased it became necessary to separate or split off genus after genus from the original *Hypnum* of Linnaeus. Each writer splits off what seems to him good leaving the residue as *Hypnum*, often without a thought of what the earlier author considered as typical members of his genus. This method of residues sometimes produces queer results. Take the case of the moss generally known as *Dicranodontium longirostre* described under the name *Didymodon denuatus* in Braithwaite's British Moss-flora. *Didymodon* was

established by Hedwig in 1792 for *D. rigidulus* to which he later added *D. homomallus*; the former is now referred to *Barbula*, the latter to *Ditrichum*.

In 1807 Weber and Mohr added two species now referred to *Swartzia*, and a new species, the *Dicranodontium*, above mentioned. Thus it will be seen that the *Didymodon* of Braithwaite does not contain a single species originally included in it by the author. Such cases are not rare and if the method of residues is still tolerated by the scientific world there is nothing to prevent a perpetual migration of generic names after this manner just as one sees fit to add and another to subtract. Under such circumstances it seems a scientific farce to write as Braithwaite does *Didymodon* (Hedw.) for a genus that does not include a single species included by its author.

In the Memoirs of the Torrey Botanical Club, Vol. 6, No. 4, Dr. L. M. Underwood proposes a rule of procedure which he has carried out in the generic nomenclature of ferns, much to the upsetting of current generic names. His method of procedure is to take the first species mentioned in the original definition of a genus as the type unless the author in some other manner clearly indicates what his type species is. To apply the rule to the mosses would be to make the plant now called *Neckera complanata* the type species of *Leskea* and all our other *Neckeras* would become *Leskeas*. Also the first species named by Dillenius under his genus *Mnium* is *M. androgynum*, now known as *Aulacomnium*. According to Dr. Underwood all the *Aulacomniums* become *Mniums*, and a new name must be found for *Mniums*. These two instances are only illustrations of the many that would be required by the application of this rule to the nomenclature of the mosses. It seems as though this arbitrary selection of the first species as the generic type would be productive of much needless change, and it is by no means certain that it would in many cases give any better representation to the ideas of the author of a genus. But it does seem indisputable that a genus accredited to a man should contain at least one species which he included in it in his original definition. And the present condition of nomenclature makes it imperative upon every man describing new genera to indicate clearly what he considers the type species.

In conclusion it may be said that many of the proposed changes are absolutely necessary to do away with indefinite confusion and many of the rules made by the reformers of nomenclature are wisely chosen, but the avowed purpose of some of them to make the whole matter of botanical nomenclature depend on a set of rules to be mechanically applied with no reference to previous usages savors of the methods of the middle ages, and is evidently only another manifestation of the tendency of the human mind to avoid personal responsibility by reference to authority.

A NOTE.

A new station for *Buxbaumia indusiata* Brid. has been added to the list for New Hampshire, having been found by Mrs. B. Madeline Britton on decayed logs at Surry, N. H., September 3d, 1902.

A MOSS?

BY ALICE L. CROCKETT.

There were capsules, quantities of them, each on the summit of a slender seta, and crowded together in little tufts. They were too small to be distinctly seen by the naked eye, but a magnifying glass made them very clear, and I fancied I could see the operculum, but not a leaf was to be found. I clung to the hope that it might be moss, though there was enough of mystery about it to arouse a provoking doubt. It was found in June, 1900, among the short grass, weeds and moss growing on low land near the brook that empties from our frog pond. During the winter I sent a bit to Mrs. Smith, but her microscope revealed to her things I had not seen—things that were puzzling—bryum leaves and other things, and she asked for better material. It was May before I found it again and sent a fresh supply. Mrs. Smith and others enjoyed a series of interesting investigations. Meanwhile I was watching developments. After a few weeks the capsules gradually disappeared and a fine grass-like growth showed itself. A single tuft of the moss that I had transferred to a flower pot also became grass. Whether there were two things growing together, or the two were one, was the question for me to solve, and it did seem as though the two were on one root. Finally the grass flowered and fruited, and then the revelation came. The seeds were very fine, but a lens showed them to be exact counterparts of the first capsules. There was one way on which I could satisfy myself, and I proceeded to prepare a tin can of clean soil, in which I scattered some of the seeds and covered it with a piece of window glass. Then doubt and conviction struggled for the mastery as I watched for the sprouting of the seeds—and it was conviction that triumphed as one morning I found the soil covered with like capsules of my first finding, only they were not in tufts, as they grew naturally, but evenly distributed, each one standing by itself. The baby plant in rising from the ground had lifted its former habitation securely fixed up on its head, and continued to hold it in position for some time. Quickly following this came word from Mrs. Smith that the specimen had been determined by Prof. C. H. Peck to be a rush, *Juncus bufonius*. I had lost my moss, but found a new and interesting acquaintance.

Camden, Me.

CLIMACIUM DENDROIDEUM FOR MILLINERY.

Miss Clark's notes on mosses for millinery has suggested that perhaps it may be of interest to note that last spring there was offered for sale at McCreery's in New York City, bunches of *Climacium dendroideum*, fastened to wires by their stems, and colored a brighter green than they naturally are. It has also been known that *Hylocomium proliferum* has been used in the manufacture of Moss-roses.

MRS. E. G. BRITTON.

CURRENT LITERATURE.

Reprinted from Bulletin of the N. Y. Bot. Gardens, No. 6, May 27, 1901. (Concluded.)

Hypnum cupressiforme brevisetum Schimp. Lake Marsh, on rock. The sterile specimens referred here possibly belong elsewhere, yet they come very close to this variety, differing principally from the species in the leaves being straighter, rather shorter and with somewhat shorter leaf cells (758).

Hypnum polare Lindb. Lake Lindeman. Growing along low wet shore. This species is distinguished from any of our others by the ovate-oblong leaves, with stout nerve, very convex on the back, vanishing just below the apex and becoming as wide or wider above the middle than at the middle. Alar cells scarcely enlarged or forming a distinct cluster. The plant has been previously collected in several localities in Europe, and also in Greenland (773).

Hypnum sarmentosum fontinaloides Berggrn. Bonanza Creek, near mouth. On rocks in the bottom of a small stream. This variety with long, slender stems and large leaves, often all green or partly green and partly purple. These specimens have the cell walls less thickened and pitted than in the species (777).

Hypnum turgescens uliginosum Lindb. In swamps with the preceding (*B. turgescens* (Jensen) Schimp.). This variety has elongated stems and distant more or less spreading leaves (782).

Hypnum badium Hartmann. On margin of pond just below snow banks about 1000 feet above Lake Lindeman, also at Dawson on wet, shady bank. From the remarks in Lesquereux & James' Manual that "It is considered by Mueller to be a form of *H. revolvens*," one would suppose the leaves to be somewhat similar to that species, but in fact they are very distinct. The median leaf-cells are only about $\frac{1}{2}$ as long (.040 to .060 mm.), the cell walls are thicker except at the points where the rounded ends overlap, where they become very thin and the leaf is differently shaped. In *badium* the widest part of the leaf is near the middle and gradually tapers to a base only about $\frac{2}{3}$ as wide. Above the leaf tapers rather abruptly to a sharp point. In *revolvens* the leaf base is wider, the leaf above tapers gradually to a long, slender point and the basal cells are much less differentiated. In *badium* there are usually one or two rows of well-defined, enlarged, oblong cells at base with occasionally an almost inflated cluster in the angles. It is a plant of northern distribution, having been previously collected in Norway, Sweden, Greenland and Labrador (795).

Hypnum scorpioides gracilescens Sanio. In dried-up swamp a few miles below White-horse Rapids, covering extensive areas with a mat up to 18 cm. thick. The stems are slender, with short, distant branches and leaves distantly placed (793).

New or Interesting Species from Montana.

Reprinted from "A Preliminary List of Montana Mosses," by R. S. Williams.

From Bulletin of the N. Y. Bot. Gardens, No. 7, April 25, 1902.

Dicranoweisia compacta (Schleich.) Schimp. An alpine species growing in compact tufts with smaller leaves than the preceding (*D. crispula*), basal leaf-cells shorter and thinner walled and teeth not so deeply inserted under the mouth of the capsule. Forty-mile Cr., Blackfoot Ind. Reserv.; Essex, G. N. Ry., 7,000 ft.; Stanton Lake, Rocky Mts., 7,000-8,000 ft. (422).

Dichodontium flavescens (Dicks.) Lindb. A common species in the Rocky Mts. of northern Montana, on wet rocks about the falls and along streams. Distinguished from any form of *pellucidum* by the leaves comparatively smooth above and teeth of the margin separated by 3-5 or more intervening cells. In the preceding (*D. pellucidum fagimontanum*) each marginal cell forms more or less of a tooth in the upper part of the leaf (269).

Dicranum hispidulum n. sp. (Plate 34) Monoicous, perigonium close under the perichaetium, of 4 or 5 broad, more or less pointed leaves mostly costate. In compact tufts much like the smaller forms of *D. Starkei*. Stems usually without radicles and few branches, up to 2.5 cm. high, the cross-section nearly round, .180 mm. in diameter, with distinct central strand and outer cells with but slightly thickened walls. Leaves spreading all around, rough on back and margins above with irregular, mamillate papillæ, ovate-lanceolate, 1½ mm. long, cross-sections showing no stereid band or distinct guide cells, the cells on either side of costa near middle of leaf often doubled for five or six rows outward. Costa excurrent, usually .040-.050 mm. wide at the base and .050-.080 mm. above. Leaf cells scarcely elongated and irregular in upper part, medium cells .010 mm. wide and .010-.020 mm. long, alar cells forming a distinct group of somewhat enlarged, nearly square or inflated more or less colored cells. Cell walls not pitted or distinctly thickened. Capsule oval, slightly curved before opening and barely strumose, 1½ mm. long without lid. Lid obliquely rostrate, about ¾ mm. high. Exothecal cells rectangular, 2-4 times longer than broad. Well developed annulus of 2-3 rows of cells. Teeth split to below the middle. Smooth spores up to .012 mm.

This species is somewhat intermediate between *H. Starkei* and *H. falcatum*. It differs from both in the leaves being only half as long and scarcely falcate or secund. The first also has leaf-cells with thickened and pitted walls and cells twice longer, while the second has a poorly developed annulus, alar cells less distinct, and the exothecal cells shorter and broader, from roundish to one and one-half times longer than wide. Collected at head of Macdonald Lake, Aug. 3, 1895, with capsules not quite mature (323).

BARBULA PERANNULATA n. sp. (Plate 36). Dioicous. Plants small, ½-1 cm. high. Upper leaves mostly linear with broad, obtuse or slightly acute point. Outer perichaetial leaves very similar with slightly enlarged base, the middle with a more or less distinct limb, and the 2 or 3 inner, convolute with a distinct, narrowed point usually ¼ or more the length of the clasping

part, the outer perichaetial leaves extending to or above the tips of the inner Upper leaves up to 2 mm. long, deeply channeled and crenulate-papillose on the margin above, lower leaves 1 mm. or less, all with flat borders and costa vanishing below the apex. Leaf-cells distinct, roundish above, .006-.008 mm. in diameter with 1 or 2 papillæ to each cell. Lower cells hyaline, somewhat irregular, 2-4 times longer than wide. Capsule ovate-oblong, with lid up to 2½ mm. long, the lid often nearly as long as the capsule. Annulus large, of 3 rows of cells. The twisted papillose teeth form a solid basal membrane about ½ the height of the teeth. Mouth of capsule with 5 or 6 rows of small roundish cells with groups of 4 or 5 twice larger cells interspersed here and there. Smooth spores up to about .008 mm.

This species is near *convoluta*, but may be distinguished at once by the perichaetium. In *convoluta* the sheathing leaves project one-half or more above the tips of the next surrounding leaves and are mostly truncate-crenulate or with a very short point. On earth, June 18, 1894, Columbia Falls (292). Also collected by J. B. Leiber, Traill River Basin, Idaho (190).

Pohlia atropurpurea (Wahlenb.) Lindb. fil. Columbia Falls, on wet gravel about springs, May. I am indebted to Harald Lindberg, fil., for the determination of this species. It is dioicous, exanulate, teeth of peristome dark ferruginous, stomata superficial, leaves not or scarcely decurrent, seta large and fleshy above while growing. The leaves are narrower and less serrate than in *carnea* which has light colored teeth. Not before credited to America, I believe (297).

Pohlia vexans (Limpr.) Lindb. fil. Tenderfoot Cr., on Belt Mts., on rocks, Oct. Also determined by Harald Lindberg. It is certainly near *pulchella*, which according to Lindberg, has a well differentiated annulus. *P. vexans* is supposed to have no annulus but my specimens show a tendency to produce an annulus (in the well-developed capsules) of 1 or 2 rows, slightly smaller, but otherwise scarcely different cells that mostly remain attached to the lid, breaking away in small fragments. This is about like the annulus described for *pulchella* in Lesq. & James' Manual. The Montana plant is dioicous, with decurrent leaves, costa red at base and broad, ⅓ the width of leaf base with leaf-cells long and narrow above, often 1-6 (145).

BRYUM WILLIAMSII Philibert, Rev. Bryol. 28:31, 1900. (Plate 38). Dioicous. In compact tufts felted with radicles below and up to 3 cm. high. Stems somewhat branching, rather uniformly leaved above. Leaves erect, imbricated both wet and dry, broadly ovate-lanceolate, entire or minutely serrulate at apex, up to 2 mm. long, flat on borders or recurved along the middle, with 2 or 3 rows of narrow, elongated cells forming a distinct margin. Stout red costa, .080 mm. wide at base, percurrent or ending 1 or 2 cells below apex. Leaf-cells rather elongated rhomboidal to rectangular, median, .050-.060 mm. long and .016-.018 mm. wide, all with thickened but not pitted walls. Capsule elongated-pyriform, not contracted below the small mouth, up to 4 mm. long, with distinct-collum equalling sporangium in length. Lid rather low-convex mamillate. Annulus large. Teeth somewhat papillose, with narrow border, the outer plates below 2½-3½ times

broader than high, inner lamellæ up to 30, parallel and not connected or irregular and joined by very oblique cross-walls. Basilar membrane of endostome extending about $\frac{1}{2}$ up, the segments very narrow and papillose with narrow slits between articulations; cilia 2 or 3, and short or nearly equalling segments in length and more or less appendiculate. One or two rows of transversely elongated cells about mouth of capsule. Seta up to 4 cm. high. Nearly smooth spores up to .024 mm.

Growing in very damp or wet crevices of rock by springs. July 6, 1888, Missouri River bank below Great Falls. This species is near *Muhlenbeckii* but differs in the very narrow segments of the endostome with narrow slips between the articulations, not rounded perforations, the leaf-cells also are more elongated above and less regularly short-rectangular below (19).

Brachythecium velutinum intricatum (Hedw.) Br. & Sch. Columbia Falls, April. Western plants, undoubtedly average somewhat larger than eastern or ordinary European specimens. I have found the stem leaves of Montana plants up to 2.25 mm. long. Limpricht gives 1.8 mm. for the species but there are two European varieties with large leaves (up to 2.10 mm.) and the common Montana form exactly matches in appearance the variety as given above (257).

Brachythecium collinum subjulaceum Pfeffer. Divide Mt. and Two-Medicine Lake, Blackfeet Ind. Reservation. Growing in moister, more shaded places, of larger size with larger, less imbricated leaves (435).

Hypnum intermedium Lindb. Columbia Falls. Stem sections of this plant show an outer wall of large, thin cells next several rows of thickened cells and a distinct central strand. In appearance it is much like *revolvens* and *Sentneri* (414).

Hypnum styriacum Limpr. Belt Mts., Columbia Falls, Forty-mile Cr. and Cut-Bank Cr., Blackfeet Ind. Reservation, 5,000 ft. Aug. Not before credited to North America. It is somewhat like a slender form of the preceding (*H. palustre*) with more distant, curved and spreading leaves. The leaves are also rather more pointed, often distinctly serrulate on the margin below, and vein weaker, usually slightly forked above. The flowers are clustered along the stem, often 2 or 3 ♀ and 1 ♂ and the outer perigonal leaves are figured by Limpricht as distinctly 3-toothed; this character is variable however in authentic specimens received from J. Breidler, the original collector of the species in the Alps of Austria (400).

Hypnum giganteum dendroides Limpr. Plants with lower branches often long, and all the branches with more or less numerous branchlets. The stem leaves are comparatively long and narrow, $3\frac{1}{2}$ by $1\frac{3}{4}$ to 2 mm., in this respect approaching *cordifolium*, but they have the abruptly inflated alar cells of *giganteum*. Belt Mts., Columbia Falls (219).

A NEW HABITAT FOR SCHISTOSTEGA.

Like Mr. Huntington I have always longed to find *Schistostega*. Several years ago I found a few bits of the protonema and one or two scattering sterile plants in a cave known as the "Devils Den" at the top of Mt. Prospect in Holderness, N. H. Since then I have looked in every dark hole in the woods with the hope of seeing it again, but in vain.

This summer I was greatly surprised and delighted to find this rare moss in an entirely unexpected place, 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. The shed is open on the south side, and the floor is several inches lower than the soil on the north side, so that the earth and soil of the underpinning on this side is kept moist. Here were square inches, almost square feet, of the gleaming 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. Here also were an abundance of sterile plants but no capsules.

The protonema reproduces itself rapidly as spots from which collections were made were again covered in two or three weeks. Under the microscope the protonemal filaments were seen to end in flask-shaped cells, a character not shown in any illustrations with which I am familiar. The New Hampshire plants also had this character.

The question now is, where in the country round is the original habitat of this moss? The place where the shed stands has been dug over within my memory. The shed itself was built about twenty-five years ago. The country around is more familiar to me than any other place in the world, yet I have never seen any other indications of this moss in that part of the state.

A. J. GROUT.

NECROLOGY.

It is our sad duty to record the death of Professor Albert G. Wetherby, at Magnetic City, North Carolina, February 15th, 1902. He was known by correspondence to many readers of *THE BRYOLOGIST*, as a collector of mosses and lichens and as a generous friend in the matter of exchanges. He was identified with the Sullivant Moss Chapter from the beginning, and when the lichen department was added joined most heartily in its work.

Professor Wetherby was born at Pittsburg, Pa., in 1833. He received his early education in Cleveland, Ohio, and after his college graduation he spent some years in farming during the summer and teaching a country school in winter. In 1861 he removed to Cincinnati and was appointed principal of the Woodburn public school. In 1870 he was elected to the Chair of Natural History in the Cincinnati University and served for a term of six years, adding geology and botany to his other subjects. The work in the new university was too heavy for his strength though backed by wonderful enthusiasm, and he was obliged to resign his position, thus ending his strictly pedagogic work. He engaged in business, and in 1886 it took him to North Carolina

and he located his home on Roan Mountain, an ideal spot for one with his natural inclination.

The list of published works by Professor Wetherby contains many papers on conchology, one of his many lines of study, but the last years of his life were devoted to critical work on the mosses and grasses of the Roan Mountain region, and it is to the regret of all that the work was not completed, as it would have been a most valuable contribution to the botany of North Carolina. He made large and valuable collections, as field work was his especial delight. The series representing the smaller mammals of the Roan region he had already presented to the Smithsonian Institution. His minerals he had given to the Cincinnati University. His large and valuable herbarium it is hoped will find a place in one of our large museums where it will be of use to many workers.

Our friend was taken ill the first of January with congestion of the lungs, and though supposed to be making a slow but favorable recovery, died of heart failure on February 15th. He was buried at Magnetic City, February 18th, 1902. A wife and family of children survive him. A. M. S.

SULLIVANT MOSS CHAPTER NOTES.

OFFERINGS. [To chapter members only—for postage.]

Mrs. J. D. Lowe, Noroton, Ct. *Georgia pellucida*, *Weissia Americana*, *Hypnum chrysophyllum*, *Brachythecium salebrosum*, *B. Starkii*, *B. rivulare*, *Aulacomnium palustre*, *Pohlia albicans*, *Rhynchostegium ser-rulatum*, *Funaria hyrometrica* (antheridial plants).

Miss Harriet Wheeler, Chatham, N. Y. *Thuidium scitum*, *T. abietinum*, *Bryum caespiticium*.

Wm. C. Barbour, Sayre, Pa. *Jungermannia barbata*.

Mrs. Carolyn W. Harris, 125 St. Mark's Ave., Brooklyn, N. Y. *Umbilicaria Muhlenbergii*, *U. vellea*.

Miss Alice L. Crockett, Camden, Maine. *Umbilicaria Dillenii*, *U. pustulata*, *U. Pennsylvanica*.

NOTICE—ELECTIONS.

Forward your ballot *at once* to Miss Alice L. Crockett, Camden, Maine. Polls close December 1st.

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JANUARY, 1903



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

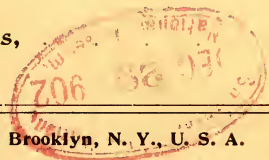
EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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PLATE I — *Sematophyllum recurvans*.

THE BRYOLOGIST.

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JANUARY, 1903.

No. 1.

SEMATOPHYLLUM RECURVANS.

BY ELIZABETH G. BRITTON.

Michaux, in 1803, described two species of *Leskea* from the mountains of North Carolina, *L. recurvans* and *L. squarrosa*, the latter from damp humus. Both have been cited as synonyms of *Hypnum recurvans*, following Schwaegrichen's Supplement of 1816, in which he stated that he could see no difference between them. This statement has not been questioned by recent authors, until the publication in THE BRYOLOGIST for July, 1902, in which I placed a question mark after two of the synonyms of this species. I did this after careful consideration of the descriptions given by Michaux and Bridel, and an examination of the earlier North American Exsiccatae; for it is evident that Sullivant's first understanding of this species differed from his later descriptions in the Icones. The possibility suggested itself, that one of the earlier synonyms of this species might antedate *S. delicatulum* (*H. laxepatulum*). This cannot be definitely settled without seeing the types, though a set of cotypes exist in the Boissier Herbarium at Geneva. Two attempts have been made to find the types at Paris, without success, so we must rely on the specimens preserved in the Schwaegrichen collection and on the original descriptions. In 1897, I had the privilege of examining these cotypes, and found they were mere fragments, and had therefore lost all distinctive macroscopic appearance, but the pedicels were 15-18mm. long, dark red and arcuate, the capsules horizontal, 1.5 to 2 mm. long, and the lid and peristome agreed with the figures of *H. recurvans* in Sullivant's Icones (Plate III). The basal alar cells, however, were more inflated than figured in the Icones, and were more like the ones shown in the plate accompanying this article. This cotype has also been examined by Cardot, who published a brief description in the Bulletin of the Boissier Herbarium for 1899, and concluded that they were referable to *Raphidostegium recurvans*, and that *L. squarrosa* is a synonym.

The original descriptions are somewhat contradictory, but if the specific names are any guide, they indicate two forms with two kinds of leaves, and suggest *S. recurvans* and *S. delicatulum*. The most striking difference is in the length of the pedicels; *L. recurvans* was described with a pedicel 6-8 long, and *L. squarrosa* nearly an inch. This amount of variation occurs in *S. recurvans*, though not usually on the same plant.

Bridel, in the Bryologia Universalis, recognized *H. recurvans* as the same species as *L. arcuata* Brid. and kept *L. squarrosa* Michx. as a variety, stating that at first they appear to be distinct species, but his descriptions do not indicate clearly in what way they differ. He described *H. recurvans* with the leaves densely imbricated, circinnate-falcate, and glossy yellow, the pedicel one-half to one inch long, the capsule nearly erect, and constricted below the mouth when dry.

The November BRYOLOGIST was issued November 3d, 1902.

Austin expressed the opinion that *R. delicatulum* is only a starved form of *H. recurvans*, and that the figures in the Supplement to the Icones give a much better representation of this species than the figures in the first volume. He also stated that he had found it difficult to distinguish small forms of it from *H. cylindricarpum* when sterile and larger forms from *H. nemorosum*. I cannot agree with him altogether in these statements, though *H. recurvans* is not correctly represented in the Icones, as the basal alar cells are more inflated. That the plants intergrade, and have originated from one common species, is evident, but the most constant differences, as illustrated by Sullivant, are that *S. recurvans* is the larger and coarser species in all its parts, usually with a more erect and denser habit of growth, with longer pedicels and capsules, the lid being usually only half the length of the urn. *S. delicatulum* grows in thin appressed mats of a darker, less glossy green, with shorter pedicels and the lid equalling the urn. The position and recurving of the leaves is a less constant character, and is variable in both species, as *S. recurvans*, when growing over wet cushions of *Leucobryum* will often send out long creeping branches on which the leaves are scarcely recurved, and *S. delicatulum* is more commonly found with its leaves strongly recurved than with spreading leaves. In fact, *H. laxepatulum* was a poor substitute for the specific name *delicatulum*, as it is an abnormal form of the species. But Dr. Best and I are agreed that *S. recurvans* has an annulus, which cannot be found in *S. delicatulum*. The number and length of the cilia in both *S. recurvans* and *S. delicatulum* is variable, and the Manual is incorrect in stating that the cilia are none or rudimentary in the latter species. An examination of the type has shown they may be one or two as in *S. recurvans*. The habitat also is different, as *S. delicatulum* is a plant of higher elevations and more moist habitat, and is usually found growing with hepatics such as *Blepharostoma trichophyllum*, *Lepidozia reptans* and *Jungermannia exsecta*. These species were found growing with the type, collected by T. P. James, at Errol Dam, N. H.

Austin is quite right in saying that it is difficult to separate *H. cylindricarpum* from *S. delicatulum* when sterile, as the main difference is in the shape and position of the capsule, but there are leaf differences as well, which a practiced eye can detect.

Sullivant, in the Musci Alleghenienses, distributed two forms of *H. recurvans* from Grandfather Mountain, North Carolina; No. 17, which he considered typical, grew in thin, appressed mats, with *Archelejeunia clypeata*, was dark green in color, and had pedicels only one centimeter long; it is evidently referable to *S. delicatulum*. No. 18 was issued as *H. recurvans*, var. (*L. squarrosa* Michx.). It is a much coarser moss, with densely tomentose, matted stems, making taller tangled tufts with longer pinnate branches and pedicels 15-20 mm. long; the capsules are twice as large with the lid shorter in proportion; they are evidently what we have been considering typical *H. recurvans*. It appears as if Sullivant had critically studied Michaux's descriptions, and tried to refer the two forms which he recognized to them; but there is nothing to show that he had seen

the types, and as the descriptions are misleading, he evidently changed his opinion when he published the Icones. He referred to the specimens issued by Drummond as *H. amoenum* as a synonym. In Dr. Torrey's set, No. 196 appears to be a small form of *S. recurvans* mixed with *Hypnum pratense*. In the Musci Boreali-Americani, Sullivant and Lesquereux also issued two numbers in each set, one as *H. recurvans* and the other as an unnamed variety. In the first set I cannot see much difference between them, but in the second set, No. 447 *H. recurvans* var. is evidently *S. delicatulum*.

Austin has suggested a resemblance in the coarser forms of *S. recurvans* to *H. nemorosum*. I have only seen one specimen that at all approximated this species in size, and it suggested *S. Carolinianum*. They were collected by Dr. Small in the Canyon of Tallulah Falls, growing on quartzite rocks; they are bright glossy yellow or red-brown plants, with branches 7cm. long, and the pedicels 25mm. long; the leaves are strongly recurved. It occurs also in lax, loose mats in the same locality where the normal form was also collected. Austin also named some specimens in his herbarium *H. recurvans* var. *compactum*; they were collected at Otter Pond, near Closter, N. J., forming densely caespitose tufts, fully three centimeters high and matted together by brown tomentum. They evidently grew in rich moist soil, as I have noticed that this species when growing on the ground has a tendency to become pulvinate, while on roots of trees or on rocks it spreads out in thin mats. He also named some specimens in his herbarium *H. recurvans* var. *minus*; these are referable to *S. delicatulum*, but owing to the strongly recurved leaves, and the misleading characters of *H. laxepatum* he did not recognize them for this species. In fact, Austin failed to discriminate between them. His idea about *H. recurvans* seems to have been that it was as variable a species as *H. cupressiforme*.

Kindberg has described *Raphidostegium Whitei* as having the leaves faintly or not recurved, the pedicel short and the tufts green. This agrees with the form we have been calling *H. laxepatum*, but I have not seen the type.

In geographical distribution, *S. recurvans* has the greater range, having been collected in British America from New Foundland to Manitoba, along the Alleghanies from Maine to Georgia, northwestward to Michigan, Minnesota and Wisconsin. It appears to be unknown in the Rocky Mountains and the West Coast, where it is replaced by *S. Roellii*. In Part VII. of the Catalogue of Canadian Plants, *Raphidostegium Roellii* is credited to Cape Breton Id. N. S.; this determination needs investigation. In the immediate vicinity of New York City *S. recurvans* is not common, though it has been collected on the Palisades by Austin and Gilman; on Long Island by Dr. Grout, and in Westchester County, near Bedford, by me. It is common in the Catskills and the Mountains of Pennsylvania. *S. delicatulum* ranges from Hudson's Bay to Manitoba, along the Alleghanies from Vermont to North Carolina, is abundant in the Catskill and Adirondack Mountains as well as the mountains of southern Virginia. It is apparently more restricted in its range, occurring at higher elevations and in more moist shady localities.

New York Botanical Gardens.

ORTHOTRICHUM.

BY A. J. GROUT.

FAMILY ORTHOTRICHACEÆ.

Plants usually growing in short dense cushions on rocks or trees blackish or brownish green, at least below. Leaves oblong-lanceolate or linear-lanceolate, usually very hygroscopic; cells of the upper part, at least, more or less rounded-hexagonal, often papillose. Capsule often immersed. Calyptra often hairy. Peristome double or single, rarely absent, the teeth often united in pairs. This family is usually united with the Grimmiaceae on account of similar habit and facies, but the peristome characters are so different as to fully warrant its separation. A general idea of these peristomial differences is best obtained by an inspection of the illustrations.

ORTHOTRICHUM Hedw.

Plants comparatively short stemmed, in close rounded cushions, sometimes looser, on trees everywhere, and more rarely on rocks. Leaves very hygroscopic, imbricated when dry and not appreciably curled or twisted, which character separates the genus from *Weissia* except *W. Americana*. Upper leaf cells usually papillose, thick-walled, the lower thinner-walled and quadrate to rectangular. Calyptra sparsely hairy or naked. Base of seta enclosed in a minute cup-like sheath, the ochrea. Capsule immersed or emergent, rarely exerted; usually with 8 regular folds or plicae when dry, but sometimes smooth or with 16 plicae. Peristome usually double with 16 broadly lanceolate teeth, which are usually united in pairs. Inner peristome of 8-16 narrow segments, often called cilia. The paired (bigeminate) teeth and degenerate inner peristome illustrate well the degeneracy of peristomes on erect capsules.

A difficult genus, usually avoided by the amateur, but I believe one can learn to recognize all the common species with a hand lens when they are well fruited. It will usually serve to determine the number and position of the teeth, markings of the capsules and general outlines of the leaves. Sterile specimens are often indeterminable. The stomata furnish an excellent and definite character and are easily observed by separating a capsule into two or more divisions with the dissecting needles and mounting outside up; the stomata are nearer the middle of the capsule than in many mosses and are, therefore, easier of observation. The condition of the material is of the utmost importance. The capsule must be thoroughly soaked in hot water for a long time to be fully expanded, and the dry capsule must be thoroughly dry to be characteristic. The capsules of all species shrink progressively with increasing age, and many varieties had their origin in this fact. The plants should be moistened to determine whether the capsules are immersed, emergent, or exerted.

KEY.

- 1. Rock-inhabiting species; peristome single, teeth 16, erect or erect-spreading on dry capsules. 2.
- Tree-inhabiting species; peristome double, teeth usually united into 8 pairs, recurved or reflexed when dry 4.

2. Capsule fully exerted, 16-striate *anomalum*.
Capsule emersed or emergent, 8-striate 3.
3. Capsule ovate-cylindric, urn half emergent when dry... *Porteri*.
Capsule much shorter, ovate-globose, leaves nearly reaching
mouth of urn when dry..... *Lescurii*.
4. Stomata superficial (*i. e.*, with both guard cells on the surface.
See Plate VI, Figure 13).....5.
Stomata immersed. (See Figure I, 10).....8.
5. Leaves obtuse (rarely with some leaves acute), broad
pointed, margins plane..... *obtusifolium*.
Leaves acute, margins revolute or involute.....6.
6. Capsule almost or quite exerted, smooth, or very slightly
plicate around the mouth when dry and empty... *speciosum*.
Capsules immersed or slightly emergent, plicate the whole
length when dry.....7.
7. Empty capsule strongly contracted below the mouth when
dry, neck immersed; common... *sordidum*.
Empty capsule less strongly contracted, exerted; rare..... *affine*.
8. Capsules strongly contracted under the mouth when dry,
and so strongly plicate that the red-brown folds are in
contact on the outside when dry and empty... *strangulatum*.
Capsules very slightly or not at all contracted, much less
strongly plicate, pale, whitish or yellowish.....9.
9. Leaves entire, blunt at extreme apex..... *Ohioense*.
Leaves (some at least) dentate, with projecting cells, often
apiculate.....10.
10. Leaves mostly acute at apex, not rounded; usually some with
an apiculus of a single projecting cell, capsules plainly 8
plicate when dry..... *Schimperi*.
Leaves obtuse, rounded at apex and some sharply dentic-
ulated at apex with several projecting cells, capsule
smooth or faintly 8 plicate when dry..... *pusillum*.

O. ANOMALUM Hedw. Plate II. In rather dense cushions, dark olive green or brown below; leaves ovate-lanceolate, papillose with small simple papillae; calyptra hairy; capsule usually fully exerted, 16-striate, the 8 intermediate folds less distinct, oval-cylindric when moist, cylindric when dry, abruptly narrowed to the neck; peristome erect when dry, of 16 teeth, usually separate, with preperistome (*i. e.*, with two short lamellae before each tooth reaching as high as the second or third articulation); segments none or rudimentary. Spores maturing May-June. Not rare.

Mrs. Britton says that we also have the var. *saxatile*, which has narrower 8-striate capsules with teeth united in pairs, and 8 well developed segments.

This species will not be confused with any other species of *Orthotrichum*, but may be confused with *Weissia Americana*. The latter has the dry capsule gradually narrowed into the long neck and the teeth *reflexed* when dry; besides it is almost black in color except at the extreme ends of

the stems and branches, and grows in loose wide mats. Its spores mature much later, July-September. *Drummondia* has the general appearance of an *Orthotrichum* with an exerted capsule, but it grows on trees only.

O. PORTERI Aust. and *O. LESCURI* Aust. are our only other rock-inhabiting forms, at least the only ones at all likely to be met with. They have usually been treated as varieties of *O. cupulatum* Hoffm., but both Dr.

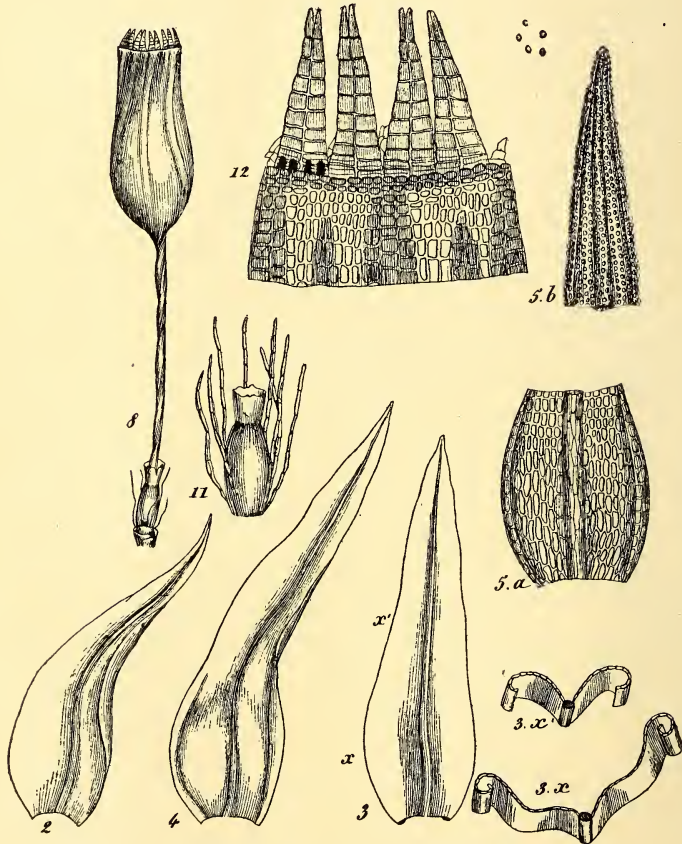


PLATE II.—*Orthotricum anomalum* (Bry. Eur. Pl. 210).

Figs. 2, 3, 4 and 5—Leaves; x and x' indicate where the sections $3x$ and $3x'$ were made. Fig. 11—Vaginula. Fig. 8—Deoperculate capsule and seta. Fig. 12—Peristome highly magnified; the tooth at the left has been redrawn to show the lamellae of the preperistome.

Venturi and Mrs. Britton consider them distinct, and Mrs. Britton says that we have no *capulatum* in the Eastern States. These two forms have not been frequently collected or adequately described. Their habitat and immersed or emergent capsules should serve to identify them and collectors should be on the lookout for them.

Dr. Venturi stated in a letter to Mrs. Britton that *O. Porteri* had a distinct preperistome as in *O. anomalum*, but he is the only one who has noted it, and other observers have failed in their attempts to verify his observations.

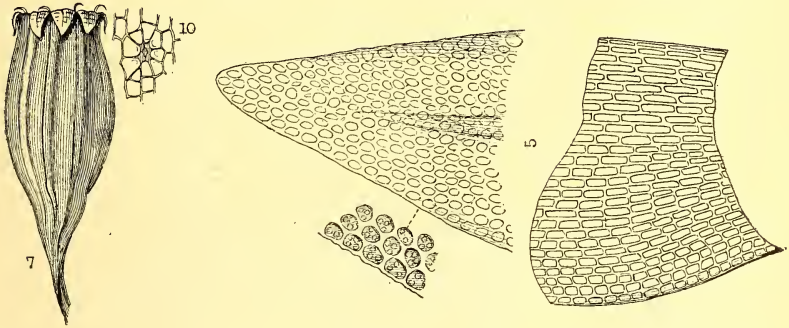


FIG. I.—*O. Ohioense* (Icones Musc. Suppl. Pl. 48).

Fig. 7—Dry and empty capsule. Fig. 10—Stoma. Fig. 5—Areolation of leaf.

O. OHIOENSE S. & L. Figure I. In rather dense, small cushions, yellowish green, brown below; stems about 1 cm long; leaves oblong-lanceolate, blunt at the apex or obtusely acute, papillose; calyptra hairy; moist capsule immersed, oblong-ovate, when dry slightly 8-plicate, campanulate, becoming more narrowed with age, straw colored; peristome of 8 double teeth, strongly reflexed when dry; segments shorter than the teeth, of a double row of cells, except at apex; spores maturing in early spring (April) Common on trees. When sterile it is a difficult matter to distinguish this from the next, but the straw-colored lightly-plicate capsules are easy of recognition and the entire leaves serve to distinguish it from the other species with light-colored capsules.

O. STRANGULATUM Sulliv. Figure II. This is one of our commonest mosses, abundant on shade trees almost everywhere. It can be recognized with a hand lens by the characters given in the key if one is familiar with it. The capsules are not so deeply plicate until a month or more after the spores ripen. It is a little smaller than the preceding, the leaves are narrower, and the calyptra naked; the spores apparently mature about a month

later. The first few rows of cells around the mouth of the capsule in this species have nearly quadrate cavities, while in the preceding these cavities are nearly circular.

FIG. II.
Capsule of
O. strangu-
latum.

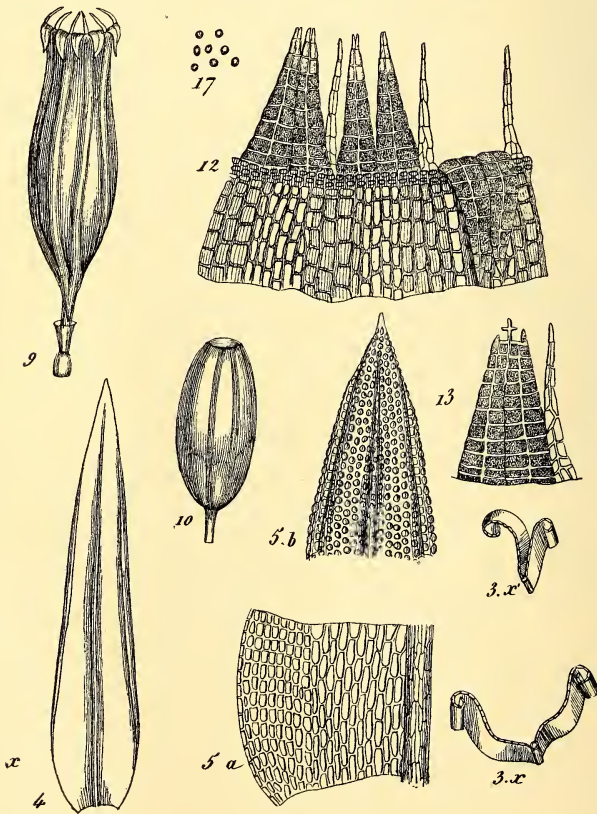


PLATE III.—*O. Schimperii* (Bry. Eur. Pl. 211).

Figs. 3, 4 and 5—Leaves. Figs. 9, 10, 12 and 13—Capsules and peristome

O. SCHIMPERI Hamm. (*O. fallax* Schimp) Plate III. In short, close, dark green tufts, only a few mm. high; leaves oblong-lanceolate, obtuse or usually some acute and ending in an apiculus of a single elongated cell, leaf cells rather large and thinner-walled than usual in the genus, papillose; calyptra with a few short hairs; capsule small, immersed oblong-ovoid, light colored, when dry narrow and slightly contracted below the mouth, with 8 rather prominent plicae; teeth 8, reflexed, densely papillose; segments 8; spores maturing in spring, Frequent.

A specimen with all the leaves obtuse might be mistaken for *O. Ohioense*, but the smaller size and darker color and smoother calyptra are quite pronounced. The form with the leaves narrowly acute and apiculate and narrower capsule has been called var. *truncatulum* by Austin. Rarely the leaves have more than a single projecting cell at the apex. Mrs. Britton and Dr. Best think that *O. brachytrichum* Schimp. is a synonym for the American form of this species, and that we have no true *O. Schimperii*.

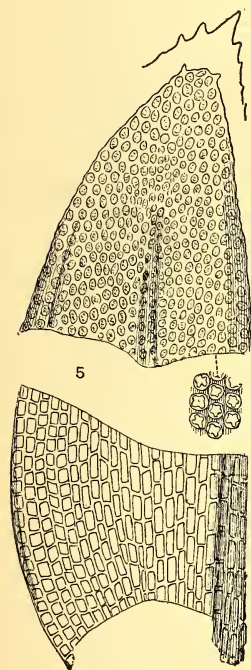


FIG. III.

Leaf structure of
O. pusillum
(Icon. Musc. Suppl.
Pl. 50).

O. PUSILLUM Mitt. (*O. psilocarpum* James.) Figure III. The plants are as small as those of the preceding and the color is blackish green, but the capsules are ovoid or globose when moist, only faintly ribbed even when old. Spores maturing in May. Apparently not common. The apex of the leaves is very characteristic as figured. It is very like *O. Schimperii* except in the characters mentioned here and in the key.

O. OBTUSIFOLIUM Schrad. Plate IV. Yellowish-green, about an inch high; leaves short and very broad, oblong-ovate, very broad and obtuse at apex, papillose, margin not appreciably revolute or incurved; calyptra naked; capsule immersed, with 8 plicae when dry; peristome double.

Probably a very common species, but so seldom fruiting as to be collected infrequently. The leaves usually bear clavate,

septate gemmae, which may account for the rarity of the fruit. The broad apex, entire except for papillae, and erect margins, render sterile specimens easy to determine. All other species have the margins revolute or involute. *O. gymnostomum* Bruch has been found in Newfoundland. It is closely related to this species but has *involute* leaves and no peristome. Collectors should look out for it.

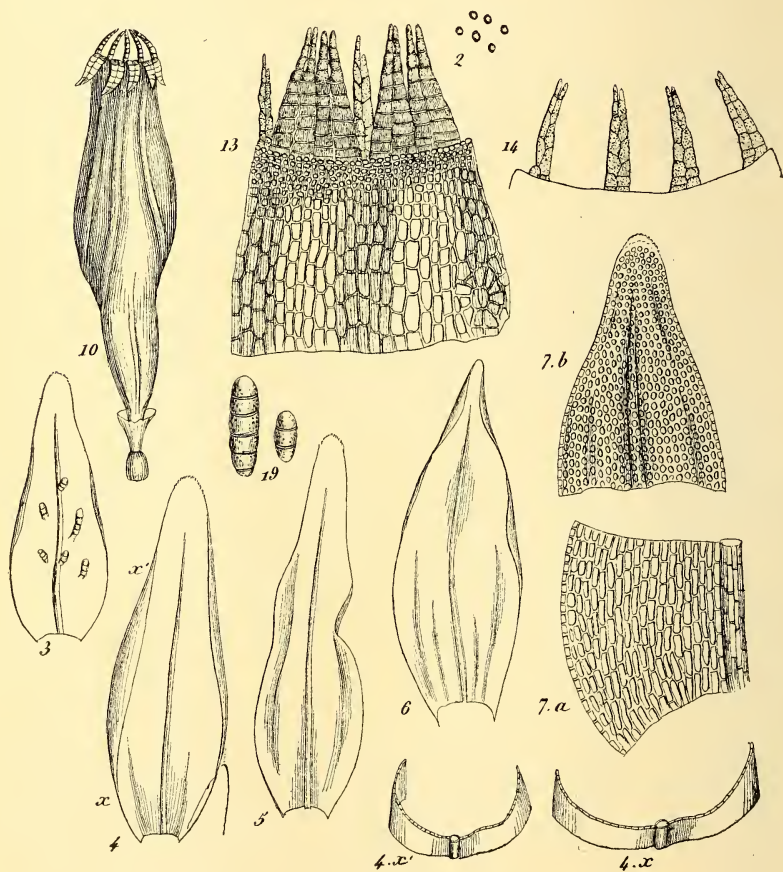


PLATE IV.—*O. obtusifolium* (Bry. Eur. Pl. 208).

Figs. 3, 4, 5 and 6—Leaves from below upwards. Fig. 7—Showing cellular structure. Fig. 10—Capsule. Fig. 13—Peristome highly magnified. Fig. 14—Segments of the same. Fig. 19—Propagula.

O. SPECIOSUM Nees. Plate V. Perhaps the largest of our species, an inch to an inch and a half in height, yellow-green above; leaves tapering, *very acute*, papillose; *leaf cells very thick walled*, the upper circular or elliptical; calyptra large, hairy, companulate; capsule oblong-cylindrical, almost exserted, the upper leaves barely reaching the base, smooth or barely marked with irregular ridges when dry; operculum rostellate; peristome of 8 teeth, which when dry are recurved rather than reflexed, as the tip of the tooth sometimes touches the capsule wall in a way to remind one of the handle of a mug; segments 8, papillose. Like *O. obtusifolium*, this species rarely occurs on rocks. The spores mature by October, but I have collected operculate capsules in March.

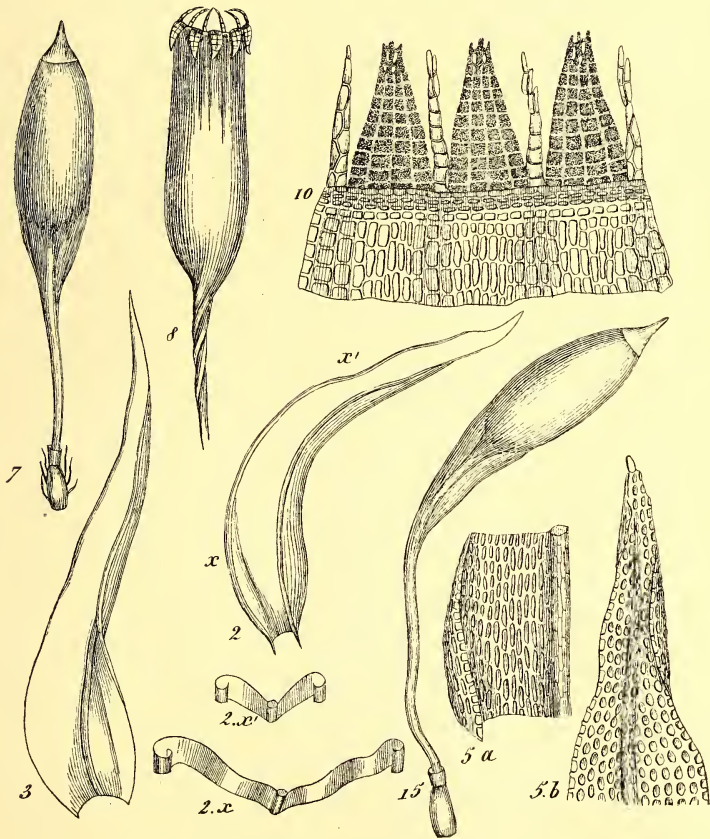


PLATE V.—*O. speciosum* (Bry. Eur. Pl. 217).

Figs. 2, 3 and 5—Leaves. Figs. 7, 8, 10 and 15—Capsules and peristome.



PLATE VI.—*O. sordidum* (Icones Musc. Suppl. Pl. 49).

O. sordidum S & L. Plate VI. Somewhat resembles the preceding in leaf characters, but the leaves, though acute, are broader pointed with thinner cell walls. It is at once distinguished by the immersed or emergent plicate capsules and smooth segments. The spores mature in late spring or summer.

This species is so close to the var. *fastigiatum* of *O. affine* that it may cause confusion, especially as the teeth of *sordidum* are often as markedly trabeculate at the summit as those of *fastigiatum* figured by Limpricht (Laubmoose 2:82), but both *affine* and its var. are rare. I have not been able clearly to differentiate *sordidum* from *affine*, and incline to the opinion that they are forms of the same species for all except the experts. All our ordinary forms are *sordidum*, however. *O. affine* is certainly treated differently by European authors and is exceedingly variable. The capsule of *sordidum* is often so strongly contracted under the mouth as to resemble *strangulatum* except for the larger size of the plant and the lighter color of the capsule.

O. striatum (L.) Hedw. (*O. leiocarpum* B. & S.) is a rare species, with capsule almost as smooth as in *O. speciosum*, and it has been confused with it by several good bryologists, but the capsules are *immersed* or only slightly emergent and ovoid; teeth 16, *separate*, and 16 comparatively broad segments.

In August I have found *O. speciosum*, *O. sordidum*, *O. strangulatum*, and *O. Ohioense* growing together on fruit trees. *O. strangulatum* is much the most abundant, and is easily recognized by the strangulate, dark red-brown capsules appearing as described in the text. *O. Ohioense* is about the same size, but the straw-colored capsules catch the eye at once. *O. sordidum* stands out at once by reason of its greater size and larger leaves and capsules less plicate than in *O. strangulatum*. *O. speciosum* is somewhat smaller than *sordidum*, and at this time the capsules are immature with the hairy calyptra still firmly attached. The comparative sizes of *speciosum* and *sordidum* is just the reverse of what my herbarium specimens and the book descriptions lead me to expect, as the specimens of *speciosum* I collected were much smaller than those in my collection.

I desire to acknowledge my indebtedness to Dr. G. N. Best for notes and specimens, and to Mrs. Britton's published notes on this genus.

This monograph is taken from the MS. of a new moss book now in preparation by the writer. I should be very glad to receive criticisms from any one who may have occasion to use it, to the end that I may succeed in making as helpful a book as possible.

A. J. G.

DESCRIPTION OF PLATE VI.

Fig. 1—Plants natural size. Fig. 3—Leaves. Fig. 4—Leaf sections. Fig. 5—Cellular structure of leaf base and apex. Fig. 12—Antheridial branch with antheridium and paraphysis. Fig. 11—Segment of peristome highly magnified. Fig. 13—Superficial stoma. The other figures are self explanatory.

KARL GUSTAV LIMPRICHT.

BY JOHN M. HOLZINGER.

Professor Karl Gustav Limpricht, principal of the Evangelical High School in Breslau, Germany, died on October 20, 1902, after a protracted illness. He was born July 11, 1834, and had reached the age of 68 years.

In the death of this man Bryology has lost one of the ablest, most scholarly and conscientious workers of his time; one who was as modest as able. Publishing little if anything in the current bryological journals of his time, he quietly and unostentatiously spent the best part of the past 20 years in elaborating his *Laubmoose*. After the completion of his *Mossflora of Silesia* he had so fully gained the confidence of his contemporaries that he was selected to contribute to *Rabenhorsl's Cryptogamenflora*, the manuscript for the *Hepaticae* and *Musci* of Germany. The *Musci* have appeared in parts under the title *Laubmoose Deutschland's, Oestreich's, und der Schweiz*. The first volume, consisting of 834 pages, with 533 illustrative drawings, was completed in November, 1889, after five years of arduous labor. It goes as far as *Hedwigieae*. The second volume, consisting of 853 pages, with 867 drawings, was completed in June, 1895. It includes *Orthotrichaceae* to *Leskeaceae*. Each of these volumes was issued in 13 parts, each of the separate parts appearing immediately after its completion. Of the third volume, which appears to be planned to have the same number of parts, 11 have so far appeared. Most of parts 10 and 11 record new stations for old species and species described as new since 1885. According to the plan of the author there will be an alphabetical index including synonyms at the conclusion of the entire work. Volumes 1 and 2 are also indexed separately.

After the preface of four pages, in the first volume, the author devotes 85 pages to the discussion of the development and structure of the moss plant and its organs, to geographical distribution, the collecting and study of mosses, and treats briefly of the systems of classification proposed in later years. This is a clear concise, and satisfactory treatment helpful to the systematic student.

In the execution of the body of his monumental work the author has set for himself a standard to which he has adhered with a steadfastness and a devotion undiminished to the last. After outlining briefly the degrees of excellence attempted in previous manuals, in which a distinct progressive movement is traced commensurate with the perfection and increased availability of the compound microscope, he says: "As early as 40 years ago Karl Mueller, at a time when the marks of affinity of mosses were found entirely in the external forms of organs, gave a new direction to systematic bryology by introducing *leaf areolation* into the sphere of observation, a tendency which will reach its closing climax in the utilization of the sum total of anatomical characters, both of the vegetative and reproductive organs. If, then, every description furnishes also physiological, biological, historical and bryo-geographical data, *then* it approaches the ideal in that it sets forth in brief form *all* that is known about the object under consideration.

In this endeavor I have laid the center of gravity of my labor upon explicit description. And I am able to state, without conceit, that in this matter a great abundance of *new* characters has been furnished to Bryology; and even each *known* character has been admitted only after *careful* scrutiny." According to this standard, thus set well in advance of manuals prior to his time, the author has worked out his three long volumes from beginning to end. The descriptions go into the greatest detail, and are invaluable to both European and American students of mosses.

The Keys to Orders, Genera and Species are excellent, and usually call for the most available diagnostic characters.

The treatment of generic names is in many cases elucidated by critical notes, which are gems of historical glimpses of the greatest value to the student of nomenclature problems. Lindberg, the radical reformer in this direction, while often endorsed, is as often set aside for reasons ingeniously and dispassionately stated, all in accordance with a reasonable conservatism.

In his treatment of the species the author follows the prevailing custom, of citing the valid synonyms after the specific name and its literary setting are given. Then he cites all the available exsiccati by name and number, followed by the minute description, which often covers a full page, rarely less than half a page. At the close comes the treatment of habitat, substratum, range in altitude and geographical distribution, with citation of stations, which often cover over half a page of fine print alone!

Lastly, it is worthy of note that the author has described not a few species *new* to the mossflora to which he has devoted his life. All these descriptions he has garnered into his great work. It is this garnering, this focusing of all available lights upon the objects in hand, this concentrating of all that has a bearing on the questions involved, bringing *all* together between the covers of one treatise, that establishes the reputation of Professor Limpricht as one of the most thorough bryologists of his time, and that gives undoubted value and authority to the crowning effort of his life, his *Laubmoose Deutschland's, Oestreich's und der Schweiz*.

Winona, Minn.

NOTE—We have just received from Prof. Holzinger a communication giving much interesting information regarding the earlier works of Limpricht which materially adds to the above data. It is too late to print it in this issue but it will be given in full in the March BRYOLOGIST.

WANTED.

Enough good fruiting material of the following mosses to make 20-30 good sized specimens of each: Pogonatum urnigerum, Dicranum Drummondii, Pottia truncatula, Splachnum ampullaceum, Mnium Drummondii, Plagiothecium sylvaticum, Brachythecium acuminatum, Eurhynchium hians, Climacium dendroides, C. Americanum, Leucodon bracypus and L. julæcus. A liberal exchange from a choice list of duplicates is offered in return.

Address, A. J. GROUT, 360 Lenox Road, Brooklyn, N. Y.

CURRENT BRYOLOGICAL LITERATURE.

Species of European and North American Bryineæ.

BY NILS CONRAD KINDBERG.

This work was published by P. M. Sahlstroems at Linköping, Sweden, in 1896, and an attempt is made to use English throughout, since the work was designed to aid the moss students of both continents. There are three parts. The first, paged separately from 1-40, treats the "Genera—synoptically disposed." The second and third parts are paged continuously from 1-410, and take up the "Species—synoptically described." In the preface to this second part the author states his purpose briefly thus:

"The present treatise is an attempt to revise and compare all hitherto known species and subspecies of Bryineæ, found in Europe and North America. . . . About 1,600 species and 340 subspecies are described. . . ." And this he has attempted to accomplish by re-describing all species of which he was able to secure typical material, surely a heroic effort. Necessarily, most of the so-called descriptions are but skeletons of diagnostic sketches. And with so vast a number of species to be passed in review by one man, single handed, it would have been a miracle if errors had not crept in.

To use the author's own words in setting forth his effort: "I have therefore not described selected specimens in all their parts, but generally omitted such characters as evidently are too variable. When some species are critical or hitherto not well known, I have tried to propose all their necessary distinctive characters. To facilitate the determination of sterile specimens, so often occurring, I have accurately described the areolation of the leaves and the common habit of the vegetals." But accuracy in the strict sense, in such a bryological attempt, of such magnitude, is at best difficult to attain. In critical cases it will therefore not do to rely upon these brief characterizations.

The author's method of citing authorities, if method it can be called, disregards all present usage. Of bracket authorities he is innocent. One illustration will suffice: *Tetraphis pellucida* (L.) Hedw., or *Georgia pellucida* (L.) Rabenh., he writes simply *Georgia pellucida* L. It is hardly worth while to point out other irregularities in this direction. Suffice it to say that the author seems out of joint with his contemporary colleagues, on nomenclature certainly; in a measure also in his views on diagnosing new species, many of which have been compelled to seek refuge under familiar names.

In spite of these drawbacks, the venerable author, a voluminous, enthusiastic and earnest worker on mosses, has rendered a considerable service to Bryology in the production of his Bryineæ, which cannot but be of the greatest service, as a reference book, to cautious workers on both continents who know enough not to rely too implicitly on its pages.

J. M. HOLZINGER.

REPORTS OF THE SULLIVANT MOSS CHAPTER. PRESIDENT'S REPORT.

It is a pleasure to say that since my last annual report the Sullivant Moss Chapter has continued to prosper, its workings have been mutually satisfactory, and the relations existing between officers and members most cordial. Aside from a few topics of minor importance to which Miss Wheeler, our efficient Secretary-Treasurer, has kindly called my attention, the duties devolving upon me have been chiefly the determining of specimens of our members. While many of these were common species and, therefore, easily disposed of, others were more or less critical, often necessitating considerable labor and research. In behalf of the incoming President I would suggest that only such material be sent him as actually needs the assistance of an expert for its determination.

Our official organ, *THE BRYOLOGIST*, although conducted on a somewhat higher plane than formerly, is ably edited and merits our support and patronage. In all of its departments it is doing a grand work for American bryology. For amateurs as well as professionals it is simply indispensable.

In conclusion, I wish to sincerely thank the members of the Chapter and my official associates for the kind consideration they have shown me during the two years I have tried to serve them as presiding officer.

Respectfully submitted,

G. N. BEST.

REPORT OF THE SECRETARY.

During the year 1902, 24 names have been added to the roll of membership of the Sullivant Moss Chapter, 9 members have withdrawn and one member, Mr. A. G. Wetherby, has died; 118 members are now enrolled. The Chapter herbarium has been enriched by contributions from various quarters and represents 95 genera and 273 species and varieties, many of the species being several times duplicated. A valuable set of Colorado mosses has been presented by Mrs. Streeter, some interesting ones have come from Florida and a handsome collection from the Pacific coast has recently been contributed by Dr. J. W. Baily of Seattle, Wash. Warm appreciation of the *BRYOLOGIST* and its increase of matter is frequently expressed in the communications received from members; the correspondence between members is fairly maintained, interest and enthusiasm in the study prevails and serious work is done, not only by professional, but by amateur bryologists.

Respectfully submitted,

HARRIET WHEELER, Secretary.

REPORT OF THE TREASURER.

The following statement for the year 1902 is respectively submitted:

RECEIPTS.	DISBURSEMENTS.
By check from former treasurer, Jan. 10, 1902.....\$ 10.50	To Bryologist.....\$ 57.50
By dues from members..... 72.00	“ Herbarium supplies..... 3.10
\$82.50	“ Herbarium cases..... 2.25
	“ Express charges..... 1.00
	“ Postage..... 3.80
	“ Account book..... .25
	“ Stationery..... 1.05
	\$68.95
	Cash in hand, Dec. 1, 1902... 13.55
	\$82.50

MISS HARRIET WHEELER,

Secretary Sullivan Moss Chapter.

HARRIET WHEELER, Treasurer.

The following report of the election of officers of the Chapter for the year 1903, is respectfully submitted:

Whole number of votes cast.....	26
FOR PRESIDENT.—Prof. J. M. Holzinger.....	20
Mr. E. M. Chamberlain.....	6—26
FOR VICE-PRES.—Mr. Wm. C. Barbour.....	21
Dr. A. F. K. Krout.....	5—26
FOR SEC.-TREAS.—Miss Harriet Wheeler.....	20
Mrs. J. D. Lowe.....	6—26

Prof. Holzinger, Mr. Barbour, and Miss Wheeler are elected.

ALICE L. CROCKETT, Judge of Election.

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Adams, Mr. F. M.....	361 Madison street, Brooklyn, N. Y.
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Smith, Mrs. Charles C.....	286 Marlborough street, Boston, Mass.
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Wetherby, Miss Louise J.....	Magnetic City, Mitchell County, N. C.
Wheeler, Miss Harriet.....	Chatham, Columbia County, N. Y.
Wheeler, Miss Jane.....	248 Lark street, Albany, N. Y.
Wheeler, Mr. John A.....	Milford, N. H.
Williams, Mrs. Mary E.....	1536 Pine street, Philadelphia, Pa.
Williams, R. S.....	Botanical Garden, Bronx Park, N. Y. City.
Windle, Mr. Francis.....	8 South High street, Westchester, Pa.

CHAPTER NOTES CONTINUED.

Dr. J. W. Bailey, 12 Downs Block, Seattle, Wash., desires, for purpose of comparison, the gift or loan of a specimen of *Isothecium mysuroides*.

Miss Harriet Wheeler, Chatham, N. Y., would like to communicate with any members who have made a special study of the genus *Sphagnum*.

OFFERINGS. [To Chapter members only—for postage.]

Dr. J. W. Bailey, 12 Downs Block, Seattle, Wash. *Ceratodon minor* Aust.; *Aulacomnium androgynum* Schwaegr.; *Bryum cirrhatum* Hoppe.; *Orthotrichum pulchellum* var. *leucodon* Vent.

Mrs. R. H. Carter, 37 Church street, Laconia, N. H. *Hypnum fluitans pinatum* Boul.

Mr. J. Warren Huntington, Amesbury, Mass. *Pottia truncatula* (L.) Lindb. *Pterigynandrum filiforme* Hedw.

Mrs. Mary E. Williams, 1536 Pine street, Philadelphia, Pa. *Octoblepharum albidum* Hedw.

Mr. Edw. B. Chamberlain, 1830 Jefferson Place, Washington, D. C. *Drummondia prorepens* (Hedw.) E. G. Britton.

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MARCH, 1903



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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THE BRYOLOGIST

A BIMONTHLY JOURNAL DEVOTED TO THE STUDY OF NORTH AMERICAN MOSSES
HEPATICS AND LICHENS.

ALSO OFFICIAL ORGAN
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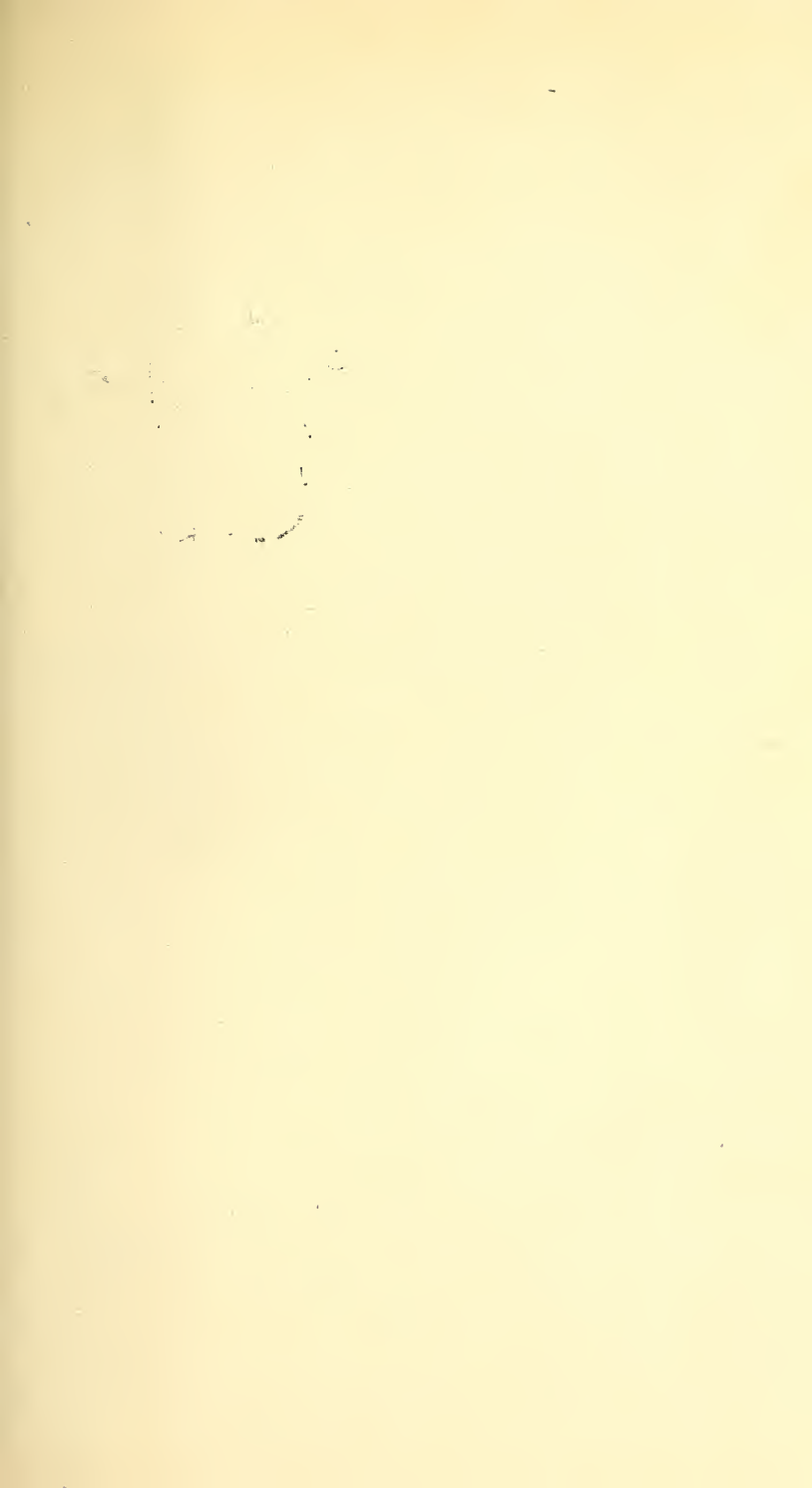
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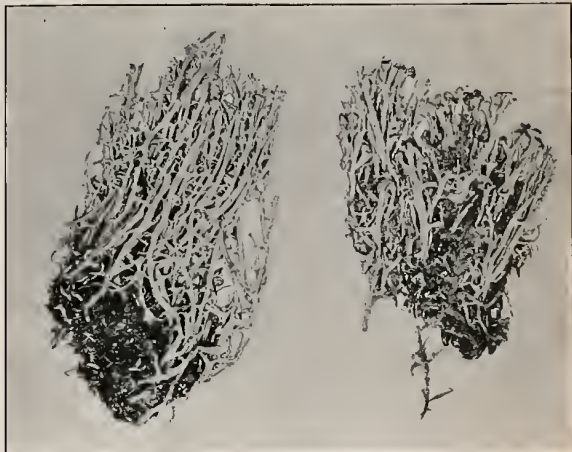
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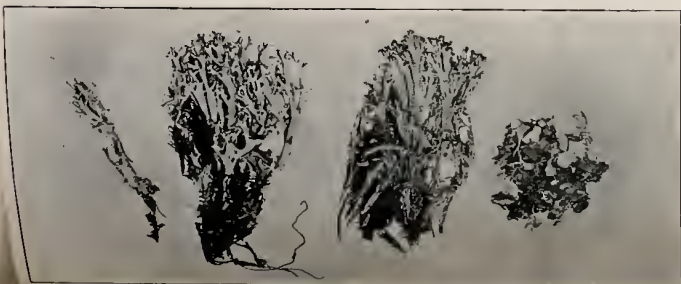


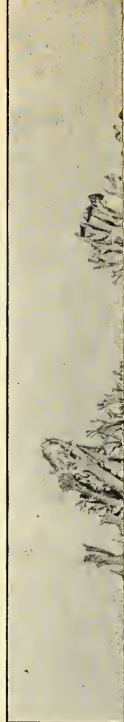
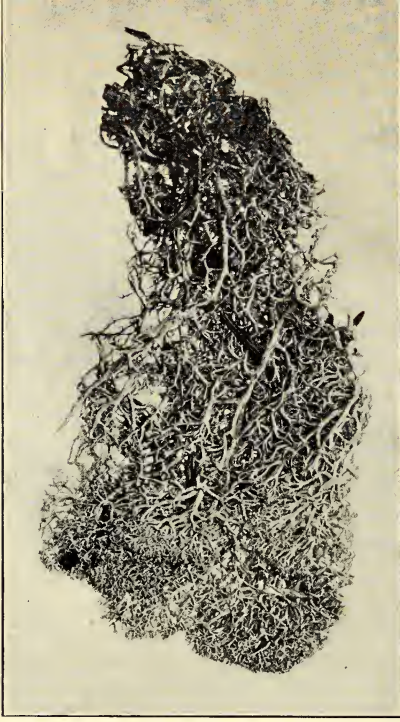
PLATE VII.

Fig 1—*Cladonia rangiferina* Fig 2—*C. sylvatica*. Fig 3—*C. alpestris*. Fig 4—*C. amaurocraea*. Fig 5—*C. uncialis*. Fig 6—*C. cenotea*. Fig. 7—*C. turgida*.

The photographs are all from plants that have been seen by Dr Wainio. Reduced one quarter.



2



been seen by Dr. Wainio. Reduced one quarter.

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NOTES ON CERTAIN CLADONIAS.

BY BRUCE FINK AND MABEL A. HUSBAND.

PLATE VII.

The western hemisphere surpasses the eastern in number of *Cladonias* and in number of species peculiar to the hemisphere, hence the genus should have a special interest for the American student of lichens. While this is true, it remains a fact that our American descriptions of *Cladonias* have been, without exception, wholly inadequate and many of our determinations consequently incorrect. *Cladonias* are the most variable of all of our lichens and therefore the most difficult to describe definitely. Fortunately, the most variable characters are those which may be studied with the eye or with a good hand lens, and yet nothing but the most careful observation will enable one to determine a *Cladonia* with any degree of certainty even with the best descriptions. Size, form, color, lobing and branching and the presence or absence of cortex and soredia must be constantly kept in mind in the consideration of the horizontal thallus and yet more in the study of the podetia.

As to microscopic examination, it may be said that the spores, usually of considerable importance in determination, are here so constant in size and form that they may usually be neglected in descriptions. The same may be said of the algal cells. The so-called hypothallus is seldom seen and is of no use in the determination of *Cladonias*. Also those doubtful structures, the spermagones and the spermatia may be entirely neglected, while there is serious doubt as to the diagnostic value of chemical tests in the determination of any lichens. The minute anatomy of the thallus may yet be found to have some value in determination, but our investigations do not indicate that it is of sufficient importance to warrant adding to the necessarily long descriptions of such variable plants as the *Cladonias*.

With this short preliminary statement let us pass to the consideration of a few of the species; and we make no plea for beginning with the more conspicuous and better known *Cladonias*, for there is urgent need for careful study of every species. It is hoped that good descriptions of a few *Cladonias* may enable those interested in these plants to observe some characters usually quite overlooked. We have selected for description a number of *Cladonias* that are very commonly confused by American lichenists.

CLADONIA RANGIFERINA (L.) Web. in Wigger's Prin. Fl. Hols. 90. 1780.

Primary thallus rarely developed, when present crustaceous, delicate and composed of subglobose, depressed or irregular, clustered or scattered verrucae, which are .20-.40 mm. in diameter, ashy white and destitute of cortical layer. Podetia, without cortex, arising from the surface of the verrucae, or often as branches of old or dying podetia, or from free fragments

of old podetia, dying at the base and increasing in length at the top, 30-200 mm. long and .7-3 mm. in diameter, subcylindrical and cupless, subdichotomously or subradiately branched, the short branches usually unilaterally deflexed and their axils somewhat dilated and frequently perforate, erect or rarely ascending or even decumbent, clustered or often confusingly subsolitary among other lichens, grayish or grayish-brown, the apices subulate and furcellate, the sterile ones commonly nutant and often brownish. Apothecia small, .5-2 mm. in diameter, corymbose, solitary or clustered at the apices of the branches, immarginate, convex, the disk commonly brown. Hypothecium colorless or the sub-hymenial portion brownish. Hymenium brown above and pale-brownish below. Paraphyses usually simple, thickened at the pale or brownish apex. Asci cylindrico-clavate, the apical wall thickened. (Fig. 1.)

The plant grows on earth and over rocks covered by more or less humus. It also occurs in a degenerate condition on old wood. It is our largest *Cladonia*, single clusters being often three feet in diameter and standing a foot high in the most favorable habitats in northern regions. This lichen is known in nearly every part of all the continents.

CLADONIA SYLVATICA (L.) Hoffm. Deutschl. Fl. 114. 1796.

Primary thallus rarely developed, when present crustaceous, delicate and composed of subglobose scattered or clustered verrucae, which are .12-.48 mm. in diameter, straw-gold colored and destitute of a cortical layer. Podetia without cortex, commonly formed from branches of old or dying podetia or rarely arising from the verrucae of the primary thallus, dying at the base and increasing in length at the top, 30-150 mm. long and .5-4.5 mm. in diameter, cylindrical or subcylindrical, cupless, frequently somewhat dilated in the axils which are often perforate, dichotomously or finally sympodially or radiately branched, one or two radii becoming larger and erect, the others short and usually unilaterally or irregularly fasciculate and deflexed, the upper branches not much shortened and forming loose clusters, growing in dense clusters or subsolitary among other lichens and mosses, erect or rarely ascending or decumbent, often minutely webby-tomentose, whitish or yellow-straw-colored, or light sea-green, apices subulate and very minutely radiate or furcate spinous, the upper sterile ones often more or less nutant and especially these upper ones frequently brown or brownish. Apothecia small, .5-1.2 mm. in diameter, arranged in corymbs, solitary or clustered at the apices of the branches, having at first a very thin margin and finally immarginate, convex or depressed convex, the disk brown. Hypothecium almost colorless or the subhymenial portion brownish. Hymenium brownish above and pale or pale-brownish below. Paraphyses usually simple, somewhat thickened at the pale or brownish apex. Asci clavate with walls thickened at the apex. (Fig. 2).

This lichen grows with the last and is very closely related to it. The American and foreign distribution of the two is about the same, and they are found growing in the same clusters in a most confusing way. However, the first plant described is somewhat larger as a rule, the branching is

somewhat different, the tomentose condition scarcely marked, the color of the thallus on the whole duller and the spinous apices of the branches absent.

CLADONIA SYLVATICA (L.) Hoffm. var. *LAXIUSCULA* (Del.) Wainio Mon. Clad. Univ. 1:29. 1887.

Podetia slender, quite long, abundantly dichotomously and sparingly radiately branched, the sterile apices nutant. Determined from Minnesota by Dr. Wainio. Apparently new to America and little known in Europe.

CLADONIA SYLVATICA (L.) Hoffm. var. *SYLVESTRIS* (Oed.) Wainio Mon. Clad. Univ. 1:20. 1886.

The more tomentose condition, having rather more slender podetia and the apices of the branches more inclined to be straight.

This variety was determined for us from Minnesota by Dr. E. Wainio. It is doubtless widely distributed in America, though it has seldom been distinguished from the usual form of the species. Dr. Wainio has also given us the name *CLADONIA SYLVATICA* (L.) Hoffm. var. *PUMILA* (Ach.) Del. in Dub. Bot. Gall. 621. 1830, but the plant seems to be simply a small form of the above variety.

CLADONIA ALPESTRIS (L.) Rabenh. Clad. Eur. Exsic. 11. 1860.

Primary thallus rarely developed, when present crustaceous, delicate and consisting of subglobose or irregular, clustered or scattered verrucae, which are .16-.28 mm. in diameter, straw-colored and destitute of a cortical layer. Podetia arising from the verrucae of the primary thallus or often from old or dying podetia or from free fragments of dying podetia, dying at the base and increasing in length at the top, 50-200 mm. long and .5-2.5 mm. in diameter, subcylindrical, often somewhat dilated in the axils, cupless, subdichotomously or more commonly radiately or fasciculately branched, frequently from four to six branches surrounding a perforation in the axil, one or more branches becoming erect and larger, the others remaining short and becoming finally unilaterally fasciculate and deflexed, the upper branches shorter and forming dense thryses, caespitously clustered, erect, without cortex and more or less webby-tomentose, whitish or yellowish straw-colored, the apices subulate and frequently spinous, more commonly straight and sometimes colored brown. Apothecia small, .3-.5 mm. in diameter, disposed in dense corymbs at the apices of the branches, solitary, clustered or confluent, at first thin margined, finally immarginate, convex, the disk brown (or brick-red?). Hypothecium pale or pale brownish. Hymenium brownish above and pale below. Paraphyses simple or rarely branched, sometimes enlarged toward the apex. Asci clavate to cylindric-clavate, the apical wall thickened. (Fig. 3).

Occurs with the two species above described, frequently intermingled in the same clusters and is more beautiful in color, delicacy of branching and arrangement of clusters than either of them. The three lichens are very closely related, and only the most careful study will enable one to distinguish the best marked forms, to say nothing of a multiplicity of intermediate con-

ditions. The usual absence of the primary thallus and the peculiar origin of what may be called secondary podetia from other podetia, the dying away at the base and the frequent great luxuriance are characters common to the three species. The last one, like the other two, has a wide American and foreign distribution, but it is more confined to cold regions than the first two.

CLADONIA AMAUROCRAEA (L.) Schaer. Lich. Helv. 34. 1823.

Primary thallus usually disappearing early, composed of small usually ascending squamules, which are .5-1.7 mm. long and .16-.29 mm. wide, crenate or digitate-incised, scattered or clustered, sea-green above and whitish below and covered by a continuous cortical layer. Podetia usually arising from old podetia, from free fragments of old podetia or rarely from the surface of the primary thallus, dying at the base and increasing in length at the top, 15-120 mm. long and .5-3 mm. in diameter, cupless and subcylindrical or more rarely cup-bearing, dichotomously, radiately or rarely irregularly or fasciculately branched, the axils closed or rarely perforate, branches spreading, the apices tapering and subulate and terminated by spines, cymose branchlets or cups, forming larger or smaller clusters, erect ascending or decumbent with straight apices, having a continuous or areolate cortex, without squamules or sparsely squamulose toward the base, straw-colored to sea-green or rarely whitish between the areoles of the cortex, usually brownish toward the apices, the basal dead portions frequently of a darker color. Cups quite abruptly dilated and becoming 5 mm. in diameter, perforate or imperforate, frequently oblique, the margin finally spinous or radiately proliferous. Apothecia of medium size, .7-3 mm. in diameter, solitary or clustered at the apices of the branches, thinly margined or at length immarginate, plane or convex, sometimes perforate and lobed, the disk pale to brown (or even brick-red?). Hypothecium pale. Hymenium brownish above and pale or yellowish below. Paraphyses simple or rarely branched and scarcely thickened at the pale or brownish apex. Asci cylindric-clavate, the apical wall thickened. (Fig. 4).

Common in the extreme northern portion of the United States and Canada, but found further south only in the mountains. Grows on earth and on rocks covered by humus. Also widely distributed in foreign lands, but confined to cold regions. The plant is frequently confused with forms of *Cladonia furcata* and yet more frequently with the next below.

CLADONIA UNCIALIS (L.) Web in Wigger's Prim. Fl. Hols. 90. 1780.

Primary thallus usually disappearing early, composed of small, usually ascending squamules, which are .5-1 mm. long and .08-.15 mm. wide, crenate or incised-crenate, clustered or scattered, sea-green to straw-colored above and whitish below, having a continuous cortical layer. Podetia usually arising from old or dying branches or fragments of podetia or rarely from the margin of the primary thallus, dying at the base and increasing in length at the top, 25-100 mm. long and 1-3.5 mm. in diameter, cupless and subcylindrical, sometimes slightly dilated in the axils, dichotomously, sympodially or radiately branched, branches all elongated or some of them short

and all more or less spreading, erect, ascending or decumbent, axils frequently perforate and the sides of the podetia also rarely perforate, cortex subcontinuous or areolate, the areoles smooth or somewhat raised, destitute of squamules, straw-colored to sea-green or the decorticate portions between the areoles white, the dead portion below frequently darker, the apices subulate and straight and frequently spinous and not infrequently brownish. Apothecia small, .5-.9 mm. in diameter, solitary or clustered at the ends of short radiately or cymosely arranged apices, thinly margined or without margin, plane or somewhat convex, the disk pale to brown. Hypothecium pale or colorless. Hymenium brownish above and pale or pale-brownish below. Paraphyses simple, rarely cohering, the pale apices very slightly thickened. Asci clavate or cylindrico-clavate, the apical wall thickened. (Fig. 5).

Grows on earth or on rocks covered by humus. The plant is found in all parts of North America and is quite cosmopolitan in its foreign distribution also. The species is usually a shorter plant than the last with rather stouter podetia, whose apices are rather more obtuse. Yet in northern regions where both species occur, the shorter cupless conditions of the last frequently seem to pass into the present species.

CLADONIA UNCIALIS (L.) Web. var. OBTUSATA (Ach.) Nyl. Syn. Meth. Lich. 215. 1860.

The plant of Acharius was of the usual size with minute axillary perforations, was densely radiate-branched and had obtuse more or less spinous summits. Ours from Oak Island, Lake of the Woods, and determined by Dr. Wainio, is a stout plant, the podetia reaching 3 or 4 mm. in diameter. The axillary perforations are by no means minute, and the summits of the branches are scarcely spinous, though quite obtuse. The podetia reach 65 mm. in length. The specimen is well supplied with small apothecia and seems very near *Cladonia Boryi*, Tuck. Known in Europe, but not previously reported from America so far as we know. Perhaps *Cladonia uncialis* (L.) Web var. *turgescens* (Schaer.) Del. in Dub. Bot. Gall. 620. 1830, and *Cladonia uncialis* (L.) Web. var. *dilacerata* Leight. Not. Lich. Richards, 191. 1866, should be noticed as both have been reported from North America.

CLADONIA CENOTEA (Ach.) Schaer. Lich. Helv. 35. 1823.

Primary thallus persistent or finally disappearing, composed of middling sized, irregularly or subdigitately incised, more or less ascending, flat or involute, clustered or scattered squamules, which are whitish, sea-green, brownish or olivaceous, 1-3.5 mm. long and .10-.30 mm. wide. Podetia arising from the surface of the primary thallus, sometimes dying at the base but slowly increasing in length at the top, 10-85 mm. long and .5-4 mm. in diameter, cylindrical, turbinate or irregularly turgescens, commonly erect, cup-bearing, decorticate and sorediate or corticate toward the base, without squamules or squamulose toward the base, white, ashy, sea-green or brownish or these colors variegated, the lower dead portion usually darker, the sides and the apices usually perforate. Cups 2-8 mm. in diameter, commonly perforate, becoming repeatedly proliferate. Apothecia small,

and rare in ours, .5-1.5 mm. in diameter, subsolitary or more or less clustered on the margins of the cups or at the apices of the branches, most commonly immarginate, plane to convex, often perforate, the disk flesh-colored to brown. Hypothecium pale or pale-brownish. Hymenium brownish or pale above and pale or pale-brownish below. Paraphyses often thickened and sometimes branched toward the pale apex. Asci clavate, the apical wall thickened, commonly containing six spores. (Fig. 6).

Grows on earth or old wood, and in the western hemisphere is confined to the northern half of North America, including the extreme northern part of the United States. Common to all the grand divisions of the eastern hemisphere. Certain conditions are sometimes confused with the last species, but more commonly with the next below. Dr. Wainio has referred one of Tuckerman's specimens, (Tuck. Lich. Amer. Exsic. no. 125. 1854) to *Cladonia cenotea* (Ach.) Schaer. var. *crossota* (Ach.) Nyl. Lich. Scand. 57. 1861, and gives description, which in absence of specimen conveys no distinct idea.

CLADONIA TURGIDA (Ehrh.) Hoffm. Deutschl. Fl. 124. 1796.

Primary thallus persistent or finally disappearing, composed of large foliose squamules, which are irregularly or subdichotomously lobate or lacinate, erect or ascending, plane, convex or convex and involute, often closely clustered, whitish to pale sea-green above and white below, having a continuous cortex, 5-20 mm. long and 2-5 mm. wide. Podetia arising one or more from the surface of any squamule of the primary thallus, sometimes dying at the base and rarely increasing in length at the top, 20-75 mm. long and 1.5-3.5 mm. in diameter, turgescient and turbinate or subcylindrical, sometimes rather obsoletely cup-bearing, radiately or dichotomously branched, the branches erect or spreading, axils and also the sides frequently perforate or even gaping, erect or ascending, cortex subcontinuous or areolate, sometimes more or less squamulose, whitish to whitish-sea-green or the decorticate portions between the areoles white, the basal dead portion sometimes becoming brown, the cupless apices obtuse or shortly radiate or furcate and frequently becoming brown. Cups slightly dilated, perforate or closed and rarely cribose, the margin radiate-proliferous. Apothecia small or middling sized, .5-2 mm. in diameter, solitary or clustered at the ends of the branches and frequently short stipitate, thinly margined or immarginate, plane or convex, often lobed and perforate, the disk brown (or brick-red?). Hypothecium pale or pale-brownish. Hymenium pale brown above and pale or pale-brownish below. Paraphyses somewhat clavate toward the pale or brownish apex. Asci cylindrical to clavate, the apical wall thickened. (Fig. 7).

Occurs on earth or on rocks covered with humus. Known in the northern part of North America and in northern Europe and extending further south in mountains. Found in northern United States as well as further north. Easily confused with either of the last two plants. *Cladonia turgida* (Ehrh.) Hoffm. var. *grypea* Tuck. Enum. Lich. in Agass. Lake Super, 173. 1850. may be distinct. This variety is described in Tuckerman's

Synopsis under the name, *Cladonia turgida* (Ehrh.) Hoffm. var. *conspicua* (Schaer.) Nyl. Addit. Fl. Chil. 147. 1855. The primary thallus is usually wanting, the podetia elongated and sometimes quite squamulose.

In closing some explanation of a few expressions used above will be helpful. Our sea-green is a grayish green or perhaps nearer a gray than a green. Single cells or hyphae which are hyaline, when seen collectively as in an hymenium or an hypothecium, are of a whitish color, which we have called pale. Paraphyses of *Cladonias* are hyaline except at the tips.

Even water will sometimes causes the coloring matter of the epithecium to diffuse through the hymenium, especially the upper portion, in sections. To avoid error from this source, sections must be examined as to color the moment after cutting. Fayette, Iowa.

HEPATICIS—LEJEUNEA.

WILLIAM C. BARBOUR.

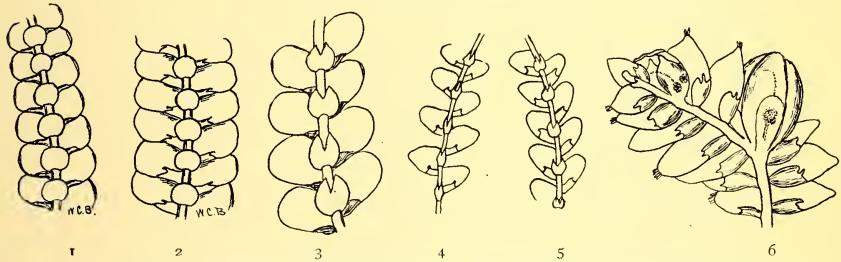


Fig. 1. *Archilejeunea clypeata* Fig. 2. *A. Sellowiana* Fig. 3. *Lejeunea Americana* Fig. 4. *Microlejeunea lucens* Fig. 5. *M. Ruthii* Fig. 6. *Cololejeunea Jooriana*

The genus *Lejeunea* was founded by Libert, and as such was accepted by Spruce and many other writers. If considered as a single genus it is a very large one, and was divided by Spruce into thirty-seven subgenera. Most of these were raised to the rank of genera by Schiffner when, in 1893, he issued the Hepatic part of Engler and Prantl's *Natur Pflanzenfamilien*.

We shall endeavor to adapt from older works a description of the genus which shall cover the composite *Lejeunea* as covering all these divisions. The descriptions of species are adapted and simplified from the monograph by A. W. Evans, of Yale University, published in Volume VIII., No. 2, *Memoirs of the Torrey Botanical Club*. Most of the illustrations were redrawn from the same source. Dr. Evans admits to the flora of the United States and Canada twenty-three species, of which about ten occur in the "Gray's Manual Region."

Of the thirteen species not here included, seven are found in various States of the South, including Florida; five in Florida only; and one, *Colelejeunea Macounii* (Spruce) Evans, occurs in British Columbia. Of the species here noted, one, *Lejeunea patens* Lindb. is found in Newfoundland and Nova Scotia. The other occurs at various points in the Northeastern States.

In temperate regions the number of species found is comparatively small, while in the tropics the genus reaches proportions which are alarm-

ARCHILEJEUNEA CLYPEATA (Schwein.) Schiffn. (*Phragmicoma clypeata* Nees) (*Lejeunea clypeata* Sull.) Fig. 1.

Plant pale green, growing in broad mats; stems irregularly branched: leaves imbricated, dorsal lobe obliquely spreading, broadly oblong; apex rounded: margin crenulate from projecting cells; ventral lobe ovate-triangular, inflated, apex blunt, junction of lobes forming an obtuse angle: underleaves distant, orbicular, rounded at the apex, abruptly narrowed at base, very short decurrent: inflorescence autoicous or dioicous: female inflorescence borne on a principal branch; bracts complicate, unequally bifid, scarcely or not at all winged on keel, lobe obovate, rounded at apex, crenulate, lobule oblong, rounded at apex; bracteole ovate-oblong, narrowed at base, truncate or retuse at apex; perianth obovoid, truncate with a short broad beak, five keeled, keels roughened: male spikes on short branches, oblong; antheridia in pairs.

This species occurs on rocks and trees, and ranges from Connecticut to Georgia and Louisiana. It has been distributed in Musci Alleg. 262, and in Hep. Bor. Amer. 95, as *Phragmicoma clypeata*. Also in Hep. Am. 50, as *Lejeunea clypeata*.

ARCHILEJEUNEA SELLOWIANA Steph. (*Phragmicoma xanthocarpa* Aust.) (*Lejeunea velata* Gottsche.) Fig. 2.

Plants pale green or glaucous, in wide mats: stems closely appressed to matrix: leaves closely imbricated, the dorsal lobe widely spreading at nearly right angles with the stem, ovate-oblong, apex rounded, margin entire or nearly so, lower margin arching across stem: lobule inflated toward base, oblong, apex acuminate, sometimes curved, ending in a tooth three to eight cells long, two to four cells wide at base and with a single row of cells at apex; lobules on small branches often poorly developed: underleaves broadly orbicular to reniform, rounded, truncate or retuse at apex, rounded at base: inflorescence autoicous; female on short branch usually, bracts complicate, unequally bifid; perianth obovoid, half exerted, broad and truncate above, with short, narrow beak, five-keeled, keels roughened: male spikes similar to *A. clypeata*. Found on trees and rocks. Range from Rhode Island to Tennessee, south to Florida and Texas. Distributed in Hep. Bor. Am. 95b, as *Phragmicoma xanthocarpa*.

HARPALEJEUNEA OVATA (Hook.) Schiffn. (*Lejeunea ovata* Tayl.) (*Lejeunea Molleri* Steph.)

Plants pale to dark green, loosely caespitose or scattered: stems prostrate, closely appressed: leaves contiguous or somewhat imbricated, lobe spreading, gradually narrowed beyond middle, apex often reflexed, usually acute, margin nearly entire; lobule (ventral lobe) strongly inflated, ovoid, keel strongly arched, crenulate from convex cells: apex with a single projecting cell: underleaves distant, broadly cuneiform, apex broad, truncate or emarginate with a shallow sinus, rounded or obtuse segments, margin entire: inflorescence dioicous; female on a leading branch; bracts as before; perianth obovate-clavate, acutely five-keeled in upper part: male spike on short branch.

On trees and fallen logs. Virginia, Tennessee, and Georgia. It is also found in Western Europe, and the type specimen was collected in Ireland by Taylor. Fruiting material is rare. The acute lobes of its leaves and the emarginate-bifid underleaves with rounded divisions distinguish it from all other *Lejeuneæ* of the United States. In the tropics, however, it has an abundance of relatives.

LEJEUNEA PATENS Lindb.

Plants pale or dark green, slightly glossy when dry, caespitose: stems copiously branched: leaves imbricated, the lobe ovate, widely spreading, strongly convex, rounded and decurved at apex, margin distinctly crenulate from projecting cells, antical margin arching across the stem; lobule strongly inflated, ovate, mostly crenulate, apex tipped with a single blunt, projecting cell: cells of lobe convex: underleaves distant, about the size of or a little smaller than the lobules, orbicular, gradually narrowed to base, bifid about one-half, apex of lobes varying from obtuse to acute, sinus varying from acute to obtuse, margin crenulate: inflorescence autoicous; female sometimes on leading branch, sometimes on short one; perianth half exerted, oblong-obovoid, gradually narrowed toward base, rounded above and with short beak, terete below, sharply five-keeled above, keels crenulate from projecting cells, becoming blunter with age: male spike on short branch; antheridia in pairs. Found on rocks. Localities:—Ireland (type—Lindberg), Great Britain, Norway; and, in America, Newfoundland and Nova Scotia. May be found in northern borders of the United States, or in mountainous regions.

LEJEUNEA CAVIFOLIA (Ehrh.) Lindb. (*Lejeunea serpyllifolia*, Lib.) (*L. serpyllifolia* var. *cavifolia* Lindb.) (*L. serpyllifolia* var. *Americana* Lindb., in part.) (*Eulejeunea serpyllifolia* Schiffn.),

Plants pale to dark green, dull or glossy when dry, in tufts or creeping over other bryophytes: branches spreading, usually abundant: leaves imbricated, lobes ovate, obliquely spreading, rounded to obtuse at apex, margin entire or nearly so; lobule strongly inflated, ovate, scarcely crenulate: underleaves distant, as large as or a little larger than the lobule, ovate-orbicular, gradually narrowed toward base, neither decurrent or rounded, bifid about one-half with rounded to acute lobes, margin entire or nearly so: inflorescence autoicous; female on leading branch, sometimes on short branch; perianth about half exerted, oblong to oval-oblong from narrowed base, rounded or truncate at apex with short, slender beak, terete below; sharply keeled in upper part, the keels smooth.

This plant grows on rocks and trees. The range is from Ontario, New Hampshire and Pennsylvania, to Minnesota and Wisconsin. Has been distributed in Hep. Bor. Am. 97 (in part), and in Hep. Am. 8 (As *Lejeunea serpyllifolia*).

LEJEUNEA AMERICANA (Lind.) Evans (*Lejeunea serpyllifolia* var. *Americana* Lindb.—in part.) Fig. 3.

Pale, whitish or yellowish green, closely appressed or in depressed mats: stems irregularly pinnately branched: leaves imbricate, the lobe ovate, widely spreading, rounded to obtuse at apex, margin entire or

slightly crenulate; lobule inflated, ovate, scarcely crenulate, apex with a single projecting cell: underleaves contiguous or sub-imbricate, a little larger than lobule, orbicular, rounded or sub-cordate at base; bifid about one-half, segments usually acute or apiculate, occasionally obtuse, sinus acute to obtuse, margin entire or sinuate: inflorescence autoicous: female on leading or short branch; perianth obovoid, often distinctly dilated above middle, gradually narrowed toward base, broad and truncate above, and with a short beak, terete below, sharply five-keeled above, keels smooth: male inflorescence usually on short branch: spores greenish, angular, thick-walled. Grows on trees. Ranges from North Carolina to Florida, westward to Louisiana and Texas. Has been distributed in Drummond's Southern Mosses 171, in part; Musc. Allegh. 272 (as *L. serpyllifolia*); Hep. Bor. Am. 97, in part (as *L. cavifolia*): Hep Am. 98 (as *L. Austini.*); Hep. Amer. 137 (as *L. lucens.*).

MICROLEJEUNEA LUCENS (Tayl.) Evans (*Lejeunea lucens* Tayl.) Fig. 4.

Pale green, scattered or in turfs: leaves distant to imbricated, lobe obliquely spreading, ovate, apex rounded varying to obtuse, margin entire or subcrenulate from projecting cells; lobule half as long as lobe, strongly inflated, ovoid; lobule often poorly developed: underleaves distant, ovate narrowed toward base, not decurrent, bifid to about the middle, with subulate to acuminate divisions ending in a single cell or in a row of two cells, sinus narrow and obtuse: inflorescence dioicous: female on short branches; bracts complicate, nearly equally bifid; perianth scarcely exerted, broadly pyriform, slightly compressed, five-keeled, the keels smooth, the beak short: male spike julaceous, at base of an elongated branch. On trees or moist rocks. Virginia, Florida, Mississippi, Louisiana. Throughout tropical America. Was distributed in Sull. Musci Alleg. No. 274, as *Lejeunea cucullata*; and in Hep. Bor. Am. No. 98, under same name.

MICROLEJEUNEA RUTHII Evans Fig. 5.

Pale or dull green, scattered or loosely caespitose, sparingly and irregularly branched, the branches widely spreading: leaves distant to loosely imbricated, the lobe obliquely spreading to suberect, ovate or broadly ovate, rounded at apex, margin nearly entire, sometimes slightly angular-sinuate; lobule half the length of lobe, strongly inflated, ovoid, apex tipped with a single projecting cell which is sometimes outwardly curved: underleaves distant, orbicular, narrowed toward base, and neither rounded nor decurrent, bifid to about middle with broad, suberect, triangular lobes and obtuse sinus, lobes acute, ending in single cell or row of two cells, margin entire or subcrenulate from the projecting cells, lateral margins rounded: inflorescence dioicous; female on a leading branch, bracts complicate, deeply and unequally bifid; bracteole free, ovate from an abruptly contracted base: perianth and male inflorescence as yet unknown. Known only from the type locality, Big Frog Mountain, Tennessee. The original description is in Mem. Torr. Bot. Club, 8:161, 1902. The species is near *M. ulicina* Tayl. of Europe. It somewhat resembles *M. lucens*, from which it may be distinguished by the less widely spreading lobes of its leaves, smaller cells with thicker walls, broader underleaves, which have broader segments and are

never unidentate on sides, by male spike on leading branch instead of short branch.

COLOLEJEUNEA BIDDLECOMIÆ (Aust.) Evans (*Lejeunea calcarea* of Sull., not of Libert.) (*Lejeunea echinata* of Aust., not of Taylor.) (*Lejeunea Biddlecomiæ* Aust.)

Pale or bright green, scattered or depressed caespitose: irregularly pinnately branched: leaves distant to imbricated, lobe obliquely to widely spreading, ovate, apex varying from rounded to acute, usually obtuse, margin crenulate or denticulate from projecting cells; lobule inflated, ovoid to globose, keel bearing an obtuse, sometimes indistinct tooth beyond the middle, and another tooth composed of two cells midway between this tooth and end of keel: stylus conspicuous, composed of two to ten cells in a single row, sometimes two cells broad a part of its length; inflorescence dioicous or autoicous; female on a leading branch, bracts unequally bifid, the lobe obliquely spreading, broadly ovate; perianth partly exerted, obovoid to oblong, not compressed, rounded to truncate at the apex, with a short beak sharply five-keeled in upper part, surface roughened from projecting cells, except near base: male spikes on leading branches; bracts similar to leaves, but with proportionately larger lobule; antheridia singly or in pairs. On trees and rocks. Range from Ontario and Massachusetts to Alabama and Florida. Distributed in Sull. Musci Allegh. 275 (as *Lejeunea calcarea*). Aust. Hep. Bor. Am. 99 (as *Lejeunea echinata*). Hep. Amer. 51 (as *L. calcarea*). Can. Hep. 13 (as *L. calcarea*). Found best developed on trees especially in swamps. A tiny species, when dry hardly noticeable to the unaided eye; leaves $\frac{1}{3}$ mm. long.

COLOLEJEUNEA JOORIANA (Aust.) Evans. (*Lejeunea Jooriana* Aust.) Fig. 6.

Yellowish green or whitish, darker with age, scattered or loosely caespitose: irregularly pinnately branched: leaves imbricated, lobe widely spreading, ovate, gradually narrowed from just below middle to the rounded, obtuse or subacute apex, margin entire or subcrenulate; lobule inflated, ovoid, free margin with two teeth as in last species; stylus inconspicuous and soon obsolete, composed of two cells in a row or even of a one-celled papilla; cells scarcely convex; hyaline cells at apex one to ten in number, elongated, usually in a single row, their ends usually free, hyaline cells sometimes also along the antical margin, usually becoming indistinct with age; inflorescence synoicous or sometimes paroicous; female usually on a leading branch, rarely on short branch; bracts similar to leaves, with more or less inflated lobule, stylus three to four cells long sometimes; perianth half exerted, broadly ovoid to obvoid, rounded at base, rounded, truncate or slightly retuse at apex, with extremely short and indistinct base, somewhat flattened, antical face plane or with broad, low keel, lateral keels sharp to blunt, postical keel broad and two angled: antheridia borne singly or in pairs in the axils of the female bracts; spores elongated, angular, greenish. On bark and reed. North Carolina, Florida, Louisiana, Differs from *C. Biddlecomiæ* in its ordinary leaf cells which are plane or nearly so, also in its inflorescence, hyaline cells, and much shorter stylus.

Sayre, Pa.

KARL GUSTAVE LIMPRICHT. SECOND PART.

By JOHN M. HOLZINGER.

Since writing the above (see *THE BRYOLOGIST* for January, 1903,) I have received the following data, which will correct and enlarge our knowledge regarding Mr. Limpricht. For this information I am indebted to Dr. Paul Richter, editor of the entire work of Rabenhorst's *Cryptogamen-Flora*, to whom all moss students will be grateful for so much interesting information about the author in question.

My question having been addressed to Mr. Eduard Kummer, the publisher, regarding the completion of the *Laubmoose*, Dr. Richter informs me, first, that the work will be brought to a fitting close by the son, Dr. Wolfgang Limpricht, who is also a botanist. The work yet to be finished includes the supplements to half of Volume II., and to all of Volume III. For this there are in hand many drawings by the author. Then will come the index including synonyms for the entire work, which the author's son will also furnish.

Part 38 is now in press and will be published before the end of the year (1902). It contains supplementary data to parts 14-26, that is, to Volume II. Next year (1903) part 39 will close the entire work, and an additional number will contain the general index.

The following additional data are of interest. Mr. Limpricht was the son of a gardener and nursery owner in Eckersdorf near Sagan in Prussian Silesia. From 1853 to 1856 he completed his studies in the Normal School of Bunzlau, Silesia. With the recommendation of ranking first in his class he found a position as teacher in Obergläserdorf near Lüben in Silesia. In 1858 he was called to teach in the higher Ladies' Seminary in Bunzlau, where he found leisure to delve with zeal and with success into the study of the natural sciences. Much inspiration in his efforts came to him from his Normal School teacher, subsequently Privy Counsellor, W. Prange, the well-known Silesian botanist, R. von Wechtritz, and Professor Göppert in Breslau. From these men he received much encouragement to take up botanical studies, and it was through their influence that he was in 1869 given the position of teacher of the natural sciences in the higher schools in Breslau. Here he was in 1871 introduced into the study of mosses by Professor J. Milde. From that time on this was to be his special field of labor.

At the University in Breslau he found further incentive to scientific pursuits in his friendly association with Professors Göppert and Ferdinand Cohn, both original investigators who in their special lines in Botany command leading positions. Besides his principal work as teacher in the High School he was special instructor in the descriptive natural sciences in a special school at Breslau for improving teachers and preceptresses, also custodian for the Silesian Society for Popular Culture. He was also a corresponding member in several scientific societies, both domestic and foreign. In recognition of his scientific services the school authorities elected him in 1897 to the principalship of the schools where he had taught so long and so successfully.

The following is a list of Mr. Limpricht's bryological labors:

1. Bryotheca Silesiaca (Exsiccati of Silesian Mosses). Fasc. I-VII, Nos. 1-350. Bunzlau and Breslau, 1866-1871.
2. Schlesien's Laub- und Lebermoose, nebst Nachträgen. (Mosses and Liverworts of Silesia, with Supplement.) In F. Cohn: Kryptogamen-Flora. Bd. 1, pp. 27-352, and pp. 413-444. Breslau, 1877. (358 pages).
3. Laubmoose Deutschland's, Oesterreich's und der Schweiz. Bd. IV. von Rabenhorst's Kryptogamen-Flora, 2 Aufl., 1890-1902.

It is this latter work especially, its quality of scientific poise as well as its contents, that has placed American as well as all other bryologists under a debt of obligation to the author, and that makes us all wish to know more about him. Besides these, his principal works, the following are his briefer papers:

1. *Beitrag zur Bryologischen Kenntniss der Grossen Schneegrube und der Kesselkoppe*, in "Jahresberichte der Schlesischen Gesellschaft für vaterländische Cultur," 44th year, pp. 139-146, Breslau, 1867.
2. *Ueber das Vorkommen der Lebermoose im Schlesisch-maehrischen Gesenke*, in l. c., 49th year, pp. 75-81, Breslau, 1872.
3. *Ueber die Moosflora der Oberschlesischen Muschelkalkhuegel*, in l. c. 50th year, pp. 96-97, 1873.
4. *Nachtraege zu J. Mildé's Bryologia Silesiaca*, in l. c., 50th year, pp. 124-140, 1873.
5. *Ueber die Moosvegetation der Babiagora*, in l. c., 51st year, pp. 77-78, 1874.
6. *Ueber die Laubmoose der Hohen Tatra*, in l. c., 52d year, pp. 92-94, 1875.
7. *Novitacten aus der Laubmoos-Flora der Hohen Tatra*, in l. c., 52d year, pp. 130-132, 1875.
8. *Die Lebermoose der Hohen Tatra*, in l. c., 54th year, pp. 143-152, 1877.
9. *Ueber die Moosflora der Insel Bornholm*, in l. c., 57th year, pp. 272-273, 1880.
10. *Neue und Kritische Lebermoose*, in l. c., 57th year pp. 311-317, 1880.
11. *Neue Buerger der Schlesischen Moosflora*, in l. c., 57th year, p. 310, 1880.
12. *Ueber Neue Arten und Formen der Gattung Sarcoscyphus Corda*, in l. c., 58th year, pp. 179-184, 1881.
13. *Ueber Neue Muscineen fuer Schlesien*, in l. c., 58th year, pp. 184-186, 1881.
14. *Einige Neue Funde aus der Schlesischen Moosflora*, in l. c., 59th year, pp. 278-9, 1882.
15. *Ueber Sphagnum, Myurella und Fontinalis*, in l. c., 59th year, p. 317, 1882.
16. *Einige Neue Laubmoose*, in l. c., 60th year, p. 214, 1883.
17. *Neue Buerger der Schlesischen Moosflora*, in l. c., 60th year, pp. 242-3, 1883.
18. *Moose aus Norwegen*, in l. c., 61st year, p. 175, 1884.
19. *Die Moose im Sorbusguertel des Riesengebirges*, in l. c., 61st year, p. 24, 1884.

20. *Ueber Einige Neue Arten und Formen bei den Laub-und Lebermoosen*, in l. c., 61st year, pp. 204-225, 1884.
21. *Ueber Tuepfelbildung bei Laubmoosen*, in l. c., 62d year, p. 289, 1885.
22. *Ueber Porenbildung in der Stengelrinde von Sphagnum*, in l. c., 63d year; p. 199, 1886.
23. *Ueber Neue Bucrger der Schlesischen Moosflora*, in l. c., 63d year, p. 214-5, 1886.
24. *Ueber Th. Guembel, Beitræge zur Entwickelungsgeschichte der Laubmoose*, in l. c., 65th year; p. 258, 1888.
25. *Ueber Neue Laubmoose*, in l. c., 68th year, p. 93, 1891.
26. *Drei Neue Laubmoose*, in l. c., 47th year, 5 pages, 1897.
27. *Zur Systematik der Torfmoose*. in "Botanisches Centralblatt, von Uhlworm," Cassel: First paper, Bd. VII, No. 36, pp. 411-319, 1881; Second paper, Bd. X, No. 6, 1882.
28. *Besprechung von W. Ph. Schimper's Synopsis Muscorum Europæorum*, in "Flora oder Regensburger Botanische Zeitung," 9 pages, 1876.
29. *Die Deutschen Sauteria Formen*, in l. c., No. 6, 4 pages, 1880.
30. *Ueber Gymnomitrium adustum, N. v. E.*, in l. c., No. 5, 7 pages, 1881.
31. *Ueber Eine Verschollene Jungermannia*, in l. c., No. 3, 4 pages, 1882.
32. *Neue Kritische Laubmoose*, in l. c., No. 13, 5 pages, 1882.
33. *Nekrolog auf Professor J. Milde*, in "Hedwigia von L. Rabenhorst," Dresden, bei Heinrich, No. 10, 4 pages, 1871.
34. *Ueber Leptotrichum sonatum*, in l. c., No. 12, 2 pages, 1872.
35. *Schlesische Lebermoose*, in l. c., No. 2, 3 pages, 1876.
36. *Auf der Schlesisch-mærkischen Grenze. Ein Bryologischer Beitrag*, in "Verhandlungen des Botanischen Verein's der Provinz Brandenburg," Bd. IX, No. 108-116, 1967.
37. *Reviews of the entire Moss Literature in the years 1875-8*, in "L. Just, Botanischer Jahresbericht," Berlin, bei Bornträger, Bd. VI, 1876-1881.
38. *Ueber Laub-und Lebermoose* in "den Berichten der Deutscher Botanischen Gesellschaft," Bd. III, Heft II, 1881. (Also a review).

These constitute the numerous bryological writings of Limpricht. He explored personally the Mossflora of Silesia (Riesengebirge), of the Karpathen (Tatra), and the Islands of Bornholm. It is strange that the *Revue Bryologique* failed to give a hint as to the richness of this author's productivity, which led me to suppose that he published little, concentrating all his energies in his *Laubmoose*. It is true, however, that most, if not all of his productions antedate his labor on his monumental work.

Winona, Dec. 15th, 1902.

THE MOSSES OF ALASKA.

BY J. CARDOT AND I. THERIOT.

This is No. XXIX. of the "Papers from the Harriman Alaska Expedition." It is published in the "Proceedings of the Washington Academy of

Science," Vol. IV., pp. 294-374, July 31st, 1902. The eleven plates illustrating the new species are executed by M. Theriot, in this author's excellent and painstaking style and show microscopic details with accuracy. The list of 280 species of Alaskan mosses enumerated here includes, besides the Harriman collection, previous collections as follows: that of W. H. Dall, in 1867; of the Krause brothers, in 1882; of W. G. Wright, in 1891; of James M. Macoun, 1891-2; of B. W. Evermann, in 1892; of C. H. Townsend, in 1893-1895 (Expedition of the U. S. S. *Albatross*); of W. M. Canby, in 1897; of W. H. Evans, in 1897; of W. A. Setchell, in 1899; and of F. C. Schrader, in 1899. Of these, 124 are new to Alaska, and 46 are new to science. Of the latter 29 are new species, and 17, new varieties.

The new species and varieties will be described in successive numbers of THE BRYOLOGIST as space permits. Three new combinations are made. First, *Trichostomum affine* Schleich., which in Bryol. Eur. stands as a synonym for *Rhacomitrium heterostichum alopecurum* B. S., is written *Rhacomitrium heterostichum affine* (Schleich) C. & Th. Then, *Atrichum Lescurii* James, which Mr. E. S. Salmon had placed under *Lyellia*, the authors place under *Bartramiopsis Lescurii* (James) C. & Th. not Kindb. Also *Pogonatum Macounii* Kindb., becomes *Pogonatum alpinum Macounii* C. & Th.

A number of species are accompanied by critical notes recording the authors' judgment. Thus *Mnium nudum* Williams, for reasons stated, is considered rather a subspecies of *Mnium punctatum*. *Psilopilum Tschuctschicum*, discussed under *P. arcticum* Brid., is discredited as a good species. On this point there appears to the writer ground for difference of judgment. (See THE BRYOLOGIST, September, 1902.) Incidentally it may also be noted that the authors have preferred to retain the name *Psilopilum arcticum* in place of the revised name. *Polytrichum Yukonense* C. & Th. is under suspicion of being only a form of *P. Jensenii* Hagen, most of the differentiating characters given being variable in the typical *P. Jensenii*. *Pseudoleskea stenophylla* Ren. & Card., for which Dr. Best in his Revision of this genus had substituted *P. rigescens* (Wils.) Lindb., is restored, Dr. Best's substitution being shown as untenable. Likewise *Brachythecium Novæ-Angliæ* Jaeg. & Sauerb. is restored, the character on which it was recently erected into the new genus *Bryhnia*, the *papillose leaves*, having proved to be variable.

There is a short postscript of three notes. The first of these refers to Mr. R. S. Williams' Catalogue of the Bryophytes of the Yukon, which was published in 1901 in the Bulletin of the New York Botanical Garden and which contains 115 species not listed in the present paper. This brings the number of species of mosses now known from Alaska and the Bering Sea Islands up to about 350, not considering a large number of doubtful species mentioned in passing by the authors.

JOHN M. HOLZINGER.

SOME NOTES ON COLLECTING.

Within the past three years I have discovered the haunts of several of the minute species of mosses on my collecting trips, such as *Archidium Ohioense*, *Phascum* sp., *Pleuridium subulatum*, *Astomum* sp., *Ephemerum crassinervium*, *Physcomitrium immersum*, *Pyramidula tetragona*, and *Bruchia flexuosa*.

Six of these beautiful little plant species I found in the close vicinity of Winona, where I had collected for over fifteen years. This fact, linked with the other fact that these and similar minute mosses are in late years very little represented in collections, leads me to suspect that our younger generation of moss students, including myself, have yet to learn *where* and *when* to look for them. Having by chance stumbled upon the hiding places of these little elves, not merely sporadic patches but the regular haunts, it has occurred to me that it might be profitable for the more enthusiastic collectors of the Sullivant Chapter, and for all interested, to learn where and when I found these mosses.

The *Ephemerum* and *Physcomitrium* I found associated together several years ago on the shaded edge of a Mississippi slough, where weeds and grass do not come up to furnish excess of shade. The months are October and November. Since then I have annually looked for them on my November tramps through the river bottoms and most always I bring home some *Ephemerum* and its protonema. The *Physcomitrium* is more freaky, and is not easily found, apparently depending for its best development upon more exact seasonal conditions.

The *Archidium*, *Phascum*, *Pleuridium* and *Astomum*, I found first two years ago on the top of our bluffs 450 feet above the level of the Mississippi bottoms, on slightly north-facing surfaces, which during early summer become covered with a scant growth of grass, but which the dry autumn leaves again practically bare for the winter snows. The outcrop of Magnesian limestone weathered to fragments near the tops of the bluffs are there mantled over by a thin sheet of modified drift clay, or possibly it is simply wind-blown clay, which I doubt, blackened with the mould of the scant vegetation. It is in this situation that these little mosses have their home, starting their annual life effort *under the melting snows*. By a mere chance I stumbled upon them where I never thought it possible for anything worth looking for to exist, on one of my late March bluff rambles, when the roads were still muddy from snow-water. Repeated visits (for I am less than a mile from the spot at this writing, January) showed that the fruits ripen rapidly; and after the middle of April they soon show signs of weathering, and shortly seem to disappear altogether, the ground receiving now too much heat for their existence. Indeed the drouth has the past two seasons come on so rapidly that in case of *Astomum* only a few of the abundantly set capsules actually ripened spores.

The *Pyramidula* I found in June, 1901, in the upper Mississippi valley, in scant soil, probably windblown, in the shallow depressions of the water-worn granitic outcrops of that interesting region. It was very abundant

there, though I found only weathered plants. I regret that the distance, nearly the width of our State, makes it difficult to visit that profitable collecting ground often.

Lastly, the *Bruchia* I found only in June, 1902, close to the railway station at Dodge, Wis., some miles north of Winona, in the Trempealeau River valley. The plants occurred in greatest abundance among the short juncus and similar grass-like plants in a patch of fallow ground close by a tamarack swamp. In this case also all were already badly weathered. It is my purpose to revisit that station five or six weeks earlier this spring to secure plants in better condition.

In closing this note it may be worth mentioning incidentally that the geographical range of several of the species noted has been considerably extended.

JOHN M. HOLZINGER.

NOTES.

POGONATUM BREVICAULE (Brid.) Beauv.

In a recent letter M. Jules Cardot calls attention to the fact that Bridel in 1798 first gave the name *Polytrichum brevicaule* (Muscol. Recent II. pt. 1, p. 87) to the moss which has since been called *Pogonatum brevicaule* and that the specific name *tenue* was given to the same plant in the same year by Menzies, hence it is next to impossible to say which has the priority.

This being the case I agree with M. Cardot that *P. brevicaule* (Brid.) Beauv. is the proper name for this plant, because this name was in use for eighty-nine years before Mrs. Britton made the new combination.

A. J. GROUT.

PSILOPILUM TSCHUCTSCHICUM C. Müll.

In recently looking over a collection of mosses received at the Botanical garden from Prof. Macoun, which he made in the upper Yukon region last summer, I found good fruiting specimens of what I take to be the above species. They are undoubtedly the same as the sterile plants I collected on the Klondike river in 1899 and referred to *P. arcticum*. They are distinguished from this latter by the much longer, less curved capsules, less imbricated leaves, incurved when dry and by the margins of the leaf and also of the lamellæ, which are entire or only slightly undulate above, while *P. arcticum* has both leaf border above and lamellæ on margin irregularly serrate with crowded, crenulate teeth. In the first specimens I examined this last difference was scarcely noticeable owing to the much abraded margins. The distinction of basal leaf cells between the two species is not apparent, being quite variable in different leaves from the same plant. (See J. M. Holzinger's article on these species in BRYOLOGIST V:80, 1902). Also the difference in the exothecal cells does not seem to have been clearly pointed out. In *arcticum* the cells on the incurved side of the capsule are short, often slightly transversely elongated, while on the opposite side they are quite rectangular and mostly 2 to 3 times longer than wide. In *Tschuctschicum* the cells are more uniform around the capsule, mostly from a little longer than broad to about twice longer. The spores of the Macoun specimens measure from .022 to .025 mm.

R. S. WILLIAMS, N. Y. Botanical Garden.

MNIUM INSIGNE Mitt.

Among some mosses which I recently received from the Vienna Exchange Club for Cryptograms, was one labelled *Mnium insigne*, Mitt. June 20, 1896; on wet shaded earth, Columbia Falls, Montana, U. S. A. R. S. Williams. I examined this moss which had abundant capsules with interest, as *M. insigne* is generally considered synonymous with *M. Seligeri*, Jur., which is a shy fruiter in Europe and very rare in England in that condition. I was, however, surprised to find that the fruiting plants had a clearly synoicous inflorescence, though a few purely ♂ flowers were also present. I also found that the leaves were rather broadly ovate and sharply pointed which together with their long sharp marginal teeth, generally consisting of but one cell, and ceasing about the middle of the leaf, suggested that the plant before me was scarcely the same as the European *M. Seligeri*. The moss in question seems to agree well with the diagnosis given by Limpricht of *M. Drummondii* Br. & Sch. of which unfortunately I have no authentic specimens, but I cannot find that *Mnium insigne*, Mitt. is given as a synonym for this species, although Limpricht points out that Mitten's species is not the same as *M. Seligeri* Jur., to which many authors have referred it. A close comparison of the European and American species of this fine genus would be of great interest.

January, 1903.

W. E. NICHOLSON,

Lewes, Sussex, England.

SULLIVANT MOSS CHAPTER NOTES.

Dr. Best says of *Claopodium pellucinerve* (Mitt) Best, offered in this number of THE BRYOLOGIST by Mrs. J. B. Lowe, and collected by her at Noroton, Ct.: "So far as I know it has been collected only once before this and then by Mr. R. S. Williams in the Yukon territory. See THE BRYOLOGIST 3:19, 1900."

HARRIET WHEELER.

Members desiring the offerings will please forward stamped and addressed envelopes to the donors.

H. W.

Confusion would be avoided and some labor saved if the annual dues of Chapter members were paid directly to the Secretary who reports such payments to the editors of THE BRYOLOGIST and members receive the magazine to which they are thereby entitled. Subscriptions to THE BRYOLOGIST should be paid to Mrs. Annie Morrill Smith.

H. W.

In a letter just received from Prof. Holzinger he says: "If you have space please express my cordial thanks to the Sullivant Moss Chapter for honoring me with the Presidency. I promise to be faithful to this high trust and work hard." He adds in a letter of a few days later date: "Members wishing mosses determined *must* prepare material neatly, and send *abundant* specimens, in *proper, folded envelopes* with exact data written thereon. Scraps of mosses put up in indifferently folded scraps of paper will receive no consideration. Use pockets of good paper 7x8 inches. This request is absolutely necessary since the endless scraps have come pouring in."

Prof. Holzinger is right. The former Secretary of the Sullivant Moss Chapter felt her work to be largely of an educational nature, and for fear of nipping a bud prematurely, took extra pains with "scraps" and often consumed hours of time in their determination only to find the collector had no more material, so all that labor was wasted. Why? Because, if that little scrap contained a peculiar form—albeit of a well known species, it has only too frequently happened that a new variety or species even has been described, only later to have it find its true place as one in a long link of intermediate forms in a well known series.

The moral is: send good sized specimens for determination with proper data.

A. M. S.

REPORT OF THE LICHEN DEPARTMENT,

A year ago the Lichen Herbarium belonging to the Moss Chapter was placed in my hands. At that time it contained fifty specimens, representing eighteen genera and forty-four species. At the present time there are one hundred and seventy specimens, representing twenty-seven genera and ninety-five species and varieties. Many of the specimens have been contributed by the members of the Moss Chapter, and I hope during the coming year there will be many more contributions to the Chapter Herbarium.

I would urge all who are interested in the Lichens to make local collections, taking pains to collect good sized specimens and in fruit where it is possible. The Lichens should be pressed lightly while damp, if allowed to dry without pressing they are much more brittle. It would be well if more of the members would offer specimens for distribution, in this way they will gain experience and secure specimens from other localities which will be useful for comparison.

A number of specimens from California, Montana, Oregon and Lower California have been added during the past year.

The many letters asking for help in determining lichens and the requests for the offerings prove that the interest is growing in the study of these plants.

Respectfully submitted,

CAROLYN W. HARRIS.

OFFERINGS TO CHAPTER MEMBERS.

[To chapter members only—for postage.]

Miss Mary F. Miller, 1109 M Street, N. W., Washington, D. C. *Rhyncostegium rusciforme*, *Dicranum undulatum*, *Funaxia hygrometrica*, *Bryum proliferum*, *Aphanorhegma serratum*, *Hypnum Haldanianum*.

Mrs. J. D. Lowe, 200 "A" Street, S. E., Washington, D. C. *Brachythecium plumosum*, *Amblystegium riparium longifolium*, *Claopodium pellucinerve*, *Sematophyllum adnatum*.

Mr. J. Warren Huntington, Amesbury, Mass. *Philonotis fontana*, *Leptotrichum glaucescens*, *Barbula tortuosa*.

Prof. J. M. Holzinger, Winona, Minn. *Pyramidula tetragona*, *Grimmia leucophea*, *Grimmia Pennsylvanica*, a limited supply.

Mrs. Carolyn W. Harris, 125 St. Mark's Avenue, Brooklyn, N. Y. *Ramalina calicaris* var. *farinacea*, *Parmelia Borreri* var. *rudecta*.

Miss Alice L. Crockett, Camden, Me. *Hypnum eugyrium*, *Ceratodon purpureus*.

Mr. W. C. Barbour, Sayre, Pa. *Chiloscyphus polyanthus rivularis*, *Hylacomium rugosum*, *BaCOMYCES roseus*.

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THE BRYOLOGIST

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HEPATICS AND LICHENS

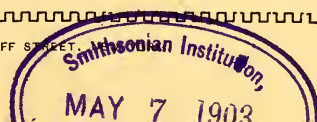
EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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PLATE VIII.

SOME INTERESTING FORMS OF POLYTRICHUM.

BY A. J. GROUT.

Polytrichum Smithiae n. sp.

While collecting on Mt. Mansfield summit in August, 1902, I noted in moist depressions of the moss covered summit a *Polytrichum* which looked to me like *P. gracile* and which I collected in quantity intending to distribute it as that species. Microscopic examination, however, showed that it could not be *P. gracile* as the terminal cells of the lamellæ were broader than high and usually concave on the outer face as in *P. Ohioense*. The plant was then referred to *P. Ohioense* as a variety, but on preparing the description for publication it seemed so distinct as to be worthy of specific rank. I have named it in honor of Mrs. Annie Morrill Smith, who has done so much to advance the study of mosses in this country.

Plants dioicous, light green, small for the genus, about 2 cm. high exclusive of sporophyte, rarely reaching 3 cm.; leaves reaching 5 mm. in length exclusive of the sheathing base, erect spreading when moist, closely appressed when dry, not curling in the least, serrate on the margins, lamellæ about 32, four to six cells high, flat or usually concave on the upper surface; seta about 3 cm. long, pale; capsules small, urn 3-4 mm. long with operculum beaked as in *P. Ohioense*, inclined to horizontal, slightly curved with an indistinct hypophysis, four angled.

Distinct from *P. Ohioense* in its constantly smaller size in all parts, leaves closely appressed and straight when dry, and lighter color. Its habitat is similar to that of *P. strictum* and it seems to be related to *P. Ohioense* much in the same manner as *P. strictum* is to *P. juniperinum*.

Forms close to this were collected on the summit of Mt. Katahdin, Maine, by F. P. Briggs, August, 1892; on Mt. Mansfield, August, 15, 1892, by Mrs. Britton

Polytrichum commune uliginosum Heuben.

In August, 1898, I collected on the summit of Mt. Washington a form of *Polytrichum commune* with very small capsules, calyptra reaching only to the base of the capsule, and the leaves spreading-recurved when dry. This seems to be nearer the variety *uliginosum* than any described form, although the leaves and stems are shorter than is indicated in Limpricht's description. For this form I would suggest the name forma *Washingtonianum*.

Plate VIII. Figs. 1, 10 and 11. *Polytrichum Smithiae*. Figs. 2, 3, 12 and 4. *P. Ohioense*. Fig. 5. *P. commune* Fig. 6. *P. commune*, pressed when wet with leaves expanded. Fig. 7. *P. commune uliginosum* forma *Washingtonianum*. Fig. 8. *P. commune uliginosum*, from State of Washington. Fig. 9. *P. commune perigoniale*, showing the elongated perichaetial leaves.

NOTES ON NOMENCLATURE. II.

BY ELIZABETH G. BRITTON.

It is surprising when we compare the various references to American species, what contradictions and mistakes we encounter! The following is as good an illustration as could well be selected:

Hypnum revolutum (Mitt.) Lindb. Hedwigia 7:108. 1868 (1858).

Stereodon revolutus Mitt. Journ. Linn. Soc. 4: Suppl. I. 97. 1859.

Hypnum Heufleri Jur. Verh. K. K. Zool. Bot. Ges. 11. 431. 1861.

Stereodon plicatile Mitt. Journ. Linn. Soc. 8:40. 1864.

Hypnum plicatile Lesq. and Jas. Man. 394. 1884.

Hypnum Watsoni Lesq. and Jas. Man. 886. 1884.

In tracing back the history of this species the following references should also be consulted: Jaeger and Sauerb. Adumb. 316, 321, 325,—1877-78; Austin, Bull. Tor. Bot. Club, 7:6. 1880; Rau and Herv. Cat. 46. 1880; Macoun Cat. 6. 237. 1892; Ren. and Card. Musci Am. Sept. 61. 1893; Paris Index. 668 and 675. 1894; Kindb. Bryin. Eu. and N. A. 1:136. 1897; Limpr. Laubm. 3:479 and 498. 1899; and R. S. Williams Bull. N. Y. Bot. Gard. 2:141. and 379. 1901-02.

This is the opinion that Austin expressed before the Manual was written:

“*Hypnum Watsoni*, L. and J., Hab. Utah, Watson. There is a more accurate description of this species in the Bryology of the Forty-ninth parallel, by Mitten, under the name of *Hyp. plicatile* (1864). It is undoubtedly *Hyp. Heufleri*, Juratzka (1861) (compared with a specimen from Schimper kindly furnished by Mr. James). It is also *H. revolutum*, Lindb., Ms. and *H. recurvo-marginatum*, n. sp. Aust Ms. I have many specimens of it from Colorado, Oregon and British Columbia. It also occurs in the high latitudes and alpine regions of Europe. The most striking feature of the species is the (usually) broadly revolute margin of the leaf, from base to point. The capsule is curved in the middle from an erect base, the operculum is shortly conic and very obtuse. The leaves are often serrulate at the apex, shortly bicostate, and furnished with a larger or smaller, usually not well defined patch of very short and minute, more or less obscure cells at the basal angles. In mode of growth, ramification, and in the reticulation of the leaves it is variable. I have what appears to be a form of this species also from Monterey, Mexico.”

In order to determine if Austin was right, I have endeavored to see type specimens and authentically named material, and have been favored with a portion of the type of *Stereodon plicatile* Mitt. collected by Taylor at Davis' Straights, and also with specimens collected in the Rocky Mountains by Bourgeau, with drawings of the leaves. Besides the specimens mentioned by Austin, which are preserved in his Herbarium, we have an authentic specimen of *Hypnum Watsoni*, named by James (No. 1474 of the U. S. Geol. Surv. of the Fortieth Par.), from Bear River Canyon, Utah, Alt. 9,000 ft., collected by S. Watson. We also have two specimens named *Hypnum Heufleri* Jur. (*H. revolutum* Lindb.) from Gray's Peak, Colorado, collected by Hooker and

Gray, 11-14,000 ft. Of *H. Heufleri* besides the specimen mentioned by Austin, we have a portion from the type locality sent to Jaeger by Heufler, as well as a large number of exsiccatae and specimens from various European authorities. With these I have made comparisons with a series of specimens from various Western States, and I have no hesitation in agreeing with Austin's decision as expressed by the synonymy given above. Mr. Williams also has come to the same conclusion as he has had occasion to study some of these specimens in determining his collection from Montana and the Yukon Territory, and he is already on record in his lists of species of these regions.

The species seems to be common in high Alpine and subarctic regions of both hemispheres, the type locality of *H. revolutum* being at an elevation of 18,700 ft. in Thibet. Lindberg also described a species which he called *H. plicatulum* (Act. Soc. Scien. Fenn. 10:254. 1872) collected by Arnell in Siberia which Harald Lindberg has recently examined and pronounced to be the same as *H. revolutum*. It is singular that both Mitten and Lindberg should have used the same specific name for the same species.

It will be found that Limpricht describes two European varieties, *pygmaeum* and *Molendoanum*, and that Renauld and Cardot have described one American variety, *Villardii*, from specimens collected by Röhl at Helena, Montana. The latter appears to me to be referable to the European variety *pygmaeum*, and is simply a depauperate, slender form, resembling some of the states of *H. cupressiforme*.

Limpricht records a long list of European stations at high elevations in all the mountain regions, ranging from 1,300-5,800 meters. In North America, the species has not been recorded from the Eastern United States, but is common in the Rocky Mountains, from British Columbia to Arizona and into Mexico. It is also reported from Hudson's Bay and Greenland.

Kindberg reverses the sequence of names by placing *H. revolutum* as a subspecies of *H. plicatile*, and limiting the name to the European species.

New York Botanical Garden.

Explanation of Plate I, *Sematophyllum recurvans* (Michx.) E. G. Britton. In THE BRYOLOGIST, January, 1903 :

Fig. 1. *S. recurvans*, plant x 2; *S. recurvans*, anteridial, bud x 2. Fig. 2. Same enlarged, x 10. Fig. 3. Leaf of stem. Fig. 4. Base of same showing vesicular alar cells. Fig. 5. Apex of same showing serrate point. Fig. 6. Antheridial bud, x 10. Fig. 7. Leaf of same. Fig. 8. Antheridia and paraphyses. Fig. 9. Perichaetium and base of pedicel. Fig. 10. Apex of perichaetial leaf. Fig. 11. Mature capsule. Fig. 12. Old capsule. Fig. 13. Lid, showing beak. Fig. 14. Stomata on neck of capsule. Fig. 15. Peristome. Fig. 16. Annulus, showing three inflated cells. Fig. 17. Tooth of peristome, showing inter trabeculate surface. Fig. 18. Spores.

AN INTERESTING TREE.

The maple tree of the Sound Country of Western Washington is of great interest to the bryologist, because of the many species of moss which find lodgment on its trunk and branches. It is more often found in the river bottoms than on high land. It has a thick, corky bark, and the leaves are much larger than those of the eastern maple. This tree (*Acer macrophyllum* Pursh) is the most plentiful of our large deciduous trees and, besides giving a home to the various mosses mentioned in this article, supports colonies of polypodies and numerous lichens.

The moss found in greatest profusion on the lowest part of the trunk, is *Claopodium crispifolium*. It grows in olive or dark green mats, the color depending on the exposure to the sun. One is led astray in the determination of this moss by the description in the Lesquereux and James Manual, where the perichætal leaves are put down as ecostate; they are lightly costate; see Dr. Best's notes in his revision of *Claopodia*. It fruits very freely and the capsules are very persistent.

Eurhynchium Oreganum occasionally sends up long pinnæ from the ground; but as a rule it prefers trees with smoother bark than is that of the maple, and, if it does secure a place, is easily crowded out by the *Claopodium*.

Next above these two, grow *Camptothecium lutescens*, *C. Nuttallii*, *Hypnum subimponens*, and *Neckera Menziesii*. *C. lutescens* is a large woolly moss of a tawny yellow when dry. It fruits freely and its operculum is rostrate. A specimen of this moss from Limoges, France, which was sent me the other day, was growing on sand. Its habitat here is tree trunks and logs. *C. Nuttallii* is like gold thread when dry and no more beautiful moss is found in this section. It assumes the stoloniferous form, either in the centre of old growths or on the underside of small limbs. The terminal leaves of the stolons present prominent hooklets at the apices, from which characteristic Kindberg names it *hamatidens*. *Hypnum subimponens* is difficult to differentiate from an *Harpidium*. It fruits freely in early summer. The pinnæ are soft and white or pale when growing on a tree trunk. When this moss grows where water drips on it, the color is a rich golden copper. *Neckera Menziesii* prefers the tree trunk to the limbs. Its pinnæ hang in graceful curves, are very regular and of a rusty brown color. The immersed capsules are plentiful. I never found it in fruit at any great altitude.

Neckera Menziesii, *Neckera Douglassii* and *Antitrichia curtispindula* var. *gigantæ*, are the cushions of moss seen hanging to the trees, which are so marked a feature of our landscape. *Isothecium stoloniferum* seldom grows in as large masses. *Neckera Douglassii* is a soft, green moss. Its leaves are sharply dentate, its branches long and irregularly pinnate. The new capsules are orange and unlike those of *Menziesii* have a pedicel. The *Antitrichia* clings to the limb well out of reach. After a wind storm one finds quantities of it on the ground. The flagellæ, hanging below the limbs, bear the capsules which are attached by a short pedicel. The furry stems

above are tipped in the growing season with golden yellow, transforming the dull, dusky masses into things of beauty.

There is another moss accredited to this locality which is found associated with the *Antitrichia*, viz. *Alsia abietina*. This moss grows in little plumes three or four inches long, resembling miniature ostrich feathers. When dry the stems curl in on themselves and the plant shuts up, as it were, like a shut hand. I have not found it in fruit.

Two *Orthotricha* are found on the trunk and limbs, *O. pulchellum* var. *leucodon*, and *O. speciosum*. The former is a small moss growing in little cushions rarely larger than the end of one's little finger; the latter is a larger moss occurring in masses, an inch or so in diameter. The capsules of *pulchellum* are exerted and prominent, while those of *speciosum* are hidden under the leaves and one has to look closely to find them.

In suitable places *Mnium insignne*, with its clusters of orange capsules, is found scattered through the mosses of the trunk. *Scleropodium colophyllum* may be found on uncovered roots. When dry it may be mistaken for a *Camptothecium*. *Isothecium Brewerianum* occurs on the trunk and low decaying branches. When moist large forms of this may be confused with *Antitrichia*. A *Brachythecium* is found occasionally in the lower forks of the tree; it may be *B. rutabuliforme* but of this I am not sure.

Any other pleurocarpus moss, especially if clinging to dead limbs, is very likely to be *Isothecium stoloniferum* which is the most common of our tree mosses and varies sufficiently to puzzle even an expert.

All of these mosses are not confined to the maple alone but are found on other trees as well. The maple is the common meeting place for all of them. Whenever any readers of THE BRYOLOGIST visit this section of the West, they will find it greatly to their advantage to visit a grove of these trees. The species of moss on them make a respectable collection.

Since writing the above I have found *Mnium Menziesii* growing on the maple and *Eurhynchium praelongum* on roots washed by running water.

JOHN W. BAILEY, M.D.,
Seattle, Wash.

SUN PRINTS IN BRYOLOGY—ADDITIONAL NOTES.

BY A. J. GROUT.

The illustration for the *Polytrichum* article in this number was made by a variation in the method described by Dr. True in THE BRYOLOGIST V:May, 1902. Instead of the apparatus described, an ordinary photographic frame, was used. First, the mosses were arranged on the glass in the frame, then the sensitized (solio) paper was carefully laid on these so as not to disturb the arrangement. On the paper was placed a pad made of absorbent cotton backed with pasteboard and covered with lens paper. Then the back of the printing frame was put in and the springs gave sufficient pressure to hold the plants firmly in place and closely pressed against the paper. A deeper frame such as is used in making lantern slides might be better as it would allow of a

thicker pad. If the pad be too thin some moss capsules filled with nearly ripe spores will be crushed by the pressure.

The chief advantages of this method are convenience and the fact that the plants can be arranged on the glass in the light instead of on the sensitized paper which has to be in a measure protected from the light.

To keep the printing frame at right angles to the sun's rays, stick a pin in the upper surface of the wood of the printing frame and perpendicular to it; then hold the frame so that the shadow of the pin's head just covers its point.

OBITUARY.

Monsieur Emile Bescherelle, a bryologist of note, and a man of diverse activity, died on February 26th of the present year, at Arcachon, Gironde, France, in his 76th year. Besides his immediate circle of relatives and personal friends, who are numerous, the moss students of the whole world are left to mourn the loss of this earnest, energetic and genial man. For in a letter, dated July, 1899, he informed the writer that he was interested in "the mosses of the whole world." This statement is well borne out by a glance at the numerous publications from his pen. His bryological activity extends over nearly forty years. His writings are found in the Bulletin of the Botanical Society of France, in the *Journal de Botanique* de M. Moret, and in the *Revue Bryologique*; the principal memoirs are printed mostly in the *Annales des Sciences Naturelles*. Of these the following are the most important:

Prodromus Bryologiæ Mexicanæ (1871). *Florule Bryologique de la Nouvelle Calédonie* (1873). *Florule Bryologique des Antilles Françaises* (1875). *Mousses de Paraguay* (1875). *Florule Bryologique de la Réunion* (1880). *Catalogue des Mousses de l'Algérie* (1882). *Flore bryologique du Tonkin* (1887). *Mousses du Cap Horn et Magellan* (1889). *Musci Yunnanenses* (1892). *Flore Bryologique du Japon* (1893). *Mousses de l'Amerique Centrale* (1894). *Flore Bryologique de Tahiti* (1895). *Essai sur le genre Calymperes* (1896). *Mousses de la Tunisie* (1897). *Flore bryologique de Tahiti Supplement* (1898). *Flore bryologique du Japon. Supplement* (1899).

This selected list shows the range of Mr. Bescherelle's interests. His energy did not abate till shortly before his death. And while he has not worked on North American mosses, his work on West Indian, Central American and South American mosses is so considerable that it will ever place his name prominently among American bryologists.

Incidentally it may be of interest to note that Mr. Bescherelle was Chief of the Honorary Division, under the Minister of Public Works; former President of the Botanical Society of France; Corresponding Member of the Museum of Natural History; Chevalier of the Legion of Honor; and "Officier d'Académie."

J. M. HOLZINGER.

SELIGERIA TRISTICHOIDES IN SOUTHERN FRANCE.

In the Bescherelle collection of European Mosses, recently purchased by the University of Minnesota, are found some twelve sheets labelled "*Seligeria tristicha*." A hand lens inspection of these plants revealed the fact that a majority of the sheets are referable probably to *Seligeria tristichoides* Kindb., the capsules of which species have a characteristic shape and color. Upon examining the leaves of one of the plants, the one collected by Mr. Montague in the "Grotte de Rousseau," near Lyons,—my suspicion changed to a practical conviction that these plants from southern France are actually *Seligeria tristichoides*! This plant, according to the accompanying note, appears to have been sent to Mr. Bescherelle by Montague erroneously as *Trichostomum tophaceum*, with the remark that it did not yet form a part of the French flora, and that he had found it in three different localities: In the eastern Pyrenees, at Canigou; at Lyons, near the Grotte de Rousseau; and near Toulon. There are several other specimens from near Lyons, all doubtless referable to Dr. Kindberg's species. One, without date or locality, is marked Ex herb Schimper: so that Schimper evidently saw the plant, but together with his contemporaries confused it with *S. tristicha*.

Thus *Seligeria tristichoides*, so far reported only from northern Norway, and from the N. E. United States (coll. G. G. Kennedy in Vermont) under the var. *laxa*, appears also on the French slopes of the Pyrenees, and in the Cevennes Mts. It ought to occur also in the higher reaches of the Alps.

J. M. HOLZINGER.

ÆDIPODIUM GRIFFITHIANUM (DICKS.) SCHWAEGR.

In looking over some of the mosses from Alaska, collected by the Harri-man Expedition, with Mrs. Britton, we found one rather peculiar looking specimen not named by Cardot. That he had seen it was evident by the fact that pencilled on the packet was something to the effect that it contained a *Mnium* in poor condition. (The packet is not accessible to me at present, and I am unable to give the exact words or translation.) On investigation, the specimen proved to be *Ædipodium*, a rare plant first collected over a hundred years ago in the British Islands. Elsewhere it has since been found in only a few localities in Norway and Lapland, and by Berggren in Greenland. The Alaskan specimen, a single dense tuft, was found by Dr. Trelease, at Kodiak, on Kodiak Island, July 3d, 1899, and is in fruiting condition, but the capsules are all quite immature, although one or two are nearly full size and when moistened, show the shape of capsule, lid and its line of fission. *Æ. Griffithianum* is the only known species of the genus and is usually placed under the *Splachnaceae*. It may be known by the large, obovate, very *Mnium*-like leaves and leaf-cells, and the small, erect, globose capsule raised four or five lines above the leaves on a pale seta-like apophysis, gradually enlarging into the sporangium. The uppermost leaves are not ciliate, but below, the leaves bear on either margin near base a fringe of slender hairs.

That the authors of the list of "Mosses of Alaska" failed to appreciate so remarkable a species, one of the most interesting collected by the party, indeed, seems rather singular, since they have rather gone out of the way in an attempt to name slight variations that often might far better be included with the species.

R. S. WILLIAMS,

New York Botanical Garden.

THE MOSSES OF ALASKA.

BY J. CARDOT AND I. THERIOT.

From "Papers from the Harriman Alaska Expedition."

CONTINUED.

The new species and varieties described and figured in the above article (see THE BRYOLOGIST for March, 1903,) are: *Anoctangium compactum Alaskanum*, *Cynodontium Treleasei*, *C. polycarpum Alaskanum*, *Dichodontium pelucidum Kodiakanum*, *Dicranella heteromalla latinervis*, *Dicranum subflagellare*, *Pottia Heimii Beringiana*, *Trichostomum cuspidatissimum*, *T. Sitkanum*, *Barbula brachypoda*, *B. Saundersii*, *B. Treleasei*, *B. rigens*, *Racomitrium sudeticum Alaskanum*, *R. cyclodictyon*, *Ulota Alaskana*, *U. crispa subcalvescens*, *Orthotrichum fenestratum*, *Entosthodon spathalifolius*, *Webera pseudogracilis*, *Bryum ateleostomum*, *B. Treleasei*, *B. Agattuense*, *B. mucronigerum*, *B. cylindrico-arcuatum*, *C. Laurentianum*, *B. leptodictyon*, *B. heterogynum*, *B. pseudostirtoni*, *B. Harrimani*, *B. Duvalii obtusatum*, *B. drepanocarpum*, *Mnium punctatum anceps*, *Polytrichum Yukonense*, *Brachythecium Beringianum*, *Plagiothecium fallax*, *Amblystegium serpens Beringianum*, *A. varium Alaskanum*, *Hypnum Treleasei*, *H. uncinatum polare*, *H. sulcatum stenodictyon*, *H. subeugyrium occidentale*, *H. sarmentosum Beringianum*, *H. plesiostramineum*, *Hylocomium triquetrum Beringianum*. *Bryum Agattuense* and *B. mucronigerum*, both elsewhere described (in Rev. Bryol. 1904) are here for the first time figured.

ANOECTANGIUM COMPACTUM ALASKANUM Card. and Thér.

Distinguished by a more robust habit, leaves more spreading when moist, larger and broader, cells larger (medium 6-9 μ wide, instead of 4-6 μ), areolation more opaque.

From Port Wells (Trelease, 1832).

CYNODONTIUM TRELEASEI Card. and Thér.

Monoicous, somewhat densely cespitose, stems erect, short, 3-4 mm. high, leaves crispate when dry, patent when moist, 2-3 mm. long, suddenly contracted from an oblong base to a long and narrowly subulate, acumination, apex sinuate denticulate, margin plain and entire, costa percurrent lower cells rectangular 2-3: 1, upper irregular, and mostly sub quadrate, opaque and papillose, 9-15 μ long, 8-9 μ broad, alar cells larger, subinflated, yellowish; antheridial buds on short branches, inner perichaetial leaves sheathing, long acuminate; capsule on a short pedicel 7-8 mm., cernuous or inclined, shortly ovate, convex, sometimes stramulose, smooth or slightly

striated; operculum long-rostrate with an oblique beak, crenulate at base; annulus distinct, peristome deep purple 0.5 mm. long, strongly papillose, teeth irregularly trifurcate; spores, smooth, 16–18 μ .

From Port Wells (Trelease, 2268, 2271).

This species is only comparable with *C. polycarpum* Sch., from which it is easily distinguished by its smaller size, its shorter, smooth or hardly striate capsule; its more papillose, longer and brighter purple peristome; its shorter leaves with a thinner subula, and its upper leaf-cells smaller and less distinct.

CYNODONTIUM POLYCARPUM ALASKANUM Card. and Thér.

Differs from the typical form in the leaves more strongly denticulate at apex, margins less widely and less longly revolute, leaf cells smooth, or nearly so, upper a little larger and more distinct (20 x 13 μ instead of 14 x 11): distinct from variety *laxirete* Dixon in the narrower leaves, and more dense areolation. From *Oncophorus suecico* Arn. and Jens., it differs in having the leaves revolute below, and alar cells indistinct, or nearly so.

From Juneau (Trelease, 2176); Cape Fox (Trelease, 2374); Indian Camp, Yakutat Bay (Brewer and Coe, 645).

The type has been indicated for Alaska by Kellogg and by Lesquereux and James (Manual, p. 58).

DICHODONTIUM PELLUCIDUM KODIAKANUM Card. and Thér.

In size like *D. flavescens* Lindb., 5–8 cm. high; leaves subentire, apex broadly obtuse, somewhat sinuate, scarcely papillose.

From Kodiak (Trelease, 1848).

DICRANELLA HETEROMALLA LATINERVIS Card. and Thér.

Differs from the typical form in having leaves shorter subulate, costa broader, occupying one-third of base.

From Douglas Island (Trelease, 2389).

DICRANUM SUBFLAGELLARE Card. and Thér.

Nearest to *D. flagellare*, differs in the lack of flagellæ, the erect subfalcate leaves, narrower, little flexuose, shorter (2–2.5 mm.), acumen canaliculate, not subtubulose, margins and back subentire, lower cells narrower, upper much smaller, specimens scanty, sterile.

From Kodiak (Trelease, 1899).

POTTIA HEIMI BERINGIANA Card. and Thér.

Differs from the typical form in the shorter leaves, surrounded by a yellowish border; mucronate by the shorter excurrent costa, areolation more opaque, strongly papillose.

From St. Matthew Island (Trelease, 2151 in part).

We found only a few stems of this moss, mixed with *Barbula brachypoda* Card. and Thér., and a Bryum. By the pellucid margin of the leaves, it is nearly related to *P. obtusifolia* C. Müll. (*P. Heimii arctica* Lindb.) but it is easily distinguished from it by its pointed leaves. It also closely resembles *Desmatodon systylioides* Ren. and Card., from Labrador, which is probably also a *Pottia* of the same group, but it differs from this species by its ovate,

shorter and proportionately wider capsule, its longer and more finely beaked lid, its shorter and more briefly acuminate leaves, and finally by its areolation formed of larger and less obscure cells.

TRICHOSTOMUM CUSPIDATISSIMUM Card. and Thér.

Dioicous, compactly caespitose, brownish yellow, stems erect, about 5 cm. high, densely foliate, reddish tomentose; branches numerous, erect; leaves crispate when dry, erect-arcuate when moist, clustered at the apex of the stems and branches, fragile (apex often broken off) from an ovate base gradually long acuminate: 3-3.5 mm. long, 0.45-0.7 wide, margins plane, inflexed above, crenulate with prominent papillæ, costa narrow, 80-90 μ wide at base, long excurrent into a very acute cuspidate apex, lower cells rectangular 5-6:1, yellowish, upper mostly quadrate, 10-12 μ wide, opaque, strongly papillose. Sterile.

From Hall Island (Brewer and Coe, 674).

A fine species, easily distinguished from the large forms of *T. mutabile* Bruch, and its variety *cuspidatum* Limpr. (*T. cuspidatum* Sch.), by the form of its leaves, and more particularly by its narrower costa and its upper cells which are much larger and more distinct (10-12 μ instead of 6-8).

TRICHOSTOMUM SITKANUM Card. and Thér.

Dioicus (?). In somewhat dense tufts, above green, blackish within, covered with earth below stems 2-3 cm. high, little divided, loosely foliate. Leaves soft, cirrate-crispate when dry, patulous when moist, the lower 2.5-3 mm. long, upper longer, 4-4.5 mm. long, linear lanceolate from a long subsheathing base, margins plane and entire, costa quite strong, about 110 μ wide at base, excurrent into a short, yellowish mucro, cells of the sub-sheathing base rectangular, hyaline 4-6:1; others quadrate, hexagonal, 12-14 μ wide, strongly papillose; other parts lacking.

From Sitka (Trelease, 2370).

The aspect, the form of leaves, the looser basal areolation and the upper cells more papillose, easily distinguish this plant from *T. cuspidatissimum* Card. and Thér. It is more closely connected with *T. Bambergeri* Sch., but the latter has the costa shining on the back in a dry state, and the hyaline cells of the base going up along the borders of the leaf, as in *Barbula tortuosa* Web. and Mohr.

BARBULA BRACHYPODA Card. and Thér.

Monoicus, laxly caespitose, green, stems 5-10 mm. high, erect, simple or divided, leaves soft, erect when dry, erect-open when moist, elliptic or subspatulate. 2.5-3 mm. long, 0.6-1 mm. broad, broadly and shortly acuminate, obtuse, subobtuse or acute, margins revolute from base to middle, thence plane and bordered with three or four rows of yellowish cells; costa narrow (50 μ), vanishing a little below the apex; areolation smooth, the cells in the lower half very lax, hyaline, rectangular, 66-88 \times about 22 μ , strongly chlorophyllose; above, cells irregular roundish-quadrate or very short rectangular, gradually smaller from costa to margin (larger, 25 \times 16 μ : smaller, quadrate 14 μ wide); antheridial buds below the archegonial; perichaetial leaves larger

than the stem leaves, acuminate; inner very narrow; seta short, pale, 5-7 mm. long, 0.2 mm. thick; capsule erect, cylindric, about 2 mm. long, operculum conic equalling one-third the length of the capsule; annulus broad, distinct; peristome papillose, basal membrane short, teeth once or twice twisted; spores smooth, 12-16 μ .

From St. Matthew Island (Trelease 2151, in part 2166).

This species, which belongs to the section *Cuneifoliae* Sch., is easily distinguished from *B. cuneifolia* Brid. by its leaves revolute below, its longer lower cells, the upper more chlorophyllose with thicker walls, its shorter seta, its broad annulus, etc.

Kindberg has established in *Revue Bryologique*, 1896, p. 22) a *B. subcuneifolia* from Alaska, which, by some characters, seems to be near to our *B. brachypoda*; but his description is so incomplete that we can neither ascertain whether this *B. subcuneifolia* is identical with the plant here described, nor, with still more reason, mention the characters which might distinguish it from the former.

BARBULA SAUNDERSII Card. and Thér.

Dioicus? laxly caespitose, olive-green, stems short, 5-8 mm. high, simple or little divided. Leaves incurved when dry, erect, or erect-open when moist 1.5-2 x 0.8 mm., shortly acuminate, obtuse or shortly mucronate with margins revolute below to two-thirds the length of the leaf, concave above, costa strong, nearly the same thickness (0.1 mm.) throughout, strongly prominent at back, percurrent, or rarely somewhat excurrent, areolation smooth, lower cells lax, rectangular, yellowish, 40 x 12 μ , the next above quadrate, 12 x 13 μ ; incrassate middle and upper cells minute, 7-8 μ wide, scarcely distinct: perichætil leaves longer than the stem leaves, erect, incurved when dry, erect-appressed when moist; seta purple, about 10 mm. long, twisted to the left when dry; capsule erect, oblong or subcylindric, 1-1.25 mm. long; operculum very long-conic, equalling the capsule; peristome purple, papillose; basal membrane short, 30 μ high, teeth once or twice twisted; spores smooth 14-16 μ .

From Hidden Glacier Inlet, Yakutat Bay (Trelease, 2514).

In habit recalls the smallest forms of *B. unguiculata* Hedw., from which it differs by the shorter and proportionately broader leaves, which are shortly ovate-lanceolate, not or hardly mucronate, etc. By the form of leaves, it is also connected with *B. brachyphylla* Sulliv., but the latter has the stems much longer and the basal areolation of the leaves quite different.

BARBULA TRELEASEI Card. and Thér.

Dioicus? densely caespitose yellowish green; stems 1-2 cm. high, erect, divided; leaves slightly crispate when dry, erect-open when moist, about 1.5 x 0.6 mm., ovate-lanceolate, shortly acuminate, entire, margins revolute from the base; costa strong, percurrent, 80 μ thick at base; lower leaf cells rectangular, subhyaline, smooth median and upper minute (8 μ), quadrate, strongly papillose, scarcely distinct: perichætil leaves much larger and broader, suddenly contracted, long acuminate, arcuate-spreading when

moist; inner subsheathing, hyaline in the lower half; seta 10-11 mm, long, capsule erect, oblong cylindrical. Other parts lacking.

From Juneau (Trelease, 2179, 2181).

This moss has the aspect of a slender *B. fallax* Hedw.: but the texture of the leaf base, form of rectangular subhyaline cells, clearly separate it. On the other hand, it differs from *B. vinealis* Brid and allied forms by the much shorter leaves.

BARBULA RIGENS Card. and Thér.

Reddish, loosely caespitose or intermixed with other mosses; stems slender, erect, rather rigid, divided, 1-2 cm, high, leaves somewhat crispate when dry, erect-open when moist, shortly linear-lanceolate, 1.25 to 1.5 x 0.3 mm., margins entire (somewhat revolute towards the middle); costa strong of nearly the same thickness throughout (56 μ). biconvex, percurrent or excurrent into a short mucro; lower leaf cells rectangular, hyaline, smooth for the most part, upper cells opaque, indistinct, round-quadrate, densely papillose on both sides, median about 11 μ wide. Other parts lacking.

From Orca (Trelease, 2260; mixed with *Distichium capillaceum* and *Anoetangium compactum*).

This species belongs to the group of *B. rigidula* Mitt., from which it is easily distinguished by its stiff stem and leaves, the latter being shorter and very briefly acuminate and by its much more papillose areolation.

RHACOMITRIUM SUDETICUM ALASKANUM Card. and Thér.

A small form with the habit of var. *tenellum* Boul., but with hyaline apex nearly or quite lacking and the costa more distinct.

Hidden Glacier Inlet, Yakutat Bay (Trelease, 2508 in part).

RHACOMITRIUM CYCLODICTYON Card. and Thér.

Dioicous? Small, densely caespitose, dark brown, stem depressed, very freely branching erect short, 3-5mm. long. Leaves when dry suberect, scarcely flexuous, erect open when moist, 1.25mm. long, by 0.5mm. broad, muticous, entire lower margin revolute, costa rather slender, 35-40 μ wide, vanishing a little below the apex, areolation subequal, a few of the lower cells next the costa rectangular or sublinear, not sinuous, all the others round or shortly ovate, 8-12 μ wide, marginal cells incrassate, smooth or strangely convex so as stimulate large papillae. Perichaetial leaves much larger from a sheathing base, gradually long acuminate, erect when moist. Seta short, purple becoming blackish and twisted to the left when dry. Capsule 5mm. long, erect, narrowly cylindrical, 1.5mm long, by 0.3 thick. Spores minutely granulose, 16-17 μ . The rest unknown.

From Muir Glacier (Trelease, 2431).

A most remarkable species which cannot be mistaken for any other on account of its characteristic areolation very different from that of all known species of the genus *Rhacomitrium*.

ULOTA ALASKANA Card. and Thér.

Differs from the closely allied *U. crispa* Brid. at first sight in its size and more robust habit (stem 2-4cm. high, freely branching), seta longer

4-6 mm.) lower leaves more narrowly hyaline margined (four or five rows of cells) spores larger (19-23 μ) and especially by having the dry capsule dilated at the mouth, never constricted below the mouth.

From Wrangell (Coville and Kearney, 407); Point Gustavus (Coville and Kearney, 774); New Metlakatla (Trelease, 2239); Yakutat Bay (Trelease, 2337); Virgin Bay (Trelease, 2499); Hot Springs (Trelease, 2347).

By the shape of its capsule, dilated at mouth, this species is very distinct from *U. Bruchii* Hornsch. and *U. intermedia* Sch. It cannot be either mistaken for *U. connectens* Kindb., which, according to the author, has a short, hardly emergent seta. *U. camptopoda* Kindb. would appear, according to the description, nearer to *U. Alaskana*, but as Kindberg has recently joined it to *U. connectens*, we need not take it into account. Besides, he gave it the aspect of *U. crispula* Bruch, which does not at all agree with our *U. Alaskana*, characterized by its great size and the length of its seta.

ULOTA CRISPA SUBCALVESCENS Card. and Thér.

Capsule short, when moist as in *U. crispula*, but when dry and empty constricted below the mouth as in *U. crispa*. Calyptra hairy only at apex. Baranof Island (Trelease, 2348 in part).

Two small tufts, mixed with *U. phyllantha* Brid.

ORTHOTRICHUM FENESTRATUM Card. and Thér.

Monocious, in rather loose cushions, dark or blackish-green becoming black within, stems frequently divided, 1-1.5 cm. high. Leaves erect, imbricated when dry and barely spreading when moist, median leaves 3.5 mm. long, by 0.75-1 wide, the upper larger, lanceolate or ovate-lanceolate, acute, margins entire, revolute to near the apex; costa narrow, brownish, vanishing below the apex; the lower leaf cells subhyaline, rectangular, 2-4 times longer than wide, shorter near the margin, walls sinuous, median and upper cells unequal, roundish or short-ovate, 9-12 μ ; walls incrassate; antheridial buds below the archegonial, sessile, perichætal leaves short with rounded apex, ecostate or obsolete costate, paraphyses filiform; capsule exerted on short seta, 1-2 mm. long, pale yellow, ovate-pyriform, when dry, subglobose, abruptly constricted at the base, when moist, gradually narrowed into a long neck tapering into the seta, smooth or slightly striate when dry, 3 mm. long (with the neck) by 1.5 wide, stomata immersed, the striæ are subindistinct composed of yellowish and more incrassate cells; operculum depressed, long beaked, the calyptra conical-campanulate, somewhat plicate, with white hairs at the brown apex; the vaginule without hairs; peristome as far as observed is simple, with eight bigeminate, pale-yellow, granulose teeth, when dry erect or spreading, cancellate and cribose-perforate in the upper half. Spores large for the genus, 24-28 μ , brown and papillose.

From St. Paul Island (J. M. Macoun).

This moss was distributed as *O. anomalum* Hedw., but it bears no resemblance to that species. It is allied to *O. cribosum* C. Muel. from the Chukchi Peninsula, Siberia, chiefly by the shape of the capsule and from the structure of the peristomial teeth, but it differs from it by its larger size and the

leaf areolation, composed of less incrassate and less papillose cells. In *O. cribosum* the leaf-cells are strongly incrassate and coarsely papillose from the base.

OFFERINGS TO CHAPTER MEMBERS.

[To chapter members only—for postage.]

- Mr. Severin Rapp, Sanford, Florida, *Syrrhopodon Floridanus* Sulliv.
Miss Alice L. Crockett, Camden, Maine. *Plagiothecium elegans* Schimp.
Mr. J. F. Collins, 468 Hope St., Providence, R. I. *Ulota phyllantha*, Brid.,
U. Ludwigii Brid.
Mr. J. W. Huntington, Amesbury, Mass. *Pleuridium subulatum* B. & S.,
Hypnum Boscii Schwaegr.
Miss Mary F. Miller, 1109 M Street, N. W., Washington, D. C. *Barbula unguiculata* Hedw., *Ditrichum viginans* (Sulliv.) Hampe., *Brachythecium plumosum* B. & S.
Mrs. J. D. Lowe, Noroton, Conn. *Ulota crispula* Brid., *Fissidens taxifolius* Hedw., *Cylindrothecium seductrix* Sulliv.
Mrs. Carolyn W. Harris, 125 St. Mark's Ave., Brooklyn, N. Y. *Cladonia rangiferina* (L.) Hoffm., *C. rangiferina* (L.) Hoffm. var. *sylvatica* L. *C. rangiferina* (L.) Hoffm.) var. *alpestris* L.

NOTE TO CHAPTER MEMBERS. Please take notice. In order to secure greater uniformity in the writing of labels we will give in future the authority in full as well as name of plant. In matters of nomenclature we endeavor to follow the best usage—this often necessitates one or more cross references to be made on ones own label, at least till such time as the newer name is well fastened in the memory.

Another suggestion we make is that members indicate on their list sent to the Secretary, the geographical location of the various species so that an intelligent choice may be made by those requesting specimens. When the same moss is offered again and again it would often save sending for it from a locality already well represented in ones herbarium. A. M. S.

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
NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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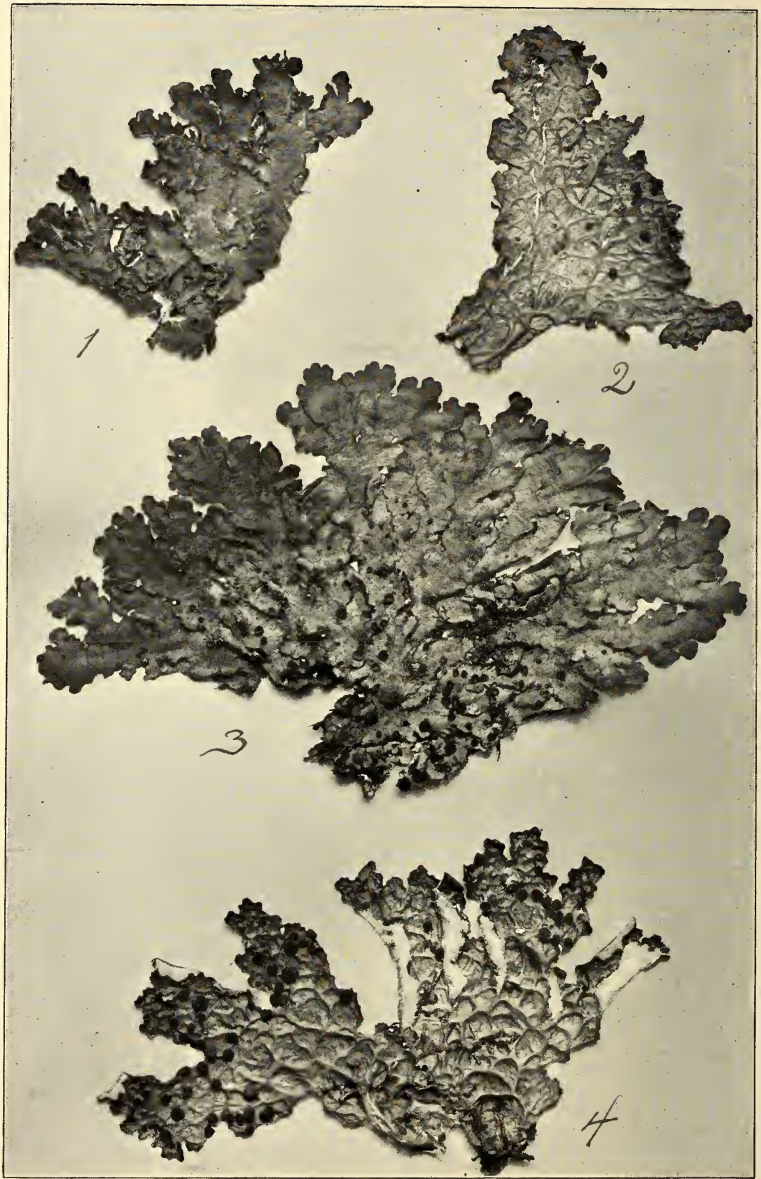


PLATE IX. Fig. 1. *Sticta quercizans*. Fig. 2. *S. Oregona*.
Fig. 3. *S. amplissima* Fig. 4. *S. anthraspis*.

LICHENS—STICTA.

BY CAROLYN W. HARRIS.

Sticta is largely a tropical genus, but we have in our own country a number of very interesting species; a few are found in the gulf states which are tropical. The name, meaning spotted, probably comes from the cyphellæ with which the underside of the thallus of most of the Stictas is covered, those in which cyphellæ are not present are beset with light-colored spots. As this is the only genus we have bearing cyphellæ it is readily distinguished by them from the other foliaceous lichens which it somewhat resembles. These cyphellæ are circular breaks in the lower cortical layer, and are analogous to the stomata or breathing pores of leaves.

The thallus of Sticta is usually wide lobed, elongated, medium in thickness and cartilaginous in texture; it lies flat upon the substratum and is usually loosely attached by rhizoids. The color is generally brown, light or dark, tinged with bluish green in some species. Sometimes the upper surface of the thallus presents a series of depressions, outlined by ridges. In the majority of species the upper surface is smooth or slightly wrinkled. The under part is always villous, the spongy nap varying in thickness, this with the cyphellæ or naked pale dots give the specimens a peculiar appearance. In several species the inner layer is a lemon or orange color which shows through the breaks in the cortical layer; these species are usually covered with soredia of the same color.

The apothecia are medium in size, varying in color from a bright to a dark chestnut, the disk is often convex, the margin thin and lighter in color. Stictas are found on shaded rocks, frequently growing with mosses, they also grow on the trunks of dead or living trees. Where conditions are favorable, some species attain a large size. A specimen of *Sticta amplissima* collected at Chilson Lake, Essex Co., N. Y., measured nearly a foot in diameter; it is now in the Museum of the New York Botanical Garden.

STICTA AMPLISSIMA (Scop.) Mass. Plate IX. Fig. 3. Thallus large, round, rather thin and brittle, when young it is smooth but grows somewhat wrinkled when fully developed. It is a light greenish gray when fresh, turning darker when pressed, often changing to brown. The lobes are elongated, somewhat appressed with wavy margins. The under surface is light brown, growing darker toward the centre; it is covered with a fine nap and scattered bunches of short rhizoids with which it is loosely attached to the substratum. The apothecia are very numerous, especially toward the centre, they are found in all stages of development on the same plant; when young they are sessile and cup-shape, becoming flat, the disk is a bright shiny chestnut with an entire margin.

S. amplissima is found on rocks in its best form, but grows on old wood and even trunks of living trees. It is one of the most common of the Stictas, and when growing on rocks, where it forms a large, round mat of light gray, thickly covered with the reddish apothecia, is a very handsome plant.

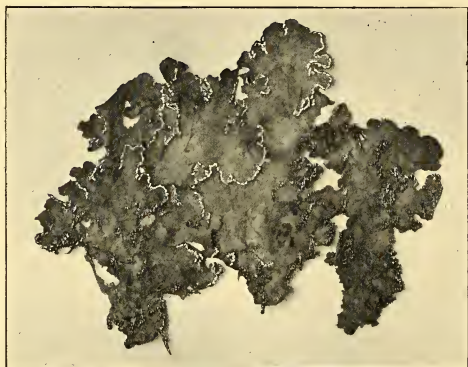


Fig. 5. *Sticta aurata*. Red. $\frac{1}{3}$.

confounded, *S. crocata*, but in this the soredia are a bright lemon, the thallus is more brown than red. The under surface of the thallus of *S. aurata* is light brown with a reddish bloom, becoming darker toward the centre, with small cyphellæ which appear as minute yellow spots. The apothecia are large, near the margin, and are dark red; they are only found on tropical specimens. This is a southern lichen, is found growing with mosses on rocks and trees.

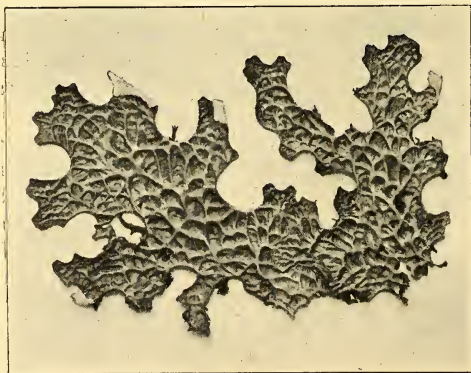


Fig. 6. *Sticta pulmonaria*. Red. $\frac{1}{3}$.

STICTA AURATA (Sm.) Ach. Fig. 5. The thallus of this interesting species has broad, deep lobes with crenate margins covered with golden colored soredia, is greenish brown soon turning a brownish red and finally a deep rose. The inner part of the thallus is a beautiful orange color, and as the deep, broad lobes turn over, with their bright yellow powdery margins, the effect is unusual. There is only one other species with which *S. aurata* can be

STICTA PULMONARIA (L.) Ach. Fig. 6. Thallus large, very thin and brittle, covered with depressions, the lobes are long, angular, narrow, and truncate at the ends, frequently the margins are thickly dotted with silvery soredia. The lower side is a light brown, villous, and loosely attached to the substratum. There are no cyphellæ, but light spots appear which seem to be caused by the depressions above.

The apothecia, which are not so common as soredia, are medium in size, usually near the margin, the

disk is reddish brown or chestnut, has an entire margin and is flat or slightly convex. *S. pulmonaria* is a common species in North America, it grows on living and dead trees, and on rocks.

STICTA OREGONA Tuck. Plate IX. Fig. 2. Thallus similar to *S. pulmonaria*, is not so brittle, but soft and crumbles easily. It has long lobes, rounded at the ends, with erose, finely dissected edges which give it a ragged appearance; in color is a light greenish brown. The under surface is also light brown and covered with a fine nap, through which appear light colored, bare looking spots as in *S. amplissima*. The apothecia are medium, scattered over the surface, but more numerous near the margin, the disk is a dark chestnut with a light colored margin. This species is found in Oregon, as its specific name indicates, also in California and British Columbia, growing on trees.

STICTA QUERCIZANS (Michx.) Ach. Plate IX. Fig. 1. Thallus thin, somewhat coriaceous, smooth, from greenish to reddish brown, darker at the margin. The lobes are deeply cut, pinnatifid, with rounded ends which are usually crisped, finely toothed, with tiny, coral-like points.

In many specimens at the margin the thallus breaks and shows a line of the white inner layer. The under surface is a paler brown with a thick, spongy nap, dotted with numerous round, white cyphellæ which look like minute holes in the thick nap.

Apothecia are very rare except in tropical specimens, they are small, marginal, with a red brown disk and thin toothed margin, lighter in color than the disk. Found on trees and rocks with moss, common in the southern states, especially in the mountains of North Carolina.

STICTA CROCATATA (L.) Ach. In appearance this species resembles *S. aurata*, but the thallus is russet brown, not reddish brown, the soredia are lemon colored, not golden, the lobes are longer and narrower, with crenate margins, the surface is pitted and wrinkled. The powdery lemon colored soredia are found on the thallus as well as the margin. On the under side it is a light brown, turning darker until almost black.

Apothecia are rare except in tropical specimens where they are small and not abundant, the disk is a dark chestnut, with a paler, entire margin. This handsome lichen is found on rocks, growing with moss, occasionally is found on trees.

STICTA ANTHRASPIS Ach. Plate IX. Fig. 4. Thallus thin and brittle, reticulated with deep depressions, the lobes are wide with irregular crenate edges, these are frequently covered with light gray soredia. In color it is a light olive brown, becoming darker until it is a russet brown. The under-side is covered with a light brown nap which is thicker and darker at the centre. The cyphellæ are very minute and white, not depressed but seeming to be on the surface of the thick nap. The apothecia are very numerous in specimens where soredia are not present; they are medium, the disk convex and reddish brown.

This species is found on rocks with mosses, and on trees, in California, Oregon, and farther north, as well as in the tropics.



Fig. 7. *Sticta scrobiculata*. Red, $\frac{1}{2}$.

STICTA SCROBICULATA (Scop.) Ach. Fig. 7. The thallus is large, almost round, is irregularly pitted, in color is a light green and at the margin is usually darker, with a reddish tinge. The rounded, wavy lobes are frequently covered with light gray soredia. The under surface is a light brown with a close nap through which appear pale spots, smaller and rounder than those in *S. amplissima* and *S. pulmonaria*. Apothecia are very rare, they

are small and scattered, the disk is a dark brown with an entire margin.

S. scrobiculata is found in the northern states, on rocks, occasionally on trees where it does not reach its highest development. While not a very common species it is not rare, and is one of the most interesting species of this handsome genus.

WEST INDIAN MOSSES IN FLORIDA.

ELIZABETH G. BRITTON.

On our way home from Cuba, we stopped off for a day at Miami, and drove to Peacock Inn, at Cocoanut Grove. After leaving the Tropical Laboratory of the Agricultural Experiment Station, the road passes through a "Hammock" or grove of hard wood trees, with a tangled growth of shrubs and vines giving shade and moisture and some wood loam. Elsewhere, the pine woods are dry and arid, and the coral rock so devoid of soil that it is a wonder anything will grow there; they have to dig holes with picks, instead of shovels, to plant their orange trees.

One of the commonest mosses found was *Octoblepharum albidum*, growing on the trunks of palmettos in the axils of the leaves, with *Vittaria lineata*. It is found in the same places in Cuba, associated with two species of Polypody. In the hammocks, however, mosses and hepatics found a congenial home and five species were collected which I had not before seen growing. One of these is not described in the Manual, so I give a description:

Microthamnium thelistegium (CM.) Mitt. J. L. Soc. 12:504. 1869.

Hypnum thelistegium, CM. Syn. Musc. 2:269. 1851.

Plants pale green or yellow; stems irregularly or pinnately branched, the branches short, 2-5 mm, long, spreading; leaves small, ovate-acuminate, concave, clasping and slightly decurrent at base, vein short, double or

none, margins finely serrulate, a few alar cells denser and quadrate, all other cells elongated with small papillæ at the angles. Monoicous; perichetial leaves short, scarcely covering the vaginule; seta short, 7-12 mm. long; capsules small, less than 1 mm. long; contracted below the mouth when dry, ovate when moist; lid hemispherical, mammillate, walls with thickened cells, peristome double; teeth and segments finely papillose, the teeth with lateral and dorsal projections, cilia slender, 1-3; segments not perforate; spores small, .010-.013 mm..

Rooting and creeping on old stems and roots in moist, shady hammock, St. Lucie River, Florida, J. D. Smith (Austin Musci App. Suppl. no. 545); Miami, Florida, E. G. Britton.

This species is listed by Renauld and Cardot in their Check-list, and was originally described by Müller from specimens collected in Brazil by Pabst, with which he included some Mexican specimens wrongly referred to *H. reptans* by Deppe and Schiede. According to Mitten this species is widely distributed in the West Indies and South America.

Taxithelium planum (Brid.) Mitt. J. L. Soc. 12:496. 1869.

Hypnum planum Brid. Musc. Recent. Suppl. 2:97. 1812.

This species is listed by Renauld and Cardot in their Check-list by the above name, but in the Manual it appears as *Hypnum*. It is described as having cells of the leaves "papillose," but no mention is made of the peculiar fact that the papillæ are very small, and numerous, occurring in rows down the centre of each cell. It was collected by John Donnell Smith. "In wet hammocks near Caloosa, Fla., 1878, associated with *Hypnum Wrightii*, *H. thelistegium*, *H. micans* and *H. serrulatum*," according to Austin's specimens. This association is also very interesting, as three of these species have since been referred to other tropical American genera, *Stereophyllum*, *Microthamium* and *Isopterygium*. Austin was at first inclined to call his specimens a new species, but finally concluded to refer them to *T. planum*.

One of the species which seemed to be most common at Miami, was *Neckera undulata* Hedw. This species has been referred to *Hypnum Jamaicensis* by Stuntz. Apparently the synonymy is as follows:

Neckera Jamaicensis (Gmel).

Hypnum Jamaicensis Gmel. L. Syst. Nat. 1341. 1791.

Neckera undulata Hedw. Musc. frond. 3. 51. t. 21. 1792.

Pilotrichum undulatum, Beauv. Prod. 37. 1805.

Eleutera Jamaicensis Stuntz, Bull. T. B. C. 27:210. 1900.

This is a small species with dark green foliage, the leaves very undulate; it has thus far been found sterile in Florida. It was collected by Charles Wright in Cuba and Santo Domingo, and occurs in various parts of Central and South America.

In his Revision of the genus *Neckera* (Bull. T. B. C. 27:202-211. 1900) Mr. Stuntz substituted the name *Eleutera* for this genus, as there is an older use of the genus *Neckera* by Scopoli, 1777. Both Scopoli and Hedwig, however, spelled it *Neckeria*. It would save confusion, if this change could be avoided, as it appears that the genus *Leskia* is also mixed up in the ques-

tion. It will be impossible now, to go into the details of this question of nomenclature, but it seems certain that *Eleutera* is untenable, and that *Leskia*, the first species of which is *Neckera complanata*, would have to be used if *Neckera* were rejected.

It will be evident in looking through *Neckera* as treated in the Manual, that *N. Floridana*, *N. Ludoviciana* and *N. cymbifolium* are not congeneric with the other species described. This may be seen at once by the subgeneric names prefixed to these species, *Pilotrichum* and *Orthostichella*. In Renauld and Cardot's Check-list, *N. Ludoviciana* is reduced to *Pilotrichella cymbifolia*. In this species alone we have the choice of three generic names. Two originated as subgenera of *Neckera* given by Carl Müller, and Paris fails to give any reference to their first use as generic names. *Pilotrichum* dates back to 1805, in Beauvois' Prodomus, two pages beyond *Eleutera*, and the first species named under it are *Neckera pennata* and *undulata*. This matter of nomenclature is also much involved, and cannot be taken up at length here.

Pilotrichella cymbifolia (Sull.) Ren. and Card. Musc. Am. Sept. 44. 1895.

Pilotrichum cymbifolium Sull. Mosses U. S. 681, 1856. Icon. Musc. 122. t. 76b. 1864.

This species has also been found sterile in Florida, and is conspicuous for its pinnately branched stems, and its leaves in regular ranks, they are also remarkably boat-shaped or keeled, as the specific name implies. It has been distributed by Austin as no. Musci App. Suppl. from Florida, collected by John Donnell Smith; and by Cardot from Louisiana, collected by Langlois, It has also been collected at Caloosa and Jupiter Inlet, Florida, and in Alabama by Sullivant.

Meteorium nigrescens (Sw.) Mitt. Journ. Linn. Soc. 12:441; 1869.

Hypnum nigrescens Sw, Prod. Fl. Ind. Occ. 141, 1788.

This species grows entangled with *Octoblepharum* and *Vittaria*, both at Miami and St. Augustine, and is conspicuous for the defoliation of the young branches, having the aspect of reproducing by flagellæ. As in all other species of this genus the fruit is very rare. Austin distributed it as var. *Donnellii* (no. 533 Musci App.) on account of the peculiar flagellæ, which have also been seen in specimens from Jamaica.

The Manual states that the species has been collected at "Lake Huron Todd, in fruit, and in Canada West, by Emery." I wrote to Prof. Macoun for further information and he suggested that Mitten might be able to throw some light on this very improbable statement. From the reply received, I am still inclined to believe that there must be some mistake in crediting this tropical genus to the Flora of Canada. Mitten says:

"I send you a fragment of the *Meteorium* from Lake Huron. The specimen is a single stem with many branches and one old capsule, with a small piece of paper on which is written in a plain handwriting quite unknown to me, 'Lake Huron, Dr. Todd.' It came to me with a small number of United States mosses, which from various notes on the waste paper in which they were wrapped I refer to the time of Torrey and Greene, both of whom sent

mosses to Bridel. What came to me seemed to be the refuse of some collection which Wilson had seen." "Emery was a young farmer who went from here to Canada. I had asked him to get for me any mosses he might see on trees. After some years he came back for a short stay, and gave me a small tuft of moss which he told me he had gathered in remembrance of my request. It was *Meteorium nigrescens*, and nothing beside it. As he was quite ignorant of mosses, and as far as I know had been nowhere else, I supposed it was as he said. I do not find this specimen now among my numerous specimens from Mexico, and the West Indian Islands. I have probably cast it out, but shall re-find it among some heaps of surplus specimens of these tiresome mosses."

In the case of the Todd label, it might easily have been misplaced in handling and belong with some other species, but the Emery specimens are only explainable on the ground that it was a wrong determination, which Mitten rejected on later consideration, and that some species of *Leucodon* or *Anomodon* may have been mistaken for *Meteorium*. It is unfortunate that the specimens are lost, as thus far this species has not been collected by anyone else except in Florida.

N. Y. Botanical Garden, N. Y. City.

HYPNUM CAPILLIFOLIUM **Baileyi** Ren. n. var.

"Well characterized specimen with its rather longly excurrent nerve. This variety differs from the type by its less robust habit, the short leaves *broadly ovate* at base, *rapidly* tapering to a rather short acumen; areolation rather *lax* with short cells, *parenchymatous* just above the base, *sub-hexagonal* or *rhombic* in the middle and near the apex."

"Teste F. Renault in litt. March 27th, 1903."

Communicated by Dr. John W. Bailey, Seattle, Washington.

This will be issued in the next fascicle of Dr. Grout's *Musci Pleurocarpi*.

ADDITIONAL MOSSES OF THE UPPER YUKON RIVER.

BY R. S. WILLIAMS.

In the summer of 1902, Prof. John Macoun made a collection of mosses, as well as other plants, in the vicinity of Skagway, Alaska and Dawson, Yukon Terr, this being much the same ground as that which I collected over some three years earlier. There are a good many sterile specimens in the lot, but out of some 125 species that have been determined, the following are not in my list, published in Bull. N. Y. Bot. Garden, Vol. II. no. 6:

Dicranella cerviculata Schimp. (246) Hunker Cr., July 6, in fine fruit.

Ditrichum tenuifolium (Schr.) Lindb. (17 and 77) Hunker Cr., July 26, and Bonanza Cr., Aug. 11.

Barbula Montana (Mitt.) Jaeg. (119). In compact sterile tufts on rock. West Dawson and Hunker Cr.

Grimmia anodon B. & S. (108) Hunker Cr., on dry rock, in fruit, July 25.

Splachnum sphaericum Linn. fil. (138) West Dawson.

Amblyodon dealbatus Beauv. (158) Dawson, July 12.

Pohlia albicans (Wahlenb.) Lindb. (193) Sterile. West Dawson.

Pohlia albicans glaciale (Schleich.) Limpr. Sterile tufts up to 10 cm. high.

Buxbaumia aphylla L. (245). Only two specimens collected. Growing on earth among other mosses and lichens on "The Dome," near Dawson, at 4,000 ft. elevation. This seems to be the most northern point it has yet been collected in America.

Brachythecium edentatum n. sp.

Low and loosely caespitose with lax, spreading leaves. Stems procumbent, with few, short and irregular branches. Stem leaves $1\frac{1}{2}$ mm. long by $\frac{3}{5}$ mm. wide, not decurrent, pale, ovate-lanceolate, shortly acuminate, concave, scarcely or not plicate, margin entire, flat; costa rather faint, extending a little above the middle, rarely shorter and forked, with sometimes small clusters of radicles on lower side at its base. Branch leaves smaller, entire. Leaf-cells above the base very narrow, the median .004 to .005 mm. wide and .04 to .05 mm. long. Alar cells abruptly enlarged, hyaline, often forming distinct, inflated, convex clusters. Perichæatial leaves but little longer than stem leaves, gradually acuminate, half costate, very entire. Dioicous. Pedicel smooth, up to $2\frac{1}{2}$ cm. high. Capsule when moist about two and one-half times longer than broad, curved, much contracted under the mouth when dry. Annulus narrow. Height of conical lid scarcely equalling its basal diameter. Segments of inner peristome solid, with two or three smooth cilia between.

This is one of the smaller species, in size perhaps nearest *reflexum*. It seems quite distinct from all others in the very entire leaves, with narrow cells above and inflated clusters in the angles. It differs from *B. Beringianum* Card. & Thér. in having the majority of leaf-cells little more than half as wide, in the different alar cells and in the low, creeping stems with lax, spreading leaves (374). Gold Run Cr., on wet earth, June 6.

Plagiothecium denticulatum laetum Aust. (292) Bonanza Cr., fruiting, July 29.

Amblystegium serpens (Hedw.) B. & S. (282) Bonanza Cr., July 18.

Amblystegium riparium flaccidum (L. & J.) R. & C.

Lax, sterile specimens in pool near mouth of Bonanza Cr.

Harpidium exannulatum (Guemb) Br. Eur. (346). Fruiting, in peat bog, July 29.

Harpidium Kneiffii laxum Schimp. (348). In brook, Hunker Cr.

Harpidium polycarpum Bland. (367). In pools, sterile, Klondike valley.
N. Y. Botanical Garden.

THE PERISTOME V.

BY A. J. GROUT.

In my third article on this topic I called attention to the fact that the peristomes of the Buxbaumiaceæ are somewhat intermediate between the Arthrodont and Nematodont types. In the Encalyptaceæ also there are some interesting transitional stages which, perhaps, will be better understood after we consider the method of formation of the Arthrodont peristome in detail. I have chosen *Mnium hornum* to illustrate this article because Schimper's illustrations of this species serves my purpose so well.

Fig. 1. Transverse section through the upper part of a nearly ripe mature capsule of *Mnium hornum*. This figure shows the upper portion of the archesporium with several spores; the columella occupies the upper portion inside the peristome; the annulus is shown at the junction of the operculum with the mouth of the capsule; x 120.

The basis of the Arthrodont peristome, both double (Diplolepideæ) and single (Aplolepideæ) is a layer of sixteen large cells lying just underneath the operculum and shown in cross section in Fig. 3. This layer we will call the peristomial layer for convenience. In *Mnium hornum* and nearly all the double peristomed mosses except the Funariaceæ

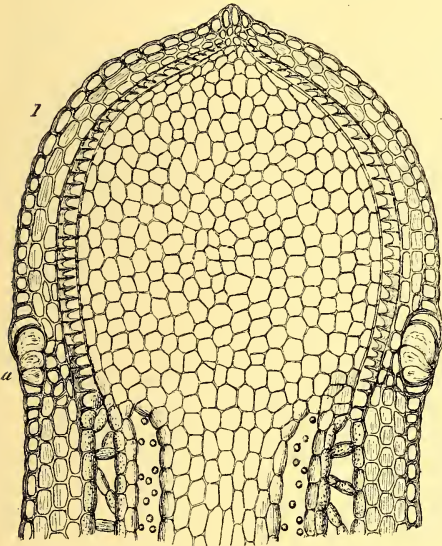


FIG. 1.

the teeth of the outer peristome are formed by the thickening of the outer walls of the cells, and the inner peristome by a much less pronounced thickening of the inner walls. The thickening laid down on the outer walls is continued along the horizontal walls which separate each tier of cells, forming the projection (trabeculæ) on the inner faces or the teeth, Fig. 5 and Fig. 2, b. These trabeculæ and the walls thus thickened form the transverse lines separating the joints or articulations in the teeth of *Mnium*, *Bryum*, *Hypnum*, etc. The layer of cells next outside the peristomial layer is composed of twice as many cells, and the median zig-zag line of the peristome teeth marks the intersection of vertical radial wall of these cells with the outer wall of the peristomial layer, the alternating walls coming at the boundary line between the teeth and consequently not leaving any traces. (Fig. 3). A reference to Plate I. of this volume of THE BRVOLOGIST, Figs. 15 and 17, will be very helpful in understanding this matter. A description of these fig-

ures is printed in the May number. In Fig. 15 the zig-zag line shows plainly, and in Fig. 17, the left hand side shows clearly the trabeculate inner face of the tooth. The plates of lignin forming these thickenings are deposited on both sides of the original wall as shown in Fig. 5, so that the teeth are formed of a double layer of plates, Two rows on the outside and a single row inside. The cells next inside the peristomial layer are much more numerous and somewhat irregular. They follow the curvature of the peristomial cell walls forming a keel alternating with each cell as shown in Fig. 3.

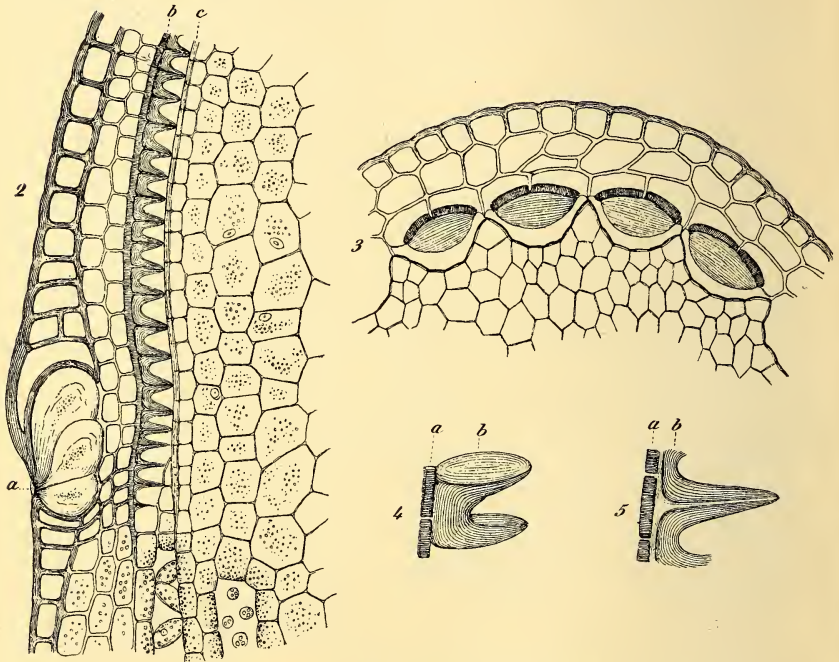


Fig. 2. A longitudinal section of a capsule of *Mnium hornum* x 500; *a*, annulus; *b*, outer peristome; *c*, inner peristome. This section shows clearly the method of formation of the double peristome. The teeth of the outer peristome are formed by thickenings or "plates" laid down on the inner and outer faces of the outer wall of a layer of cells extending around the capsule; these thickenings are continued along the top and bottom walls of these cells to form the transverse bars or trabeculae. The inner wall of this same layer of cells becomes thickened to form the inner peristome

Fig. 3. Shows one-fourth of a cross-section through the same capsule and gives a good idea of the way the thickenings on the top and bottom walls project into the cells, and of the keel-shape of the segments or sections of the inner peristome.

Fig. 4. Shows a single joint of a tooth; *a* is the deposit laid down on the dorsal wall of the cell, and *b* shows the deposit made on the inside.

Fig. 5. Shows the deposit laid down on both sides of one of the bottom (or top) walls of these cells at *b*, and of the external deposit at *a*.

The inner wall of the peristomial layer becomes thickened on either side of the keel line forming the segments of the inner peristome, while the intermediate cell walls of the other cells just inside the peristomial layer forms the cilia.

The number of these cells adjoining each cell of the peristomial layer is somewhat variable, consequently, as is well known, the number of cilia between the segments often varies in the capsule (See also Fig. 15, Plate 1). Sometimes not only the vertical cell wall becomes thickened but the transverse junction also, when the cilia become appendiculate. The separation of teeth and segments, as well as the separation of tooth from tooth and segment from cilium, is brought about by the absorption or breaking down of the connecting portions of the cell walls. In some degenerate peristomes as in the case of *Pylaisia intricata*, *P. velutina* and **Burnettia* (*Homalothecium*) **subcapillatum** the walls connecting inner and outer peristomes remain, so that the two never become separate.

*Named in honor of the late D. A. Burnett.

THE MOSSES OF ALASKA.

BY J. CARDOT and I. THERIOT

From "Papers from the Harriman Alaska Expedition."

(CONTINUED.)

ENTHOTHODON SPATHULIFOLIUS Card. and Thér.

Polygamous, rather densely caespitose, green above, brown within. Stem erect, 10-15 mm. high, radiculose, branching with slender clavate branches, starting beneath the parichætium. Leaves soft erect-appressed when dry, sometimes subcrispate, spreading when moist, the lower minute, ovate, the upper larger, 1.5-2 mm. long, 1 broad, oblong-spathulate, entire, obtuse or subapiculate, margins plane, sometimes subrevolute towards the base; costa thin, attenuate, vanishing not far from the apex; areolation lax, basal cells subrectangular, 60-80 by 30 μ , median and upper shorter, rectangular, quadrate or subhexagonal, 25-30 μ long, 20 broad, the marginal cells often longer and narrower. Flowers polygamous, terminal, sometimes unisexual, sometimes synoicous: antheridial buds growing at the tip of the branches. Capsule on a pale yellow flexuous seta 6-9 mm. long, obliquely erect, pyriform with a distinct attenuate neck; operculum convex mammillate. Calyptra short-cucullate, not at all or scarcely inflated. Other characters unknown.

From St. Paul Island (Trelease, 2067, 2074).

A remarkable species, very distinct from all the *Enthostodon* of Europe and North America by its polygamous inflorescence, its leaves shortly spatu-

late, obtuse or subapiculate and its calyptra hardly swelling. It is much to be regretted that the too immature capsules do not show the peristome, annulus and spores.

WEBERA PSEUDOGRAECILIS Card. and Thér.

Dioicous, laxly caespitose, yellowish-green. Stem short, 4-5 mm. high, simple or sparingly branched. Leaves uniformly crowded, small, imbricate when dry, erect-spreading when moist, 1-1.5 mm. long, 0.4-0.6 broad, neither carinate nor decurrent, the lower ones shorter, ovate or ovate-lanceolate, the upper linear-lanceolate, acute, denticulate at apex, the margin slightly reflexed about two-thirds the way from the base; costa rather strong, 56μ thick at the base, percurrent or subpercurrent, reddish; areolation dense, lower cells rectangular, reddish, the median cells linear $48-64\mu$ long, 8 broad, the upper narrowly linear with sinuous strongly incrassate walls, the marginal cells narrower and longer. Perichæcial leaves smaller than the stem leaves. Capsule pendulous, pale, obovate, 3mm. long on a flexuous seta about 2 cm. long with convex mammillate operculum. Antheridial buds terminal, subdiscoid. Other characters unknown.

From Muir Glacier (Trelease, 2419, 2425, 2427, 2428, 2463).

Aspect of *Webera gracilis* De Not., but the areolation is different and much closer; it is distinguished, on the other hand, from *Webera Drummondii* Lesq. and James, by its leaves which are more crowded on the whole stem, and not carinate-concave, and its capsule hanging and with a mammillary lid.

BRYUM ATELEOSTOMUM Philibert

Polygamous, green, densely caespitose and densely radiculose. Stem branching 1-1.5 cm. high. Leaves erect imbricate, crowded into a comal tuft on stem and branches, 1.2-1.4 mm. long, 0.5 broad, ovate-lanceolate cuspidate by the excurrent costa, all decurrent at base; leaf border entire, sometimes plane, sometimes revolute for a little way; costa thin, $50-55\mu$ thick at base; areolation rather dense, lower cells quadrate or rectangular, $25-50\mu$ long, 20-25 broad, some oblong or ovate-hexagonal $28-45\mu$ long, 12-13 broad; capsule nodding or pendulous, ovate, 2 mm. long, with a short neck, on a rather short, red seta about 1.5 cm. long; operculum convex mammillate. Teeth of the exostome pale yellow, of uniform color, the articulations 20, regular, the endostome barely developed, often composed of a uniform thin fugacious membrane. Spores 18-20 μ .

From Kudak Bay (Coville and Kearney, 1516).

BRYUM CYLINDRICO-ARCUATUM Philibert

Monoicous (fide Philibert), green, rather densely caespitose, densely radiculose. Stem erect 1-2 cm. high, with slender branches above. Leaves at base of stem and branches minute, remote, the upper larger, crowded into a head about 2 mm. long, 1-2 broad, erect, subflexuous when dry, spreading or slightly so when moist, ovate or oblong-lanceolate, from a slightly decurrent base, broadly and shortly acuminate, mucronate, margins entire, not at all bordered, scarcely revolute; costa 80μ thick at base, attenuate above, shortly excurrent, areolation rather dense, lower cells more laxly rectangular, $55-85\mu$

long, 22 broad, median cells oblong-hexagonal 28–56 μ long, 14 broad, the upper cells smaller and shorter. Antheridial buds terminal 25–30 antheridia. Capsule nodding or pendant, narrowly cylindrical-arcuate, with a long neck on a flexuous red seta 2 cm. long curved at apex; operculum obtusely conical. Teeth of peristome very long, with a red base. Endostome well developed, cilia appendiculate. Spores smooth, 12 μ .

From Kodiak (Trelease, 2186).

BRYUM LAURENTIANUM Card. and Thér.

Plants tall, densely caespitose, yellowish green. Stems 3–4 cm. high radiculose, sparingly foliate with numerous erect subclavate branches. Leaves erect imbricate both dry and moist, ovate or oblong-lanceolate 1.5 mm. long, 0.75 broad, sharply acuminate, margins plane and entire below, distinctly denticulate above, costa stout, becoming brownish, 80–100 μ thick, gradually attenuate and vanishing below the apex, basal cells rectangular, median and upper rectangular or oblong-subhexagonal 40–75 μ long, 14–17 broad, four or five rows of marginal cells longer and narrower, linear, with walls a little thicker forming a scarcely distinct border. Other characters unknown.

From St. Lawrence Island (Trelease, 1871).

This species, which seems to belong to the group of *B. alpinum* Huds. is chiefly characterized by its more acuminate and distinctly denticulate leaves, and by its nerve disappearing below the apex.

BRYUM LEPTODICTYON Philibert

Dioicous, gregarious, pale or yellowish-green. Stem erect, simple 4–6 mm. high. Leaves imbricated when dry, erect when moist, the lower smaller becoming larger above, narrowly lanceolate, sublinear, gradually long-acuminate, 1–1.8 mm. long, 35 broad, not decurrent at base, margin plane, entire below, minutely denticulate above; costa narrow, 55 μ broad at base, percurrent, areolation same as in *Webera*, with uniform linear cells, median 45–60 μ long, 5–6 broad. Capsule abruptly pendulous, oblong, small, 2 mm. long, 0.8–0.9 broad, pale tapering into a short neck on a flexuous reddish seta 1.5–2 cm. long. Operculum conical, apiculate. Peristome perfect, teeth red at base, cilia appendiculate. Spores smooth, 9–12 μ .

From Hidden Glacier in Russell Fiord (Coville and Kearney, 964).

Species very distinct, having quite the facies and areolation of a *Webera* with the peristome of *Bryum*.

BRYUM HETEROGYNUM Philibert

Dioicous. In low tufts, deep dark red, purple when old, covered with earth at base. Stem erect, radiculose, branching, 5–12 mm. high, leaves erect when dry, erect-spreading when moist, ovate-lanceolate, 1.5 mm. long, 0.5–0.6 broad, long-acuminate, cuspidate by the excurrent costa, slightly and acutely denticulate at apex, the margin often bordered, border narrow below plane, broader and distinct above, sometimes subreflexed, rarely wanting; costa narrow, 50–55 μ at base, gradually attenuate, lower cells rectangular 50–65 μ long, 17–22 broad, median cells oblong-hexagonal, 45–55 μ long, 13 broad, the marginal narrower, linear. Capsule nodding or pendulous, ovate-pyriform,

3-4 mm. long. furnished with a tapering neck, on a red seta 2.5-3 mm. long. Operculum convex, teeth of exostome, pale ferruginous, endostome perfect, cilia appendiculatè. Male plants short, gemmiforme, forming distinct tufts with shortly ovate-cuspidate leaves.

From Muir Glacier (Trelease, 2426, 2434, 2441, 2461, 2462). Hidden Glacier Inlet in Yakutat Bay (Trelease, 2518).

BRYUM PSEUDOSTIRTONI Philibert

Often synoicous, densely caespitose, dirty or yellowish green, Stems elongated, filiform, slightly branched, 2.5-4 cm. high. Leaves soft, rather lax, erect-imbricate when dry, erect-spreading when moist, the stem leaves ovate-lanceolate, acuminate and cuspidate by the long excurrent costa, 2 mm. long, .7 broad, margins entire, plane or subreflexed. Costa narrow, 60-70 μ broad at base, areolation lax, lower cells rectangular, median and upper ovate-hexagonal, 28-50 μ long, 14-17 broad, marginal cells narrower, branch leaves smaller, the lower ovate, subobtuse or shortly cuspidate. Capsule nodding or pendulous, oblong, small 2 mm. long, tapering into a short neck, subconstricted or not constricted when dry, on a slender seta 1.5 cm. long. Operculum conical-mammillate, teeth of exostome pale red at base, endostome perfect, with cilia sometimes long-appendiculate and sometimes simple. Spores 12-18 μ .

From Muir Glacier (Trelease, 2448, 2459).

BRYUM HARRIMANI Card. and Thér.

Quite robust, rather densely caespitose, yellowish-green, Stems erect, 3-4 cm. high, fragile, radiculose, loosely foliate, branching, with erect obtuse branches. Leaves soft, erect-spreading when dry and somewhat spreading when moist, 1.2-1.6 mm. long, .8-.9 broad, slightly decurrent at base, plane or subreflexed margins, dimorphous, the lower ovate-lanceolate, acute, the upper and branch leaves broadly-ovate, strongly concave with an obtuse cucullate apex. Costa thin, 40-50 μ broad at base, percurrent or shortly excurrent in the acute lower leaves, vanishing below the apex in the obtuse upper leaves, areolation very lax, scarcely chlorophyllose, lower cells quadrate or short-rectangular, 40-50 μ long, 25-35 broad, the others ovate-hexagonal, marginal linear in one or two rows. Other characters unknown.

From Yakutat Bay (Trelease, 1793); Hidden Glacier Inlet (Trelease, 1784 in part, 1815).

This moss can be placed near *B. obtusifolium* Lindb. from which it is easily distinguished by its dimorphous leaves, plane on the borders and of a looser texture.

BRYUM DUVALII OBTUSATUM Card. and Thér.

Differs from the typical form in the obtuse leaves with cucullate-denticulate apex, a little less decurrent at base.

From Disenchantment Bay (Trelease, 2517).

BRYUM DREPANOCARPUM Philibert

As far as observed dioicous, laxly caespitose, fuscous-green or purplish-red. Stems erect, 1-2 cm. high, radiculose below, branching above with numerous slender, erect branches. Leaves erect when dry, flexuous when

moist, erect-spreading, about 2 mm. long, .9 broad, not at all or slightly decurrent at base, oblong-lanceolate, acuminate, acute or cuspidate by the short excurrent costa, margins entire, reflexed, narrowly bordered. Costa thin, attenuate, percurrent in the lower leaves, short-excurrent in upper; areolation slightly chlorophyllose, median cells subrectangular or oblong hexagonal, 47-70 μ long, 16-22 broad. Capsule nodding or inclined, fuscous when old, oblong, tapering into a long neck, curved, dilated at mouth, on a red seta, 1.5-2 cm. long when mature. Operculum conical. Peristome perfect, teeth of exostome red at base, membrane of endostome broad, cilia appendiculate.

From Juneau (Canby, 485; Coville and Kearney, 579); Disenchantment Bay (Trelease, 2515).

This species, which offers many points of resemblance to *B. meeseoides* Kindb., differs from it by the peristomial teeth which are firmer, stiffer, more scabrous and reddish at the base, the segments more acuminate and perforate from more irregular openings, and the higher membrane.

MNIUM PUNCTATUM ANCEPS Card. and Thér.

Differs from the typical form in the leaves which are often cuculate and the much smaller upper cells which are almost isodiametric as in *Mnium glabrescens* but distinguished by not having an incrassate border.

From Unalaska (Trelease, 1727).

BARTRAMIOPSIS LESCURIИ Card. and Thér. not Kindb. .

Diocious, loosely caespitose, dark-green. Stem very slender, filiform, flexuous, simple or forked, loosely foliate. Leafless below for a considerable distance, 2-8 cm. high. Leaves when dry very crispate, when moist arcuate-spreading, 4 mm. long, subsheathing at base, linear-lanceolate acuminate, the basal margins entire below, having 3-5 long cilia above on each side, the margins of the blade plane, strongly serrate, scarcely bordered; costa broad, smooth on back, lamellate on front, 5-8 lamellæ, dentate on margins, in cross sections consisting of six to eight rows of cells, cells of the base rectangular, hyaline, four to six times times longer than broad, areolation of blade opaque, cells minute-hexagonal (8 μ in diam.) bistratose except at margin which is unistratose forming a translucent border. Capsule at first short ovate-cylindrical, when old turbinate, gymnostomous, strongly dilated at mouth, closed by the epiphragm which adheres to the columella. Seta red, short, 8-12 mm. long, operculum high-conical, long-acuminate almost equaling the capsule, calyptra without hairs, smooth, short-acuminate, covering the operculum. Spores ovate or subangular 12-16 μ .

From Virgin Bay (Trelease, 1733); Orca (Trelease, 1731); Douglas Island (Trelease, 1729, 1730).

The moss which was described by Mr. Kindberg, under the name of *B. Lescurii*, from sterile specimens collected in Japan, does not seem to be the true *Atrichum Lescurii* James, because its leaves are only incurvate and not crispate when dry. On the contrary, it is probable that *B. Sitkana* of Kindberg, equally described from sterile specimens, differs in nothing from the species of James. The latter was, after all, imperfectly known until now,

the author having seen neither the calyptra nor the lid, and having been unable to ascertain the existence or absence of a peristome. Therefore, we here give a complete description with drawings of this interesting moss, which by the absence of the peristome and chiefly by the structure of its leaves, which, except on the borders, consist of two layers of cells, seems to us to constitute a genus distinct from *Atrichum*.

Note 2, p. 347. In a recent paper in "The Journal of Botany," Vol. 39, pp. 339-341, Mr. E. S. Salmon points out that *Bartramiopsis Lescurii* has the same leaf structure as *Lyellia crispa*, and he suggests placing it in this genus. But *Bartramiopsis* differs from *Lyellia* by its small, erect, symmetrical not angular and macrostomate capsule, and it seems preferable to keep it as a distinct genus.

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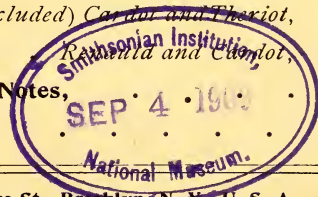
HEPATICS AND LICHENS

EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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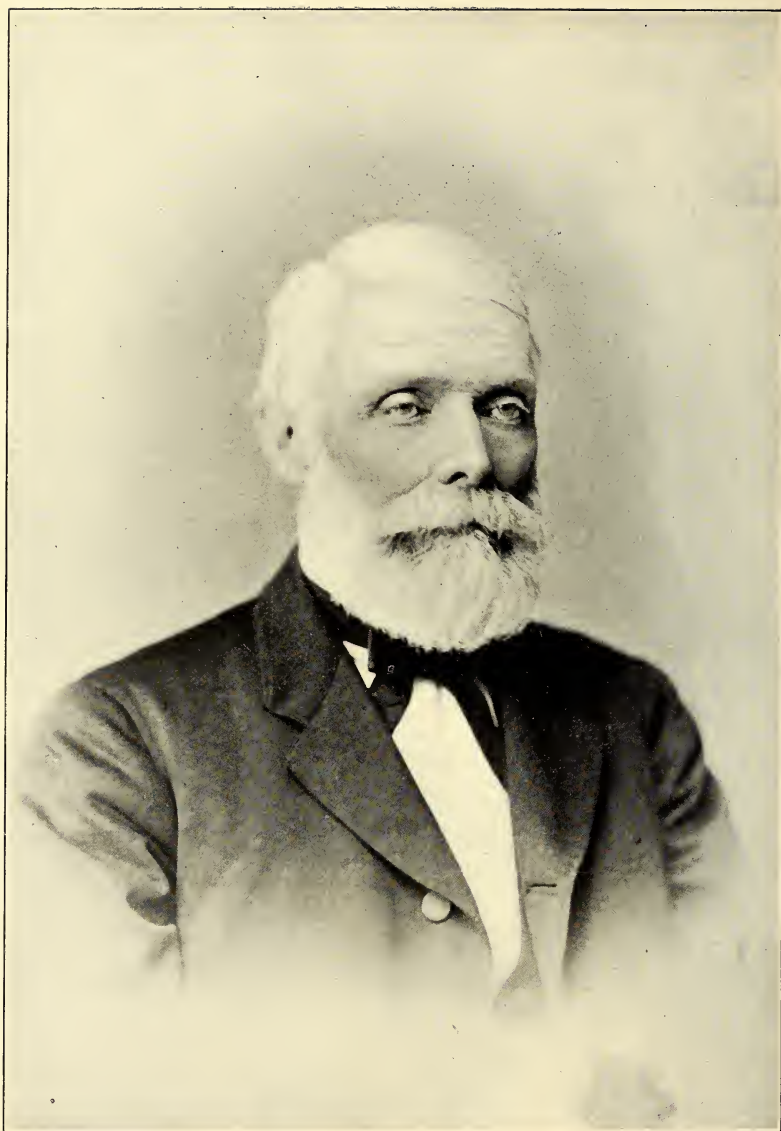
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No. 5.

THOMAS POTTS JAMES.

BY MARY ISABELLA JAMES GOZZALDI.

A hundred years have passed since the birth of my father, and it seems that the time has come to redeem a promise made years ago to write a sketch of his life for the readers of *THE BRYOLOGIST*, who are so familiar with his name and work. So far as I know he never kept any journal, and I have had to depend on letters for the facts and dates given. In the Cryptogamic Museum at Harvard are five large albums of letters written to him, together with his rough copies of his answers, that may serve some day for his biography. As I have not followed in the steps of my father my record must necessarily be of the man and not the scientist.

My father, Thomas Potts James, was born September 1, 1803, in the old James mansion house at Radnor, Pennsylvania, standing back from the Lancaster Turnpike, a little way from Byrn Mawr College.

His parents were Isaac James, M.D., and his wife, Henrietta, daughter of Col Thomas Potts, of Coventry, Pa. In the old house at Coventry she had married Isaac James, in the first year of the new century, and on Jan. 16, 1802, John Fletcher James, their eldest child, had been born in this house, and less than twenty months later the second son, Thomas Potts James.

The ancestor of the family, David James, came to Pennsylvania from New Radnor, Wales, purchasing in 1682 a large tract of land from William Penn. Of my father's boyhood at Radnor I know nothing except that he was a chubby blond, with delicate skin, fine thick fair hair and blue eyes. When he was nine years old his father removed to near Trenton, where he could have better schools for his children than in the country west of Philadelphia. Thomas and his elder brother, John, began to fit for Princeton College, but their father, Dr. James, unfortunately lost so much money at this time that a college education had to be given up, and they early began to earn their own living. John and Thomas both studied Pharmacy

It was probably while studying botany as used in the *materia medica* that my father found his vocation. A congenial companion at this time was a Mr. Laning, who devoted much time to long excursions after new plants. My father was soon familiar with the principal flora of the neighborhood of Philadelphia, and thinking that it had been determined and named he turned his attention to the Cryptogams where there was a chance of original research.

In 1831 the brothers, John and Thomas, started in the drug business in Philadelphia and continued for nearly forty years, but only as a means of providing daily bread. In 1866 my father was able to dispose of his drug store and free himself forever from business and could thus devote all his

time to Mosses. He studied medicine but never graduated; he was Professor and Examiner in the Philadelphia College of Pharmacy many years; Secretary of the Pennsylvania Horticultural Society, and after the death of Dr. Darlington took his place as Professor of Botany. He was also Treasurer of the American Pomological Society till his death and was indefatigable in its interests, editing and indexing its biennial reports, etc. It was in connection with Dr. Darlington's editing of the Bartram correspondence that my father made the acquaintance of his future wife, Miss Isabelle Batchelder. She was a friend of Dr. Asa Gray's and much interested in Botany, and gave valuable suggestions regarding the illustrations to the Bartram Letters. They were married in old Christ-Church, Cambridge, Mass., in December, 1851. They lived a few months in Philadelphia, then settled at Burlington, New Jersey, where I was born: the following winter they returned to Philadelphia, and here my two brothers and sister were born. Now came the time when my father began to give the fruit of his labor to the public. In 1853 he prepared the list of Anophytes, *i. e.*, Mosses and Liverworts for Dr. Darlington's third edition of *Flora Cestrica*. A little later the *Flora of Delaware County* to Dr. George Smith's *History of that county*.

Under date Nov. 12, 1855, Dr. Asa Gray writes: "The first sheets of the revised edition of the Manual is now in the printer's hands—and I am going on with it pretty fast. After a while Sullivant is to revise the mosses and hepaticæ, adding all the species he knows in Atlantic States, *i. e.*, east of the Mississippi. If you do not like to furnish him a list of the species you have detected, I think it would be well (and the only way to secure the priority of your discoveries) for you to publish beforehand a list of the mosses you know, or of those you have detected which are not in the Manual. Only you should do it soon. These people that wait for *perfection* before they give their knowledge to the world, I notice generally die before they reach the *acme*. And I should think it hard if you know of mosses in New England which we do not and you let a new edition of my Manual come out, and be stereotyped while you confine that knowledge to your own bosom. As to those thought to be new, why not decide and bring them out or keep those for further investigation."

A hall room on the third floor, in the Thirteenth and Locust street house, was given up to mosses. The walls were entirely lined with high wooden cases, grained to imitate oak, whose fronts let down and showed innumerable pasteboard boxes filled with mosses from all lands. Above them hung engravings of botanists. A delightful mossy smell pervaded the room, and in the window stood a little table on which were the microscope and many watch crystals with moss floating in water. To this den I used to come with specimens or letters as they arrived, feeling sure of a hearty welcome, especially if I brought a letter postmarked "Columbus, O.," addressed in the fine script of Mr. Leo Lesquereux, LeCru as we always called him. My father began sending him mosses soon after he came to this country in 1848, and a constant correspondence was kept up between them until my

father's death, though the first letter I can find from Mr. Lesquereux is dated March 1, 1857, and begins:

"I thought of proposing you to go together to the White Mts. next summer, but being engaged in the Geological Survey of Kentucky I shall scarcely find time for a journey to the mountains. I would be delighted to have your company but perhaps you would decline to go with me. I am entirely deaf. The only way I could have given you some compensation for the trouble of travelling with me is by my intimate acquaintance with the alpine mountains and their botanical riches. Many and many a time I have travelled over the Alps, the Jura, the Vosges, in France and Switzerland with Schimper, Mougeot, and other excellent friends and bryologists. If you were not afraid of my company I would try and meet you somewhere, perhaps in August this year.

I have pretty well explored the northern part of Pennsylvania during two years that I was engaged in the geological Survey of the coal basin. There are some very good places around Mauch-Chunk, and also on the high waters of the Juniata River."

From this it will be seen that they had not met; my father eagerly accepted the offer of his company, and after describing the proposed excursion added, "I do hope this arrangement will comport with your convenience, and that you, Mr. Sullivant, and perhaps Prof. Porter, of Lancaster, will make the party. Prof. Porter in a letter recently informed me that you were to make him a visit, so bring him along, and if we can get some of the Yankees to fall in we will have a very pleasant and instructive tour." I do not know if Mr. Lesquereux went; he wrote that Mr. Sullivant, though a close student at the cabinet, did not go out collecting. Either at this time or soon after the authors of the Manual of Mosses did meet and became close friends. I think they never had a discussion or difference.

In 1871 he published another catalogue of mosses in Volume V, of the Clarence King Surveys. And in the spring of 1873 he lost his dear old friend, Dr. Torrey, and his correspondent, Sullivant. It was then that Dr. Gray came to my father and told him that there was no one but him to bring out the Synopsis of North American Mosses with Mr. Lesquereux. At first my father refused, saying he could not do it, but Dr. Gray would not take no for an answer, and at last my father consented. Once having made up his mind that it was his duty to do this work he went at it with the energy of youth. His colleague not being able to use the microscope it fell to him to make the examinations and comparisons and to draw almost constantly, looking through the microscope and then at his drawing. In 1878 he published another catalogue of Western Mosses, in Vol. VI of the Wheeler Surveys. By this time the steady application was beginning to tell on his health, and the physician recommended rest. He also felt the need of consulting Schimper, the best European Bryologist, who, in 1862, had become Professor of Geology and Minerology at the University of Strassburg: So in April, 1878, my mother and I sailed with him for England. We were gone five months, and the whole journey was a delight to him. In London

he renewed his acquaintance with Sir Joseph Hooker, who entertained him at Kew Garden. Sir William Hooker, his old correspondent, was long since dead. Schimper was very delightful spending afternoons with my father determining the doubtful specimens he had brought with him. At first Prof. Schimper thought that he had forgotten his English and they would have to discuss the mosses in Latin, but as he heard us talk, his English came back to him and they got on famously. My father did not speak either French or German. A disappointment awaited him at Geneva where his correspondent, De Condolle, was away from home, but he enjoyed seeing some of the German botanists and attending the Botanical Meetings at the Paris Exhibition.

In 1879 he and Mr. Lesquereux brought out a "Description of some new species of North American Mosses" which was published in the Proceedings of the American Academy of Arts and Sciences for February. The same month my Grandfather Batchelder died. This broke up the household in the old Vassall house in Cambridge, where we had lived for ten years, and after a time my father bought land from the heirs and began to build a house just west of the old home. On February 22, 1882, which was Ash Wednesday as well as Washington's birthday, he went over the house, in whose building he had taken such interest, then went to church at St. John's Chapel opposite, saying when he returned home, "All is ready, we will move in to-morrow." But it was not to be. That night he was called to the "house not made with hands eternal in the heavens."

His work, that for which he was born, was done, the Manual was nearing completion, but there was still more to be done than Mr. Lesquereux was able to do, and Mr. Sereno Watson, with that self-sacrifice of which scientific men seem always capable, laid aside his own work and completed that which had fallen from my father's hands, as a labor of love.

Generous and unselfish to all, he was self-denying and ascetic to himself. He never smoked or drank. His dress was of the simplest and he had no hobbies. I never knew him to spend anything on himself, except the purchase of his microscopes and the books needful for his work. I wish I could give an idea of his quick, boyish manner, his sense of humor, his cheerfulness and his delight in this beautiful world. What jolly times he used to have with his fellow botanists. They were always the most delightful of visitors. The world seems poorer now they are all gone.

My father sleeps under a tree at the west end of Mt. Auburn, in a spot chosen by himself. It is marked by a Cornish cross with his name and date and the words: "Wearing the white flower of a blameless life, through the long tract of years." Cambridge, Mass.

FABROLESKEA AUSTINI IN EUROPE. ✓

BY JOHN H. HOLZINGER.

Among Bescherelle's European Mosses acquired by the University of Minnesota is found a *Leskea grandiretis* Lindb., collected by Dr. V. T. Brotherus on the European side of the Caucasus. The exact reading of the

data is: "Caucasus: Balta ad flumen Terck ad truncos arborum, 1881, 19/5." The Terck River flows through the Russian province of Kabarda into the Caspian Sea. According to Paris' Index the plant is described in Brotherus' Enumeratio Muscorum Caucasi, p. 97. The omission of the date of publication of this Enumeratio by Paris is vexatious. It is, however, safe to infer that it could not well have been published prior to 1881, the year in which the moss was collected. Also since Dr. Brotherus and Dr. S. O. Lindberg were fellow townsmen and worked together, no doubt, it is natural to assume that the plant in the Bescherelle collection is a part of the type material of Dr. Lindberg's *Leskea*, seen by the author himself, or certainly that it was determined by Dr. Brotherus and was carefully compared by him with Dr. Lindberg's type, and that an error in determination is hardly possible at the hands of so eminent and thorough a bryologist as Dr. Brotherus.

Now, this *Leskea grandiretis* Lindb. looks under the hand-lens strikingly like *Leskea Austini* Sulliv., which Dr. George N. Best has recently made the type of a new genus, *Fabroleskea Austini*. A closer microscopic examination of the leaves of the Russian plant and a comparison with the American plant leaves no doubt as to the identity of Lindberg's and Sullivant's species. Sullivant published *Leskea Austini* in the Supplement to his Icones, p. 81, which bears the date of 1874. Sullivant's name therefore is at least seven years prior to Dr. Lindberg's, and stands, and *Leskea grandiretis* Lindb., from the European Caucasus becomes a synonym for *Fabroleskea Austini* (Sulliv.) Best.

It is noteworthy in closing this note, that here we have another case of curious distribution; a plant generally distributed in the northeastern United States turns up in an isolated station in the Russian Caucasus in the remote southeastern corner of Europe, along the banks of a river that flows into an inland sea which is in recent geologic times entirely separated from the oceans, and whose surface lies 84 feet below sea level! Winona, Minn.

MOUNTING MOSS SPECIMENS.

EDWARD B. CHAMBERLAIN.

Recently, while looking over the earlier numbers of THE BRYOLOGIST, I found several notes upon methods of mounting moss specimens. The most satisfactory method, of course, is one that holds the specimen firmly to the mounting sheet, and at the same time readily permits the transference of the specimen to other sheets without the disfigurement of either the sheet or the specimens. As none of the ways mentioned in THE BRYOLOGIST seemed to realize this end completely, the description of a method which I have used, may be of interest.

First, I keep all my mosses in packets, or envelopes, made by folding an oblong piece of stout paper upon itself just below the middle, turning the top flap down, and creasing the ends backwards and underneath. This form of envelope prevents accidental opening and the loss of the specimen. Personally, also, I use standard size mounting sheets, attaching several packets of the same species to each sheet.

These envelopes are attached to the sheet by pins, the size known to the trade as Lill pins being used. In most cases two pins suffice to hold the envelope in place. The pins should be placed about one-third the width of the envelope from the top, and far enough from the ends to permit of easy opening. Usually twice the width of the flap folded under, will be sufficient for this last. The pins, of course, pass through the back of the envelope and the mounting sheet in such a manner that both head and point of the pin remains inside the envelope.

By this method no rough surfaces are left to catch in other specimens, the specimen is held securely in place, yet it is but a moment's work to transfer it to another sheet whenever occasion arises. This ease of transference is especially convenient if one wishes to arrange the specimens of each species with regard to geographical distribution, and so be able to accommodate new packets in their proper places. The same is true in the case of erroneous determinations. The small holes left by the pins can easily be closed by the pressure of the thumb, and the portions of the pin inside the envelope do not injure the specimens.

I have given this method a careful trial in my own collection, and have also used it in mounting the larger portion of the mosses in the Brown University Herbarium. I find that it works well in practice, and that, with ordinary care in handling the mounted sheets, answers all demands. A very little practice in this manner of mounting, enables one to work rapidly and the sheets can be filed away in the herbarium at once, without any bothersome wait for drying of glue. Washington, D. C.

BUXBAUMIA APHYLLA L.

In March, 1903, while collecting in open woods along the banks of the Potomac river, about two miles above Cabin John Bridge, Maryland, Mr. W. R. Maxon and the writer were fortunate enough to secure several plants of *Buxbaumia aphylla*, L., in good fruit. I am not sure whether or not the plant has been previously reported from this vicinity, but it seems best to make a definite record of this collection. Specimens are in my own and in Mr. Maxon's collections. EDWARD B. CHAMBERLAIN.

LICHENS—NEPHROMA-SOLORINA.

BY CAROLYN W. HARRIS.

The genus *Nephroma*, which is not a large one, is represented by several well defined species. It is an interesting group from the peculiarity of its fruiting as it is the only genus where the apothecia are borne on the lower side of the extended lobes of the thallus. This distinguishes it readily from *Peltigera* where the thallus is very similar. The range of *Nephroma* is northern, the finest specimens having been collected in alpine or arctic regions. It is found on rocks and tree trunks in shaded and moist localities.

The thallus is frondose or composed of leaf-like sections overlapping each other, in some species it is smooth and polished, in others somewhat tomen-

tose. The underside is usually tomentose or slightly villous, sometimes there are short rhizoids, but no veining. The apothecia are large, reniform or kidney shaped, they are borne on the underside of the lobes, which in fruiting specimens are elongated and turn over onto the upper side of the thallus. The apothecia are innate with a thin margin which soon disappears; the disk is a reddish brown.

NEPHROMA ARCTICUM (L.) Fr. Thallus usually large and smooth, with rounded lobes, the edges of which are folded or rolled over onto the upper side; when fresh it is straw-colored with a greenish shade, when dry it is a decided straw color. On the under side the margin of the thallus is an apricot color, soon turning almost black, it is covered, except at the margin, with a short, thick, nap of interlaced fibrils. The apothecia are not frequent, they are large, and affixed to the lobes of the lower side of the thallus; the disk is an orange red.

N. arcticum, as its specific name indicates, is an arctic species, and is found on rocks with moss or on trunks of trees, sometimes on earth, growing with moss. Prof. Peck, the State Botanist of New York, collected this species on Pitchoff Mountain in the Adirondacks; so far this is the only known station in the State.

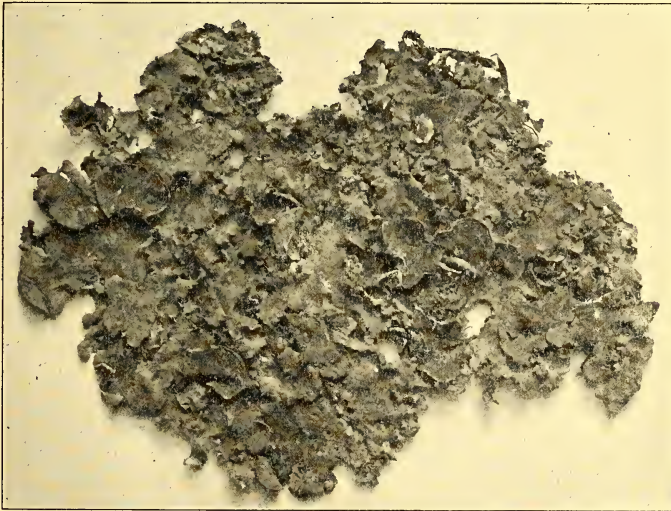


Fig. 1. *N. tomentosum*.

NEPHROMA TOMENTOSUM (Hoff.) Koerb. Fig. 1. Thallus quite large, in some specimens very large, with rounded lobes, the margins of which are wavy, and usually more or less tomentose. The color is glaucous or greenish brown, becoming lead color or dark russet. The under side is paler, usually somewhat tomentose, and covered with groups of minute, smooth, pale tubercles, toward the center are short, stiff fibrils by which it is

attached loosely to the substratum. The apothecia are large and are borne on the produced lobes of the under side of the thallus; disk chestnut with a thin, pale margin.

This is an alpine or subalpine species growing on the ground, on rocks and trunks of trees, usually fertile. In some specimens the elongated, turned over lobes with the large apothecia almost obscure the upper surface of the thallus.

NEPHROMA HELVETICUM Ach. Thallus small with narrow, deeply cut, undulate lobes, with wavy margins which are edged with tooth like nodules. The color is a tawny brown when pressed, a grayish brown when fresh. Usually the thallus is smooth but in some specimens there are little groups of spine like nodules. The under surface is dark brown, almost black at the center, is irregular and somewhat tomentose. Apothecia smaller than those of *N. tomentosum*, the disk light reddish brown turning darker with age; the margin is finely crenate.

N. Helveticum is found on rocks and trees, usually with mosses. On rocks the specimens are well developed, usually fertile, on trees the thallus is smaller and more appressed, apothecia not so frequent. This is a common species both in the Northern and Southern States.

NEPHROMA LAEVIGATUM Ach. The thallus in this species is medium and smooth, with rounded lobes which are wrinkled and rolled over. The color is greenish brown soon turning to a chestnut. The lower side is pale, growing darker toward the center, is wrinkled but has no rhizoids. The apothecia are small, the disk is a dull, red brown.

N. laevigatum is found on trees and rocks in subalpine forests, usually growing on moss to which it clings closely.

NEPHROMA LAEVIGATUM Ach. var. *PARILE* Nyl. The variety is more common than the species, *N. laevigatum*. The thallus is thinner and not so crisp, the lobes are broader and are usually covered on or near the crenate margins with soredia of a lighter shade. The under side is pale at the margin, soon turning a dark brown. Habitat the same as of *N. laevigatum*.

NEPHROMA LUSITANICUM Schaer. In this species the thallus is much wrinkled, especially toward the center, the lobes are deeply cut with crenate margins. In color it is a dark russet, the outer layer of the thallus frequently breaks, showing the dull yellow of the inner part; this is particularly conspicuous on the under side, which is darker than the upper surface. The apothecia vary in size, some are small, some are quite large, they differ on the same specimen.

N. Lusitanicum is found on rocks and trees in alpine districts; is also found in the Western States and in the tropics.

Solorina. This genus is a small one and may be considered the connecting link between *Sticta* and *Peltigera*. It is represented in the arctic and alpine regions by the species *S. crocea*, in the temperate by *S. saccata*, the former being found on granitic rocks, the latter on calcareous rocks or soil. The thallus is medium, smooth, foliaceous, rather rigid, it adheres rather closely, with short rhizoids to the rock, moss or soil on which it may be grow-

ing. The apothecia are innate or depressed in the upper side of the thallus, they have no apparent margin and the disk is a dark reddish brown.

The two species described in this article are the common ones and differ very much in the color of the thallus and in the position of the apothecia.

SOLORINA CROCEA (L.) Ach. Thallus small to medium, very brittle when dry, has round appressed lobes with crenate margins. It is a dull green, becoming cinnamon colored when pressed. The under surface is somewhat villous, with thick, dark brown reticulated veins, the margin is crisp, the color is a rich saffron, the rolling of the lobes giving the upper side the same hue. Apothecia are large, appressed, adnate to the thallus, disk dark reddish brown with no well defined margin.

S. crocea is an alpine species, is found on the earth, or on mossy rocks, and is not rare in the Rocky Mountains. Very handsome specimens have been collected in Scotland on Ben Lomond and other mountain peaks.



Fig. 2. *S. saccata*.

SOLORINA SACCATA (L.) Ach. This unusual looking lichen is a bright green becoming when dry a gray green; the thallus is thinner than that of *S. crocea*, the lobes are somewhat imbricate, the margin wavy. The under side is white with fibrils the same color. The apothecia are at first appressed, then depressed, giving the appearance of brown holes or pits in the thallus.

This species is found in temperate regions growing on earth or in the crevices of damp and shaded calcareous rocks.

In Chilson Lake, Essex Co., New York, there is an island an acre in extent, on the south side of which the rocks are granitic, on the north side calcareous, and here *S. saccata* is found in abundance but at no other place on the lake.

BRANCHED PARAPHYSES OF *BRYUM ROSEUM*.

BY E. J. HILL.

In the early part of November, 1902, specimens of *Bryum roseum* Schreb. were collected. They grew in a clay loam soil on the bank of a creek at Elmhurst, Ill., their most common associates being *Atrichum angustatum* and *Porella platyphylla*. Being without fruit they were placed in a packet and laid aside for future study, since their appearance suggested that they might be male plants. The packet kept in the warm air of a room soon became dry and was not opened until the end of January of this year. Nearly all the plants examined bore abundant archegonia and in most of them the paraphyses were prevailingly branched, the cells well filled with chlorophyl and had the form of protonema. Schimper calls attention to this chlorophyllose feature, remarking in his synopsis (Synopsis Musc. Eur., Introductio, p. xv.): "If we consider color, the paraphyses of *B. roseum* are seen to be green and filled with grains of chlorophyl." Limpricht (Die Laubmoose, 2:445, 1895.) repeats the statement when mentioning the male flowers: "Antheridia very numerous, mixed with filiform chlorophyllose, paraphyses and little leaflets."

This property of chlorophyl-bearing is a common occurrence in mosses with clavate paraphyses, as those of *Funaria*, *Aphanoregma*, and the *Physcomitraceae* in general, but in my experience is infrequent in those with filiform paraphyses.

I do not quite understand the statement of Ruhland (Die Natürlichen Pflanzenfamilien, 1:3, p. 217) that paraphyses "always contain chlorophyl," since from the context he does not seem to limit the property to any form of them, but is concerned rather with their number. They generally appear hyaline or of some other color than green, as yellow, red or purple. It is possible that under chlorophyl are included the various pigments into which it may be transformed or broken up, such as xanthophyl, erythrophyl, etc., but the statement is a very broad one at best.

There is a strong probability that these branched paraphyses are protonemic in character and function, though no buds were found or developed on them. Some were kept moist under a bell-glass for several weeks but left attached to the plants. It resulted chiefly in increasing their length and probably the number of branched forms, as in such cases those without a branch were greatly in the minority. Detached examples placed under other conditions of growth finally shriveled; but this was doubtless due to imperfect facilities for cultivation. Such paraphyses cannot be distinguished from the ordinary protonemata of mosses before the appearance of buds. The cylindrical cells are plump and devoid of the shrunken look common to most filiform paraphyses. Buds do not necessarily appear on protonema. Goebel, (Organography of Plants, 1: 239, 1900.) treating of the influence of external stimuli, makes the statement: "Moss-buds appear upon the protonema only when the intensity of light is higher than that which is required for the normal growth of protonema. If the formation of buds does not take place, the protonema may theoretically continue its growth to an unlimited extent."

The derivations of brood-bodies from paraphyses is mentioned by Correns (Vermehrung der Laubmoose, p. 419, 1890.) who succeeded in obtaining protonema from isolated paraphyses of male flowers of *Funaria*: "As is known, these are club shaped and end in a large globose cell rich in chlorophyll. This is frequently divided longitudinally or transversely. I expected to obtain protonema directly from these cells but was disappointed; it always sprang from cells lower down." His conclusion is (l. c., p. 360): "I believe that the derivation of brood-bodies from paraphyses is correct if they have in general up to the present time been traced to organs occurring in the male flowers."

These protonema-like paraphyses point to another means by which *Bryum roseum* may perhaps be propagated. It has a ready mode of multiplying by its abundant stolons and is also prolific (Synop. Musc. Frond. 1: 247, 1849,) "*Planta e perigonio saepe prolifera.*" (Dixon and Jameson, Handbook Brit. Mosses, p. 341): "The stems are frequently continued beyond one rosette, subsequently forming another and innovations are produced below the flowers." The statement is often made by authors that it rarely fruits, probably more rarely in Europe than in America. This is so much the case in Great Britain that Dixon and Jameson call special attention to it (l. c., p. 341): "The fruit is exceedingly rare and has only been found in three or four British localities." With an experience of more than thirty years, during which the moss has frequently been observed or collected, I have found it fruiting but twice, at Miller, Indiana, 1878, and the same year at Boyne Falls, Michigan.

a | These branched paraphyses are from 1-2 mm. long (mostly 1.4-1.7 mm.) and are generally provided with a single branch, sometimes two. As shown in the illustration, Fig. 1, the branches originate from the end of a cell as one frequently sees in

fresh-water Algæ, but are so oriented that it is hard to tell whether from one above or below, being contiguous to both at the junction. I saw no exception to this.

After the drawing was made one was noted with three branches. The first was nearly basal and consisted of four cells; the second started two cells above this and had two cells; the third, three cells above the second and was a single cell. The paraphysis continued ten cells above the last.

I am indebted to Mrs. Agnes Chase for the accurate drawing of the paraphyses and archegonium. Chicago, Ill., June, 1903.

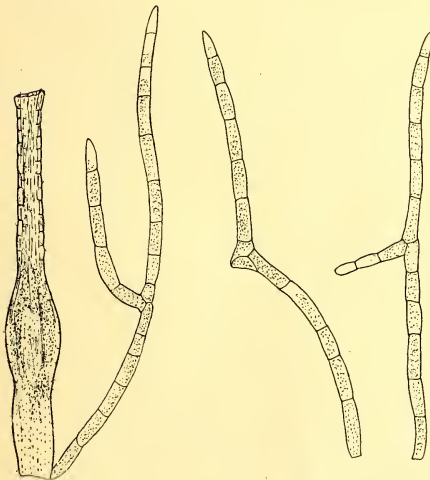


Fig. 1. *Bryum roseum*.
Archegonium, 1 mm. \times 50 diam.
Paraphyses, 1-2 mm. \times 50 diam.



Plate X. Leaves $\times 40$. Cells cross-section of stem $\times 280$.

- Fig. 1. *Stereodon plicatulus* Lindb., Yukon, Lake Lindeman, R. S. Williams, May 30, 1898.
Fig. 2. *S. plicatulus*, Lindb., Jenisei, Siberia, Arnell, Sept. 18, 1876.
Fig. 3. *S. revolutus* Mitt., Kongsvold, Dovre, Norway, S. O. Lindberg, July 8, 1882.
Fig. 4. *S. plicatulus*, Lindb., Jenisei, Siberia, Arnell, Sept. 13, 1876.
Fig. 5. *S. callichroum* Brid., Naes, Norway. C. Rosenberg, Aug. 6, 1854.

STEREODON PLICATULUS LINDB. ✓

BY HARALD LINDBERG.

In the last number of THE BRYOLOGIST (May, 1903), p. 42-43, is to be found an article "Notes on Nomenclature, II.," by Elizabeth G. Britton, in which Mrs. Britton writes that I recently have examined specimens of *Stereodon plicatulus* Lindb. collected by Arnell in Siberia, and pronounced this species to be the same as *Stereodon revolutus* Mitt. In November, 1900, I received from Mr. R. S. Williams a specimen collected by him (May 30, 1898) at Lake Lindeman in the Yukon Region, Fig. 1, and sent with the following inscription: "*Hypnum subplicatile* (Lindb.) Limpr.?" This moss I examined and found it identical with specimens of *Stereodon plicatulus* Lindb. (*Hypnum subplicatile* (Lindb.) Limpr.) collected by Arnell at Jenisei in Siberia, Fig. 2. I have never said that *Stereodon plicatulus*

Lindb. and *Stereodon revolutus* Mitt. belong to the same species. *S. revolutus*, Fig. 3, has the leaves with broadly revolute margins, the cross-section of stem with small outer cells, etc. *S. plicatulus*, Figs. 1, 2 and 4, on the contrary, has the leaves broadly triangular with long acumen and plane margins the outer cells of the cross section of stem are much larger, etc. *S. plicatulus* Lindb. is thus very different from *S. revolutus* Mitt. and is much nearer related to *S. callichroum* Brid., Fig. 5, and in my opinion a very good species, which thus not only is found in Siberia and East Russia, but also in North America. Helsingfors, Finland, May 21, 1903.

THE MOSSES OF ALASKA.

By J. CARDOT and I. THERIOT

From "Papers from the Harriman Alaska Expedition."

(CONCLUDED.)

POLYTRICHUM YUKONENSE Card. and Thér.

Stem 5-8 cm. high, simple or sparingly branched, denuded of leaves for a long distance, covered at base with a white tomentum. Leaves rigid, sub-erect when dry, erect-spreading when moist, 4-6 mm. long, 8 broad, appressed from a subsheathing yellowish base, shortly linear-acuminate, tapering into an entire fuscous tip, erect entire margins. lamellæ about thirty, crenulate on margin, composed of eight to twelve cells in transverse section, the apical cell larger and deeply emarginate. Other characters unknown.

From Yukon River (W. H. Dall, in 1867).

This species is easily distinguished from the smaller forms of *P. commune* by its short and entire leaves, its higher lamellæ with more deeply crenated borders and more strongly emarginated marginal cells.

A recently described species, *P. Jensenii* Hagen (*P. fragilifolium* Lindb. fil. mss.), which has been found in Greenland, Spitzbergen, Lapland and Wyoming, comes very near our *P. Yukonense* by its size and the height and structure of its lamellæ, but differs from it by its leaves being longer and dentate at the point, by the cells of the basilar and subvaginant part, which are wider, and by the much less emarginated apical cells of the lamellæ.

BRACHYTHECIUM BERINGIANUM Card. and Thér.

Densely cæspitose, resembling in habit small forms of *B. albicans*. Stem erect, 3-4 cm. high, much branched, branches erect, sometimes fastigiate, julaceous, acute. Leaves crowded, imbricate, the stem leaves 1.5 mm. long, 0.8 broad, ovate-lanceolate, from a slightly decurrent base, quite abruptly and short-acuminate, concave, plicate, with entire margins, plane or reflexed, the branch leaves smaller, longer acuminate, costa thin, 30-35 μ broad at base, extending barely to the middle, often forked and sometimes very short; alar cells numerous, quadrate, elongated in the five to six rows next to the margin, the rest linear, 40-45 μ long, 6-7 broad. Walls incrasstate. Other characters unknown.

From St. Paul Island (Trelease, 1861, 2087); Agattu Island (U. S. S. Albatross Exped., 40).

Distinct from *B. acuminatum* Ren. and Card. by its habit, its more abruptly acuminate leaves, etc. It more closely resembles *B. albicans* Br. Eur., from which it differs by its shorter and more abruptly acuminate leaves, its quadrate, more numerous alar cells, its more chlorophyllose areolation, and by its narrower, short and often bifurcate costa.

PLAGIOTHECIUM FALLAX Card. and Thér.

Dioicous, robust, yellowish-green, glossy. Stem prostrate or decumbent, 5-8 cm. long, flexuous, sparingly branched, often radiculose at the attenuate apex. Leaves loosely complanate-distichous, subundulate-crispulate when dry, 2.5 mm. long, 1-1.3 broad, not at all decurrent at base, oblong-lanceolate asymmetric, broadly short-acuminate, plicate, margins plane, entire, costa double, unequal, the longer branch extending one-third to one-half the length of leaf; basal cells few quadrate or short-rectangular, the others linear 125-225 μ long, 9-14 broad: Other characters unknown,

From Douglas Island (Trelease, 1743 in part).

Resembling in habit the species of the *denticulatum* group, but very distinct by its leaves being not decurrent.

AMBLYSTEGIUM SERPENS BERINGIANUM Card. and Thér.

Differs from the typical form in the broader ovate-lanceolate leaves with shorter acumen, in the stronger costa extending to the base of the acumen, and in the rectangular basal cells with incrassate walls.

From St. Paul Island (Trelease, 2089 in part).

Under number 1760 we found some stems of a stouter species much resembling *A. radicale* (P. Beauv.) Mitt.

AMBLYSTEGIUM VARIUM ALASKANUM Card. and Thér.

Very robust, densely branched in broad depressed tufts, leaves very short, broadly ovate, constricted below, shortly and narrowly acuminate, alar cells much larger, inflated.

From Muir Glacier (Trelease, 1752).

HYPNUM TRELEASEI Ren.

Densely caespitose, fragile, yellowish-green. Stem short, 2-3 cm. high, erect, radiculose below, branches erect, fastigiata. Leaves crowded, small, subimbricate, sometimes subhomomallous, 1.2 mm. long, 0.6 broad, ovate-lanceolate, rather short-acuminate, scarcely plicate generally suddenly narrowed, minutely denticulate, costa double, short basal cells quadrate or short-rectangular, chlorophyllose, the outer cells elongated, decurrent, the rest linear, 30-40 μ long, 6-7 broad. Other characters unknown.

From Virgin Bay (Trelease, 2305); St. Matthew Island (Trelease, 2158, 2165).

The description here given, as also the drawing, is based on the St. Matthew Island specimens. The Virgin Bay specimen has the leaves longer, with a more elongated and narrower acumen and a closer areolation, formed of longer and narrower cells. This is, however, no doubt of the specific identity of the two specimens. This species should be placed near *H. stellatum* Schreb., from which it is distinguished by its much smaller dimensions, its short and fastigiata stems, its leaves which are small, imbricate, shortly

acuminate and for the most part finely denticulate, and finally, by its small quadrate alar cells, the median ones shorter.

HYPNUM UNCINATUM POLARE Ren.

In habit resembling a variety of *plumosum*. but the basal areolation is laxer, parenchymous, median cells shorter, more chlorophyllose.

From St. Matthew Island (Trelease, 2159); Plover Bay, Siberia (Trelease, 1977).

HYPNUM SULCATUM STENODICTYON Ren.

Distinguished from the typical form by the closer areolation and narrower cells.

From Muir Glacier (Trelease, 2019).

HYPNUM SUBEUGYRIUM OCCIDENTALE Card. and Thér.

Differs from the typical form of the new world as a rule, in the broader, softer, more concave leaves, entire apex, slightly larger alar cells forming sometimes subinflated auricles but always much less distinct than in *H. eugyrium*. Costa sometimes subsimple.

From Hidden Glacier Inlet, Yakutat Bay (Trelease, 1784); Muir Glacier (Trelease, 1805).

HYPNUM SARMENTOSUM BERINGIANUM Card. and Thér.

Differs from the typical form in the more slender stems, more laxly foliate, in the broader costa and especially in the much smaller usually quadrate, scarcely dilated alar cells.

From St. Matthew Island (Trelease, 1888, in part 1889).

By the structure of the angles of the leaf, this moss comes near *H. brunneo-fuscum* C. Muel from the Chukchi Peninsula, but the latter has a different facies, a closer areolation and a much thinner costa.

HYPNUM PLESIOSTRAMINEUM Ren.

Tufts loose, soft. Stems slender, erect, 4-6 cm high, simple or sparingly branched, branches slender. Leaves quite crowded, erect, only a little spreading at apex, about 1.4 mm. long. .6 broad, various shapes, the lower ovate-oblong or subdeltoid, acuminate, subobtuse, the upper elliptical with a broader and more obtuse acumen, the branch leaves ovate, round-obtuse, all plicate, slightly sinuate, plane margins. Costa thin, extending about three-fourths or further, 40-50 μ broad at base, alar cells large, lax, hyaline, forming inflated beautifully distinct auricles, the median narrowly linear, flexuous prosenchymatous, 40-60 μ long, 5-6 broad, the apical shorter ovate or subhexagonal. Other characters unknown.

From Yukon River (W. H. Dall, in 1867).

This species resembles *H. stramineum* Dicks. and *H. pseudo-stramineum* C. Muel., but it is with the latter that it has the closest affinity. It differs from it by its leaves being shorter, subdeltoid, with a costa thicker (40-50 μ instead of 30-40), longer, usually exceeding the three-fourths, and finally by the firm areolation formed of flexuous cells, rather obtuse (not truncate) at the ends, with thick walls, and resembling those of *Hygrohypnum*.

Note 3, p. 347)—A preliminary diagnosis of this moss has been published

by Mr. Renauld in THE BRYOLOGIST IV, p. 65. It is perhaps the same species as *H. amplyphyllum* Williams, in Bull. N. Y. Garden, II, p. 139.

HYLOCOMIUM TRIQUETRUM BERINGIANUM Card. and Thér.

Leaves yellowish, erect imbricate, subhomomalous less distinctly papillose.

From Hall Island (Trelease, 1989 in part; Coville and Kearney, 2059).

From the Botanical Gazette, July, 1896.

NEW MOSSES OF NORTH AMERICA.

F. RENAULD AND J. CARDOT.

GYMNOSTOMUM CALCAREUM N. et H. var. WINONENSE Holz.

Differs from the var. *tenellum* Sch. by the leaves acute and the capsule not constricted at the mouth. Very small and loosely cespitose or gregarious.

Minnesota: Winona, amongst the stems of *Myurella Careyana* (J. M. Holzinger, 1893).

DICRANUM DEMETRII R. and C.

In very compact, yellowish-green tufts, brownish and a little tomentose below. Stems erect, simple or sparingly branched, three to four inches long. Leaves crowded, erecto-patent when moist, crispate when dry, from an oblong-obovate base rather suddenly constricted and linear-subulate, canaliculate, smooth, quite entire or subsinuate at apex, 3-6 mm. long, 0.30-0.60 mm. broad at base; costa narrow, percurrent or subexcurrent; cells smooth, small; quadrate or short-rectangular and incrassate in the upper part, becoming narrowly linear and slightly posed towards the base near the costa, the alar looser, subrectangular. Pericheatial leaves from an oblong sheathing base suddenly long-cuspidate. Fruit unknown. Seems dioicous.

Labrador: Rattler's Bight (*Rev. A. C. Waghorne*, 1892; comm. *Rev. C. H. Demetrio*). Specimens bearing young fructifications and remains of old pedicels.

Seems to have some affinities with *D. elongatum* Schw., but is readily distinguished at first sight from this species by its leaves crisped in the dry state, which gives it rather the appearance of *D. montanum* Hedw., and also by the very different areolation of the leaves.

DICRANUM TRACHYPHYLLUM R. and C.

Dioicous, cespitose, green or olivaceous. Stems erect, 2-6 cm. long, simple or branching, sparingly tomentose in the lower part. Leaves falcate or flexuous-patent when moist, flexuous-crisped when dry, often tufted, linear-lanceolate, canaliculate above and rather thickly subulate, strongly serrate on the margins, spinulose-dentate at apex; costa stout, about one-fourth the width of leaf-base, generally very rough at back, percurrent or short-excurrent into a spinulose-dentate point; cells of the upper part quadrate or subrotundate, mostly papillose on the back, oblong or linear and smooth towards the base, the alar lax, inflated brownish or hyaline. Per-

perichaetial leaves from an oblong sheathing base constricted into a rough subula; costa narrower. Pedicel pale, at last twisted to the left above when dry. Capsule and peristome as in *D. fuscescens*.

Newfoundland: Leading Pickles and Hermitage Bay (*Rev. A. C. Waghorne* 1893 and 1895).

Closely allied to *D. fuscescens*, Turn., to which it might be subordinated as a subspecies, but nevertheless easily distinguished by the leaves more strongly serrate, very rough on the back, less narrowly subulate and the nerve thicker and broader.

DICRANUM SUBFULVUM R. and C.

Loosely cespitose, dark green, filled with earth below. Stems erect, 1-2 cm high, simple or sparingly branched little radiculose. Leaves erectopate, flexuous, crisped when dry, narrowly lanceolate, acuminate-subulate, subula canaliculate, subentire or minutely denticulate at apex; costa strong, very broad, about half width of leaf base, smooth or nearly so at back; cells very small, opaque, quadrate, scarcely papillose, somewhat larger and quadrate or short rectangular below, all very chlorophyllose, the alar lax, enlarged, quadrate or subhexagonal, pellucid, yellowish, brownish or subhyaline. Flowers and fruit unknown.

Distinguished from *D. fulvum* Hook., by the stems not flexuous, the leaves not tufted, nearly entire, the costa broader, smooth or only very slightly papillose on the back and the supra-alar cells chlorophyllose, scarcely distinct from the others.

FISSIDENS DECIPIENS DeNot var. WINONENSE R. and C.

Differs from the type by its smaller size, the smaller and narrower leaves with the pellucid border most often indistinct, and the less opaque areolation.

Minnesota: Winona (*J. M. Holzinger, Mosses of Minnesota*, No. 6).

TRICHOSTOMUM INDIGENS R. and C.

Very small, gregarious, dirty-green. Stems scarcely 1-2 mm. high. Leaves patent subciliate when dry, 1.25-1.75 mm. long, oblong-lingulate, obtuse, apiculate or subacute, margins revolute below, plane above, very minutely crenulate by the projection of the papillæ; costa stout, percurrent or vanishing just below the apex; cells minute, rotundate or subquadrate, densely papillose, becoming gradually larger, oblong, rectangular, pellucid and smooth towards the base. Perichaetial leaves from an oblong and loosely reticulate base, linear-lingulate, obtuse or mucronate. Pedicel thin, reddish, paler above, 4-6 mm. long, slightly twisted to the left under the capsule when dry. Capsule small, erect oblong-cylindrical chestnut-colored, about 1 mm. long. Lid unknown. Annulus simple, teeth of the peristome purple, slightly twisting, on a narrower basilar membrane, segments filiform, minutely granulose, marked with a longitudinal line, articulate, slightly nodose and partly connected in the lower part. Probably dioicous (male flowers unseen).

Newfoundland (*Rev. A. C. Waghorne*, 1895).

Resembling the smallest forms of *Barbula unguiculata* Hedw. by the shape and the areolation of the leaves, but well distinct by the peristome much shorter and less twisted, the teeth describing scarcely half a spiral turn.

ULOTA CRISPULA Brid. var. DOLOSA R. and C.

Distinct from the genuine form by the dark green tint, the leaves less crispate and generally broader and the areolation less incrassate, the lower cells looser, shorter, hyaline or greenish, not yellow.

District of Columbia: Tenallytown, mixed with *Orthotrichum Ohioense* and *O. Braunii* (J. M. Holzinger, 1892).

This variety differs considerably from the type by its much looser basilar areolation, and would be easily taken for a well distinct species; but we have specimens, gathered at Atco, New Jersey, by Mr. H. A. Green, which are intermediate between this variety and the typical form,

PHILONOTIS VENELLA C. Muel. var. COLORADENSE R. and C.

Areolation more chlorophyllose; marginal cells narrower, teeth of the leaves more patulous. Sterile. Perhaps a small depauperate form of *P. Muehlenbergii* Brid.?

Colorado: Springdale, Boulder Co. (*Marie Holzinger*, 1892, comm. J. M. Holzinger).

ANOMOBRYUM FILIFORME Husn. var. AMERICANUM R. and C.

Differs from the var. *concinnum* (*Bryum concinnum* Spr.) by the more slender and shorter stems, the smaller leaves and the shorter cells. Costa percurrent or vanishing just below the point. Sterile.

Wisconsin: Trempealeau Mt. (*F. M. Holzinger*, 1893).

With Rev. Boulay, we consider *Anomobryum filiforme* (Dicks.) Husn., *A. juliforme* Solms., *A. sericeum*, DeLacroix, and *A. concinnum*, (Spr.) Husn., as belonging to the same specific type, which is widely distributed under numerous local or regional forms, throughout Europe, Africa, North, Central, and South America.

HYPNUM IMPLEXUM R. and C.

Tufts depressed, light green. Stems intricate, pinnately ramulose, branchlets hooked, fastigiate above. Leaves falcate-secund, from a broadly ovate-deltoid base rather suddenly constricted into a narrow subulate acumen, plane on the margins, quite entire or subdenticulate at base of the acumen; costa double, short; cells narrowly linear, those of the angles few but distinct, small, quadrate, greenish or pellucid. Flowers and fruit unknown.

Labrador: Seal Island (*Rev. A. C. Waghorne*, 1893).

Allied to *H. hamulosum* Sch., but more robust, and distinct by the light green tint; the leaves broader at base and more suddenly constricted into a subulate acumen, and the alar cells more numerous and more conspicuous. Much resembling the small green form of *H. cupressiforme* L., but in this the leaves are narrower and the alar cells still much more numerous and conspicuous.

HYPNUM SUBEUGYRIUM R. and C.

Monocoicous, resembling *H. eugyrium* Sch. var. *Mackayi* Sch., from which it differs by the alar cells of the leaves small, quadrate, not forming excavate auricles and the capsule exannulate. From the forms of *H. palustre* L. having the leaves subimbricate, it is distinguishable by the minutely denticulate apex of the leaves and by the costa always double and shorter.

Newfoundland: Exploits (*Rev. A. C. Waghorne*, 1893).

SULLIVANT MOSS CHAPTER.

AN IMPORTANT NOTE TO CHAPTER MEMBERS.

A Matter to be Voted Upon.

In organizing the Sullivant Moss Chapter the precedent established by the Fern Chapter was followed, and its Constitution adapted to the supposed needs of the new Society. It has seemed to the writer from the first that the informal character of our Chapter did not require so much red-tape as the Constitution involved. In the practical working of the Chapter several changes have been found necessary and these so far have been accomplished by amending the Constitution, but now the time has arrived when further simplification is needed and the changes contemplated really abrogate the original Constitution. The best way of accomplishing this end has been the subject of much discussion among the active workers.

The Chapter was started by Dr. Grout and Mrs. Britton, and the latter asked me to take the position of Secretary-Treasurer and work up the organization. The list of Chapter Members and the Constitution had already been printed when I assumed office, January 1, 1898. It was my first experience in such work and I felt the whole must evolve as circumstances developed. The work has grown to be a far larger one than was at first anticipated. Starting with a membership of thirty, we soon reached one hundred, and now have one hundred and twenty-six on our list. Of this number a large proportion are students needing direction from time to time. This is done through correspondence with the Secretary who attends to all routine work and elementary instruction at large expense of time and labor. As students advance and their work is specialized they are put in touch with the advanced worker in his particular line. In this way there has come to be a group of directors, consisting of Mrs. Britton, Dr. Grout, Dr. Best, Prof. Holzinger, and later Mrs. Harris, Miss Warner and Mr. Barbour, who really constitute a Board of Control.

The Constitution calls for a double ticket and this in so small an organization is a very cumbersome method. This is the first point for consideration. The above explanation has been made so that all the members may be informed of the exact situation and be able to vote intelligently. The intention is to do away with the Constitution, and vest the interest of the Chapter in the hands of a board of control, consisting of the above named

persons and the writer. These eight will guide the work, and each year nominate for the various offices those who have signified their willingness not only but their ability to serve during that particular year.

The second point is to have a separate person for the Treasurer. This would relieve the Secretary of much mechanical work and be a simpler way to conduct the business part of the Chapter.

All members are urged to send in their vote on the four points.

1st. Dropping the Constitution but retaining the name Sullivant Moss Chapter.

2d. Vesting the interests in a Board of Control as indicated above.

3d. Having a single ticket nominated each year.

4th. Having a separate person for Treasurer when advisable.

Send in your vote *at once* during September to Mrs. Smith, 78 Orange street, Brooklyn, N. Y. The result will be announced in the November BRYOLOGIST as well as the ticket for officers for 1904.

ANNIE MORRILL SMITH.

OFFERINGS.

[To Chapter Members only—for postage.]

Mrs. M. E. Williams, care Dr. Sahler, Kingston, N. Y. (during September).

Leskea gracilescens Hedw. cfr. Collected, Kingston, N. Y. *Cladonia leporina* Fr. Collected, Wilmington, N. C.

Mr. Walter Gerritson, 66 Robbins street, Waltham, Mass. *Buxbaumia aphyllia* L. *Webera sessilis* (Schmid.) Lindb.

Mrs. J. D. Lowe, Noroton, Conn. *Thuidium Virginianum* Lindb. cfr. Collected in Noroton, Conn.

Miss Alice L. Crockett, Camden, Maine. *Hypnum fluitans* L. *Sphagnum squarrosus* Pers. cfr. Collected in Camden, Maine.

Mrs. R. E. Metcalf, Hinsdale, New Hampshire. *Stereocaulon paschale* (L.) Fr. Collected in Hinsdale, N. H.

Mrs. M. L. Stevens, 39 Columbia street, Brookline, Mass. *Brynhia Novae-Angliae* (S. & L.) Grout. *Hypnum vernicosum* Lindb. cfr. Collected in Hebron, Maine. This moss has never before been reported from New England.

Miss Mary F. Miller, Mountain Lodge, Shandaken, New York (during September). *Bryum bimum* Schreb. cfr. *Climacium dendroides* W. & M. str. *Leucodon brachypus* Brid. cfr.

Mr. C. B. Robinson, Pictou, Nova Scotia. *Bartramia Oederi* (Gunn) Swtz. cfr. *Pogonatum alpinum* (L.) Roehl. cfr. *Philonotis fontana* (L.) Brid. cfr. *Plagiothecium denticulatum* (L.) B. & S. Collected, Hartley Falls, Nova Scotia.

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NOVEMBER, 1903



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NORTH AMERICAN MOSSES

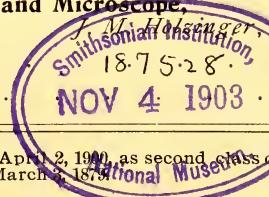
HEPATICAS AND LICHENS

EDITORS:

ABEL JOEL GROUT and ANNIE MORRILL SMITH

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PLATE XI. *Splachnum luteum*.

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No. 6.

THE SPLACHNUMS.

ELIZABETH G. BRITTON.

The taller specimens of *Splachnum luteum*, illustrated in the plate accompanying this number, were collected by Mr. M. W. Gorman at White River, Yukon Territory, near the Alaska Boundary. The specimens are remarkable not only for their large size, which exceeds any measurements recorded, but also for the fact that very few of the capsules had developed the characteristic apophysis or "yellow umbrellas" which are shown in the smaller specimens. But it was these "umbrellas" that attracted Mr. Gorman's attention, for he says, "I noticed a moss in open spots on the borders of Sphagnum marshes, that I had not observed in Oregon, Washington or southern Alaska. The tall delicate stems had many of their tips surrounded by a pale yellow cap about five-sixteenths inches wide, causing the moss to be noticeable amongst the surrounding grasses, sedges and ericaceous plants. I would like an explanation of the yellow caps, some of which may still be seen on the specimen, although it has been twice immersed in the icy waters of the White River."

Their absence may be due to immersion in cold water, but it is evident that although they were collected on August 14th, they had not fully developed and grew taller from being among shrubs and grasses. It generally happens with most mosses that grow in crowded tufts, that some of the plants do not get their share of nourishment and room, and hence do not attain the size and development that others do. This may be seen in *Funaria hygrometrica* particularly. In endeavoring to learn something about the anomalous specimens of *Splachnum*, the researches made by J. R. Vaizey on this species, published in the Annals of Botany for 1890, will be of interest. In this paper he states that being convinced of the importance of obtaining further knowledge of the highest development to which the sporophyte of the mosses attains, as being likely to throw light indirectly on the phylogeny of the higher Cryptogams and Phanerogams, he determined to investigate the morphology of *Splachnum luteum* and *S. rubrum*. These species being arctic or subarctic, and not found in Great Britain, he made a journey to Norway for his material. He did not succeed in getting much of the Red Umbrella Moss, but of the yellow he secured abundant specimens. He says of these:

"In the sporophyte of *S. luteum* we have a structure with a remarkable similarity to an umbrella, the handle end, which is inserted in the tissues of the oophyte, is known as the foot. The seta is much elongated, frequently attaining the length of 150 meters (6 inches); it bears the umbrella-like expansion, the apophysis, at the top just below the sporangium. It is the structure of the apophysis which is of greatest interest." Mr. Vaizey found

that the tissues of the oophyte surrounding the foot, contained a quantity of organic substance, and that large numbers of leucoplastids were developed which served to absorb nourishment for the sporophyte. Sections through the foot, seta and capsule, showed that the water and organic substances were conveyed through the central tissue of the seta to the apophysis. These cells contain little or no chlorophyll, but outside of them in the expanded portions of the apophysis the cells are rich in chlorophyll, and on the upper side of the "umbrellas" have even formed a "palisade-tissue" similar to that developed in leaves of vascular plants. Furthermore there are a number of stomata developed on the upper surface around the top of the umbrella. It is evident then that the apophysis or umbrella, performs the functions of a leaf, and is therefore analogous to the leaves of vascular plants. That is, it is an organ of respiration and assimilation and large quantities of starch are formed in it, especially while the apophysis is still young and green at the beginning of the formation of the umbrella and before the spores ripen.

Unfortunately Mr. Vaizey died before his studies were completed so that gaps remain in the life-history of this most highly developed and specialized moss, but it is evident that even without developing the umbrella the capsules are able to mature their spores. The article is illustrated by a series of plates which are most interesting.

The history of the *Splachnums* is equally interesting. The first reference to them occurs in a small vellum-covered volume, published in London in 1695, called "Petiver's Museum, containing the first century of Rare Natural Objects of Animals, Fossils and Plants." He described *Splachnum rubrum* as "Muscus Norvegicus umbraculo ruberrimo insignito. We owe the discovery of this elegant plant to my friend Mr. Richard Wheeler, who gathered it near Portsground, in Norway, and for its singularity and likeness I think it may not very improperly be called his Norway Bongrace Moss. This quaint little volume is filled with pictures of various curious natural objects sent to Pettiver for his museum. Both Ray and Dillenius had descriptions and plates of *S. rubrum*, specimens of which had also been sent from the Lena River. But Linnaeus was the first to give them the names which they now bear. In a series of essays written by his pupils in 1752, one is devoted entirely to three species of *Splachnum*, *S. luteum*, *S. rubrum* and *S. ampullaceum*. *S. luteum* was called the "Swedish Parasol Moss." Linnaeus took up the names in his *Species Plantarum*. The apophysis in *S. rubrum* is the same shape and size as in *S. luteum*, but in *S. ampullaceum* it is shaped like an urn, and is much larger than the spore-case.

None of the species of this family are common in North America.

Splachnum luteum has been collected in New Brunswick by Fowler, and *S. rubrum* was collected on the shores of a small pond in the Adirondacks by Prof. Peck. One curious peculiarity of them all is that they grow on the excrement of animals, on cow and horse dung, and on the decomposing skeletons of animals, such as mice, hedgehogs, etc. *Tetraplodon mnioides* has

been found on the summits of Mt. Marcy, Mt. Mansfield and on Mt. Washington, along the bridle-path, and on the timbers of the stable. There is one species only, which is found in the Southern States. In Europe they used to be common in Alpine pastures, but are growing rare, owing to the drying up and draining of the marshes. It is strange that they are able to maintain such a sporadic and scattered existence, when their food-supply is so uncertain and peculiar.

New York Botanical Garden.

ON SOME FOSSIL MOSSES.

BY JOHN M. HOLZINGER.

Fossil mosses are rare. It is, therefore, with pleasure that I report on some from Iowa. In 1897 Prof. T. H. MacBride took from a railroad cut near Oelwein, Iowa, several wads of moss embedded in blue clay at a depth of 32 feet below the surface of the ground, beneath the Kansas Drift. This material was intrusted to Prof. P. C. Myers, at present science teacher in the Winona High School, for the purpose of ascertaining the presence of diatoms in the clay matrix, and it is from Mr. Myers that I have received this material for examination.

So far as I can ascertain, the age of the deposit under which this moss is found is estimated to be between 5,000 and 10,000 years. Small wonder, therefore, that the stems have become rather brittle. However, it is possible, as I have found by careful manipulation, to float out some stems which show the characteristic branching and leaf position of certain *Harpidia*, notably of *Hypnum fluitans*, and my conclusion after considerable work on this fragmentary moss, the leaf areolation of which is admirably preserved, is that it is certainly one of the *Harpidia* and comes nearest to *Hypnum fluitans brachydictyon* Ren. The preservation of this moss for so long a period is a matter of surprise. Two causes seemed to have conspired. First, it is a well known fact that peat bogs formed by the annual addition of vegetable matter furnished to the subaqueous stratum, have by this process antiseptic properties imparted to the water tending to preserve certain organic forms, and the aquatic habit of this *Harpidium*, together with the blue clay surrounding it (the color of blue clay being due to the presence of carbonaceous matter from bogs), point to this antiseptic bog water as a preservative. Secondly, the matrix, the blue clay, seems to have formed an effective mechanical protection, hermetically sealing it under tons of its substance against the access of air. This second element of protection alone could not have effected the preservation, and the first mentioned element, the antiseptic property of carbonaceous mud in bogs, has probably been the principal factor.

In this connection it is proper to call attention to an article in the *Botanisches Centralblatt*, 1901, Bd. X, Heft 3, on "A Fossil Moss from the Vicinity of Fulda," Germany. (Ueber ein Fossiles Laubmoos aus der Umgebung von Fulda,) by Mr. Adelbert Geheeb. The author, supported by Dr. K. Schliephacke, determined this moss as *Hypnum fluitans fossile*. *Amblystegium*

filicinum had previously been found fossil by the author, also from near Fulda. Mr. Geheeb mentions still another fossil moss which was found in 1869, in the Schussenquelle, near Schussenried, Württemberg, by Apotheker Valet, and determined by Schimper as *Hypnum sarmentosum* Wahlenb., an arctic-alpine moss.

Note.—Since writing the above I have asked Dr. G. N. Best to examine the Oelwein moss. To my surprise he found the bulk of what I sent to be *Hypnum revolvens* Sw., coming in between var. *typicum* and *Cossoni*. He also found bits of a Calliergon which appears to be *H. Richardsoni*. This difference in conclusions led me to float out a larger quantity of the moss, submitting a second lot of twelve packets to Dr. Best, with the result that he agreed with my first determination of that material. I had doubtless overlooked the presence of *Hypnum revolvens*, and the Calliergon, bits of both of which species are scattered through the mass of *H. fluitans*.

Prof. Myers also entrusted to me a very small bit fossil moss, taken eighteen feet under ground, also from under Kansas Drift, from the excavation under the Iowa City High School. This Dr. Best finds to be nearest to *Hypnum fluitans glaciale* Ren.

It thus appears that Iowa has furnished at least four fossil mosses. The material from Oelwein is mostly *Hypnum fluitans brachydictyon* Ren., with a little *Hypnum revolvens* Sw., and *Hypnum Richardsoni*; the Iowa City moss is *Hypnum fluitans glaciale*,
Winona, Minn.

SOME MOSS SOCIETIES.

BY A. J. GROUT.

By the above title I do not mean to designate any generalizations in the phytogeography of mosses, but merely to record a few observations on species associated together in different groupings under different conditions.

I was led to take up this topic by poor health, which prevented my walking more than two or three miles daily. To entertain myself I selected the various places mentioned in this account, and set myself to find all the mosses growing in each spot under conditions as nearly similar as possible. For instance, when collecting on the stone wall I carefully avoided plants growing on the soil at the base of the wall. I have been greatly surprised by the results, as I have collected several species for the first time, in localities that have been familiar to me for years, and I have discovered a great extension of range in at least one case (*Fabroleskea*).

I have also found several plants on unusual substrata, e. g., *Grimmia apocarpa* and *Hedwigia* on the old roof, and *Ulota crispa* on the stone wall. In this last case Dr. Best suggests that scraps of bark, etc., from the trees overhead furnished the material suitable for the first stages in the development of the plants.

Perhaps the most interesting collecting place was the cut in Brooklyn Heights, where the Wall St. Ferry cars pass up along Montague St., from the water level to the level of the Heights. The ground here is apparently springy, and in the chinks between the stones I found five or six species, the

first two in fruit: *Funaria hygrometrica*, *Leptobryum pyriforme*, *Bryum caespiticium*, and another *Bryum* which may be a variety of this but is probably a different species, *Barbula unguiculata*, and *Amblystegium Kochii*, B. & S. The first two of this list with *Ceratodon* I had previously collected on the brick foundations of my Brooklyn (Flatbush) house. The last was one of the greatest surprises of the season.

In May of this season I collected *Bruchia Sullivantii* Aust., for the first time. It grew in a sandy field in Lawrence, L. I., just beyond the city limits. I was interested to note the other plants growing associated with it so as to know where to look for more. Growing with it, or near it under similar conditions were *Pleuridium subulatum* (L.) Rabenh., *Weisia viridula*, (L.) Hedw., *Ceratodon purpureus*, *Ditrichum pallidum*, *Catharinea angustata*, *Bryum caespiticium*, *Polytrichum commune*, and *Mnium sylvaticum*. Some of these evidently thrive during the wet weather of early spring and others during the dry weather. The soil was sandy with a little clay, recently (within a year or two) plowed. The daisy, *Antennaria* sp., and the creeping blackberry were accompanying flowering plants.

An old pear tree in my father's yard, from which I have eaten fruit for thirty years, yielded *Pylaisia Schimperii* R. & C. (*P. intricata*), *Orthotrichum strangulatum* Sulliv., *O. speciosum*, Nees., *O. Ohioense*, S. & L., *O. obtusifolium*, Schrad., *O. sordidum*, S. & L., *Fabroleskea Austinii* (Sulliv.) Best (Det. Dr. Best), *Ulota (Weissia) crispa*, *U. coarctata*, *Amblystegium adnatum* on the bark of the tree from 3-7 feet from the ground. In a knot hole grew *Brachythecium salebrosum*, and at the base of the tree *Amblystegium serpens*. Besides the mosses there was a minute hepatic in the bark growing mosses.

From an old roof in the village of Williamsville in the same town, I collected *Ulota (Weissia) crispa*, *Grimmia apocarpa*, *Hedwigia albicans*, *Platygyrium (Entodon) repens* with flagella; *Ceratodon purpureus*, *Brachythecium oxycladon* and also a form with secund leaves, *Hypnum reptile*, *H. Haldanianum*, *H. fertile*, and *H. Schreberi*. I find *Dicranum Bonjeani* De Not., to be frequently on old roofs; indeed it is the only place I have ever found the typical form, but I have never found it fruiting. It did not occur on the roof from which the above named collection was taken.

On an old log, in deep moist woods, at an altitude of 1300 ft. I found *Georgia pellucida*, *Dicranum scoparium*, *D. viride*, *D. flagellare*, *Mnium ciliare*, *Thuidium recognitum*, *Hylocomium proliferum*, *H. Pyrenaicum*, *Hypnum Haldanianum*, *H. hispidulum*, *H. reptile*, *H. Schreberi*, and an undeterminable species of *Hypnum*, *Plagiothecium denticulatum*, *P. turfaceum*, *Raphidostegium recurvans*, *Brachythecium oxycladon*, *Cephalozia* sp., and two other hepatics.

On about four rods of old stone wall under two great maples, and on the north side of the wall, I found *Dicranum longifolium*, *Dicranum* sp., *Ceratodon purpureus*, *Grimmia apocarpa*, *Hedwigia*, *Ulota Americana*, *U. crispa* forma, *Bryum caespiticium*, *Mnium sylvaticum*, *Amblystegium adnatum*, *Hypnum reptile*, *Plagiothecium denticulatum*, *Platygyrium*

repens with flagella, *Brachythecium populeum*, *B. velutinum*, *Porella platyphylla* (L.) Lindb., *Radula complanata* (L.) Dum., *Cephalozia* sp.

All of the studies except the first two were made in the town of Newfane, Vermont. The names are the same as those in my Vermont Mosses unless the authorities are given.

BUXBAUMIA APHYLLA L.

In the September BRYOLOGIST Mr. Chamberlain mentions the finding of *Buxbaumia aphylla* on the Maryland bank of the Potomac, near Washington, D. C. I also have this species from the vicinity of Washington. Among a lot of fresh mosses collected for me by a young friend, on December 1st, 1900, were seven or eight plants of *Buxbaumia aphylla*, with capsules not quite mature. They had been found on the ground, in woods near Capitol View, Md.—about ten miles north of the city.

MARY F. MILLER,
Washington, D. C.

DR. BEST'S REVISION OF LESKEA.

In the Bulletin of the Torrey Botanical Club for September, 1903, Dr. G. N. Best publishes a "Revision of the North American Species of Leskea," which is a notable contribution to the literature of North American bryology. Dr. Best makes two new species and two new varieties. He also publishes two other varieties not new but with new names. These descriptions we give below in full.

Dr. Best describes two other species not included in the Manual of Lesq. and James, *L. gracilescens* Hedw. and *L. tectorum* (A. Braun) Lindb. We print also his notes on these two species but not his descriptions. As a help to the understanding of the relationship between the new and old species we publish Dr. Best's Key. The text is accompanied by two excellent plates drawn by Miss Alexandrina Taylor.

It is a pleasure to see a work like Dr. Best's; it is conservative, but not too much so. New species are not founded on mere scraps, à la Kindberg (and some other European writers that might be mentioned), but are founded on plants representative of a large series of widely distributed forms. In nomenclature he recognizes the claims of usage, and also that names are made for science and not science for names.

If Dr. Best were to accept the principles lately laid down and followed by our foremost fern students it would not be Leskea at all. Heaven only knows what it might be, but Dr. Best says "The usually accepted type of Leskea is *L. polycarpa*, and since both the name and the type bear the sanction of all recent authorities, the author of the Revision feels constrained likewise to accept them."

A. J. GROUT.

Reprinted and abridged from the Bulletin of the Torrey Botanical Club, 30; Sept., 1903.

REVISION OF THE NORTH AMERICAN SPECIES OF LESKEA.

BY DR. G. N. BEST.

Key to the Species.

- EULESKEA: leaves papillose, costate; median cells usually isodiametric; peristomial teeth abruptly incurved from a bulging base when dry.
- Leaves ovate-lanceolate, acute to acuminate, more than twice as long as wide.
 - Leaves more or less secund; leaf-cells distinct.
 - Capsules straight; operculum short-conic *L. polycarpa.*
 - Capsules curved; operculum long-conic. *L. arenicola.*
 - Leaves straight; leaf-cells small, indistinct; capsules straight, erect. *L. microcarpa.*
 - Leaves ovate, subacute to obtuse, less than twice as long as wide.
 - Leaves symmetric, biplicate, margins often revolute. *L. gracilescens.*
 - Leaves asymmetric, not plicate, margins plane. *L. obscura.*
- HETEROLESKEA: leaves smooth or nearly so, costate or ecostate, median cells longer than wide; peristomial teeth erect when dry.
- Leaves denticulate, ecostate. *L. denticulata.*
 - Leaves entire or nearly so, costate;
 - Acumen longer than body;
 - Costa subpercurrent. *L. nervosa.*
 - Costa short. *L. Williamsi.*
 - Acumen shorter than body;
 - Costa short, bifid.
 - Leaves smooth. *L. tectorum.*
 - Leaves subpapillose. *L. cyrtophylla.*

(1) ***Leskea polycarpa subobtusifolia*** (C. M. & K.) Best.

Leskea subobtusifolia C. M. & K.; Macoun, Cat. Can. Pl. 6:169. 1892.

Subsp. *L. obtusifolia* Kindb. Eur. & N. Am. Bry. 25. 1896.

Tufts dirty yellowish green; stems and branches curved at tips: stem-leaves subsecund, biplicate, ovate-oblong to ovate-lanceolate, subacute to obtuse, obliquely pointed, the lower acuminate and blunt-pointed, 1 mm. long, 0.4 mm. wide; leaf-cells as in *L. polycarpa*. Macoun, Canadian Musci 533.

Professor Macoun has kindly loaned me the duplicate of the type, collected at Sprout, Pass River, B. C., as well as other material from the same locality and referred to it. All the specimens are destitute of fruit and are unquestionably but forms of *L. polycarpa*, nearer however the var. *paludosa* than the type. It is retained as a variety from the fact that the sporophyte when found might possibly offer something distinctive entitling it to specific rank.

(2) ***Leskea arenicola*** Best.

Plants somewhat rigid, in loosely spreading tufts, pale yellowish green passing to reddish brown; stems 2-5 cm. long, creeping, radiculose, pinnately branched; branches simple, ascending, sometimes curved; central strand small, distinct; paraphyllia multiform, mostly linear-lanceolate: stem-leaves rigid, secund, 0.4-0.5 mm. wide, 0.8-1 mm. long, ovate to ovate-lanceolate, obliquely acuminate, acute to blunt-pointed, scarcely biplicate, margins usually recurved at base, entire or sinuate-serrulate above, costa disappearing in the acumen; leaf-cells somewhat clear, stoutly uni-papillate on under

surface, usually smooth on upper alar; cells quadrate, in 5 or 6 rows; median oval-rhombic to oblong-fusiform, 8-9 μ wide, about twice as long; branch-leaves broadly lanceolate, scarcely secund, 0.25-0.35 mm. wide, 0.5-0.7 mm. long; monoicous; perichetial bracts appressed, plicate, costate, long and narrowly acuminate, entire or serrulate above; pedicel 1.5 cm. long, grooved, twisted to the left below, to the right above, curved, reddish; capsule oblong-cylindric, curved, tapering at base, wrinkled when dry; urn about 2 mm. long, 0.6 mm. wide; exothelial cells oblong-linear, thick-walled; annulus broad, 2-3 rows of cells; teeth lanceolate-linear, 0.6-0.7 mm. long, 0.03 mm. wide, yellowish below, pale above, densely papillose, divisural line faint, ventral surface strongly lamellate; endostomial band yellowish, papillose, about one-seventh the length of the teeth; segments as long as the teeth, split, scarcely open on the keel; cilia rudimentary; operculum whitish, subshining, narrowly conic, about one-half as long as the urn; calyptra cucullate; spores smooth, 10-13 μ , mature in early summer. On the base of trees, rarely on decaying wood, in sandy places. (Plate 15, Figs, 1-13.)

TYPE LOCALITY: Delaware; collected by Mr. A. Commons, June 9, 1894; type in the New York Botanical Garden.

DISTRIBUTION: From Maine southward along the coast to Virginia and northward and westward to Minnesota and Dakota. Maine (Merrill); New York (Maxon, Grout); New Jersey (Best); Delaware (Commons); Maryland (Smith, Holzinger); Virginia (Vail and Britton); Ohio (Lesquereux); North Dakota (Holzinger); Minnesota (Holzinger).

EXSICCATAE: S. & L. Musc. Bor. Am. 243 and 365 as *L. obscura*; Ren. & Card. Musc. Am. Sept. 192b as *L. polycarpa forma*.

My first acquaintance with *L. arenicola* was in 1892 while collecting in the New Jersey pine-barrens. Recognizing its distinctness as a species specimens of it were distributed under this name. Subsequently, however, while examining the collection of the New York Botanical Garden, the same species was found under the name of *L. Donnellii*, having been collected in Maryland by Mr. J. Donnell Smith and so named by Austin. The type being in a poor condition, with only fragments of peristomes and no opercula, it was thought best to discard Austin's manuscript name and use a type as well as a new name.

L. arenicola is readily distinguished from all other species of *Euleskea* by its curved capsules, longer teeth and segments, longer and narrower opercula and by its rhombic, elongated leaf-cells. In its general appearance it resembles some forms of *L. polycarpa paludosa*, from which it is however easily separated by the character just named. When once understood it will probably be found more common than here indicated.

(3) ***Leskea nervosa nigrescens*** (Kindb.) Best.

Leskea nigrescens Kindb. Bull. Torrey Club, 16: 97. 1889.

Leskea nervosa var. *flagellifera* Kindb. Ottawa Nat. 4: 62. 1890.

Anomodon heteroides Kindb.; Macoun, Cat. Can. P. 6: 62. 1890; Eur. & N. Am. Bry. 12. 1896.

In intricate tufts or mats, dirty yellowish green to dark green or black; stems 2-3 cm. long, creeping, scarcely radiculose, defoliate or with distant ovate narrowly acuminate recurved leaves, irregularly branched; branches usually few, short, ascending with numerous flagelliform branchlets, commonly bearing bulbils at their tips; branch-leaves as in type but

smaller, 0.2-0.3 mm. wide, 0.4-0.6 mm. long; leaf-cells quadrate-hexagonal smooth or slightly papillose, 6-8 μ wide; leaves of branchlets rudimentary, scarcely costate; sterile. On the base of trees, sometimes on stones and rocks; with the type but less common; Canad. Musc. 395.

In nearly all specimens of this variety leaves, from either stems or branches may be found sufficiently developed to show that they are identical with those of *L. nervosa*, proving conclusively that var. *nigrescens* is only a retrograde form of this species. Moreover tufts are often made up of both plants growing together, the one bearing bulbils in small heads, the other a few on flagellate branchlets. While these organs are usually sessile when in compact clusters, they sometimes appear on short flagellate stems, thus constituting a transitional form between those of the type and those of var. *nigrescens*. Such was conspicuously the case with a specimen from Vermont (Dr. Grout).

(4) *Leskea Williamsi* Best.

Plants quite small, in spreading subshining tufts, pale yellow to golden brown; stems slender, creeping, radiculose, pinnately branched, 2-4 cm. long; central strand none; branches ascending, simple or with flagellate branchlets; lower stem-leaves decolorate, roundish ovate, abruptly acuminate, costa short, nearly obsolete; upper stem-leaves appressed when dry, erect spreading when moist, straight or subsecund, entire or serrulate above, ovate-lanceolate, acuminate, acumen about as long as the concave biplicate body, 0.25-0.35 mm. wide, 0.4-0.5 mm. long; margins recurved below or plane all around; costa short, thin, simple or bifid, scarcely reaching the middle; branch-leaves smaller, 0.15-0.20 mm wide, 0.25-0.4 mm. long; leaf-cells smooth clear; median linear-rhomboidal to fusiform, subvermicular, about 6 μ wide, 3-5 times as long; alar quadrate to transversely oval, in about 4 rows, extending well up the margins and passing to oval-oblong; dioicous; perichetial bracts oblong-lanceolate, acuminate, striate-plicate, inner subvaginant; pedicel smooth, flexuous, about 1 cm. long; capsule straight, erect or inclined, oblong-subcylindric, tapering at base; urn 2 mm. long, 0.7 mm. wide, brownish; teeth reddish, incurved when dry, lanceolate, confluent at base, finely striate below, rugulose above, divisural line distinct, ventral surface lamellose; endostomial band strongly reticulated, about one-fourth the length of the teeth; segments narrow, concave keeled, hiant, about as long as teeth; cilia none; annulus of two rows of pellucid cells, shed with the operculum; operculum conic, straight or obliquely beaked; calyptra cucullate, reaching to the base of the capsule; spores smooth, 10-13 μ wide, mature in summer. On rocks and rotten wood. (Plate 16, Figs. 55-68.)

TYPE LOCALITY: Montana; type collected by Mr R. S. Williams, on Tenderfoot or Belt Mountains, Sept. 9, 1891; now in the Herbarium of the New York Botanical Garden; also collected by Mr. Williams at Columbia Falls, Mont., and by Prof. Holzinger in Minnesota.

In general appearance *L. Williamsi* resembles the smaller forms of *L. tectorum*, from which it differs, however, by its narrower, longer acuminate, often serrate leaves, its longer median cells, its broader, strongly reticulated endostome and its striate-plicate perichetial bracts. Named in honor of my friend Mr. R. S. Williams.

(5) *Leskea Williamsi filamentosa* Best.

In thin loosely spreading or somewhat intricate tufts, pale green pass-

ing to yellowish green or reddish brown: stems prostrate, defoliate or with a few rudimentary leaves, sparingly branched; branches filiform, diffusely spreading, 2-5 cm. long; branchlets flagellate, brittle, broken when dry; larger branch-leaves narrowly ovate-lanceolate, long-acuminate, erect, not plicate, entire or serrulate above, 0.15-0.2 mm. wide, 0.3-0.5 mm. long; costa thin, commonly marked by 3 or 4 rows of enlarged cells, disappearing below the middle; leaf-cells smooth, clear, not uniform; median cells oval-rhombic to linear-rhomboidal, 2-4 times as long as wide; alar quadrate, in 3 or 4 rows; leaves of branchlets similar, smaller, sometimes rudimentary; sterile.

Type of variety collected by Mr. L. F. Anderson on rocks near Lahoon, Idaho. Drummond's Musci Americana 219, in part; Brandege's Mosses of Southern Colorado 38.

This delicate little moss appears to have been a standing puzzle for several years. It was found in some of the sets of Drummond's Musci Americana No. 219, but not in all, and was distributed as *Hypnum catenulatum*. Some of the other sets of this number, but not all, contained *Heterocladium heteropteroides filescens*, a moss it closely resembles, but which differs in being papillose. Some years ago Mr. Gepp sent me from the Natural History Museum in London a portion of one set of Drummond's 219 bearing the name of *Hypnum graveolens* Wils. It therefore appears that so good an authority as Wilson had discovered that the moss in question was not *Leskea catenulata* (Brid.). Subsequently Mrs. Britton gave me some specimens of Brandege's No. 38, which I named *Heterocladium heteropterum fallax* Milde? A careful study of Drummond's 219 and Brandege's 38 made it obvious that we had to deal with an attenuated form of some species which under more favorable conditions grew better developed.

(6) ***Leskea tectorum flagellifera* Best.**

In somewhat dense compact tufts, pale green to yellowish-brown: stems prostrate, pinnately branched; branches filiform with numerous flagellate deciduous branchlets; stems defoliate, rarely with rudimentary leaves; branch-leaves as in type but usually much smaller; leaf-cells smooth, clear, oval-rhombic; leaves of branchlets very small, 0.05-0.1 mm. wide, 0.1-0.2 mm. long. Differs from *L. Williamsi filamentosa* by its entire leaves and larger leaf-cells. Type of variety collected by Mr. R. S. Williams at Columbia Falls, Montana, Sept. 5, 1895; found also by Professor Holzinger in Minnesota. It usually grows on rocks and rotten wood.

The North American *Heteroleskeae* differ from the European by being usually more markedly proliferous. The somewhat dense tufts of var. *flagellifera* are mostly flagellate branchlets which when dry readily separate from their attachments. By soaking these tufts and dissecting out the stems and branches leaves may usually be found sufficiently developed to make possible the identification of the plants.

(7) ***Leskea gracilescens* (Hedw) Best.**

L. gracilescens is quite common and widely distributed, ranging through the Eastern, Middle, Northern and Western States, rare in Canada and in the Southern States and absent west of the Rocky Mountains. It differs from the closely related *L. polycarpa* by its smaller straight leaves which are shorter and comparatively broader, usually gradually acute and blunt

pointed, and by its shorter, often unequal segments. In some of its forms it approaches *L. polycarpa*, in others *L. obscura*, without however fitting either as a variety. In general terms it may be said that all those doubtful forms that plainly do not belong to either of these species should be referred to *L. gracilescens*, which moreover has priority over the last.

(8) ***Leskea tectorum*** (A. Braun) Best.

Widely distributed and quite variable, *L. tectorum* is usually easily recognized when once understood. Its leaf-cells, broad, plump, rounded, glassy, furnish its most distinctive character. Its leaves are quite like those of *Amblystegium adnatum* but some what smaller. This differs, however, in having its leaf-cells longer and narrower, especially in the upper part of the leaves, so that no difficulty need be experienced in discriminating between the two species. The closely allied European *Leskea catenulata* (Schwägr.) Brid., undoubted specimens of which have not as yet been reported from North America, may be known by its narrower, longer and thicker costa, usually reaching the middle and not forking, and by its thick-walled leaf-cells.

The type of *L. Wollei* Aust. has been compared with European specimens of *L. tectorum*, with the result of finding them nearly or quite identical. While the median leaf-cells are slightly longer, sometimes more rhomboidal than in the ordinary forms of this species, the same variations occur in foreign specimens. The cotype of *Pseudoleskea malacoclada* C. M. & K., through the kindness of Prof. Macoun, has likewise been seen and carefully examined. Although it is slightly stouter and the basal margins of the leaves are more commonly recurved, it differs in none of the essentials from the specific type of *L. tectorum*.

Rosemont, N. J.

BIBLIOGRAPHY—T. P. JAMES.

In response to a request to supplement the article on Thomas P. James by a list of his writings, Mrs. Gozzaldi writes the following under date Oct. 8, 1903. "My father was so much taken up with the study of Bryology and his work in the Horticultural and Pomological Societies that he wrote very little outside these lines for publication. I will add what I can think of to these." Then follows: Life of William Darlington, M. D.; "Anophytes" in Darlington's Flora Cestrica; Flora of Delaware Co., Pa. in Dr. George Smith's History of Delaware Co.; The Journal of Pursh the Botanist, Edited and Published by T. P. J.; "Anophytes" in Smithsonian Report of Flora of Alaska, by J. T. Rothrock; "Mosses" in Vol. V, Clarence King Surveys, and the Manual of the Mosses of North America in connection with Lesquereux.

A. M. S.

MOUNTING MOSSES.

CORA H. CLARKE.

The answer to the question as to what is the best way to arrange mosses depends somewhat on the purpose of the collection and how it is to be used.

I am constantly needing to examine my mounts and compare new finds with those I already have, and I could not manage with mosses tucked away in envelopes or packets. I prefer an open-faced collection, and to attach the pressed mosses to paper I always use a solution of gum tragacanth, being so directed by that learned and kindly bryologist, Thomas Potts James, to whose generous help I owe so much. He recommended the use of gum tragacanth, because it is so absolutely colorless, that it never shows on the paper—the moss has the effect of being fixed, like a seaweed, by its own gluten. One must buy the purest quality of gum tragacanth, and discard all stained pieces. It takes very few pieces to make a fair sized bottle of the prepared material, and even then the gum is of the consistency of jelly. I spread it on the pressed moss as if I were buttering a piece of bread; and then lay the moss on the paper, wiping off all that spreads outside, placing under light pressure until dry. One must use care not to let any stray grains of earth mix with the gum, for it will affix them as firmly to the paper as it does the moss. Mr. James used a few drops of oil of lavender to prevent the prepared gum tragacanth from molding, but I have not always found it effective, and now I prepare first a saturated solution of boracic acid in water, and then dissolve my gum in this solution, in consequence of a hint derived from an article by Rodney True, on The Prevention of Mold on Cigars, in *Science*, July 18, 1902; an article to which I am much indebted.

Although I mount nearly all my mosses on herbarium paper, or paper similar in weight and quality, I use paper of different sizes, and have six different methods according to the purpose for which the collection is intended.

1. This method hardly deserves the name, it is only a sort of moss-diary. When I go on a particularly prolific prowl, I gum scraps of all the mosses I find onto a single sheet, giving date and locality, and calling it "a Record Sheet." I often do the same with sea-weeds. They do not make herbarium specimens, but only a sort of collecting journal, and often convenient to refer to.

2. For a handy and popular set, to sell at fairs or give to friends, I select mosses with especially characteristic and contrasting forms, stiff and graceful, dark and light, erect and trailing, and most especially those which rejoice in popular names, like Broom-Moss, Four-tooth Moss, Twisting Cord Moss, Urn Moss, Peat Moss, Brook Moss, Fern Moss, etc., and mounting a nice specimen of each on a sheet of paper about 5 x 8 inches, tie these sheets together in booklets of twenty or thirty leaves, each having a cover of gray card-board. People who have never studied mosses are amazed at the number of different forms that can be found in their own woods.

3. When making a set of the mosses of some particular town or village,

to deposit in the Public Library of that town, I use a scrap book with fair white leaves, gumming the mosses directly onto the leaves, and writing in the names. One cannot make up such a set, however, until one knows pretty well how many and what kinds one is likely to find, so as to know how to group them. A beginner should have a method allowing for the growth of the collection and its rearrangement, and for the insertion of new finds among the former ones, and of new forms of species already placed in the collection.

4. My own special herbarium is on half-size herbarium sheets, those being easier to handle and examine than the full-sized sheets. If the moss is large, it is mounted directly on the sheet, indeed, there may be several sheets to one species; if small, it is mounted on a 4 x 5 or 5 x 8 paper, and the paper pinned onto the larger sheet with small pins (these pins, Kirby Beard & Co., are only half an inch long, and can be bought at small-wares counters). The use of these small pins allow one to add new mounts, or rearrange the old ones, at will. This collection can grow to any extent.

5. In arranging my local or *Magnolia* collection, which I keep in the summer cottage, I am cramped for room, and here I economize space by mounting all my mosses directly on the half-size sheets, and where the moss is small, like most of the *Bryums*, or *Ditrichums*, I gum several species on one sheet, though the *Fontinalis* and *Sphagni* require a sheet for each species.

6. In preparing mosses to present to any institution not cramped for space, I use full size herbarium sheets, and of course but one sheet to a species, and I try to have each species represented by many specimens; for instance, one to show it as it grows, another carefully picked out to show the branching; one to show it growing clear and clean by itself; another, mixed with other mosses: one to show the sporophytes starting, and the next, the swelling fruit; the third shows the ripe fruit dropping caps and lids, and finally, one shows the old fruit with the empty spore-cases; each of course has exact date and locality given, and if possible the same moss is secured from various localities, to show range of distribution, and also variations in growth. And on every sheet is gummed an envelope, plentifully filled with plants, which can be taken out and studied. Such an open-faced collection as this is meant to be freely handled and examined. I admit that rare or valuable mosses must be protected by being in packets or envelopes, and if there is any doubt about the species, a specimen must not be gummed onto a sheet with other specimens. Such doubtful plants can be given a sheet to themselves, or else provisionally placed in pin-attached packets, which can be easily transferred elsewhere, when new revelations as to their affinities occur. Mr. Chamberlain's method of folding his packets is like that which Mr. James taught me, except that I think Mr. James folded his oblong paper, exceptly in the middle, making his top fold double. He then creased the ends backward and under, as Mr. Chamberlain describes, thus holding the upper flap taut and firm. Boston, Mass.

REVIEW OF MOSSES WITH HAND-LENS AND MICROSCOPE.

BY JOHN M. HOLZINGER.

Part I of this work appeared in June of the present year. It is published by the author A. J. Grout, Ph. D., at 360 Lenox Road, Brooklyn, N. Y. It aims to be "a non-technical hand-book of the common mosses of the northwestern United States."

It is a pleasure to note at the outset that the paper, the printing, and the figures and plates, all, are excellent. In addition to numerous original figures many of the full-page illustrations for families and genera are reproduced from Bruch & Schimper's monumental work, *Bryologia Europaea*, and from Sullivant's *Icones*. The chapter on life history and structure is especially well illustrated with plates and figures reproduced from Schimper's "*Recherches sur les Mousses*." The illustrations of the glossary include numerous original additions to Dixon & Jameson's *Handbook of the British Mosses*, which is also followed in the system of classification adopted by the author. Since all of these works are either inaccessible to the majority of our moss students or else are too expensive, the reproduction of these illustrations is an especially valuable feature for all for whom this handbook is intended. These include not only all our moss students remote from the larger universities, the libraries and herbaria of which afford the best opportunities, but also all teachers of botany who, while they may not wish to take up bryology as a specialty, have yet offered them in this work the ready means of understanding this most fascinating group of plants somewhat more fully than the current general manuals of botany make possible. To them the excellent diagnostic characters of families and genera, drawn from the author's own working experience, will be a most welcome aid in distinguishing the more common genera.

The first part consists of eighty-six pages of printed matter and plates; the latter, like the smaller figures, are printed in with the text, and are paged continuously with the printed pages. The first forty-six pages take up in different chapters the discussion of classification principles, the collection of mosses, mounting, methods of manipulation in their study, life history and structure, and the illustrated glossary. The manual proper begins with page 47, the Key to the Families of Mosses occupying the next three pages. In the pages following the attempt is made to enumerate and describe all the mosses of the region covered. Doubtful or doubtfully identified forms have been advisedly omitted.

All in all, this is the best elementary manual of mosses in any language, considering both print and illustrations, it is certainly the first illustrated manual offered to our young American Bryologists. Two keys will be given at the end of the work, one for the fruiting mosses and the other for the sterile ones.

Winona, Minn.

SULLIVANT MOSS CHAPTER REPORT ON VOTE.

Twenty-five votes were cast in response to the Note to Chapter Members in the September BRYOLOGIST. All were in the affirmative, therefore, the four points outlined are adopted. ANNIE MORRILL SMITH.

NOTICE—ELECTIONS.

Forward your ballot *at once* to Miss Edith A. Warner, 19 Schermerhorn street, Brooklyn, N. Y., Judge of Elections. Polls close December 1st.

For President.—Prof. John M. Holzinger, Winona, Minn.

For Vice-Pres.—Mrs. Carolyn W. Harris, 125 St. Mark's Avenue, Brooklyn, N. Y.

For Secretary.—Miss Mary F. Miller, 1109 M street, N. W., Washington, D. C.

For Treasurer.—Mrs. Annie Morrill Smith, 78 Orange street, Brooklyn, N. Y.

A CORRECTION.

In the last BRYOLOGIST (September) on p. 90, under the mosses offered by Mrs. M. L. Stevens, the statement that *Hypnum vernicosum* Lindb., had not before been reported from New England is an error. Our attention has been called to two stations, see Vt. Mosses; Grout, p. 30. Five stations are also reported for *Bryhnia Novae-Angliae* in New England. A. M. S.

NOTICE.

Membership in the Sullivant Moss. Chapter for 1904, and Part I. of Dr. Grout's new book, "Mosses with Hand-Lens and Microscope," and a copy of his "Vermont Mosses, with Keys," can be obtained by sending \$2.00 to Dr. A. J. Grout, 360 Lenox Road, Brooklyn, N. Y., *before* Jan. 1st, 1904. This special offer is made for two months to hasten the sales of "Mosses with Hand-Lens and Microscope" so that Part II., which is ready for the printer, may be printed soon.

NOTICE.

The undersigned will issue in fascicles of twenty-five numbers, "Musci Acrocarpi Boreali Americani" at \$1.50 a fascicle. Contributions from collectors are solicited and will be generously paid for. Not over twenty-five sets will be prepared. Subscriptions solicited. Address

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- Mr. C. B. Robinson, New York Botanical Garden, Bronx Park, New York City. *Fissidens osmundoides* Hedw. *Dichelyma capillaceum* (Dill.) Schimp. *Tortella fragilis* (Drumm.) Limpr. = *Barbula fragilis*, B. & S. Collected in Nova Scotia and Cape Breton. Limited supply of last two.
- Miss Mary F. Miller, 1109 M. St., N. W. Washington, D. C. *Hylocomium parietinum* Lindb. c.fr. Collected, Shandaken, N. Y.
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- Miss Annie Lorenz, 96 Garden St., Hartford, Conn. *Camptothecium nitens* Schimp. c.fr. Collected in Willoughby, Vt.
- Mrs. R. H. Carter, 37 Church St., Laconia, N. H. *Weissia ulophylla* Ehrh. c.fr. *Umbilicaria flocculosa* Hoffm. Collected in Laconia, N. H.

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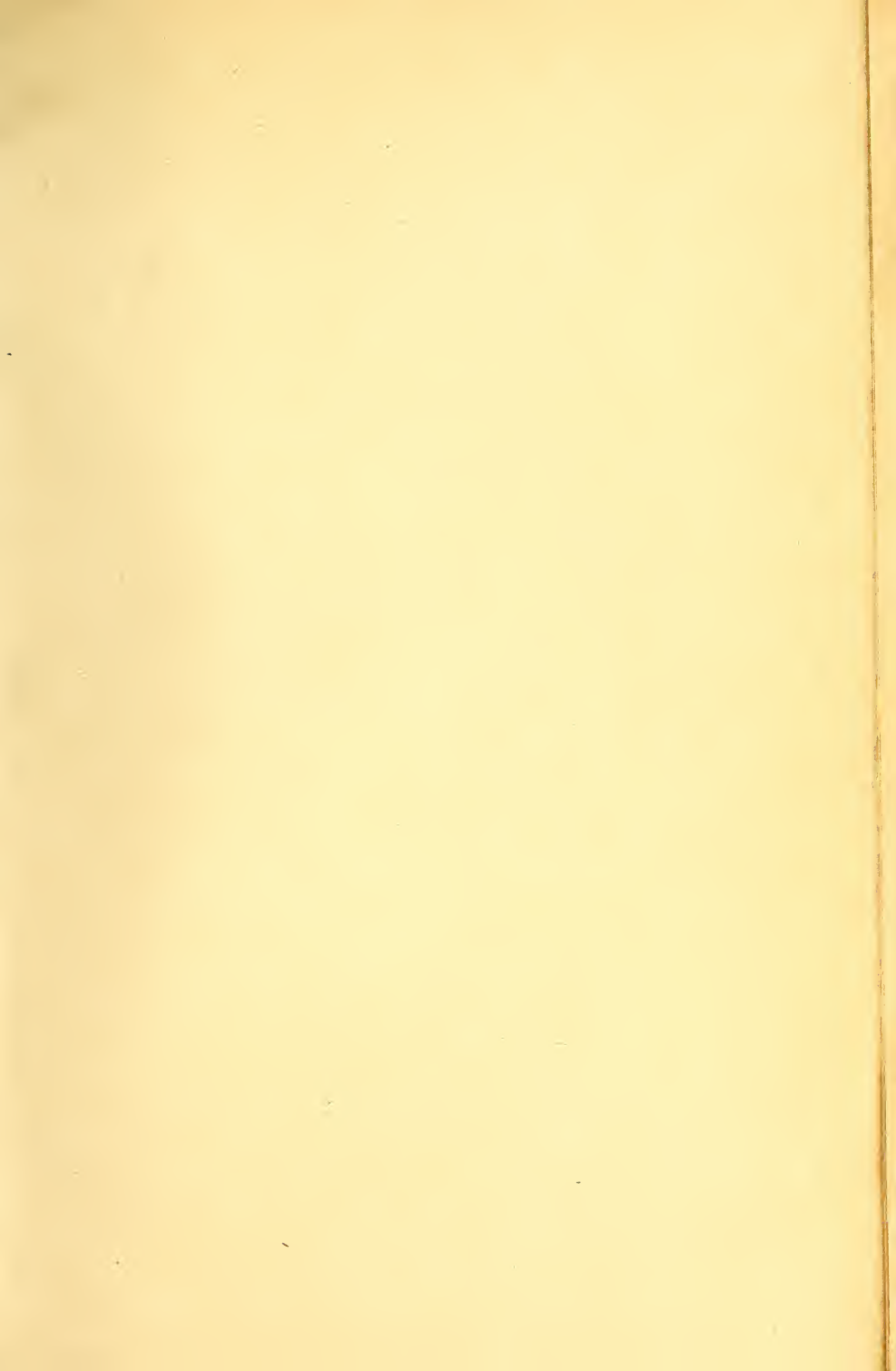
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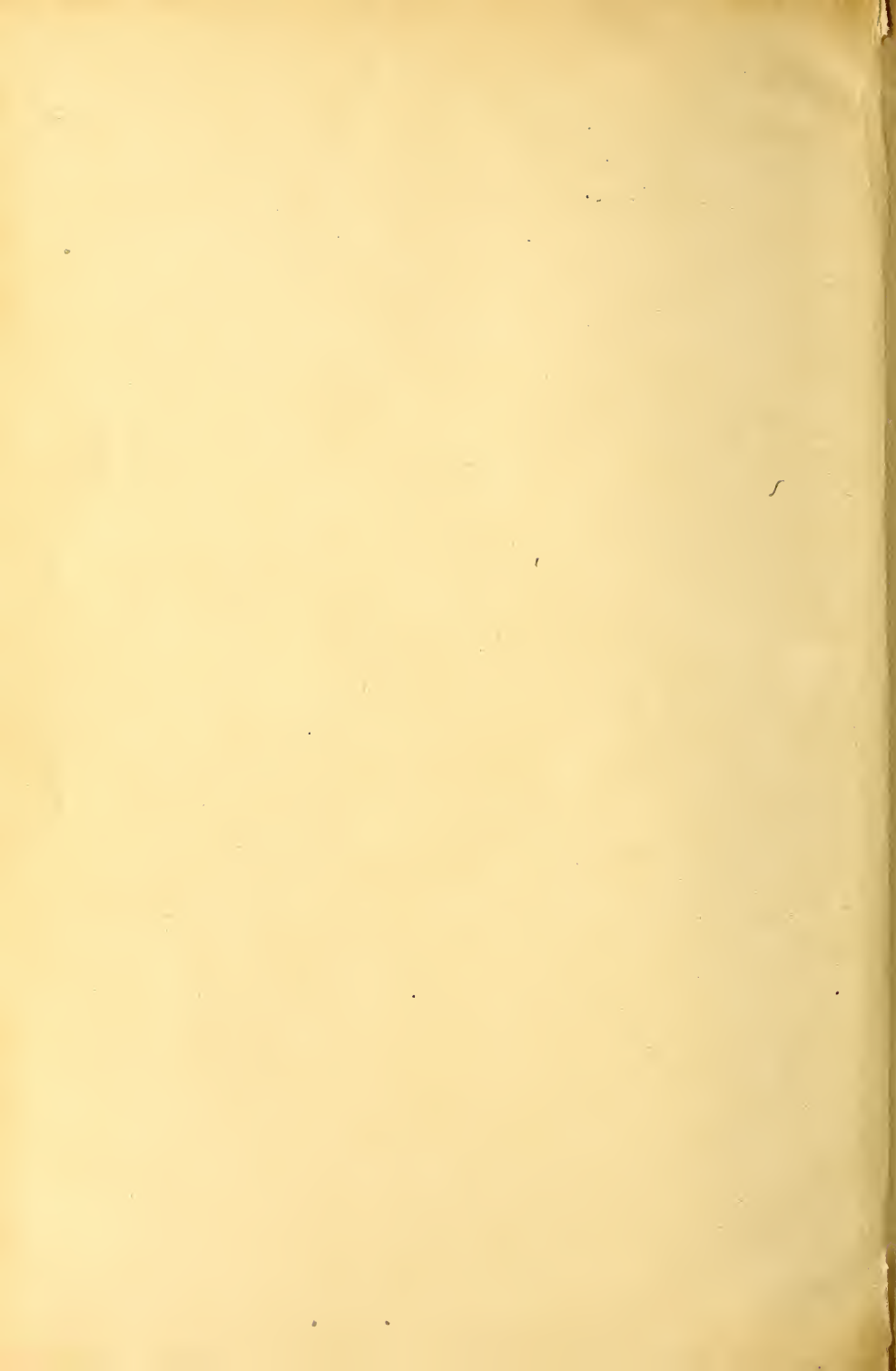
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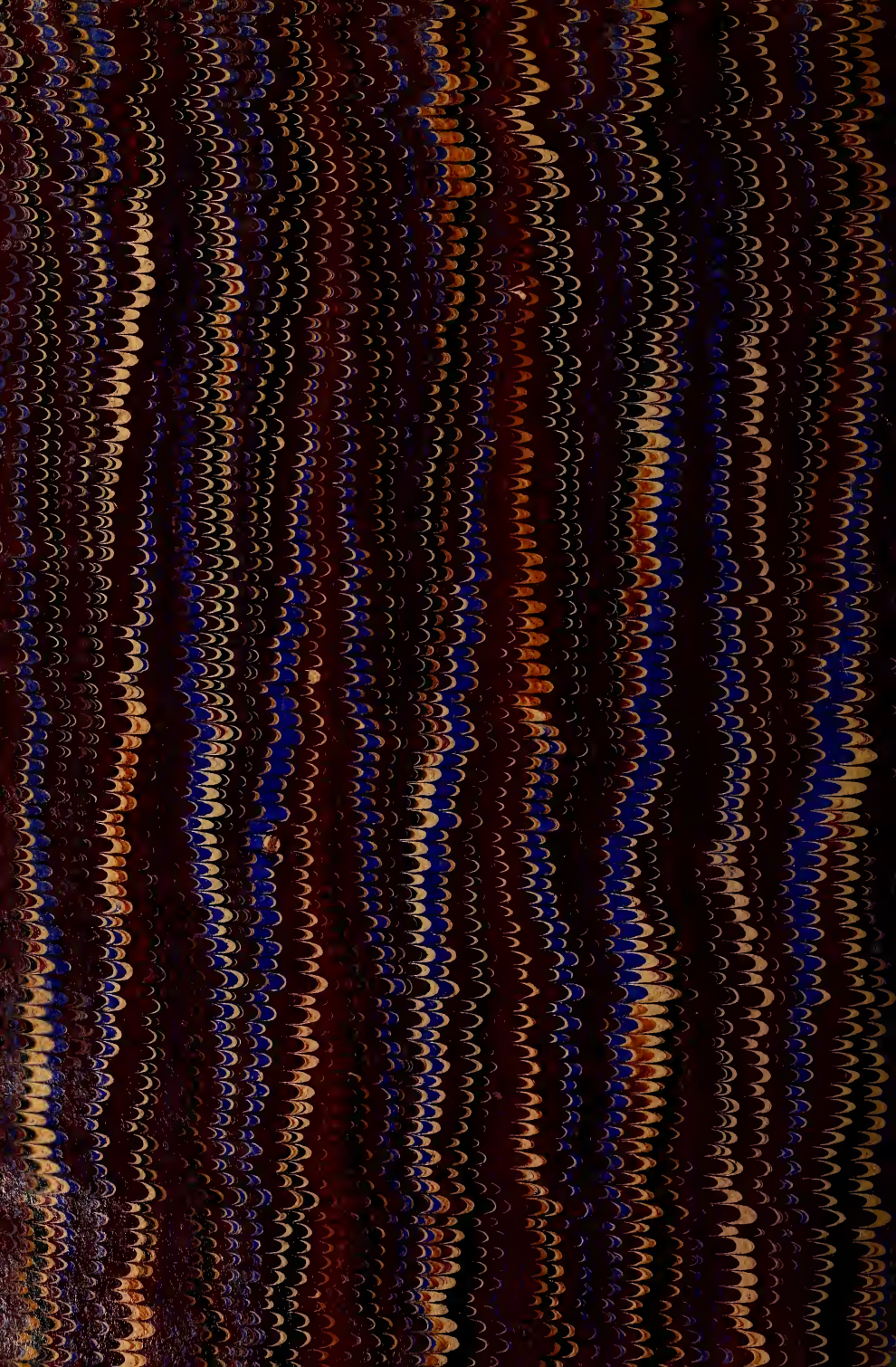
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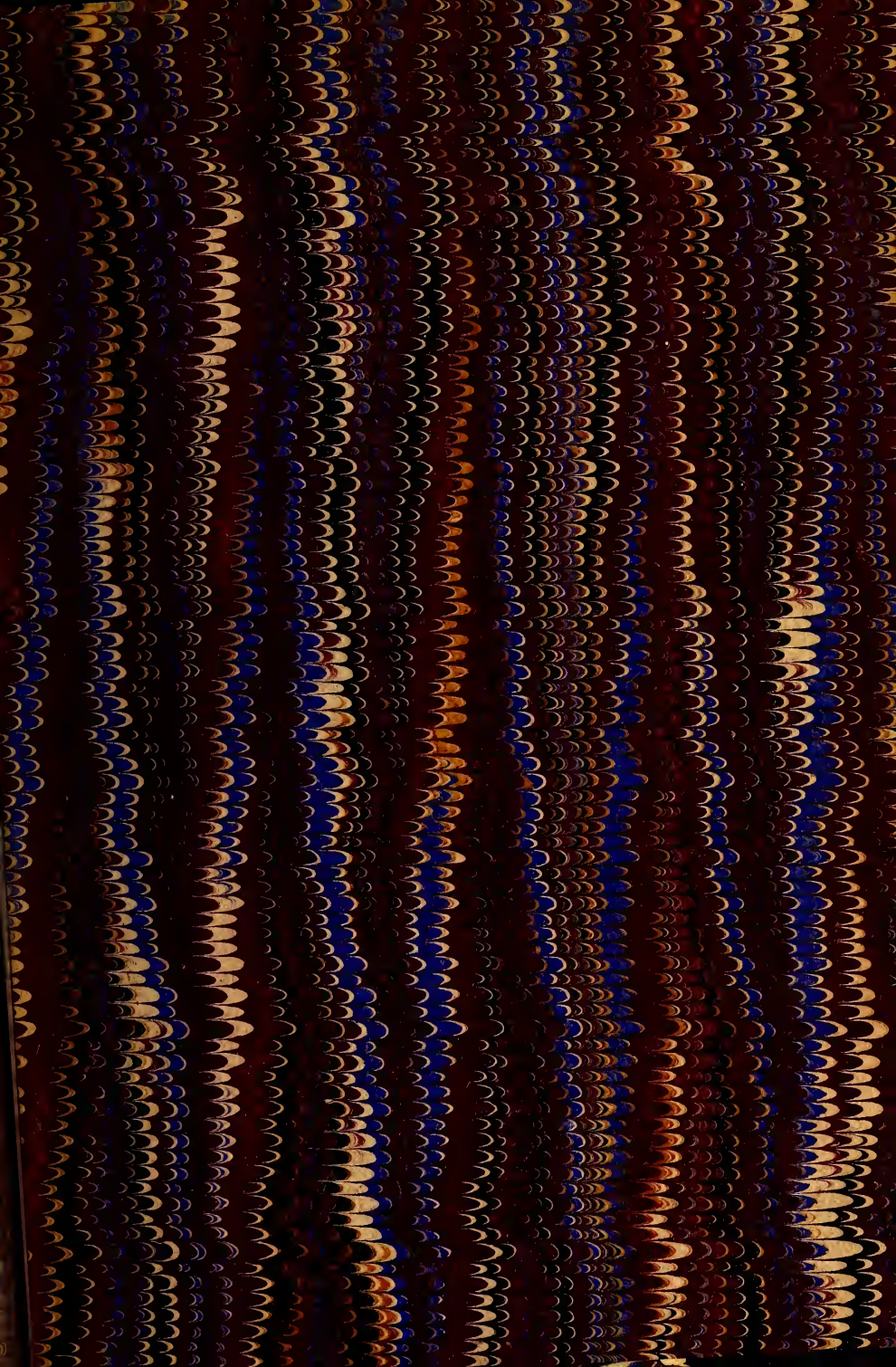
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