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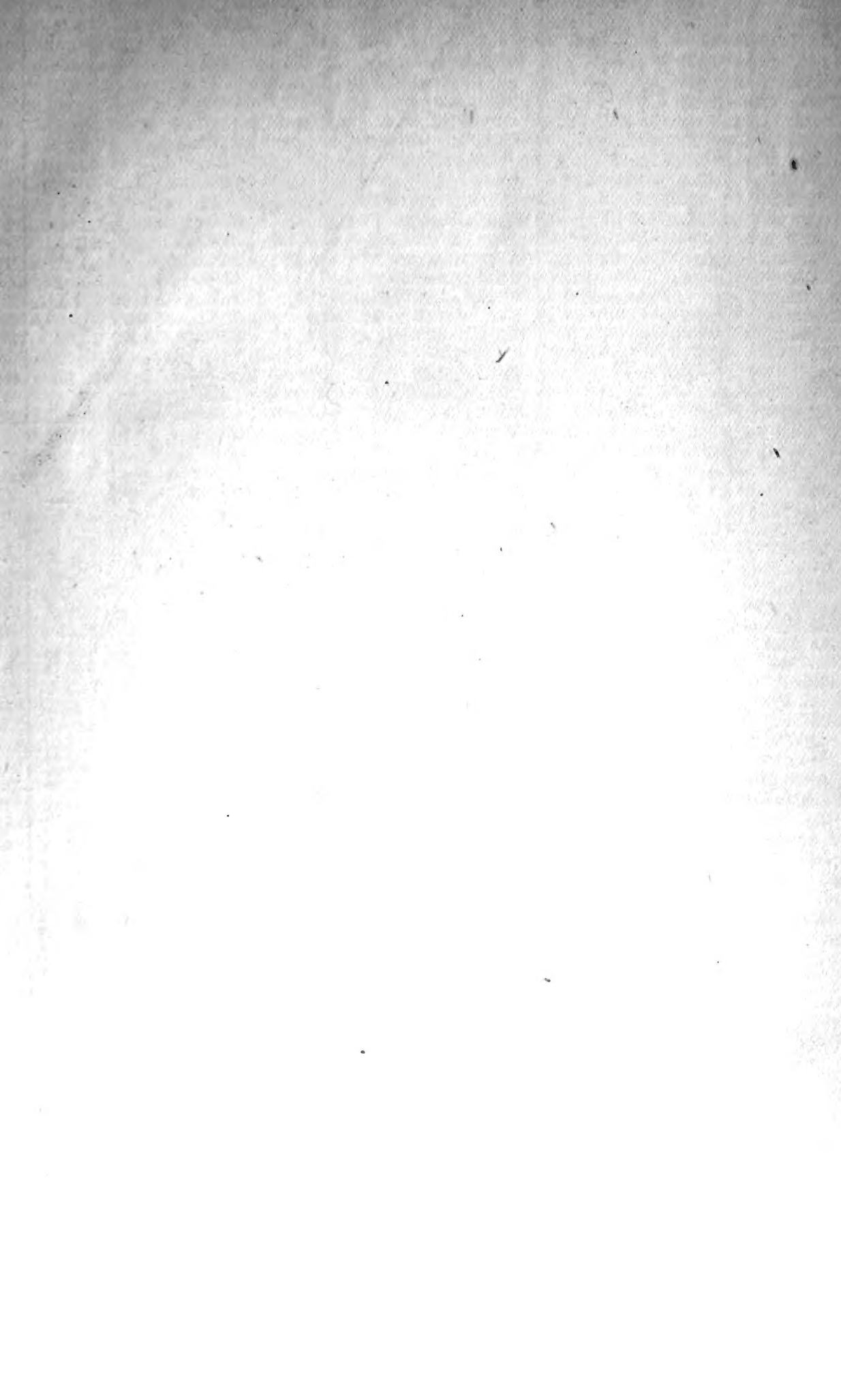
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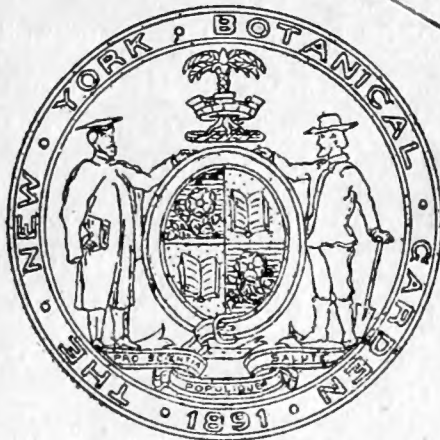
May 27<sup>th</sup> 1901.

# BULLETIN

OF

# THE NEW YORK

# BOTANICAL GARDEN.



## Contributions to the Botany of the Yukon Territory.

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1. An Enumeration of the Hepaticae collected by R. S. Williams, 1898-1899.

BY MARSHALL A. HOWE.

Mr. Williams' collection of Hepaticae is of much interest inasmuch as it contains one species which appears to be entirely new, one which has not before been reported from this

continent, five others new to the Alaska region, and besides these two or three which have been rarely collected in America. With the exception of the collections made by the Harriman Alaska Expedition in 1899 and reported upon by Dr. Alexander W. Evans,\* the number of species—24—secured by Mr. Williams is greater than that brought from Alaska † by any other collector. The literature bearing upon the Alaskan Hepaticae has been so fully discussed in the recent paper by Dr. Evans that nothing on that point need now be said.

*Marchantia polymorpha* L. West Dawson, July 30, 1899.

*Metzgeria pubescens* (Schrank) Raddi. On rocks, Cañon City, March 27, 1898.

*Gymnomitrium coralloides* Nees. On rocks, Lake Lindeman, May 5 and 8, 1898. In cañon above Lake Lindeman, April 8, 1898.

*Marsupella emarginata* (Ehrh.) Dumort. Sheep Camp, March 29, 1898. A variety, also, of this species on rocks above Long Lake, May 24, 1898.

*Nardia scalaris* (Schrad.) S. F. Gray. Dawson, September 11 and October 2, 1898. Mixed with *Lophozia Floerkii*.

*Jungermannia cordifolia* Hook. Abundant in streams running into Lake Lindeman, April 9, 1898. Mixed with *Scapania undulata*. The leaves are more rigid and the leaf-cells have larger trigones than is normal, but the plants (sterile) agree with *J. cordifolia* in size, habit, form of leaves, etc.

\* LOPHOZIA RUTHEANA (Limpr.). (*Jungermannia Rutheana* Limpr. Jahresb. Schles. Gesell. vaterl. Cult. 61: 207. 1884. *Jungermannia lophocoleoides* Lindb. Medd. Soc. Faun. et Fl. Fenn. 14: 66. 1887. Kongl. Sv. Vet.-Akad. Handl. 23<sup>5</sup>: 41. 1889.) Paroicous. The species was originally described as dioicous. Lindberg, however, called attention

\* Proc. Wash. Acad. Sci. 2: 287-314. pl. 16-18. 10 O. 1900.

† The word "Alaska" is employed in the present paper in a geographical rather than political sense. Most of Mr. Williams' specimens came from British soil.



to the great similarity between it and his paroicous *J. lophocoleoides*, suggesting the possibility that it had not been rightly interpreted, owing to poverty of material. In a copy of the original diagnosis sent out by Limpricht, the "Diöcisch" has been replaced by a pen-and-ink "Paröcisch," indicating the recognition of an error in the first description.

*Lophozia heterocolpa* (Thed.) M. A. Howe. Over rocks and earth on mountain side, Dawson, August 7 and September 7, 1898.

*Lophozia incisa* (Schrad.) Dumort. On *Sphagnum*, Klondike, September 18, 1898.

*Lophozia barbata* (Schreb.) Dumort. Klondike River bottom, October 9, 1898. New to Alaska.

*Lophozia Floerkii* (Web. & Mohr) Schiffn. On wet rocks, Lake Lindeman, May 30, 1898.

*Lophozia lycopodioides* (Wallr.) Schiffn. Very common among bushes, Lake Lindeman, May 22, 1898. New to Alaska.

*Lophozia quinquedentata* (Huds.) Schiffn. On rocks, Klondike, October 10, 1898. Mixed with the following species.

*Lophozia saxicola* (Schrad.) Schiffn. On rocks, Klondike, October 10, 1898. We have seen but two other American specimens of this, both in the herbarium of Professor Underwood. One bears the inscription "Moore Factory, Canada, in herb. Tayl., Greville, 1843." This was probably collected by Drummond. The other was collected by Prof. J. Macoun, August, 1882, in "alpine situations, Mount Albert, Gaspé, Canada," and was issued as no. 236 of Carr. & Pears. Hep. Brit. Exsicc. According to Herr Stephani,\* the species was collected in Alaska by the Drs. Krause, also.

*Lophozia minuta* (Crantz) Schiffn. On rocks, Lake Lindeman, May 24, 1898. In a swamp, Dawson, September 8, 1898.

*Mylia anomala* (Hook.) S. F. Gray. On *Sphagnum*, Dawson, August 31, 1898. New to Alaska.

\* Engler's Bot. Jahrb. 8: 97. 1887.

*Geocalyx graveolens* (Schrad.) Nees. Dawson, August 31, 1898. Gemmiferous. New to Alaska.

*Odontoschisma sphagni* (Dicks.) Dumort. In swamp, Dawson, September 8, 1898. New to Alaska.

*Blepharostoma trichophyllum* (L.) Dumort. On river bank below Bonanza Creek, Klondike, June 18, 1899.

TEMNOMA SETIFORMIS (Ehrh.). (*Jungermannia setiformis* Ehrh. Beitr. 3: 80. 1788.) On rocks, Lake Lindeman, May 5, 1898.

*Ptilidium ciliare* (L.) Nees. On ground in woods, Dawson, September 7, 1898.

*Diplophyllia taxifolia* (Wahlenb.) Trevis. On rocks, Cañon City, March 27, 1898.

*Scapania undulata* (L.) Dumort. In streams running into Lake Lindeman, April 9 and May 21, 1898. Also a variety in still water, Lake Lindeman, May 23, 1898. A very peculiar plant, probably to be considered a variety of this species, was collected by Mr. Williams "in springs between Lakes Lindeman and Bennett, June 2, 1898." The leaf-lobes in this are almost wholly separate, as sometimes happens in *S. uliginosum*, but it differs from the latter species in the acute and dentate-margined lobes.

#### *Scapania imbricata* sp. nov.

Yellowish green, becoming somewhat brown, densely caespitose: stems (secondary) prostrate or subascending, plane at apices, 2-4 cm. long, .4-.57 mm. (22-28 cells) in thickness, brown, simple or sometimes sparingly and irregularly branched, root-hairs obsolescent: leaves for the most part very densely imbricate, of nearly uniform size throughout, rigid and subconchiform when dry, or slightly wrinkled, not decurrent, bipartite for  $\frac{3}{5}$ - $\frac{4}{5}$  their length, the carina slightly or not at all alate; lobes very entire; ventral lobes twice as large as the dorsal or subequal, oblong, oblong-ovate, or elliptical, 1.8-2.2 mm.  $\times$  .96-1.34 mm., patent-horizontal, the very obtuse often subtruncate apex deflexed, the ventral margin nearly plane; dorsal lobes elliptical-ovate or ovate, suberect or erecto-patent, inflato-convex, appressed-imbricate, rounded-obtuse; leaf-cells near the margin subquadrate or elliptical-oblong, 12-22  $\mu$ , firm-walled, those near the middle of lamina

5- or 6-angled, 16-30  $\mu$ , with pronounced trigones, cuticle smooth or very slightly roughened. (Plate 14.)

On rocks, Crater Lake, at foot of Chilcoot Pass, altitude about 900 m., May 24, 1898. Although Mr. Williams' specimen is wholly sterile, the peculiarities of the species are so striking that we think our description and figures will make possible its easy recognition. We are unacquainted with any *Scapania* which seems closely related to this species. *Scapania Kaurini* Ryan, from Norway, has obtuse, entire or subentire leaf-lobes but here the resemblance ceases, for *S. Kaurini* is a much smaller plant in every way, its leaves increase in size toward the stem-apex, are commonly subvertical, and are less deeply lobed, the dorsal lobes are not at all imbricate unless at the very apex of the stem, the ventral lobes are ovate or obovate, the root-hairs are numerous, etc. The arrangement of the leaf-lobes in *Scapania imbricata* is quite suggestive of the genus *Diplophylleia*, yet the plant is doubtless a true *Scapania*.

#### Explanation of Plate 14.

- Figs. 1 and 2. Stems (secondary), natural size.  
 Fig. 3. From near base of stem, dorsal view,  $\times 7$ .  
 Fig. 4. Apical portion, dorsal view,  $\times 7$ .  
 Figs. 5 and 6. Portions of stem with typical leaves, dorsal view,  $\times 12$ .  
 Figs. 7 and 8. Same portions, ventral view,  $\times 12$ .  
 Figs. 9 and 10. Single leaves viewed from outer (lower) surface,  $\times 12$ .  
 Fig. 11. Leaf cells from apex of ventral lobe, showing margin,  $\times 245$ .  
 Fig. 12. Leaf-cells from middle of ventral lobe,  $\times 245$ .  
 Fig. 13. Cross-section of (secondary) stem,  $\times 40$ .  
 Fig. 14. Cells from near surface in cross-section of (secondary) stem,  $\times 245$ .

## 2. An Enumeration of the Mosses collected.

BY R. S. WILLIAMS.

Our party arrived at Dyea, Alaska, March 23, 1898, and a day or two later a few specimens of mosses were collected in the immediate vicinity, from which time on collections were made at intervals as opportunity offered till Dawson was reached on the 21st of June. On our arrival the streets of

Dyea, scarcely above tide water, were quite bare, but a mile or two above town and on the mountain sides snow was in more or less abundance and constantly increasing in amount as one went back from the coast. The nights were not very cold, about such, perhaps, as might occur in New York City during February. Dyea Creek at the mouth of which the town of that name was located (it is scarcely an inhabited town any longer, the travel all going by way of Skagway) is some 16 miles long. About half way up is the place called Cañon City where the gulch narrows for a mile or two often to only a few rods in width. Here the rocks, where exposed, were often covered with fine growths of mosses and lichens, but there was too much snow and frost to do any satisfactory collecting. About 4 miles farther up the gulch was Sheep Camp, the last place where wood for fuel could be obtained till after crossing the Chilcoot Pass. We camped here from the 28th of March to the 7th of April, and although the ground was everywhere covered with 2 or 3 feet or more of snow, a number of specimens were obtained from the trunks of trees and exposed rocks. Chilcoot Pass is 3,500 feet high and the mountain summits near, 2,000 or 3,000 feet higher. Just beyond the Pass, Crater Lake lies in a small depression at the foot of a steep hill and ten miles away is Lake Lindeman, at an elevation of 2,170 feet. This last lake is the nearest point to the coast where boats can be built and run into the Yukon and we camped here from the 7th of April to the first of June. Quite a number of specimens were obtained during this time although the ground was well covered with snow up to the middle of May. By the 25th of the month the lower hills and mountain sides were mostly bare and the ice in the upper half of the lake had largely melted. Frogs were first heard croaking in a marsh May 16th and on the 26th a single small buttercup was found in bloom close to the lake shore, while sedges were appearing above ground with green tips an inch or so long. Leaving Lindeman the first day of June we sailed down to the foot of the lake (5 or 6 miles only) and camped for 5 days. Vegeta-

tion was found to be considerably more advanced than at the head of Lindeman owing doubtless to the somewhat smaller snowfall and the dryer, more sandy soil. A lupine, one or two violets and a species of *Ribes* were in full bloom, *Equisetum arvense* was in good fruit and a young fern had reached a height of 5 or 6 inches on June 2d. But little collecting was done here owing to lack of time and as no more stops of any length were made from this place on to Dawson, a distance of 525 miles, but little collecting was really done along the Yukon. At Dawson I remained from the 21st of June, 1898, to the 14th of Aug., 1899, and doubtless a fairly complete collection of the higher plants, mosses and lichens was made, growing within 2 or 3 miles of town. All the mountains near Dawson are low (1,200 or 1,500 feet above town, which has an elevation of some 1,700 feet, I believe) and without snow for 3 months during the warm season. Rains were not very frequent or heavy during the summer spent there and snow fell in winter about 16 inches deep in town and perhaps twice that amount on the mountains near.

Aug. 14, 1899, I left Dawson, coming out by the same route as that traversed going in till the head of Lake Bennett was reached on the 25th. Frequent stops along the Yukon allowed the collection of some flowering plants at this season as did a stop over night at Bennett City. On the 26th I took the train at this place for Skagway. We started at 7.15 A. M., reached the White Pass Summit (elevation 2,600 feet) at 9.25 A. M. where a stop-over of 1¼ hours gave time to obtain a number of specimens just on the line between Alaska and British soil, then we continued on down to Skagway arriving there early in the afternoon where the last collecting of the trip was done while awaiting a steamer for Seattle.

To Mrs. Britton the author is under many obligations for assistance in preparing this list.

Dr. Warnstorf has kindly determined the Sphagnums.

*Sphagnum Warnstorfi* Russow. Swamps at the head of Lake Lindeman (507).

*Sphagnum Warnstorfi purpurascens* Russow. Locality of preceding (505).

*Sphagnum Girgensohnii* Russow. Locality of preceding (506).

*Sphagnum fuscum* (Schimp.) Klinggr. In swamps about Dawson. In fine fruit the latter part of August. Often used in large quantities for filling the spaces between the logs of buildings (501).

*Sphagnum fimbriatum* Wils. In swamps about Dawson. Fruiting. Rather rare (502).

*Sphagnum teres squarrosulum* (Lesq.) Schp. Cañon City, Dyea Creek. On damp mountain side (509).

*Sphagnum squarrosum* Pers. Klondike River bottom (513).

*Sphagnum squarrosum subsquarrosum* Warns. Swamps about Dawson. Fruiting (508).

*Sphagnum medium* Limpr. Abundantly fruiting in swamps and on cold, wet hillsides about Dawson. This species is also largely used in the building of log houses (516).

*Andreaea petrophila* Ehrh. Common about Lake Lindeman. In fine fruit May 17. The plants are quite variable in color and length of stem. The leaves are papillose on both sides but most distinctly so on the back in upper part. The cell walls are very thick, the upper cells measure .008 × .008 mm. to .008 × .012 mm., below they are 3-4 times longer than wide (520).

*Andreaea petrophila acuminata* Schimp. Lake Lindeman. All the specimens examined seemed to be dioicous. The papillae 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 *petrophila* 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).

*Andreæea alpestris* (Thed.) Schimp. Sheep Camp, Dyea Creek. This has leaves very similar to the preceding in size and shape, but the leaf cells below are longer, thinner-walled and less pitted. It should, perhaps, be regarded as only a variety of *petrophila*, as Braithwait does (512).

*Gymnostomum curvirostrum* (Ehrh.) Hedw. Yukon River bluff just below Dawson (524).

*Dicranoweisia crispula* (Hedw.) Lindb. Common on rocks about Lake Lindeman (555).

*Dicranoweisia contermina* R. & C. Locality of preceding (556).

*Cynodontium Schisti* (Wahlb.) Lindb. On earth about ledges of rock. The leaves are roughly papillose on both faces. Upper leaf-cells irregular, not much elongated, up to about .008 mm. long. Rough spores up to .016 mm. Teeth either solid or with two or three perforations above (525).

*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 perichaetial leaves longer-pointed and less clasping than in *gracilescens*, foliage leaves also narrower above. The perigonium, of two leaves, close under the perichaetium or almost at its side (526).

*Cynodontium polycarpum* (Ehrh.) Schimp. Common on rock on upper Dyea cr., also just over the Coast Range on streams flowing into Lake Lindeman. The leaves are distinctly serrate above (527).

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

*Oncophorus virens* (Sw.) Brid. (*Cynodontium virens* Schimp.) About springs between Lakes Lindeman and Bennett. Alar cells sometimes more or less enlarged or inflated (529).

*Oncophorus virens serratus* (B. & S.) Limpr. (*Cynodontium virens serratum* B. & S.) On earth along streams flowing into Lake Lindeman (792).

*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).

*Oncophorus Wahlenbergii* Brid. (*Cynodontium Wahlenbergii* Hartm.) Common about Dawson on old stumps and logs, in fine tufts, up to 6 cm. high (530).

*Dicranella crispa* (Ehrh.) Schimp. On damp sandy soil at mouth of Bonanza Creek (552).

*Dicranella varia* (Hedw.) Schimp. Below Lake Lebarge on Thirty-mile River (551).

*Dicranella heteromalla* (L.) Schimp. Sheep Camp, Dyea Creek (554).

*Dicranella subulata* (Hedw.) Schimp. Growing on a thin layer of damp earth over rock at Lake Lindeman (553). These specimens have the upper leaves somewhat serrulate above, thus approaching *curvata*, but the capsule is scarcely elongated, erect and symmetrical enough to be that.

*Dicranum fulvellum* (Dicks.) Smith.\* On rock at Long Lake a few miles below Chilcoot Summit. The specimens are old and blackish with distinctly furrowed capsule. Leaf-cells not pitted and costa .050 mm. wide at base (531).

*Dicranum falcatum* Hedw. Sterile plants collected on rock at Lake Lindeman. The leaf-cells from apex one-half down are short and angular, often nearly square, the excurrent costa of the upper leaves is very rough with teeth-like projections of the cells, width of costa at base .080 mm. (532).

*Dicranum molle* Wils. Collected at Lake Lindeman on damp, clayey soil subject to overflow. The specimens bear very immature capsules but show a distinct struma. The leaves are entire or nearly so and erect-spreading, with cell-walls thickened and pitted chiefly a little above the base, the upper cells elongated, often rectangular and 4 to 6 times longer than broad. Costa about .065 mm. wide at base, about  $\frac{1}{7}$  leaf base. This species has been previously collected outside of Europe in Alaska and Greenland (546).

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\* The *Dicranums* have been kindly revised by Dr. R. F. True, but the notes are by the author.



*Dicranum Blyttii* B. & S. Rather common on rock about Lake Lindeman. Some specimens are dioicous, male plants occurring with three or four antheridial buds. The leaf-cells vary considerably in width below, with walls sometimes thickened and pitted, especially in the perichaetial leaves a little above the base (533).

*Dicranum elongatum* Schleich. Dawson. Very common on both old stumps and rocks in damp places. Some of the specimens might be referred to var. *orthocarpum* if that is worth recognition as a variety (534).

*Dicranum fuscescens* Turn. On rock along Dyea Creek and on earth at Lake Lindeman (536).

*Dicranum congestum* Brid. On swampy ground at Dawson. Distinguished from the preceding by the wider leaf point with cells elongated-oval, not short and angular above. In both species the cell walls are more or less porose and the nerve at base varies from  $\frac{1}{4}$  to  $\frac{1}{7}$  the width of leaf base (537).

*Dicranum Muhlenbeckii* B. & S. Growing among boulders at Lake Lindeman. This has small, angular leaf-cells, often only  $.006 \times .006$  mm.— $.006 \times .008$  mm. extending  $\frac{3}{4}$  down the leaf or more. The cell walls may be more or less porose. The costa at base is about  $\frac{1}{4}$  width of leaf base (538).

*Dicranum fragilifolium* Lindb. Very common on decayed logs about Dawson. Perichaetial leaves rather gradually narrowed to the subula with cell walls porose in lower part. Other leaves scarcely or not porose. The costa often well defined below and broad, over  $\frac{1}{3}$  width of leaf base (535).

*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 *scofarium* 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. Perichaetial 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 beautifully 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 papillae. 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 perichaetium (544).

*Dicranum Bonjeani* DeNot. (*D. palustre* Br. and Sch.). On rather dry ground at Lake Lindeman. A variety with straight leaves  $4\frac{1}{2}$  mm. long with costa scarcely papillose on back and margin entire or nearly so (543).

*Dicranum Bergeri* Blandow. (*D. Schraderi* Web. & Mohr.), Lake Lindeman, mouth of Little Salmon River and near Dawson (540).

*Fissidens bryoides* (L.) Hedw. Common on earth about Dawson (559).

*Fissidens osmundoides* (Swartz) Hedw. On earth and rocks at Lake Lindeman (557).

*Fissidens adiantoides* (L.) Hedw. In marshy places at Lake Lindeman (558).

*Ceratodon purpureus* Brid. Common on rock at Lake Lindeman (560). Sterile specimens of a moss that may be only a variety of this were collected at Marsh Lake on dry rock, in which the leaves are broader than the normal form and only  $\frac{1}{2}$  as long (800).

*Distichium capillaceum* (Sw.) B. & S. On earth and rock from Lake Lindeman to Dawson (561).

*Distichium inclinatum* (Ehrh.) B. & S. Lake Lebarge on earth and at Dawson on old stumps (562).

*Blindia acuta* (Huds.) B. & S. Skagway, in fine fruit

Aug. 27, also sterile specimens on dry rock at Lakes Lindeman and Lebarge (563).

*Pottia latifolia pilifera* (Brid.) Muell. On bare earth of river bluff just below Dawson (564).

*Didymodon rubellus* (Hoffm.) B. & S. Cañon City, Dyea Creek, also common at Dawson. The apex of the leaf of this species usually terminates in a somewhat enlarged, pale, smooth cell with one or two similar cells on either side, forming teeth that stand out very distinctly from the rest of the rather obscure papillose cells of upper leaf. The capsule varies greatly in length and breadth. Cells of the lid not in oblique rows (565).

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

Dioicous. Growing in large cushions up to 12 cm. high, usually of a yellow-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 perichaetial 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 perichaetial 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).

*Ditrichum flexicaule* (Schleich.) Hampe. (*Leptotrichum flexicaule* Hampe.) Common about Dawson in swampy places. These specimens are similar to 961, Rabenhorst, Bry. Eur. The leaf-cells below are often much pitted, perichaetial leaves gradually narrowed and leaf towards apex only slightly serrulate. Occasionally there is a distinct cluster of alar cells found in both European and American specimens (567).

*Ditrichum flexicaule densum* (B. & S.) Braithw. Specimens about 1 cm. high, collected between the Big and Little Salmon rivers, in good fruit June 16. This plant has the habit of *D. homomallum* and Macoun's no. 8, so called, belongs here. It is at once distinguished from *homomallum* by the short, often transversely elongated cells near middle of leaf toward margin, also the rectangular basal cells are only  $\frac{1}{2}$  as long. These specimens appear quite distinct from *flexicaule* by their small size, short, nearly entire leaves and scarcely or not pitted cell walls, the teeth also are distinctly articulate; possibly, however, all these characters are too variable to make specific distinctions (566).

*Desmatodon cernuus* (Hüben) B. & S. Dawson (570).

*Barbula brevirostris* (Hook. & Grev.) Bench. On earth-covered stumps and bare clayey soil about Dawson (571).

*Barbula fallax recurvifolia* Wils. (*Barbula reflexa* Brid.) Dawson. Growing in large tufts on rock (572).

*Barbula fragilis* (Drumm.) B. & S. Dawson. In damp

shady places on earth. Collected with rather old fruit, August 4th. The lid about equals the capsule in length, the calyptra extends nearly  $\frac{1}{2}$  down capsule. Teeth red and closely twisted when first exposed, later becoming scarcely twisted. Outer walls of the cells of leaf subula much thickened (574).

*Barbula subulata* (L.) Beauv. Dawson. On earth in rather dry places (575).

*Barbula ruralis* (L.) Hedw. On rocks about Lakes Lindeman and Bennett (576).

### *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 very distinct cells being highly convex. From *Trichostomum* and *Tinmiella* it is distinguished by the costa with only one stereid 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* R. S. 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 mm. 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 mamilllose 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).

*Scouleria aquatica* Hook. Fine fruiting specimens collected near Cañon City, Dyea Creek. As usual in clear mountain streams, the plants are blackish and robust. Also collected sterile in Miles's Cañon and in fruit on the Yukon at Dawson. These latter specimens are more slender and of a dull green color, such as are usually found in larger streams that become swift and muddy in high water. There seems to be no microscopical differences between the different specimens (588) and (806).

*Grimmia conferta* Funck. Marsh Lake. This plant has cell walls thin, not or scarcely sinuous, the upper cells roundish, the lower short rectangular, about 1 to 3 (589).

*Grimmia apocarpa* (L.) Hedw. Lake Lindeman. Growing in blackish tufts on perpendicular walls. This species has cells of leaf above, mostly oblong to square, with thick, sinuate, angular walls, especially near middle, toward base becoming hyaline and long-rectangular with thin walls. The leaf towards apex consists of a double layer of cells throughout; about  $\frac{1}{2}$  down the cells are double only in margin and here and there within (591).

*Grimmia apocarpa gracilis* Web. & Mohr. Lake Lindeman. The cell structure of the leaves is similar to the preceding, I believe. The plant differs in being rather more slender, with leaves more papillose and lateral appearing fruit (592).

*Grimmia rivularis* Brid. Lake Lindeman. On rock near water-line. This plant has rather obtuse leaves, mostly somewhat sinuate dentate above. The cell walls are less thickened and angular than in *apocarpa*, and the lower cells shorter rectangular and broader (593).

*Grimmia torquata* Hornsch. Sterile specimens collected at Sheep Camp, Dyea Creek; also at Lakes Lindeman and Bennett. The typical form has leaves more or less curved and twisted in various directions (596). In other specimens the leaves all twist about the stem in the same direction, presenting a very rope-like appearance (598). The tufts may finally become of a dull, brownish-black throughout. Some small, brownish-green tufts only 1 cm. high were collected at Lake Bennett, apparently young plants. The leaves are short, with scarcely thickened or sinuous cell walls. Propagula, mostly at the base of the costa beneath, resemble those of ordinary *torquata* (599).

*Grimmia ovalis* (Hedw.) Lindb. (*Grimmia ovata* Schwaegr.) Lake Lindeman and Dawson and at various intermediate points on the Yukon. Common (595).

*Grimmia tenuicaulis* R. S. Williams, Bull. Torr. Bot. Club, 27: 316-317. 1900. Dawson on rather dry rock walls. Specimens not quite so slender as the type (590).

*Grimmia acicularis* (L.) C. M. (*Racomitrium aciculare* Brid.) Lake Lindeman (601).

*Grimmia microcarpa* (Hedw.) C. M. (*Racomitrium Sudeticum* (Hedw.) B. & S.) Lake Lindeman. Limpricht states the leaf margin in this species consists of 2 layers of cells, distinguishing it from *heterostichum* which has only one. In these specimens the margin above consists sometimes of a double layer, on one side, at least (602).

*Grimmia heterosticha* (Hedw.) C. M. (*Racomitrium heterostichum* Brid.) Lake Lindeman and Skagway. Leaf border of a single layer of cells (603).

*Grimmia fascicularis* (Schrad.) C. M. (*Racomitrium fasciculare* (Schrad.) Bridel.) Lake Lindeman (605).

*Grimmia ramulosa* Lindb. (*Racomitrium microcarpum* (Schrad.) Brid.) Lake Lindeman (606).

*Grimmia canescens* (Timm.) C. M. (*Racomitrium canescens* Brid.) Sheep Camp, Dyea Creek and Lake Lindeman. Specimens sometimes blackish throughout. The alar cells, more or less hyaline and somewhat inflated-hexagonal, in several rows, seem always to distinguish this plant (608).

*Grimmia hypnoides* (L.) Lindb. (*Racomitrium lanuginosum* Brid.) Lake Lindeman (607).

*Hedwigia albicans* (Web.) Lind. (*H. ciliata* Ehrh.) Common about Dawson in fine fruiting tufts with stems up to 8 cm. long, also collected at Lake Bennett (610).

*Amphidium Lapponicum* (Hedw.) Schimp. (*Amphoridium Lapponicum* (Hedw.) Schimp.) Lake Lindeman and Lake Marsh (611).

*Weissia Drummondii* (Hook. & Grev.) Lind. (*Ulota Drummondii* Brid.) On bark of *Alnus* at Sheep Camp, Dyea Creek (612).

*Weissia Bruchii* (Hornsch.) Lindb. (*Ulota Bruchii* Hornsch.) On rock at Sheep Camp and Lake Lindeman (613).

*Weissia ulophylla intermedia* (Schimp.) Braithw. (*Ulota crispa intermedia* (Schimp.) Dixon.) Sheep Camp. On *Populus* and *Alnus* (614).

*Weissia phyllantha* (Brid.) Lindb. (*Ulota phyllantha* Brid.) Skagway, Alaska. On rock just above tide-water. The plants are stout and dark colored, bearing dense clusters of gemmae on both sides of the costa near apex (615).

*Orthotrichum anomalum* Hedw. Dawson. In fine fruit June 29, on rock. Also collected at Skagway (616).

*Orthotrichum Macounii* Aust. Dawson. On rock. I refer specimens to this species with a seta about twice the length of the cylindrical capsule, which is at first smooth but may finally become ribbed throughout, with teeth regular and often united to apex and stout cilia (of a double row of cells) often nearly as long as the teeth. The characters pointed out by Austin as separating this species from *Kingianum* are not apparently very constant (617).



*Orthotrichum rupestre* Schleich. Lake Lindeman (618).

*Orthotrichum alpestre* Hornsch. Lake Marsh and Dawson. On rock (619).

*Orthotrichum speciosum* Nees. Skagway, Alaska. On cotton-wood (620).

*Orthotrichum obtusifolium* Schrad. Skagway. On cotton-wood (621).

*Leersia rhabdocarpa* (Schwaegr.) Lindb. (*Encalypta rhabdocarpa* Schwaegr.) Dawson (623).

*Leersia Selwyni* (Aust.) E. G. Britt. (*Encalypta Selwyni* Aust.) Lake Marsh; also common about Dawson (624).

*Georgia pellucida* (L.) Rab. (*Tetraphis pellucida* (L.) Hedw.) Lake Lindeman (625).

*Georgia geniculata* (Girgens.) Lindb. (*Tetraphis geniculata* Girgens.) Cañon City, Dyea Creek (626).

*Dissodon splachnoides* (Thunb.) Grev. & Arn. Lake Lindeman. A few specimens found growing on damp earth by margin of pond. The rhomboidal leaf-cells a little below the apex measure .010 mm. by .025 mm., toward base becoming rectangular with a width of about .008 mm. and from 4 to 6 times longer. Spores up to .036 mm. Synoicous (627).

*Tetraplodon angustatus* (Sw.) B. & S. Dawson. On bones. In good fruit, May 7. This species often grows mixed with the next and is scarcely to be distinguished by the unaided eye, unless by the little shorter pedicel. The stomata are confined to the upper end of the apophysis, the teeth approximate in fours, not in twos, as given in the L. & J. Manual (805).

*Tetraplodon bryoides* (Zoeg.) Lindb. (*Tetraplodon mnioides* (Sw.) B. & S.) Dawson. On bones. In fine fruit, July 3. The stomata are scattered over the apophysis and teeth approximate in twos (628).

*Tetraplodon urceolatus* (Brid.) B. & S. Near summit of Moosehide Mt. just back of Dawson. On bones. In a letter recently received by Mrs. Britton from Mr. H. N. Dixon, speaking of the differences between *T. mnioides cavifolius*

and *T. urceolatus* he states he found "that the areolation of the leaf afforded a very distinct character, that of *urceolatus* being shorter, more rectangular and above all more incrassate, that of all forms of *T. mnioides* being more irregular, more elongated and with thinner walls." He further states that the Labrador plants he has seen all belong to *mnioides* and that possibly we do not have the true *urceolatus* in America. The specimens collected at Dawson, however, entirely agree with European specimens of the latter, the cell characters being just such as pointed out above (622).

*Funaria calcarea* Wahl. On bare earth of river bluff just below Dawson. This species is only to be separated from *Mediterranea*, apparently, by the slightly more serrate leaf and shorter point. Leaf-cells above about  $.036 \times .060$  mm. Teeth with about 12 lamellae, 4 or 5 rows of transversely elongated cells about mouth of capsule and rough spores up to  $.025$  mm. (629).

*Funaria hygrometrica* (L.) Sibth. Lake Marsh and near Dawson (630).

*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).

*Bartramia ithyphylla* (Haller) Brid. Lake Lindeman (631).

*Bartramia Oederiana* (Gunn.) Swartz. Dawson (632).

*Bartramia pomiformis* (L.) Hedw. Cañon City and Sheep Camp, Dyea Creek (633).

*Philonotis fontana* (L.) Brid. Rather common about Lake Lindeman and Lake Bennett (635).

*Conostomum boreale* Swartz. Growing in dense cushions on wet rock near Long Lake, between Chilcoot Pass and Lake Lindeman (634).

*Catoscopium nigratum* (Hedw.) Brid. Dawson. In fine fruit about springs, May 7 (636).

*Meesea trichodes* (L.) Spruce. (*Meesia uliginosa* Hedw.) Dawson. The teeth of the peristome are sometimes almost

up to  $\frac{1}{2}$  the segments in length, they are separated by spaces up to  $\frac{1}{2}$  the width of the teeth across. Apex of teeth often split or perforated by a single opening. The minutely roughened spores measure up to .048 mm. (637).

*Meesea triquetra* (L.) Aongstr. (*Messia tristicha* B. & S.) Klondike River bottom. In fine fruit July 23 (639).

*Paludella squarrosa* (L.) Brid. Sterile specimens growing in bogs at Lake Lindeman. Found abundantly in fruit at Dawson July 23, growing in large patches many feet across. In places, specimens were so mixed with *Camptothecium nitens* that only the tall seta and capsule of *squarrosa* were visible (640).

*Leptobryum pyriforme* (L.) Schimp. Lake Lindeman and Dawson (641).

*Pohlia nutans* (Schreb.) Lindb. (*Webera nutans* (Schreb.) Hedw.) Sheep Camp, Dyea Creek, also on an island just below Fort Selkirk (642).

*Pohlia nutans* var. (*Webera nutans* var.) Lake Lindeman. These specimens are dioicous with appendiculate cilia and costa rough on the back above by the projecting upper ends of the cells. *P. nutans longiseta* is described as having a rough costa, but it has a seta 3 or 4 times longer than these specimens. Limpricht states it attains a height of 10 cm. I have Montana specimens of *nutans* with paroicous inflorescence, seta 2 or 3 cm. high and costa slightly rough on back above, also specimens with seta 6 cm. high and costa smooth (643).

*Pohlia cruda* (L.) Lindb. (*Webera cruda* (L.) Schimp.) Lake Lindeman (644).

*Pohlia sphagnicola* (Brid.) Lindb. & Arn. (*Webera sphagnicola* Schimp.) Dawson. In fine fruit July 2. Growing with slender, mostly solitary stems up through tufts of *Sphagnum* and *Aulaacomnium*. The specimens are paroicous not dioicous as usually described, with leaves mostly flat-bordered and entire except a few of the elongated perichaetial, which are slightly serrulate near apex. It is undoubtedly closely related to *nutans*, differing chiefly in the

slender, elongated stems and more entire leaves. Some of the perichaetial leaves are only  $\frac{1}{3}$  mm. wide and up to  $3\frac{1}{2}$  mm. long, without teeth, the margin being slightly sinuate only toward apex. These specimens agree in inflorescence and in every other way with specimens from Greenland, and labeled *sphagnicola* apparently in Schimper's own handwriting. Some half dozen other specimens in the "Garden" collection from Europe and labeled *sphagnicola* are very different plants (647).

*Pohlia commutata* Lindb. (*Webera commutata* Schimp.) Lake Lindeman. On sandy bank by stream. This species may usually be distinguished from our other *Weberas*, I believe, by the comparatively broad, short leaves, ovate rather than lanceolate, mostly 1-4, excepting a few perichaetial, the only other species approaching it in this respect being *cucullata*, which is paroicous (645).

*Pohlia gracilis* Lindb. (*Webera gracilis* De Not.) On shaded, moist sand bank of the Klondike River just above Dawson. The specimens are not fruiting but bear abundant red bulbs in the axils of the leaves, often 4 or 5 on the same stem. The bulbs measure about .260 by .375 mm. and are readily observed at some distance by the naked eye. They are borne on a very short stalk that comes out from the stem some little distance above the attachment of the leaf (646).

*Pohlia prolifera* Lindb. (*Webera prolifera* (Lindb.) Kindb.) Lake Lindeman in marshy place. A dioicous, very pale-colored plant, with elongated, spindle-shaped, more or less vermicular brood-bodies, clustered in the axils of the leaves. These bodies are quite variable in size and shape. They usually consist of several series of cells somewhat twisted together but apparently always terminating in a single pointed cell and measure about .020 by .200 mm., or even larger. The median leaf-cells are about .120 by .008 to .010 mm. (803).

*Bryum arcticum* B. & S.\* Dawson, on earth in rather dry

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\* The *Bryums* have all been submitted to M. Philibert for determination and he has indicated several new species, the descriptions of which, however, have been drawn up by the author.

places. The outer plates of the teeth are often nearly square and up to .020 mm. high. The lamellae, about 16, are usually connected below by cross walls, not more than one, however, between adjoining lamellae. The spores in these specimens measure up to .028 or .030 mm. Upper leaf-cells large, up to .025 by .070 mm.

*Bryum Brownii* B. & S. ? (*Pohlia bryoides* R. Br. ?) Dawson, on earth about ledges of rock. There seems to be some confusion with regard to this plant. My specimens are called a variety, "*piliferum*" by M. Philibert, but they are scarcely or not longer pointed than is shown in Fig. 8a, Tab. Supp. I, IV., Bryo. Eur. The peristome as figured in this plate, also, as far as it goes, rather agrees with my specimens, viz., the lamellae are not very numerous (14 to 16) or close together and the outer plates are comparatively high. This does not agree with Limpricht's description, who states that the lamellae are numerous and close together and basal plates narrowly rectangular (1 to 4), also that the costa of the leaf is excurrent into a short awn. In the Dawson specimens the 14 or 15 lamellae are joined by 1 to 3 thick cross walls between the adjacent lamellae and the outer plates are from twice wider than high to nearly square. In a packet in the Columbia Herbarium, are European specimens called *Brownii* from Chr. Kaurin, but the lamellae are not connected by vertical walls and the plants are otherwise different so that they certainly are not *Brownii*. The same may be said of Bourgeau's specimens of "The Palliser N. A. Expedition; that is, unless true *Brownii* belongs to a section that does not have the lamellae connected by cross walls as in *pendulum*.

The Dawson specimens are synoicous and antoicous, leaf border of one layer of cells not more thickened than within, spores roughened, up to .028 mm., leaf-cells below sometimes pitted (581).

Since writing the above Mrs. Britton has received a letter from Ernest S. Salmon, in which he gives good reasons for believing that the type of *Pohlia bryoides* R. Br., is not in existence. Taking, then, Schimper's figures in the Bryologia

Europea as representing the type of *B. Brownii*, it would seem that the only differences by which this is to be distinguished from *pendulum* (*B. cernuum*), Plate 331, are the better developed cilia and the thin, not pitted leaf-cells. We have lately received from M. Philibert a specimen collected in Norway and regarded by him as true *Brownii*. This shows teeth with about 23 lamellae joined by very thin cross walls, the outer plates toward base  $1\frac{1}{2}$  to  $2\frac{1}{2}$  times wider than high and 2 or 3 cilia, not appendiculate and irregular, some of them nearly as long as the segments. Roughened spores up to about .030 mm. Flowers autoicous, ♂ and ♀ very similar, but the first rather larger. The leaf-cells are thin-walled, the lower being longer in proportion to width (from 3 to 6 to 1) than in *pendulum*, in which they are nearly square, often, in basal angles. The stem leaves are nearly all worn away and imperfect; a few, however, show points nearly as long as Schimper's figure. In any case my Dawson specimens must be referred to *pendulum* and the others mentioned above, except the one from Norway, are not *Brownii*, nor is Drummond's no. 265, so there seems to be no known American specimens at present.

*Bryum pendulum* (Hornsch.) Schimp. Dawson, in fine fruit July 30. Inflorescence, teeth, etc., as given for the preceding Dawson specimens (582).

***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 longisetum* Bland. Dawson. In good fruit July 31, on swampy ground with *Meesea uliginosa*. These specimens have a seta up to 8.5 cm. high. The teeth are small with only about 12 lamellae not joined by cross walls, the dorsal plates high (about 1 to 2). Inner peristome free with narrow segments and very short cilia. Spores large and nearly smooth, up to .040 mm. Leaves long-pointed, costa excurrent for a length of 4 or 5 cells (649).

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

Dioicous. 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 cuspidatum* Schimp. Dawson. This species has the costa excurrent into a sharp, denticulate point 4 or 5 cells in length, a revolute margin of narrow cells, dorsal plates of exostome 2 or 3 times wider than high, 25 or more lamellae on ventral surface and smooth spores up to .014 mm. (586).

*Bryum caespiticium* L. Marsh Lake. In good fruit June 10 (658).

*Bryum Duvalii* Voit. Sterile specimens collected at the head of Lake Bennett (652).

*Bryum ventricosum* Dicks. (*B. pseudotriquetrum* (Hedw.) Schwaegr.) Skagway. In fine fruit August 27, on wet rock (807).



## BRYUM VENTRICOSUM COMPACTUM (B. &amp; 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 medium 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 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 colum. Exostome pale yellow below. Plates of teeth narrow (about 1-3) near base, lamellae 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).

Collected in good fruit July 17, 1899, at Dawson, also at the mouth of the little Salmon River. The plants form extensive mats, often many feet across, in low, wet places.

**Bryum suborbiculare** Philibert, sp. nov.

Apparently dioicous, no male flowers found. Tufts up to  $2\frac{1}{2}$  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  $2\frac{1}{2}$  cm. high. Exostome with lower dorsal plates narrow (1-3) and 25-30 lamellae on inner face. Endostome free with basilar membrane extending over  $\frac{1}{2}$  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 Zierii* (Dicks.) Lindb. (*Zieria julacea* Schimp.) A few sterile specimens collected on earth in crevices of rock about 1000 ft. above Lake Lindeman (660).

PLAGIOBRYUM ARGENTEOIDES R. S. Williams sp. nov.

With the appearance of *Bryum argenteum*. In dense tufts up to 1 cm. high. Stems 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  $\frac{1}{2}$  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 mm. 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.

*Mnium medium* B. & S. Left bank of the Klondike River just below Bonanza Creek, not common, also collected at Skagway, growing abundantly under the heavy evergreen forests. Cell walls thickened and pitted, cells somewhat elongated, not in oblique rows, stomata immersed (661).

*Mnium rugicum* Laur. Head of Lake Bennett. In these specimens the leaf-cells are somewhat obliquely elongated but not in rows. The leaves are narrow at base, not decurrent and without distinct rectangular basal cells, the margin with very small irregular teeth or entire (662).

*Mnium serratum* Schrad. Klondike River near mouth of Bonanza Creek. In fine fruit, June 18. The leaves are long-decurrent, median cells up to .025 mm. (663).

*Mnium orthorrhynchum* Brid. Dawson. In good fruit, July 16. Leaves somewhat decurrent, occasionally long-decurrent. Median leaf-cells up to about .016 mm. (664).

*Mnium spinulosum* B. & S. Lake Lindeman (665).

*Mnium cinclidoides* (Blytt.) Hueben. Dawson (666).

*Mnium Blyttii* B. & S. Dawson. The sterile specimens referred here were growing in dense tufts up to 5 cm. high. The lower stem leaves are very broad and obtuse with mostly an entire border of one row of cells somewhat elongated and often nearly disappearing toward apex. The upper leaves are longer with a distinct border extending to a short pointed apex and usually bearing a double row of short, blunt teeth. Leaf-cells somewhat thickened, not pitted, scarcely elongated, up to .020 mm. Costa smooth on the back, vanishing 5 or 6 cells below the leaf point. Leaves scarcely or not decurrent. *M. Blyttii* usually has rather long-decurrent leaves (667).

*Mnium punctatum elatum* B. & S. Lake Lindeman (668).

*Mnium subglobosum* B. & S. Lake Lindeman. This species seems to constantly differ from the preceding in its inflorescence and peristome. The teeth of the latter are only about  $\frac{2}{3}$  as large as in *punctatum*, most of the dorsal plates are nearly as high as wide and the lamellae are distant and only 12 or 14 in number (669).

*Mnium hymenophyllum* B. & S. Bennett City and Dawson. Growing in large, thick tufts in damp and shady or wet places. This species is very near *M. hymenophylloides*. It was removed to *Cinclidium* by Lindberg, and Limpricht has also placed it there. The only collection cited by the latter is "Rabenhorst, Bryoth. Eur. No. 246," which is, at least in the Columbia University set, not this plant but undoubtedly *hymenophylloides*. The only true European specimens of *hymenophyllum* examined are labeled "*M. hymenophyllum*. Herjedalen. Un. itin. cr. 1867. Hellbom (41 et 42)."

They correspond well with the description and figures in the *Bryologia Europaea* and my specimens from the Yukon are the same. The species may be distinguished from *hymenophylloides* by the more decurrent leaves, with more rounded apex and by the much shorter, wider cells in margin on either side just below the apex. The first 2 or 3 cells on either side of apical cell of leaf are scarcely elongated, the next 2 or 3 are rhomboidal, 2 or 3 times longer than wide, the width being .020 to .025 mm. In *hymenophylloides* the second or third cell in margin below the apical cell is about .010 mm. wide and 6 to 10 times longer than wide (673).

*Cinclidium stygium* Swartz. Dawson. Common in swampy places. In fine fruit July 9. The clear, rich red border of the leaves at once distinguishes this plant from any *Mnium*. The margins are mostly flat and of a single layer of thick-walled cells. The leaf-cells are obliquely elongated, somewhat in rows, the inner median up to .050 mm. long. Cell walls more or less thickened and pitted (671).

*Cinclidium subrotundum* Lindb. Head of Lake Bennett about springs. Tufts up to 9 cm. high. The leaves are very similar to the preceding but have a double layer of cells in the border (672).

*Aulaconnium palustre* (L.) Schwaegr. Mouth of the Little Salmon River. Fruiting, June 16 (675).

*Aulaconnium palustre imbricatum* B. & S. Dawson, very common in wet places. Plants about the size of *turgidum* (676).

*Aulaconnium turgidum* (Wahl.) Schwaegr. Sheep Camp, Dyea Creek, sterile. Dawson, very abundant, fruiting (677).

*Timmia cucullata* Michx. Yukon River just above Dawson. Growing at the base of trees. This species is quite distinct from *megapolitana*. It occurs in Montana and appears to be the commonest species of the genus in the eastern United States. It differs from *megapolitana* in the wider mouthed capsule, more curved and smooth when dry, the exothecal cells, also, are elongated and not sinuous walled, the stomata roundish, about .048 mm. in diameter, sometimes even

slightly elongated at right angles to the opening and the leaves are rather larger and wider above with larger cells and leaf base narrower (679).

*Timmia megapolitana* Hedw. Marsh Lake and Klondike River near mouth. This species seems to grow mostly on rather dry earth at the base of rock ledges, usually at a somewhat higher elevation than the preceding. The capsule is nearly straight and furrowed when dry, the exothecal cells sinuous-walled and not elongated, the stomata oblong to roundish, up to .072 mm. long and the leaf-base is usually wider than above (678).

*Timmia Austriaca* Hedw. Cañon City, Dyea Creek and Moose Creek just below Dawson. This species has the leaf-cells somewhat angular above, as compared with the two preceding species and vein more or less toothed dorsally toward apex (680).

*Psilopilum arcticum* Brid. Left bank of Klondike River just below Bonanza Creek. On damp black soil of hillside. Not fruiting (682).

*Pogonatum alpinum* (L.) Roehl. Sheep Camp, Dyea Creek and Lake Lindeman (683).

*Polytrichum gracile* Dicks. Yukon River just below Whitehorse Rapids (684).

*Polytrichum piliferum* Schreb. Lake Lindeman (685).

*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 juniperinum* Willd. Lake Lindeman (687).

*Polytrichum strictum* Banks. Sheep Camp, Dyea Creek, and Lake Lindeman (688).

*Polytrichum commune* L. Lake Lindeman and Dawson. At the latter place in fine fruit July 30 (689).

#### 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 Lillelvedal, 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).

*Dichelyma falcatum* (Hedw.) Myrin. Lake Lindeman. On wet banks. In fine fruiting tufts up to 11 cm. high (692).

*Neckera Menziesii* Drumm. Cañon City, Dyea Creek (695).

*Neckera pennata* (L.) Hedw. Sheep Camp, Dyea Creek. On cotton-wood (694).

*Neckera pterantha* C. M. & K. Dawson. In crevices of rock. Fruiting abundantly. Secondary stems scarcely branching. Paraphyllia abundant or almost wanting (693).

*Pterigynandrum filiforme* Hedw. Sheep Camp, Dyea Creek. On trees (696).

*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).

*Antitrichia curtispindula gigantea* Sulliv. & Lesq. Dyea Creek, on trees. Skagway, on rock. All sterile (698).

*Antitrichia Californica* Sulliv. Dyea, Dyea Creek. Fruiting (802).

*Myurella julacea* (Vill.) B. & S. Head of Lake Bennett. On rock, sterile. Dawson, about roots of trees in damp places. In fine fruit, April 23 (700).

*Myurella apiculata* (Hüben.) B. & S. Dawson. On earth at foot of rock ledges, in fruit (699).

*Leskea tectorum* (A. Braun) Lindb. Lake Lebarge 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).

*Pylaisia polyantha* (Schreb.) B. & S. Sheep Camp, Dyea Creek, on wood. Dawson, at base of trees and on rock. Abundant and fruiting (703).

*Entodon orthocarpus* (La Pyl.) Lindb. (*Cylindrothecium concinnum* Schimp.) Island about 10 miles below Ft. Selkirk. On ground under heavy spruce forest. This species has before been reported only from Colorado and Newfoundland in North America. It is so like a slender form of *H. Schreberi*, however, that it must have been largely overlooked in this country. The hyaline cluster of rather small alar cells is sometimes as much as 4 layers of cells in thickness (789).

*Climacium dendroides* (L.) Web. & Mohr. Cañon City, Dyea Creek, Marsh Lake and Klondike River bottom near mouth. Not found fruiting (705).

*Climacium dendroides Oregonense* R. & C. Shore of Lake Marsh, on gravel, sterile (706).

*Holmgrenia chrysea* (Schwaegr.) Lindb. (*Orthothecium chryseum* B. & S.) Skagway and Lake Bennett (707).

*Pseudoleskea radicata* (Mitt.) Lesq. & James. Lake Lindeman (656).

*Pseudoleskea pallida filescens* Best. Head of Lake Bennett (706).



*Pseudoleskea substriata* Best. Lake Lindeman, on rock along shore (657).

*Heterocladium procurrens* (Mitt.) Rau & Hervey. (*Heterocladium aberrans* Ren. & Card.) Skagway and Cañon City, on rock (708).

*Thuidium recognitum* (Hedw.) Lindb. Yukon River above Ft. Selkirk and common about Dawson. Not fruiting (709).

*Thuidium Philiberti* (Philib.) Limpr. Klondike River bottom near mouth. Sterile. The leaves have a smooth hair-point up to 6 cells in length, the median leaf-cells near costa are up to .008 or .010 mm. in length being about twice longer in *recognitum*. Also the papillae are shorter, the leaf margins smoother, and the cells more angular with thinner walls than in the latter species (710).

*Thuidium abietinum* (L.) Br. & Sch. Tagish Custom House; also common about Dawson on earth and rock (711).

*Thuidium Blandovii* (Web. & Mohr) Br. & Sch. At head of Lake Bennett also near mouth of Bonanza Creek, in fine fruit July 9 (712).

*Claopodium pellucinerve* (Mitten) Best. Cañon City, Dyea Creek. Determined by Dr. G. N. Best. A notice of this plant has already appeared in the *Bryologist*, 3: 20, 1900. It is a very slender species with ovate-lanceolate leaves, the surface densely and minutely papillose and leaf-cells obscure except in the smooth, slender point (655).

*Camptothecium lutescens* (Huds.) B. & S. Sheep Camp, Dyea Creek. On cotton-wood. In these specimens the vein of the leaf never seems to end in a spine as in European specimens (713).

*Camptothecium nitens* (Schreb.) Schimp. Lake Lindeman, sterile. Mouth of Little Salmon River, in fruit. Dawson, common and fruiting abundantly. Capsules in fine condition June 18 (715).

*Camptothecium Nuttallii* B. & S. Skagway (714).

*Brachythecium salebrosum* (Hoffm.) B. & S. Lake Lindeman and Dawson (716).

*Brachythecium salebrosum densum* B. & S. Mouth of

Little Salmon River. I refer specimens here with rather narrower leaves more closely placed on stems and branches than in the preceding (717).

*Brachythecium albicans* (Neck.) B. & S. Skagway, on rock. Sterile (797).

*Brachythecium Starkei* (Brid.) B. & S. Lake Lindeman. In these specimens the costa extends about  $\frac{2}{3}$  up or is shorter and double (719).

*Brachythecium reflexum* Starke. Lake Lindeman (718).

*Brachythecium Idahense* R. & C. Dawson, on earth and rock. This species is evidently most closely related to *collinum* from which it is distinguished principally by the narrower leaves. The costa of the leaves near the ends of the branches terminate in a spine, with the leaf surface on either side papillose by the projecting upper ends of the cells. This roughening of the back of the leaf occurs in *collinum*, but to a less degree and it makes these two species close to those of *Bryhnia*, or rather, brings those species almost too close to *Brachythecium*, it would seem. The perichaetial leaves of both *collinum* and *Idahense* are somewhat variable, usually rather abruptly acuminate with one or two coarse teeth at base of acumen (720).

#### BRACHYTHECIUM PETROPHILUM R. S. Williams sp. nov.

In low, dense tufts or sometimes in thin mats with long creeping stems and short subpinnate branches. Stem leaves 1.5 mm. long by .4 mm. wide, narrowly ovate-lanceolate, about one-half costate, serrulate all round, more or less decurrent and margin reflexed near base, not very concave and scarcely or not plicate. Median leaf-cells linear flexuous up to .065 mm. long and .005 mm. wide. Alar cells short and broad not forming a distinct cluster. Branch leaves very similar to stem leaves but mostly a little smaller, with longer costa ending in spine on back and adjacent cells sometimes papillose by the projecting upper ends. Inner perichaetial leaves pale, ecostate, gradually narrowed to a slender, flexuous, serrulate point, with rarely 1 or 2 coarse teeth at its base. Capsule nodding, curved, with lid about 2.5 mm. long and 1 mm. broad. Lid conical, its height about equal to basal di-

ameter. Annulus of two rows of cells. Teeth of peristome hyaline bordered, papillose above, outer plates striate, inner lamellae about 30, segments without rounded perforations, more or less split along the keel with mostly 2 appendiculate cilia between. Seta rough throughout, up to 1.2 cm. high. Smooth spores up to .011 mm. (Plate 23.)

Dawson, on rock. In good fruit June 24, 1898 (722). This species is evidently nearest *suberythrorrhizon* but differs in the rough pedicel, leaves narrower, less serrate and plicate and cilia appendiculate.

*Brachythecium erythrorrhizon* B. & S. Dawson, on earth, common. Leaves always more or less falcate-secund, thus resembling *velutinum* more perhaps than any other of the genus (721).

*Cirriphyllum cirrosom* (Schwaegr.) Grout. Skagway. In thick mats on rock by stream. Collected in rather old fruit, August 27. These specimens have stems up to 11 cm. long. A few of the capsules still retain the lid which is acutely conical, a little higher than its basal diameter. The segments are separated by 1-3 long, nodose cilia. Not before reported with fruit in North America (794).

*Eurhynchium strigosum* (Hoffm.) B. & S. Dawson, common (725).

*Eurhynchium stoloniferum* (Hook.) Jaeger & Sauerb. Cañon City, Dyea Creek and Skagway (724).

POROTRICHUM NECKEROIDES (Schwaegr.) Williams.

(*Thamnium neckeroides* B. & S.)

Cañon City, Dyea Creek. Lower stem leaves nearly as broad as long, entire or nearly so, with rounded apex. Costa rather coarsely toothed above on back in the upper leaves (726).

*Plagiothecium piliferum* (Sw.) B. & S. (*Hypnum trichophorum* Spruce.) Skagway, Cañon City and Lake Lindeman. In very soft, often thick cushions on rock (727).

*Plagiothecium pulchellum* (Dicks.) B. & S. Lake Marsh and Dawson. Common on earth and rock (728).

*Plagiothecium denticulatum* (L.) B. & S. Head of Lake Bennett and Dawson (729).

*Amblystegium filicinum* (L.) De Not. (*Hypnum filicinum* L.) Head of Lake Bennett, in springs (747).

*Amblystegium Sprucei* (Br.) B. & S. Dawson, in good fruit, August 7 (733).

*Amblystegium compactum* (C. Muell.) Aust. Dawson. Common (734).

*Hypnum hispidulum* Brid. Dawson, on logs. In fruit, July 16. These specimens have the perichaetial leaf rather short pointed and cilia only occasionally appendiculate (732).

*Hypnum chrysophyllum* Brid. Dawson (736).

*Hypnum stellatum* Schreb. Head of Lake Bennett and Dawson (737).

*Hypnum polygamum* (B. & S.) Wils. Klondike River bottom (738).

*Hypnum uncinatum* Hedw. Cañon City, Dyea Creek, Lake Lindeman, Lake Lebarge and Dawson (744).

*Hypnum uncinatum plumulosum* Schp. Lake Lindeman, among boulders in rather dry places (799).

*Hypnum fluitans* L. In swamps near Marsh Lake. These specimens have leaves minutely serrulate all round, scarcely decurrent or very narrowly so at angles with costa from .050 to .060 mm. wide at base (about  $\frac{1}{5}$  width of leaf base) and extending  $\frac{3}{5}$  up. Median cells .006 mm. wide and up to .130 mm. long. Cross section of stem shows 2 or 3 rows of thickened cells in outer wall and a slightly developed central strand (798).

*Hypnum Wilsoni* Schimp. Middle of Lake Lebarge. The specimens I refer here are rather short (7 cm. high) with leaves a little narrower and less recurved than in typical specimens from Southport, Eng. The Yukon specimens are more like the specimens figured by Limpricht. All the specimens have leaves with very long, slender, flexuous or twisted points and scarcely decurrent angles. Sections of stem show 3 or 4 rows of thick-walled, golden-yellow cells next the surface and a central strand not always very distinct (740).

*Hypnum revolvens* Swartz. Dawson, common in swamps.

Sections of stem show at the surface a layer of thin-walled cells next to several rows of thickened cells and mostly a central strand of 4 or 5 small cells, sometimes not distinct, however. The costa is in section plano-convex. Plates of teeth finely cross-lined (745).

HYPNUM AMBLYPHYLLUM R. S. Williams sp. nov.

Dioicous. Growing in water up to 3.5 dm. high, with mostly short, subpinnate 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. Medium leaf-cells .005 or .006 mm. wide and mostly .035 to .060 mm. long. Younger branch leaves narrowly 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 of 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 falcatum* Brid. About springs at head of Lake Bennett. Leaves nearly entire or serrulate slightly below. Median cells about .004 mm. wide and .030 to .060 mm. long and cell walls all thickened (748).

*Hypnum crista-castrensis* L. Lake Lindeman and Klondike River bottom. Not found in fruit (750).

*Hypnum reptile* Michx. Dawson, on rock. Median leaf-cells .004 by .030-.040 mm., scarcely vermicular, alar cells short oblong to quadratic. Leaves not decurrent (756).

*Hypnum hamulosum* B. & S. Dawson. At base of trees in damp places. These specimens are rather more robust than usual with longer and more narrowly pointed perichaetial leaves. Cross sections of stem are oval, about .200 by .160 mm. This is smaller than given by Limpricht (.300-.350 mm. long), but no. 491, Raben. Bry. Europ., cited by him, shows sections similar to mine in every way. The thin outer cells of the stem have the exposed surfaces mostly sunken in or worn away giving the surface a rough, papillose appearance in cross section. The thickened cells next the outer wall are in 3 or 4 rows. Central strand distinct. The leaves are more or less plicate and border revolute below on one side (754).

*Hypnum subplicatile* (Lindb.) Limpr. Lake Lindeman, on damp rock and earth. This plant is very close to *calli-chroum* 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 col-

lected on the island of Sachalin and in eastern Russia (751).

*Hypnum circinale* Hook. Cañon City, Dyea Creek. In good fruit March 28, on trees. Common at Skagway on fallen logs. These specimens are dioicous with antheridial flowers more or less clustered on the stems. The annulus is simple, composed of pale cells slightly cohering. Median cells about .004 by .055 mm. Alar cells forming an inflated cluster. Spores rough, up to .016 mm. (752).

*Hypnum revolutum* (Mitt.) Lindb. (*H. plicatile* Mitt.) Lake Lindeman and Lake Marsh. Medium leaf-cells .005 mm. wide and up to about .040 mm. long, the majority of cells, however, up to .025 or .030 mm. long. Numerous short often nearly square alar cells with usually a few hyaline, somewhat enlarged cells in angles. In *cupressiforme* the median cells are about twice longer (757).

*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 Vaucheri* Lesq. Dawson at base of tree. This species is dioicous. The leaves are entire, with flat borders. Cells in angles small, roundish or nearly square, extending up for a distance of 10 or 12 cells and in toward costa about the same amount. Median leaf-cells about .004 by .030 to .040 mm. (755).

*Hypnum Lindbergii elatum* Schimp. Lake Lindeman, in swamps. The specimens referred here have rather longer pointed leaves than the type with leaf-cells also longer and narrower, the median cells measuring about .004 by .080 mm. The stem leaves are entire, flat bordered, not decurrent with a convex cluster of more or less inflated alar cells, either pale or colored. Stem sections oval, .280 mm. long, the outer row of cells thin-walled, the next 2 or 3 rows thick-walled, with central strand well developed, of 10 or 12 small cells (761).

*Hypnum pratense* Koch. Dawson, on hummocks in swamp. Growing in depressed tufts with distichous leaves and the habits of a *Plagiothecium*. Stem leaves serrulate or nearly entire, branch leaves distinctly serrulate towards apex (730).

*Hypnum palustre* Huds. Skagway, Lake Marsh and Miles' Cañon. The cell walls are somewhat thickened and linear-vermicular, the median up to .040 mm. long and scarcely .004 mm. wide. Alar cells mostly forming a distinct cluster often more or less colored (765 and 767).

*Hypnum Bestii* Ren. & Bryhn. Skagway. This species attains a greater size, 15–20 cm., than any other of the *Limnobiums*. It has leaves secund, broadly ovate-lanceolate, with a blunt, slightly serrulate apex. The leaf-cells are rather irregular and thin-walled except at base, the alar cells somewhat gradually enlarged or 2 or 3 cells rather abruptly enlarged at the more or less decurrent angle. This plant is described as a subspecies of *molle* by Renauld and Bryhn, but I think it will stand as a distinct species. It differs from *molle* in having no central strand. It is a larger species, also, with stems below wiry and harsh with the bases of the broken-off leaves. At first glance it more resembles *dilatatum* but the latter has much broader, often almost circular leaves and a distinct, convex cluster of alar cells, as well as central strand (770).

*Hypnum alpinum* Schimp. Lake Lindeman. I have compared these specimens with no. 1348 Rabenhorst, Bryoth. Eur., the only collection cited by Limpricht, and they are undoubtedly the same; it may be questioned however, whether *alpinum* is at best anything more than a variety of *dilatatum* with slightly more serrulate leaves (771).

*Hypnum alpestre* Sw. Skagway and Lake Lindeman. These specimens have a rather broadly ovate, short-pointed leaf and costa forked near base, with both branches often extending to or above the middle. The leaf-cells are probably more uniformly elongated and narrowed, with thicker walls from base to apex than in any other *Limnobium*. In older



leaves the very distinctly inflated cluster of alar cells is apparently always more or less deep red, sometimes the whole base being colored or even the cell walls up to apex. Young leaves have alar cells hyaline. Median cells measure .005 mm. wide and up to .060 mm. long. The leaves are usually minutely serrulate all round (768 and 769).

*Hypnum ochraceum* Turn. Dawson, on rock in bed of stream. The stems of these specimens are rather slender and elongated, with leaves shorter and broader-pointed than in typical specimens. The hyaline alar cells are more decurrent, I believe, than any other species of the group. The outer wall of the stem consists of a single layer of large, thin-walled cells next several rows of thickened cells (772).

*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 cordifolium* Hedw. Klondike River bottom near mouth. I refer specimens here having scarcely branched stems, alar cells not forming quite so distinct a convex group as in the next and other leaf-cells perhaps a little wider, none of the assigned differences between this and *giganteum* seem very constant however (774).

*Hypnum giganteum fluitans* Klinggr. In still water of small stream flowing into Marsh Lake. These specimens are the largest I have seen, the leaves measuring 4.5 by 3 mm. The leaves on lower stem are distant, the branches mostly few, short and irregularly placed (775).

*Hypnum sarmentosum* Wahl. In small pond by snow banks about 1000 feet above Lake Lindeman (776).

*Hypnum sarmentosum fontinaloides* Berggrn. Bonanza Creek near mouth. On rocks in the bottom of a small stream. This is a variety with long, slender stems and

larger 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 Richardsoni* (Mitt.) Lesq. & James. Dawson in swamps. In fine fruit July 27. This species is distinguished from *cordatum* and *giganteum*, the two most closely related, I believe, by the shorter nerve, extending only  $\frac{2}{3}$  or  $\frac{3}{4}$  up and often forking in the upper part. The perichaetial leaves are ecostate to faintly  $\frac{1}{2}$  costate (778).

*Hypnum Schreberi* Willd. (*Hylocomium parietinum* (L.) Lindb.) Lake Lindeman and Dawson, not fruiting (779).

*Hypnum stramineum* Dicks. Lake Lindeman (780).

*Hypnum turgescens* (Jensen) Schimp. Just below Whitehorse Rapids in dried-up swamp. Growing in broad depressed mats (781).

*Hypnum turgescens uliginosum* Lindb. In swamps with the preceding. 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  $\frac{3}{5}$  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* L. (*Scorpidium scorpioides* (L.) Limpr.) Just above Lake Lindeman in blackish mats almost covering the bottom of a small pond 12 or 15 inches below the surface. The plants have the appearance of great age, most of the leaves being worn into shreds (783).

*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).

*Hylocomium proliferum* (L.) Lindb. (*H. splendens* Hedw.) Lake Lindeman, Thirty-mile River and Dawson. An abundant species occasionally fruiting. Plants variable in size and color, the long stems sometimes scarcely branching (784).

*Hylocomium Pyrenaicum* (Spruce) Lindb. (*H. Oakesii* Sulliv.) Lake Lindeman, on rock (785).

*Hylocomium squarrosum* (L.) B. & S. Lake Lindeman (786).

*Hylocomium triquetrum* (L.) B. & S. Yukon River below Ft. Selkirk and Klondike River bottom near mouth. Not apparently very common (787).

*Hylocomium loreum* L. Cañon City, Dyea Creek and Skagway. Not observed on the Yukon River (788).

*Hylocomium rugosum* (Ehrh.) De Not. (*Hypnum rugosum* L.) Lake Marsh and Mile's Cañon, sterile specimens abundant. Dawson, not rare in fruit (794).

#### Description of Plates.

Camera lucida drawings reproduced without reduction.

#### PLATE 15. *Ditrichum giganteum*.

Figs. 1 and 2. Plants, natural size.

Fig. 3. Capsule enlarged.

Fig. 4. Perichaetium,  $\times 9$ .

Fig. 5. Inner perichaetial leaf enlarged.

Fig. 6. Apex of stem leaf,  $\times 285$ .

Fig. 7. Part of peristome and capsule,  $\times 285$ .

Fig. 8. Marginal cells  $\frac{1}{2}$  down leaf,  $\times 285$ .

- Fig. 9. Upper stem leaf,  $\times 12$ .  
 Fig. 10. Cells of basal angle,  $\times 285$ .  
 Fig. 11. Part of annulus,  $\times 285$ .  
 Fig. 12. Cells near middle of capsule,  $\times 285$ .  
 Fig. 13. Perigonial leaf and antheridium enlarged.  
 Fig. 14. Stoma,  $\times 285$ .

PLATE 16. *Bryobrittonia pellucida*.

- Fig. 1. Plant about natural size.  
 Fig. 2. Upper stem leaf,  $\times 8$ .  
 Fig. 3. Lower stem leaf,  $\times 8$ .  
 Fig. 4. Cross section of leaf,  $\times 160$ .  
 Fig. 5. Cross section of stem,  $\times 160$ . *a*, section of costa at point where it joins stem; *b*, a radicle growing out from stem; *c*, lower part of costa where it is wholly adnate to stem.  
 Fig. 6. Apex of leaf,  $\times 285$ .  
 Fig. 7. Leaf cells at margin a little above the base,  $\times 285$ .  
 Fig. 8. Cross section of costa,  $\times 160$ .

PLATE 17. *Bryum Dawsonense*.

- Fig. 1. Plant, natural size.  
 Fig. 2. Outer perichaetial leaf,  $\times 12$ .  
 Fig. 3. Upper stem leaf,  $\times 12$ .  
 Fig. 4. Lower stem leaf,  $\times 12$ .  
 Fig. 5. Inner perichaetial leaf,  $\times 12$ .  
 Fig. 6. Capsules, moistened,  $\times 8$ .  
 Fig. 7. Annulus,  $\times 160$ .  
 Fig. 8. Exothecal cells a little above the middle,  $\times 160$ .  
 Fig. 9. Stoma,  $\times 160$ .  
 Fig. 10. Peristome and part of capsule,  $\times 160$ .  
 Fig. 11. Leaf border near middle,  $\times 160$ .  
 Fig. 12. Apex of upper leaf,  $\times 160$ .  
 Fig. 13. Median leaf-cells,  $\times 160$ .

PLATE 18. *Bryum conditum*.

- Fig. 1. Plant ♂, about natural size.  
 Fig. 2. Plant ♀, about natural size.  
 Fig. 3. Outer perichaetial leaf,  $\times 12$ .  
 Fig. 4. Upper stem leaf,  $\times 12$ .  
 Fig. 5. Capsules showing variations in size,  $\times 8$ .  
 Fig. 6. Lower stem leaf,  $\times 12$ .  
 Fig. 7. Part of annulus,  $\times 160$ .  
 Fig. 8. Median leaf-cells,  $\times 160$ .  
 Fig. 9. Inner perichaetial leaf with archegonium,  $\times 12$ .  
 Fig. 10. Inner perigonial leaf with antheridium,  $\times 12$ .  
 Fig. 11. Part of peristome,  $\times 160$ .

- Fig. 12. Exothecal cells just above the middle,  $\times 160$ .  
 Fig. 13. Apex of perichaetial leaf,  $\times 80$ .  
 Fig. 14. Cross section of upper leaf,  $\times 160$ .

PLATE 19. *Bryum submuticum*.

- Fig. 1. Plant, natural size.  
 Fig. 2. Outer perichaetial leaf,  $\times 20$ .  
 Fig. 3. Upper stem leaf,  $\times 20$ .  
 Fig. 4. Inner perichaetial leaf and archegonium,  $\times 20$ .  
 Fig. 5. Capsules,  $\times 11$ .  
 Fig. 6. Part of annulus,  $\times 160$ .  
 Fig. 7. Apex of outer perichaetial leaf,  $\times 160$ .  
 Fig. 8. Inner perigonial leaf with antheridium,  $\times 20$ .  
 Fig. 9. Part of peristome,  $\times 160$ .  
 Fig. 10. Marginal cells of leaf  $\frac{1}{2}$  down,  $\times 160$ .  
 Fig. 11. Median leaf-cells,  $\times 160$ .  
 Fig. 12. Perigonium,  $\times 10$ .  
 Fig. 13. Stoma,  $\times 160$ .  
 Fig. 14. Exothecal cells about  $\frac{1}{2}$  down,  $\times 160$ .

PLATE 20. *Bryum suborbiculare*.

- Fig. 1. Plant, natural size.  
 Fig. 2. Outer perichaetial leaf,  $\times 20$ .  
 Fig. 3. Upper stem leaf,  $\times 20$ .  
 Fig. 4. Lower stem leaf,  $\times 20$ .  
 Fig. 5. Inner perichaetial leaf and archegonium,  $\times 20$ .  
 Fig. 6. Capsules,  $\times 9$ .  
 Fig. 7. Apex of perichaetial leaf,  $\times 160$ .  
 Fig. 8. Part of peristome,  $\times 160$ .  
 Fig. 9. Stoma,  $\times 160$ .  
 Fig. 10. Part of annulus,  $\times 160$ .  
 Fig. 11. Marginal cells  $\frac{1}{2}$  down leaf,  $\times 285$ .  
 Fig. 12. Apex of stem leaf,  $\times 160$ .  
 Fig. 13. Exothecal cells  $\frac{1}{2}$  down capsule,  $\times 285$ .

PLATE 21. *Plagiobryum argenteoides*.

- Fig. 1. Terminal stem leaf,  $\times 50$ .  
 Fig. 2. Terminal stem leaf,  $\times 50$ .  
 Fig. 3. Lower stem leaf,  $\times 50$ .  
 Fig. 4. Cross section of stem,  $\times 205$ .  
 Fig. 5. Apex of leaf,  $\times 205$ .  
 Fig. 6. Base of leaf on one side,  $\times 205$ .  
 Fig. 7. Leaf of *P. Zierii* corresponding to number 2,  $\times 50$ .  
 Fig. 8. Basal cells of same corresponding to number 6,  $\times 205$ .

PLATE 22. *Polytrichum inconstans* Hagen.

- Fig. 1. Leaf,  $\times 9$ .  
 Fig. 2. Cross section of stem,  $\times 160$ .

- Fig. 3. One half cross section of leaf,  $\times 285$ .  
Fig. 4. Marginal cells  $\frac{1}{2}$  down leaf,  $\times 285$ .  
Fig. 5. Upper part of stem, about natural size.  
Fig. 6. Apex of leaf,  $\times 80$ .

PLATE 23. *Brachythecium petrophilum*.

- Fig. 1. Plant, about natural size.  
Fig. 2. Stem leaf,  $\times 40$ .  
Fig. 3. Branch leaf,  $\times 40$ .  
Fig. 4. Perichaetial leaf,  $\times 40$ .  
Fig. 5. Capsules,  $\times 9$ .  
Fig. 6. Part of peristome,  $\times 160$ .  
Fig. 7. Part of annulus,  $\times 160$ .  
Fig. 8. Alar cells,  $\times 160$ .  
Fig. 9. Apex of leaf,  $\times 285$ .  
Fig. 10. Exothecal cells near middle of capsule,  $\times 160$ .  
Fig. 11. Stoma.  
Fig. 12. Section of pedicel near middle, showing papillae,  $\times 285$ .  
Fig. 13. Median leaf-cells,  $\times 285$ .

PLATE 24. *Harpidium amblyphyllum*.

- Fig. 1. Stem leaf,  $\times 12$ .  
Fig. 2. Branch leaf,  $\times 12$ .  
Fig. 3. Capsules,  $\times 10$ .  
Fig. 4. Perichaetial leaf,  $\times 12$ .  
Fig. 5. Apex of stem leaf,  $\times 285$ .  
Fig. 6. Cross section of stem,  $\times 160$ .  
Fig. 7. Part of peristome,  $\times 160$ .  
Fig. 8. Median leaf-cells,  $\times 285$ .  
Fig. 9. Base of leaf on one side,  $\times 285$ .  
Fig. 10. Stoma,  $\times 160$ .

**3. An Enumeration of the Pteridophytes Collected by R. S. Williams and J. B. Tarleton.**

BY L. M. UNDERWOOD.

Family OPHIOGLOSSACEAE.

*Botrychium Lunaria* L. Dawson (Williams).

Family POLYPODIACEAE.

*Polypodium vulgare* L. Skagway (Williams); 50 miles above Stewart River (Tarleton).

*Filix fragilis* (L.) Underw. (*Cystopteris fragilis* Bernh.) Dawson and near mouth of the Klondike (Williams); 50 miles above Stewart River (Tarleton).

*Filix montana* (Lam.) Underw. (*Cystopteris montana* Bernh.) Klondike-Indian Divide (Tarleton).

*Dryopteris fragrans* (L.) Schott. Dawson; Marsh Lake (Williams); 50 miles above Stewart River (Tarleton).

*Phegopteris Dryopteris* (L.) Fee; 50 miles above Stewart River (Tarleton).

*Phegopteris Robertiana* (Hoffm.) A. Br. Dawson, and near mouth of Klondike (Williams).

Family EQUISETACEAE.

*Equisetum sylvaticum* L. Foot of Lake Lindeman (Williams).

Family LYCOPODIACEAE.

*Lycopodium Selago* L. Lindeman (Williams); Klondike-Indian Divide (Tarleton).

*Lycopodium annotinum* L. Lindeman (Williams); 50 miles above Stewart River (Tarleton).

*Lycopodium alpinum* L. Lindeman (Williams); Klondike-Indian Divide (Tarleton).

*Lycopodium clavatum* L. Lindeman (Williams).

Family SELAGINELLACEAE.

*Selaginella rupestris* (L.) Spring. Mountain side, Dawson (Williams; Tarleton).

*Selaginella selaginoides* (L.) Link. Lindeman (Williams).

**4. An Enumeration of the Flowering Plants Collected by R. S. Williams and by J. B. Tarleton.**

BY N. L. BRITTON AND P. A. RYDBERG.

The collection of specimens made by Mr. J. B. Tarleton in the valley of the Yukon during the summer of 1899 is the property of the United States National Museum. It supplements that made by Mr. Williams by a considerable number of species and the specimens have in nearly all cases been ample enough to permit a duplicate to be taken for the Garden Herbarium; the types of all the species proposed as new have been so divided.

## Family PINACEAE.

*Pinus Murrayana* Balf. Five-finger Rapids (Williams); twenty miles above Ft. Selkirk (Tarleton).

*Juniperus nana* Willd. Dawson; Marsh Lake (Williams); Lake Lebarge (Tarleton).

*Juniperus prostrata* Pers. Near Selkirk (Williams); Lebarge Island (Tarleton).

*Tsuga Mertensiana* (Bong.) Sargent. Long Lake. Reduced to a low bush (Williams).

*Tsuga heterophylla* (Raf.) Sargent. Skagway (Williams).

## Family SPARGANIACEAE.

*Sparganium minimum* Fries. Klondike bottom (Williams).

## Family SCHEUCHZERIACEAE.

*Triglochin maritima* L. Lebarge Island (Tarleton).

*Triglochin palustris* L. Above Ft. Selkirk (Tarleton).

## Family GRAMINEAE.\*

*Beckmannia erucaeformis* (L.) Host. Slough below Rink Rapids (Williams.)

*Savastana alpina* (Sw.) Scribn. White Pass. (Williams.)

*Savastana odorata* (L.) Scribn. Thirty-mile River. (Williams); Lebarge Island (Tarleton).

*Stipa comata* Trin. Five-finger Rapids (Tarleton).

*Phleum Haenkeanum* Presl.? Dawson, introduced (Williams). Mr. Williams regards this as merely introduced. It has the spike of *P. alpinum* L., but it is a taller and more slender grass, and the awns are much shorter than the empty scales. It differs from *P. pratense* L. in the much larger spikelets and the broader spike, but resembles it in the short awn of the empty scales. It has been provisionally referred as above, although with considerable doubt, as Presl gives a very short description of his species, hardly sufficient to definitely identify it. He states, however, that it is related to *P. alpinum* L., but differs in the shorter awns, and it is on this that I have doubtfully referred it to his species.

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\* By George V. Nash.



*Alopecurus geniculatus* L. Ft. Selkirk (Tarleton).

*Alopecurus alpinus* J. E. Smith. Ft. Selkirk (Tarleton).

ARCTAGROSTIS ANGUSTIFOLIA Nash, sp. nov.

A rather leafy perennial, with long running rootstocks. Culms erect, rather slender, 10–12 dm. tall, bracted at the base, the bracts gradually passing into leaves: leaves 3 or 4; sheaths, at least all but the lowermost, shorter than the internodes, roughened at the summit; ligule scarious, 5–6 mm. long, decurrent on the sheath; blades apparently lax, rough on both surfaces, 2–3 dm. long, 3–5 mm. wide, long-acuminate: panicle rather slender, contracted, nodding at the apex, 2–2.5 dm. long, its axis smooth, the fasciculate, somewhat hispidulous, branches appressed, the larger ones 4–6 cm. long and naked at the base: spikelets numerous, about 3 mm. long, on hispidulous pedicels usually about 0.5 mm. long; empty scales acute, 1-nerved, or the second sometimes with an additional lateral nerve on each side of the base, the first scale about two-thirds as long as the second which is usually a trifle shorter than the palet; flowering scale acute, about 3 mm. long, strongly hispidulous, usually 1-nerved, or rarely with a very obscure lateral nerve on each side, in side view lanceolate and about 0.5 mm. wide; palet slightly shorter than the scale or equalling it, faintly 2-nerved, strongly hispidulous; stamens 3, about 1.5 mm. long.

Type collected by R. S. Williams on damp mountain side among brush at Dawson, on August 14, 1899; also secured near Big Salmon, on August 22. Resembling *A. poaeoides* described below, and *A. arundinacea* (Trin.) Beal in the basal bracts, from both of which, however, it is clearly distinct in its taller and more slender culms and slender panicle, and the narrow flowering scales, which characters, together with its long lax leaves, at once separate it from *A. poaeoides*.

ARCTAGROSTIS MACROPHYLLA Nash, sp. nov.

A rather leafy perennial, with a running rootstock. Culms rather stout, 4–8 dm. tall, erect; leaves usually 3 or 4; sheaths rather loosely embracing the culm, the lower ones overlapping and exceedingly rough; ligule scarious, 4–5 mm. long, decurrent on the sheath; blades erect, very rough on both surfaces, 2–4 dm. long, 8–12 mm. wide, long-acuminate: panicle contracted, 1.5–2 dm. long, its axis and erect branches rough, the fasciculate branches of varying length,

the larger 6–10 cm. long and naked at the base: spikelets numerous, about 4 mm. long, on hispidulous pedicels 1.5 mm. long or less; empty scales acute, the first scale 1-nerved, about two-thirds as long as the 3-nerved second which is usually about four-fifths as long as the palet; flowering scale about 3.5 mm. long, 5-nerved, the midnerve hispidulous, the two lateral nerves on each side very obscure and sometimes hardly discernible, acute, strongly hispidulous, in side view oblong and about 0.8 mm. wide; palet faintly 2-nerved, strongly hispidulous, from a little shorter than the scale to equalling it; stamens 3, oblong-linear, about 2 mm. long; stigmas 2, plumose.

Type collected by R. S. Williams in wet springy places on mountain sides, Dawson, July 14, 1899. Also collected by F. Funston along the Yukon River, in August, 1893, no. 159, and distributed as *A. arundinacea* Trin. It is quite distinct from that species, being taller and having larger and very rough leaves, and lacking the prominent pointed bracts at the base of the culm which gradually pass into leaves, as indicated by Trinius in his *Spec. Gram. Icon. & Descrip. pl. 55*. There is material in the herbarium of Columbia University from Kotzebue's Sound, the type locality of the *Vilfa arundinacea* Trin., exactly matching this figure.

#### ARCTAGROSTIS POAEOIDES Nash, sp. nov.

A somewhat tufted perennial, with a branching running rootstock. Culms 6–8 dm. tall, erect, bracted at the base, the bracts gradually passing into leaves: leaves about 4; sheaths striate, shorter than the internodes, very rough; ligule scarious, 4–5 mm. long, decurrent on the sheath; blades erect, stiff, exceedingly rough on both surfaces, long-acuminate, 1.5–2.5 dm. long, 5–6 mm. wide: panicle about 1.5 dm. long, contracted, its axis almost smooth, the fasciculate erect hispidulous branches varying in length, the larger 3–4 cm. long and naked below: spikelets numerous, 2.5–3 mm. long, on somewhat hispidulous pedicels usually less than 1 mm. long; empty scales acute, the first scale 1-nerved, about two-thirds as long as the 3-nerved second which is usually about four-fifths as long as the palet; flowering scale usually a little less than 3 mm. long, strongly hispidulous, 5-nerved, the midnerve hispidulous, the two

lateral nerves on each side very obscure, acute in side view, oblong-lanceolate and about 0.8 mm. wide; palet faintly 2-nerved, strongly hispidulous, usually about equalling the scale; stamens 3, oblong-linear, about 2 mm. long; stigmas 2, plumose.

Type collected by R. S. Williams on mountain side at Dawson, July 14, 1899. Also obtained at Cumberland House, on the Saskatchewan River, in the Lake Winnipeg region, and communicated to Torrey by Hooker, and bearing the number 105. Resembling *A. arundinacea* (Trin.) Beal in the bracts at the base, but it is a taller and much rougher plant with a more contracted panicle and smaller spikelets.

*Agrostis hyemalis* (Walt.) B.S.P. Dawson, August 13 and 23, 1899 (Williams), referred for the present to this complex species.

#### CALAMAGROSTIS ATROPURPUREA Nash, sp. nov.

A tall perennial with a rather stout long rootstock and deep purple contracted panicle. Culms 8-12 dm. tall, erect, smooth, or a little roughened just below the panicle: leaves about 5; sheaths striate, somewhat roughened, especially toward the apex, rather loosely embracing the culm; ligule scarious, about 5 mm. long; blades erect, flat, strongly roughened, long-acuminate, 1-2 dm. long, 3-5 mm. wide: panicle contracted, about 1 dm. long, its branches and their divisions extremely hispidulous, erect, the larger ones 2-4 cm. long, not spikelet-bearing below: spikelets numerous, 3.5 mm. long, lanceolate, acute; empty scales strongly strigose, deep purple, acuminate, rounded on the back, the first scale 1-nerved, equalling or slightly longer than the 3-nerved second; flowering scale about 2.8 mm. long, usually deep purple at the base, 5-nerved, the nerves converging above and indistinctly excurrent, the strongly hispidulous rather stout awn inserted about the middle and extending to or considerably beyond the apex of the scale; callus-hairs rather copious, in two lateral tufts, generally a little exceeding the scale; rudiment about 0.5 mm. long, its hairs extending to the apex of the scale; palet about two-thirds as long as the scale.

On wooded hillsides, Dawson, July 14, 1899 (R. S. Williams). Related to *C. Scribneri* Beal, but the much

longer callus-hairs and the deep purple color of the panicle readily distinguish it.

*Calamagrostis Canadensis acuminata* Vasey. Dawson, July 14, 1899; Klondike City, July 23, 1899; Bennett City, August 25, 1899 (Williams).

*Calamagrostis Lapponica* (Wahl.) Hartm. Dawson, July 13, 1899 (Williams). This exactly matches a specimen in the herbarium of Columbia University from Wahlenberg, labeled *Arundo Lapponica*. It has long been uncertain whether we had this species in this country, but this collection definitely settles the point, if the specimen from Wahlenberg, above referred to, is typical of his species, the original description, however, calling for a taller plant. The grass secured by Mr. Williams is a tufted perennial with culms erect and 3-4 dm. tall, the innovations being about one-third as long as the culm with their leaf-blades very narrow and often involute: panicle contracted, 7-9 cm. long and 1 cm. or a little more wide, its branches erect: spikelets about 5 mm. long, purple toward the apex, the flowering scale a little exceeding the copious basal hairs and with a rather stout awn inserted at or near the middle and about reaching the apex of the scale.

#### CALAMAGROSTIS YUKONENSIS Nash, sp. nov.

A tall slender perennial with a slender running rootstock, narrow leaf-blades, and marcescent basal sheaths. Culms 8-10 dm. tall, erect, the innovations nearly one-half as long as the culms: culm-leaves 2; sheaths very rough, much shorter than the internodes; ligule scarious, about 5 mm. long, decurrent on the sheath; blades gray-green, erect or ascending, long-acuminate, very rough on the lower surface, the upper surface strongly pubescent with short hairs, the longer blades on the innovations about 3 dm. long and 2 mm. wide, those on the culm 1-2 dm. long and 3-4 mm. wide: panicle 8-15 cm. long, contracted, its apex sometimes nodding, the branches erect, fascicled, strongly hispidulous, the longer ones 3-4 cm. long, naked at the base: spikelets numerous, on strongly hispid pedicels usually 1-2 mm. long; empty scales hispidulous, strongly so on the prominent keel, very acute, yellowish, variegated with purple, the first scale 5-6 mm. long, 1-nerved, or sometimes with a short lateral

nerve on each side near the base, broader than and a little exceeding the 3-nerved second; flowering scale strongly hispidulous, 4-5 mm. long, 5-nerved, the nerves usually excurrent in short awns, the dorsal awn inserted about one-quarter way from the base of the scale, its column yellowish brown, closely spiral and about reaching the apex of the scale where it is strongly bent, the divergent portion much exerted and 5-6 mm. long; palea a little shorter than the scale, irregularly and finely toothed at the apex, 2-nerved, the nerves sometimes barely excurrent; callus with a tuft of hairs on each side about 0.5 mm. long, the dorsal portion naked: rudiment  $\frac{1}{3}$  to  $\frac{1}{2}$  as long as the scale, pubescent with erect hairs 1 mm. or a little less long, sometimes bearing an awn.

Type collected by R. S. Williams in dry soil in open places at Dawson. There is also a specimen in the herbarium of Columbia University collected by Kennicott on the Yukon River, but with no other data. Related to *C. Tweedyi* Scribn., but its more slender culms and narrower more open panicle, long and narrow leaf-blades with the upper surface pubescent, and the smaller spikelets readily separate it.

*Calamagrostis purpurascens* R. Br.? An unusual loose-panicled form with large anthers, fully 3 mm. long. It may be undescribed. Five-finger Rapids (Tarleton).

*Deschampsia atropurpurea* (Wahl.) Scheele. White Pass, August 26, 1899 (Williams). The branches of the panicle are exceedingly long, much longer than in the typical form, the lower ones being 10-12 cm. long, spikelet-bearing only at the summit, and drooping. The spikelets, however, are identical with those of the common form.

*Deschampsia caespitosa* (L.) Beauv. Dawson (Williams).

*Deschampsia calycina* Presl. Dawson (Williams). Regarded by the collector as introduced.

#### TRisetum ALASKANUM Nash, sp. nov.

A tufted pubescent perennial with the innovations about one-half as long as the culms. Culms 2-4 dm. tall, stout, ascending, densely villous with reflexed hairs: leaves 2; sheaths loose, pubescent with soft reflexed hairs; ligule scarious, about 1 mm. long; blades lax, pubescent with soft spreading hairs, those on the culm 8-10 cm. long, 3-4 mm.

wide, those on the innovations narrower and longer: panicle contracted, strict, 4-5 cm. long, 1-1.5 cm. thick, its axis and appressed branches pubescent with long hairs, the branches spikelet-bearing to the base, the larger ones 1-1.5 cm. long: spikelets 6-7 mm. long, crowded, 2-3-flowered; empty scales brownish or yellowish brown, strongly hispidulous on the keel, sparingly so on the surface, the midnerve excurrent in a short point, the first scale 1-nerved, the second 3-nerved; flowering scales strongly hispidulous, not exerted, the callus pubescent with hairs about 0.25 mm. long, acute, shortly 2-toothed at the apex, the teeth awn-pointed, the awn inserted about one-third way down, stout, hispidulous, finally strongly reflexed, about the length of the scale; palet about four-fifths as long as the scale, 2-toothed at the apex.

On steep open hillsides, Skagway, August 28, 1899 (Williams). Related to *T. subspicatum* (L.) Beauv., but the larger spikelets with their included flowering scales at once distinguish it from any form of that species.

*Trisetum subspicatum* (L.) Beauv. Dawson (Williams).

*Trisetum subspicatum molle* (Michx.) A. Gray. Summit of White Pass (Williams); Ft. Selkirk (Tarleton).

*Trisetum* sp. Five-finger Rapids, Aug. 21, 1899 (Williams). This is probably undescribed, but the parts of the spikelets are so abnormally large, owing to its infestation by nematode worms, that its description as new is not warranted.

*Avena sativa* L. Dawson. Introduced (Williams).

*Poa arctica* R. Br. Klondike Bottom (Williams).

*Poa nemoralis* L. Dawson (Williams).

*Poa nemoralis* L. ? Dawson (Williams).

*Poa nemoralis* L. ? Five-finger Rapids (Tarleton).

*Poa pratensis* L. Rink Rapids (Williams).

#### POA WILLIAMSII Nash, sp. nov.

A tufted smooth and glabrous perennial, the innovations apparently intravaginal and much shorter than the culm. Culms 1.5-2 dm. tall, erect or ascending: leaves 1 or 2; sheaths striate; ligule scarious, about 2.5 mm. long; blades erect, about 2 mm. wide, acuminate, those on the culm 2-4 cm. long, those on the innovations sometimes longer: panicle

4-6 cm. long, its branches ascending, the larger ones 2-2.5 cm. long, spikelet-bearing above the middle: spikelets longer than their pedicels, in 2's-4's on the larger branches, variegated with yellowish brown and purple, 3-4-flowered, 5-6 mm. long; empty scales acuminate, hispidulous on the keel above the middle, the first scale 1-nerved, the second 3-nerved at the base, the lateral nerves vanishing below the apex, the first scale about three fourths as long as the second which is a little shorter than its adjacent flowering scale; flowering scale acute, hispidulous on the midnerve above the middle, cobwebby at the base, the lower ones about 4.5 mm. long, 5-nerved, the midnerve and lateral nerves prominent, densely pubescent below the middle with silky hairs, the intermediate nerves rather faint, sometimes sparingly pubescent, the internerves hispidulous at the apex and minutely pubescent toward the base; palet a little shorter than the scale, 2-keeled, the keels hispidulous.

Along a brook, summit of White Pass, R. S. Williams, Aug. 26, 1899. Related to *P. arctica* R. Br., but distinguished by its innovations and the narrower acute flowering scales.

*Colpodium pendulinum* (Vahl) Griseb. Mouth of Klondike (Williams).

#### *Panicularia pulchella* Nash sp. nov.

A leafy glabrous perennial, apparently with a running rootstock. Culms 4-5 dm. tall, stout, smooth: leaves crowded; sheaths overlapping and loose, rough; ligule scarious, 2-2.5 mm. long; blades erect, rough, long-acuminate, 1.5-2 dm. long, 2.5-5 mm. wide: panicle loose and open, 1.5-2.5 dm. long, its smooth more or less flexuous slender dividing branches ascending or nearly erect, the larger ones 8-11 cm. long, naked toward the base: spikelets longer than their pedicels, 5-6 mm. long, 4-6-flowered; empty scales brownish, scarious margined, irregularly toothed at the rounded or obtuse apex, much shorter than their adjacent flowering scales, the first scale 1-nerved, shorter than the second which is 3-nerved at the base; flowering scales usually purple, with a broad hyaline margin above the middle, strongly but minutely hispidulous, oval when spread out, prominently 7-nerved, obscurely and irregularly toothed at the rounded apex, the lower ones about 3 mm. long; palet slightly shorter than the scale.

Type collected by R. S. Williams in low marshy ground in river bottoms near White River, Aug. 17, 1899. Also secured by Messrs. Onion, Kennicott and Hardisty in 1861-62. It has somewhat the appearance of low forms of *P. pauciflora* (Presl) Kuntze, but it is stouter and more leafy, and the flowering scales are longer and not truncate at the apex as in that species. The deep purple of the flowering scales makes a strong contrast with their broad white hyaline margins, giving the spikelets a beautiful and striking appearance.

*Festuca Altaica* Trin. Hillsides at Dawson, June 25 and July 13, 1899; White Pass, August 26, 1899 (Williams). This is closely related to *F. scabrella* Torr., differing in its more acuminate flowering scales, but otherwise strongly resembling it. Should it prove the same, Torrey's name must be considered a synonym, it having been published several years later than that of Trinius.

*Festuca ovina polyphylla* Vasey. Skagway (Williams).

*Bromus Pumpellianus* Scribn. Dawson (Williams); Ft. Selkirk (Tarleton).

*Bromus racemosus* L. Dawson. Introduced (Williams).

*Agropyron Richardsoni* Schrad. Dawson (Williams).

*Agropyron spicatum tenuispicum* (S. & S.) Rydberg. Dawson (Williams).

*Agropyron tenerum* Vasey. River bank opposite Dawson (Williams).

*Hordeum nodosum* L. Dawson. Introduced (Williams).

*Elymus arenarius* L. Skagway (Williams).

#### Family CYPERACEAE.

*Eriophorum polystachyon* L. Mouth of Klondike (Williams).

*Eriophorum vaginatum* L. Dawson; below White Horse Rapids; Klondike River Bottom (Williams); Five-finger Rapids (Tarleton).

*Carex vesicaria* L. Dawson; Klondike River Bottom (Williams).



*Carex saxatilis* L. Thirty-mile River (Williams).

*Carex Grahami* Boott. Near Stewart River (Williams).

*Carex alpina* Sw. Dawson (Williams); White Horse Rapids (Tarleton).

*Carex Gmelini* Hook. Skagway (Williams).

*Carex stylosa* Drejer. Mouth of Bonanza; also a specimen doubtfully referred to this species from Dawson Swamp (Williams).

***Carex Yukonensis* Britton sp. nov.**

Group of *C. caespitosa*. Culms slender, roughish, 2.5-4 dm. high, longer than the leaves. Leaves narrowly linear, roughish margined, 2 mm. wide, the midvein prominent; lowest spike subtended by a nearly filiform bract 1-2.5 cm. long; staminate spike terminal, stalked, 2-2.5 cm. long; pistillate spikes 2 or 3, 1.5-2 cm. long, 2.5 mm. thick, dense, apparently erect, the upper nearly sessile, the lower one, when 3 are present, filiform-stalked, loosely flowered toward the base; perigynia nearly orbicular, nerveless, 1 mm. in diameter, very minutely beaked, lenticular, sharply margined, about as long as the black, ovate-oblong, acute or acutish scale; stigmas 2 or 3.

Mouth of Bonanza Creek, R. S. Williams, June 18, 1899.

*Carex rigida* Good?. Mouth of Bonanza Creek (Williams).

*Carex acuina* Bailey. Mouth of Klondike (Williams).

*Carex podocarpa* R. Br. White Pass (Williams).

*Carex Magellanica* Lam. Klondike River Bottom; near Mouth of Klondike (Williams).

*Carex capillaris* L. Dawson (Williams).

*Carex altocaulis* (Dewey) Britton. Hillside among willows, Dawson and at Walker Gulch (Williams).

*Carex bicolor* All. Ten miles above Lebarge (Williams).

*Carex concinna* R. Br. Dawson (Williams); Lake Bennett (Tarleton).

*Carex filifolia* Nutt. Miles Cañon (Williams).

***Carex Williamsii* Britton, sp. nov.**

Glabrous; culms filiform, smooth, 1-2.5 dm. high. Leaves filiform-linear, shorter than the culms, equitant, 1 mm. wide

or less, the margins minutely serrulate at least below; spikes 3 or 4, 3-6-flowered, the uppermost staminate above with 1 or 2 pistillate flowers below, the others pistillate, the lower 1 or 2 on filiform erect stalks 1.5 cm. long or less, subtended by leaf-like bracts which sometimes exceed them; scales oval, brown, acute, or obtusish, distant on the filiform rachis, nearly 2 mm. long; perigynia spindle-shaped, few-nerved, 3-3.5 mm. long, less than 1 mm. wide, readily deciduous, the orifice entire; stigmas 3.

Dawson, R. S. Williams, June 12, 1899 (type); also, by the same collector, near the same locality August 1, 1899.

*Carex teretiuscula* Good. Klondike River Bottom; near mouth of Klondike (Williams).

*Carex tenella* Schk. Klondike River Bottom (Williams).

*Carex capitata* L. Ten miles above Lebarge; Dawson Swamp (Williams).

*Carex Redowskyana* C. A. Meyer. Bennett City (Williams).

#### *Carex Bonanzensis* Britton, sp. nov.

Group of *C. canescens*. Glabrous; culms about 4 dm. high, roughish above. Leaves nearly equalling the culm, very rough-margined, 2 mm. wide. Spikes about 7, sessile, the upper clustered, the lower somewhat separated, oblong, obtuse, about 8 mm. long, and 3 mm. thick, the lowest subtended by a filiform flattened serrulate bract 2-2.5 cm. long; scales ovate, with broad brown margins, shorter than the perigynia, the lower acute, the upper obtuse; perigynia nearly white, plano-convex, glabrous, rather strongly several-nerved on both faces, 1.5 mm. long, 1 mm. wide, minutely beaked.

Mouth of Bonanza Creek, R. S. Williams, June 18, 1899.

*Carex tenuiflora* Wahl. Dawson (Williams).

*Carex lagopina* Wahl. White Pass (Williams).

*Carex praticola* Rydb. Walker Gulch (Williams).

#### Family JUNCACEAE.

*Juncus Balticus* L. Near Stewart River (Williams).

*Juncus Richardsonianus* Schultes. Near Indian River (Tarleton).

*Juncus Mertensianus* Bong. Bennett City (Williams).

*Juncooides pilosum* (L.) Kuntze. Dawson; Klondike City (Williams).

*Juncooides glabratum* (Hoppe) Sheldon. Bennett City (Williams).

*Juncooides arcuatum* (L.) Kuntze? White Pass (Williams).

Family MELANTHACEAE.

*Tofieldia palustris* Huds. Bennett City (Williams); Lake Lebarge and below Stewart River (Tarleton).

*Zygadenus elegans* Pursh. Dawson (Williams); Five-finger Rapids (Tarleton).

Family LILIACEAE.

*Allium Sibiricum* L. Rink Rapids (Williams); above Ft. Selkirk (Tarleton).

Family CONVALLARIACEAE.

*Vagnera stellata* (L.) Morong. Above Ft. Selkirk (Tarleton).

Family ORCHIDACEAE.

*Cypripedium guttatum* Sw. Dawson (Williams); near Sixty-mile Creek (Tarleton).

*Cypripedium passerinum* Richards. Mountain side near Dawson (Williams); Lake Lebarge (Tarleton).

*Lysiella obtusata* (Pursh) Rydb. Near mouth of Klondike; Dawson (Williams); Lake Lebarge and above Ft. Selkirk (Tarleton).

*Limnorchis brachypetala* Rydb. sp. nov.

Roots fascicled, fleshy, the largest 7-8 mm. in diameter; stem 1.5-2.5 dm. high, slender, striate, glabrous, 4-5-leaved. Lower leaves oblong, obtuse, 4-6 cm. long, half-clasping, strongly nerved; upper leaves lanceolate, acute; bracts linear-lanceolate, the lower 2-3 times as long as the flowers, the upper much shorter; flowers greenish or brownish, about 8 mm. long; upper sepal about 2 mm. long, nearly orbicular, slightly truncate and indistinctly 3-toothed at the apex, 3-nerved, somewhat arched; lateral sepals oval-oblong, obtuse, spreading, nearly 3 mm. long; upper petals round-ovate, acute, slightly over 1 mm. long, very narrow, a little dilated

at the base and near the apex, acute; spur club-shaped or almost saccate, nearly straight, about equalling the lip in length; ovary 8-9 mm. long in fruit, oblong-ellipsoid.

Apparently nearest related to *L. hyperborea*, but smaller in every way; the spur is not curved forward as in that species, and the petals are very broad and short, scarcely more than half as long as the upper sepal; the spur resembles that of *L. stricta*, but that species has much larger flowers, comparatively longer linear lip, longer petals and reflexed lower sepals. Type collected by R. S. Williams at Bennett City, August 25, 1899; also collected by Tarleton above Ft. Selkirk.

***Limnorchis leptoceratitis* Rydb. sp. nov.**

Roots fascicled, fleshy, fibrous; stem slender, striate, glabrous, 2-4 dm. high. Lower leaves oblong, obtuse, half-clasping, 4-8 cm. long; upper leaves linear-lanceolate, acute; bracts linear-lanceolate, the lower somewhat longer than the white flowers, the upper shorter; sepals 3-4 mm. long, broadly lanceolate, the upper erect and almost straight, the lateral ones reflexed-spreading, 3-nerved, acute; upper petals linear, acute, about as long as the sepals; lip lanceolate, obtuse, somewhat rhombic-dilated at the base, equalling the sepals; spur very slender, cylindrical, curved forward, a little exceeding the lip; ovary 8-9 mm. long in fruit, ellipsoid.

Nearest related to *L. dilatata* (*Habenaria dilatata*), from which it differs in the longer spur, which is not at all clavate, the narrower petals, smaller flowers, and shorter, more obtuse leaves. Type collected by R. S. Williams at Bennett City, Aug. 25, 1899. Also collected by J. Albert Rudkin in southern Alaska, 1883, and by J. M. Macoun in Unalaska, July 25, 1891.

*Orchis rotundifolia* Pursh. Lake Lebarge (Tarleton).

*Peramium repens* (L.) Salisb. Below Selkirk (Williams).

*Corallorhiza* *Corallorhiza* (L.) Karst. Thirty-mile River (Williams); fruiting specimen only, and determination doubtful. White Horse Rapids and above Fort Selkirk (Tarleton).

*Gyrostachys Romanzoffiana* (Cham.) MacM. Swamp, Dawson (Williams).

*Gyrostachys stricta* Rydb. Klondike Bottom (Williams);  
Sixty-mile Creek (Tarleton).

*Listera borealis* Morong. Five-finger Rapids (Tarleton).

### Sub-class DICOTYLEDONES.

#### Family SALICACEAE.

*Populus tremuloides* Michx. Dawson (Williams).

*Populus balsamifera* L. River bank opposite Dawson  
(Williams).

*Salix myrtillofolia* Anders. Below White Horse Rapids;  
Dawson Swamp (Williams); Lake Bennett (Tarleton).

#### *Salix perrostrata* Rydb., sp. nov.

A shrub, 1-4 m. high with grayish, rough and scaly bark; branches yellow or the youngest tinged with red, at first finely pubescent; leaves obovate-lanceolate or oblanceolate, when young finely silky, in age glabrate, 2-4 cm. long, 1-1.5 cm. wide, acute at both ends, and with undulate margins, light green above and paler beneath; petioles 2-6 mm.; stipules minute, deciduous; aments somewhat leafy bracted, almost sessile; the staminate 1-1.5 cm. long, the pistillate in fruit 2-3 cm.; capsule conic, long-rostrate; stigma subsessile.

Black Hills of S. Dakota and Pine Ridge, Neb., to Colorado and Alaska, May-June. (*S. Bebbiana* Rydb. Cont. U. S. Nat. Herb. 3: 523, mainly, not Sarg.)

Type collected near Hermosa, Black Hills of South Dakota, 1892, P. A. Rydberg, 1018. Hillsides, Dawson, R. S. Williams.

*Salix anglorum* Cham. Summit of White Pass (Williams).

*Salix orbicularis* Anders. Summit of White Pass (Williams); Lake Bennett (Tarleton).

*Salix phlebophylla* Anders. Summit of White Pass.

*Salix chlorophylla* Anders. ? Dawson Swamp (Williams).

#### *Salix longistylis* Rydb. sp. nov.

A shrub, 4-5 m. high, with stems 13-15 cm. thick, the bark of the branches greenish brown or purplish, pubescent

when young. Leaves obovate, thick, acutish, minutely glandular-denticulate, the upper surface slightly villous when young, soon glabrate and shining, the lower surface densely white-tomentose; pistillate aments almost naked, from lateral buds, 4-5 cm. long, 1 cm. thick; bracts obovate, obtuse, about 3 mm. long, almost black, subsessile; ovary about 5 mm. long, densely villous; style slender, over 2 mm. long, the divisions fully 1 mm. long.

Perhaps nearest related to *S. Sitchensis*, but readily distinguished from that species by the much larger ovary, the long and slender style and stigmas and the broader and darker bracts. Mouth of the Klondike, May 30, 1899 (Williams).

*Salix Alaxensis* (Anders.) Coville. Lake Bennett (Tarleton). Determined by Mr. F. V. Coville.

*Salix Saskatchewan* Seem.? Dawson (Williams).

*Salix Richardsoni* Hook. Lake Bennett (Tarleton). Determined by Mr. F. V. Coville.

#### *Salix Seemannii* Rydb. sp. nov.

A shrub, 3-4 m. high, the bark of the older branches dark brown, that of the younger ones lighter, those of the season villous-pubescent. Leaves oval to oblong-lanceolate, acute at both ends, 3-7 cm. long, rather firm, entire; upper surface silky-villous when young, glabrate and bright green in age; lower surface permanently densely white or grayish silky-villous; aments on short lateral branches which bear 3-5 small leaves, the pistillate ones 4-7 cm. long, rather loose; bracts oblong, obtuse, light brown, somewhat villous, about 2 mm. long; ovary in anthesis 3-4 mm. long, in fruit about 8 mm. long, densely white-villous, subsessile; style 0.5-1 mm. long; stigmas slender, about 1 mm. long, 2-cleft at the apex; staminate aments 2-3 cm. long; stamens 2; filaments slender, about 8 mm. long, free.

Seemann's specimens, cited below, were named by Hooker *Salix glauca* var. *macrocarpa*, but the plant is neither *S. macrocarpa* of Trautvetter, nor that of Nuttall; it is related to the former, but not to the latter. *S. macrocarpa* Trautv. (*S. glauca macrocarpa* Ledeb.) is described as having sessile

stigmas and fuscous bracts; it probably does not occur in America.

Type collected at Dawson by R. S. Williams, June 11, 1899, a more mature specimen June 12. Also collected by Seemann on Chamisso Island, 1851, no. 1783, and Kotzebue Sound and Norton Sound, 1849, no. 1423.

Family BETULACEAE.

*Betula glandulosa* Michx. Dawson (Williams); Ft. Selkirk (Tarleton).

*Betula papyrifera* Marsh. Skagway.

*Betula resinifera* (Regel) Britton.

*B. alba* subsp. *verrucosa* var. *resinifera* Regel, Bull. Soc. Mosc. 18: 398. 1865.

A white barked tree, sometimes 15 m. high, the trunk reaching 3 dm. in diameter, the young twigs densely glandular-resiniferous. Leaves deltoid-ovate, acuminate, sharply irregularly serrate, broadly cuneate, truncate, or some of them cordate at the base, dark green above, pale, and when young resinous-glandular beneath, glabrous, slender-petioled; blades 5-8 cm. long, 4-7 cm. wide just above the base; petioles 1.5-2.5 cm. long; young staminate aments 2 or 3 together; ripe pistillate aments slender-peduncled, cylindrical, 3 cm. long, 1-1.2 cm. thick; pistillate scales about equally 3-lobed, the middle lobe lanceolate, acute, the lateral ones obliquely oblong-obovate, obtuse, all 3 ciliate; wings of the seed rather broader than its body.

Dawson, R. S. Williams, Aug. 13, 1899 (type); Ft. Selkirk, J. B. Tarleton, no. 138, July 18, 1899. Specimens in the National Herbarium, obtained by Miss E. Taylor on Peel's River, July 14, 1892, and at Ft. Simpson in 1860, no collector indicated, are also referable to this species.

Our material agrees in every respect with Regel's description in De Candolle's Prodrusus, 16: Part 2, 164. 1868.

The tree is evidently more closely related to the Old World *Betula alba* than to either of the other American white-barked species *B. papyrifera* and *B. populifolia*, and is an interesting addition to our arboreal flora.

*Alnus tenuifolia* Nutt. River bank opposite Dawson (Williams).

*Alnus fruticosa* Rupr. Dawson (Williams); Ft. Selkirk (Tarleton). Agrees with Asiatic specimens so determined, and seems distinct from *Alnus Alno-Betula*.

Family URTICACEAE.

*Urtica gracilis* Ait. Dawson (Williams).

Family CHENOPODIACEAE.

*Blitum capitatum* L. Dawson (Williams); near Sixty-mile Creek (Tarleton).

Family POLYGONACEAE.

*Polygonum amphibium* L. Ft. Selkirk (Tarleton).

*Polygonum viviparum* L. Bennett City (Williams); above Ft. Selkirk (Tarleton).

*Polygonum alpinum Alaskanum* Small. Klondike below Bonanza (Williams); above Stewart River (Tarleton).

*Polygonum plumosum* Small sp. nov.

Perennial, deep green. Stems erect, 1-3 dm. tall, simple, glabrous: leaves few; blades thickish, sparingly pubescent beneath, those of the basal and lower stem-leaves ovate to oblong-ovate or broadly oblong, 2-5 cm. long, blunt or markedly obtuse, abruptly narrowed or subcordate at the base, as long as their petioles or shorter, those of the upper stem-leaves mostly oblong, short-petioled or nearly sessile, all more or less revolute and with prominent nerves about the edge: ocreae ample, prolonged into a narrowly funnelform sheath, persistent: racemes cylindric, 2-6 cm. long, dense: flowers persistent: calices rose-colored; lobes usually 5, broadly oblong or oval, 3.5-5 mm. long, obtuse or nearly truncate at the apex, often inequilateral: stamens exerted; filaments slightly flattened; anthers dark brown or blackish: styles 3, elongated; stigmas capitate, minute: achenes 3-angled, ovoid or oval, 3-3.5 mm. long.

Related to *Polygonum bistortoides* Pursh; but it is stouter and more stocky in habit. It differs from *P. bistortoides* very conspicuously in its leathery and pubescent leaf-blades,



in the deep rose-colored calices and the narrow cylindrical raceme, and the pedicels are only about one-half as long as those of its relative. The species has been collected several times during the past decade; all the specimens having been found in Alaska or on the neighboring islands.

St. Paul's Island. Bering Sea Commission Collection, no. 130. July 29, 1891. J. M. Macoun, collector. (Type.)

Porcupine River, Alaska, 1891. J. Henry Turner, collector.

Port Clarence, Alaska. Harriman Alaska Expedition, no. 1970. July 12, 1899. F. V. Coville and T. H. Kearney, Jr., collectors.

Hall Island, Bering Sea. Harriman Alaska Expedition, no. 2023. July 14, 1899. F. V. Coville and T. H. Kearney, Jr., collectors.

Klondike, "The Dome." August 10, 1899. J. B. Tarleton, no. 175b.

#### *Polygonum fugax* Small sp. nov.

Perennial from horizontal rootstocks, bright green. Stems erect, 3-4 dm. tall, glabrous, discolored below the nodes and the inflorescence: basal leaves several; blades lanceolate or oblong-lanceolate, 5-12 cm. long, acute, undulate, finely wrinkled above, minutely pubescent beneath, slightly revolute, cuneately narrowed at the base; petioles as long as the blades or longer, winged near the top: stem-leaves nearly similar to the basal, but with smaller and narrower blades and short petioles: ocreae delicate, closely surrounding the internodes of the stem, except the loose and obliquely open top: spike cylindrical or nearly so, 2.5-5 cm. long, about 1 cm. thick, erect: bracts very delicate, light brown, ovate-lanceolate to oval, acuminate, 5-7 mm. long: flowers early deciduous or fugacious: calyxes pink; lobes various, the inner oblong, obtuse, the outer larger and all three of different sizes: stamens 8: achenes 3-angled, oval, dark brown, abruptly acute.

Related to *Polygonum Bistorta* L., but more slender and with much more delicate parts throughout. The leaves differ from those of *P. Bistorta* in having lanceolate or oblong-lanceolate blades with narrowed bases. The inflorescence

differs in being spicate instead of racemose, while the individual flowers, instead of persisting, fall away easily and early, perhaps before the fruit is fully matured.

The only specimens known were found growing in moss below Sixty mile Creek, by J. B. Tarleton, August 3, 1899, no. 175a.

Family SANTALACEAE.

*Comandra livida* Richards. Dawson (Williams); Lake Bennett (Tarleton).

Family CARYOPHYLLACEAE.

*Silene repens* Patrin. Dawson; Walker Gulch (Williams); Ft. Selkirk (Tarleton).

*Silene Williamsii* Britton sp. nov.

Related to *S. Menziesii* Hook. Viscid-pubescent all over; stem 1-3 dm. high, the slender branches widely ascending. Leaves lanceolate to ovate-lanceolate, sessile, firm, entire, 2-3 cm. long, 5-10 mm. wide, acuminate at the apex, narrowed at the base; cymes terminal, few-flowered; pedicels filiform, 5-10 mm. long; calyx urceolate, its teeth about 2 mm. long, erect, the whole about 8 mm. long; petals scarcely longer than the calyx.

Dawson, R. S. Williams, July 14, 1899 (type); fifty miles above Stewart River (Tarleton).

*Lychnis triflora* R. Br. Stream by West Dawson (Williams).

*Vaccaria Vaccaria* (L.) Britton. Dawson, introduced (Williams).

*Cerastium arvense* L. Lebarge Island (Tarleton).

*Cerastium vulgatum* L. Dawson, introduced (Williams).

*Cerastium maximum* L. Above Stewart River (Tarleton).

*Alsine borealis* (Bigel.) Britton. Dawson (Williams); Five-finger Rapids (Tarleton).

*Alsine laeta* (Richards.) Rydb. Dawson (Williams); White Horse Rapids (Tarleton).

*Alsine crassifolia* (Ehrh.) Britton. Five-finger Rapids (Tarleton).

*Mochringia lateriflora* (L.) Fenzl. Dawson (Williams); Five-finger Rapids (Tarleton).

*Merckia physodes* Fisch. Mouth of Klondike (Williams); above Stewart River (Tarleton).

*Arenaria laricifolia* L. Dawson (Williams).

*Arenaria triflora* (L.) S. Wats. Lebarge Island (Tarleton).

***Arenaria Dawsonensis* Britton, sp. nov.**

Glabrous. Stems very slender, several times forked, 1.5–3 dm. high. Leaves narrowly linear, smooth, blunt-pointed, the lower 1–1.5 cm. long, 0.5–1.3 mm. wide, firm, the lowest sometimes with fascicles of smaller ones in their axils, the uppermost reduced to bracts; lower internodes 4–6 cm. long; pedicels filiform, divergent-ascending, straight; sepals oblong-lanceolate, acute, strongly 3-nerved, 4 mm. long, 1–1.5 mm. wide, the calyx impressed at the base; petals oblong, a little shorter than the sepals or equalling them; pod narrowly ovoid, membranous, 3-valved, a little longer than the sepals: seeds oval-oblong, reddish brown, 0.6–0.7 mm. long, roughened with low irregular ridges.

Dawson, R. S. Williams, July 16, 1899.

Apparently nearest to *A. Michauxii* (Fenzl.) Hook., but with short petals, merely acute sepals and much longer internodes.

Family RANUNCULACEAE.

*Actaea arguta* Nutt. Five-finger Rapids (Tarleton).

*Anemone Richardsoni* Hook. Near mouth of Bonanza (Williams); near Selwyn River (Tarleton).

*Anemone parviflora* Michx. Dawson (Williams); White Horse Rapids and Lake Bennett (Tarleton).

*Anemone globosa* Nutt. Lake Lebarge and White Horse Rapids (Tarleton).

*Pulsatilla hirsutissima* (Pursh) Britton. Near Hootalinqua (Williams); Lake Bennett and Lake Lebarge (Tarleton).

***Ranunculus Yukonensis* Britton, sp. nov.**

Group of *R. Purshii*. Stems almost filiform, 1 dm. long or less, sparingly pubescent toward the end. Leaves slender-petioled, 6–14 mm. wide, dissected into linear, entire or

toothed, obtuse segments; flowers several, slender-peduncled, 6-10 mm. broad; sepals broadly ovate, obtuse; head of fruit globular, 2-3 mm. in diameter; achenes slightly compressed, about 1 mm. long, abruptly tipped with a hooked beak of one third their length.

Mouth of the Bonanza, June 18, 1899, R. S. Williams (type); mouth of the Klondike, July 9, 1899, same collector.

*Ranunculus Purshii* Richards. Island below Stewart River (Tarleton).

*Ranunculus Lapponicus* L. Klondike River (Tarleton); near mouth of Bonanza (Williams).

*Delphinium glaucum* S. Wats. Dawson (Williams); above Fort Selkirk and below Stewart River (Tarleton).

*Aconitum delphinifolium* DC. Dawson (Williams); Fort Selkirk (Tarleton).

*Aconitum paradoxum* Reichenb.? Summit of White Pass (Williams). This is an interesting plant with short obtuse leaf-lobes, and larger flowers than *A. delphinifolium*. It appears to be the same as specimens collected on the Harri-man Expedition to Alaska by Messrs. Coville and Kearney at Plover Bay and Port Clarence, Siberia. Mr. Williams' specimens are referred to Reichenbach's species with much doubt.

*Aquilegia brevistyla* Hook. Dawson (Williams); Five-finger Rapids (Tarleton).

*Thalictrum sparsiflorum* Turcz. Mouth of the Klondike (Williams); Five-finger Rapids (Tarleton).

#### Family PAPAVERACEAE.

*Papaver nudicaule* L. Below Selwyn River (Tarleton).

#### Family FUMARIACEAE.

*Capnoides aureum* (Willd.) Kuntze. Lake Lebarge and Bonanza Creek (Tarleton); Dawson and Walker Gulch (Williams).

*Capnoides sempervirens* (L.) Borckh. Dawson (Williams); Bonanza Creek (Tarleton).

## Family CRUCIFERAE.

*Cardamine pratensis angustifolia* Hook. Near mouth of Bonanza and mouth of Klondike (Williams).

**Roripa Williamsii** Britton, sp. nov.

Glabrous, about 1.5 dm. high. Leaves about 5 cm. long, deeply pinnatifid into oblong, obtuse, entire or toothed segments 2–3 mm. wide, the terminal segment much larger than the lateral ones; racemes elongating and with very distant pedicels in fruit; pedicels spreading, about 1 cm. long; pod oblong, obtuse, about 3 mm. long.

Near mouth of Bonanza Creek, R. S. Williams, June 18, 1899.

*Arabis lyrata occidentalis* S. Wats. Near mouth of Bonanza (Williams).

*Arabis Holboellii* Hornem. White Horse Rapids (Tarleton).

*Parrya macrocarpa* R. Br. The Dome, Klondike-Indian Divide (Tarleton).

*Erysimum cheiranthoides* L. Dawson (Williams).

**Erysimum angustatum** Rydb., sp. nov.

A more or less caespitose perennial, with a slender tap-root and short branched rootstock or caudex. Stems 1–2 dm. high, sparingly grayish strigose, obtusely angled; leaves very narrowly oblanceolate-linear or linear, 4–7 cm. long, 1–2 mm. wide, grayish strigose; sepals linear, obtuse, about 8 mm. long, two alternate ones deeply saccate at the base, pale yellowish; petals lemon-yellow, about 14 mm. long; pods 5–8 cm. long, about 1.5 mm. broad, obtusely angled, ascending on ascending pedicels 5–8 mm. long, with a distinct beak 3–5 mm. long, somewhat constricted between the seeds; cotyledons incumbent.

This species is probably nearest related to *E. asperimum* (*Cheiranthus asperrimus* Greene) but differs in the more elongated branches of the caudex or rootstock, which are covered with remnants of old leaves, the narrower perfectly entire leaves, the more slender stem, the less sharply angled pod and the more evident beak. The type was collected at Dawson by R. S. Williams, July 13, 1899.

*Sophia sophiodes* (Fisch.) Heller. Dawson (Williams).

*Draba incana* L. Lake Bennett (Tarleton).

*Draba oligosperma* Hook. Lake Bennett (Tarleton).

*Draba aurea* Vahl. White Horse Rapids (Tarleton).

*Draba glacialis* Adams. Lake Bennett (Tarleton).

Family DROSERACEAE.

*Drosera rotundifolia* L. Above Stewart River (Tarleton); Klondike (Williams).

Family SAXIFRAGACEAE.

*Heuchera glabra* Willd. Summit of White Pass (Williams).

*Saxifraga tricuspidata* Retz. Lebarge Island (Tarleton); Dawson and Miles Cañon (Williams).

*Saxifraga reflexa* Hook. Dawson (Williams).

*Saxifraga pulvinata* Small, sp. nov.

Perennial, deep green, densely tufted. Stems copiously branched, 3–10 cm. long: leaves numerous, crowded or approximate, often 4-ranked; blades oblong to broadly spatulate, 1.5–3 mm. long, leathery, ciliate, except at the thickened apex: flowering stems leafy at the base, naked above, gradually enlarged to the hypanthium: sepals softly glandular-pubescent when young, oblong, 2.5–3 mm. long, obtuse and green at the tip, longer than the hypanthium: corolla deep blue or purplish: petals 6–7 mm. long, the blades oval to nearly orbicular, minutely notched or toothed at the apex, the claws shorter than the blades: capsules 6–7 mm. high, the beaks erect, nearly as long as the body.

In dense tufts on the higher summits about Lake Bennett, (Tarleton, no. 11, June 6, 1899). Related to *Saxifraga oppositifolia* L., but differing in the smaller size, the markedly naked upper part of the flowering stems, the smaller turbinate hypanthium and the slender tips of the follicles.

*Saxifraga galacifolia* Small, sp. nov.

Perennial by horizontal rootstocks, glandular-pubescent throughout. Leaves basal or mainly so, few; blades membranous, ovate or orbicular-ovate, 5–8 cm. long, dentate or crenate-dentate, pale green beneath, deep green above; cor-

date, petioles as long as the blades or much longer: scapes erect, 2-4 dm. tall: panicle narrow, 5-15 cm. long, the branches erect or nearly so: pedicels glandular-pilose: sepals 2-2.5 mm. long, triangular-ovate, reflexed: corolla white; petals oblong to oblong-lanceolate, 3-5 mm. long, sometimes slightly accrescent: filaments filiform, longer than the petals: capsules 12-13 mm. high; follicles erect, nearly distinct.

Along mountain streams, near Indian River, August 3, 1899 (Tarleton, no. 176).

Related to *Saxifraga punctata* L.; but the leaves with blades manifestly longer than broad, the narrow panicle with its short branches and the lower leaf-like bracts, and the larger fruit are some of the characters which readily separate this species from its relative.

*Chrysosplenium tetrandrum* Fries. Klondike below Bonanza Creek (Williams); White Horse Rapids (Tarleton).

#### Family PARNASSIACEAE.

*Parnassia palustris* L. Walker Gulch (Williams); above Fort. Selkirk (Tarleton).

*Parnassia Kotzebuei* C. & S. Fort Selkirk and near Selwyn River (Tarleton).

#### Family GROSSULARIACEAE.

*Ribes rubrum* L. Lindeman and Bonanza Creek (Williams).

*Ribes Hudsonianum* Richards. Near mouth of Bonanza Creek (Williams).

*Ribes lacustre* Poir. West Dawson (Williams).

*Ribes irriguum* Dougl. Five-finger Rapids (Tarleton).

#### Family ROSACEAE.

*Spiraea densiflora* Nutt. Klondike-Indian Divide (Tarleton); Mouth of Bonanza (Williams).

*Luetkea pectinata* (Pursh) Kuntze. Summit of White Pass (Williams).

*Potentilla Pennsylvanica* L. Five-finger Rapids (Tarleton).

*Potentilla nivea* L. White Horse Rapids (Tarleton).

*Potentilla Monspeliensis* L. Dawson (Williams).

*Comarum palustre* L. Below Selwyn River (Tarleton); Klondike Bottom (Williams).

*Argentina Anserina* (L.) Rydb. Fort Selkirk (Tarleton); Dawson (Williams).

*Fragaria Chiloensis* Duchesne. Rink Rapids (Williams); Lake Lebarge (Tarleton).

*Dasiphora fruticosa* (L.) Rydb. Above Fort Selkirk (Tarleton); Dawson (Williams).

*Rubus Chamaemorus* L. Dawson (Williams); above Stewart River (Tarleton).

*Rubus strigosus* Michx. Dawson (Williams); above Stewart River (Tarleton).

*Rubus arcticus* L. Dawson (Williams); White Horse Rapids and below Sixty-mile Creek (Tarleton).

*Rubus pedatus* Smith. Bennett City and Skagway (Williams).

*Geum Oregonense* (Scheutz) Rydb. Fort Selkirk (Tarleton).

*Dryas octopetala* L. Dawson (Williams).

*Dryas integrifolia* Vahl. Dawson (Williams); Five-finger Rapids (Tarleton).

*Sanguisorba officinalis* L. Above Fort Selkirk (Tarleton).

*Sanguisorba latifolia* (Hook.) Coville. Bennett City (Williams).

*Rosa acicularis* Lindl. Five-finger Rapids (Tarleton); Dawson and near Thirty-mile River (Williams).

#### Family POMACEAE.

*Amelanchier alnifolia* Nutt. Dawson (Williams); White Horse Rapids (Tarleton).

*Amelanchier florida* Lindl. Miles Cañon (Williams).

*Sorbus occidentalis* (S. Wats.) Greene. Bennett City (Williams).

#### Family PAPILIONACEAE.

*Lupinus*. An undescribed species named by Prof. C. V. Piper but not yet published. Dawson (Williams); Five-finger Rapids and foot of Lake Lebarge (Tarleton).



*Astragalus debilis* (Nutt.) A. Gray. Fort Selkirk (Tarleton).

*Astragalus alpinus* L. Near mouth of Klondike (Williams); White Horse Rapids (Tarleton).

***Astragalus Williamsii* Rydb. sp. nov.**

Stem ascending or erect, 2-4 dm. high, more or less distinctly 4-angled, perfectly glabrous, light green or in age straw-colored; stipules ovate to narrowly lanceolate, 3-6 mm. long, free; leaves longer than the internodes, 5-10 cm. long; leaflets 9-11, elliptical to almost linear, 15-35 mm. long, 4-8 mm. wide, obtuse or retuse at the apex, perfectly glabrous; raceme at first short, in fruit elongating and about 1 dm. long, borne on a peduncle 1-1.5 dm. long; bracts oblong, obtuse, membranous, straw-colored, about 3 mm. long; pedicels short, 1-2 mm. long; calyx about 3 mm. long, black-hairy; lobes less than 1 mm. long, triangular obtuse; corolla yellow, except the purplish tip of the keel; banner about 1 cm. long, narrow, keel about 8 mm.; pod ascending, half membranous, oblong-ovate in outline, 10-14 mm. long and 4 mm. wide, glabrous, rounded at the base, acute at the apex; dorsal suture deeply sulcate for about two-thirds of its length and with a narrow partial partition, making the pod there deeply obcordate in section; the upper third not sulcate and with no indication of a partition; seeds about 4, brownish black.

A species perhaps referable to the *Oroboides*, but without any close relative in that group. Its small yellow flowers and peculiar fruit are characteristic.

The type was collected by R. S. Williams, near Big Salmon, August 22, 1899.

***Astragalus Tarletonis* Rydb.**

Stem ascending, about 2 dm. high, angled, striate and sparingly strigulose: stipules lanceolate, attenuate, sparingly strigose, free from the petiole but somewhat united around the back of the stem: leaves about 1 dm. long, spreading; leaflets 17-29, elliptic to lanceolate, oblong, 10-15 mm. long, 3-6 mm. wide, sparingly strigose or in age glabrate, obtuse or retuse at the apex: spikes short and crowded, 3-4 cm. long on peduncles about 1 dm. in length: bracts oblong, 6-8 mm. long, mostly obtuse and black-hairy: calyx black-hairy; its tube about 6 mm. long; lobes linear subulate,

almost of the same length: corolla about 15 mm. long, purplish: fruit not seen.

This species is evidently closely related to *A. hypoglottis* L., but distinguished by its long slender calyx-lobes.

The type was collected by J. B. Tarleton at Five-finger Rapids, July 5, 1899 (no. 78).

*Phaca Americana* (Hook.) Rydb. Fort Selkirk (Tarleton; Williams).

PHACA LITTORALIS (Hook.) Rydb. (*Phaca frigida* γ *littoralis* Hook. Fl. Bor. Am. 2: 140. 1840.) Five-finger Rapids (Tarleton).

*Homalobus aboriginum* (Richards.) Rydb. Miles Cañon (Williams); White Horse Rapids and foot of Lake Lebarge (Tarleton).

*Homalobus tenellus* (Pursh) Britton. Fifty miles above Stewart River (Tarleton).

*Aragallus Richardsonii* Greene. Above Fort Selkirk (Tarleton).

***Aragallus varians* Rydb., n. sp.**

Cespitose perennial: leaves all basal, 1–2 dm. long, numerous: stipules lanceolate, scarious, long-acuminate, densely silky-villous, 1–2 cm. long: leaflets 30 or more, more or less verticillate, linear-oblong, silky-villous, obtuse, 1–2 cm. long, 3–4 mm. wide: scape about 2 dm. high, slender, terete, sparingly villous: spike short, 4–5 cm. long, dense: bracts linear-lanceolate, long-attenuate, about 1 cm. long, exceeding the calyx: calyx tube often dark, cylindrical, about 5 mm. long, silky-villous: lobes linear-subulate, 2–3 mm. long: corolla about 1 cm. long, yellow: fruit not seen.

Apparently related to *A. Richardsonii* and *A. splendens*, but easily distinguished by its yellow flowers and the fact that the leaflets are not always verticillate.

The type was collected by J. B. Tarleton on Lewis River, June 28, 1899 (no. 33b).

*Aragallus viscidus* (Nutt.) Greene. White Horse Rapids (Tarleton).

*Aragallus viscidulus* Rydb. Near Selkirk (Williams).

*Aragallus podocarpus* (A. Gray) Greene. Lake Bennett, near summit of "Pinnacle" (Tarleton).

*Aragallus deflexus* (DC.) Heller. Five-finger Rapid Tarleton.

*Aragallus*. Species not determined; nearly related to *A. Lambertii*. Lewis River (Tarleton).

*Hedysarum Americanum* (Michx.) Britton. Near mouth of Klondike (Williams); Five-finger Rapids (Tarleton).

*Hedysarum Mackenzii* Richards. Five-finger Rapids (Tarleton).

Family LINACEAE.

*Linum Lewisii* Pursh. Lake Lebarge (Tarleton).

Family CALLITRICHACEAE.

*Callitriche palustris* L. ? On mud, Klondike bottom (Williams). A small form with bracts very small or wanting.

Family EMPETRACEAE.

*Empetrum nigrum* L. Lindeman (Williams); Fort Selkirk (Tarleton).

Family VIOLACEAE.

*Viola palustris* L. White Horse Rapids (Tarleton); Upper Walker Gulch (Williams). ?

Family ELAEAGNACEAE.

*Lepargyreaa Canadensis* (L.) Greene. Dawson (Williams); Lake Bennett and above Fort Selkirk (Tarleton).

Family ONAGRACEAE.

*Chamaenerion angustifolium* (L.) Scop. Dawson (Williams); above Fort Selkirk (Tarleton).

*Chamaenerion latifolium* (L.) Sweet. Five-finger Rapids (Tarleton); Thirty Mile River (Williams).

*Epilobium palustre* L. Dawson (Williams). The *E. palustre albiflora* Hook., differing from the type by its narrower leaves and pale flowers.

Family HALORRAGIDACEAE.

*Hippuris vulgaris* L. Island below Stewart River (Tarleton).

## Family UMBELLIFERAE.

- Selinum Dawsoni* Coult. & Rose. Dawson (Williams).  
*Cicuta virosa* L. Pond, Klondike bottom (Williams).  
*Bupleurum Americanum* Coult. & Rose. Near Selkirk (Williams).

## Family CORNACEAE.

- Cornus Canadensis* L. Dawson and near mouth of Klondike (Williams); above Fort Selkirk (Tarleton).  
*Cornus stolonifera* Michx. Five-finger Rapids (Tarleton); Dawson (Williams). Leaves not so white beneath as in the eastern plant.

## Family PYROLACEAE.

- Pyrola uliginosa* Torr. Below Selwyn River (Tarleton).  
*Pyrola secunda* L. Dawson (Williams).  
*Pyrola secunda pumila* Paine. Walker's Gulch (Williams); above Fort Selkirk (Tarleton).  
*Pyrola bracteata* Hook. Below Selwyn River (Tarleton); Dawson (Williams).  
*Moneses uniflora* (L.) A. Gray. Walker Gulch (Williams); Fort Selkirk (Tarleton).

## Family ERICACEAE.

- Ledum Groenlandicum* Oeder. Along river above Dawson (Williams); above Stewart River and above Fort Selkirk (Tarleton).  
*Ledum decumbens* (Ait.) Lodd. High ridge above Lindeman (Williams); Bonanza Creek (Tarleton). Apparently distinct from *L. palustre* L.  
*Kalmia microphylla* (Hook.) Heller. Bennett (Williams).  
*Andromeda Polifolia* L. Dawson (Williams); below Stewart River (Tarleton).  
*Chamaedaphne calyculata* (L.) Moench. Dawson swamp (Williams).  
*Chamaecistus procumbens* (L.) Kuntze. Above Lindeman (Williams).  
*Phyllodoce glanduliflora* (Hook.) Coville. Lindeman and summit of White Pass (Williams).

*Phyllodoce empetriformis* (Smith) Don. Lindeman (Williams).

*Cassiope Stelleriana* (Pall.) DC. Above Lindeman and summit of White Pass (Williams).

*Cassiope Mertensiana* (Bong.) Don. Above Lindeman, and summit of White Pass (Williams).

*Cassiope tetragona* (L.) Don. Above Lindeman (Williams); Lake Bennett (Tarleton).

*Arctostaphylos Uva-Ursi* (L.) Spreng. Dawson (Williams); Lake Bennett (Tarleton).

*Mairania alpina* (L.) Desv. Dawson and near Selkirk (Williams); Lake Bennett and Klondike Indian Divide (Tarleton). The red-fruited form collected also by Tarleton below Selwyn River.

#### Family VACCINIACEAE.

*Vaccinium uliginosum* L. Dawson (Williams); below Selwyn River (Tarleton).

*Vitis-Idaea Vitis-Idaea* (L.) Britton. (*Vaccinium Vitis-Idaea* L.) Lindeman and Little Salmon River (Williams); Lake Lebarge (Tarleton). The recognition of the genera *Batodendron* and *Polydodium* as segregates from the complex *Vaccinium* of previous authors requires, it seems to me, the separation also of *Vitis-Idaea*, as was maintained by Tournefort, and since the Linnaean period by Moench.

*Oxycoccus Oxycoccus* (L.) MacM. Dawson (Williams); below Selwyn River (Tarleton).

#### Family PRIMULACEAE.

*Primula Sibirica* Jacq. Lebarge Island (Tarleton); on clayey shore, Lebarge (Williams).

*Primula stricta* Hornem. Five-finger Rapids (Tarleton, no. 73), apparently identical with specimens from Scandinavia.

*Androsace septentrionalis* L. Dawson and Rink Rapids (Williams).

*Androsace Gormanii* Greene? Lake Bennett (Tarleton).

*Trientalis arctica* Fisch. Summit of White Pass, and below Bonanza (Williams).

*Dodecatheon frigidum* C. & S. Stream by West Dawson (Williams).

Family GENTIANACEAE.

*GENTIANA HOLOPETALA* (A. Gray) Rydb. (*G. serrata holopetala* A. Gray). Above Fort Selkirk (Tarleton).

*Gentiana propinqua* Richards. Dawson (Williams); Fort Selkirk (Tarleton).

Family MENYANTHACEAE.

*Menyanthes trifoliata* L. Ponds, Klondike bottom (Williams); Sixty Mile Creek (Tarleton).

Family APOCYNACEAE.

*Apocynum androsaemifolium* L. Dawson (Williams). A low pubescent form, perhaps referable to *A. androsaemifolium incanum* DC.

Family POLEMONIACEAE.

*Polemonium occidentale* Greene. Dawson (Williams); hills around Dawson and at Fort Selkirk (Tarleton).

*Polemonium pulchellum* Bunge. White Horse Rapids (Tarleton); Dawson (Williams).

*Gilia capitata* Dougl. Dawson, introduced (Williams).

Family HYDROPHYLLACEAE.

*Phacelia*. A species related to *P. Lyallii* (A. Gray) Rydb., but villous all over. Collected only in fruit. Below Selwyn River (Tarleton).

Family BORAGINACEAE.

*Lappula*. Specimens in flower only. White Horse Rapids and Lebarge Island (Tarleton).

*Lappula Redowskii* (Hornem.) Greene. Near Rink Rapids (Williams).

*Mertensia paniculata* (Ait.) Don. Lebarge (Williams); Five-finger Rapids (Tarleton).

**Mertensia Alaskana** Britton, sp. nov.

Similar to *M. paniculata*, 5 dm. high, or more. Stem and branches glabrous; pedicels 1-3 cm. long, very slender, appressed-pubescent with whitish hairs: leaves papillose-pubescent above, sparingly pubescent or glabrous beneath, the lower oblanceolate, 6-10 cm. long, acute, with margined petioles, the middle ones oblong-lanceolate, sessile, the upper lanceolate, acuminate: corolla 1.5 cm. long, the limb about the length of the tube: calyx 5-6 mm. long, cleft nearly to the base, the lobes lanceolate, acuminate, bristly-ciliate, otherwise glabrous or very nearly so; style not exerted.

Fort Yukon, Alaska, Antoine Soule, 1865 (type); Dawson (Williams), a white-flowered form; Mackenzie's River, Onion, Kennicott and Hardisty, 1861-62.

## Family LABIATAE.

*Dracocephalum parviflorum* Nutt. Dawson (Williams); Fort Selkirk (Tarleton).

## Family SCROPHULARIACEAE.

*Veronica alpina* L. Summit of White Pass (Williams).

*Pentstemon cristatus* Nutt. Five-finger Rapids (Williams; Tarleton); Lake Lebarge (Tarleton).

*Euphrasia Americana* Wetts. River bank above Fort Selkirk (Tarleton).

*Castilleja pallida* (L.) Kunth. Above Dawson (Williams); above Fort Selkirk, near Indian River, and Five-finger Rapids (Tarleton). Mr. Tarleton's specimens from above Fort Selkirk and Five-finger Rapids (nos. 80 and 80b) differ from the others in being villous to the base and may represent another species.

*Pedicularis euphrasioides* Stephan. Dawson and mouth of Bonanza (Williams; Five-finger Rapids (Tarleton)).

*Pedicularis Sudetica* Willd. Five-finger Rapids (Tarleton).

## Family OROBANCHACEAE.

*Thalesia fasciculata* (Nutt.) Britton. Fort Selkirk (Tarleton).

*Boschniakia glabra* C. A. Meyer. Dawson (Williams); Selwyn River (Tarleton).

Family LENTIBULARIACEAE.

*Pinguicula villosa* L. Dawson (Williams); below Selwyn River (Tarleton).

*Utricularia vulgaris* L. Sixty Mile Creek (Tarleton).

Family PLANTAGINACEAE.

*Plantago aristata* Michx. Dawson (Williams).

*Plantago septata* E. L. Morris, sp. nov.

A bright green, acaulescent perennial, with one tap-root and with the bases of the leaves of the preceding year persistent, generally cinereous-woolly, most of the hairs under a lens flattened and distinctly 3-9-septate or even articulate. Leaves crowded, erect or spreading, several, narrowly lanceolate, acute or obtuse at the apex, entire, narrowed to the more or less margined semi-clasping petiole, about 140 mm. by 15 mm., 5-nerved in blade and petiole, very woolly at the base and on the petiole; scapes basal, erect or ascending, stout, terete and striate, several, equalling or surpassing the leaves, about 150 mm. high, woolly below, pubescent above; spikes erect, long-cylindrical, about 50 mm. by 5 mm., in fruit somewhat loose, their axes pubescent; bracts brown-herbaceous, with wide scarious margins, in fruit keeled, nearly equalling the calyx, ovate to round-ovate, obtuse and delicately fimbriolate, about 2 mm. by 2 mm., glabrous; flowers numerous, perfect, glabrous; divisions of the calyx scarious, with brown-herbaceous midribs, broadly obovate, rounded, 2 mm. long; corolla tube just equalling the calyx, its lobes, spreading, broadly oblong, obtuse and often abruptly apiculate, nearly 1.5 mm. by 1 mm., white; stamens four, and, with the filiform stigma, long-exserted; pyxis finely reticulate, two times as long as the calyx, oblong, rounded at the apex, circumscissile at the lower third; seeds two, black.

Type specimen, collected by R. S. Williams, near Little Salmon, Yukon Territory, August 22, 1899.

Family RUBIACEAE.

*Galium boreale* L. Five-finger Rapids (Tarleton); Dawson (Williams).



## Family CAPRIFOLIACEAE.

*Viburnum pauciflorum* Pylaie. Dawson and Miles Cañon (Williams); Five-finger Rapids (Tarleton).

*Linnaea Americana* Forbes. Walker Gulch (Williams); Five-finger Rapids (Tarleton). This North American plant appears to differ constantly from the European *L. borealis* in its funnelform, not campanulate corolla.

## Family VALERIANACEAE.

*Valeriana bracteosa* Britton, sp. nov.

Similar to *V. sylvatica* and *V. uliginosa*, about 4 dm. high, slightly pubescent at the nodes, otherwise glabrous. Rootstock slender, horizontal; lower and basal leaves oval, entire, petioled; upper leaves about 3 pairs, sessile, with 3 lanceolate acuminate few-toothed segments, or those of the uppermost pair entire: cyme open, its branches filiform; bracts very narrowly linear, black, much longer than the fruit: calyx-lobes united near the base into a black cup, loosely plumose: corolla 5-6 mm. long, its tube about equaling the throat and limb.

Type collected by R. S. Williams at Dawson, July 14, 1899; also collected by Tarleton above Fort Selkirk, July 12, 1899, no. 101a and 101b.

## Family CAMPANULACEAE.

*Campanula lasiocarpa* Cham. White Pass (Williams); the Dome, Klondike-Indian Divide (Tarleton).

*Campanula aurita* Greene. This species is closely related to *Campanula expansa* Rudolph, of Siberia, which has been referred by Ledebour to the *Wahlenbergia homallanthina* of De Candolle. Both plants agree in having a rotate deeply divided corolla and a strongly upcurved style. It does not seem to me that they are properly referable to the Old World genus *Wahlenbergia*. In the characters of style and corolla they resemble the East American *Campanula Americana* L.

Dawson (R. S. Williams, July 29, 1899); also collected by Tarleton at Dawson, Aug. 19, 1899, no. 185a and 185b.

## Family CICHORIACEAE.

*Taraxacum ceratophorum* DC. Five-finger Rapids (Tarleton).

*Crepis elegans* Hook. River bank opposite Dawson (Williams). Specimens with lyrate-pinnatifid lower leaves.

*Hieracium gracile* Hook. Bennett City (Williams).

*Hieracium triste* Cham. White Pass (Williams).

*Hieracium albiflorum* Hook. Bennett City (Williams).

## Family COMPOSITAE.

*Solidago multiradiata* Ait. Dawson (Williams); Fort Selkirk (Tarleton).

*Solidago elongata* Nutt. Fifty miles above Stewart River (Tarleton).

*Solidago oreophila* Rydb. Dawson (Williams); Fort Selkirk and fifty miles above Stewart River (Tarleton).

***Stenotus borealis* Rydb., sp. nov.**

Depressed cespitose, branches 3–6 cm. long, densely covered with the leaves, which are narrowly linear, almost filiform, 10–18 mm. long and .5–.7 mm. wide, hispid ciliate on the margin and with a strong rib: peduncles naked, 4–5 cm. long, puberulent and glandular especially above: head about 1 cm. high: bracts subequal in two series, linear lanceolate, acute, thin, puberulent and somewhat glandular, yellowish green: rays about 1 cm. long and 3–4 mm. wide, obtuse or truncate and entire at the apex: pappus tawny white.

This species is nearest related to *S. stenophyllus* (A. Gray) Greene, but the latter has thicker bracts and its leaves are glandular puberulent all over, while in *S. borealis* the leaves are devoid of glands, perfectly glabrous except the ciliolate margin. Foot of Lake Lebarge (J. B. Tarleton, 51).

ASTER GIGANTEUS (Hook.) Rydb. (*Aster Richardsonii giganteus* Hook. Fl. Bor. Am. 2: 7. 1840.) Near mouth of Klondike and at Dawson (Williams); Five-finger Rapids (Tarleton).

*Aster Unalascensis* Less. The same as the specimen in the Columbia Herbarium from Unalaska, named by Bongard.

White Pass (Williams). The species is referred by Gray to *Aster peregrinus* Pursh, and if correctly, this is the older name for it.

*Erigeron acris* L. Above Fort Selkirk (Tarleton); Dawson (Williams).

***Erigeron Yukonensis* Rydb. sp. nov.**

Perennial with horizontal rootstock. Stems usually more than one, ascending, about 2 dm. high, more or less hirsute: basal leaves linear-oblongate, 3-10 cm. long, acute or acuminate at the apex, below tapering into a short winged petiole, more or less hirsute on both sides and ciliate on the margin; lower stem leaves linear and short-petioled, the upper linear-lanceolate, sessile, 2-3 cm. long: heads 1-3, solitary at the end of the stem or the few elongated branches: involucre about 15 mm. in diameter, white-hirsute, bracts very narrowly linear-subulate, long-attenuate, with the loose tips slightly exceeding the disk; rays very numerous, bluish-purple, about 12 mm. long and less than 1 mm. wide.

In general habit, this species resembles most *E. Eatonii*, but the size of the head and the numerous narrow rays suggest *E. macranthus* and the hairiness of the involucre *E. simplex*. The type was collected by R. S. Williams at Dawson, July 23, 1899.

*Erigeron multifidus* Rydb. Lebarge Island (Tarleton).

*Erigeron caespitosus* Nutt. Near Little Salmon River (Williams).

*Erigeron grandiflorus* Hook. Fort Selkirk (Tarleton).

*Erigeron Turneri* Greene. Five-finger Rapids (Tarleton).

*Antennaria pulcherrima* (Hook.) Greene. Lower Thirty Mile River (Williams).

*Antennaria parvifolia* Nutt. Lower Thirty Mile River (Williams); Five-finger Rapids (Tarleton).

*Anthemis Cotula* L. Dawson, introduced (Williams).

*Achillea lanulosa* Nutt. Dawson (Williams); above Fort Selkirk (Tarleton).

*Tanacetum Huronense* Nutt. River bank opposite Dawson (Williams); Fort Selkirk (Tarleton). Specimens with dark brown involucre bracts.

*Artemisia laciniata* Willd. Sp. Pl. 3: 1843. Above Fort Selkirk (Tarleton, no. 111).

This specimen agrees with Karelin and Kiriloff's no. 705, determined as *A. laciniata glabriuscula* Ledeb., from Narym, Siberia. This is cited by Ledebour, Fl. Ross. 2: 582, as variety *a* of the species. It also answers to the description of the species, and to the left hand figure of Gmelin's Fl. Sib. 2: pl. 57, except that the heads are a little larger. The species has not hitherto been reported from America; it is said in Kew Index to occur also in the Himalayas.

*Artemisia elatior* (T. & G.) Rydb. Fifty miles below Stewart River (Tarleton); Dawson (Williams).

*Artemisia Canadensis* Michx. Selkirk (Williams).

*Artemisia frigida* Willd. Dawson (Tarleton); near Little Salmon River (Williams).

*Artemisia longipedunculata* Rudolph. White Pass (Williams).

*Petasites frigida* (L.) Fries? Lake Bennett (Tarleton). Dawson Swamp (Williams). Mr. Tarleton's specimens differ from the typical European plant in having much more deeply lobed leaves.

#### ***Petasites gracilis* Britton, sp. nov.**

Scape slender, about 4 dm. high, sparingly lanate. Leaves thin, broadly ovate, subcordate, loosely lanate beneath, 5-6 cm. broad, with about twelve large acute cuspidate teeth or short lobes, the sinuses rounded; petiole slender, twice as long as the blade; scales of the scape and bracts of the inflorescence lanceolate, acuminate: inflorescence racemose, about 1 dm. long: peduncles very slender, glandular-pubescent, 2-5 cm. long: involucre glandular-pubescent, its linear-oblong obtuse bracts about half the length of the bright white pappus, the few outer bracts much shorter.

Walker Gulch, Williams, July 16, 1899.

*Arnica angustifolia* Vahl. Dawson (Williams); Lebarge Island (Tarleton). Differing from typical specimens of this species by having three long-peduncled flower-heads.

*Senecio frigidus* Less. Dawson (Williams).

*Senecio lugens* Richards. Above Fort Selkirk (Tarleton); Dawson (Williams).

*Senecio saliens* Rydb. Bennett City (Williams).

*Senecio discoideus* (Hook.) Britton. Dawson (Williams); Fort Selkirk (Tarleton). One of the specimens with rays.

*Saussurea nuda* Ledeb. Walker Gulch (Williams); below Stewart River (Tarleton, 168; 168b).

These specimens are the same as one of *S. alpina remotiflora* Hook., received by Dr. Torrey from Dr. Hooker, and preserved in the Columbia University Herbarium. This variety of Hooker is referred by Ledebour in *Flora Rossica* to his *S. nuda*. It differs, however, in its much narrower leaves, and may be a distinct species.

### The Oaks of the Continental Divide north of Mexico.

BY P. A. RYDBERG.

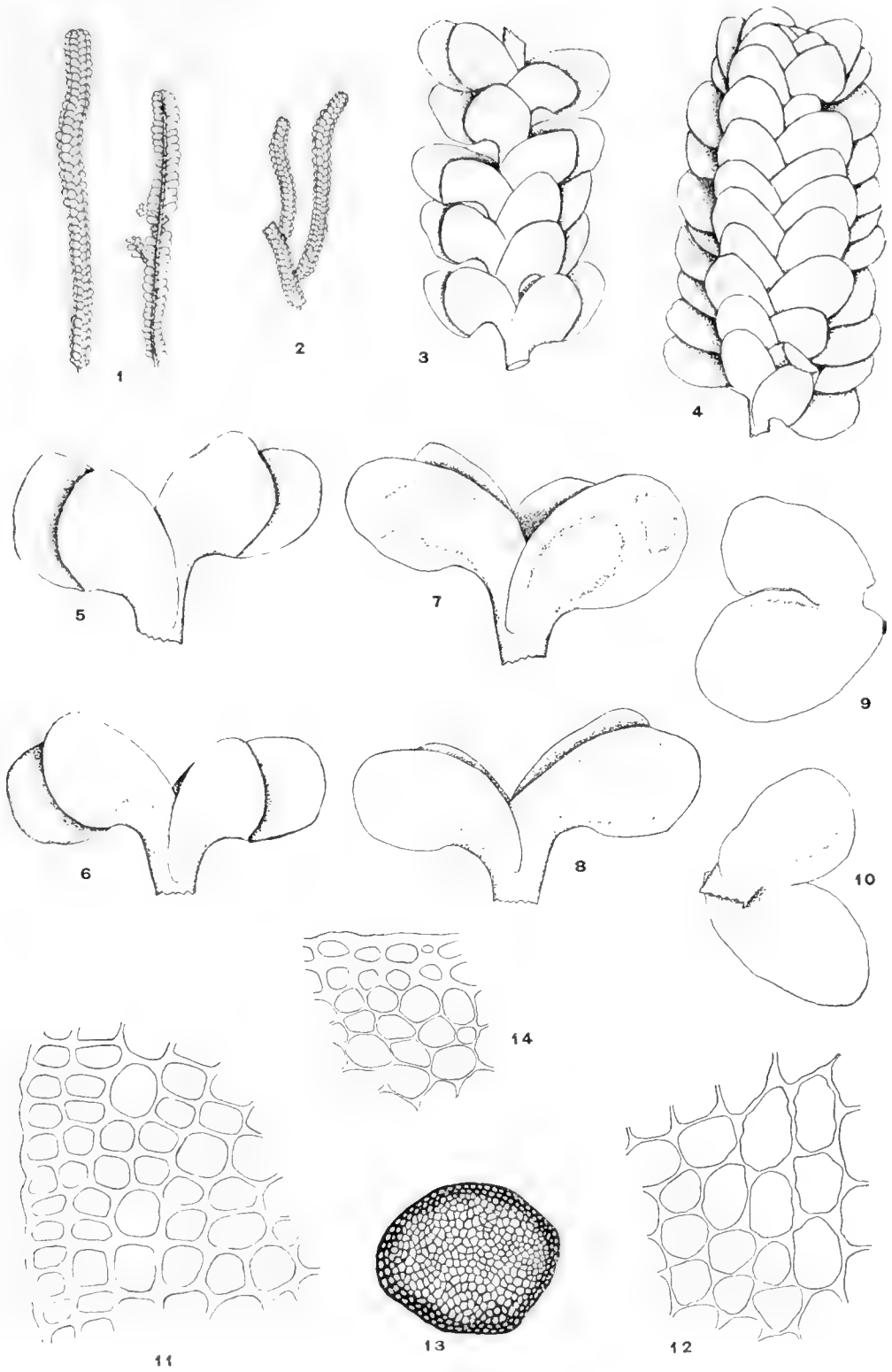
All the oaks of Colorado have lately been referred to only two species, *Quercus undulata* and *Q. Gambelii*. Mr. F. K. Vreeland and I spent a portion of last summer in the southern part of that State, and in studying the oaks in the field we came to the conclusion that those of the regions visited must belong to five or six species. The differences were manifest even early in the spring when the leaves unfolded. In the Cuchara valley around La Veta scrub-oaks are very common. They usually grow in large clumps often 20-30 m. in diameter. The roots of several of the species grow horizontally, close below the surface of the ground and send up numerous shoots. These oaks also fruit very early, often before they are a meter high; therefore, when a young oak has started in a place, there soon grows up around it a whole colony of still younger ones. As the youngest on the periphery of the clump have more light and air, they grow faster and soon overtake those in the center, and consequently the small trees of the colony quite often have the same height (1-5 m.) as if they were trimmed with a gardener's clipper. In rocky

ground the colonies are more irregular and shrub-like. When the leaves unfold in the spring the contrast between the clumps of the different species or subspecies, as you may call them, is best shown, as one clump is bright red, while the next may be yellowish or gray. One of the yellow forms I afterwards identified as *Q. Gambelii* Nutt. and the gray one is *Q. Fendleri* Liebm.

In the South Cheyenne Cañon, near Colorado Springs, in Wahatoga Cañon between the two Spanish peaks and on Turkey Creek, a tributary of Huerfano River, we also found oaks but of a different habit, viz., solitary, middle-sized trees, that could scarcely be referred to *Q. Gambelii*. Those of the last locality, at least, were so unlike any of the forms included in *Q. Gambelii*, that I immediately regarded them as belonging to an undescribed species; the thin leaves and general habit suggest rather *Q. minor*.

When I left I instructed Mr. Vreeland to collect acorns in the fall. He has sent me specimens of three or perhaps four distinct forms of the *Q. Gambelii* series. We may call them species or varieties just as we please, but they look very different in the field—more so than in herbarium specimens. Besides these I had notes and material gathered by myself in 1895, by Dr. Fred. Clements, of Nebraska, and Mr. E. A. Bessey, of Washington, D. C., in the years 1896-1900, and of course the specimens in the herbaria of New York Botanical Garden and Columbia University. I found, however, that these collections were not sufficient to make a thorough study of the oaks of the southern Rockies. I wrote to the Missouri Botanical Garden and the United States National Herbarium, asking for the loan of their specimens of *Q. undulata*, *Q. Gambelii* and related species. These requests were kindly granted.

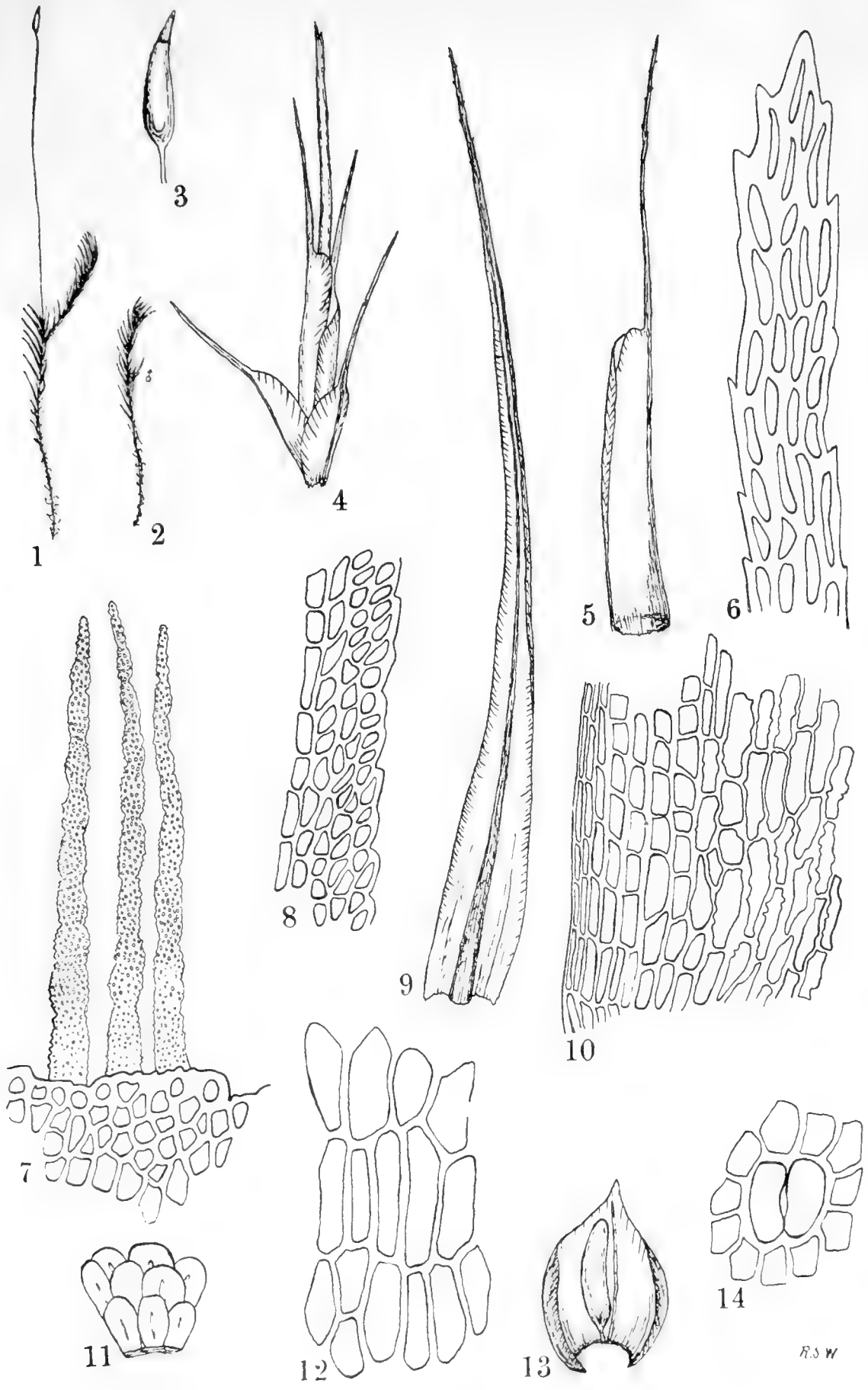
My original intention was to confine my study to the oaks of the Rockies proper, but I found that in order to reach a satisfactory understanding of these, it was necessary to take into consideration the nearly related forms of the plains and table-lands of Arizona, New Mexico and western Texas. I



SCAPANIA IMBRICATA M. A. HOWE.



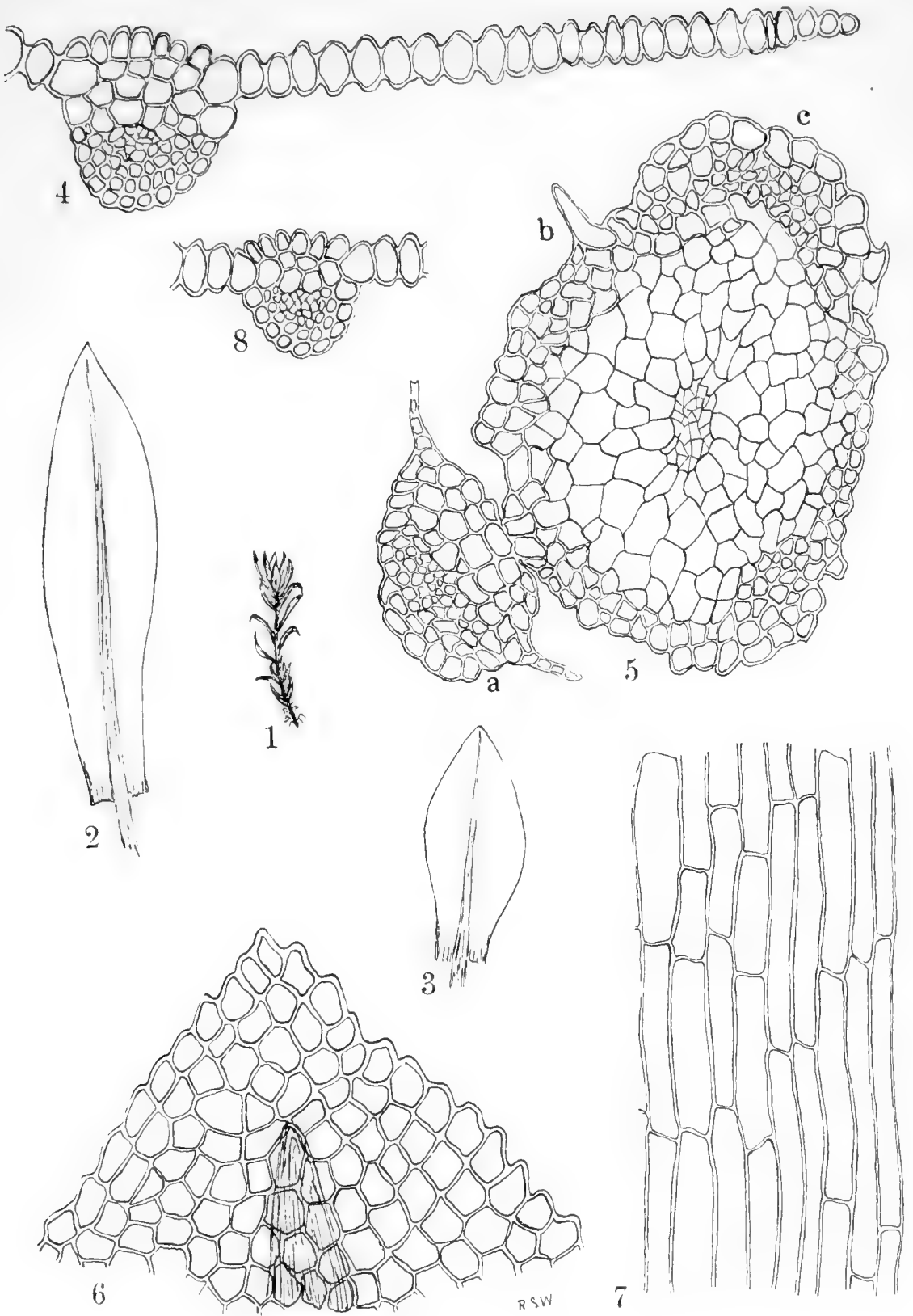




R.S.W

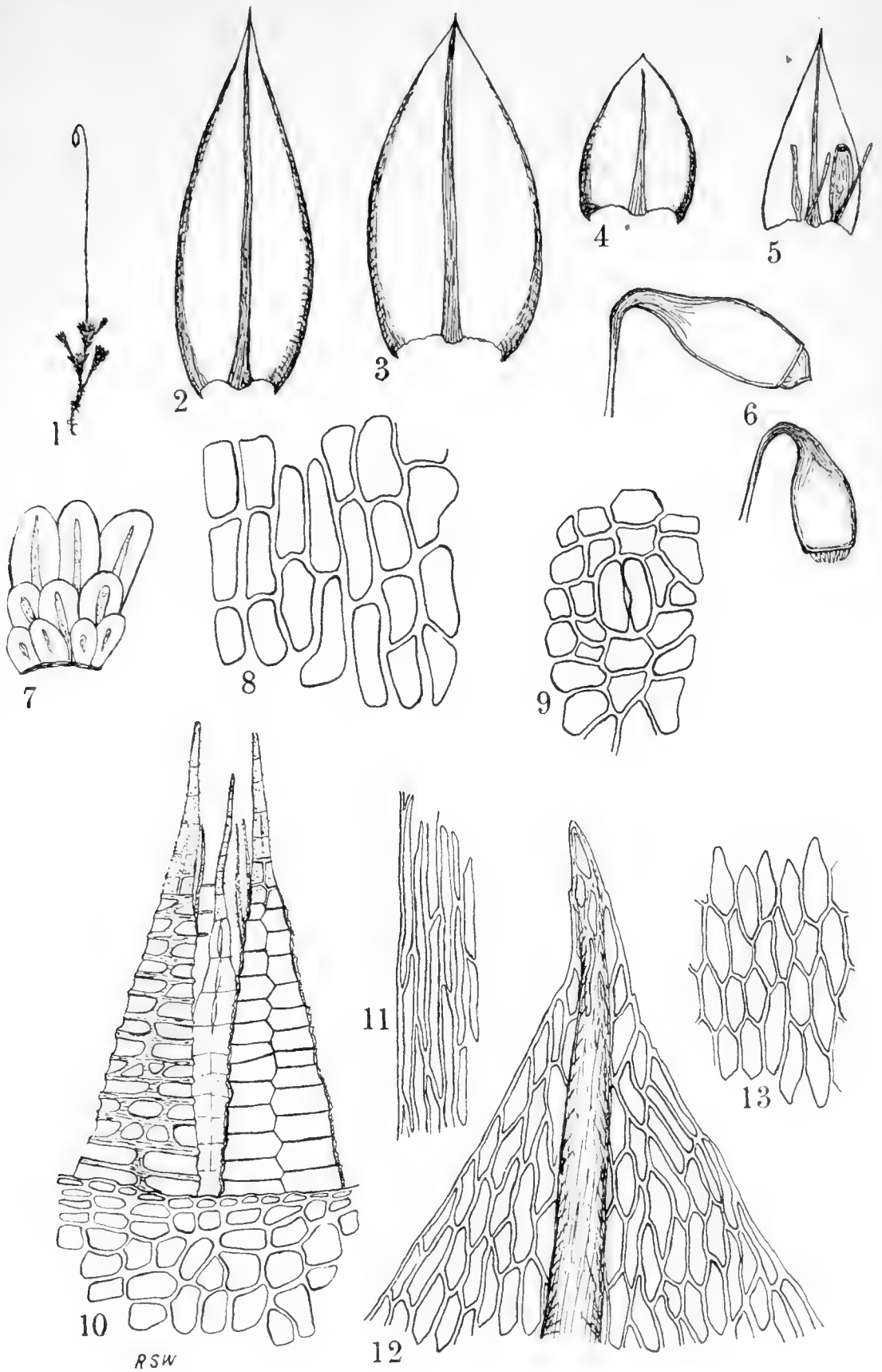
DITRICHUM GIGANTEUM R. S. WILLIAMS.





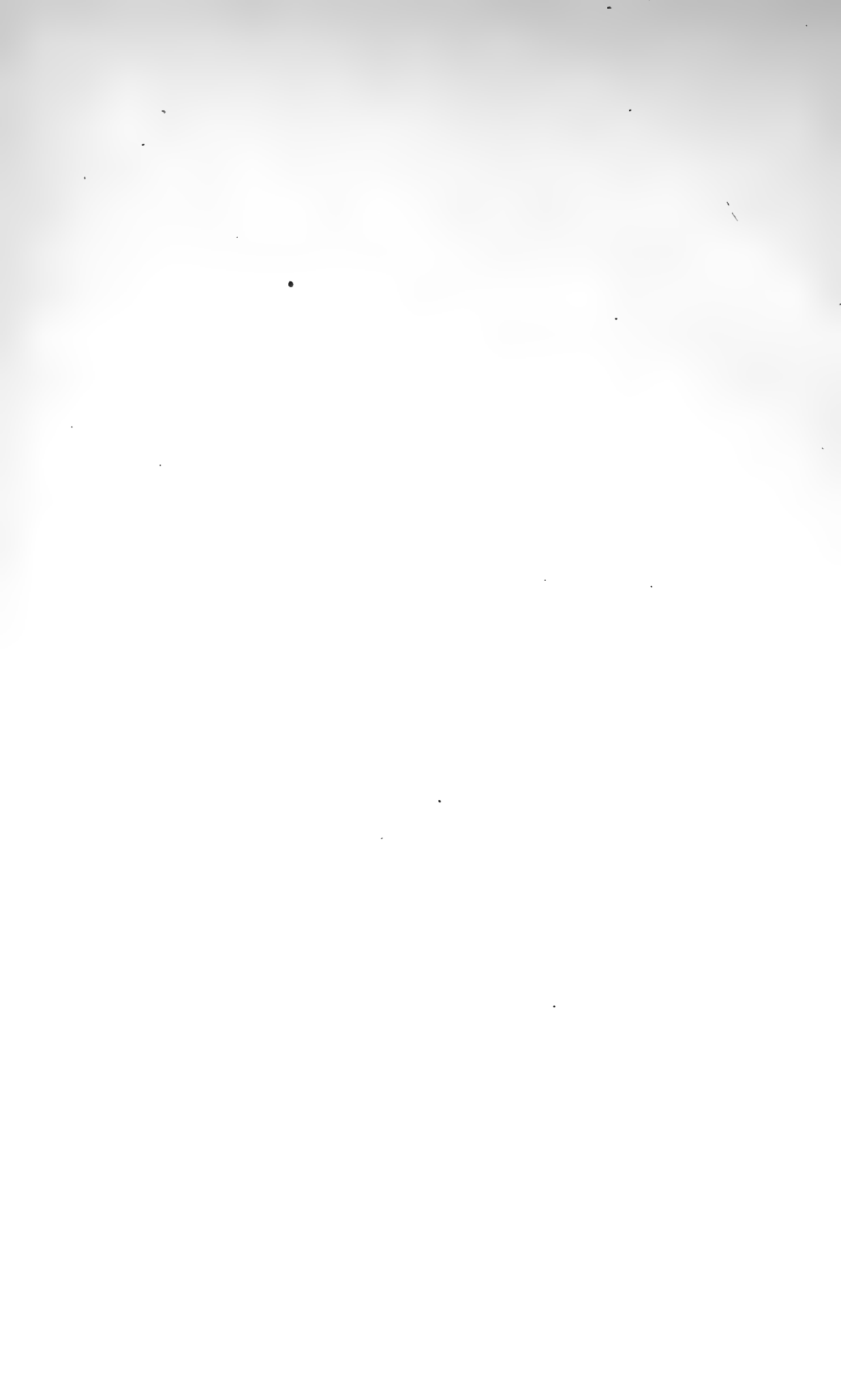
BRYOBRIITTONIA PELLUCIDA R. S. WILLIAMS.

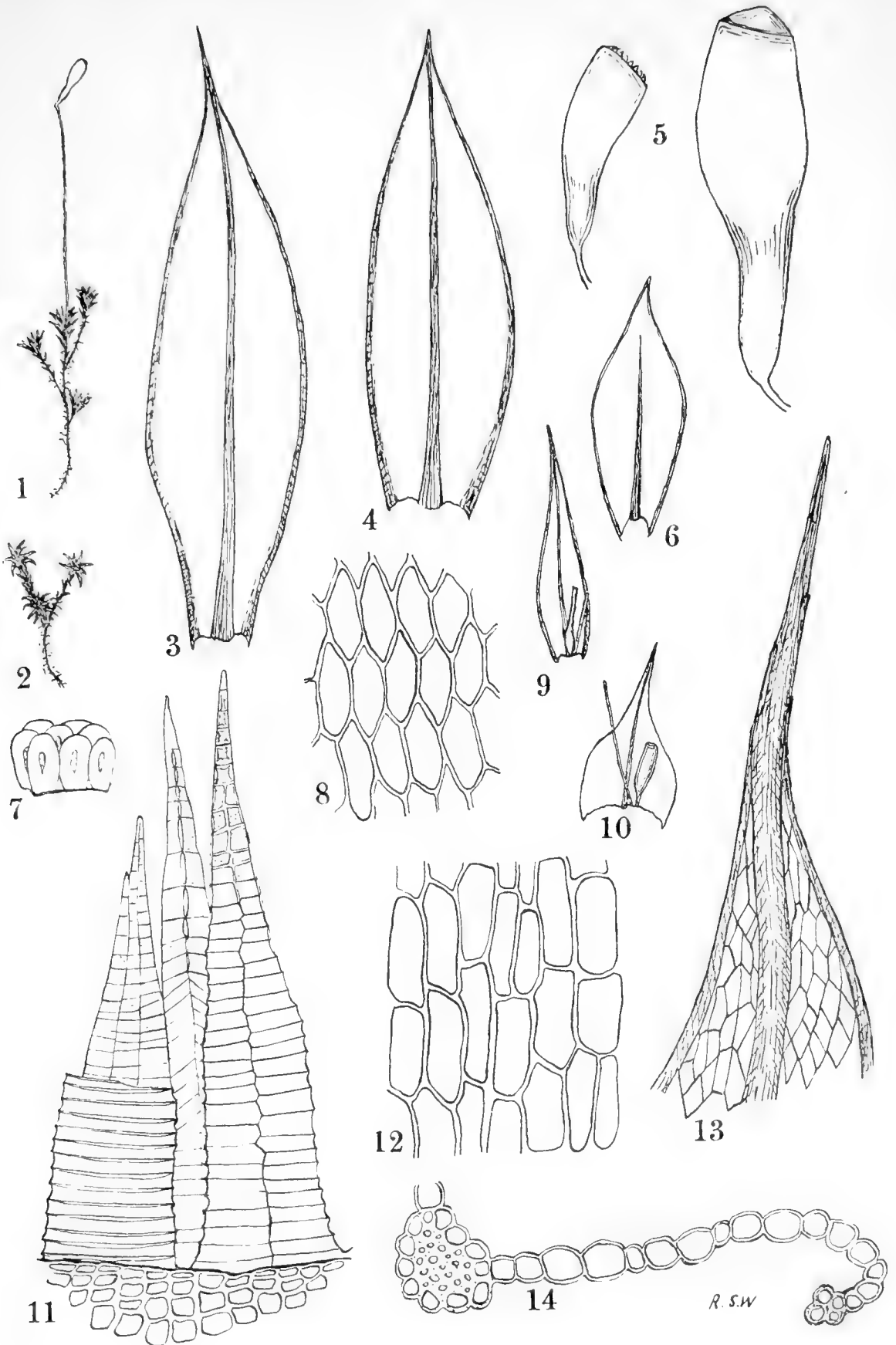




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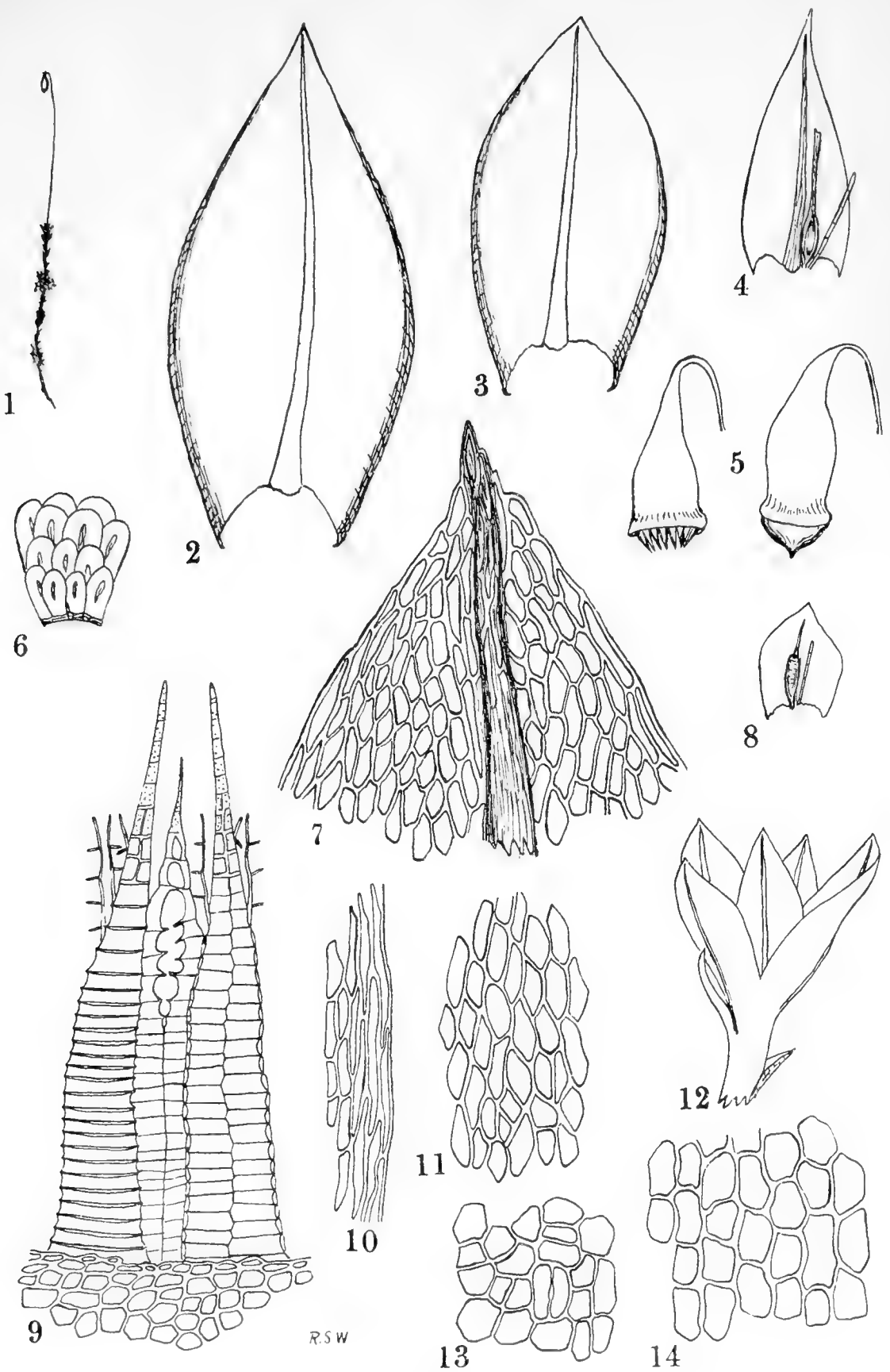




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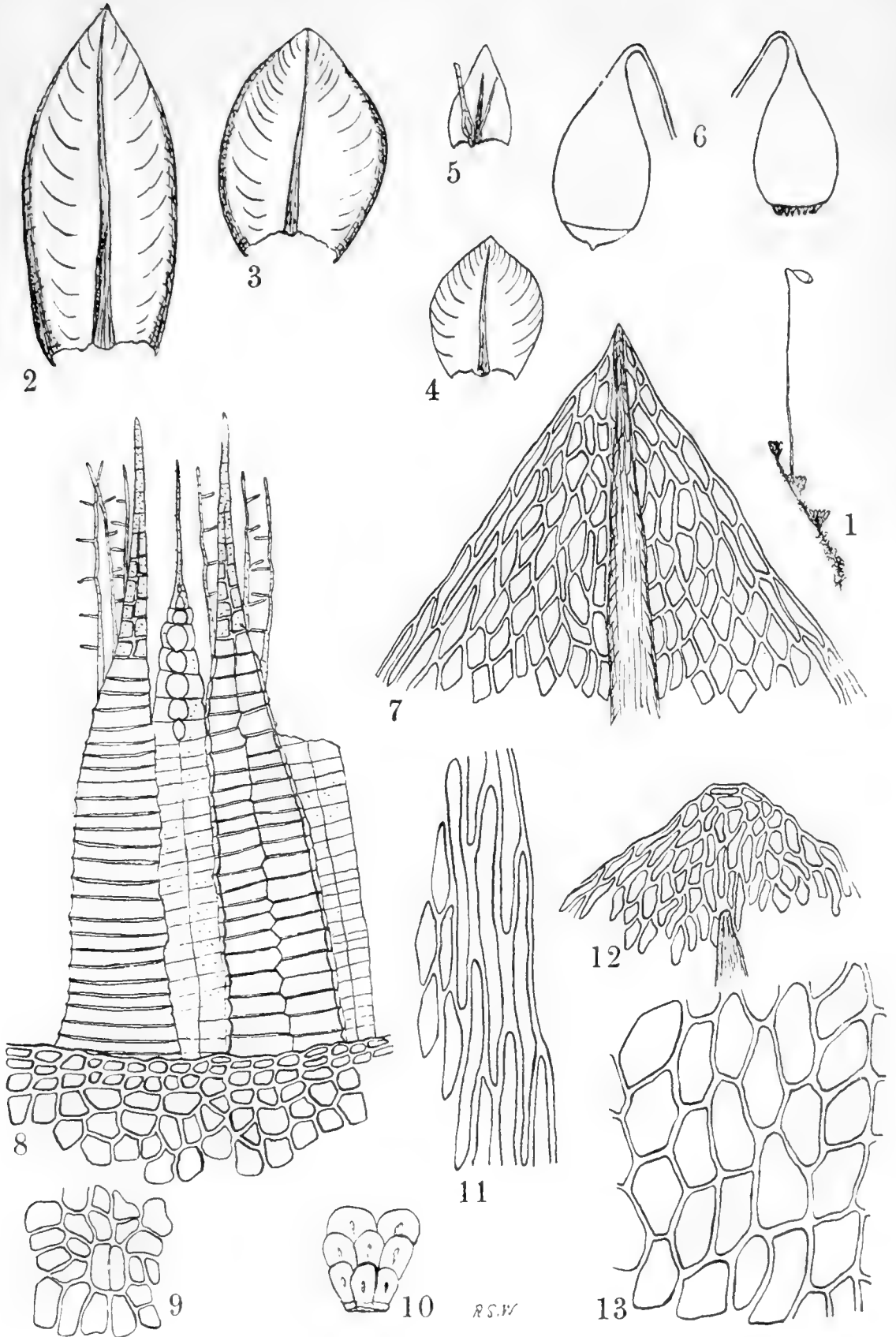






BRYUM SUBMUTICUM PHILIBERT.

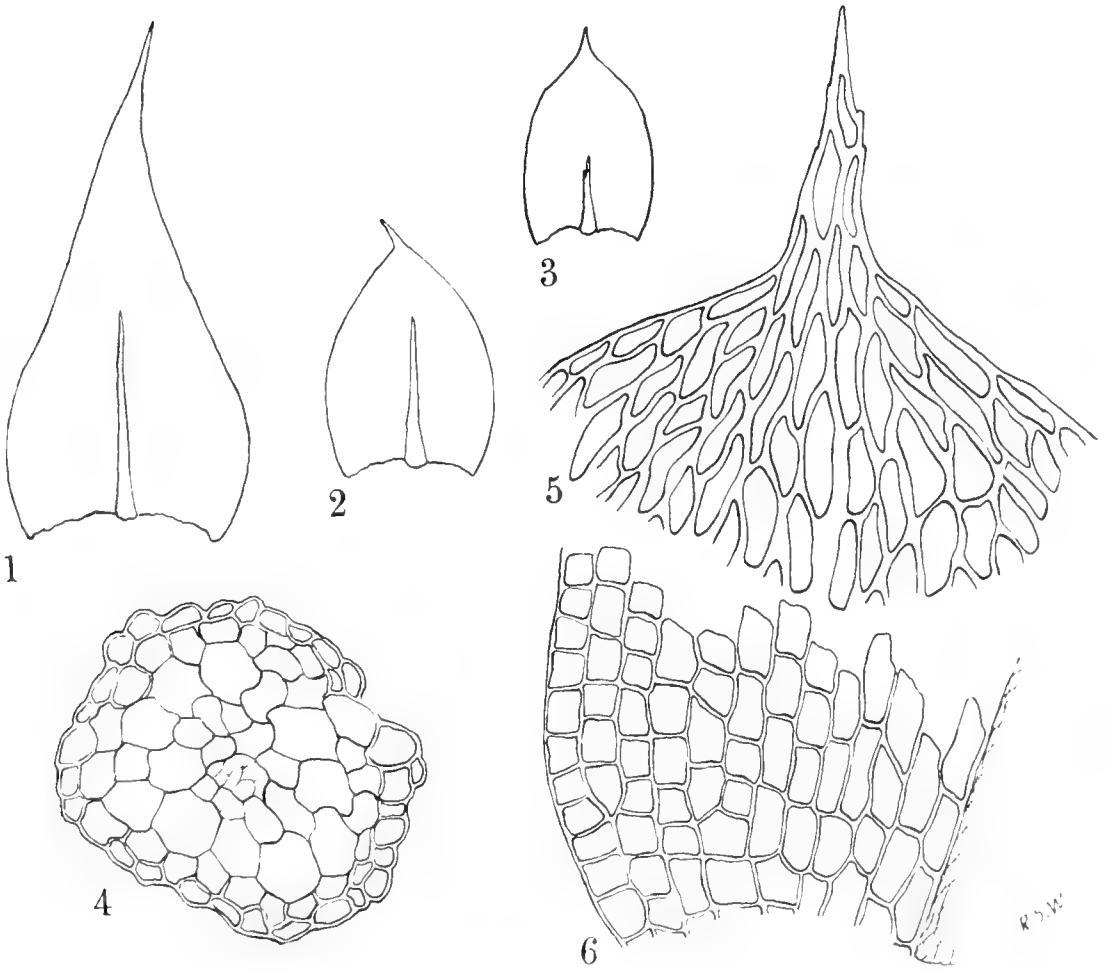
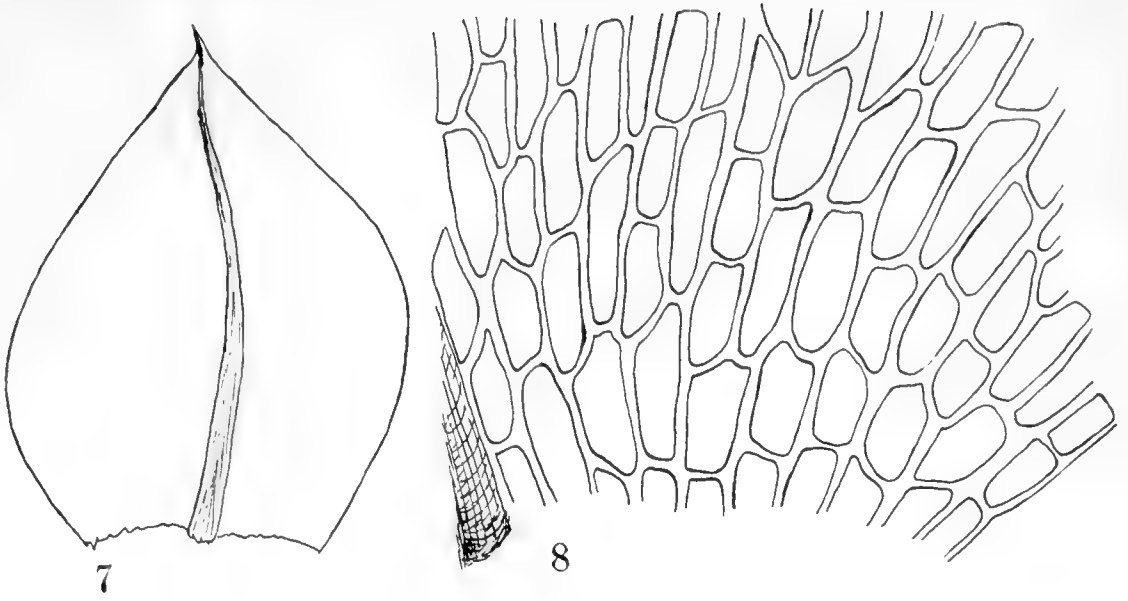




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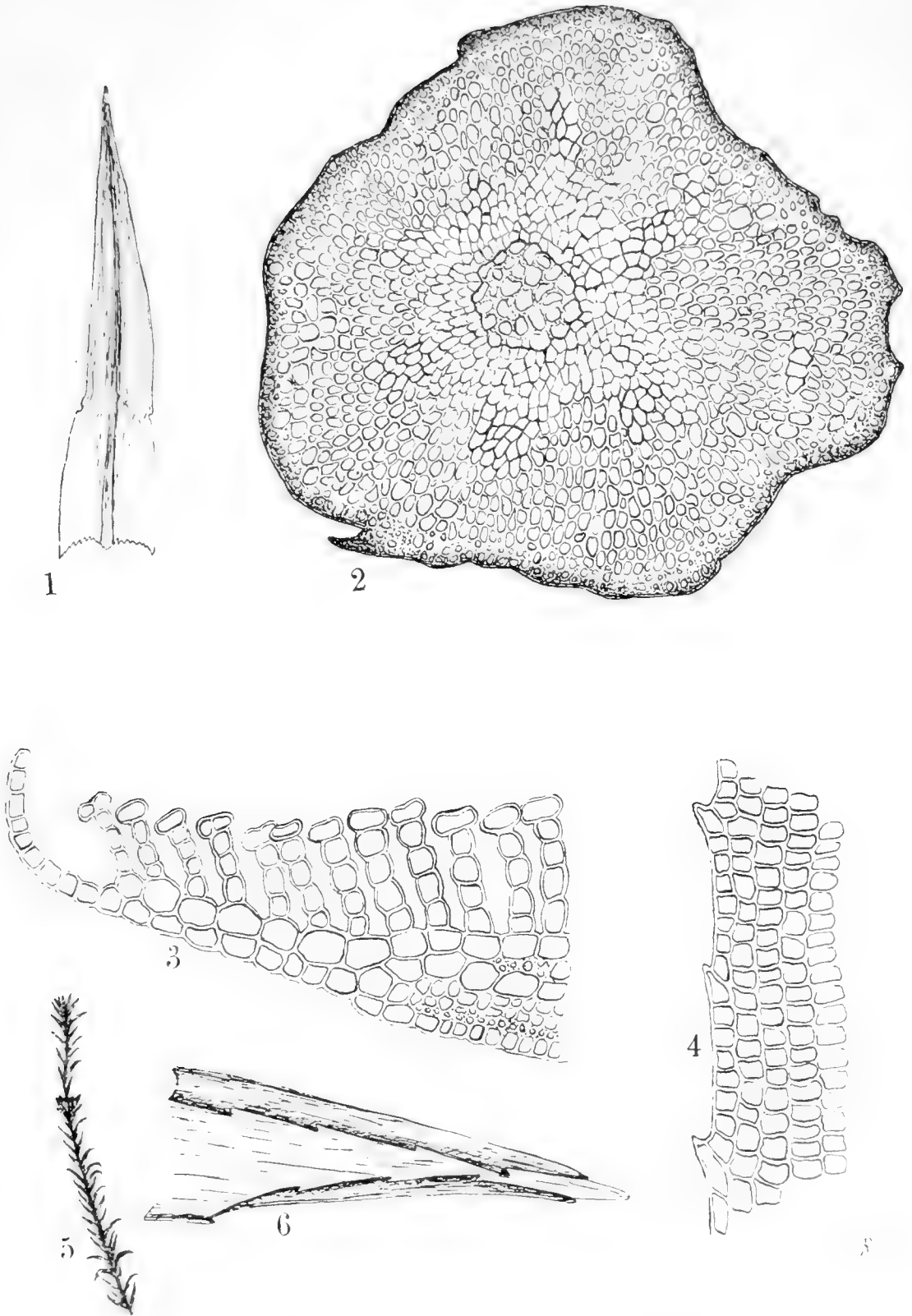
BRYUM SUBORBICULARE PHILIBERT.





FIGS. 1-6. *PLAGIOBRYUM ARGENTEOIDES* R. S. WILLIAMS.  
FIGS. 7, 8. *PLAGIOBRYUM ZIERII* (DICKS.) LINDB.

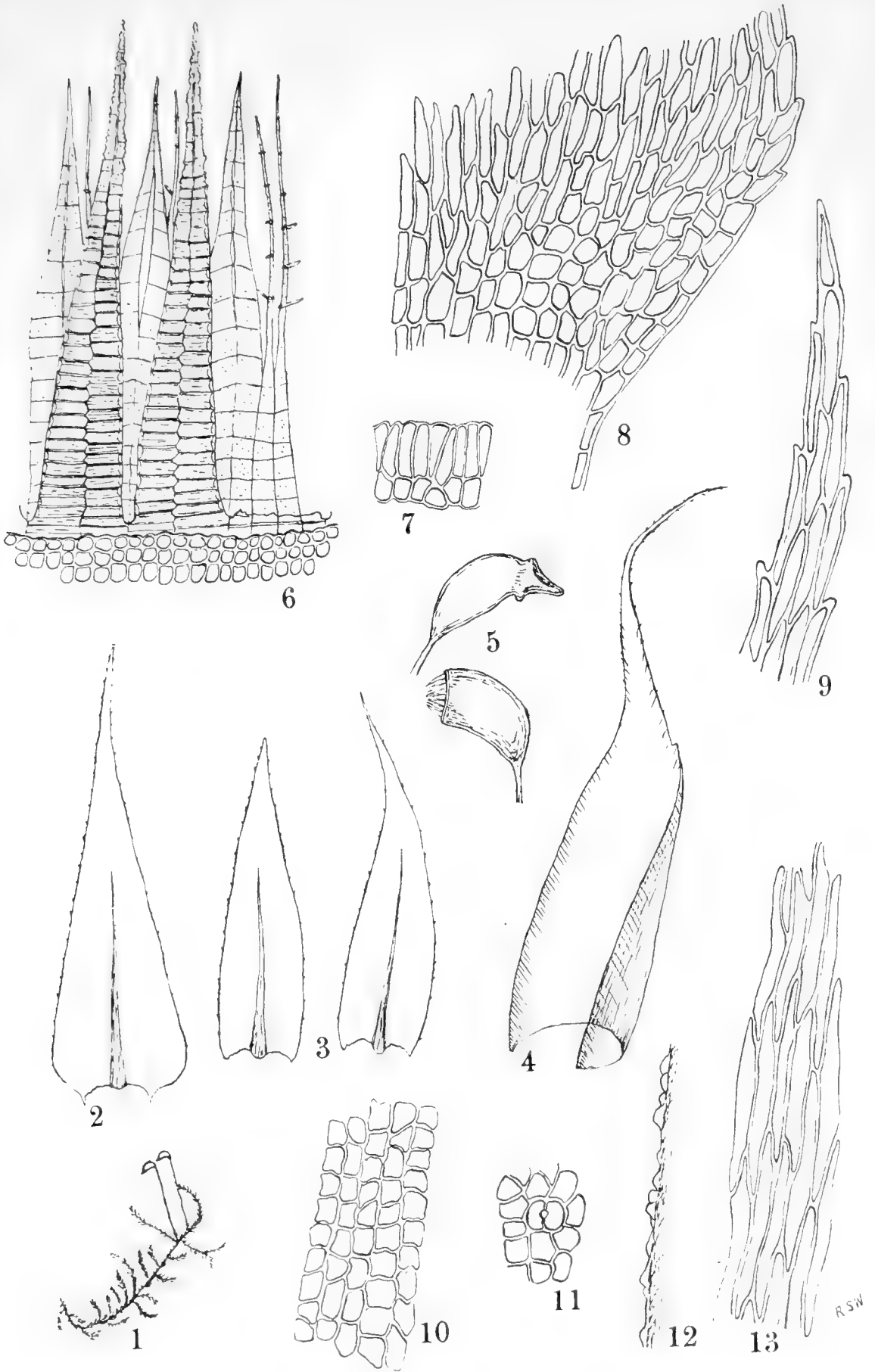




POLYTRICHUM INCONSTANS HAGEN.

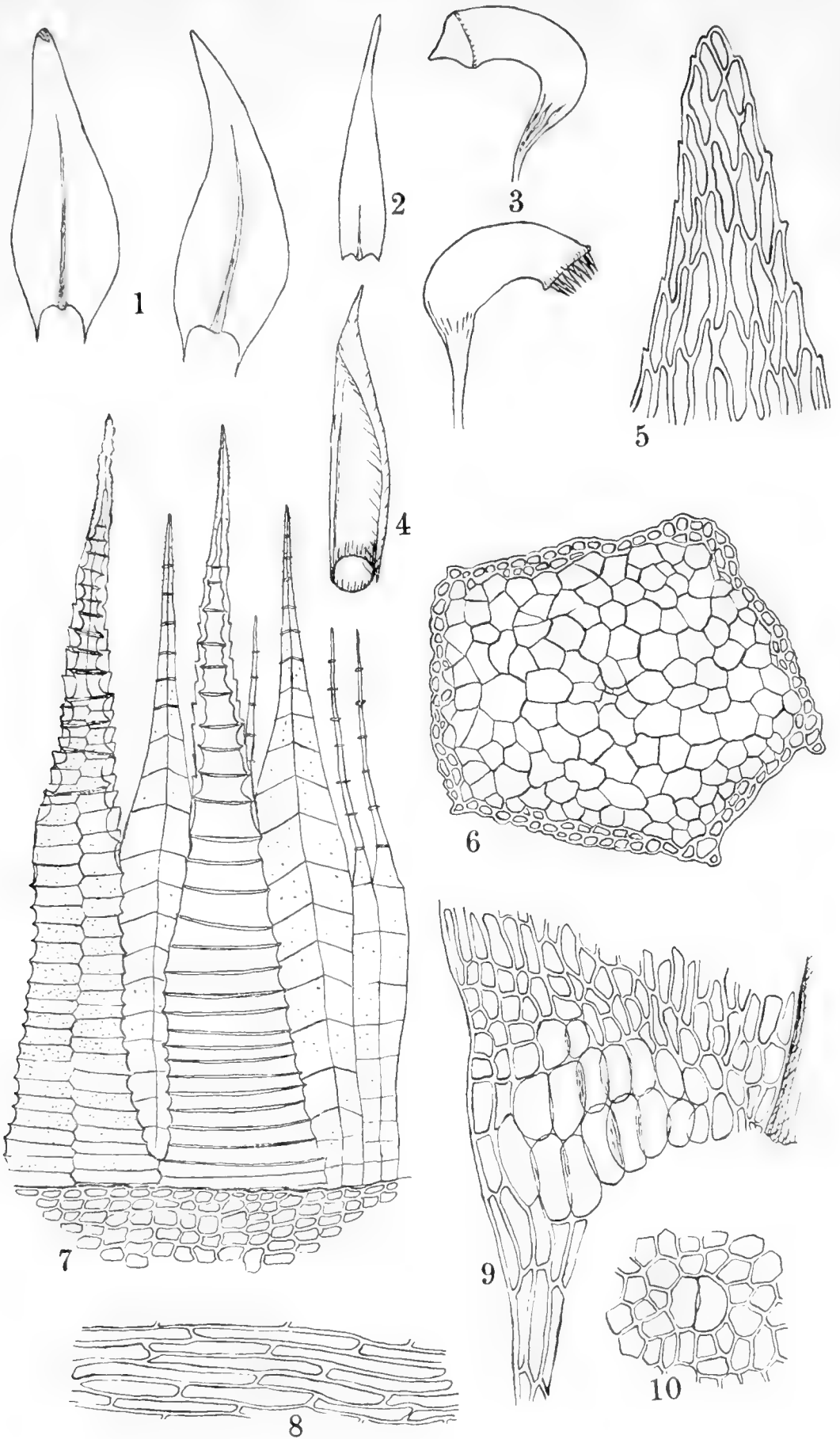




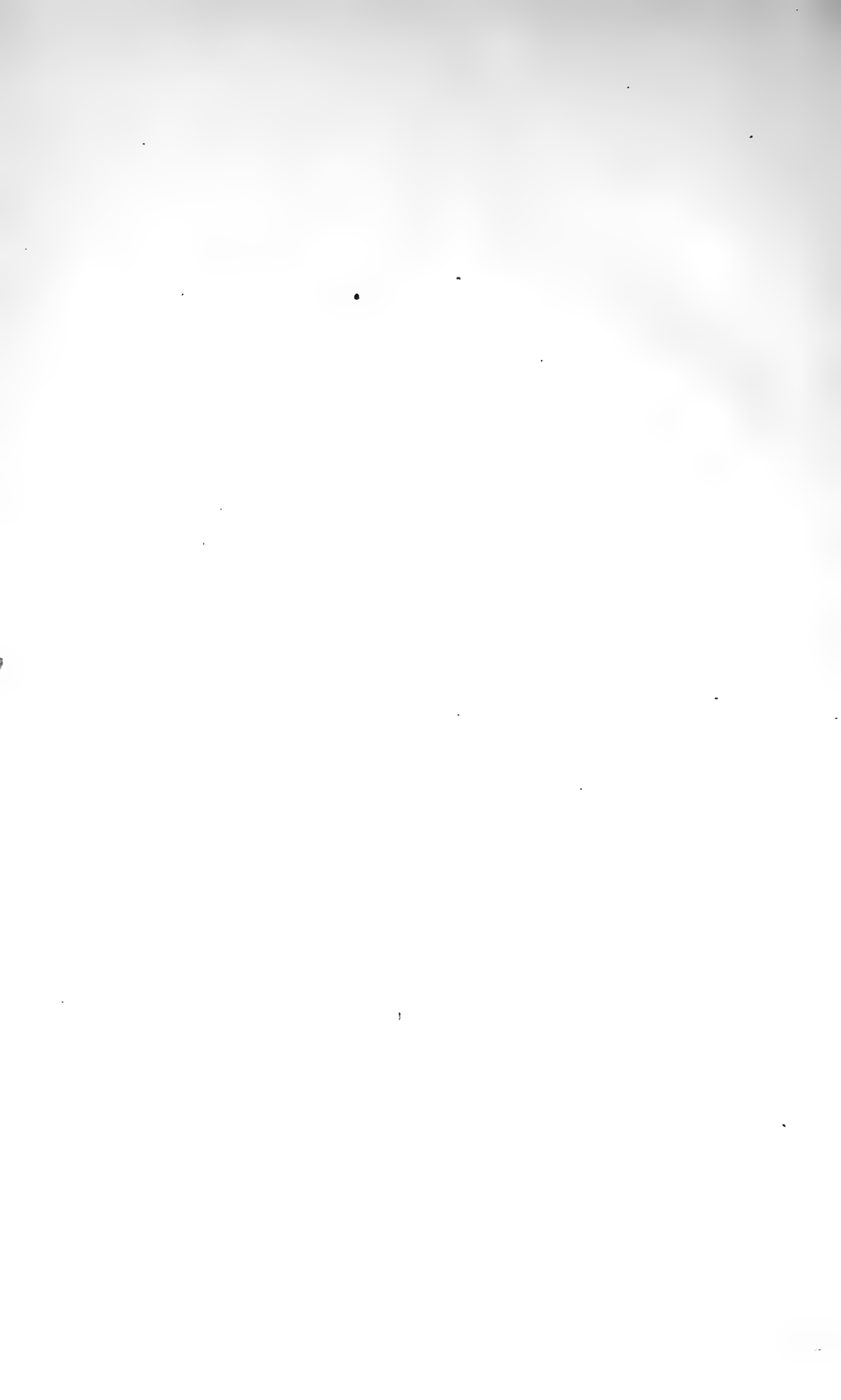


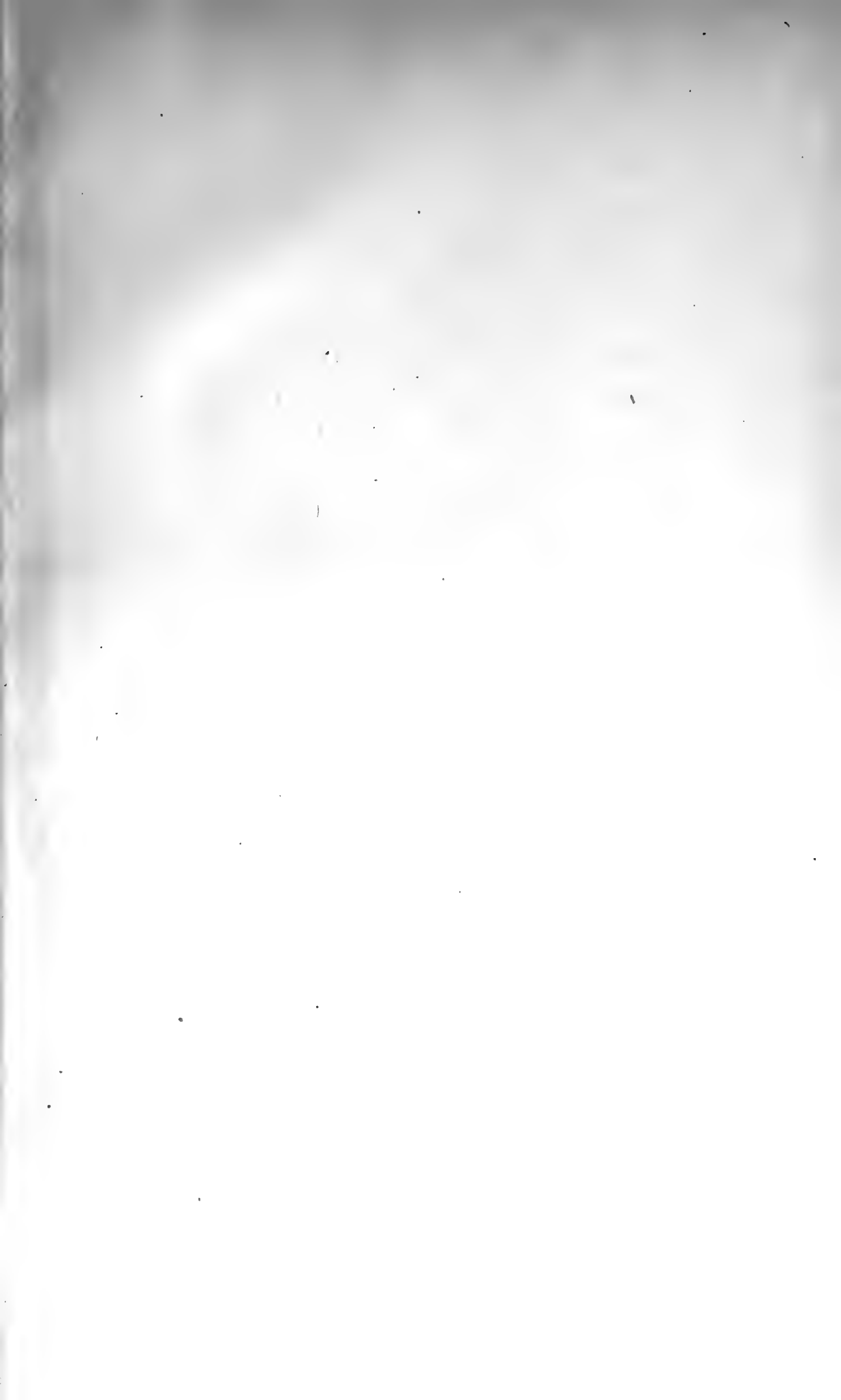
BRACHYTHECIUM PETROPHILUM R. S. WILLIAMS.

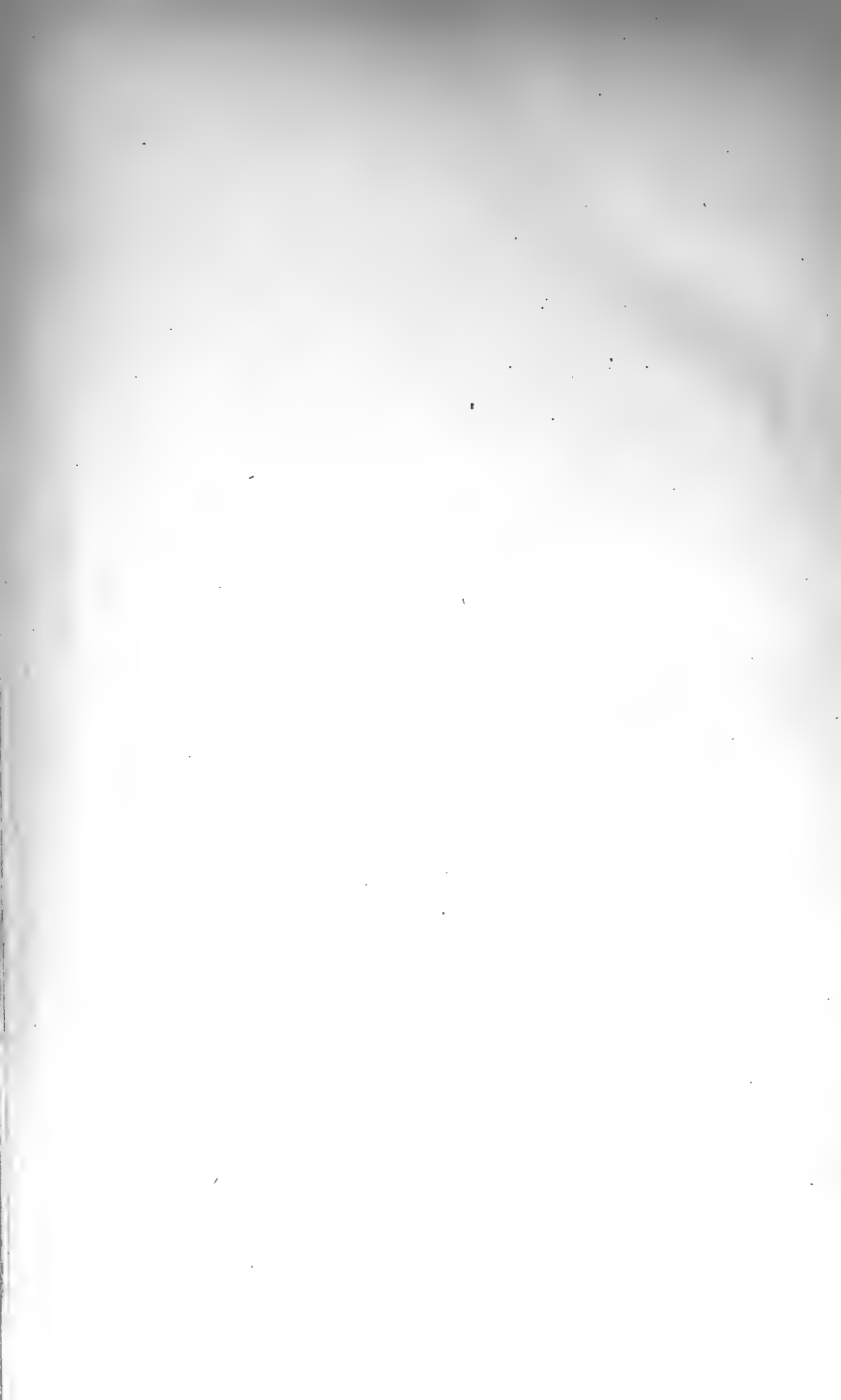




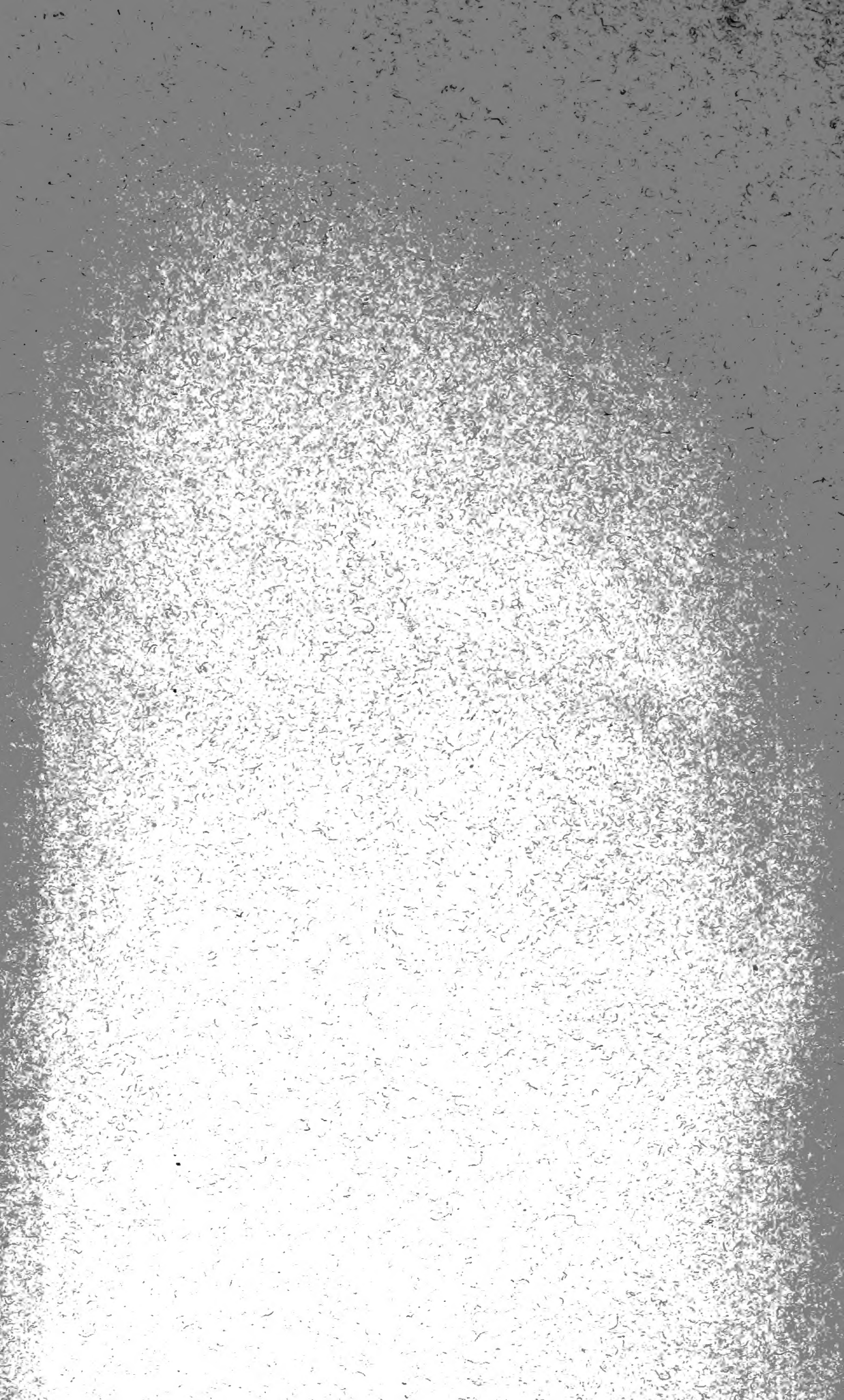
HARPIDIUM AMBLYPHYLLUM R. S. WILLIAMS.













QK202 .C65 gen

/Contributions to the botany of the Yuko



3 5185 00129 2463

