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An Enumeration of the Plants Collected by H. H. Rusby, in
Bolivia, 1885-1886.—II.

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MUSCI.

There has been a long delay in publishing this portion of the enumeration of Dr. Rusby's collection, because at the time that the first comparisons were made at Kew in the summer of 1888, I felt that further study, and, in many cases, better material would be necessary in order to accurately determine many of the species. Furthermore, all of Mandon's specimens, which were collected in the same localities which Dr. Rusby visited, such as La Paz and Sorata, were still lying in Schimper's herbarium undescribed and bearing only manuscript names.

In all instances when Dr. Rusby's specimens agreed with Mandon's the latter have been cited by number and locality, but as we did not possess at that time a set of Mandon's mosses, and my time at Kew was limited, it was impossible for me to write descriptions of all of the new species preserved in Schimper's herbarium collected by him. Hoping, however, that some one better fitted to do this than myself would have the opportunity of studying these Bolivian mosses, and also in recognition of the special privileges accorded to me at Kew while studying there, the first and most complete set of Dr. Rusby's duplicates was deposited there. The second set was sent, after having been carefully studied and named as far as possible by one unacquainted with

Tropical American genera, to Dr. Carl Müller, at Halle. He treated them in the same way that Schimper did Mandon's, giving most of them manuscript names, making few or no critical comparisons, and furnishing no descriptions. As far as we know, they are still lying in his herbarium unpublished.*

When we went to Europe, in 1891, I again took with me all the doubtful species and those supposed to be new, for the sake of making further comparisons at Kew with Schimper's specimens. In several cases, as shown in the text, I found that Dr. Müller was mistaken, and that my original determinations were correct; in several others I found manuscript names of Schimper's given to Mandon's specimens which had priority over those of Müller's given to Dr. Rusby's specimens. In several other cases the types were not at Kew, and the specimens had to be referred to William Mitten and Emile Bescherelle for further study. We visited Mr. Mitten and I showed him and gave him several species, the types of which were in his herbarium. He very kindly made the comparisons for me, and in several cases shared his specimens with me.

We also took a set of the duplicates for M. Bescherelle, and I spent a day with him at the Jardin des Plantes in Paris looking up some of Montagne's types. In a letter received from him at Kew he says:

"As for the mosses collected in Bolivia by Mandon, I think I remember that they were distributed by me in 1869, after the death of Mandon, which occurred on the 30th of December, 1866. Schimper named them, but did not describe or diagnose them. All of Mandon's mosses, Bolivian and Madeira, were sent to me by M. Cosson to be made up into sets, which were sold for the benefit of the widow. I kept one set and the residue, and proposed publishing at least the list of new species with the numbers and localities, in order to save Schimper's priority in the new discoveries. Unfortunately, other occupations have prevented my accomplishing this project. It will give me pleasure to share with you my duplicates."

We have to thank M. Bescherelle for a very good set of Mandon's mosses and we were also fortunate enough to secure Dr. Spruce's own private set of his *Musci Amazonici et Andini*, so

* Since this manuscript was sent to the printer we have learned that Dr. Müller is proposing to publish a *Brylogia Boliviana* in the *Nuovo Giornale Botanico Italiano*.

that we are now better able to study and compare Dr. Rusby's specimens.

In 1893 we received a much larger collection of mosses than Dr. Rusby's, made by Mr. Pierre Jay in northern Bolivia, also from the vicinity of La Paz and Sorata. I again wrote to M. Bescherele, offering to send him a complete set if he would name them. He replied that he was so occupied with his studies of the mosses of Japan that he found it impossible to undertake it and that it was a thankless task acting as secretary for some one else. I might, perhaps, have been strongly tempted to take the same stand had there not been twelve pages skipped in the reprints of Dr. Rusby's enumeration and held in reserve for this list of mosses. Just as we are going to press I have received a postal card from M. Emile Levier, inquiring for the Bang collection of Bolivian mosses and telling me that Dr. Carl Müller is printing in Florence a *Bryologia Boliviana*. As my manuscript is completed and the priority of Schimper's names from Mandon's collections is maintained throughout, we think it best to publish our enumeration independently.

This summer I have also commenced wrapping and sorting Mr. Jay's collections and have found several of Dr. Rusby's new species in fruit, which had previously only been collected sterile, so that the work promises to be of great interest, but will take a good deal of time to accomplish with the limited collection at my disposal and the pressure of other duties. However, it seems best to publish the list of Dr. Rusby's collection as it stands, first with such determinations and descriptions as I now know to be correct, and to modify and amend this list subsequently as I find time to study and compare the fine collections made by Mr. Jay.

The sequence of genera followed is nearly that given by Mitten in his *Musci Austro-Americani* (Journ. Linn. Soc. 12: 12-25. 1869). Thirty-nine genera and ninety-six species are enumerated in this collection of which forty-two are new or previously undescribed. Six mosses, as many hepatics, four lichens and a few algae and fungi were also collected in Bolivia by A. M. Bang and enumerated by Dr. Rusby (Mem. Torr. Bot. Club, 4: 273). These were named by Mr. Wright at Kew, but the *Sphagnums* have since been examined and corrected by Dr. Warnstorf from specimens preserved in the Boissier Herbarium at Geneva.

ACROCARPI.

Ceratodon Nova-Granatensis Hpe. Mapiri, 5000 ft. (3107)= Lindig, Nova Granada, Boq. Tequedamas, 1863.

Leptodontium gracilescens C. Müller. Yungas, 6000 ft. (3108); Sorata, 8000 ft. (3108a) *fide* C. Müller. E. Bescherelle says: "Affine *L. luteo* foliis tamen patulis haud appressis or minus longe cuspidatis differt."

At Kew in Herb. Hooker there are four specimens of Jameson's from the Andes of Quito, labelled *Didymodon luteum*, evidently the types of Hook. Lond. Journ. 5: 48. No. 174 is annotated by Wilson: "var. foliis magis recurvis patenti-recurvo serrulato." A part of 143 has the leaves much recurved as in 193b, both of which are sterile. On the same sheet is a specimen of G. Mandon's *Plantae Andium Boliviensium Exsicc.*, no 1616, from vicinuis Sorata labelled *Didymodon luteus* Taylor, which quite agrees with Rusby's specimens in its bright yellow recurved leaves, longer pedicels two or three in the same perichetium, and capsules twice longer than Jameson's specimen's.

LEPTODONTIUM GRACILE C. Müller, n. sp. Mapiri, 5000 ft (3111); Unduavi, 8000 ft. (3109).

Plants bright yellowish green, stems slender, leaves squarrose and curled when dry; cells densely papillose and obscure above, clearer and oblong below, margins entire and recurved to above the middle, sharply and doubly serrate above. Plants all sterile.

Allied to *Didymodon cirrifolius* Hpe. by its papillose leaves but with the aspect of *L. gracilescens* Müll. "Affine *L. luteo* foliis longioribus quam *L. gracilescens* acutioribus margine non repetito denticulatis." E. Bescherelle, teste.

LEPTODONTIUM GRIMMIOIDES C. Müller, n. sp. Sorata, 13000 ft. (3192).

Plants dark and discolored below, tips of the branches bright yellowish green, stems 3-4 cm. long, leaves squarrose, spreading and curled when dry, remaining undulate when moist, margins entire and recurved below with a few protruding teeth above, vein generally excurrent into a cuspidate apex, cells clear but papillose at base, densely and finely papillose above. Plants sterile.

Leptodontium Mandoni Sch., *fide* C. Müller. Unduavi, 10000 ft. (3110). (Sterile.)

There is no specimen in Schimper's Herbarium at Kew bearing this name, so no comparison was possible. These specimens of Dr. Rusby's have the leaves strongly costate to the apex, the costa is papillose on the back, the margins are entire below, serrate and recurved above, papillose and undulate, the upper cells are small and round, but not opaque, the basal cells longer and brown.

HOLOMITRIUM BOLIVIANUM C. Müller, n. sp. Near Yungas, 4000 ft. (3190).

Plants in light yellowish tangled mats, mixed with hepatics; stems 3-4 cm. long, flexuous and matted, with light-colored tomentum; leaves 3-5 mm. long, linear lanceolate, twisted and curled when dry, costate to apex, serrate and papillose above as well as undulate, entire with revolute margins below; cells round and small, lower ones hyaline. Plants sterile.

This species was compared with *H. flexuosum* Mitt. at Kew, but it differs from No. 21 Spruce from Andes Quitenses in the leaves, nor does it agree with any other species from this region at Kew. It should be compared with *H. longifolium* Hpe.

Dicranella angustifolia Mitt. Near Yungas, 4000 ft. (3112).

DICRANELLA NANOCARPA C. Müller, n. sp. Near Yungas, 4000 ft. (3139 pp).

Stems 3-5 mm. high, simple or branching, leaves erect or slightly secund when dry, uppermost often 2 mm. long, linear-subulate, margin entire, vein excurrent with a few indistinct teeth at apex; perichetial leaves broader and clasping at base. Dioecious. Pedicels 5-8 mm. long, twisted above, bright orange; capsule erect, ovoid, less than .5 mm. long, with a longer straight beak on the lid than the theca, which becomes broad and hemispherical when empty; mouth with a dark border, peristome red, teeth fugacious; cells of the walls oblong or hexagonal in regular rows.

Only six plants found mixed with a specimen of *Philonotis*, No. 3139; the alliance was not determined.

DICRANUM SPECTABILE Sch. mss. Unduavi, 12000 ft. (3113.)

Plants stout and large, much discolored at base, glossy and yellow at the tips of the branches; stems 10-15 cm. long, decumbent, branching by short innovations, tomentose in the axils of the leaves, often slender and interruptedly foliate; leaves longest at the tips of the branches, often 15 mm. in length and 1 mm. broad at base, to a concave apex with involute margins, entire below, serrate, becoming spinose along the excurrent vein; basal

cells larger and brown, a few hyaline ones near the vein, others conspicuously porose, becoming long, spindle-shaped above and oblique along the margin. Monoecious antheridia in small buds on the tomentum in the axils of the leaves. Pedicels 15–20 mm. long, much twisted to the left; capsule 3–4 mm. long, erect, smooth, ovoid, largest at base, abruptly contracted or with a short neck; lid with a slender oblique beak 2 mm. long; mouth small, teeth short, slender and bifid.

Compared with and equal to Mandon Plantae Andium Bolivensium, No. 1609. Hab. vicinus Sorata, also Songo, 1857.

Nearest to *D. speciosum* Hk. & Wilson. Compared with No. 325 of W. Jameson's Pl. Aequatoriales from which it differs in its more slender habit, shorter leaves and pedicels half as long. Dr. C. Müller, also recognized this as a new species.

Dicranum species? Yungas, 6000 ft. (3115).

These specimens are sterile, and have baffled Dr. Müller, and Mr. Mitten as well. They have been compared with all the specimens at Kew likely to be the same. Mr. Mitten sent me a portion of his specimen of *Dicranum Mittenii* CM., but they do not agree. Dr. Müller named them *Campylopus concolor* Hook., but they were compared at Kew with specimens in Hooker's herbarium collected by Lindig in Bogota, and they differ in being much stouter plants of a glossy yellow color, with longer and broader leaves, which are serrate *only* at the apex and have a much broader blade.

Pilopogon gracilis Hook. Near Yungas, 6000 ft. (3159 in part).

Compared with Hooker's specimens at Kew collected by Weddell in the Province of Yungas, Bolivia, May, 1847, with which they agree in every way. The leaves are hyaline at the basal angles and these cells extend up along the margins; the short transverse walls of the cells are thickened; the vein is broad, the margins incurved, and there are a few teeth at the apex. The perichetial leaves end in a very long tip, often extending half the length of the pedicel.

Dr. Müller gave this a manuscript name under *Catagonio*.

CAMPYLOPUS TRIVIALIS C. M. n. sp. Mapiri, 2500 ft. (3196).

Plants loosely matted, dirty green; stems flexuous, not rigid, 3–5 cm. long, usually simple, occasionally with crowded branches

at the apex of the stems; stem leaves short, 3–5 mm. long, slightly falcate at the tips of the branches, tubular with incurved, entire margins; vein more than one-third of the width of the base of leaf excurrent with a few teeth at apex; basal cells thin, hyaline to the vein, not colored.

Plants sterile and much less rigid than is usual in this genus; their alliance was not indicated nor determined.

Campylopus sp. undetermined. Yungas, 6000 ft. (3116).

Plants fragmentary and broken. Stems 2–3 cm. high, proliferous with fasciculate branches at apex, branches often 15 mm. long with the leaves crowded at the summit; leaves curled and twisted when dry, 3–5 mm. long, blade narrow, forming a serrate border of one row of cells almost to the apex; vein papillose on the back; cells enlarged at base, brown at angles; leaves of the branches shorter, often entire, and radiculose at base, perichetial leaves very long pointed, costate, entire, or scarcely serrulate; cells much enlarged at base, brown, upper oblong; antheridia in heads matted with brown radicles; pedicels several in the same head, 8–10 mm. long, curved, becoming erect where dry; capsules 1.5 mm. long, ovoid, not ribbed when dry; peristome red, lid not seen.

These specimens are closely allied to *C. annotinus* Mitt., and *C. brachyphyllus* Mitt., and *C. multicapsularis* Sch., from all of which they differ in the leaves and the smooth walls of the capsules when dry.

GRIMMIA NANO-GLOBOSA C. M. n. sp. Mapiri, 5000 ft. (3195).

Plants pulvinate in gray cushions, stems 5–8 mm. high; leaves crowded with a long, rough, white hair-point, blade carinate, cells small, almost quadrate, sinuous, basal ones elongated. Dioecious(?). Perichetial leaves with a long sheathing base, the white tip reaching the lid of the capsule. Pedicel erect, straight, 3–4 mm. long; calyptra lobate-mitrate, capsules 1–1.5 mm. long, lid with a straight beak, .5 mm. long; annulus narrow, of several single rows of cells falling in fragments with the lid; peristome red; teeth short, papillose; spores smooth, .008–.010 mm.

A smaller species than either *G. ovata* Web. & M., or *G. longirostris* Hook.

Compared at Kew with Matthews' Peruvian specimens labelled *G. ovata* and illustrated by W. Wilson. The Bolivian specimens are smaller.

Grimmia (*Racomitrium*) *crispipila* (Taylor) Mitt. Sorata, 10000 ft. (3117).

Agrees with specimens at Kew collected by Pearce at Undu-

avi and Yungas, duplicates of which are in our collection, sent by Mr. C. H. Wright with the permission of the Director.

GRIMMIA (RACOMITRUM) DIMORPHUM C. Müller, n. sp. Unduavi, 10000 ft., Oct., 1885 (3118).

Plants in dark dirty mats, stems blackened beneath, decumbent, giving off lower branches 3-4 cm. long, branchlets short, fasciculate; leaves subsecund, incurved and twisted when dry, spreading when moist, carinate, plicate with one strongly involute margin, generally blunt apex, but occasionally with a white mucronate tip or the apical ones with white crisped tips, vein prominently keeled, ending below the blunt apex or continuous into the white prolongation; cells all uniformly sinuous, elongated with faint transverse walls; perichetium short, 3 mm. long, broadly convolute, sheathing; bracts broad, apex acute, cells scarcely sinuous. Pedicels short, less than 1 cm., long, arcuate, twisted; capsule erect, or bent, 3 mm. long, smooth except just below the small dark bordered mouth; lid 1 mm. long, conic beaked, teeth long, slender, papillose, yellow.

Compared with *R. crispipilum* Taylor in Herb. Hooker, nos. 135, *a*, *b*; Spruce Musci Am. et And.

Leaves less cirrous pointed than 135 *b*; stems shorter than 135; leaves exactly alike; capsules on shorter pedicels, less cylindric, shorter and broader, with a broader mouth. General aspect quite different.

Leucobryum longifolium Hpe. Mapiri, 2500 ft. May, 1886 (3119).

Sporophyte immature. Agrees with no. 71 c. of Spruce's Musci Amazon. et. And. and with no. 7169 of A. Glaziov from Rio Janeiro, both at Kew.

LEUCOBRYUM STRICTUM C. Müller, n. sp. Unduavi, 10000 ft., Oct., 1885 (3119a).

Plants short, loosely tufted, mats dull gray when dry, stems short, decumbent at base, less than 2 cm. high, brown when moist, with light tips; leaves erect and slightly spreading, iridescent when dry, about 1 cm. long by 2 mm. broad, concave from a broad white base, tubular and dark above the middle, margin narrowly hyaline, apex with a few brown cuspidate teeth.

Plants sterile, smaller and darker than *L. indans* (Brid.). "Ab *L. longifolium* Hpe., cellulis chlorophyllis tantum latioribus differt." E. Bescherelle.

TORTULACEAE.

The treatment of this group by Mitten in his "Musci Austro-Americani" is far from satisfactory. It has seemed best, however, to follow him in this as in the other families. Duplicates of these were not sent to Dr. C. Müller, as they had not been carefully studied nor compared at that time. Later M. Bescherelle had a set of them, and made one or two comparisons for me with Montagne's types at the Jardin des Plantes. It will require more study and comparison with a more modern treatment of the family, before the specimens listed can be thoroughly understood.

Tortula (Trichostomum) contortifolium Mitt.? Unduavi, 8,000 ft. October, 1885 (3126).

There were no specimens of this species at Kew; hence these specimens were named only from the description on page 147 of Mitten's Musci Austro-Americani. They were shown to Mitten and sent to M. Bescherelle, but should be compared with Spruce, "No. 213, Andes Quitenses, Chimborazo (10000 ped.)"

TORTULA (*Trichostomum*) SEMIVAGINATUM Sch. mss. in Herb., no. 1618. Mandon, Plantae Andium Boliviensium. De Capanuta a Songo, 18 Obr., 1857, in Herb. Schimper. Vicinius Sorata, April, 1858, in Herb. Hooker. Near Yungas, 4000 ft., 1885, in Herb. Rusby, no. 3128.

Plants 2-3 cm. high, dark below, red-brown above; stems simple or branching by subapical innovations 1-2 cm. high; leaves curled and twisted when dry, spreading when moist from an erect, glossy clasping base, the lanceolate blade 2 mm. long, suddenly bent and contracted from the hyaline base, 1 mm. long, upper cells small, dense and with thickened irregular walls and small, blunt papillae, decurrent at the margins a short distance on each side of the clasping base, vein large, yellow, ending in the acute apex. Dioecious? Perichetial leaves smaller, with a longer, more sheathing base. Pedicels 5-15 mm. long, twisted in two directions; capsules 2-3 mm. long, straight, cylindric, smaller at the mouth; lid with a long curved beak, annulus large, falling with the lid; peristome fragile, pale, papillose, teeth long and slender, thickened and united at the basal joints, not twisted.

Closely related to *T. decolorans* Hpe., from which it differs in its larger size, longer, more spreading and clasping leaves and paler not twisted peristome.

Tortula (*Barbula*) *campylocarpa* Taylor. Unduavi, 8000 ft. October, 1885 (3127).

Compared with Spruce Musci Am. et And. nos. 185 and 201, agrees with specimens at Kew and has been verified by Bescherelle. Also compared with *T. rectifolia* Taylor, nos. 193-196, Spruce, from which it differs in its larger size and longer, more acuminate leaves.

BARBULA AUSTRO-REVOLUTA Besch. mss. Near La Paz, 10000 ft. April, 1885 (3129).

Plants in dense light yellowish-green or slightly glaucous, and dirty tufts; stems 1-2 cm. high with numerous, slender, subapical branches; leaves erect-spreading when moist, spirally twisted around the stem when dry, small, 1 mm. or less long, with strongly revolute margins and a broad, thick, yellow vein, ending in and forming the blunt apex; lower cells oblong, clear; upper smaller, denser and papillose; dioecious (?), perichetial leaves with a longer, more hyaline, clasping base. Pedicels light yellow, 5-7 mm. long; capsule 2 mm.; lid conic-beaked, cells spirally formed; peristome immature.

Closely related to no. 1622 of Mandon's Bolivian Mosses, collected in April, 1856, near Sorata, and labelled *B. glaucescens* in Herb. Schimper, but differing in the shorter, more blunt leaves, the more revolute margins, and in the yellow pedicel. Bescherelle says of it, "*B. revoluta* affinis sed foliis magis obtusa acuminatis glaucescentibus cucullatis; pedicello flavo, peristomio longe distat."

TORTULA (*Syntrichia*) sp.? Near Yungas, 4000 ft., 1885 (3124). Unduavi, 8000 feet. October, 1885 (3125 and 3127 pp).

Plants in dirty, yellowish-brown tufts; stems 1-1.5 cm. high, branching; much abraded and discolored below; leaves erect-appressed when dry, tufted on the stems, upper, green with white hair-points, the vein papillose on back, and excurrent into a rough awn, apex rounded, margins involute; upper cells densely papillose, lower, clear and hyaline. Dioecious? Seta 10-12 mm. long, red below, twisted; capsule narrowly cylindric, 1 mm. long, straight or slightly arcuate when old, with a long-exserted columella; mouth small, annulus narrow, falling in fragments when old; peristome short or broken, twisted from a short basal membrane; teeth pale, papillose.

These plants were compared with several of Mandon's Plantae Andes Bolivienis, but their alliance was not determined by me while at Kew, nor by M. Bescherelle, to whom they were subsequently submitted.

Tortula (*Syntrichia*) *Andicola* Mont. Unduavi, 8000 ft. October, 1885 (3120). Sterile plants only collected.

Large sterile specimens answering the description given in the Ann. Sci. Nat. (Series 2, 953) and compared at the Jardin des Plantes with the type collected by D'Orbigny near La Paz, in the Bolivian Andes.

Tortula (*Syntrichia*) *aculeata* Wils.? Mapiri, 5000 ft. April, 1886 (3123); Sorata, 10000 ft.

Compared at Kew with Spruce, no. 144 and Jameson's specimens from Pichincha, both cited by Mitten under the description of this species. Ours agree with Jameson's better than Spruce's no. 144, and it would seem as if the two were distinct or the species very variable. Beschereille also seems to think there is room for separation here, as he says: "*T. aculeata* Wils. affinior sed primo viso differt. Foliis integerrimis, magis papillosis, duplo longioribus, pilo valde longiore diversa, ut videtur—forsan species nova?

TORTULA (SYNTRICHIA) BIPEDICELLATA n. sp. Beschereille, M. S. Mapiri, 5000 ft. May, 1886 (3123a).

Plants in small yellowish-brown tufts; stems 1–2 cm. high; leaves not crowded, curled and twisted when dry, 3–4 mm. long, without a hyaline point, the vein stout and brown, but ending in a short mucronate point at the apex of the leaves; margins plane or rarely slightly revolute below; upper cells densely papillose, lower large, clear and oblong. Dioecious perichetial leaves not differentiated. Pedicels mostly two together, about 1 cm. long, straw-colored; capsules 3–5 mm. with a long beaked lid, straight or slightly curved; mouth small, red; peristome not developed.

Closely related to *T. glacialis* Kze. Compared at Kew with Weddell's no. 20, collected in Bolivia, province of Larecaja, June, 1847, with which it agrees in the leaf characters but differs in having the pedicels more uniformly in pairs. There is a mixture also in this species at Kew, for the specimens collected by Liebmann on Mt. Orizaba and Poeppig in Chili are very different in aspect. Beschereille says of them: "Affinis *T. glacialis* Kze., foliis tamen duplo-longioribus, ad summum planis haud undulatis; capsula geminore, peristomio non afformato."

Tortula fragilis Taylor? Sorata, 10000 ft. (3121).

Compared with specimens at Kew collected by Lindig, New

Granada, 2075, and Jameson's, from the Andes of Quito, 1847. Our plants are larger than Lindig's, the capsules longer and the pedicels single. The leaf is broadly undulate, ending in a short cusp, the marginal cells short, quadrate and papillose, the basal cells oblong and hyaline. The basal membrane of the peristome is very short, the teeth twisted once, white and granulose. Bescherelle says of this: "Folia ad basin margine recurvis, cellulis inferioribus similibus differe mihi videtur. *T. fragilis* (N. Grenada, Lindig, 2075) folia basi plana, ab cellulis marginales inferiore minores ut marginata habet: an *T. fragilis* forma peculiaris?"

Tortula Pichinchensis Taylor (*Barbula affinis* Hpe.). Ingenio del Oro, 10000 ft. (3122).

Compared at Kew with Spruce's nos. 185, 194, 197, 200-202 *Andium Quitensium*. Also verified by M. Bescherelle.

Orthotrichum pariatum Mitt. Sorata, 10000 ft., Feb., 1886 (3130).

Compared with no. 130 Spruce, And. Quit., with which it agrees.

MACROMITRIUM RUSBYANUM E. G. Britton, n. sp. Unduavi 12000 ft. October, 1885 (3188).

Plants large and showy in yellowish-brown tufts; stems 9-10 cm. long, repeatedly branching; leaves brown, broken and abraded on the lower parts of the stems, light yellow, longer and spirally twisted at the tips of the branches, 5-9 mm. long, lanceolate-linear, from a broader yellow or brown base, margins finely serrate above, vein ending in the channelled apex; lower cells elongated, porose; upper, shorter with thick protruding walls. Dioecious? Seta twisted or arcuate, 5 mm. long, stout; capsule almost globose, 2 mm. long, walls smooth and thick, brown and shining; lid conic-beaked; peristome double, outer, a thick fleshy membrane; inner, short, fragile, with bright yellow smooth teeth; calyptra, not seen; spores large, .0810-.0864 mm.

This is one of the handsomest species collected by Dr. Rusby and was dedicated to him by Dr. Müller, but referred to a new genus allied to *Leptodontium*; but after careful comparison at Kew with specimens of *Macromitrium trichophyllum* Mitt., and *M. scoparium* Mitt., I have concluded that its alliance is with these species. The absence of the calyptra is unfortunate, but in all other respects the likeness is very close, and the alliance is concurred in by William Mitten, to whom specimens were sent.

SCHLOTTHEIMIA RUSBYANA C. Müller, n. sp. Near Yungas, 4600 ft. 1883 (3191).

Plants densely matted together in dark red-brown cushions among the roots of orchids. Stems trailing, branches erect, about 1 cm. long; leaves densely crowded at the apex of the branches, erect-appressed and plicate when dry, 1–1.5 mm. long, oblong, obtuse, the vein ending in a short cuspidate apex; upper cells in regular transverse rows, the blade slightly undulate; lower elongated with thickened papillose ends. Plants sterile; alliance not determined.

Zygodon recurvifolius Sch. Sorata, Bolivia, 8000 ft. Feb., 1886 (3194.)

Compared with type in Herb. Schimper at Kew, no. 1629, G. Mandon Plantae Andium Boliviensium Exsicc. from Vicinius Sorata; also compared with no. 1627 *Z. ferrugineus* Sch., of the same Exsiccatae, Dr. Müller having determined Dr. Rusby's specimen as the last named species. It is unmistakably the former having much larger leaves which quickly become recurved when moistened. The plants also are not at all rusty. M. Bescherelle has subsequently supplied me with duplicates of Mandon's nos. 1629 and 2627 and I have recently been able to verify my previous determination.

ENTOSTHODON PAPILLOSUM E. G. Britton, n. sp. Sorata 10000 ft. Feb. 1886 (3131).

Plants scattered on hard, bare patches of earth; plants including the sporophyte 5–8 mm. high; leaves few, rosulate, long subulate, acuminate, the vein excurrent into or ending below the long slender tip, margins entire; cells very lax. Dioecious. Seta 5–8 mm. long, stout, densely papillose, erect or slightly arcuate when dry, sinuous when moist; capsule globose-pyriform, about 2 mm. long, including the stomatose neck; lid flat; peristome none; calyptra not lobed at base.

Allied to *E. Lindigii* Hpe. according to the description and key given by Mitten (Musci, Austro-Americani, p. 243), but differing in the densely papillose pedicel. This and the following species were found growing together in the same patches.

Entosthodon Lindigii Hpe.? (ex. descriptio.) Sorata 10000 ft. Feb. 1886 (3131).

Compared with specimens of *E. Mandoni* Sch. mss., no. 1645, Mandon, Bolivia, the leaves of which are less acuminate and have not a subulate tip; in both, the leaves are not bordered and

the mouth is small and surrounded by 3-4 rows of darker, denser cells. In *E. apiculatus* Sch., no. 1646 of Mandon, the lid of the capsule is beaked, not flattened as in our specimens, and the leaves are not subulate pointed.

Funaria hygrometrica (L.) Sibth. Near Yungas, 4000 ft., 1885 (3132a).

Growing mixed with *Bryum argenteum* var. *lanatum*.

Funaria calvescens Schwaegr. Near Yungas, 4000-6000 ft., 1885 (3133a); Unduavi, 8000 ft., Oct., 1885 (3133b).

FUNARIA INCURVIFOLIA C. Müller, n. sp. Near La Paz, 10000 ft., Oct., 1885 (3132).

Plants 1-2 cm., pale straw-yellow; stems often several together, 2-5 mm. high; leaves rosulate, 2-2.5 mm. long, incurved, carinate-cucullate; vein yellow, ending in the acuminate, incurved apex; margins with a narrow border of 1 row of elongated cells, entire or faintly subserrulate; cells of the basal angles large, swollen. Dioecious; seta 5-10 mm. long, pale yellow and twisted; capsule small, 1.5-2 mm., oblique-pyriform; annulus large, compound, falling with the blunt lid; teeth with projecting cross-bars; inner peristome present, of short slender segments.

Belonging to the section of *F. hygrometrica* with which it was compared; differs in being smaller with incurved, more hyaline leaves, the cells with thinner walls.

Both *F. hygrometricoides* Sch. (Mandon, no. 1648) and *F. Mandoni* Sch. (Mandon, no. 1647) have shorter, blunt leaves, with cells more lax and thicker walled, and the vein ending below the apex with the marginal cells more swollen.

PHILONOTIS ASPERRIMA C.M., n. sp. Sorata, 10000 ft. (3140).

Plants small; stems matted with brown tomentum, branches short, less than 5 mm. long, numerous; leaves of two kinds, those of the main stems with a long subulate tip, a dark excurrent vein and serrate, revolute margins, with clear, rectangular cells; branch leaves smaller, the upper part of the leaf very spinose, the vein ending in the shorter, acuminate apex, margins plane or slightly recurved, sharply serrate; lower cells quadrate, smoother and clearer than in the upper ones. Dioecious. Perichetial leaves, broad, hyaline, and clasping at base, with a long subulate apex. Pedicels short, 1 cm.; capsules globose, 1.5-2 mm., oblique, strongly ribbed; lid mamillate, appressed; peristome double, endostome shorter than the teeth, mouth bordered by 4-6 rows of darker denser cells.

Growing mixed with *Bryum argenteum* var. *lanatum* and a

sterile species of *Dicranum* in dense tufts, copiously fruiting. Compared with nos. 11, 13, 14, 17, 18, 20 and 21 of the species listed by Mitten in his *Musci Austro-Americani*. Most closely related to *P. gracilentia* Hpe., but differing in its smaller size and shorter pedicel.

PHILONOTIS PAGIONIFOLIA C. M., n. sp. Yungas, 4000–6000 ft. 1885 (3139).

Plants forming dense, matted tufts, with little fruit; stems short, branches fasciculate, about 5 mm. long, slender and curved at apex; leaves erect-spreading or secund, narrowly lanceolate, acuminate from a clasping, slightly decurrent base; margins thickened or revolute with several rows of teeth from base to apex; vein thick, excurrent into a toothed subulate apex; cells clear and square at base, all papillose on the upper surface. Dioecious; perigonium broad and clear at base, long-cuspidate at apex; perichetium concave, hyaline at base, ecostate, also with a long serrate tip; both sets of bracts much longer than the stem leaves. Pedicels 20–25 mm. long, bright glossy, orange-colored; capsule 3 mm. long, oblique, strongly ribbed when dry; lid mamillate; peristome double.

Resembling *P. gracilentia* Hpe. (Lindig, New Granada) but the leaves are more blunt. Compared with Mandon's no. 1676 from Sorata, Bolivia, named by Schimper *Philonotis Boliviana*, it differs in its slender and delicate branches, which are less fasciculate. Specimens at Kew are much confused in this troublesome group of species, but ours do not seem to agree with any of theirs. The nearest are those collected by Matthews at Casapi, Peru, in Herb. Hooker, named by Wilson and labelled "No. 2313, *Bartramia uncinata*" (*B. scabrida* Schwaegr. Supp. pl. 57), but they differ in the leaves being non-cuspidate and in the large ecostate perichetium.

BARTRAMIA (PLICATELLA) SCORPIOIDES C. Müller. n. sp. Near Yungas, 4000 ft., 1885 (3138).

Plants large, 5–6 cm. high, decumbent and matted with brown tomentum at base, yellowish-green, glossy; stems arcuate, branching by innovations 1–2 cm. long, or fasciculate; leaves secund, uncinulate, acuminate, plicate; vein narrow, ending in the carinate serrulate apex, forming a sharp point; cells all papillose, the end walls thickened; dioecious; the antheridia surrounded by broad orange-colored bracts, with serrate papillose tips; perichetial leaves broad, clasping and hyaline, smooth and entire, vein narrow, excurrent into a slender point; pedicels 10–15 mm. long, red, curved at tip; capsules all eaten off or decayed.

Resembling *B. andina* Mitt. in its second leaves, but when compared with Spruce no. 429 from Pichincha they are quite distinct, our species belonging to the section with *B. arcuata* and *B. scoparia*, but agreeing with neither. The absence of fruit prevents the determination of its closest alliance.

Bartramia tomentosa (Sw.) Mitt. Near Yungas, 4000 ft., 1885 (3136b.) Unduavi, 10000 ft. Oct. 1885 (3136a). Sorata 13000 ft. February, 1886 (3136).

Bartramia (Breutelia) Brittoniae R. & C. Bull. Soc. Bot. Belg. 31: 161. 1892. Sorata 13000 ft. February, 1886 (3137).

Large plants of a glossy golden green color; stems 6–7 cm. high densely matted with brown tomentum below; capsules few and immature.

Mixed with and resembling *B. tomentosa*, but differing in its squarrose, not secund leaves, which are longer and more sharply acuminate, and serrate.

Bartramia (Cryptopodium) Jamesoni Tayl. Near Yungas, 4000 ft. 1885 (3134).

BARTRAMIA THRAUSTA Schpr. mss. in Mandon's *Plantae And. Boliv.*, no. 1673. Vicinius Sorata, 3200–4000 m. Mapiri, 5000 ft. May, 1886 (3135) H. H. R.

Plants decumbent and matted together with brown tomentum at base; stems 3–4 cm. high; leaves very brittle, with a conspicuous, white, clasping imbricate base, those of the young branches with a slender twisted apex 3–5 mm. long; older ones all broken off, the white base smooth, the upper part opaque and papillose on the short walls of the cells; margins bordered by 1 row of long yellow cells with small appressed teeth; vein narrow, toothed on back. Dioecious. Perichetial leaves with a short base and long serrate awn. Pedicel curved, 5 mm. long, red; capsule curved, 2 mm. long, with a small orange-colored lid; mouth small; walls ribbed; peristome short, double.

Allied to *B. potosica* Mont., but differing in the longer, less crowded, more spreading leaves with a more conspicuous white clasping base. Named by Dr. Müller for Dr. Rusby but Schimper's name has priority.

BARTRAMIA (VAGINELLA) AURICOLA C. M. n. sp. Ingenio del Oro, 10000 ft., February, 1886 (3135b). Sorata, 10000 ft., February, 1886 (3135a).

Plants light green or brown when old, with numerous, erect,

simple stems, 1–2 cm. long, matted together with brown tomentum at base; leaves 2–6 mm. long, crowded, their white bases imbricated, the green upper part of the blade spreading, much broken, except on the youngest branches; margins finely and sharply serrate, bordered by one or two rows of smooth, elongated, clear cells, those of the blade densely papillose and opaque, vein narrow, keeled and spinose on back. Dioecious, perichetial leaf with a short basal blade only covering the foot and a long rough awn; pedicels short, 3–5 mm. long, pseudo-lateral, straight or curved; capsules large, 3 mm., erect or oblique, strongly ribbed when dry and brown; lid mamillate, appressed; peristome double, teeth, orange-red, trabeculate on the inner face; spores large, .027–.032 mm., rough, brown.

Differing from *B. thrausta* in its smaller size, more strict, erect habit, stouter more rigid leaves. Agrees with Lechler's no. 2680, from Chili, labelled *B. potosica* at Kew, but differs from the type of that species at Paris in the much more conspicuous white base of the leaves.

BRYUM RUSBYANUM C. Müller. n. sp. Yungas. 6000 ft. 1885 (3148a).

Plants slender, stems erect with short, strict branches, bearing small, erect, lanceolate, serrate leaves, vein disappearing below the apex; stem leaves larger, acuminate with a prominent red vein, also disappearing below the apex. Dioecious; pedicel, 3 cm. long, tawny, capsule pendent, 3–4 mm. long, with a neck half its length; lid mamillate; annulus double, inflated, dehiscent in fragments; mouth with an orange-colored border; cell-walls of exothecium much thickened, peristome double, teeth white, granulose, erose and irregular, endostome also granular with a basal membrane, segments hardly distinguishable from the teeth, neither carinate nor parted, basal rudiments of cilia two; spores large, yellow.

Seemingly a *Dicranobryum* most nearly allied to *D. fusiferum*, Mitt. with the type of which it was compared at South Kensington. Nat. Hist. Museum.

Bryum (*Webera*) *albicans* (Wahlb). Near Valparaiso, Chili, June, 1885 (3145). Antheridial plants only. Sorata, Bolivia, 10000 ft. February, 1896 (3193). Sterile.

Compared with Austin's, No. 189, Musci Appalachiani, these specimens agree perfectly in all the leaf characters, but are a little taller, 3–4 cm. in height.

Bryum candicans Taylor. Sorata, 13000 ft. February, 1886, (3144).

Bryum argenteum L. Near Yungas, 4000 ft. 1885 (3142). Mapiri, 5000 ft. May, 1886 (3142a).

B. argenteum var. *lanatum* Br. & Sch. Mapiri, 5000 ft. May, 1886 (3143).

BRYUM HUMILLIMUM C.M., n. sp. Ingenio del Oro, 10000 ft. March, 1886 (3147).

Plants small, bright glossy, yellowish-green; with julaceous branches less than 1 cm. high; stems red; leaves small, 1 mm. or less, imbricate, concave, those of the young branches obtuse and closely imbricated, the vein dividing and ending below the apex; lower cells lax and enlarged, upper rhomboidal spindle-shaped, forming small inconspicuous teeth. Dioecious. Pedicels short, 5–7 mm. long, darker below; capsules 2 mm. long, pendant; neck nearly half the length, contracted below the spore-sac; lid mamillate, orange-colored, rim red; annulus large, falling with the lid; peristome double, outer of light yellow teeth, papillose outside, trabeculate inside; endostome a shorter membrane with carinate segments, open along the keel, with rudiments of two cilia between.

Closely allied to *Bryum julaceum* Sm., but differing from European specimens at Kew in the shorter more rigid branches, with more closely imbricated leaves and shorter pedicels. Specimens collected by Mandon near Guyaboya, 28th May, 1866, named *B. julaceum*, at Kew, differ in much longer, more slender branches and pedicels 10–12 mm. long.

Bryum soboliferum Taylor. Sorata, 10000 ft. February, 1886. Ingenio del Oro, 10000 ft. (3148).

Compared at Kew with specimens collected by Jameson from Quito, nos. 151–200, and Pichincha, no. 328. Sent to Dr. Müller and with this name, and he replied “forsan species nova.”

BRYUM COLORATUM, C. Müller, n. sp. Near La Paz. October, 1885 (3141).

Plants cespitose, in loose light-green cushions; stems with several 4–5 short fasciculate innovations about 1 cm. high; leaves in rosettes at the ends of the branches, 2–6 mm. long, oblong-lanceolate carinate, serrate above the middle, margins bordered by 2–3 rows of elongated cells; vein round, ending in a short mucronate apex; cells all regularly rhomboidal. Dioecious. Perichetial shorter with a longer mucronate tip. Pedicels straight or bent, about 2 cm. high, glossy yellow; capsules nodding, 4–5 mm. long, bright yellowish-brown; neck short, plicate; lid conic-apiculate; annulus compound, falling with the lid; peristome

double perfect, teeth brown, inner membrane deep, carinate segments open along the keel with 3-4 slender, papillose, appendiculate cilia; spores brown .013-.016 mm.

Resembling *B. cernuum* Hedw. in the bright yellow color of its capsules, but a larger and coarser plant, seemingly one of the smaller *Rhodobryums*, with the leaves twisted when dry, allied to *B. andicola*.

Mielichhoferia campylocarpa H. & T. Near Yungas, 4000 ft. 1885 (3150).

Compared with no. 1694 of Mandon's Bolivian mosses, with which it agrees.

Mielichhoferia brevicaulis Hornsch. Near Yungas, 4000 ft. 1885 (3149).

Mielichhoferia n. sp.? Ingenio del Oro, 10000 ft. March, 1886 (3146).

These specimens were compared at Kew with all the species described by Mitten (Jour. Linn. Soc. 12, 320) having leaves at all similar and found to be most nearly related to *M. diplodonta*, but as the fruit is too immature to determine any peristome characters, it cannot be safely referred to any of them. A portion sent to C. Müller was named by him *Mielichhoferia modesta* n. sp.

Rhizogonium spiniforme (L.) Bruch. Yungas, 6000 ft.; Mapiri, 5000 ft. (3151).

Polytrichadelphus grossidens C. Müller, n. sp. Yungas 4000-6000 ft. 1885 (3159)*

Plants dark red, glossy; stems erect, unbranched 5-6 cm. high, leaves erect, 5 mm. long, closely imbricate with a brown clasping base; margin coarsely serrate; vein pellucid, excurrent into a smooth blunt cusp; perichaetium longer tipped, enclosing long dark protruding paraphyses; Dioecious, the male plants proliferous at apex. Pedicels stout, erect, 2-3 cm. long, bright fulvous, capsules horizontal 4-5 mm. long; lid conic, beak hooked, 2 mm. long.

Compared with *P. rubiginosus* Mitt. no. 211, J. Weir, Andes Bogotenses, pedicels shorter, leaves more sharply dentate; with *P. aristatus* Hpe., no. 2002, Lindig, New Granada, Bogota (1859), and another not numbered, collected in 1863, in the fewer but larger multicellular teeth and short cuspidate apex as well as in the longer pedicels and larger capsules of Dr. Rusby's plants.

Polytrichadelphus umbrosus Mitt. Unduavi, 10000 ft. October, 1885 (3160).

POLYTRICHADELPHUS INTEGRIFOLIUS C.M., n. sp. Unduavi, 10000 ft. October, 1885 (3159a).

Stems 5–8 cm. high, leafless below and tomentose, proliferous at apex; leaves erect, slightly spreading, vein broad, excurrent into a smooth, dark awn; margins entire, incurved; lamellae seven, rows of cells high, uppermost cells rounded in section. Dioecious. Perigonial bracts scarious, with short triangular points.

Male plants only collected, and from the robust stems and broad, scarious, perigonial bracts it strongly resembles *Polytrichum*. Compared with various species of *Polytrichadelphus* at Kew, none of which it resembles.

Pogonatum oligodus Kze. Near Yungas, 4000 ft. 1883 (3157).

Pogonatum tortile Sw. Near Yungas, 4000 ft. 1885 (3158).

Agrees with specimens so named collected by Matthews in Peru.

Polytrichium juniperinum Hedw. Sorata, 13000 ft. February, 1886 (3156).

Polytrichum cuspidigerum Sch. Teste C. Müller. Unduavi, 18000 ft. October, 1885 (3156c).

Plants 5–8 cm. high; stems naked below, densely leafy above; leaves erect-appressed, almost imbricate when dry, 5 mm. long, margins serrate with a few large, coarse, teeth; lamellae filling almost all of the blade, margins only slightly incurved. Perichetial leaves longer, erect, innermost with a scarious base and long, slender tips; pedicel 15–25 mm. long; capsules 3 mm. long with a small hypophysis; teeth lax, short, pale and regular.

No specimens bearing this name can be found in Schimper's Herbarium at Kew.

Polytrichum aristiflorum Mitt. Unduavi, 8000 ft. October 1885 (3155a).

This species has also been collected at Yungas by Pearce. There are a great many diverse localities cited for this species by Mitten, and there is as much diversity in the specimens at Kew. We referred all of Dr. Rusby's specimens from Yungas, nos. 3155b and c and no. 3155a from Sorata and 3155c from Mapiri to this species, but Dr. Müller gave it a manuscript name, which is antedated by *P. patulum* Harvey (Müll. Syn. Musc. 1: 210) from Nepal. It seems probable that there is room for the separation of several species, but as ours agree with Jameson's from the Andes

of Quito and Weddell's from Peru, we have thought it best to enumerate them under this species.

POLYTRICHUM ANGUSTICAULE C.M., n. sp. Near Yungas, 4000 ft., 1885 (3155).

Plants large, 8–10 cm. high; stems simple, 2–4 cm. high; leaves 6–8 mm. long, the clasping base oblong, brown or slightly scarious on the margins, tapering into a slightly longer apex, with incurved entire margins; vein rough on back, with two or three rows of sharp teeth, excurrent into a smooth or only slightly roughened awn; lamellae covering almost all of the blade, of 6–7 rows of cells, the last row elongated, conical and smooth. Dioecious; male plants proliferous; perichetial leaves with a long smooth point; seta 6–8 cm. long, stout, glossy, curved at apex; capsules large, 5 mm. long, cubic, with a short wrinkled apophysis; lid dark red, beak long; teeth white, 64.

Closely allied to *P. aristiflorum* Mitt., and compared with specimens sent us by Wm. Mitten, collected in Venezuela by Funk and Schlim, no. 472. Differs in the longer, scarcely roughened awn of the leaves, which are more closely appressed when dry, and in the larger capsules.

PLEUROCARPI.

All the specimens of the pleurocarpous mosses as well as the acrocarpous ones were carefully studied and separated before duplicates were sent to Dr. Müller, yet in two cases in the genus *Hookeria*, there was evidently a mixture of species growing together, which in one instance seems to have misled Dr. Müller.

HOOKEIA BAKERI E. G. Britton, n. sp. Near Yungas, 4000 ft. 1885 (3163).

Plants yellowish-green, large and coarse; stems 2–3 cm. long; branches 1 cm., leaves curled and crisped when dry, more or less undulate with long subulate tips 2 mm. long, veins prominent when dry, ending just inside the margin, which is entire below, serrulate along the tapering apex and bordered by 3 rows of narrow, elongated cells; those of the blade very large and clear, not papillose. Pedicel 20–25 mm. long, bright, glossy brown; capsules ovoid, 2 mm., brown, walls thick; lid conic-rostrate; teeth long, slender, brown and incurved in pairs, and papillose; endostome yellow, erect, carinate segments closed.

Compared with *H. marginata* to which it is related, but differs in the lighter green leaves, broader and less acuminate, the cells more lax and hyaline.

Dedicated to Mr. J. G. Baker, of the Royal Herbarium at Kew in grateful acknowledgement of the many kind favors received from him while at work, under his charge, on Dr. Rusby's Ferns and Mosses, and also as a small recognition of the task he accomplished in mounting and putting in order the Herbarium of W. P. Schimper, presented to Kew by the Baroness Burdett-Coutts.

This species was first named *H. castanea*, from the description only, and when submitted to Dr. Müller he discovered three new species in it; but as we can find but one specimen in our packet, and have no means of determining which of his names apply to our species, we have discarded all his manuscript names.

HOOKERIA PURPUREOPHYLLA C.M., n. sp. Near Yungas, 6000 ft. 1885 (3164).

Plants small, light reddish brown, .7–1.5 cm. high; stems branched, distichous, or flattened; leaves small, 1 mm. long, closely imbricate, appressed with flexuous, filiform spreading points; veins ending below the rounded part of apex, toothed at the back of the leaf above; margins serrate to below the middle, more coarsely so above; cells papillose, upper wine-color, lower colorless and longer; pedicel purple, 15 mm. long, arched at apex; capsule 2 mm. long; neck tapering; lid conic-rostrate. Peristome not yet matured, torn off with lid.

Compared with *H. (Callicostella) rufescens* Mitt. (Spruce, no. 629) from which it differs in the longer acuminate leaves; they also are more slender and not so crisped as those of *H. purpurea* and are too acute for *H. incurva*. Our plants are mixed with a small, golden yellow *Hypnum* in fruit, and a brown Hepatic, but we cannot find the two species of *Hookeria*, indicated by Dr. Müller in his letter by two other manuscript names.

Hookeria crispa C.M. Near Yungas, 4000–6000 ft. 1885 (nos. 3161 and 3161a).

Hookeria falcata Hook. Near Yungas, 4000–6000 ft. 1885 (3162).

BRAUNIA CANESCENS Sch. in G. Mandon, *Plantae Andium Bolivien-sium*, Exsicc., no. 1641. Vicinius Sorata, 1858, Mandon. Sorata, 10000 ft., February, 1886, H. H. R. (no. 3153).

Plants crowded in brown masses, stems copiously branching, less than 2 cm. high, discolored beneath, green at tips of branches; leaves closely imbricated, lower ones with short white tips, those at the ends of the branches frequently prolonged into flex-

uous white hairs, ovate and quite concave in the middle with a plane border of small square cells in straight rows, and the margins double or recurved, bluntly papillose, frequently brown in the upper half with elongated cells in the centre of the base, and others sinuous; apex serrulate or erose when long and hyaline; perichetium short, 3 mm., enclosing very long paraphyses, bracts strongly plicate, cells long and clear, apex not hyaline; pedicels 1 cm. long, capsules about 3 mm. with small orange-colored mouth and apiculate lid.

Mandon's specimens at Kew in Herb. Schimper are somewhat larger and lighter colored than Dr. Rusby's, but agree in all essential characters, especially no. 1641 of the Exsiccatae in Herb. Hooker. Sent to Dr. Müller as *H. cirrhifolia* (Wils.) Mitt. (J. L. Soc. xii., 406, ex descriptio) and named by him *Braunia argyrocarpa* n. sp., also to Bescherelle, who says, "ut videtur foliis tamen apice diaphanis quod nos indicat Mitten."

BRAUNIA SUBPLICATA E. G. Britton, n. sp. Ingenio del Oro, 10000 ft., May, 1886 (3154); Mapiri, 5000 ft. (3154a).

Plants dark brownish green, in large dense mats, stems decumbent, pinnately branched, often giving off radiculose stolons, branches erect, 4-5 cm. long; leaves subsecund when moist, imbricate and erect when dry, with three blunt ridges, not hyaline pointed, ovate-concave, over 1 mm. long, less than 1 mm. broad, with entire revolute margins and a conspicuously rolled border to the concave center, apex acute and concave, erose dentate, but not hyaline, conspicuously papillose at the tips of the branches, basal cells elongated brown, others regular and sinuous; perichetium narrowly lanceolate, erect, sulcate, 3 mm. long, with oblong yellow cells at base and middle and blunt erose tips; pedicels 1 cm. long, erect or cernuous twisted, fulvous as well as the base of the capsule, which is 2 mm. long with a straight beak over 1 mm. long, mouth with a thick red rim, calyptra brown, 3 mm. long, tufted and ragged at base with a straight beak 1 mm. long.

Differs from *H. plicata* Mitt. (Bridges, Bolivia in Herb. Hooker) in the dull brown color of the plants and in the leaves not being hyaline tipped; from *H. secunda* (Hook. Musci Exot. t. 46, Humboldt's type in Herb. Hooker) in the larger, less secund leaves with more strongly revolute margins; resembling only an unnamed scrap in Herb. Hooker, collected by Mathews in Peru at Casapi, and a part of *Braunia subsecunda* Sch. M. S., no. 5, in Herb. Schimper without locality or name of collector. (See Jaeger, p. 86) pencilled Mexico? by J. G. Baker. Sent to E. Bescherelle as *B. plicata* Mitt. he says = "? var. *foliis majoribus*!"

Hedwigidium imberbe Sm. Unduavi, 1000 ft. (3152) Sterile. Mapiri, 5000 ft. with 3154a fertile.

Compared with G. Mandon *Plantae Andeum Bolivienis* Exsicc., no., 1638 vicinius Sorata, labelled *Harrisonia rhabdocarpa* Hpe. with which it agrees. As also with Lindig's New Granada, no. 2000. Both of these are considered to be *H. imberbe* Sm. (Mitt. J. L. Soc. 12: 405). The plants mixed with 3154a are coarser and brighter green, agreeing better with Spruce Musci Am. et. And., nos. 1293-1295, of *H. imberbe*. There is considerable variation in the size and color of this species, also in the degree of ramification of the stems and the appression of the leaves, but otherwise the leaves are indistinguishable when placed side by side under the same cover-glass under the microscope. Weddell's no. 9 Peru, are small, little over 1 cm. high and almost simple like 3152 H. H. R., while Spruce no. 1295 and Rusby's 3154a are nearly 6 cm. high and quite pinnately branched.

CRYPHAEA (EUCRYPHAEA) BOLIVIANA Sch. mss. Mandon (no, 1688), vicinius Sorata, 3200 metr., 1857. H. H. Rusby. Sorata, 10000 ft. 1886 (3165).

Plants large, slender; stems bipinnate, 10-15 cm. long, branches pendant, 5-6 cm. long, branchlets few and distant, 1-1.5 cm. long; leaves spreading when dry, those of the branches 2 mm. long, those of the branchlets only about 1 mm. long, both lanceolate-acuminate, vein ending below the long subulate, serrate apex, margins entire below, slightly recurved in the middle; basal angles auricled, decurrent. Capsules two or three together at intervals along the branches, perichetial leaves with a broad, clasping base covering the capsule, vein scarcely extending below the long nearly smooth awn, exceeding the base in length. Capsules 2 mm. long; peristome double, the outer of long, spreading, broad teeth, the inner of shorter, narrower segments, composed of a double row of papillose cells, attached to a basal membrane.

Allied to *C. pilifera* Mitt., and possibly referable to that species, but recognized also by Müller as a new species, Schimper's name having priority.

Cryphaea ramosa Wilson. Unduavi, 12000 ft., October, 1885 (3166).

Prionodon luteo-virens (Taylor) Mitt. Unduavi, 10000 ft., October, 1885 (3167). Also collected at Yungas and Unduavi by Pearce.

Phyllogonium viscosum Beauv. Near Yungas, 6000 ft., 1885 (3168). Also collected by M. Bang near Yungas, 1890 (565).

METEORIUM (PAPILLARIA) CLADONIELLA C. M. n. sp. Near Yungas, 4000 ft., 1885 (3189).

Plants light yellowish-green, glossy; stems creeping horizontally, 10–12 cm. long; branches simple, 1–3 cm. long; leaves crowded, concave, plicate, appressed, with short spreading points; vein broad at base, or rarely lacking; apex suddenly subulate; margins minutely serrate; cells all papillose.

Plants sterile. Alliance not determined.

METEORIUM LONCHOTRICHUM C. M. n. sp. Near Yungas, 4000 ft. 1885 (3172).

Plants bright yellowish-green, glossy; stems long, creeping; branches irregularly pinnate, 2–3 cm. long; leaves 1–1.5 mm. long, undulate, crisped when dry, lanceolate-acuminate, serrate, vein ending below the apex, cells of the basal angles enlarged.

Plants sterile. Allied to *M. patulum* Sw.

Meteorium filiferum (C.M.) Mitt. Near Yungas, 4000 ft. 1885. (3173).

Plants dark green or black with lighter yellowish branches. Youngest shoots very slender, filiform, and totally different in aspect from the older stems; stem leaves, entire, concave, the vein ending below the short recurved cuspidate point; basal angles conspicuously inflated at the inner angle, with a small round group of yellow cells; leaves of the young branchlets much smaller, distant, narrowly lanceolate-acuminate, vein ending below the long filiform point; basal angles decurrent with the same conspicuous round auricle, at the inner point of insertion.

Named from description, and compared with No. 131 collected by Weir, Andes Bogotensis from which it differs in aspect, and the presence of the long filiform branches described in the original.

METEORIUM (PILOTRICHELLA) PERINFLATA C.M. n. sp. Near Yungas, 6000 ft. 1885 (3171).

Plants light yellowish-green, glossy; primary stems 10–15 cm. long, creeping; branches simple, 1–2 cm. long, or with a few short branchlets; leaves concave, the margins so completely incurved as to almost meet, quite entire; vein narrow, ending below the short, sharp-pointed apex; cells of the outer basal angles square, enlarged, slightly auricled and decurrent. Fruiting branches 5 mm. long, perichetial leaves far exceeding the capsules, imbri-

cate, each with a long, squarrose, acuminate apex, with a short vein or veinless. Capsule brown, thick-walled, ovoid, about 2 mm. long, on a short seta; peristome double, teeth long, slender, yellow, endostome as long, carinate segments rarely open along the keel; spores green, .021-.024 mm.

Allied to *M. crinitum* Sull., but differing in the entire leaves and the long peristome, the inner not adhering to the outer. Specimens not compared.

METEORIUM (PILOTRICHELLA) REFLECTO-MUCRONATA C. M. n. sp

Sorata, 10000 ft., February, 1886 (3170).

Plants light green, glossy; stems creeping and rooting; branches about 1 cm.; leaves imbricate, concave, with reflexed points; vein very short and indistinct; margins incurved, entire, forming a cucullate cuspidate apex; cells of basal angles enlarged, but indistinct, slightly decumbent.

Plants sterile. Alliance not determined.

Neckera Jamesoni Taylor. Sorata, 8000 ft., February, 1886 (3169); Unduavi, 8000 ft., October, 1885 (3169a).

Beautiful plants with pendant branches, often 18-20 cm. long.

Thamnum longirostre (Hook)? Near Yungas, 4000 ft., 1885 (3174a); Sorata, 10000 ft., February, 1886.

POROTRICHUM (THAMNIUM) BOLIVIANUM C. M. n. sp. Near Yungas, 4000 ft., 1885 (3174).

Plants light yellowish-green, with a creeping rhizome; stems 4-5 cm. long, naked below, about 2 cm., bipinnate; branches flattened, frond-like, red; leaves compressed, elliptical-oblong, unequal at base, about 1 mm. long; vein dividing and disappearing below the broad sharply serrate apex; margins entire below; cells of the basal angles only slightly differentiated; monoecious; antheridial buds on different branches from the archegonia; perichetial leaves longer, outer squarrose, subulate, often veinless, inner erect-clasping, with a narrow vein; seta red, flexuous, 10-15 mm. long; capsule 2 mm., ovoid-cylindric, neck short; lid 2 mm. long, with a long beak; annulus large, simple; peristome double, teeth long, slender, endostome of slender papillose carinate segments, open along the keel; cilia none.

Allied to *Porotrichum longirostrum* (Hook.) Mitt. and possibly referable to this variable species, according to Mitten. Compared at Kew with specimens collected by Spruce (And. Quit. nos. 1361-1363) from which ours differ in being much coarser, with less slender, not flagellate branches and shorter stouter pedicels,

agreeing better with Weddell's no. 53 from the Andes of Peru, but our plants are smaller with shorter leaves, turning yellower with age, and more coarsely and doubly serrate at the apex.

Entodon Jamesoni (Tayl.) Mitt. Unduavi, 8000 ft. October, 1885 (3175).

FABRONIA SINGULIDENS C.M., n. sp. Ingenio del Oro., 10000 ft. March, 1886 (3176); Mapiri, 10000 ft. (3182 pp).

Plants in dense pale, yellowish-green mats; stems with numerous short branches 3–5 mm. long; leaves crowded, spreading minute, ovate-acuminate with a long subulate point, margins spinose-dentate or rarely entire at the apex of the branches, vein ending above the middle; basal cells square at the angles. Perichetial leaves broad and serrate at apex, with a suddenly subulate point; vein short. Pedicel erect, 5 mm. long; capsule small, little over 1 mm. long, ovoid; neck distinct, tapering into the pedicel; lid conic-rostrate, small, yellow; mouth small, bordered by 4–5 rows of transversely elongated, darker, denser cells; peristome short, teeth brown when old, pale when young, united in fours or divided when old, smooth, slender at apex.

Closely related to *F. polycarpa* Hook. from which it differs in its abruptly subulate perichetial leaves and its ovate capsule.

HYPNUM (CUPRESSINA) ENTODONTICARPUM C.M., n. sp. Unduavi, 12000 ft. October, 1885 (3186).

Plants in dense, yellowish-green, glossy cushions; stems pinnately branched, arcuate, 1–2 cm. long, branches 5–8 mm. long; leaves crowded, uncinatate hooked, entire, veinless; cells of basal angles inflated, yellow. Monoecious. Perichetial leaves longer, outer uncinatate, inner erect, subulate, all veinless. Pedicels red below, twisted above, 15–20 mm. long; capsules erect, cylindric or arched; neck tapering; walls thin; mouth bordered by denser, brown cells; peristome double; teeth brown, short and thick, bordered by the adherent segments of the inner peristome.

Compared with *Drepanium hamatum* Mitt., no. 1046, Spruce Musci Am. et And.), specimens of which are preserved at Kew but are not listed by Mitten. Closely related to this species, but differs in its more clearly veined leaves and longer pedicels.

Leskea aciculata Taylor. Near Yungas, 6000 ft. 1885 (3177).

Compared with Jameson's specimens from Quito with which it agrees.

LESKEA (SCHWETSCHKEA) BOLIVIANA C.M., n. sp. Mapiri, 10000 ft., 1886 (3102). Sorata, 10000 ft., February, 1886 (3185).

Plants in dense yellowish-green mats; stems 1–3 cm. long,

creeping, with short, irregular branches 5–8 mm. long; leaves imbricate with spreading points, ovate-acuminate, less than 1 mm. long; margins entire; vein ending below the apex; cells rhomboidal above, transversely elongated below, not papillose; monoecious; perichetial leaves longer, erect, base long, clasping, vein ending below the acuminate apex; cells elongated; pedicels red, 10–15 mm. long; capsule cylindric, 2 mm.; lid conic; annulus falling in fragments, narrow, single; mouth bordered by darker, denser cells, walls thin; peristome double, teeth long, slender, papillose at apex; endostome with a short basal membrane and slender, carinate, papillose segments, thickened at the joints, or appendiculate; cilia none.

Allied to *L. gracillima* Tayl., which has also been collected in Bolivia by Bridges, but differs in the vein ending below the apex and the leaves being quite smooth. Identical with no. 3185 cited above, which was also sent to Dr. Müller and named by him *Pseudoleskea amblystegiella* n. sp., but this name is too near *P. amblystegioides* C.M. from Costa Rica, Polanowsky.

PSEUDOLESKEA ANDINA Sch., mss. Prov. Larecaja, vicinius Sorata, 3200 metr. November, 1857 (1694), legit, G. Mandon "super arbores." Sorata, 13000 ft. February, 1886 (3181). H.H.R. and Unduavi, 12000 ft. October, 1885 (3180)

Plants in dense brown cushions; stems 7–9 cm. long, irregularly pinnate; branches .5–1.5 mm. long, slender; paraphyllia small, clustered, branching; leaves small, less than 1 mm., crowded, minute; base concave appressed, apex subulate, serrulate; vein thick, channelled, excurrent; cells rhomboidal, papillose, those of the basal angles erect, rectangular and denser on each side of the basal folds. Perichetial leaves longer and more acuminate, and not papillose, outer recurved, inner sheathing, all pale and plicate with the vein ending below the apex. Pedicels straw-colored, 2 cm. long; capsules arched, 3 mm. long, slightly contracted below the mouth when dry; lid mammillate; mouth bordered by a deep flaring rim; peristome inserted below the rim, double; teeth yellow, trabeculate; endostome yellow, segments as long as the teeth, carinate, rarely divided or open along the keel, attached to a short, basal membrane, appendaged at the joints; cilia none; spores rough, .016–.021 mm. green.

No. 3181 was named for Dr. Rusby, by C. Müller, but Schimper's name has priority.

Thuidium Peruvianum Mitt. Near Yungas, 6000 ft. (3178), Unduavi, 8000–10,000 ft. October, 1885 (3179).

Compared with Jameson's specimens from Pichincha and Pearce's from the Andes, duplicates of which have been sent to us from Kew. The specimens collected by Miguel Bang (No. 482) at Yungas, and listed by Dr. Rusby (Mem. Torr. Club, 2: No. 3, p. 274) as *Thuxidium delicatulum*, were so named by Mr. C. H. Wright at Kew. Duplicates of all our specimens, including these, were submitted to Dr. George N. Best for critical comparison. He says: "They apparently belong to one and the same species. The stem leaves differ from those of *T. delicatulum* in not being closely appressed when dry; they are more concave, broader at base and more abruptly acuminate, somewhat undulate and rugose above, and the leaf-cells are more rectangular and less rhomboidal. Notwithstanding these differences, which indicate a variety rather than a distinct species, the general type remains well marked. I should refer your specimens to *T. delicatulum*." But as these specimens are much larger and coarser than any of *T. delicatulum* which we have ever seen, and they seem worthy of a distinctive name, we have maintained them as above listed.

SPHAGNACEAE.

Sphagnum Peruvianum Mitt. Near Yungas, 6000 ft., 1885 (3100).

Sphagnum acutifolium Ehrh. Near Yungas, 6000 ft., 1885 (3102), near La Paz, 10,000 ft. October, 1885 (3103).

Sphagnum Meridense C.M. Unduavi, 10,000 ft. October, 1885 (3104).

Sphagnum recurvum Hoffm. Unduavi, 8000 ft. October, 1885 (3106).

Sphagnum recurvum var. *mucronatum* Russ. Near La Paz, 12,000 ft. (3105).

HEPATICAE.

The Hepaticae of the collection were enumerated by Dr. Richard Spruce in Memoirs of the Torrey Botanical Club, 1: 113-140. 1890.



Britton, Elizabeth G. 1896. "An enumeration of the plants collected by H. H. Rusby, in Bolivia, 1885-1886. II. Musci." *Bulletin of the Torrey Botanical Club* 23(12), 471-499.

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