

LITERATURE CITED

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BOTANY.—*Additional Costa Rican mosses*.¹ By EDWIN B. BARTRAM, Bushkill, Pennsylvania. (Communicated by WILLIAM R. MAXON.)

Since the studies on Mr. Standley's Costa Rican mosses were completed,² additional collections from Costa Rica have come in, principally from Prof. Manuel Valerio, of San José, which not only supplement Mr. Standley's excellent series in many interesting and important particulars but also add a number of new species to the apparently inexhaustible moss flora of this country. There seems to be scarcely any limit to the opportunities for constructive bryological effort in Costa Rica, and the success which has attended Professor Valerio's activities can hardly fail to serve as a stimulus to any one with an inclination in this direction, who now and then has a chance to explore the more inaccessible mountain areas.

In the following enumeration there are 28 species (marked with an asterisk) which are not represented in Mr. Standley's collections. Among these the following seem to be unrecorded from Central America: *Anoetangium condensatum*, *Chorisodontium speciosum*, *Syrrhopodon Gaudichaudii*, *Pseudosymblepharis circinata*, *Orthodontium pellucens*, *Leskeodon pusillus*, *Haplohymenium triste*, *Erythrodontium squarrosum*, and *Ctenidium malacodes*. Four species, *Dicranum costaricense*, *Pseudosymblepharis Bartrami*, *Leptodontium Valerianum*, and *Stenodictyon sericeum*, are described here for the first time, and the remaining 91 of the total of 123 species listed are additional records which have a decided interest from the viewpoint of local distribution.

¹ Received December 1, 1928.

² Contr. U. S. Nat. Herb. 26: 51-114. Fig. 1-39. Oct. 31, 1928.

Specimens of all the collections have been deposited with the United States National Museum, excepting those of Mr. Lankester which are in the Herbarium of the Field Museum of Natural History, Chicago.

SPHAGNACEAE

SPHAGNUM RECURVUM Beauv.

Pejivalle, Sept. 14, 1927, *Valerio* 51.

FISSIDENTACEAE

FISSIDENS ASPLENIODES (Sw.) Hedw.

Piedra Blanca, Oct. 9, 1927, *Valerio* 87; El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 190, 196.

FISSIDENS OERSTEDIANUS C. M.

Tablazo, Jan. 18, 1928, *Valerio* 131.

DICRANACEAE

AONGSTROEMIA JAMAICENSIS C. M.

Volcán de Barba, June 26, 1926, *Valerio* 12; Sept. 5, 1926, *Valerio* 29.

*MICRODUS BARBENSIS (Ren. & Card.) Broth.

Tablazo, Oct. 30, 1927, *Valerio* 92, 94.

DICRANELLA STANDLEYI Bartr.

Volcán de Barba, July 29, 1926, *Valerio* 20.

CAMPYLOPUS INTROFLEXUS (Hedw.) Mitt.

Tablazo, July 27, 1927, *Valerio* 34, 36, 37; Volcán de Barba, *Valerio* 6; Cerros de Candelaria, Aug. 15, 1926, *Valerio* 28; El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 184.

CAMPYLOPUS SUBLEUCOGASTER (C. M.) Jaeg. & Sauerb.

Las Cóncevas, Nov. 2, 1927, *C. H. Lankester*.

CAMPYLOPUS HOFFMANNI (C. M.) Ren. & Card.

Volcán de Barba, *Valerio* 47.**Campylopus filifolius** (Hsch.) Mitt. var. **longifolius** (Bartr.), comb. nov.

The Costa Rican collections referred to *C. Harrisii* and the var. *longifolius* Bartr.³ are evidently forms of *C. filifolius*, as Mr. R. S. Williams has suggested, but they are readily distinguished from the type by the much longer comal leaves (up to 15 or 20 mm. long) and by the strongly pitted basal cells. The variation is well marked in the material available. In addition to the collections previously cited the following have since been received: La Hondura, June 5, 1926, *Valerio* 3; La Palma, April 30, 1928, *Valerio* 149.

In this variety, as well as in the type form, the leaves are clearly dimorphous. Those of the comal tufts are widely spreading with flexuose points,

³ *Loc. cit.* 64.

the blade incurved about 1.5 mm. up from the base then channelled above, costa long-excurrent, blade gradually narrowed upward and 1 or 2 cells wide for some distance below its termination, serrulate on the margin only a short way down, alar cells forming large inflated auricles extending to the costa. The stem leaves between the comose tufts are appressed and closely sheathing, abruptly narrowed from a clasping base about 1.5 mm. long to a short filiform point about 3 times as long, which is bordered by the narrow blade almost to the apex, conspicuously decurrent, alar cells inconspicuous or none.

CAMPYLOPUS PORPHYREODICTOS (C.M.) Mitt.

Tablazo, July 27, 1927, *Valerio* 36a; Tablazo, Aug. 5, 1928, *Valerio* 156.

CAMPYLOPUS FALCATULUS Bartr.

Tablazo, Jan. 18, 1928, *Valerio* 128.

PILOPOGON GRACILIS (HOOK.) Brid.

San Ignacio, Aug. 4, 1928, *Valerio* 165; Tablazo, Oct. 30, 1927, *Valerio* 98; El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 181.

METZLERELLA COSTARICENSIS (C. M.) Broth.

Volcán de Barba, *Valerio* 22.

HOLOMITRIUM TEREBELLATUM C. M.

Volcán de Barba, June 6, 1926, *Valerio* 13; El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 114.

*CHORISODONTIUM SPECIOSUM (Hook. & Wils.) Broth.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 107.

The plants in this collection are indistinguishable from authentic specimens of this species from Ecuador and Bolivia, all of which have the costa indistinct above and the upper leaf cells irregularly in two layers. *Dicranoloma setaceum* Bartr.⁴ shows the same leaf structure, but the stems are shorter and more densely foliate and the leaves are strongly falcate-secund, with flexuose points. If not a form of *C. speciosum*, it is evidently very closely related and should take the name of **Chorisodontium setaceum** (Bartr.), comb. nov.

DICRANUM FRIGIDUM C. M.

Volcán de Barba, Aug. 14, 1927, *Valerio* 119, 120.

Dicranum costaricense Bartr., sp. nov. Fig. 1, A-K.

Dioicous. Male plants (?) numerous, up to 1.5 cm. high, simple or branched, attached to tomentum or older leaves; flowers terminal; perigonal leaves from a clasping base gradually narrowed to a stout serrulate point, the costa short-excurrent; antheridia abortive or supra-mature, only a few shrunken fragments observed. Stems robust, up to 10 cm. high, densely and more or less interruptedly foliate to the base, tomentose throughout, in loose

⁴ *Loc. cit.* 70.

deep tufts, yellowish green at the tips, fulvous brown below; leaves flexuose-spreading all around or rather appressed between the comose tufts, up to 10 or 12 mm. long, ovate-lanceolate, gradually narrowed to a long grooved point, the margin and costa remotely dentate about one-fourth of the way down; costa short-excurrent, indistinct in the lower half, about one-third the width of the leaf just above the alar cells, lightly ribbed on the back, in cross-section about the middle showing a median row of 6 or 7 guide cells with stereid bands above and below, the dorsal band much wider than the ventral with the outer cells differentiated; basal leaf cells rectangular with strongly pitted lateral walls, 3 or 4 rows on the margins very narrow but hardly forming a distinct border; alar cells conspicuous, forming an inflated, reddish brown group extending to the costa, the median and upper cells obliquely rhomboidal with rather incrassate straight or scarcely pitted walls. Sporophyte unknown.

TYPE: La Palma, Costa Rica, altitude 1,500 meters, April 30, 1928, *Valerio* 148.

The robust, interruptedly foliate stems, relatively broad costa with but a few remote teeth on the back, straight-walled upper leaf cells and the conspicuous alar group filling the entire leaf base reflect a combination of characters that readily distinguish this species from *D. frigidum*.

SCHLIEPHACKEA METEPIOIDES (R. S. Williams) Broth.

La Palma, April 30, 1928, *Valerio* 12.

DICRANOLOMA BRITTONAE Bartr.

La Palma, April 30, 1928, *Valerio* 141.

The above number is identical with the type collection from Cerros de Zurquí, but like that is absolutely sterile. Several points in the description of *Dicranum Goudotii* Hampe suggested a relationship with the Costa Rican moss; but no specimen of Hampe's species could be located in the Mitten Herbarium at the New York Botanical Garden, and from the absence of any notes it seemed evident that Mitten's description had been copied from the original source without any critical study of the type collection. Mr. H. N. Dixon has very kindly compared the two plants and reports as follows: "Compared with *Dicranoloma Brittonae* Bartr., *D. Goudotii* is shorter, with considerably denser foliation, leaves less crisped when dry; base narrower and also subula, which is much finer. Nerve $1\frac{1}{2}$ times as wide at base and ill defined. Upper cells smaller and less incrassate, as also are the alar cells. Subula not fragile, scarcely undulate when dry." In the absence of any further particulars it would seem that *D. Brittonae* is specifically distinct, but whether it properly belongs in *Dicranoloma*, *Dicranum*, or *Schliephackea* is still an open question. The leaves are very similar to those of *Schliephackea meterioides* in outline and areolation, but the margin is only obscurely denticulate above and the longer point is strongly spirally twisted when dry.

LEUCOLOMA SERRULATUM Brid.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 112.

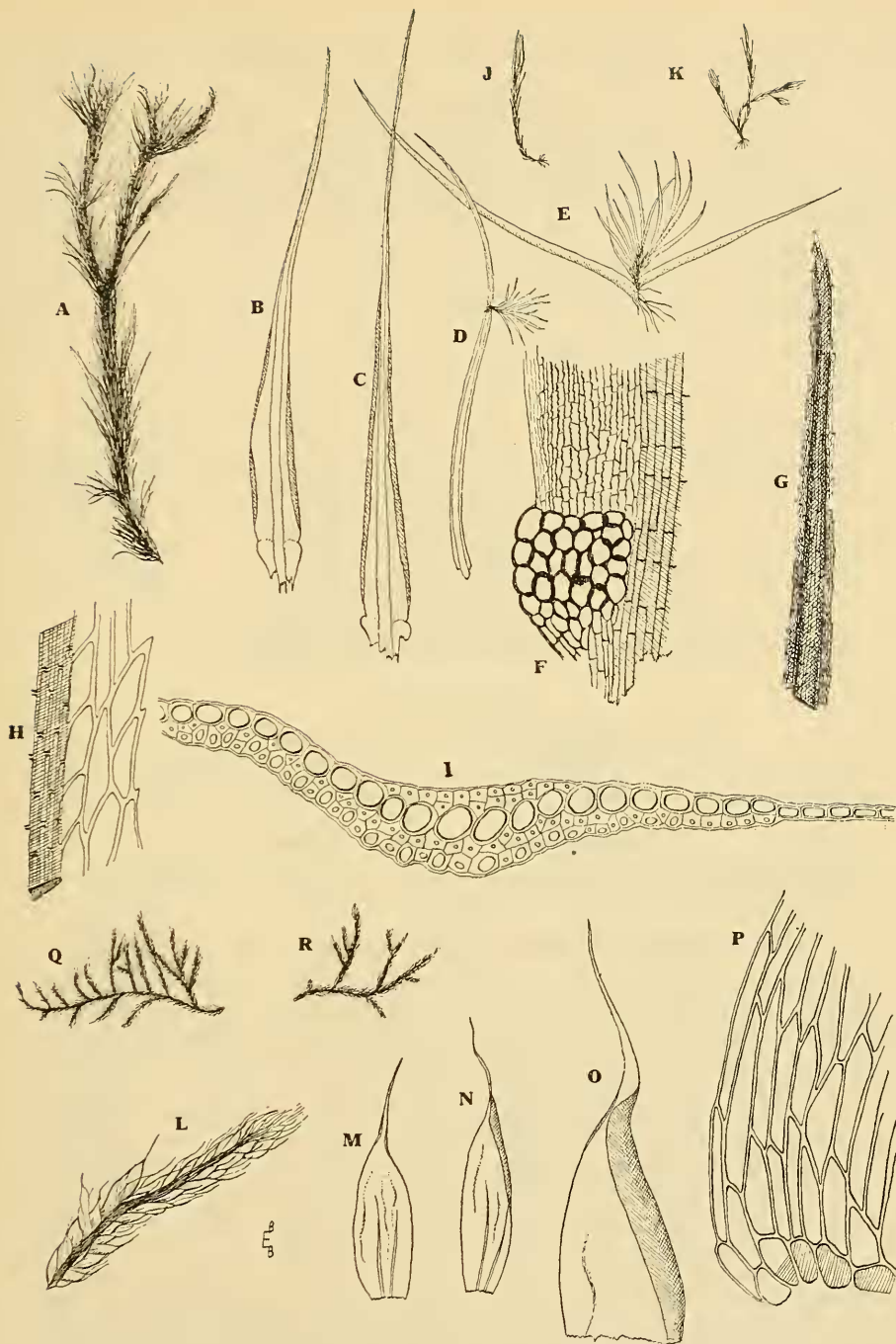


Fig. 1. A-K. *Dicranum costaricense* Bartr., sp. nov.—A, plant $\times \frac{2}{3}$; B, C, leaves $\times 8$; D, E, leaves with young male plants attached $\times 8$; F, one side of leaf base $\times 56$; G, leaf apex $\times 56$; H, part of upper leaf blade $\times 300$; I, cross-section of costa about mid-leaf $\times 300$; J, K, mature male plants $\times 1\frac{1}{2}$.

L-R. *Stenodictyon sericeum* Bartr., sp. nov.—L, tip of branch $\times 8$; M, N, leaves $\times 23$; O, leaf apex $\times 56$; P, basal angle of leaf $\times 300$; Q, R, plants $\times 1\frac{1}{2}$.

LEUCOBRYACEAE

OCTOBLEPHARUM ALBIDUM (L.) Hedw.

Pejivalle, Sept. 4, 1927, *Valerio* 47; San José, Jan. 20, 1928, *Valerio* 135; San Ignacio, Aug. 4, 1928, *Valerio* 158; Parismina, July 26, 1928, *Valerio* 168.

OCTOBLEPHARUM MITTENII Jaeg.

Pejivalle, Sept. 4, 1927, *Valerio* 46.

CALYMPERACEAE

*SYRRHOPODON GAUDICHAUDII Mont.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 111.

This species has been known from the West Indies and northern South America, but the above collection seems to be the first from Central America.

SYRRHOPODON INCOMPLETUS Schwaegr.

Pozo Azul de Pirris, *C. H. Lankester*.

SYRRHOPODON LYCOPODIOIDES (Sw.) C. M.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 198.

POTTIACEAE

ANOECTANGIUM EUCHLORON (Schwaegr.) Mitt.

Cervantes, June 30, 1928, *Valerio* 161; Cebadilla, Nov. 15, 1927, *Valerio* 101; Piedra Blanca, Province of San José, Oct. 21, 1928, *Valerio* 175.

*ANOECTANGIUM CONDENSATUM Schimp.

Piedra Blanca, Province of San José, Oct. 21, 1928, *Valerio* 176.
Previously known only from Mexico.

Pseudosymblepharis Bartrami Thér. in litt., sp. nov. Fig. 2, J-Q.

Dioicous. Antheridial flowers not seen. Plants in deep dense tufts, yellowish green above, brown below; stems about 2.5 cm. high, simple or sparingly branched, closely matted together in the lower half with reddish tomentum; leaves erect with crispate points when dry, erect-spreading with incurved points when moist, very fragile and mostly broken off about half way down, up to 5.5 or 6 mm. long, carinate, gradually narrowed to a linear-lanceolate point from an erect, ovate, lightly clasping base; costa relatively slender, 60-70 μ wide toward the base, tapering upward and short-excurrent, papillose on the ventral surface, nearly smooth on the back, in cross-section about mid-leaf showing a median row of 4 large guide cells with stereid bands on both sides and two large cells on the ventral surface; lower basal cells linear to rectangular, irregular, hyaline and smooth, gradually becoming narrower upward with thick pellucid walls, strongly pitted toward the costa, nearly straight toward the margins, gradually becoming shorter and papillose toward the top of the leaf base, several rows of elongated hyaline cells extending upward on the margins but not forming a distinct border; upper leaf cells rounded-quadrate or transversely oval, obscure, rather incrassate, densely papillose on both sides. Sporophyte unknown.

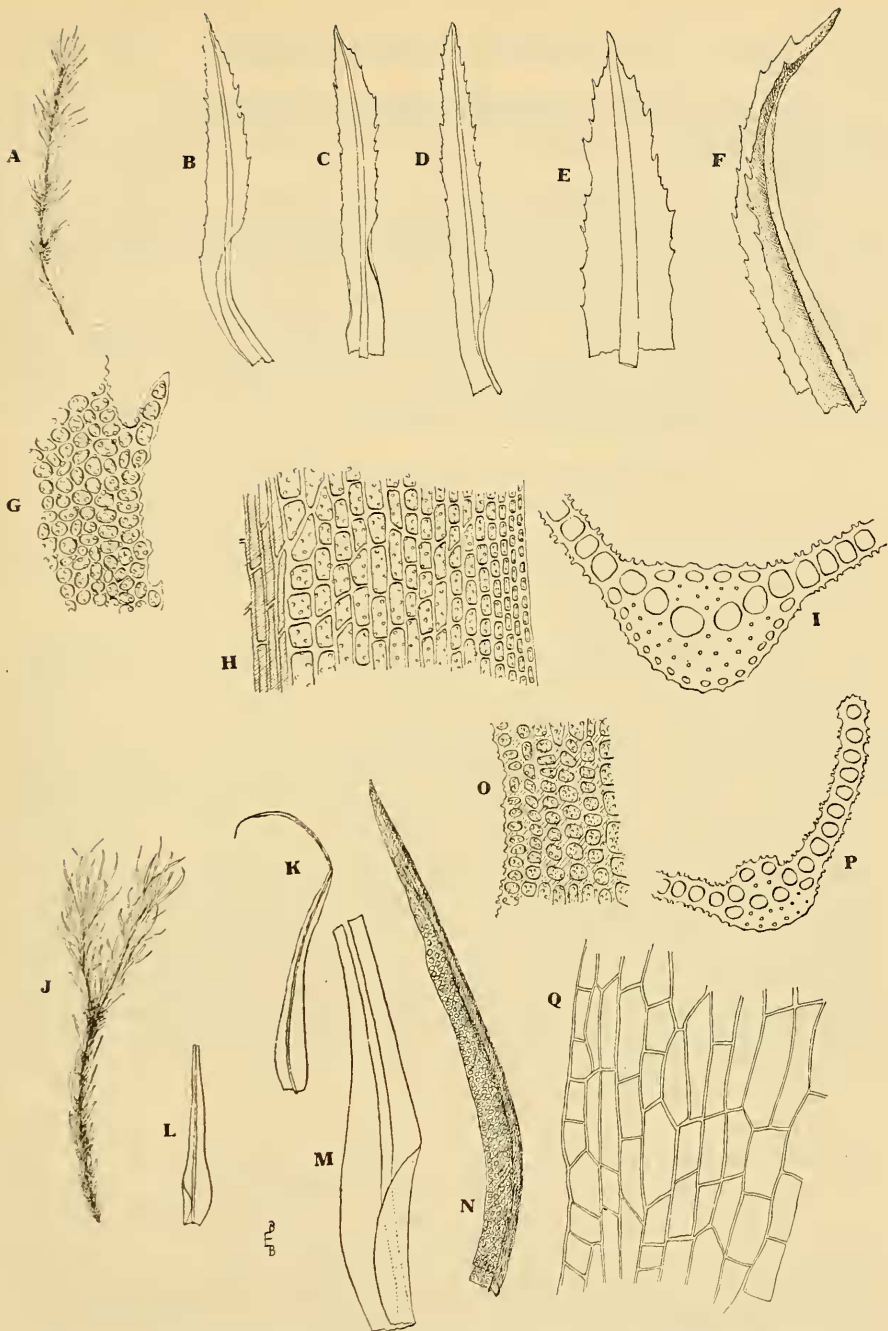


Fig. 2. A-I. *Leptodontium Valerianum* Bartr., sp. nov.—A, moist plant $\times \frac{2}{3}$; B, C, D, leaves $\times 23$; E, F, apices of leaves $\times 56$; G, upper leaf cells and margin $\times 320$; H, one side of leaf base and part of costa $\times 320$; I, cross-section of costa about mid-leaf $\times 320$.

J-Q. *Pseudosymblepharis Bartrami* Thér., sp. nov.—J, moist plant $\times \frac{2}{3}$; K, leaf $\times 8$; L, broken leaf $\times 8$; M, lower part of leaf $\times 23$; N, apex of leaf $\times 106$; O, upper leaf cells and margin $\times 320$; P, part of cross-section of leaf about half-way down $\times 320$; Q, basal cells and margin $\times 320$.

TYPE: On log, Cerros de Zurquí, northeast of San Isidro, Province of Heredia, Costa Rica, altitude 2,000–2,400 meters, March 3, 1926, *Paul C. Standley* 50701.

According to M. Thériot this plant is distinguished from *S. circinata* (Schimp.) Broth., to which it was referred in the list of Mr. Standley's Costa Rican mosses,⁵ by the more erect leaves, especially when moist, the less conspicuously sheathing leaf base, which is very gradually narrowed upward, and the more slender nerve. These differences, stressed by M. Thériot, have been verified by a further study of the material and may be supplemented by the brittle quality of the leaf points, which is so marked that in most of the plants only a few entire leaves can be found.

*PSEUDOSYMBLEPHARIS CIRCINATA (Schimp.) Broth.

Piedra Blanca, Province of San José, Oct. 21, 1928, *Valerio* 176a.

In contrast with the preceding collection these plants, segregated from the tufts of *Anoetangium condensatum*, no. 176, are identical with specimens from Mexico and Jamaica.

Leptodontium Valerianum Bartr., sp. nov. Fig. 2, A–I.

Dioicous? Antheridial flowers unknown. Plants slender, in compact tufts, yellowish green above, pale brown below. Stems about 2.5 cm. long, erect or ascendent, branched from near the base, sparingly radiculose below and rather densely matted with reddish tomentum in the lower third; leaves about 2 mm. long, incurved-cripsate when dry, flexuose-spreading when moist, linear-lanceolate, carinate; margin flat, crenulate with projecting papillae, denticulate below, coarsely and irregularly serrate in the upper half; costa about 60 μ wide just above the base, tapering upward and percurrent or ending just below the apex, in cross-section near the middle showing a median row of about 6 large cells with stereid bands above and below, the outer layer of cells on both sides clearly differentiated: upper leaf cells rounded, 7–8 μ in diameter, thin-walled, papillose and rather obscure, toward the base oblong, about 20 μ long by 5 μ wide, with more incrassate, pellucid walls, shorter and subquadrate toward the margins. Sporophyte unknown.

TYPE: Piedra Blanca, Province of San José, Costa Rica, altitude 2,400 meters, Oct. 9, 1927, *Valerio* 86.

The narrow, plane-margined leaves, coarsely serrate in the upper half, readily distinguish this plant from *L. filescens* (Hampe) Mitt. In gross appearance it suggests *Hymenostylium curvirostre*, but under a microscope or even with a hand lens the strongly serrate leaf margin is, of course, very distinctive. In the absence of fruiting plants the element of uncertainty with regard to the generic position of the species is ever-present, but its affinities are certainly more clearly with *Leptodontium* than with any of the allied genera. Professor Valerio has shown a welcome interest in the mosses of Costa Rica and it is a privilege to be able to associate his name with this unique plant.

⁵ *Loc. cit.* 74.

LEPTODONTIUM SUBGRACILE Ren. & Card.

Volcán de Barba, July, 1926, *Valerio* 27; Volcán de Barba Aug. 14, 1927, *Valerio* 117.

LEPTODONTIUM ULOCALYX (C. M.) Mitt.

Volcán de Barba, June 26, 1926, *Valerio* 21.

HYOPHILA TORTULA (Schwaegr.) Hampe.

Cebadilla, Nov. 15, 1927, *Valerio* 21.

*DIDYMODON CAMPYLOCARPUS (C. M.) Broth.

Piedra Blanca, Province of San José, Oct. 9, 1927, *Valerio* 90.

*BARBULA COSTARICENSIS Ren. & Card.

Piedra Blanca, Province of San José, Oct. 9, 1927, *Valerio* 90a.

FUNARIACEAE

FUNARIA CALVESCENS Schwaegr.

Escazú, *Valerio* 42, 43; San José, July 31, 1927, *Valerio* 45; Pejivalle Sept. 4, 1927, *Valerio* 50; Guarco, Province of Cartago, *Rubén Torres Rojas* 259.

SPLACHNACEAE

*TAYLORIA MORITZIANA C. M.

La Palma, April 30, 1928, *Valerio* 142.

BRYACEAE

*ORTHODONTIUM PELLUCENS (Hook.) Bry. Eur.

La Palma, April 30, 1928, *Valerio* 137, 138; El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 197.

The distribution of this genus is typically austral and Prof. Valerio's collections add a new and interesting element to the Costa Rican moss flora.

The species has been collected previously in Colombia and Ecuador.

WEBERA PAPILLOSA (C. M.) Broth.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 187.

BRACHYMENIUM SPATHULIFOLIUM Ren. & Card.

Tablazo, July 27, 1927, *Valerio* 39.

BRACHYMENIUM SYSTILIUM (C. M.) Jaeg.

Volcán de Barba, July 27, 1926, *Valerio* 21; Piedra Blanca, Province of San José, Oct. 21, 1928, *Valerio* 180.

*BRACHYMENIUM BARBAE-MONTIS Ren. & Card.

Cebadilla, Nov. 15, 1927, *Valerio* 100.

ACIDODONTIUM MEGALOCARPUM (Hook.) Ren. & Card.

Volcán de Irazú, May, 1928, *C. H. Lankester*.

*BRYUM CORONATUM Schwaegr.

Pozo Azul de Pirris, *C. H. Lankester*.

BRYUM ARGENTEUM L.

San José, Oct. 30, 1927, *Valerio* 99.

BRYUM ROSULICOMA Ren. & Card.

Volcán de Barba, Sept. 5, 1926, *Valerio* 32; Piedra Blanca, Province of San José, Oct. 21, 1928, *Valerio* 171.

RHIZOGONIACEAE

RHIZOGONIUM LINDIGII Hampe.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 110.

RHIZOGONIUM SPINIFORME (L.) Bruch.

La Palma, April 30, 1928, *Valerio* 143.

AULOCOMNIACEAE

LEPTOTHECA COSTARICENSIS Thér.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 183.

BARTRAMIACEAE

*BREUTELIA JAMAICENSIS (Mitt.) Broth.

Piedra Blanca, Oct. 9, 1927, *Valerio* 88.

BREUTELIA TOMENTOSA (Sw.) Schimp.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 115; Piedra Blanca, Oct. 21, 1928, *Valerio* 172.

ORTHOTRICHACEAE

MACROMITRIUM APICULATUM (Hook.) Brid.

Orrabal, Province of Cartago, July 15, 1927, *Rubén Torres Rojas* 250; Guarco, Province of Cartago, Sept. 15, 1927, *Rubén Torres Rojas* 253.

MACROMITRIUM CIRRHOSUM (Hedw.) Brid.

Cartago, Aug. 20, 1927, *Rubén Torres Rojas* 258; Tablazo, Oct. 30, 1927, *Valerio* 97; Tablazo, Jan. 18, 1928, *Valerio* 127; Reventazón, *C. H. Lankester*.

MACROMITRIUM TONDUZII Ren. & Card.

Volcán de Barba, July 9, 1926, *Valerio* 25.

MACROMITRIUM SUBCIRRHOSUM C. M.

Volcán de Barba, July, 1926, *Valerio* 33; El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 106.

MACROMITRIUM PALMENSE R. S. Williams

Volcán de Barba, June 26, 1926, *Valerio* 2.

MACROMITRIUM LONGIFOLIUM (Hook.) Brid.

La Hondura, June 5, 1926, *Valerio* 15.

MICROMITRIUM LAMPROCARPUM (C. M.) Par.

San Ignacio, April 3, 1928, *Valerio* 150; San Marcos, June 17, 1927, *Valerio* 44; Cervantes, June 30, 1928, *Valerio* 160.

HELICOPHYLLACEAE

*HELICOPHYLLUM TORQUATUM (Hook.) Brid.

Cebadilla, Nov. 15, 1927, *Valerio* 103.

RHACOPILACEAE

RHACOPILUM TOMENTOSUM (Sw.) Brid.

San José, Oct. 12, 1927, *Valerio* 83a.

PRIONODONTACEAE

PRIONODON LUTEOVIRENS (Tayl.) Mitt.

Volcán de Barba, July 14, 1927, *Valerio* 54, 66.

PRIONODON FUSCOLUTESCENS Hampe.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 108; Volcán de Barba, July 29, 1926, *Valerio* 26.

PRIONODON DENSUS (Sw.) C. M.

La Palma, June 5, 1926, *Valerio* 16; Cerro de Gallito, June, 1926, *Valerio* 7; Volcán de Barba, July, 1926, *Valerio* 50; El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 109, 124.

PRIONODON DENSUS (Sw.) C. M. var. MEXICANUS (Thér.) Bartr.

La Carpintera, June, 1926, *Valerio* 1; Volcán de Barba, May 9, 1926, *Valerio* 51.

PTEROBRYACEAE

PTEROBRYOPSIS MEXICANA (Schimp.) Fleisch.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 105.

PTEROBRYUM DENSUM (Schwaegr.) Hsch.

La Palma, *Valerio* 26; El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 118.

METEORIACEAE

*SQUAMIDIUM LEUCOTRICHUM (Tayl.) Broth.

Volcán de Barba, July 9, 1926, *Valerio* 25; Tablazo, July 27, 1927, *Valerio* 55.

The above numbers are identical with *Türckheim* 7141 from Guatemala, and also with a collection from Guadeloupe by Père Duss under the name of *Pilotrichella longipila* Schimp. There is apparently nothing to separate the latter plant from *S. leucotrichum* and it would seem, therefore, that Schimper's name should be reduced to synonymy.

PILOTRICHELLA RIGIDA (C. M.) Besch.

Pejivalle, Sept. 4, 1927, *Valerio* 77.

PILOTRICHELLA PULCHELLA Schimp.

La Carpintera, *Valerio* 5; San Ignacio, Aug. 4, 1928, *Valerio* 163; El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 122.

PILOTRICHELLA FLEXILIS (Sw.) Jaeg.

Volcán de Barba, June, 1926, *Valerio* 6; Piedra Blanca, Oct. 9, 1927, *Valerio* 89; Tablazo, Jan. 18, 1928, *Valerio* 129, 132; Cervantes, June 30, 1928, *Valerio* 162; Volcán de Barba, July 14, 1927, *Valerio* 69.

PAPILLARIA NIGRESCENS (Sw.) Jaeg.

Parismina, July 26, 1928, *Valerio* 166.

PAPILLARIA DEPPEI (Hsch.) Jaeg.

San Ignacio, April 3, 1928, *Valerio* 152.

PAPILLARIA IMPONDEROSA (Tayl.) Broth.

Volcán de Barba, July 29, 1926, *Valerio* 33.

A careful comparison of the series of Costa Rican collections with the type material of *P. imponderosa* (Tayl.) Broth., from Ecuador, fails to reveal any tangible or constant distinctions in leaf characters, and there is no doubt in my mind that *P. oerstediana* (C. M.) Jaeg. should, as suggested by Mr. R. S. Williams,⁶ be reduced to a synonym of this species.

METEORIOPSIS PATULA (Sw.) Broth.

Pejivalle, Sept. 4, 1927, *Valerio* 75.

PHYLLOGONIACEAE

PHYLLOGONIUM FULGENS (Sw.) Brid. var. GRACILE Ren. & Card.

La Palma, *Valerio* 11; San Ignacio, April 3, 1928, *Valerio* 151.

PHYLLOGONIUM VISCOSUM (Beauv.) Mitt.

Volcán de Barba, July, 1926, *Valerio* 53; La Palma, June, 1926, *Valerio* 4.

NECKERACEAE

CALYPTOTHECIUM TURGESCENTS Broth. & Thér.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 121; Piedra Blanca, Oct. 9, 1927, *Valerio* 85.

⁶ Bull. N. Y. Bot. Gard. 6: 240. 1909.

POROTRICHUM LONGIROSTRE (Hook.) Mitt.

Volcán de Barba, July 14, 1927, *Valerio* 61.

LEMBOPHYLLACEAE

*POROTRICHODENDRON SUBSTOLONACEUM (Besch.) Broth.

Volcán de Barba, July 14, 1927, *Valerio* 64.

HOOKERIAACEAE

*LESKEODON PUSILLUS (Mitt.) Broth.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 185, 195.

This genus is well represented in the Antilles and a single species has been described from Mexico, but the present collections seem to establish the first record for Central America.

CYCLODICTYON RUBRISSETUM (Mitt.) Broth.

Volcán de Barba, Sept. 5, 1926, *Valerio* 52.

HOOKERIOPSIS SUBFALCATA (Hampe) Jaeg.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 189.

HOOKERIOPSIS FALCATA (Hook.) Jaeg.

El Gallito, Province of Heredia, Dec. 20, 1927, *Valerio* 116.

HOOKERIOPSIS CRISPA (C. M.) Jaeg.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 200.

Stenodictyon sericeum Bartr., sp. nov. Fig. 1, L-R.

Dioicous? No antheridial flowers found. Plants in thin, silky, lustrous mats, yellowish green; stems creeping, up to 2.5 cm. long, irregularly branched, showing dark red through the delicate leaves when moist, sparingly radiculose in the older parts, about 1 mm. wide with the rather flattened leaves; leaves erect-spreading, oblong-lanceolate, up to 1.6 mm. long, concave, lightly plicate, rather gradually narrowed to an almost capillary, entire or remotely denticulate, flexuose hair point; margin plane below, usually strongly inflexed at the base of the acumen, entire below the point; costae double, faint, ending a little above the middle, smooth on back; leaf cells elongate, prosenchymatous, smooth, somewhat more lax toward the base, usually a single row of short irregular brownish cells at the insertion. Sporophyte unknown.

TYPE: La Palma, Costa Rica, altitude 1,500 meters, April 30, 1928, *Valerio* 146.

This species is clearly distinguished from *S. nitidum* (Mitt.) Jaeg., of Ecuador, by the more slender stems and the long hair points of the leaves. The latter character and the essentially entire leaves serve to distinguish it equally clearly from *S. saxicola* R. S. Williams, of Bolivia.

HARPOPHYLLUM AUREUM (Beauv.) Spruce

La Palma, June, 1926, *Valerio* 20; La Palma, April 30, 1928, *Valerio* 140.

HYPNELLA PILIFERA (Hook. & Wils.) Jaeg.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 199.

HYPOPTERYGIACEAE

HYPOPTERYGIUM TAMARISCI (Sw.) Brid.

Tablazo, Jan. 18, 1928, *Valerio* 130; El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 188.

FABRONIACEAE

*FABRONIA POLYCARPA Hook.

San José, Oct. 12, 1927, *Valerio* 82.

THUIDIACEAE

RAUIA SUBCATENULATA (Schimp.) Broth.

Piedra Blanca, Oct. 21, 1928, *Valerio* 170.

*HAPLOHYMENIUM TRISTE (Ces.) Kindb.

Piedra Blanca, Province of San José, Oct. 21, 1928, *Valerio* 178.

Although this species has a rather cosmopolitan distribution it was surprising to find it among Professor Valerio's collections, since it had not been known previously from regions south of the eastern United States.

THUIDIUM MIRADORICUM Jaeg.

La Palma, June, 1926, *Valerio* 14.

THUIDIUM DELICATULUM (Dill., L.) Mitt.

San Marcos, June 17, 1927, *Valerio* 72; El Gallito, Province of Heredia, Oct. 21, 1928, *Valerio* 192.

THUIDIUM ANTILLARUM Besch.

Volcán de Barba, July 9, 1926, *Valerio* 24.

AMBLYSTEGIACEAE

PLATYHYPNIDIUM AQUATICUM (Hampe) Fleisch.

San José, Jan. 20, 1928, *Valerio* 134.

BRACHYTHECIACEAE

BRACHYTHECIUM COSTARICENSE Ren. & Card.

Tablazo, Jan. 18, 1928, *Valerio* 126; Cerros de Candelaria, Aug. 15, 1926, *Valerio* 41, 46.

PLEUROPUS BONPLANDII (Hook.) Broth.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 186.

ENTODONTACEAE

*ERYTHRODONTIUM SQUARROSUM (C. M.) Par.

Piedra Blanca, Province of San José, Oct. 21, 1928, *Valerio* 174.

The short, cochleariform leaves, nearly as broad as long, and the squarrose recurved points of the outer perichaetial leaves refer this collection to *E. squarrosus*, of South America, rather than to *E. teres*, of Mexico.

ERYTHRODONTIUM LONGISETUM (Hook.) Par.

Cerros de Candelaria, Aug. 15, 1926, *Valerio* 46a; Volcán de Barba, June 26, 1926, *Valerio* 22; San José, July 31, 1927, *Valerio* 52; San José, Oct. 12, 1927, *Valerio* 83; Cartago, Aug. 20, 1927, *Rubén Torres Rojas* 260, 261.

*ERYTHRODONTIUM SUBDENSUM Broth. & Thér.

Piedra Blanca, Province of San José, *Valerio* 177.

*ENTODON ERYTHROPUS Mitt.

"La Justa," San Vincent, *Valerio* 13; Piedra Blanca, Oct. 9, 1927, *Valerio* 84; San Ignacio, Aug. 4, 1928, *Valerio* 164; Cerros de Candelaria, Aug. 15, 1926, *Valerio* 41a.

*ENTODON PALLESCENS (C. M.) Mitt.

Piedra Blanca, Oct. 9, 1927, *Valerio* 84a.

SEMATOPHYLLACEAE

RHAPHIDORRHYNCHIUM LINDIGII (Hampe) Broth.

El Gallito, Province of Heredia, Oct. 28, 1928, *Valerio* 182.

So far as I can see, this species is indistinguishable from *R. obliquerostratum* (Mitt.) Broth., in which case Hampe's name, being the older, has priority.

SEMATOPHYLLUM CAESPITOSUM (Sw.) Mitt.

Cerros de Candelaria, Aug. 15, 1926, *Valerio* 27.

*SEMATOPHYLLUM LOXENSE (Hook.) Mitt.

Reventazón, *C. H. Lankester*; Pozo Azul de Pirris, *C. H. Lankester*; Piedra Blanca, Oct. 21, 1928, *Valerio* 173; Tablazo, Jan. 18, 1928, *Valerio* 133; Tablazo, Oct. 30, 1927, *Valerio* 93.

*SEMATOPHYLLUM GALIPENSE (C. M.) Mitt.

Tablazo, Oct. 30, 1927, *Valerio* 96; Cervantes, June 30, 1928, *Valerio* 169.

After carefully comparing the Costa Rican collections referred to this and the two preceding species I am inclined to think that no specific lines can be drawn with any degree of satisfaction. The extremes, with the broadly ovate, short-pointed leaves of *S. caespitosum* at one end, and the oblong-ovate, more or less long-acuminate leaves of *S. galipense*, with longer areolation, at the other end, are surely well enough marked; but the intermediate forms, often on the same plant, seem to preclude any practical distinctions.

Brotherus has, by implication, suggested a similar thought by ignoring *S. loxense*, *S. galipense*, and several other closely related types in the second edition of *Die Pflanzenfamilien*, and there is little doubt that a critical revision of this group, with a large series of collections for comparison, will be necessary before the real relationship and value of the various forms can be cleared up.

*SEMATOPHYLLUM COCHLEATUM (Broth.) Broth.

Pejivalle, Sept. 4, 1927, *Valerio* 49.

ACROPORIUM PUNGENS (Sw.) Broth.

Reventazón, *C. H. Lankester*; La Palma, April 30, 1928, *Valerio* 139.

TAXITHELIUM PLANUM (Brid.) Mitt.

Pozo Azul de Pirris, *C. H. Lankester*.

HYPNACEAE

HYPNUM POLYPTERUM Mitt.

Volcán de Barba, July 29, 1926, *Valerio* 31, 32, 36; Cervantes, June 30, 1928, *Valerio* 159.

*CTENIDIUM MALACODES C. M.

La Palma, April 30, 1928, *Valerio* 144.

ISOPTERYGIUM CYLINDRICARPUM Card.

Cerros de Candelaria, Aug. 15, 1926, *Valerio* 43.

MICROTHAMNIUM THELISTEGUM (C. M.) Mitt.

El Gallito, Dec. 20, 1927, *Valerio* 123.

MICROTHAMNIUM REPTANS (Sw.) Mitt.

Tablazo, Oct. 30, 1927, *Valerio* 95; El Gallito, Dec. 20, 1927, *Valerio* 123.

MICROTHAMNIUM LEHMANNII Besch.

San Ignacio, April 3, 1928, *Valerio* 153; La Palma, April 30, 1928, *Valerio* 136.

MICROTHAMNIUM MINUSCULIFOLIUM C. M.

La Palma, April 30, 1928, *Valerio* 147.

MICROTHAMNIUM LANGSDORFII (Hook.) Mitt.

Cerros de Candelaria, Aug. 15, 1926, *Valerio* 42.

POLYTRICHACEAE

CATHARINAEA HIRTELLA Ren. & Card.

El Gallito, Oct. 28, 1928, *Valerio* 193.

CATHARINAEA UNDULATIFORMIS (Ren. & Card.) Broth.

Tablazo, July 27, 1927, *Valerio* 35.

**POGONATUM BARBANUM* Ren. & Card.

Tablazo, July 27, 1927, *Valerio* 38; Tablazo, Oct. 30, 1927, *Valerio* 104.

POGONATUM ROBUSTUM Mitt.

Volcán de Barba, June 22, 1926, *Valerio* 10, 14.

**POGONATUM TORTILE* (Sw.) Beauv.

La Palma, July 24, 1926, *Valerio* 24.

POLYTRICHUM ANTILLARUM Rich.

Cerros de Candelaria, Aug. 15, 1926, *Valerio* 31; La Hondura, June 5, 1926, *Valerio* 5.