

SMITHSONIAN MISCELLANEOUS COLLECTIONS
VOLUME 81, NUMBER 1

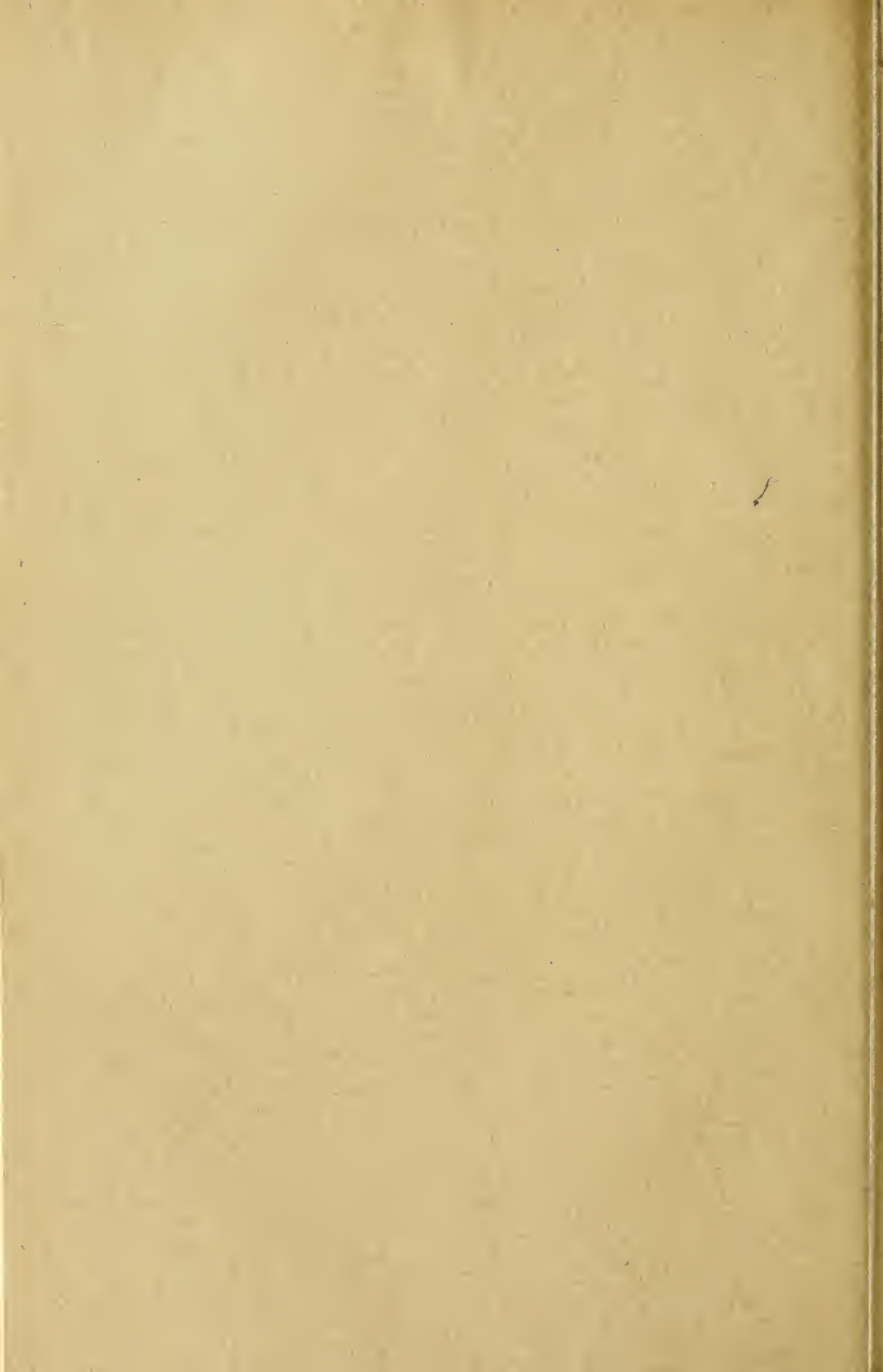
MEXICAN MOSSES COLLECTED BY
BROTHER ARSÈNE BROUARD—II

BY
I. THÉRIOT
Fontaine la Mallet, France



(PUBLICATION 2966)

CITY OF WASHINGTON
PUBLISHED BY THE SMITHSONIAN INSTITUTION
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MEXICAN MOSSES COLLECTED BY BROTHER
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By I. THÉRIOT

FONTAINE LA MALLET, FRANCE

In the present paper I continue my report upon the important moss collections made by Brother G. Arsène, which the United States National Museum submitted to me for study. The species here considered belong chiefly to the families Grimmiaceae, Funariaceae, Bryaceae, Orthotrichaceae, Meteoriaceae, Neckeraceae, Leskeaceae, and Thuidiaceae. In a third paper, in preparation, I shall review the Pottiaceae, Amblystegiaceae, Brachytheciaceae, and Hypnaceae.

Through the good offices of Brother Arsène, I have entered into correspondence with a new and zealous collector of Mexican mosses, Brother Amable (F. S. C.), a teacher in Mexico City. Last year I received from him an important collection from the "Valley of Mexico," a classic locality often cited in the *Prodromus* of Bescherelle. The plants were gathered in localities whose altitudes vary from 2,100 to 3,400 meters. Brother Amable's mosses will be included in the present paper and in the following one. To distinguish them from those of Brother Arsène's collection they are accompanied by Brother Amable's name.

About two years have elapsed since the completion of the first paper, and meantime Mr. V. F. Brotherus has published the second edition of his *Genera*. Important modifications have taken place in the families and the genera, and in the known distribution of the species. The reader is advised that the present work follows the plan of the second edition, while the preceding paper was written in conformity with the first edition.

¹ Part I was published as Vol. 78, No. 2, Smithsonian Miscellaneous Collections, June 15, 1926, and to this the reader is referred for a list of special collecting localities with altitudes. The comments and critical notes of the present instalment have been translated from the French by Brother Arsène.

DITRICHACEAE (continuation)

CERATODON PURPUREUS (L.) Brid.

Valle de México: Desierto (*Bro. Amable*).

CERATODON STENOCARPUS Bry. Eur.

Valle de México: Desierto (*Bro. Amable* 1269).

DICRANACEAE (continuation)

AONGSTROEMIA BRITTONIAE Thér., nom. nov.

Aongstroemia pusilla Thér. Smithsonian Misc. Coll. 78²: 2. 1926.

I name this species after Mrs. E. G. Britton, who had the kindness to inform me that the name *pusilla* had already been used by Haupe.

METZLERELLA LEPTOCARPA (Schimp.) Card.

Valle de México: Desierto (*Bro. Amable* 1254 in part).

Mr. R. S. Williams has established (*N. Amer. Fl.* 15: 153. 1913) the synonymy of this species with *Dicranodontium costaricense* (C. M.) R. S. Williams. I agree with him, but, following Brotherus' example, I maintain the species in the genus *Metzlerella*. Thus the name becomes ***Metzlerella costaricensis*** (C. M.) Broth.

OREAS MEXICANA Thér., sp. nov.

(FIG. 1)

Morelia: Cerro Azul (4793).

Autoica, corticola, pusilla. Caulis vix 1-2 mm. altus. Folia sicca crispula, humida valde patula, lanceolato-lineararia, breviter et late acuminata, subobtusa, concava, canaliculata, marginibus planis, integris, 1.7-2.5 mm. longa, 0.25-0.35 mm. lata, costa basi 40 μ , dorso laevi, ante apicem evanescente, cellulis basilaribus hyalinis, rectangularibus, parietibus tenuibus, sequentibus quadratis vel breviter hexagonis, saepe transverse dilatatis, valde chlorophyllosis, tenuiter papillosis, parietibus tenuibus, 10 μ \times 6-8 μ . Pedicellus sicca suberectus, tortellus, humida superne cygnicollus, 1-2 mm. longus; capsula minuta, sicca suberecta, cylindrica, valde sulcata, humida subglobosa; peristomium simplex, dentes (8) bigeminati, irregulares, nunc breves, e basi late triangulari obtusi, 6-8-trabeculati, nunc elongati, 14-16-trabeculati (0.12 mm. alti), longitudinaliter striati, sporae 18-24 μ crassae. Caetera desunt (capsulae deoperculatae).

This is one of the finest discoveries made by Brother Arsène. The genus *Oreas* has been regarded as monotypic; besides it has not been known in America.

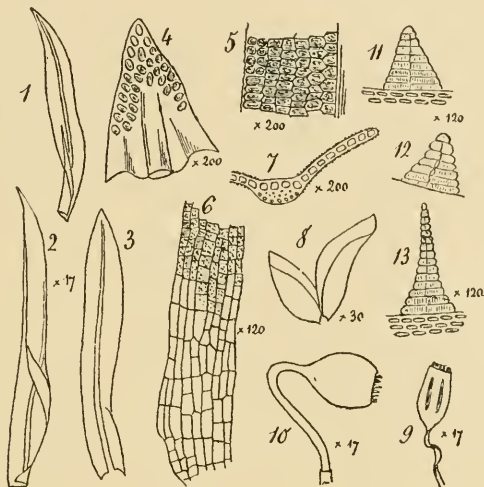


FIG. 1.—*Oreas mexicana* Thér. 1, 2, 3, leaves; 4, acumen; 5, margin and median cells; 6, basal areolation; 7, cross-section of a leaf toward the middle; 8, perigonal leaves; 9, dry capsule; 10, moist capsule; 11, 12, 13, teeth of peristome.

Oreas Martiana Hoppe & Hornsch. is more robust, with stems 2 to 6 cm. long; the leaves are very acute, partially revolute, and long-attenuate at the apex; the costa is excurrent, and the cells are strongly incrassate and completely smooth.

SYMBLEPHARIS HELICOPHYLLA Mont.

Valle de México: Desierto (*Bro. Amable* 1246, 1254 in part).

In these specimens the species appears under two distinct forms, which are, however, rather frequently combined in the same tuft. They are characterized as follows:

(a) Forma *normalis*. Pedicel 10 mm. long; deoperculate capsule 2 mm.

(b) Forma *brevisetata*. Shorter pedicel (3-4 mm.); deoperculate capsule 1.5 mm.

I am unable to discover any other differences between these two forms.

GRIMMIACEAE

COSCINODON ARSENEI Thér., sp. nov.

(FIG. 2)

Querétaro: Júrica, upon stones (11001).

Autoicus, pusillus, sat compactus. Caulis brevis, simplex, 3-5 mm. altus. Folia sicca imbricata, humida erecto-patula, obovata, breviter acuminata, longe pilifera, 1.5 mm. longa, 1 mm. lata, marginibus planis, integerrimis, costa valida, basi $80\ \mu$, in pilum longum, hyalinum, integrum excedente, cellulis basilaribus quadratis, parce chlorophyl-

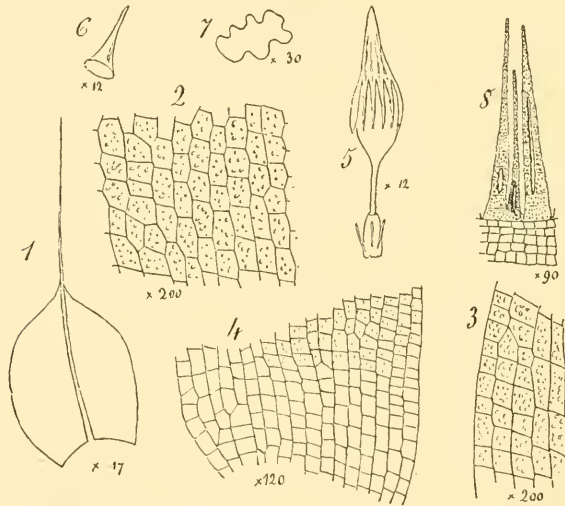


FIG. 2.—*Coscinodon Arseni* Thér. 1, leaf; 2, median cells; 3, marginal cells; 4, basal areolation; 5, capsule with calyptra; 6, operculum; 7, cross-section of calyptra; 8, teeth of peristome.

losis, sequentibus breviter rectangularibus vel hexagonis, laevibus, parietibus tenuibus, majusculis, $15-30\ \mu$ longis, $12-15\ \mu$ latis. Pedicellus erectus, circa 1 mm. longus; capsula subimmersa, minuta, ovata, sicca laevis; operculum conico-rostratum; annulus latus; peristomii dentes irregulares, nunc simplices, parum lacunosi, nunc fere ad basin fissi, papilloso, $0.35-0.40$ mm. lati; sporae $12-15\ \mu$ crassae; calyptra mitraeformis, valde plicata, profunde laciniata, fere totam capsulam obtogens.

Close to *C. Wrightii* Sull., but very distinct; differing from it by the larger, entire leaves, thin-walled cells, the capsule borne upon a longer pedicel and consequently almost exserted, and, finally and chiefly, by the narrow, slightly lacunose teeth of the peristome.

GRIMMIA OVATA Web. & Mohr, forma dioica

Morelia: Cerro San Miguel (5070); Campanario (7449).

GRIMMIA ARSENEI Card. Rev. Bryol. 40: 37. 1913

Morelia: (7894, 7906).

Sterile plants. It would be interesting to know this plant in fruit, in order to be sure of its affinities. By its size and form and the direction and areolation of the leaves it appears very close to *G. californica* Sull.; nevertheless it may be distinguished by the areolation of the lamina, which is very opaque and formed throughout by two layers of cells, while in *G. californica* the cells are bistratose only on the margin (1 to 6 rows of cells).

GRIMMIA CALIFORNICA Sull.

Valle de México: Salazar, upon earth (*Bro. Amable* 1293).

I believe this species is new for Mexico.

FUNARIACEAE

FUNARIA SARTORII C. M.

Puebla: Hacienda Alamos (4724 in part); Rancho Posadas (4806).
Distrito Federal: Mixcoac (9472); Desierto (*Bro. Amable* 1206, 1217).

Determined from description. Brother Amable's specimens differ from Brother Arsène's in having shorter and slightly broader leaves, shorter peristome, and larger and more verrucose spores. They may represent a distinct species.

FUNARIA APICULATIPILOSA Card. Rev. Bryol. 40: 37. 1913

Puebla: Cerro Guadalupe (686, 687, 4613); Rancho Guadalupe (4590, 4592).

Nos. 686 and 687 have horizontal, larger capsules and a higher peristome; moreover, their leaves are more difficult to moisten.

FUNARIA EPIPEDOSTEGIA Card. Rev. Bryol. 36: 109. 1909

Morelia: Cerro San Miguel (5043, 5044, 5083); Campanario (7939a).

FUNARIA ORTHOPODA Thér., sp. nov.

(FIG. 3)

Puebla: Río San Francisco (919, 923).

Caulis brevissimus, 1-2 mm. altus, inferne denudatus, superne comosus. Folia sicca et humida erecta, difficile emollita, valde concava,

oblongo-acuminata, acuta, elimbata, marginibus planis, integris, 2 mm. longa, 0.7 mm. lata, costa tenui, percurrente; rete pellucido, cellulis vesiculosus, quadratis vel breviter hexagonis, superioribus longioribus. Pedicellus erectus, 15-25 mm. longus, capsula inclinata, oblonga, arcuata, asymmetrica, macrostoma, collo brevi attenuata, profunde sulcata; operculum plano-convexum; peristomium duplex, dentes papilloosi, haud striati, 0.5 mm. alti, processus papilloosi; sporae sublaeves, 20-24 μ crassae.

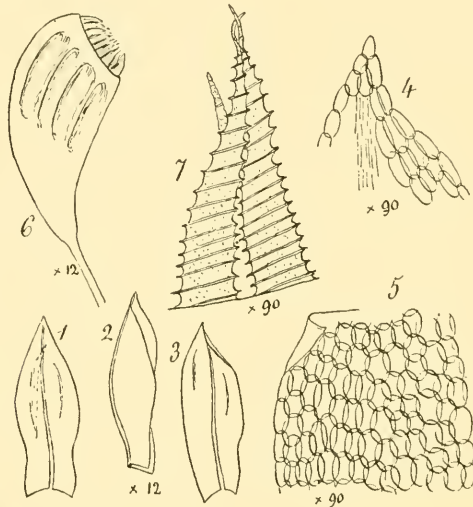


FIG. 3.—*Funaria orthopoda* Thér. 1, 2, 3, leaves; 4, apical cells; 5, basal areolation; 6, capsule; 7, fragment of peristome.

Belonging to the group of *F. hygrometrica* (L.) Sibth. Distinguished from that species and its numerous forms or subspecies by a straight not hygrosopic pedicel, a suberect capsule, and larger spores.

FUNARIA HYGROMETRICA (L.) Sibth. and var. CALVESCENS
(Schwaegr.) Bry. Eur.

Apparently very common in Mexico, as elsewhere. There are more than 25 numbers in the collection. I think it useless to enumerate them.

FUNARIA CONVOLUTA Hampe

Puebla: (7958). Morelia: Loma del Zapote (4638, 4639); Bosque San Pedro (4576).

The species is surely close to *F. hygrometrica* var. *calvescens*; nevertheless it may be recognized by the form of the capsule, the large size

of the spores, and, chiefly, by the perichaetium, the external leaves of which are spreading and the internal ones closely clasping the pedicel, all of them very concave, very shortly acuminate or subrounded, and acute or subobtusely.

A novelty for Mexico.

FUNARIA ANNULATA Besch. Prodr. Bryol. Mex. 48. 1871

Puebla: Road to Cholula (713).

Brotherus considers this moss very close to *F. calvescens* Schwaegr. I do not deny it, but I have not been able to examine enough specimens to appreciate the extent of the variations and to form a concrete opinion of its relative position.

BRYACEAE

WEBERA SPECTABILIS (C. M.) Jaeg.

Bryum spectabile C. M. Syn. 2: 583. 1851.

Morelia. Campanario (4772, 7535).

WEBERA CYLINDRICA Schimp. in Besch. Prodr. Bryol. Mex. 52. 1871

Morelia: Campanario (7549, 7932, 7952); Loma Santa María (5102).

I consider these two species very close. It would not be difficult, I think, to find some day transitional forms which will throw *W. cylindrica* into synonymy. Meanwhile I distinguish *W. cylindrica* by its broader leaves (0.5-0.7 mm., instead of 0.3-0.4 mm.), more frequently revolute, with a stronger costa (70-120 μ against 40-60 μ).

WEBERA DIDYMODONTIA (Mitt.) Broth. in Engl. & Prantl, Pflanzenfam. ed. 2, 1: 362. 1924

Bryum didymodontium Mitt. Musc. Austr. Amer. 289. 1869.

Morelia: Campanario (7547, 7555, 7556, 7640).

Determination doubtful. In the sterile state it seems to me impossible to distinguish with certainty this species from *W. commutata* Schimp. Only a single specimen (7556) is in fruit, and the capsules are very young. I recognized the species by the length of the pedicels (up to 4 cm.), and I give the same name to the sterile specimens because they are from the same place and look identical with no. 7556.

WEBERA ZACATECANANA (R. S. Williams) Thér., comb. nov.

Pohlia zacatecana R. S. Williams, Bryologist 26: 33. pl. 4. 1923.

Morelia: Andameo (4833).

MNIOBRYUM ALBICANS (Wahlenb.) Limpr. Laubm. Deutschl. 2: 277. 1895

Mnium albicans Wahlenb. Fl. Lapp. 353. 1812.

Puebla: Río San Francisco (5005). Morelia: Rincón (9436).
Distrito Federal: Tlalpam (9500).

EPIPTERYGIUM MEXICANUM (Besch.) Broth.

Valle de México: Desierto (*Bro. Amable*). Growing as isolated stems among other mosses.

BRACHYMENIUM BARBAE-MONTIS C. M.

Puebla: Tepoxúchitl (s. n.). Morelia: Andameo (4820). Tlaxcala: Acuitlapilco (743 in part).

The last number differs from the others by its broader leaves, revolute for a longer distance, with a short apiculus. It is perhaps more than a form, but unfortunately the specimens are absolutely sterile.

BRACHYMENIUM EXIGUUM Card. Rev. Bryol. 38: 7. 1911

Puebla: San Antonio (*Bro. Nicolas* 6028); Cerro Guadalupe (660).

BRACHYMENIUM MURALE Schimp. in Besch. Prodr. Bryol. Mex. 51. 1871

Puebla: Rancho Posadas (4804). Veracruz: Córdoba (s. n.).

BRACHYMENIUM Sect. **LEPTOSTOMOPSIS**

I recognized in this section among Brother Arsène's mosses the following species: *B. capillare* Schimp., *B. luteolum* (C. M.) Jaeg., *B. imbricatum* Schimp., *B. Münchii* Broth., *B. chlorocarpum* Card., *B. Lozanoi* Card., *B. niveum* Besch., and *B. condensatum* R. S. Williams.

Among these numerous species, the last three are easy to distinguish: *B. Lozanoi* by its leaves distinctly and finely serrate near the apex; *B. niveum* and *B. condensatum* by their leaves widely marginate and finely dentate at the apex.

It is not the same for the others. The determination of the numerous specimens has been a laborious and delicate task, because, according to my observations, among the characters attributed to each one of these species few are constant. And yet I had before me, for every one of them, a fragment of the type or of some other plant

authentically named! But where a variable species is concerned, a single stem can not give an accurate and complete idea. This stem constitutes simply a form of the species, and its comparison with the others makes them appear, very often, as if they were distinct species.

Such are the reasons why my opinion about these debatable species is founded more on the mosses I had to identify than upon the small fragmentary authentic specimens at hand; hence it seems useful to say how I understand them.

BRACHYMENIUM CAPILLARE Schimp. in Besch. Prodr. Bryol. Mex. 50. 1871

Innovations not julaceous, rather laxly foliated; leaves oblong, obtuse, the margins plane or almost plane, the costa excurrent; stem and perichaetial leaves obtuse-lanceolate, strongly revolute. Capsule cylindrical.

Puebla: Esperanza (4508, 4659, 4668, 4669, 4682, 4992). Morelia: Campanario (7461, 7463).

No. 4992 is a form with larger leaves, and nos. 7461 and 7463 a form with a thicker capsule.

BRACHYMENIUM LUTEOLUM (C. M.) Jaeg.

Bryum luteolum C. M. Linnaea 38: 625. 1874.

Close to the preceding species. Differs by julaceous innovations with densely imbricate leaves, which are oval-suborbicular.

Puebla: Hacienda Batán (s. n.). Morelia: Bosque San Pedro (4579).

BRACHYMENIUM IMBRICATUM Schimp.

Bryum imbricatifolium C. M. Syn. 2: 578. 1851.

As in *B. luteolum*, with julaceous innovations; leaves strongly imbricate, but in both the stem and branch leaves the costa almost always disappearing below the apex.

Puebla: Hacienda Alamos (4718, 4721, 4759, 4865).

BRACHYMENIUM MÜNCHII Broth. in Card. Rev. Bryol. 38: 5. 1911

Julaceous innovations with oval or oblong leaves, narrower at the apex and almost acute. The stem and perichaetial leaves are subobtuse or acute, with a strong ($60\ \mu$) costa always excurrent.

Puebla: Esperanza (4943); Malinche (6004); Hacienda Batán (4973).

Judging by the exsiccatae I possess (Bryoth. Levier, leg. *Münch; Pringle* 15078), this species is very variable. The leaves of the innovations are more or less elongate and somewhat narrow-acute; the perichaetial leaves are more or less revolute, widened or not at the base; the capsule is oblong, but in Brother Arsène's specimens it is more often claviform.

BRACHYMENIUM CHLOROCARPUM Card. Rev. Bryol. 36: 111. 1909

This possesses a special habit, which, once seen, renders easy its recognition. Its affinities are with *B. imbricatum* and *B. Münchii*. It is distinguished from both species by the costa, which is excurrent in the leaves of the innovations and generally evanescent in the perichaetial ones; also "by the soft, pale, inclined or hanging capsule and by the strongly flexuous pedicel" (teste Cardot).

Puebla: (4624). Morelia: Andameo (4831).

BRACHYMENIUM LOZANOI Card. Rev. Bryol. 38: 5. 1911

Morelia: Cerro Azul (4558, 4560).

Near *B. systylium* (C. M.) Jaeg. by the size and the form of the leaves; but in *B. systylium* the entire or subentire leaves are difficult to moisten.

BRACHYMENIUM NIVEUM Besch. Journ. de Bot. 15: 383. 1901

Morelia: Andameo (4834).

BRACHYMENIUM CONDENSATUM R. S. Williams, Bryologist
26: 2. 1923

Morelia: Cerro San Miguel (5065).

Very close to the preceding species. I distinguish it by its leaves, with a wider margin toward the apex, a costa vanishing more often below the apex, and a shorter and less flexuous hyaline hair point. In *B. nivium* the hair point is very long and flexuous, giving the tufts the facies of some *Argyrobryum*, like *B. arachnoideum* for instance.

BRACHYMENIUM MEXICANUM Mont. Ann. Sci. Nat. II. Bot. 9: 54. 1838

Morelia: (7905); Cerro San Miguel (4871, 4874, 5061).

The leaves are exactly entire. That condition agrees well with Montagne's original description, "foliis integerrimis," and with C. Müller's. Mitten saw them differently: "Margine superne minute serrulata;" it was probably an exceptional case.

ANOMOBRYUM FILIFORME (Dicks.) Husn. var. **MEXICANUM** (Schimp.)
Par. Ind. Bryol. 182. 1894

Puebla: Hacienda Alamos (577, 4636). Morelia: (7889, 7902, 7911); Andameo (4821, 4836); Campanario (7445, 7513, 7548). Valle de México: Desierto (*Bro. Amable*).

ANOMOBRYUM PLICATUM Card. Rev. Bryol. 36: 112. 1909

Morelia: Wall of a garden (7966).

BRYUM LAXULUM Card. Rev. Bryol. 36: 113. 1909

Morelia: (7647, 7648, 7649, 7650, 7655, 7949); Jesús del Monte (7609); Bosque San Pedro (4585); Loma Santa María (7865, 7878, 7881, 7883). Valle de México: Desierto (*Bro. Amable*).

Some of these collections, chiefly nos. 7647, 7649, and 7650, have elongate and narrow leaves like *B. lanceolifolium* Card.; but the cuspid, the reflection of the edges, and the areolation are characters which connect them closely to *B. laxulum*.

BRYUM Sect. **ARGYROBRYUM**

The species of this section belonging to Brother Arsène's collection are cited or described in the first paper.

BRYUM ARGENTEUM L.

Valle de México: Portales (*Bro. Amable* 1258).

A form tending toward var. *brachycarpum* Card.

BRYUM ARGENTEUM L. var. **COSTARICENSE** Rev. & Card.

Valle de México: Salazar (*Bro. Amable* 1310); Colhuacán (1319).

BRYUM ARGENTEUM L. var. **CHLOROCARPUM** Card.

Valle de México: Desierto (*Bro. Amable* 1266); Contadero (1297 in part).

This is a very curious plant. The capsule, narrowly cylindrical and attenuate into a long neck, would make one believe it a good species if one did not find in the same cluster shorter capsules of a different outline, among which some insensibly approach the typical form of *B. argenteum*.

BRYUM LIEBMANNIANUM C. M. Syn. 2: 573. 1851

México: Upon a roof (*Bro. Amable*).

BRYUM SQUARRULOSUM (Card.) Thér.

Brachymenium squarrulosum Card. Rev. Bryol. 38: 7, 31. 1911.

(FIG. 4)

I have this moss under two different names in my collections: *Brachymenium squarrulosum* Card., *Barnes & Land* 486, *Pringle* 10580 in part, 15213; *Bryum subchryseum* Broth. & Par. in sched. (comm. Paris), *Bro. Arsène*. Although these names belong to different genera, the two plants are certainly identical.

I found this same species, abundantly and well fruited, in Brother Arsène's collection (see below). The capsules have an inner peristome made up of a basal membrane half the height of the teeth, the seg-

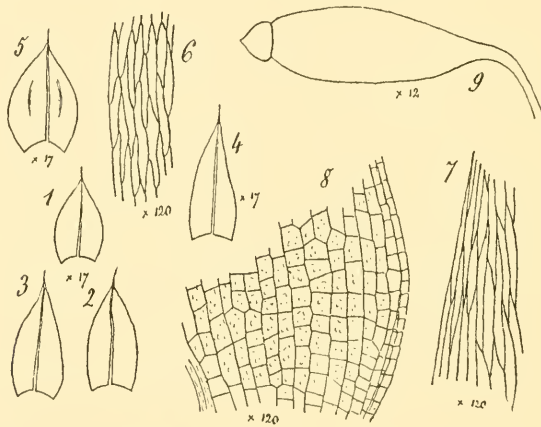


FIG. 4.—*Bryum squarrulosum* (Card.) Thér. 1, 2, 3, stem leaves; 4, perichaetial leaf; 5, leaf from the innovation; 6, median cells; 7, marginal cells; 8, basal areolation; 9, moist capsule.

ments widely split, oblong-lanceolate, equal to the teeth and provided with appendiculate cilia. The peristome of *Barnes & Land* 486 is in every way similar. This moss, which has the habit, leaves, and areolation of a *Brachymenium*, belongs, then, by its capsule, to the genus *Bryum*. It has a close affinity with *Bryum chryseum* Mitt., the same facies, size, and leaves. But the two species are essentially different in their sporophyte: *B. squarrulosum* has a short, thick, claviform capsule, and *B. chryseum* has an elongate, narrow capsule insensibly attenuate into a neck of the same length.

The name proposed by Brotherus and Paris was happily chosen, but it remains a *nomen nudum*; the one given by Cardot is the valid one.

Morelia: Loma del Zapote (7506); Andameo (4818, 4846); Punguato (4879, 5059); Campanario (7559); Jesús del Monte (7619). Distrito Federal: Mixcoac (9151, 9457). Tlaxcala: Acuitlalpilco (718).

No. 4846 presents a curious and rare mixture of two species, *Bryum squarrulosum* and *Erythrodontium densum* var. *brevifolium* Card., which have the same size, same habit, and same shade of color, and are indistinguishable to the untrained eye.

BRYUM MICROBALANUM Card. Rev. Bryol. 36: 112. 1909

Puebla: Rancho Posadas (4809).

BRYUM ROSULATUM C. M. Bot. Zeit. 14: 416. 1856

Morelia: Campanario (7529); Jesús del Monte (7963 in part).

BRYUM LATILIMBATUM Card. Rev. Bryol. 36: 114. 1909

Puebla: Cerro Guadalupe (794).

BRYUM EHRENBERGIANUM C. M. Syn. 1: 255. 1849

Puebla: (4991); Esperanza (4941). Tlaxcala: (606 in part). Valle de México: Desierto (*Bro. Amable* 1208).

BRYUM COMATUM Besch. Prodr. Bryol. Mex. 55. 1871

Morelia: Cerro San Miguel (5084); Punguato (5049); Campanario (7552 in part); Jesús del Monte (7607) Loma Santa María (7645). Valle de México: Contadero (*Bro. Amable* 1312).

BRYUM ANDICOLA Hook., forma

Puebla: Cerro Guadalupe (688). Morelia: Loma del Zapote, (7503); Calzada de México (7630a). Distrito Federal: Mixcoac (9452, 9463); Valle de México, Desierto (*Bro. Amable* 1203).

Looser areolation; cells 40-50 μ \times 20 μ .

BRYUM BOURGEANUM Card. Rev. Bryol. 36: 115. 1909

Valle de México: San Rafael (*Bro. Amable* 1278).

BRYUM SUBELIMBATUM Thér., sp. nov.

(FIG. 5)

Puebla: Fort Lorette, alt. 2,200 m. (657).

Caulis 2 cm. altus, laxe sed regulariter foliosus, interdum rosulatus. Folia sicca crispulo-contorta, elliptico-oblonga, breviter acuminata,

acuta, cuspidata, marginibus usque ad medium folii anguste revolutis, superne denticulatis, costa basi $120\ \mu$ lata, sensim attenuata, in cuspidem brevem excurrente, cellulis mediis hexagonis, $50\text{--}60\ \mu$ longis, $20\text{--}24\ \mu$ latis, parietibus tenuibus, basilaribus breviter rectangularibus, marginalibus (e 2-3-ser.) linearibus, concoloribus, haud incrassatis, limbum vix distinctum efformantibus. Caetera desunt.

In its size and the dimensions of the leaves this is to be compared with *B. andicola* Hook. ; it may be distinguished from that species by the more acute-acuminate, longer-cuspidate leaves, the cells being twice as long and also wider, and above all by the hardly differentiated

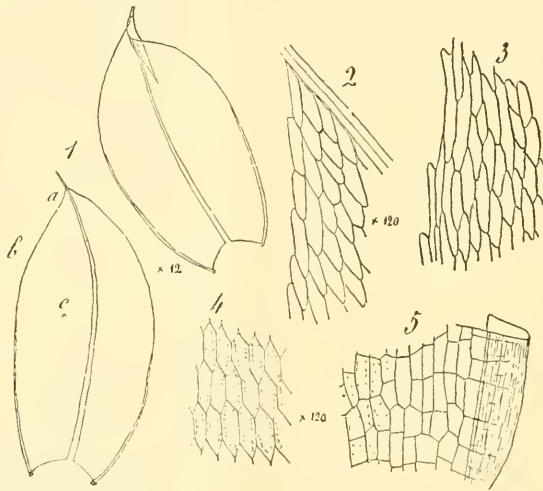


FIG. 5.—*Bryum subelimbatum* Thér. 1, leaves; 2, apical cells near point *a*; 3, marginal cells toward point *b*; 4, median cells at point *c*; 5, basal areolation.

border, composed toward the middle of the leaf of 2 or 3 linear cells with walls as thin as those of the adjacent cells and entirely disappearing toward the apex.

ORTHOTRICHACEAE

ZYGODON SPATULAEFOLIUS Besch. Prodr. Bryol. Mex. 43. 1871

Valle de México: Desierto (*Bro. Amable* 1252).

Mr. N. Malta considers this species identical with *Z. obtusifolius* Hook.

ZYGODON OLIGODONTUS Card. Rev. Bryol. 36: 107. 1909

Valle de México: Salazar, upon a tree (*Bro. Amable* 1235 in part).

ORTHOTRICHUM DIAPHANUM (Gmel.) Schrad. Spic. Fl. Germ. 69. 1794

Bryum diaphanum Gmel. Syst. Nat. 2 : 1335. 1791.

Valle de México: California (*Bro. Amable* 1273); Tlalpam (*Bro. Amable* 1236).

ORTHOTRICHUM MALACOPHYLLUM Card. Rev. Bryol. 38: 2. 1911

Valle de México: Contadero (*Bro. Amable* 1301 in part).

ORTHOTRICHUM PYCNOPHYLLUM Schimp.

Puebla: Esperanza (4680); Hacienda Batán (4966, 4967). Morelia: Cerro Azul (4794, 4930). Valle de México: Salazar (*Bro. Amable* 1295).

Brother Amable's material is plentiful, with well-fruited specimens, consequently I was able to make interesting observations and more particularly to ascertain the wide variability of this species. For instance, in the same tuft some plants have immersed capsules and others show them more or less exserted; sometimes the ripe capsules are entirely smooth and sometimes a little costate; the segments of the inner peristome may be nearly entire or more or less erose; finally, the leaves, when moist, are either spreading or strongly squarrose.

It seems that the individuals with exserted capsules and squarrose leaves should be called *O. recurvans* Schimp., and those with immersed capsules *O. Lozanoi* Card.; but both have a densely villous calyptra, while in *O. recurvans* and *O. Lozanoi* the calyptra is only sparingly villous.

To what conclusion do these remarks lead if not that the names *O. pycnophyllum*, *O. recurvans*, and *O. Lozanoi* have been created for forms of a very variable species and that it is desirable, as Cardot suggested in 1909 (Rev. Bryol. 36: 107), to reunite them under a single name, the one which has priority (*O. pycnophyllum* Schimp.)?

MACROMITRIUM GHIESBREGHTII Besch. Prodr. Bryol. Mex. 44. 1871

Puebla: Boca del Monte (4685); Esperanza (4671, 4676, 4681, 4687, 4688, 4756, 4801).

Nos. 4685, 4687, and 4688 represent forms with shorter branches, with leaves less appressed when dry and more spreading when moist, and with shorter pedicels.

I recall that Cardot (Rev. Bryol. 38: 101. 1911) considers *M. Ghiesbreghtii* and *M. Leiboldtii* Hampe as mere forms or varieties

of *M. mexicanum* Mitt., but I have not had an opportunity to form a personal opinion on this point.

MACROMITRIUM PYCNOPHYLLUM Card. Rev. Bryol. 36: 108. 1909;
37: 19. 1910

Morelia: Campanario (7568, 7635); Cerro Azul (4535, 4545, 4548, 4777); Cascade de Coincho (4717 in part).

Often found intermingled with the following species. Sometimes the association is so intimate and the stems so entangled that the separation of the two species is almost impossible.

MACROMITRIUM TORTUOSUM Schimp. in Besch. Prodr. Bryol. Mex. 45. 1871

Morelia: Cerro Azul (4557, 4777a, 4791, 4792); Cascade de Coincho (4712, 4717 in part); Campanario (7464, 7524, 7528, 7532, 7536, 7560, 7567, 7634a, 7636, 7638).

Determination only probable. I had the choice between *M. tortuosum* Schimp. and *M. Schimperii* Jaeg. (*M. flexuosum* Schimp.). Although not absolutely identical with *M. tortuosum*, the specimens do not differ enough to be separated. On the other hand, I do not know *M. Schimperii*, and the descriptions of the two species in Bescherelle's *Prodromus* are insufficient to permit distinguishing one from the other.

CRYPHAEACEAE

CRYPHAEA ORIZABAE Schimp. in Besch. Prodr. Bryol. Mex. 70. 1871

Veracruz: Córdoba (s. n.).

Determined from description. I distinguish this species from *C. filiformis* (Sw.) Brid. by the leaves, which are larger and very entire at the apex, and have larger cells.

CRYPHAEA APICULATA Schimp.

Puebla: Hacienda Batán (4970).

The leaves are entire, as described by Bescherelle, and not "sehr klein gezähnt," as described by Brotherus.

CRYPHAEA ATTENUATA Schimp. in Besch. Prodr. Bryol. Mex. 72. 1871

Morelia: Cerro Azul (4798); Valle de México: Desierto (*Bro. Amable* 1223, 1237).

CRYPHAEA PATENS Hornsch. var. **DECURRENS** (C. M.) Schimp. & Par.

Veracruz: Jalapa (8002). Puebla: Esperanza (7921, 7975).

According to my observations this variety differs from the type by the form of the leaves, which are gradually and insensibly narrowed, by their direction when moist (less spreading than in *C. patens*), and by the perichaetial leaves, which are enervate or nearly so.

CRYPHAEA SARTORII Schimp. in Besch. Prodr. Bryol. Mex. 72. 1871

Puebla: Xúchitl, alt. 2,800 m. (7980).

Cardot (Rev. Bryol. 38: 102. 1911) thinks it is convenient to reunite this species with *C. patens*. I willingly adhere to his opinion, because the habit, the less dentate acumen, and the less incrassate areolation do not seem to be characters sufficiently important for the separation of *C. Sartorii*.

DENDROPOGONELLA RUFESCENS (Schimp.) E. G. Britton, Bryologist
9: 39. 1906

Puebla: Xúchitl (7968); Esperanza (7955).

LEUCODONTACEAE (Continuation)

LEUCODON CRYPTOTHECA Hampe, Linnaea 12: 350. 1838

Valle de México: Desierto (*Bro. Amable* 1283, 1306).

PTEROBRYACEAE

RENAULDIA COCHLEARIFOLIA (Hornsch.) Broth.

Morelia: Cerro Azul (4559a).

PTEROBRYOPSIS MEXICANA (Schimp.) Fleisch. Hedwigia 45: 60. 1905

Morelia: Campanario (7460); Cerro Azul (4501, 4503, 4977, 4982, 7656); Cerro San Miguel (5080, 5086); Carindapaz (7956); Cascade de Coincho (4716).

Considering these specimens in the aggregate, I have observed some variability in the compression of the branches, the form of the leaf, the length of the cells and the thickening of their walls, the density of the chlorophyll, etc. Some of them would thus seem to show a tendency toward *P. Pringlei* Card., a species I do not know.

METEORACEAE

PILOTRICHELLA FLEXILIS (Sw.) Jaeg., forma

P. turgescens (C. M.) Jaeg.; *Neckera turgescens* C. M. Syn. 2: 131. 1850.

Puebla: Esperanza (4750, 4757). Morelia: Cerro Azul (4979, 4986). Veracruz: Jalapa (7993, 8003).

PAPILLARIA APPRESSA (Hornsch.) Jaeg.

Puebla: Xúchitl (7991). Veracruz: Córdoba (s. n.), forma *flagellifera*.

Mrs. E. G. Britton considers this species a synonym of *P. nigrescens* (Sw.) Jaeg.

PAPILLARIA HAHNII Besch.; Ren. & Card. Bull. Soc. Roy. Bot. Belg.
2: 127. 1899

Puebla: Xúchitl (7997). Veracruz: Jalapa (7999).

PAPILLARIA DEPPEI (Hornsch.) Jaeg.

Puebla: Boca del Monte (4689); Esperanza (4749, 4751).

No. 4751 has leaves ending in a very long and very fine acumen, like those of *P. subulifolia* Schimp., which, in my opinion, should not be kept specifically distinct from *P. Deppei*. I might add that the differences I have observed between *P. Deppei* and *P. Hahnii* are not of great systematic importance.

METEORIUM ILLECEBRUM (C. M.) Mitt. Musc. Austr. Amer. 437. 1869

Neckera illecebra C. M. Syn. 2: 137. 1850.

Puebla: Esperanza (4724, 4728, 4733, 4746); Xúchitl (8004). Morelia: Santa Clara, alt. 2,000 m. (4845); Campanario (7526, 7531, 7533, 7559, 7570, 7575). Veracruz: Jalapa (7969).

Variable in the form of the leaves, in the length of the hair point, and in the number of papillae (oftener 1, rarely 2 or 3) to each cell and their development.

METEORIUM ILLECEBRUM (C. M.) Mitt. var. TERETIFORME Card. Rev.
Bryol. 38: 40. 1911

Morelia: Cascade de Coincho (4711).

The following numbers belong to forma *gracilis*: Puebla: Esperanza (4514, 4662, 4691); Hacienda Batán (4962). Morelia: Cerro Azul (4525); Zamora (7964).

NECKERACEAE

NECKERA HORNSCHUCHIANA C. M. Syn. 2: 51. 1850

Morelia: Cerro Azul (4526).

NECKERA CHLOROCAULIS C. M. and N. ORBIGNYANA Lor.

I have tried to differentiate these two species, with the help of the descriptions and the specimens of my collections, but have had little success. Indeed, it is rare to find a specimen which combines all the characters attributed to each species. As a matter of fact, if, among the mosses of Brothers Arsène and Amable enumerated below, I take at random three plants, I cannot find two of them identical. This seems to mean that I have before me transitional forms linking closely the extremes which have received the names *N. chlorocaulis* and *N. Orbignyana*. It is then more convenient, beyond a doubt, to combine these two species under the name *N. chlorocaulis* C. M., which has priority (1851) over Lorenz's species (1864).

Puebla: Esperanza (4744, 7977); Hacienda Batán (4964, 4965).
Morelia: Cerro Azul (4559, 4798). Veracruz: Jalapa (7996). Valle de México: Desierto (*Bro. Amable* 1213, 1224, 1239).

PILOTRICHACEAE

PILOTRICHUM MEXICANUM Thér., sp. nov.

(FIG. 6)

Morelia: Loma Santa María (4867, 4895, 7869).

Sterile. Caulis secundarius 4-5 cm. altus, erectus, irregulariter ramosus, ramis inaequalibus, saepe arcuatis, plerumque simplicibus.

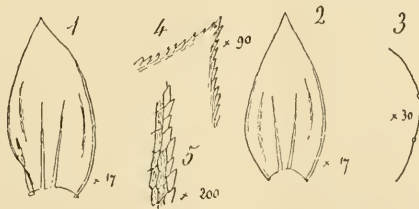


FIG. 6.—*Pilotrichum mexicanum* Thér. 1, stem leaf; 2, branch leaf; 3, cross-section of leaf; 4, apex of a stem leaf; 5, margin of leaf.

Folia caulis secundarii erecto-adpressa, late ovata, acuta, concava, longitudinaliter plicatula, 1.5 mm. longa, 0.8 mm. lata, marginibus inferne revolutis, sequentibus serrulatis, dentibus acutis hyalinis, costis

fere parallelis, attenuatis, ad medium evanidis, rete opaco, chlorophylloso, cellulis laevibus, hexagonis, parietibus tenuibus; folia ramea similia sed minora. Caetera desunt.

A curious plant, which is very different from all the species of the genus to which I could compare it, by the leaves dentate in the upper two-thirds, by its smooth obscure areolation formed by thin-walled cells, and by the insensibly attenuate costae not extending beyond the middle of the leaf. It has the habit of *P. fasciculatum* C. M., but the leaves of the latter are of a different form; moreover, the costa, which plainly contrasts with the areolation, stops abruptly, without attenuation, and projects beyond the lamina.

HOOKERIACEAE

CYCLODICTYON ALBICANS (Sw.) Broth.

Hypnum albicans Sw. Prodr. Veg. Ind. Occ. 140. 1788.

Morelia: Campanario (7721).

CYCLODICTYON ARSENEI Thér., sp. nov.

(FIG. 7)

Distrito Federal: Cuajimalpa, alt. 3,100 m. (9489).

C. albicans (Sw.) Broth. et *C. humectalo* Card. proximum, sed differt rete densiore, cellulis magis chlorophyllosis, praesertim limbo latissimo e 3-4 seriebus cellularum formato.

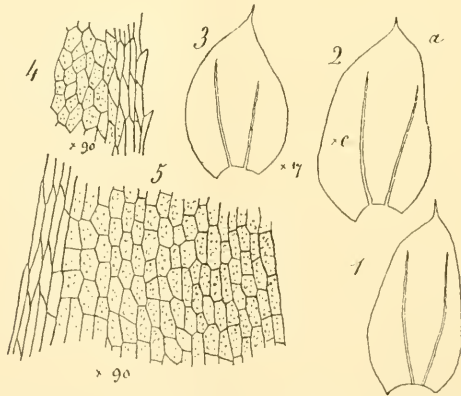


FIG. 7.—*Cyclodictyon Arseni* Thér. 1, 2, 3, dorsal and lateral leaves; 4, upper and marginal cells near point *a*; 5, median and marginal cells near point *c*.

Neither can our species be *C. Liebmanni* Schimp., for in describing the latter the author does not speak of a border; besides, he compares it with *C. albicans*, attributing to it more long-cuspidate and more strongly dentate leaves.

FABRONIACEAE (continuation)

FABRONIA PATENTIFOLIA Card.

Valle de México: Texcoco, upon trees (*Bro. Amable* 1288).

FABRONIA DENTATA Schimp. in Besch. Prodr. Bryol. Mex. 87. 1871

Valle de México: California (*Bro. Amable* 1275); Chapingo, upon tree (*Bro. Amable* 1286).

I see in this moss a species entirely independent from *F. flavinervis* C. M. It is easy to recognize by the smaller and more abruptly narrowed leaves, with almost entire margins, a slender costa scarcely reaching the middle, and shorter and wider cells.

I imagine the author was alluding to the perichaetial leaves when he named this species "*dentata*," but it will be agreed that for a moss whose stem and branch leaves are entire the name is rather badly chosen.

FABRONIA OCTOBLEPHARIS Schwaegr. Suppl. 1²: 338. pl. 99. 1816.

(FIG. 8, in part)

Valle de México: Contadero, upon the earth (*Bro. Amable* 1301, 1308 in part, 1316).

An exact match for the European moss. Cardot described (*Rev. Bryol.* 37: 50. 1910) a variety *americana* of this species, but the type had not, till now, been indicated in Mexico. It is worth remarking that the moss from Contadero grows upon the ground, a rather rare station for species of the genus *Fabronia*; yet the classical habitat of *F. octoblepharis* in Europe is precisely "earth upon walls."

FABRONIA OCTOBLEPHARIS Schwaeg. var. MEXICANA Thér., var. nov.

(FIG. 8, in part)

Querétaro: Júpica, alt. 1,850 m., on rocks (*Bro. Arsène* 11000 in part).

Differs from both the type and var. *americana* Card. by its squatty habit, its shorter, numerous, more densely leafed branches; by its oval and more abruptly acuminate leaves; by the oval, shortly apicu-

late, subentire perichaetial leaves; and, above all, by the slightly elevated (0.11 mm.) peristome, with obliquely striate and punctate teeth. Perhaps a distinct species.

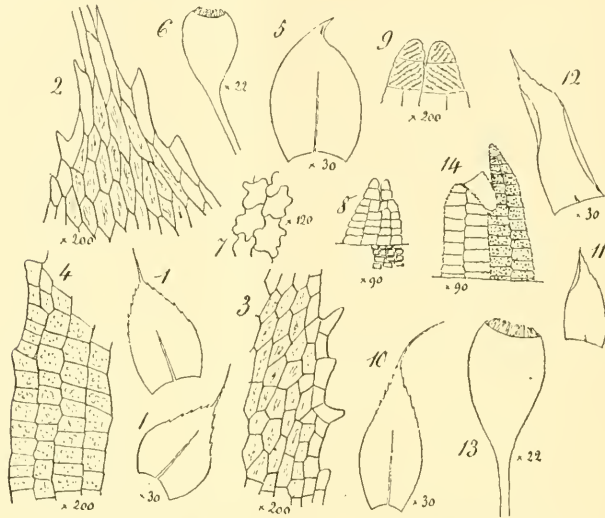


FIG. 8.—*Fabronia octoblepharis* Schwaegr. var. *mexicana* Thér. 1, leaves; 2, apical cells; 3, upper and marginal cells; 4, basal areolation; 5, perichaetial leaf; 6, moist capsule; 7, exothecal cells; 8, fragment of peristome; 9, apex of a tooth. *Fabronia octoblepharis* Schwaegr. (*Bro. Amable* 1316). 10, leaf; 11, 12, perichaetial leaves; 13, moist capsule; 14, fragment of peristome.

LESKEACEAE

RHEGMATODON FILIFORMIS Schimp. in Besch. Prodr. Bryol. Mex. 87. 1871

Morelia: Cerro Azul (4543).

LINDBERGIA MEXICANA (Besch.) Card. Rev. Bryol. 38: 51. 1911

Leskea mexicana Besch. Prodr. Bryol. Mex. 89. 1871.

This seems to be extremely common in Mexico, if one may judge by the following list: Puebla: (4511); Rancho Santa Bárbara (4517, 4518, 4597, 4601, 4810); Hacienda Alamos (4722, 4758, 4763, 4766); Cholula (4863); Molino de Huexotitla (4815). Morelia: Bosque San Pedro (4570, 4571, 4573, 4588). Tlaxcala: Acuitlalpilco (743, 744). Distrito Federal: Mixcoac (9450, 9455, 9474, 9484); Tlalpam (9496). Valle de México (*Bro. Amable*): Texcoco (1285, 1289, 1290); Desierto (1212); San Rafael (1284); Tlampantla (1234); El Peñon (1216).

No. 1216, from the Peñon, is a robust form. No. 1234 from Tlampantla is another and more remarkable form. Its leaves are narrowed and long-acuminate as in var. *acuminata* Card., but by the size and the areolation it is connected with the normal forms.

LINDBERGIA MEXICANA var. **ACUMINATA**. Card. Rev. Bryol. 37: 51. 1910

Puebla: Huejotzingo (4615, 4857). Valle de México: San Rafael (*Bro. Amable* 1276).

LINDBERGIA OVATA Thér., sp. nov.

(FIG. 9)

Morelia: Cerro San Miguel (5078, 5079).

Autoica. Caulis tenellus, repens, dense caespitosus, ramis erectis vel circinatis. Folia densa, leviter imbricata, marginibus planis, inte-

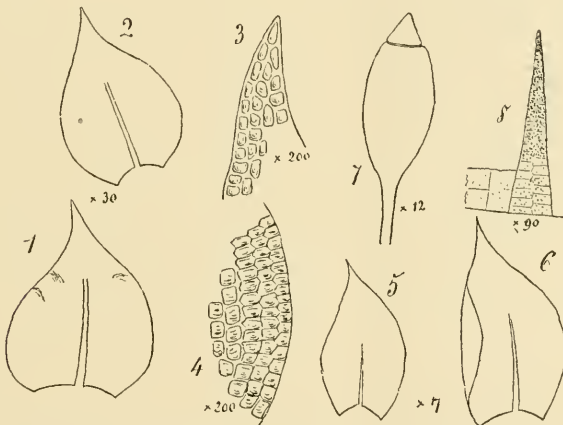


FIG. 9.—*Lindbergia ovata* Thér. 1, stem leaf; 2, branch leaf; 3, apical cells; 4, basal areolation; 5, 6, perichaetial leaves; 7, moist capsule; 8, fragment of peristome.

gerrimis, 0.8 mm. longa, 0.5-0.6 mm. lata, rete chlorophylloso, opaco, cellulis ovatis, laevibus, parum incrassatis, marginalibus transverse dilatatis, costa subaequalia circa $\frac{3}{4}$ folii evanescente. Folia perichaetialia similia, intima vaginantia; pedicellus erectus, 1 cm. longus; capsula oblonga, operculum conicum, peristomii dentes papilloso, opaci, 0.3 mm. alti, membrana pallida, vix papillosa, processus nulli; spora 30-36 μ crassae.

Differs from *L. mexicana* Besch. by the branches with less imbricate leaves, somewhat spreading when dry, by its oval leaves abruptly contracted into a short acumen, with the costa stopping much farther

from the apex, by the larger, wider, and more convolute inner perichaetial leaves, by the more inflated oblong capsule, with a higher operculum, and lastly by the longer and more densely papillose teeth of the peristome and the spores twice larger.

THUIDIACEAE

HERPETINEURON TOCCOAE (Sull.) Card. Bot. Centrabl. 19^o: 127. 1905

Anomodon Toccoae Sull. Musc. Bor. Amer. 58. 1856.

Morelia: (7907); Campanario (7454, 7465); Carindapaz (7951 in part).

HAPLOCLADIUM MICROPHYLLUM (Sw.) Broth.

Hypnum microphyllum Sw. Prodr. Veg. Ind. Occ. 142. 1788.

Puebla: Esperanza (4675). Morelia: Jesús del Monte (7608, 7613, 7625). Valle de México: Desierto (*Bro. Amable* 1241 in part, 1245 in part).

RAUIA SUBCATENULATA (Schimp.) Broth.

Pseudoleskea subcatenulata Schimp. in Besch. Prodr. Bryol. Mex. 90. 1871.

Morelia: Rincón (4566); Parc San Pedro (4580, 4586); Loma Santa María (4875, 4876, 4889, 4897, 4905, 4909, 4915, 4916, 5090, 7853); Campanario (7456); Jesús del Monte (7689).

THUIDIUM TUERCKHEIMII C. M. Bull. Herb. Boiss. 5: 219. 1897, forma

Morelia: Loma Santa María (4893).

In habit and areolation this form approaches var. *angustatum* Card.; but, disregarding the fact that one cannot compare the fruit (the plant being sterile), it differs in the dark green color of the tufts and in its longer rameal leaves. The apical cells of the secondary branch leaves are rather frequently acute.

THUIDIUM MEXICANUM Mitt. Musc. Austr. Amer. 577. 1869

Morelia: Cerro Azul (4552, 4553, 4984). Valle de México; San Rafael (*Bro. Amable* 1277, 1279, 1281, 1282).

This is the form named *T. orthocarpum* by Beschereille, and reunited by Cardot with Mitten's species.

THUIDIUM (EUTHUIDIUM)

The determination of the three following species, represented by sterile plants, is given with all reserve, especially in the case of *T. Schlumbergeri*.

THUIDIUM ROBUSTUM Card. Rev. Bryol. 37: 52. 1910

Puebla: (4944, 4955, 4958); Esperanza (4677). Distrito Federal: Cuajimalpa (9486).

THUIDIUM MIRADORICUM Jaeg.

Thuidium tamariscinum var. *mexicanum* Schimp. in Besch. Prodr. Bryol. Mex. 92. 1871.

Morelia: Cerro Azul (4540, 4987).

THUIDIUM SCHLUMBERGERI Schimp. in Besch. Prodr. Bryol. Mex. 92. 1871

Puebla: (4946, 4952); Esperanza (4564, 4658, 4665, 4684, 4739, 4753, 7981). Morelia: Cerro Azul (4529, 4785); Cerro San Miguel (5055, 5074, 7502, 7545); Campanario (7455, 7644, 7923, 7927, 7930, 7931, 7937). Mexico (9477).

ENTODONTACEAE (continuation)

ENTODON ERYTHROPUS Mitt. var. **MEXICANUS** Card., forma

Valle de México: (*Bro. Amable*); San Juanico (1260, 1261); Contadero (1304, 1309).

Pedicle short, 8 mm.; capsule elongate and narrow (4 mm. × 0.6 mm.). It is not var. *breviseta* Card., since, according to the author, that is a depauperate form, and the above plants are as robust as the ordinary forms of the type. There is therefore no authority for separating them from the var. *mexicanus*. I consider them as a forma *breviseta-stenocarpa*.

ENTODON ABBREVIATUS (Bry. Eur.) Jaeg.

Valle de México: (*Bro. Amable*); Desierto (1245); San Rafael (1280); Contadero (1302, 1305, 1308 in part).

ERYTHRODONTIUM TERES (C. M.) Par. Ind. Bryol. ed. 2, 159. 1904

Neckera teres C. M. Syn. 2: 98. 1851, in part.

Morelia: Cerro Azul (5081); Campanario (7466, 7633a).

ERYTHRODONTIUM LONGISETUM (Hook.) Par. Ind. Bryol. ed. 2, 158. 1904
Neckera longiseta Hook. Musc. Exot. pl. 43. 1818-20.

I refer with doubt to this species (which now includes *E. cylindricaule* C. M.) no. 7530, from El Campanario. This plant has the pedicel plainly yellow, but the teeth of the peristome are striate as in the species of the division A. Should not this last character have all the importance which is ordinarily given to it?

POLYTRICHACEAE (continuation)

ATRICHUM MÜLLERI Schimp. var. **CONTERMINUM** (Card.) Thér.
 Valle de México: Desierto (*Bro. Amable* 1267, 1271 in part).

POGONATUM ERICAEOFOLIUM Besch. var. **LOZANOI** (Card.) Card. Rev.
 Bryol. 37: 6. 1910; 38: 38. 1911
 Valle de México: Desierto (*Bro. Amable* 1272 in part).

POGONATUM CUSPIDATUM Besch. Prodr. Bryol. Mex. 62. 1871
 Valle de México: Desierto (*Bro. Amable* 1210, 1270).

POLYTRICHUM JUNIPERINUM Willd.

Valle de México: Mexico (*Bro. Amable* 1218).