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UGANDA MOSSES COLLECTED BY
R. DÜMMER AND OTHERS

(WITH ONE PLATE)

BY
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UGANDA MOSSES COLLECTED BY R. DÜMMER
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(WITH ONE PLATE)

Mr. R. Dümmer, who has been collecting for some years in the Uganda Protectorate, has from time to time made gatherings of mosses. Some of these have been received by the United States National Museum, and these, which form the principal material of the present paper, have been entrusted to me for determination. A few others have been sent to me from the British Museum, to be incorporated in this report, and one or two I have received direct from Mr. Dümmer. I have included also a few plants collected recently in Uganda by Mr. J. D. Snowden, and sent to me by Mr. W. H. Pearson.

Although not numerous, Mr. Dümmer's mosses contained several novelties, the most interesting being a new species of *Cyathophorum*, a small and beautiful genus hitherto unknown to Africa, confined in fact to southern and eastern Asia and the Pacific and Australasian regions.

Unless otherwise specified the types of the new species described are in the United States National Herbarium.

DICRANACEAE

TREMATODON INTERMEDIUS Welw. & Dub.

Damp roadside, alt. 4,000 ft., Luga, July, 1914, *Dümmer* 971.
Low grassland swamp, Nagoze, alt. 4,000 ft., Aug., 1916, *Dümmer* 2963. Both c. fr.

LEUCOBRYACEAE

OCTOBLEPHARUM ALBIDUM (L.) Hedw.

Rocky ledges, Jumbwa, alt. 4,000 ft., Jan.-Feb., 1917, *Dümmer* 3078; c. fr.

FISSIDENTACEAE

FISSIDENS SUBGLAUCISSIMUS Broth.

Moist ground in forest, near Kipayo, alt. 4,000 ft., Dec., 1914, *Dümmmer* 1403; c. fr.

FISSIDENS EROSULUS (C. M.) Par.

Damp caverns, in rocks, Jumbwa, alt. 4,000 ft., July, 1916, *Dümmmer* 2967; c. fr.

FISSIDENS SCIOPHYLLUS Mitt.

On *Erythrina* bark, grassland, Kijude, Nov., 1915, *Dümmmer* 2645a; c. fr.

A few stems, mixed with *Fabronia angolensis*. The leaf apex varies greatly, being usually acute, but often obtuse and apiculate; the cells are a little larger and less obscure than in Mungo Park's specimen at Kew, named by Mitten, but this is the only difference I can detect, and I have little hesitation in referring it to that species.

POTTIACEAE

TORTULA ERUBESCENS (C. M.) Broth.

On trees, Chiko Forest, Busoga, alt. 3,500 ft., *Snowden* 1, 7b.

ORTHOTRICHACEAE

SCHLOTHEIMIA GREVILLEANA Mitt.

On bark of *Erythrina tomentosa*, grassland, Kipayo, alt. 4,000 ft., May, 1914, *Dümmmer* 823; c. fr.

BYRACEAE

BRACHYMENIUM VARIABILE Dixon, sp. nov.

B. capitulato Mitt. affine sed foliis brevioribus, latioribus, late ovatis, minus distincte marginatis, longius cuspidatis. Seta multo brevior, circa 1.5 cm. longa. Theca minor, horizontalis vel plerumque subpendula, angustior, e collo brevi clavata; peristomium melius evolutum. Spori 30-40 μ . Folia siccitate plerumque valde torquata. Dioicum videtur.

Hab.: Tree trunk, savannah, Namonyungi, alt. 4,000 ft., June, 1915, *Dümmmer* 2577; c. fr.

A perplexing plant, from its great variability. It belongs to the section *Orthocarpus*, but though the leaves are often strongly spirally

twisted when dry, as in *B. nepalense* Hook., they are sometimes erect and appressed; the arista may be short and cuspidate or long and flexuose, the border well defined though narrow, or entirely wanting. The capsules may be pendulous, horizontal, or inclined. I supposed at first that there were two similar plants closely intermixed, distinguishable by the position of the leaves when dry, but the two forms appear to intergrade, and there seems to be no difference in the fruit.

It differs from *B. capitulatum*, apart from the characters distinguished above, in the peristome, the outer teeth of which are very densely barred with highly projecting lamellae on the outer surface, deep orange in color, strongly bordered, very finely and regularly papillose on the dorsal surface; the basal membrane of the endostome is about half the height of the outer teeth, with well developed, broad, obtuse segments, almost equal to the teeth, pale, and very delicately papillose.

These characters, the form and position of the capsule, and the very weakly bordered leaves, will separate *B. variable* from its other African near allies, almost all of which have the capsule suberect or only slightly inclined, and often or usually turgidly oval in form.

RHODOBRYUM ROSEUM (Weis) Limpr.

Rocky outcrops, Namonyungi, alt. 4,000 ft., June, 1915, *Dümmer* 2578.

NECKERACEAE

PILOTRICHELLA PILIFOLIA Dixon, sp. nov.

Ab omnibus congeneribus africanis facile distinguitur foliis caulinis in pilum longum filiforme saepe undulatum attenuatis.

Stirps pergracilis, ramis flexuosis attenuatis, foliis perindistincte seriatis, basi minime auriculatis, apice breviter cuspidatis. Seta flexuosa, circa 3 mm. longa; theca elliptico-cylindrica, fulva, operculo oblique longirostrato.

Hab.: Epiphytic; pendent in forest, Mabira, near Mubango, alt. 4,000 ft., July, 1916, *Dümmer* 2961; c. fr. Type in British Museum.

A distinct species, more slender than most of its African allies, with markedly attenuate branches, and a very conspicuous difference between the longly piliform stem leaves and the shortly mucronate turgid ones of the branches. Some species of the closely allied genus *Squamidium* have similarly piliferous stem leaves, but these have a distinct group of differentiated alar cells.

Pilotrichella tenellula (C. M.) and *P. capillicaulis* (C. M.) may be near it, but the author describes the leaves as shortly pointed, apparently in reference to the stem leaves. *P. pseudoimbricata* C. M. is also somewhat like it, but the stem leaves are more shortly and rigidly pointed, the branch leaves more erect, etc.

NECKEROPSIS TRUNCATA (P. Beauv.) Fleisch.

Tree trunks in forest, near Nagoye, alt. 4,000 ft., Dec., 1916, *Dümmer* 3028.

A sterile plant, probably referable here. *Neckeroopsis subtruncata* Broth. from Togoland I do not know; but it appears to be an unpublished species.

NECKEROPSIS LEPINEANA (Mont.) Fleisch.

Epiphytic in forest, Mabira, near Mubango, alt. 4,000 ft., July, 1916, *Dümmer* 2962. Locally abundant.

POROTRICHUM LAURENTII Ren. & Card.

Tree trunks in forest, Kipayo, alt. 4,000 ft., Sept., 1915, *Dümmer* 1057; c. fr.

This agrees quite well with an original specimen of Laurent's gathering from the Belgian Congo, in Herb. Besch. at the British Museum. It has not hitherto been recorded in fruit. Sporophytic characters to be noted are as follows:

Perichaetia numerous; bracts rigid, subsquarrose, broadly acuminate, subentire, thinly nerved; vaginula and paraphyses somewhat exceeding the perichaetium. Seta 1.5 cm., yellowish, slender. Theca erect, symmetrical; lid rostrate. External peristome pale; teeth hyaline, very narrow, rather closely trabeculate, striolate only in the lowest segments, above finely papillose; internal orange brown, from a low basal membrane; processes nearly equal to the teeth, rather robust, rigidly linear, narrowly and interruptedly slit for the greater part of their length, finely papillose, nodose. Cilia apparently none.

PINNATELLA ENGLERI Broth.

In small quantity, associated with the last species. Also on trees, Chiko Forest, Busoga, alt. 3,500 ft., 1916, *Snowden* 6.

THAMNIUM PENNAEFORME (Hornsch.) Kindb.

Chiko Forest, Busoga, alt. 3,500 ft., 1916, *Snowden* 6a.

ENTODONTACEAE

ERYTHRODONTIUM SUBJULACEUM (C. M.) Par.

Chiko Forest, Busoga, alt. 3,500 ft., 1916, *Snowden* 3 p. p. and 7; c. fr. On bark of *Erythrina*, grassland, Kipayo, alt. 4,000 ft., May, 1914, *Dümmer* 820; c. fr.

FABRONIACEAE

FABRONIA ANGOLENSIS Welw. & Dub.

On *Erythrina*, grassland, Kijude, alt. 4,000 ft., Nov., 1915, *Dümmer* 2645b; c. fr. Tree trunk, savannah, Namonyungi, alt. 4,000 ft., June, 1915, *Dümmer* 2577b; c. fr.

HOOKERIACEAE

HOOKERIOPSIS PAPPEANA (Hampe) Jaeg.

A stem or two with one or two capsules, associated with *Rhacopilum marginatum* (*Dümmer* 984).

Mitten¹ records this species, with some uncertainty, from the Usagara Mountains.

HYPOPTERYGIACEAE

CYATHOPHORUM AFRICANUM Dixon, sp. nov.

§ *Cyathophorella*. Stirps *pergracilis*; caules 4-6 cm. alti, flexuosi, cum foliis 5 mm. lati, apice *haud flagelliformi desinentes*. Folia sat conferta, paullo recurvata, 3-4 mm. longa, valde asymmetrica, *latere inferiore plus minusve concavo, superiore valde convexo*, margine omnino plano, e basi fere minute, apicem versus magis magisque acute, subspinose dentato, valde indistincte marginato; costa pro more *valida*, tertiam partem folii longitudinis vel supra attingens. Areolatio sat densa, valde chlorophyllosa, superne e cellulis rhomboideis 40-50 μ longis, 14-18 μ latis, marginalibus 1-2 seriebus angustioribus limbum indistinctum efficientibus.

Amphigastria multo minora, *lanccolata, sensim anguste acuminata*, argute dentata, laxius areolata, minus chlorophyllosa, costa *unica, longa* 1/2-2/3 folii longitudinem aequante praedita.

Seta erecta, tenuiuscula, 1.5-2 mm. longa; theca erecta, breviter oblonga *valde leptodermica*, pallide fusca. Peristomium *pallidum*, externum e dentibus *angustis inaequalibus* articulatis dense *grosse*

¹ Journ. Linn. Soc. Bot. 22: 309. 1886.

papillosis instructum. Endostomium? Calyptram operculumque haud vidi.

Hab.: Tree trunk in forest, Kipayo, alt. 4,000 ft., March, 1914, *Dümmer* 721.

The first member of this beautiful genus to be found in Africa. Of a dozen or so stems none show any tendency to the gemmiparous, flagelliform attenuation of most of the section *Cyathophorella* (raised by Fleischer to the position of a genus); but the peristome undoubtedly belongs there. This is, however, of a very puzzling nature. Only two capsules show it in at all good condition. In the one case the teeth are all densely and coarsely papillose from top to bottom, very unequal in width, and somewhat irregular in form; and there appears to be no endostome. In the other the teeth, while approximately of the same build, equally irregular or more so, are absolutely smooth and pellucid; and again there is no indication of a second row. At first I supposed these to be the endostome; but if so, there is absolutely no trace of outer peristome left, which would be remarkable considering that the inner (if it so be) is fairly, if not altogether intact; and still more so as in that case we are to consider that in the first capsule described the *outer* peristome has remained more or less perfect while the *inner* has altogether disappeared. I am strongly inclined to suppose, therefore, that here too it is the outer peristome present, but entirely free from the dense coating of papillae shown in the former.

RHACOPILACEAE

RHACOPILUM SPELUNCAE C. M.

On trees, Chiko Forest, Busoga, alt. 3,500 ft., 1916, *Snowden* 3.

This agrees with Schweinfurth's plant in the Kew Herbarium. The leaves, convolute and often rigidly spreading when dry, not at all connivent, and the large stipular leaves, almost similar in form to the lateral leaves, seem to be features of this species.

RHACOPILUM MARGINATUM Dixon, sp. nov.

Species valde notatum, praecipue foliorum areolatione, e cellulis *magnis*, elliptico-hexagonis, 20-30 μ longis, 12-15 μ latis instructa, *marginalibus* 1-2 seriebus *perangustis*, *linearibus* vel *rhomboideo-linearibus*, *limbum* sat *notatum* *instruentibus*; basilaribus multo laxioribus, oblongis, superioribus plus minusve papillosis. Folia lateralialia *valde* *asymmetrica*, majuscula, 2.5-3 mm. longa, obtusiuscula, supra medium sat argute denticulata; costa in cuspidem

longiusculum rigidiusculum excurrens. Folia stipuliformia multo minora, late triangulari-hastata, subdenticulata, costa valida in aristam *strictam crassam aequilongam* excurrens. Seta *tenuiuscula*, 2.5-2.75 cm. longa, theca (operculata) 4-5 mm. longa. Operculum curvirostratum, circa $1/3$ thecae longitudinem aequans.

Hab.: Tree trunk in forest, Kipayo, alt. 4,000 ft., Aug., 1914, *Dümmer* 984; c. fr.

The large-celled leaves with a more or less distinct border separate this from all the other African species. *R. macrocarpum* Broth. has a longer seta and rather longer (5 mm.) capsule. The capsules here are not quite mature, so that their ultimate form and direction is uncertain.

RHACOPILUM UGANDAE Broth. & Dixon, sp. nov.

R. Büttneri Broth. affine. Species nostra differt foliis apicem versus argutius serrulatis, cellulis (papillosis) paullo *minoribus, brevioribus*, 13-16 μ longis, 8 μ latis, foliis stipuliformibus valde crasse longe cuspidatis, foliis perichaetialibus marginibus *denticulatis*; seta *circa 2 cm. longa*, theca (nec perfecte matura) inclinata, 5-7 mm. longa, operculo *breviter rostrato seu rostellato, vix 1/3 thecae longitudinem aequante*.

Hab.: Trunk of tree in forest, Kampala, Kyagwe Prov., Nov., 1913, *R. Dümmer*. Type in my herbarium.

Although scarcely differing vegetatively from *R. Büttneri*, the fruiting characters give adequate if not striking differences, as noted above. The seta in that species is 2.5 cm., the capsule only 2.5 to 4 mm. long, the lid with a beak half the length of the capsule, the perichaetial leaves entire. *R. crassicuspidatum* Corb. & Thér., which it resembles in the long, stout arista of the stipular leaves, has these not cordate or hastate at the base, while the leaf cells are smooth. *R. speluncae* has much larger stipular leaves; *R. macrocarpum* Broth. has more serrulate stipular leaves, entire perichaetial leaves, longer seta, and rather shorter capsule.

LESKEACEAE

LINDBERGIA PATENTIFOLIA Dixon, sp. nov.

Autoica. Caespites densi, saturate virides; caulis pro genere sat robustus, strictiusculus, irregulariter pinnato-ramosus, rami sicci *valde teretes, julacei*, obtusi. Folia valde conferta, *madida horizontaliter patentia, apice saepius leniter sursum incurvo, sicca arcte*

julaceo-appressa, e basi rotundato-ovata breviter saepe oblique acute acuminata, marginibus planis vel uno latere ad basin angustissime reflexis, integris, costa inferne sat valida, *superne sensim angustata*, infra apicem evanida. Cellulae superiores *subrotundatae* seu brevissime ellipticae, parietibus subincrassatis, juxta-costales paullo elongatae, omnes fere basilares transverse ellipticae; omnes omnino laeves, *valde pellucidae*. Flores masculi numerosi, subfuscentes; perichaetia breviuscula, foliis internis suberectis, sat breviter acuminatis, superne subdenticulatis. Fructus ignotus.

Hab.: On trees, Chiko Forest, Busoga, alt. 3,500 ft., 1916, *Snowden* 7c. Type in my herbarium.

The generic position of this plant can not be considered definitely settled in the absence of fruit, but its close affinity to one or two other African species of *Lindbergia*, notably *L. haplocladioides* Dixon¹ and *L. viridis* Dixon & Wager (ined.), leaves no doubt in my mind of its belonging here. *L. haplocladioides* closely resembles it, but the leaves there are more longly acuminate, less widely spreading when moist, and not julaceously appressed when dry; the stems more slender and more curved. *L. viridis* has leaves less spreading and more gradually acuminate, longer and thinner-walled cells, stouter nerve, etc., and is a far more slender plant.

THUIDIUM LAEVIPES Mitt.

Chiko Forest, Busoga, 1916, *Snowden* 2b; c. fr. Tree trunk in forest, Kipayo, 4,000 ft., Dec., 1915, *Dümmer* 512, 720; c. fr.

Original specimens of Mitten's species appear to be unavailable; but these agree well with central African specimens so named, which agree with Mitten's description; it appears to be not infrequent in central Africa. The cilia on the inner perichaetial bracts are sometimes extremely long and conspicuous, but this character is not constant. The capsules are usually much contracted below the mouth.

THUIDIUM PALLIDISETUM Dixon, sp. nov.

T. pycnangiello C. M. affine, sed habitu multo alieno, laetevirens, ramulis *densius confertis*, foliisque *confertioribus*; cellulis foliorum ramulorum *multo minoribus*, chlorophyllosis, *magis obscuris*.

Caules elongati, *regulariter plumose bipinnati*; rami subaequales, circa 5 mm. longi, ramulis confertis, numerosis. Folia caulina *perminuta*, triangularia, breviter acuminata, falcato-squarrosa, levi-

¹ Bull. Torr. Bot. Club 43: 75.

ter plicata, sicca flexuoso-incurva, integra, marginibus subplanis, costa infra apicem desinente. Folia ramulina *dense conferta*, madida subcomplanata, ovato-elliptica, subobtusata, costa *angusta, subpellucida*, longe infra apicem desinente; cellulis *minutis*, irregulariter hexagonis, 4-5 μ latis, humiliter papillosis; marginibus crenato-serrulatis.

Autoicum. Folia perichaetialia externa aristata, *rigide patentia vel subsquarrosa*, interna erecta, in acumen *loriforme rigidiusculum subintegrum* producta, intima ciliata. Seta 1.5 cm., tenuis, *pallide aurantiaca, laevis*. Theca *subpendula*, breviter ovato-elliptica, gibbosa, operculo e basi plano-convexa breviter recte rostellato.

Hab.: Tree trunk in forest, Kipayo, alt. 4,000 ft., March, 1914, *Dümmer* 719.

A very pretty and distinct species, with the dense plumose habit more nearly of *T. plumulosum* (Doz. & Molk.) than of any of its African allies; it is indeed very similar in appearance to the more slender forms of that species. *T. ramusculosum* (Mitt.) is of quite a different order.

HYPNACEAE

ECTROPOTHECIUM DÜMMERI Dixon, sp. nov.

Caespites densissimi, *sordide virides*, nitidiusculi. Caules dense intricati, densiuscule irregulariter subpinnatim ramosi, pergraciles, ramis circa 3-5 mm. longis, *complanatis*. Folia *complanata*, valde patentia, *nec falcata, parva*, caulina circa 0.5 mm. longa, ovato-lanceolata, sensim breviter acuminata; ramea minora, *ovata, breviter oblique acuminata, vel acuta*; marginibus planis, integris vel inconspicue denticulatis, costis nullis. Areolatio *sat laxa*, e cellulis linearirhomboides, *valde prosenchymaticis*, 5-7 μ latis instructa, basilaribus unica serie latioribus, ellipticis, subvesiculososis, alaribus vix ullis.

Autoicum. Seta tenuis, *circa 1 cm. longa, laevis*. Folia perichaetialia *erecta*, sensim *longe rigidiuscule acuminata*, subdenticulata. Theca *minuta*, vix 1 mm. longa, turgide ovata, horizontalis, postea pendula; operculum conicum, siccitate conico-rostellatum.

Hab.: Damp soil in forest, Nagoye, alt. 4,000 ft., Jan., 1917, *Dümmer* 3050a; c. fr.

A distinct species, with much shorter and wider leaves, wider cells, and darker color than the allied African species, which for the most part have finely acuminate leaves and very narrow cells. The present plant is vegetatively much more like an *Isopterygium*, but the subglobose, pendulous capsule is quite ectropothecioid.

VESICULARIA SPHAEROCARPA (C. M.) Broth.

Chiko Forest, Busoga, 1916, *Snowden* 2; c. fr. Tree trunk in forest, Kipayo, May, 1914, *Dümmer* 826; c. fr.

Both these belong to a form with longly acuminate, falcate leaves and longer, narrower cells than in the type; it occurs in South African specimens mixed with the type form.

EXPLANATION OF PLATE

FIG. 1. *Brachymenium variabile* (type). *a*, Leaf apex, $\times 80$. (The nerve is shown a little too stout.)

FIG. 2. *Pilotrichella pilifolia* (type). *a*, Part of stem, nat. size; *b*, stem leaf, $\times 20$; *c*, branch leaf, $\times 20$.

FIG. 3. *Cyathophorum africanum* (type). *a*, Stem, nat. size; *b*, leaf, $\times 10$; *c*, amphigastrium, $\times 10$; *d*, capsule, nat. size.

FIG. 4. *Rhacopilum marginatum* (type). *a*, Leaf, $\times 10$; *b*, stipuliform leaf, $\times 10$; *c*, upper marginal cells, $\times 200$.

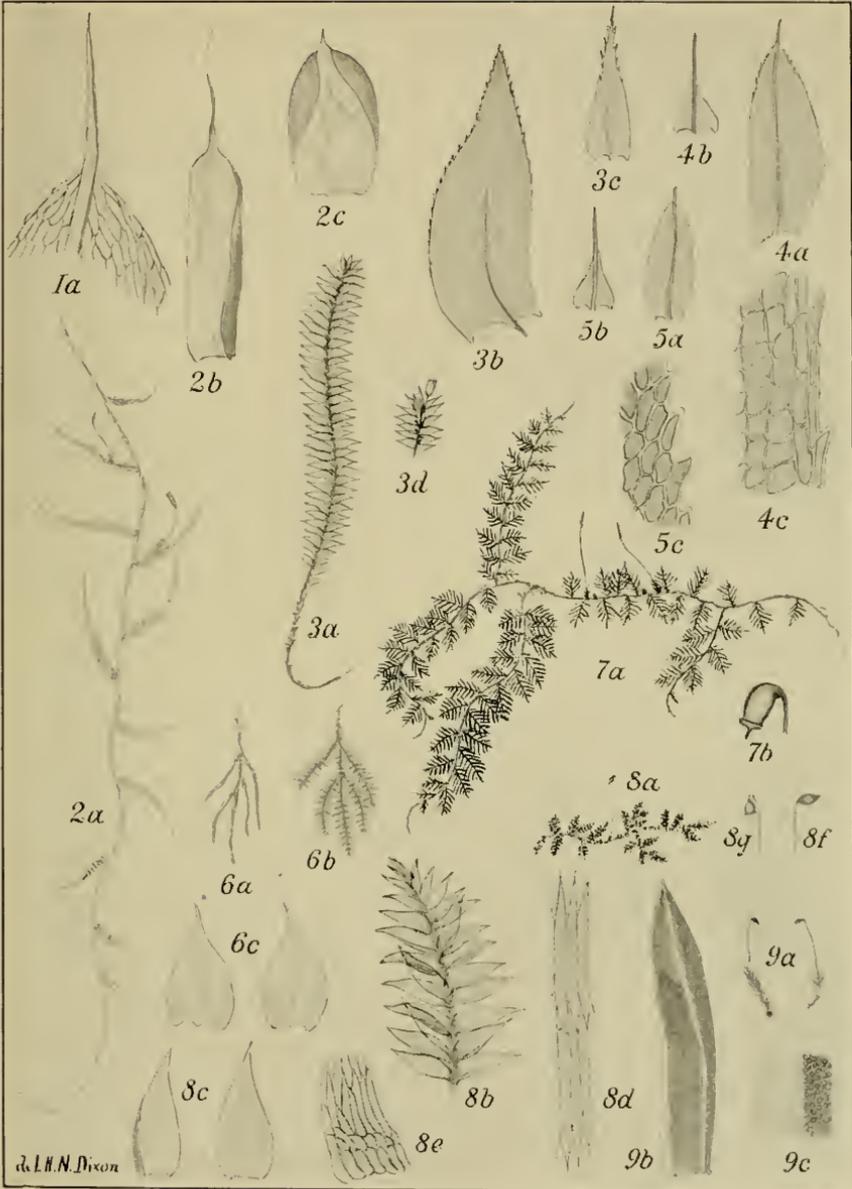
FIG. 5. *Rhacopilum ugandae* (type). *a*, Leaf, $\times 10$; *b*, stipuliform leaf, $\times 10$; *c*, upper marginal cells, $\times 200$.

FIG. 6. *Lindbergia patentifolia* (type). *a*, Stem (dry), $\times 3$; *b*, the same (moist), $\times 3$; *c*, leaves, $\times 10$.

FIG. 7. *Thuidium pallidisetum* (type). *a*, Stem, nat. size; *b*, capsule, $\times 5$.

FIG. 8. *Ectropothecium Dümmeri* (type). *a*, Stem, nat. size; *b*, branch, $\times 10$; *c*, branch leaves, $\times 20$; *d*, upper cells, $\times 200$; *e*, alar cells, $\times 200$; *f*, *g*, capsules, $\times 2$.

FIG. 9. *Fissidens subglaucessimus* (*Dümmer* 1403). *a*, Stems, $\times 1$; *b*, leaf, $\times 20$; *c*, marginal region of vaginant lamina near base, $\times 150$.



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