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Supplement to the Manual of Hawaiian Mosses*

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Since the Manual was published in 1933, I have studied numerous collections sent me by E. H. Bryan, Jr., Curator of Collections of Bernice P. Bishop Museum, which add considerably to our knowledge of the Hawaiian moss flora. The results of these studies are embodied in this supplement.

With few exceptions, the species found in the region below the rain forest belt, from sea level to 4,000 or 5,000 feet, seem to have reached almost stable equilibrium. The same species occur over and over again on all the larger islands with very little variation. The inference is that the mosses have been here long enough to adapt themselves thoroughly to the environment and that, isolated as they are from any contact with other regions, the species have crystallized into definite units that show little tendency to vary.

Among recent collections the series gathered by Miss Marie C. Neal and Dr. Constance E. Hartt on the upper slopes of Mauna Kea is of unusual interest, giving the first general idea of the bryophytes of these high slopes. It is evident that any considerable extension of the Hawaiian moss flora will come principally from the high regions of Mauna Kea, Mauna Loa, and Haleakala. A collection of Hawaiian mosses made by Sven Berggren in 1874, principally from the slopes of Mauna Kea, was sent to me for determination by Dr. Eric Hulten of the Botaniska Museet, Lund, Sweden. Although limited in num-

* B. P. Bishop Mus., Bull. 101, 1933.

bers, the series contains one new species of *Orthotrichum* and several records of species new to Hawaii.

The progress that has been made in these studies is due, in a great measure, to the cordial cooperation of the staff of Bishop Museum for which I shall always be deeply grateful.

The types of the new species and varieties described below are in my herbarium and duplicates are in the herbarium of Bishop Museum.

FAMILY FISSIDENTACEAE

Fissidens (Aloma) lancifolius, new species (fig. 1).

Autoicus, pusillus. Caulis brevis, circa 1 mm. altus. Folia 4-5 juga, infima minuta, superiora multo majora, circa 1.5 mm. longa, lineari-lanceolata, acuminata, immarginata; marginibus ubique crenulata; costa valida,

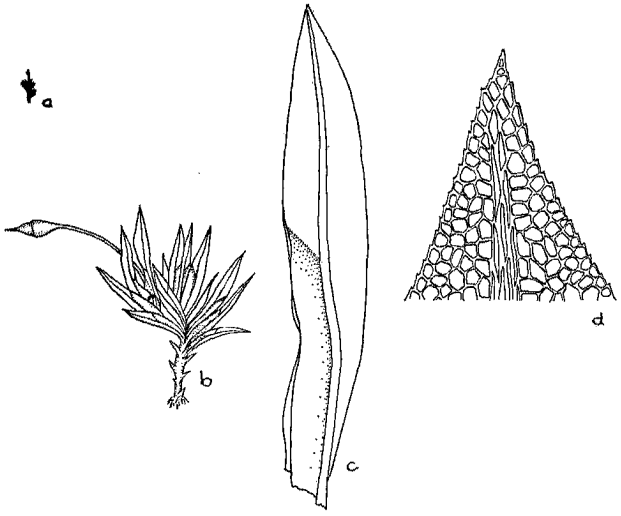

FIGURE 1.—*Fissidens lancifolius*: *a*, plant × 1; *b*, plant × 10; *c*, leaf × 40; *d*, apex of leaf × 250.

cum apice evanida; cellulae superiores hexagonae, parietibus firmis, 7-10 μ, inferne sensim laxiores. Seta 2 mm. alta, flexuosa; theca erecta, minuta, deoperculata circa 0.4 mm. longa; operculum longirostre.

Autoicous; male bud terminal on a short branch from near base of fertile stem. Small, closely gregarious plants. Stems about 1 mm. high with 4-5 pairs of leaves. Lower leaves small, upper much larger, about 1.5 mm. long, linear-lanceolate, acuminate, not bordered; margins crenulate all around; costa strong, percurrent; upper leaf cells hexagonal, with firm walls, smooth, 7-10 μ in diameter, gradually more lax below. Seta terminal, flexuose, 2 mm. long; capsule erect, urn about 0.4 mm. long; lid long beaked.

Oahu: Nuuanu Valley, 1935, *R. D. Svihla 2338, 2345* (type), *2458, 2463.* Maui: Honolua Canyon, 1935, *Svihla 2574.*

This species is readily distinguished from any of the local species with unbordered leaves by the small size and narrowly lanceolate acuminate leaves with relatively large cells. It is the first species in the Section *Aloma* to be recorded from Hawaii. In some respects the local plant resembles *F. exilis* Hedwig, of Europe, but differs appreciably in the sharply pointed leaves and much shorter setae.

Fissidens oahuensis, new name.

Fissidens insularis Bartram, B. P. Bishop Mus., Bull. **101**: 16, 1933.

M. Theriot has called my attention to the fact that the name *Fissidens insularis* Theriot (Acad. Geog., Bull. **98,** 1910) has priority. I propose the name *F. oahuensis* for the Hawaiian plant.

Family DITRICHACEAE

Genus **DISTICHIUM,** Bryol. Eur., fasc. 29-30, 1846

Slender, erect plants. Leaves distichous, subulate, from a clasping base; basal cells narrow, upper cells subquadrate, minute. Capsule oblong or cylindric, long exserted; peristome teeth 16, linear-lanceolate, pale reddish, variously cleft or divided.

Distichium capillaceum (Hedwig) Bryol. Eur., fasc. 29-30: 4, 1846 (fig. 2).

Cynontodium capillaceum Hedwig, Sp. Musc., 57, 1801.

Paroicous; antheridia free in axils of upper leaves. Slender, glossy plants in dense, silky tufts. Stems usually branched, densely tomentose below. Leaves distichous, about 3 mm. long, from an erect, pale, clasping, oblong-ovate base rather quickly narrowed to a long, spreading, papillose, setaceous point; margins erect, entire at base, minutely crenulate from shoulders up, costa excurrent, with a few teeth at extreme point; basal cells narrowly rectangular becoming linear toward margins, upper cells minute, subquadrate, papillose in subula. Perichaetium terminal, of two sheathing leaves; seta elongate; capsule erect or suberect, oblong, smooth, reddish brown and glossy when dry; peristome teeth narrow, pale, irregularly cleft, faintly obliquely striolate; lid conical.

Hawaii: Mauna Kea, *Argyroxiphium* region, 1874, Berggren.

Distribution: wide in arctic and antarctic regions and at high altitudes in temperate and tropic zones.

Easily recognized by the setaceous leaves in opposite rows on each side of the stem. New to the Hawaiian flora.

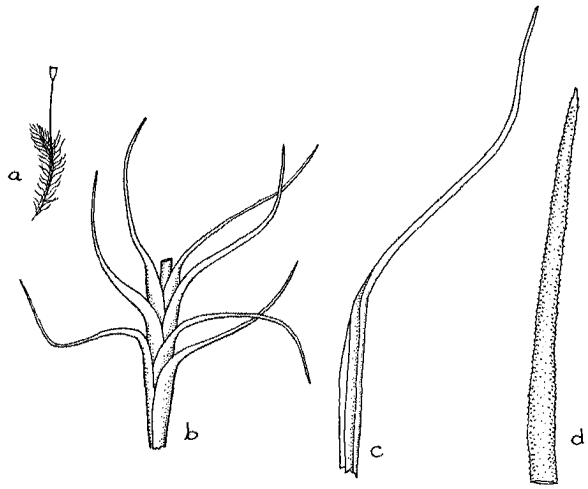

FIGURE 2.—*Distichium capillaceum* (Hedwig) Bryol. Eur.: *a*, plant × 1; *b*, part of stem × 10; *c*, leaf × 20; *d*, apex of leaf × 80.

FAMILY DICRANACEAE

Campylopus Boswelli Hampe variety **capitulatus,** new variety.

Gracilescens. Folia comalia dense comosa.

Slender. Stems filiform. Stem leaves appressed, comal leaves crowded in a dense, conspicuous, capitulate cluster.

Maui: Puukukui, west Maui, alt. about 3,500 ft., Aug. 16, 1933, *Neal 616* (type).

A peculiar and very unusual form so far as the habit is concerned but without any structural differences.

Amphidium cyathicarpum (Montagne) Brotherus.

Hawaii: Mauna Kea, *Argyroxiphium* region, 1874, *Berggren*; Laumaia, alt. 6,570 ft., Aug. 19, 1935, *Hartt and Neal 845,* in part.

Not recorded before from the island of Hawaii.

Leucoloma scaberulum, new species (fig. 3).

Dioicum; gracile, caespitosum, caespitibus densis, lutescenti-viridibus. Caulis circa 2 cm. altus, erectus vel adscendens, dense foliosus, basi tomentosus. Folia flexuosula vel falcatula, 3-4 mm. longa, anguste lanceolato-subulata, concava; marginibus erectis, summo apice denticulis paucis instructis; costa tenuissima, pallida, cum apice soluta; cellulae superiores oblongae, dorso valde papillosae, parietibus incrassatis, marginales angusti, in seriebus 2-7 lineares sed limbum hyalinum notatum haud formantes, basilares lineares, alares numerosae, fuscae, ad costam attigentes. Caetera ignota.

Dioicous; slender, densely tufted plants, yellowish green. Stems about 2 cm. high, ascending or erect, tomentose below. Leaves crowded, 3-4 mm. long, flexuose or slightly falcate, narrowly lanceolate-subulate, concave; margins erect, minutely denticulate at the extreme apex; costa slender, percurrent; upper cells oval-oblong, incrassate, papillose on back, bordered by a rather poorly defined marginal band of linear hyaline cells in 2-7 rows, basal cells elongate with thickened, slightly sinuose lateral walls, alar group conspicuous, brownish. Sporophyte unknown.

Oahu: Kipapa Gulch, wet forest, on tree trunks, alt. 2,500 ft., July 4, 1932, *E. Y. Hosaka 14*; Kipapa Gulch, alt. 1,500 ft., June 11, 1933, *Hosaka 1061* (type).

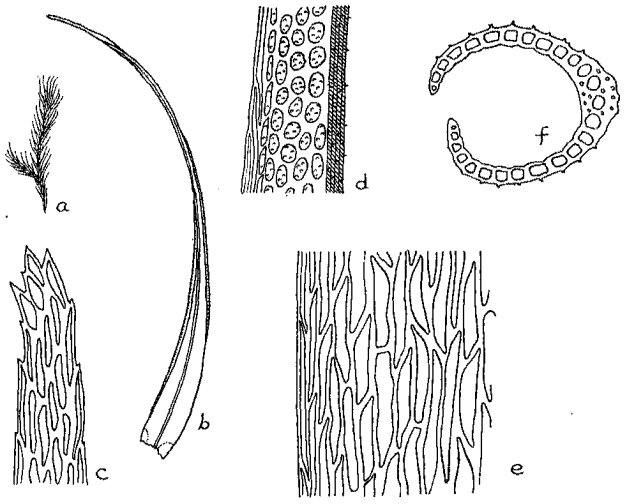

FIGURE 3.—*Leucoloma scaberulum*: *a*, plant × 1; *b*, leaf × 16, *c*, apex of leaf × 250; *d*, upper leaf cells and margin × 250; *e*, basal leaf cells and margin × 250; *f*, cross section from upper part of leaf × 250.

Very distinct from *L. molle* (C. Müller) Mitten in the shorter leaves with stouter points, the percurrent costa, the poorly defined border of elongated cells which merges insensibly with the basal areolation and the short inner cells of the leaf blade strongly papillose on the back with multifid papillae.

FAMILY ENCALYPTACEAE

Encalypta sandwicensis Sullivant.

Hawaii: Mauna Kea, *Edwardsia (Sophora)* region, 1874, *Berggren*; above Hookomo, on bark of *Sophora* and rock beneath, alt.

7,800 ft., Aug. 8, 1935, *Neal and Hartt 784.*

Confined to the Mauna Kea region, as far as known, and apparently rare.

FAMILY POTTIACEAE

Genus **MERCEYOPSIS** Brotherus and Dixon, Bot. Jour., **48**: 298, 1910

Mostly rupestrine plants. Stems branched. Leaves crispate when dry; costa strong, ending below apex, in cross section showing a median row of guide cells; upper leaf cells small, lax and rectangular toward the base. Seta elongate, terminal; capsule erect; peristome none; lid slenderly beaked; spores small.

Merceyopsis crassinervis (Brotherus), new combination.

Molendoa crassinervis Brotherus, B. P. Bishop Mus., Bull. **40**: 11, 1927.

A well-fruited collection by C. N. Forbes from Waikapu, west Maui, shows the setae terminal. This character precludes both *Anoectangium* and *Molendoa,* so there is no alternative but to refer the Hawaiian plant to *Merceyopsis.* It should be remarked, however, that the linear-lanceolate leaves are not typical of the genus.

Anoectangium Harttiae, new species (fig. 4).

Tenellum, dense caespitosum, caespitibus viridibus intus ferrugineis. Caulis erectus, ad 1 cm. altus, inferne tomentosus. Folia conferta, sicca adpressa, incurva, saepe spiraliter contorta, oblongo-ligulata, carinato-concava, rotundato-obtusa, haud mucronata; marginibus erectis, papilloso-crenulatis; costa pervalida, infra apicem folii evanida, dorso scabro, inferne ad 90 μ lata, ferruginea; cellulae superiores obscurae, rotundatae, 6-7 μ, dense papillosae, inferiores breviter rectangulares. Bractae perichaetii internae erectae, 2 mm. longae, alte vaginantes, in subulam integram saepe obtusam attenuatae; seta tenuissima, flexuosa, 8 mm. alta; theca erecta; operculum longissime subulato-rostratum.

Densely tufted plants, green above, brown below. Stems erect, about 1 cm. high, matted together with radicles below. Leaves crowded, appressed with incurved points and somewhat spirally contorted around stem when dry, 1.2 mm. long and 0.25 mm. wide, oblong-ligulate, carinate-concave, obtusely rounded, not mucronate; margins erect, papillose-crenulate; costa very stout, brown, about 90 μ wide below, scabrous on the back, ending below the apex, in cross section showing an essentially homogeneous structure; upper cells obscure, rounded, densely papillose, 6-7 μ, short rectangular toward the base. Inner perichaetial leaves 2 mm. long, erect, from a broad, high, sheathing

base, denticulate above, abruptly contracted to a rather short, entire, often obtusely pointed subula. Seta slender, pale, flexuose, 8 mm. long; capsule erect, urn 1 mm. long; lid long subulate-rostrate, beak longer than urn.

Hawaii: Mauna Kea, Laumaia, in gulch, alt. 6,574 ft., Aug. 19, 1935, *Hartt 844.*

This species is sharply distinguished by the obtusely rounded leaves and the broad, thick costa ending slightly below the apex. The costa in cross section shows no differentiated guide cells thus eliminat-

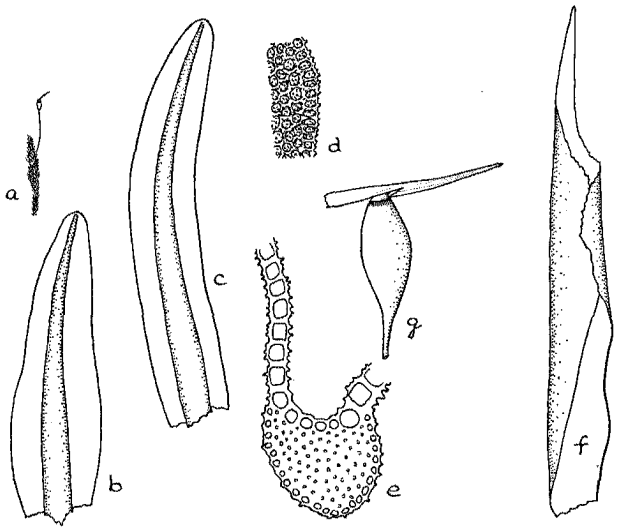

FIGURE 4.—*Anoectangium Harttiae*: *a*, plant × 1; *b, c*, leaves × 40; *d*, upper leaf cells and margin × 250; *e*, part of cross section of leaf × 250; *f*, inner perichaetial leaf × 30; *g*, capsule with lid and calyptra × 10.

ing *Molendoa.* As the setae are obviously lateral, the species must be referred to *Anoectangium.*

Named for the collector, Dr. Constance E. Hartt, of the staff of the Hawaiian Sugar Planters' Experiment Station.

Leptodontium brevicaule Bartram.

Hawaii: Mauna Kea, 1874, *Berggren*; Huumula, on lava flow at base of Puu Huluhulu, alt. 6,610 ft., Aug. 6, 1935, *Neal and Hartt 682;* Kalaeeha, alt. 6,200 ft., Aug. 7, 1935, *Neal and Hartt 711a.*

Confined to the island of Hawaii, as far as known, but apparently not uncommon there at altitudes of from 5,000 to 7,000 feet.

Tortula alpina (Bryol. Eur.) Bruch variety **inermis** (Milde) De Notaris (fig. 5).

Barbula alpina variety *inermis* Milde, Bot. Zeit., 448, 1862.

Autoicous; male bud axillary. Robust reddish-brown plants in deep cushions. Stems 1-2 cm. high, branched, densely radiculose below. Leaves appressed and lightly spirally contorted when dry, erect-spreading when moist, about 3 mm. long and 1 mm. wide, oblong-lingulate, obtuse or rounded and mucronate by excurrent costa; margins recurved below middle, plane above; costa strong, brown, 90 μ wide below, scabrous on back in upper half; upper leaf cells very obscure, rounded-quadrate, 10-13 μ, densely papillose with crescent-shaped papillae, interior basal cells rectangular, thin walled, hyaline, 4-5 rows at basal margins shorter and subquadrate. Seta red, about 1 cm. high; capsule cylindric, often slightly curved, urn 3 mm. long, brown; peristome teeth lightly twisted, from a basal cylinder 160-200 μ high; lid bluntly rostrate, 1 mm. long; spores papillose 14-15 μ.

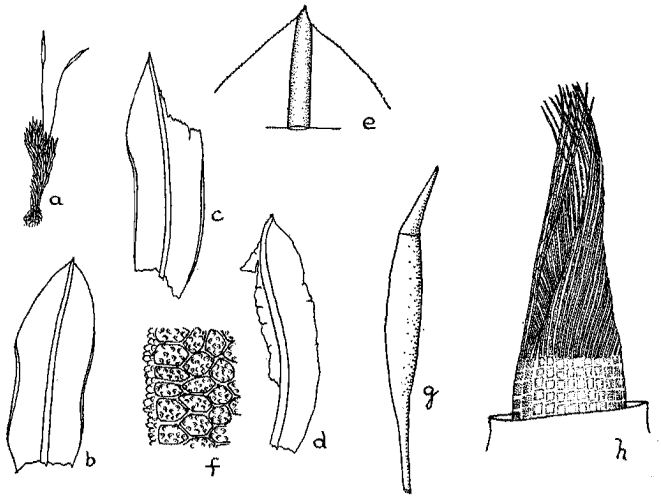

FIGURE 5.—*Tortula alpina* (Bryol. Eur.) Bruch var. *inermis* (Milde) De Notaris: *a*, plant × 1; *b, c, d*, leaves × 10; *e*, apex of leaf × 40; *f*, upper leaf cells and margin × 250; *g*, capsule × 6; *h*, peristome × 40.

Bark of trees and rocks. Hawaii: Mauna Kea, *Argyroxiphium* region, 1874, *Berggren*; Humuula, epiphyte on *Cupressus macrocarpa*, alt. 6,696 ft., Aug. 7, 1935, *Hartt and Neal 735*; above Humuula (at right), Mauna Kea-Humuula Trail, edge of rough lava, alt. 8,250 ft., Aug. 9, 1935, *Neal and Hartt 901*; above Hookomo camp, on bark of *Sophora* and rock beneath, alt. 7,800 ft., Aug. 8, 1935, *Neal and Hartt 785*. Maui: Waiakua [Waiakoa?], 1935, *Svihla*.

Distribution: Tirol, northern Italy, southern Switzerland.

The presence of this plant in Hawaii is difficult to explain. At first I felt confident it must be a distinct endemic species but careful comparisons with authentic specimens of the variety *inermis* from southern Europe fail to produce any distinctions worthy of consideration. The only explanation I can find is that typical *Tortula alpina* seems to have a wide range in alpine regions from Europe to eastern China so that the original source of the Hawaiian plant may have been in Asia. The typically rupestrine plant of Europe has firm, solid leaves, while the leaves of the corticolous local specimens are noticeably fragile and brittle though the structural details are identical. Miss Neal and Dr. Hartt are to be congratulated on such a striking addition to the Hawaiian flora which, strangely enough, is richly fruited.

FAMILY GRIMMIACEAE

Grimmia haleakalae Reichardt.

Hawaii: Mauna Kea, *Argyroxiphium* region, 1874, *Berggren*; summit area of Mauna Kea, in crevice, alt. 13,100 ft., Aug. 12, 1935, *Neal and Hartt 796*; Mauna Kea, alt. 13,350 ft., Aug. 13, 1935, *Neal and Hartt 802*; above Humuula, alt. 11,500 ft., Aug. 15, 1935, *Neal and Hartt 896*; Mauna Kea-Humuula Trail, alt. 9,500 ft., Aug. 9, 1935, *Neal and Hartt 760;* near Hookomo, alt. 7,607, Aug. 8, 1935, *Neal and Hartt 781,* in part.

Probably common at high elevations.

Grimmia trichophylla Greville.

Hawaii: top of hill southwest of Hookomo, alt. 7,607 ft., Aug. 8, 1935, *Neal and Hartt 781,* in part; Mauna Kea-Humuula Trail, edge of rough lava, alt. 8,250 ft., *Neal and Hartt 901,* in part.

The only other recorded station on the island of Hawaii is the summit of Hualalai.

Ptychomitrium mauiense Brotherus.

Hawaii: Mauna Kea, Humuula, alt. 6,610, Aug. 6, 1935, *Neal and Hartt 675*; Mauna Kea, Humuula, alt. 6,400 ft., Aug. 7, 1935, *Neal and Hartt 712.*

Previously known only from Maui but probably well distributed on the high slopes of Mauna Kea and Mauna Loa.

FAMILY BRYACEAE

Mielichhoferia (Eumielichhoferia) Nealiae, new species (fig. 6).

Synoica; gracilis, dense caespitosa, caespitibus lutescentibus, haud nitidis. Caulis erectus, ad 1 cm. altus. Folia conferta, imbricata, ovato-lanceolata, acuminata, circa 1.2 mm. longa; marginibus erectis, superne remote serrulatis; costa infra apicem folii evanida; cellulae superiores anguste lineares basilares laxiores, subrectangulares. Seta flexuosa, 5-9 mm. longa; theca magna, suberecta, valde asymmetrica, deoperculata 2.5 mm. longa; endostomium hyalinum, haud papillosum, corona basilaris humillima, processus medio circa 10 μ lati, haud appendiculati; operculum conicum, obtusum; spori minute papillosi, 17-18 μ.

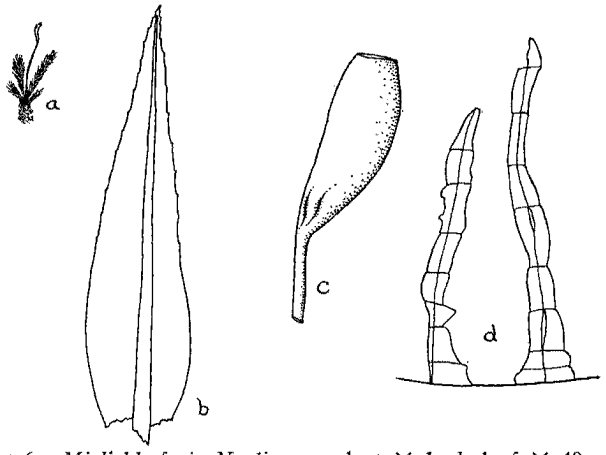

FIGURE 6.—*Mielichhoferia Nealiae*: *a*, plant × 1; *b*, leaf × 40; *c*, capsule × 10; *d*, part of peristome × 250.

Synoicous; slender, dull yellowish green plants in compact tufts or cushions. Stems about 1 cm. high including innovations, densely tomentose below. Upper leaves erect when dry, closely imbricated, about 1.2 mm. long, ovate-lanceolate, acuminate; margins erect, remotely serrulate above; costa ending below the apex; upper cells narrowly linear, becoming more lax and subrectangular toward base. Seta flexuose, reddish, 5-9 mm. long; capsule relatively large, suberect, asymmetrical, urn 2.5 mm. long with a short, sulcate neck; inner peristome hyaline, basal membrane low, scarcely projecting above the rim, segments narrowly linear, about 10 μ wide near middle, not appendiculate, essentially smooth; operculum short, obtusely conical; spores 17-18 μ, minutely papillose.

Hawaii: Mauna Kea, Laumaia, tree line, alt. 9,500 ft., Aug. 18, 1935, *Neal and Hartt 851* (type).

The short setae and asymmetrical capsules distinguish this species at a glance in the local flora. It is probably nearest *M. australis* Hampe, of Australia and New Zealand but thoroughly distinct in the shorter setae, more broadly acuminate leaves and especially in the

segments of the endostome which in *M. Nealiae* are smooth and not at all appendiculate.

Named for Marie C. Neal, Botanist of Bishop Museum, to whom I am indebted for many courtesies.

Mielichhoferia pulvinata C. Müller.

Hawaii: Laumaia, alt. 6,574 ft., Aug. 19, 1935, *Hartt and Neal 845*; Mauna Kea, foot of highest peak, alt. 13,100 ft., Aug. 12, 1935, *Neal and Hartt 795.*

Known before only from Haleakala on Maui.

Leptobryum pyriforme (Hedwig) Wilson.

Hawaii: Hookomo, in erosion crack, alt. 7,500 ft., Aug. 8, 1935, *Neal and Hartt 779.*

Sterile but evidently belongs here. No fruiting plants have been found in Hawaii.

Bryum vino-viride Bartram.

Oahu: summit of Puu Hapapa, alt. 2,878 ft., Honouliuli, Waianae Mountains, March 16, 1930, *St. John 10448.*

Previously known only from type locality on Kauai.

FAMILY HYPNODENDRACEAE

Limbella tricostata (Sullivant) C. Müller.

Oahu: Punaluu, top of ridge, west side of valley, alt. 2,000 ft., Sept. 3, 1933, *Neal*; Kipapa, Koolau Range, June 2, 1935, *Degener, Park, Potter, and Bush 9916.*

New to Oahu.

FAMILY ORTHOTRICHACEAE

Zygodon tetragonostomus A. Braun.

Hawaii: Hualalai, on summit plateau, alt. about 7,800 ft., June 19, 1934, *Neal and Hartt 636*; Mauna Kea, barom. 24.00, *Berggren.*

Previously known from only one restricted area on Haleakala.

Orthotrichum (Straminea) Berggrenii, new species (fig. 7).

Autoicum; dense caespitosum, caespitibus fuscescenti-viridibus. Caulis erectus, ad 1 cm. altus, ramosus. Folia sicca erecta, laxe adpressa, humida patula, a basi ovata sensim lanceolata, acuta, 2.5-3 mm. longa; marginibus revolutis; costa infra apicem folii evanida; cellulae superiores rotundatae, 12-15 μ, magis incrassatae, alte papillosae, basilares rectangulares, margines versus

subquadratae, laevissimae. Seta 1.5 mm. alta; theca immersa, oblonga, sicca profunde sulcata, stomatibus immersis; exostomii dentes per paria connati, minute papillosi, processus 8, breviores, angusti, laevissimi; operculum breviter apiculatum; calyptra pilosa; spori papillosi, 10-12 μ.

Autoicous; brownish green plants, without luster, in compact tufts. Stems erect, branched, to 1 cm. high. Leaves laxly erect and slightly contorted when dry, gradually lanceolate from an ovate base, acute, 2.5-3 mm. long; margins revolute in the lower half, plane and slightly sinuate above; costa ending below the apex; upper cells rounded, coarsely papillose, strongly incrassate, 12-15 μ, gradually becoming rectangular, smooth and pellucid toward the base, 6-7 rows at the basal margins subquadrate. Seta 1.5 mm. long; capsule immersed or

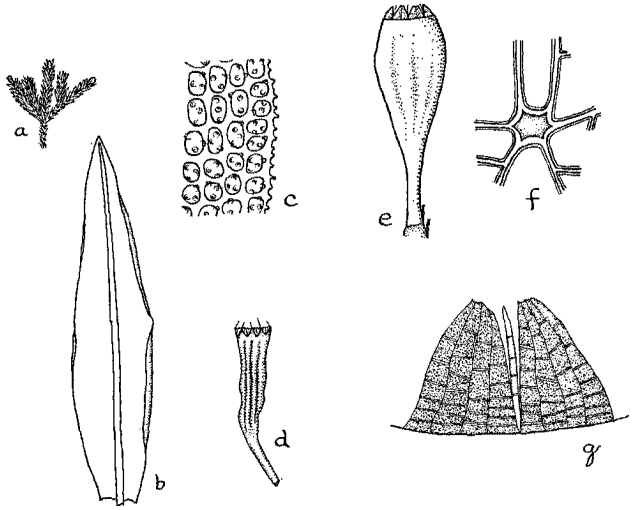

FIGURE 7.—*Orthotrichum Berggrenii*: *a*, moist plant × 1; *b*, leaf × 15; *c*, upper leaf cells and margin × 250; *d*, dry capsule × 10; *e*, moist capsule × 10; *f*, stoma × 250; *g*, part of peristome × 80.

about half emergent, oblong, deeply sulcate to the base when dry, stomata immersed; peristome double, the teeth in 8 pairs, reflexed when dry, papillose, segments of the inner peristome 8, linear-lanceolate, shorter than the teeth, smooth or faintly papillose; lid short apiculate; calyptra large, sparingly pilose; spores papillose, 10-12 μ.

Hawaii: Mauna Kea, *Argyroxiphium* region, 1874, *Berggren without number* (type).

Distinguished immediately from the other Hawaiian species by the immersed stomata near the neck of the capsule.

Orthotrichum Hillebrandi C. Müller.

Hawaii: above Hookomo, alt. 7,800 ft., Aug. 8, 1935; *Neal and Hartt 785a*; above Hookomo, alt. 8,000 ft., Aug. 9, 1935, *Neal and*

Hartt 771; southeast slope of Mauna Kea, Laumaia, alt. about 6,600 ft., June 18, 1915, *Forbes 894a.*

Collected but twice before on Hawaii, by Forbes (894a) and by Skottsberg.

Macromitrium intricatum C. Müller.

Hawaii: Mauna Kea, barom. 24.00, 1874, *Berggren*; Humuula, Puu Huluhulu, alt. 6,610 ft., Aug. 6, 1935, *Neal and Hartt 675,* in part.

These are the first records from the island of Hawaii.

FAMILY METEORIACEAE

Barbella trichophora (Montagne) Fleischer.

Hawaii: Hilo, 1874, *Berggren.*

A very robust form but the distinction seems entirely confined to size.

FAMILY BRACHYTHECIACEAE

Brachythecium lamprocarpum (C. Müller) Jaeger.

Hawaii: Humuula, Puu Huluhulu, alt. 6,610 ft., Aug. 6, 1935, *Neal and Hartt 677*; Humuula, on *Cupressus macrocarpa,* alt. 6,696 ft. Aug. 7, 1935, *Neal and Hartt 734, 738, 739*; Mauna Kea, barom. 24.00, 1874, *Berggren*; Hualalai, alt. 6,500 ft., June 19, 1934, *Neal 635.*

Apparently not uncommon on the high slopes but usually sterile. The pale, glossy, silky mats are quite characteristic.

Brachythecium plumosum (Hedwig), Bryol. Eur., fasc. 52-54: 4 1853.

Hypnum plumosum Hedwig, Sp. Musc., 257, 1801.

Hypnum oxyrrhynchium Dozy and Molkenboer, Ann. Sci. Nat., 308, 1844.

There is no reasonable doubt in my mind but that the plants from Hawaii, Philippines, and Java, referred to *Brachythecium oxyrrhynchium* (Dozy and Molkenboer) Jaeger, are inseparable from the cosmopolitan *B. plumosum.*

Brachythecium (Velutina) hawaiicum, new species (fig. 8).

Autoicum; gracile, dense caespitosum, lutescenti-viride. Caulis irregulariter ramosus. Folia falcato-secunda, ovato-lanceolata, longe acuminata, biplicata, 1 mm. longa, superne argute serrata. Seta inferne scaberrima, superne laevissima; theca inclinata, gibbosa; operculum conicum, acutum.

Autoicous; slender, yellowish green plants in dense mats or tufts. Stems about 2 cm. long, irregularly branched, branches slightly hooked at tips especially when dry. Leaves crowded, clearly falcate-secund, concave, ovate-lanceolate, biplicate, slenderly acuminate, about 1 mm. long; margins sharply and strongly serrate above, serrulate below; costa rather faint, extending beyond middle and often ending in a minute prickle on the back; leaf cells narrowly linear, about 16:1; quadrate alar cells few at the extreme basal angles. Seta 9 mm. long, reddish, scabrous toward the base, smooth above; capsule inclined, gibbous on the back; lid conic, acute.

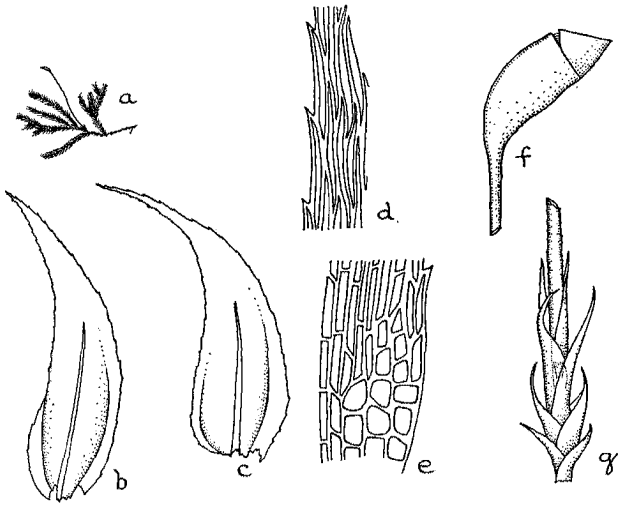

FIGURE 8.—*Brachythecium hawaiicum*: *a*, plant × 1; *b*, *c*, leaves × 40; *d*, upper leaf cells and margin × 250; *e*, basal angle of leaf × 250; *f*, capsule × 10; *g*, perichaetium and base of seta × 10.

Hawaii: Humuula, alt. 6,696 ft., epiphyte on *Cupressus macrocarpa*, Aug. 7, 1935, *Hartt and Neal 737* (type).

This is an interesting addition to the Hawaiian flora and is the only species of the Section *Velutina* recorded from the Pacific islands, so far as I know. It is easily distinguished from *B. plumosum* by the more slender habit, narrower falcate-secund leaves with a distinct plait on each side of the costa at the base, and the short setae scabrous below and smooth above.

Rhynchostegiella hawaiica (C. Müller) Brotherus.

Oahu: Mount Kaala, 1935, *Svihla.*

This is the only definite locality for this rare species, so far as I know.

FAMILY HYPNACEAE

Isopterygium vineale Bartram.

Hawaii: Laumaia, in *Acacia-Metrosideros* forest, alt. 5,800 ft., Aug. 17, 1935, *Neal and Hartt 839.*

New to the island of Hawaii.

FAMILY POLYTRICHACEAE

Polytrichum juniperinum Hedwig.

Hawaii: Mauna Kea, *Berggren*; near Aina Hou, alt. about 6,000 ft., June 12, 1915, *Forbes 824H.*

Polytrichum piliferum Hedwig, Sp. Musc., 90, 1801 (fig. 9).

Brownish green or glaucous green plants in rather dense, hoary tufts. Stems simple, about 3 cm. high, naked below. Lower leaves minute, appressed, the upper abruptly larger, crowded in a clavate head, erect-spreading when moist,

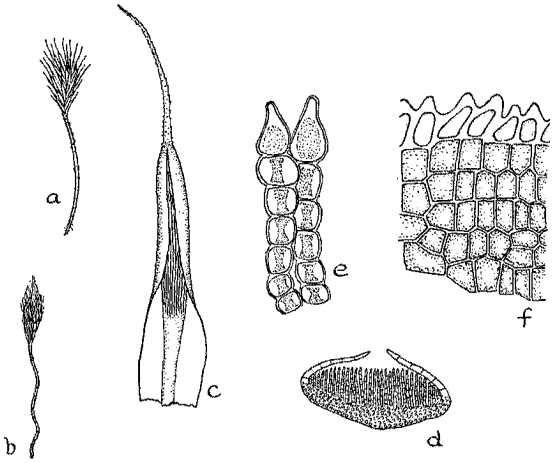

FIGURE 9.—*Polytrichum piliferum* Hedwig: *a,* moist plant × 1; *b,* dry plant × 1; *c,* leaf × 10; *d,* cross section of leaf blade × 40; *e,* lamellae in cross section × 250; *f,* part of lamella, side view, × 250.

5-7 mm. long, narrowly lanceolate from a pale oblong base, with the entire edges broadly inflexed over the face of the blade; costa excurrent in a long, hyaline, denticulate hair point, smooth on the back below the apex; lamellae in about 30 rows, in cross section 5-7 cells high with the apical cells bluntly conical, thick walled and smooth. Perichaetial leaves hyaline, long aristate, without lamellae; seta elongate; capsule short oblong, 4-angled; lid reddish, short beaked; peristome teeth 64, short and blunt; calyptra densely pilose, covering the capsule.

Dry rocks and soil. Hawaii: Mauna Kea, 1874, *Berggren*; east of Humuula below Kalaeeha, alt. 6,200 ft., Aug. 7, 1935, *Neal and Hartt 711*; east of Humuula below Kalaeeha, alt. 6,400 ft., Aug. 7, 1935, *Neal and Hartt 714*.

Distribution: North America, South America, Europe, Asia, Australia. Type locality Germany.

Although sterile these collections are unmistakable. This species is entirely new to the Hawaiian flora and adds one more to the list of cosmopolitan mosses which occur at high altitudes.