POLYNESIAN MOSSES

By

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INTRODUCTION

During the past ten years or so Bernice P. Bishop Museum has accumulated quite a representative series of moss collections from various parts of Polynesia. The list is an interesting one, and though it presents a suggestive bird's eye view of the mosses of this extensive region it is necessarily still incomplete. Only a relatively small number of species has as yet been collected in the Marquesas Islands, and the numberless small groups and isolated islands that have never been explored bryologically are legion.

The extensive collections of E. H. Quayle, in association with the Whitney Expedition in 1921-1922, from the Society Islands and other groups are nicely supplemented by smaller gatherings made by J. F. G. and A. M. Stokes in the Austral Islands; W. B. Jones, Mrs. G. P. Wilder, and K. P. Emory in the Tuamotu Archipelago; E. P. Mumford, W. B. Jones, and F. B. H. and E. D. W. Brown in the Marquesas Islands, together with a small collection from the Cook Islands and Tonga by H. E. and S. T. Parks and W. A. Setchell which came from the University of California.

A complete series of the mosses listed below, along with the types of the new species, has been deposited in Bernice P. Bishop Museum. A duplicate series remains in the herbarium of the writer.

AUSTRAL ISLANDS

Campylopus introflexus (Hedwig) Bridel.

Rapa, Whitney Expedition, 1921?.

Campylopus umbellatus (Walker-Arnott) Bartram.

Rapa, Lekie, top of peak, elevation 1150 feet, September 23, 1921, J. F. G. Stokes No. 234; Rapa, Nukumaala, on rock face of cliff, by waterfall, elevation 200 feet, September 21, 1921, A. M. Stokes no. 266.

Dicranoloma plicatum new species (fig. 1).

Robustum. Caulis ad 6 cm. altus, ramosus. Folia conferta, nitida, 7-8 mm. longa, oblongo-lanceolata, plicata; marginibus hyalino-limbatus, prope apicem argute dentatis; costa valida, percurrens; cellulae alares magnae, ex laminae inferiores elongatae, incrassatae, valde porosae, superne sensim breviores, in subula breves, ovales, laeves, incrassataes, hic illic bistratoses, marginales plus minusve elongates. Caetera ignota.

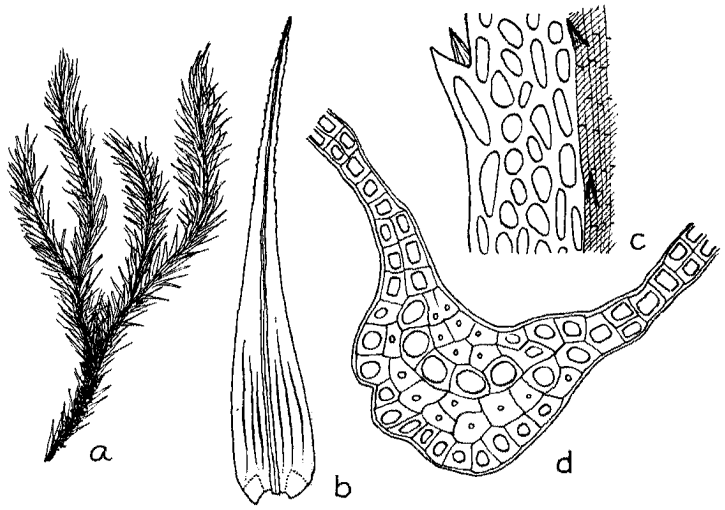

FIGURE 1.—*Dicranoloma plicatum* Bartram: *a*, plant, × .9; *b*, leaf, × 9; *c*, upper leaf cells and margin, × 377.5; *d*, cross section of costa from upper part of leaf, × 377.5.

Robust, densely tufted plants, yellowish brown and glossy above, deep brown below. Stems up to 6 cm. high, branched, densely tomentose. Leaves crowded, flexuose-spreading and somewhat crisped when dry, erect-spreading when moist, oblong-lanceolate, carinate, strongly plicate below, 7-8 mm. long, gradually narrowed to a stout, grooved point, bordered with a narrow band of elongated, colorless cells in the median portion, which merges with the basal cells below and disappears some distance below the apex; margin erect, entire below, sharply toothed above, the teeth frequently in pairs; costa about 75 μ wide near the base, percurrent or slightly excurrent, toothed on the back above, in cross-section showing bands of stereid cells on both sides of the median guide row with the surface layer on the dorsal side differentiated; alar cells conspicuous, reddish brown, extending more than halfway to the costa, basal cells linear, porose, incrassate, gradually becoming shorter upward, the upper cells short, smooth, incrassate, irregular in shape, oval and oval-rhomboidal, frequently bistratose in spots, 7-10 μ wide by 1-1.5 times as long.

Rapa, Whitney Expedition 1921? (type); Rapa, with fern (*Hymenophyllum cuneatum*), E. H. Quayle, 1921?.

A very beautiful moss which resembles *D. dicarpum* (Hornschuch), of Australia and New Zealand, in some respects but is notably different in the more numerous plicae of the leaf base, the less strongly serrate leaf margins with the teeth often in pairs and the different areolation of the upper part of the leaf in which the cells are often bistratose.

Philonotis Vescoana Bescherelle.

Rapa, Whitney Expedition, 1921?.

Spiridens Balfourianus Greville.

Rapa, with fern (*Loxoscaphe gibberosum*), E. H. Quayle, 1921?; Rapa, Whitney Expedition, 1921?.

Rhacopilum convolutaceum C. Müller.

Raivavae?, Whitney Expedition, 1921?, no. 393; Raivavae, 1921?, A. M. Stokes?.

Papillaria Aongstroemiana C. Müller.

Rapa, Mitieperu, on platform among grass, elevation 1175 feet, October 26, 1921, J. F. G. Stokes with 373; Raivavae, Whitney Expedition, 1921, no. 393?.

Neckeropsis Lepineana (Montagne) Fleischer.

Rapa, Maitua, on rocks under trees, elevation 575 feet, October 10, 1921, A. M. Stokes no. 318. Native name, *limulimu*.

Entodon Solanderi (Aongstrom) Jaeger.

Rapa, Maitua, on rocks under trees, elevation 575 feet, October 10, 1921, A. M. Stokes no. 318a.

Sematophyllum hawaiiense (Brotherus) Brotherus.

Rapa, Whitney Expedition, 1921?, (with lichen) no. 386; Raivavae, Whitney Expedition, 1921?, no. 392.

Ectropothecium sandwicense (Hooker and Walker-Arnott) Mitten.

Raivavae?, Whitney Expedition, 1921?.

Taxithelium Vernieri (Duby) Bescherelle.

Raivavae?, Whitney Expedition, 1921?.

TUAMOTU ARCHIPELAGO

Leucobryum scalare C. Müller, form.

Makatea, interior on log, August 18, 1922, Whitney Expedition no. 874.

These plants represent a slender form approaching the variety *Marschmeyeri* Fleischer but with narrower more erect leaves up to 3 mm. long.

Leucophanes nukahivense Bescherelle.

Makatea, on ground, elevation 200 feet, October, 1932, Mrs. G. P. Wilder no. 101; Makatea, on ground, elevation 250 feet, October 24, 1932, Mrs. G. P. Wilder no. 102.

Syrrhopodon Banksii C. Müller.

Makatea, growing on fallen tree trunk, elevation 175 feet, October 27, 1932, Mrs. G. P. Wilder no. 107.

Thyridium obtusifolium (Lindberg) Fleischer.

Pitcairn Island, Whitney Expedition 1922?; Henderson Island, with fern (*Polypodium diversifolium*), E. H. Quayle 1922?.

Calymperes tenerum C. Müller.

Mangareva (with lichen), April 27, 1922, E. H. Quayle no. 424; Tikei (with lichen), August 31, 1922, W. B. Jones no. 1049a; Ahii, interior on dead and living trees, August 26, 1919, W. B. Jones no. 952a; Makatea, on rotten *Pandanus* log, elevation 100 m., August 18, 1922, W. B. Jones no. 867; Makatea, interior, jungle, elevation 100 m., August 18, 1922, W. B. Jones no. 862; Makatea, on coconut trunk, elevation 200 feet, Mrs. G. P. Wilder no. 108.

Calymperes tuamotuense new species (fig. 2).

C. Aongstroemii Bescherelle persimilis, foliis autem incrassato-limbatis.

Densely tufted plants, yellowish green above, brown below. Stems simple or branched, from a few millimeters to 3 cm. high. Normal leaves erect with incurved points when dry, erect-spreading when moist, ligulate from a slightly broader ovate base, concave, obtuse or rounded at the apex, 3 mm. long; margin thickened, erect or incurved, denticulate; costa stout, about 60 μ wide toward the base, ending just below the apex, scabrous on the back to the top of the leaf base; leaf cells 5-6 μ in diameter, hexagonal, dense, mamillose on the ventral side, minutely papillose on the back, 4-5 rows at the margins in several layers forming a distinct thickened border extending from just below the apex to the top of the cancellinae, teniolae none, cancellinae scalariform, usually ending in acute angles above, 5-6 rows of cells toward the margins of the

leaf base linear-oblong, smooth; margins sharply denticulate at the top of the leaf base, denticulate above. Abnormal leaves about 4 mm. long, with a stouter costa and narrower lamina.

Ahii, interior on dead and living trees, August 26, 1919, W. B. Jones no. 952 (type); Makatea, interior on rotten *Pandanus* log, August 18, 1922, W. B. Jones no. 867; Makatea, interior on living tree in jungle, elevation 100 m., August 18, 1922, W. B. Jones no. 864; Makatea, March 3, 1930, K. P. Emory; Manihi, Whitney Expedition, February 10, 1923, no. 1929; Faite, April 26, 1923, Whitney Expedition no. 2037.

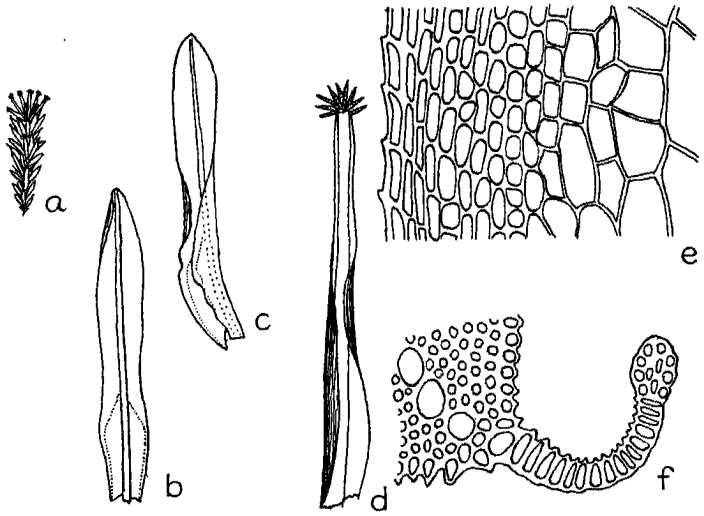

FIGURE 2.—*Calymperes tuamotuense* Bartram: *a*, moist plant, × .9; *b-c*, normal leaves, × 13.5; *d*, abnormal leaf, × 13.5; *e*, part of upper leaf base and margin, × 377.5; *f*, one side of cross section of leaf, × 377.5.

The thickened leaf border clearly separates this species from *C. Aongstroemii* Bescherelle.

Calymperes pseudopodianum new species (fig. 3).

Caulis ad 2 cm. altus. Folia ligulata, concava, apiculata, 3-3.5 mm. longa; marginibus denticulatis; costa percurrente, dorso papilloso-tuberculata, cellulis hexagonis, mamillosis, cancellina superne rotundata haud scalariformi, margines versus angustatis, teniola angusta, in lamina ad medium producta.

Stems up to 2 cm. high, usually branched. Leaves erect, incurved and slightly crispate when dry, erect-spreading when moist, broadly ligulate from a short, scarcely wider base, concave, apiculate, 3-3.5 mm. long, margins erect,

denticulate except at the extreme base; costa about 90 μ wide below, percurrent, densely papillose-tuberculate on the back to below the top of the leaf base, papillose on the inner side; leaf cells 6-8 μ in diameter, rounded-hexagonal, sharply mamillose on both sides, in one layer throughout, teniolae distinct, about 4 rows in from the margin at the top of the leaf base and extending more than halfway up the blade, 2 rows wide below and 1 row wide above, cancellinae in about 8 rows, rounded or ending in blunt angles above. Abnormal leaves up to 4 mm. long with a thicker costa and a very narrow lamina, which is frequently reduced to a scarcely evident wing on either side.

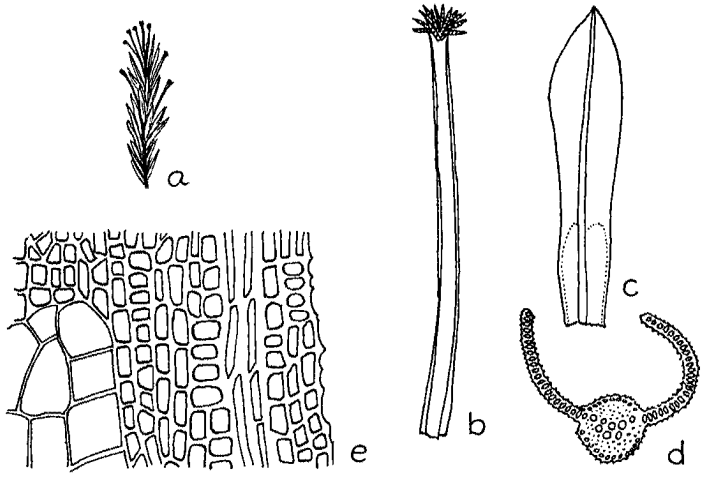

FIGURE 3.—*Calymperes pseudopodianum* Bartram: *a,* moist plant, × .9; *b,* abnormal leaf, × 13.5; *c,* normal leaf, × 13.5; *d,* cross section of leaf, × 112.5; *e,* cells and margin at top of leaf base, × 377.5.

Makatea, March 3, 1930, K. P. Emory (type); Makatea, interior on rotten log, elevation 100 m., August 18, 1922, W. B. Jones no. 877.

The well-marked teniolae and unbordered leaves will distinguish these plants from *C. tuamotuense.* A suggestive resemblance to the pseudopodia of *Aulacomnium androgynum* will be noted in the abnormal leaves which are frequently reduced to an almost naked costa with dense apical clusters of propagula.

Brachymenium melanothecium (C. Müller) Jaeger.

Makatea, on rocks, elevation 300 feet, October 21, 1932, Mrs. G. P. Wilder no. 103; Rangiroa, north side, base of living tree, August 22, 1922, W. B. Jones no. 936.

Macromitrium subuligerum (Bry. Jav.) Fleischer.

Makatea, growing on fallen tree trunks, elevation 175 feet, October 27, 1932, Mrs. G. P. Wilder no. 104; Makatea, interior on living tree, August 18, 1922, W. B. Jones no. 866.

Rhacopilum cuspidigerum (Schwaegrichen) Mitten.

Mangareva, April 27, 1922, E. H. Quayle no. 422.

Papillaria Aongstroemiana C. Müller.

Mangareva, April 27, 1922, E. H. Quayle no. 423.

Trichosteleum pygmaeum new species (fig. 4).

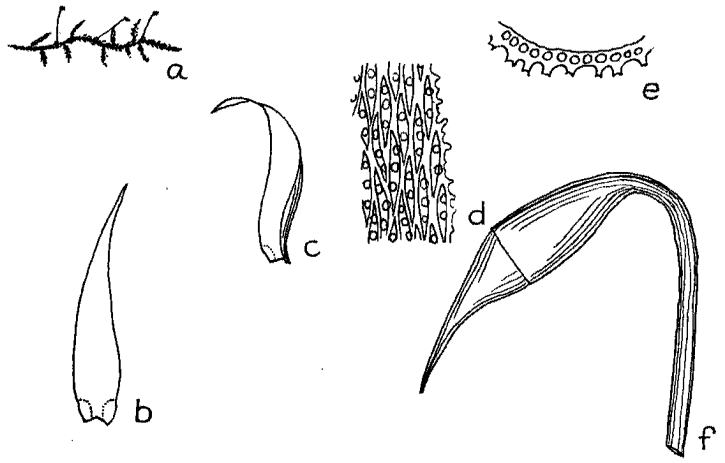

FIGURE 4.—*Trichosteleum pygmaeum* Bartram: *a*, plant, × .9; *b-c*, leaves, × 25.5; *d*, upper leaf cells and margin, × 377.5; *e*, cross section of leaf cells, × 377.5; *f*, capsule and upper part of seta, × 25.5.

Autoicum. Caulis 2-3 cm. longis, ramis brevis, erectiusculis. Folia conferta, subsecunda, ovato-lanceolata, acuminata, concava, ecostata; cellulis superioribus fusiformibus, dorso grosse seriatim papillosis, inferioribus hyalinis, laevis, alaribus tribus, vesiculaeformibus. Seta 5-6 mm. longa, rubra, fere laevis; theca minuta, ad 0.5 mm. longa, horizontalis, ovato-cylindrica.

Autoicous. Small plants growing in dense mats, golden yellow, not at all glossy. Stems prostrate, irregularly branched, branches short, stout, erect or ascending. Leaves crowded, slightly falcate-secund, ovate-lanceolate, acuminate, concave, ecostate, 1-1.2 mm. long; margins erect, denticulate above and coarsely papillose-crenulate all around; upper leaf cells elliptic-rhomboidal with 2-4 large, capitate papillae over the lumens on the dorsal side, more elongate below, linear, slightly porose and usually smooth at the extreme base. Seta 5-6 mm. long, red, hooked at the tip, smooth throughout or very slightly

scabrous at the top; capsule horizontal, ovoid-cylindric, up to 0.5 mm. long; lid needle-like, longer than the urn.

Makatea, August 18, 1922, W. B. Jones no. 867a (type); Makatea, on rotten log in jungle, elevation 100 m., August 18, 1922, W. B. Jones no. 877a.

Resembling *T. hamatum* (Dozy and Molkenboer) but much smaller in every way. The very short, nearly smooth setae, minute capsules, and shorter upper leaf cells obscured by the coarse, capitate papillae seem amply to distinguish this species from any of the familiar forms of *T. hamatum*.

Taxithelium Vernieri (Duby) Bescherelle.

Makatea, interior on rotten log, elevation 100 m., August 18, 1922, W. B. Jones no. 877b.

Ectropothecium sandwicense (Hooker & Walker-Arnott) Mitten.

Makatea, on rocks, elevation 300 feet, October 21, 1932, Mrs. G. P. Wilder no. 105; Makatea, on coral stone, elevation 250 feet, October 24, 1932, Mrs. G. P. Wilder no. 106.

MARQUESAS ISLANDS

Dicranella rufiseta new species (fig. 5).

Dioica? Gracilis, caespitibus densis, haud nitidis. Folia sicca erecta, ovato-lanceolata; marginibus paulum revolutis, summo apice obtuse denticulato; costa valida, percurrens vel excurrens; cellulis rectangularibus, incrassatibus, basilaribus longioribus. Seta ad 10 mm. alta, lutescenti-rubra; capsula erecta, ovali-oblonga; annulus latus; peristomii dentibus rubris, ultra medium bifidis, circa 250 μ longis; operculum longe et oblique rostratum; spori 18-20 μ, punctulati.

Dioicous? Slender, densely tufted plants, dull yellowish green above, brown below. Stems erect, easily separating, scarcely radiculose below, 1-2 cm. high. Leaves well-spaced below, crowded and longer at the tips of the stems, up to 2.5 mm. long, from a short oblong or ovate base gradually narrowed to a straight, grooved point which is blunt and denticulate at the apex; margin denticulate at the apex, otherwise entire, often narrowly reflexed near the shoulders of the leaf; costa stout, yellowish, 75 μ wide below, percurrent or slightly excurrent; lower leaf cells narrowly rectangular and linear with firm, pellucid walls, gradually shorter and rectangular upward. Seta 7-10 mm. long, slender, bright orange red; capsule erect, cylindric, urn 0.8-1 mm. long, brown when young, becoming dark brown or blackish with age; peristome teeth pale red, about 250 μ high, cleft to about the middle, papillose-striate; lid oblique, subulate-rostrate, as long as the urn; annulus broad; spores papillose, 18-20 μ in diameter.

Type: Nukuhiva, 1922?, E. H. Quayle no. 1253.

Although this species is closely allied to *D. hawaiica* (C. Müller) Brotherus, it is perfectly distinct in the much shorter and less flexuose leaves which are more gradually narrowed to a rigid, blunt point and, especially, by the orange-red setae.

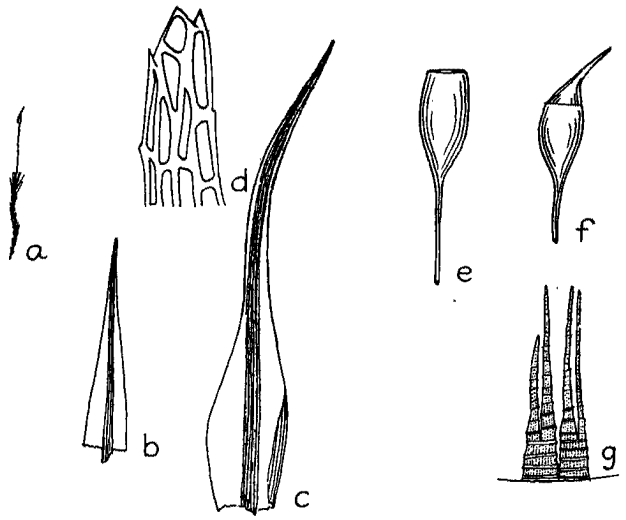

FIGURE 5.—*Dicranella rufiseta* Bartram: *a*, plant, × .9; *b*, lower leaf, × 25.5; *c*, comal leaf, × 25.5; *d*, apex of leaf, × 377.5; *e*, old capsule, × 9; *f*, young capsule with lid, × 9; *g*, 2 peristome teeth, × 120.

Dicranoloma rufifolium (Bescherelle) Paris.

Hivaoa, Tapeata, east of Mount Ootua, elevation about 700 m., May 8, 1929, E. P. Mumford and A. M. Adamson, no. 378; Uapou, elevation 1200 m., with fern (*Oleandra whitmeei* variety *minor*), September 9, 1922, E. H. Quayle no. 1145; Uapou, Mount Tekahoipu, elevation 1050 m., with filmy fern, E. H. Quayle no. 1156.

Dicranoloma brevifolium new species (fig. 6).

Robustum. Caulis ad 7 cm. altus, parce ramosus. Folia conferta, secunda, nitida, 5-6 mm. longa, ovato-lanceolata; marginibus fere ad basin denticulatis, superne grosse serratis; costa valida, percurrens vel breviter excurrens, dorso valde prominens, per partem superiorem folii seriebus duabus argute grosse spinoso-dentata; cellulae alares magnae, ex laminae inferiores elongatae, valde porosae, superiores elongatae vel perbreves, rectangulares, parietibus incrassatis, vix porosis.

Robust plants, golden brown above, deep brown below. Stems up to 7 cm. high, usually sparsely branched, tomentose throughout. Leaves crowded, fal-

cate-secund, 5-6 mm. long, from an ovate-lanceolate base gradually narrowed to a linear, grooved point; margins erect, coarsely serrate in the upper half, denticulate almost or quite to the base; costa strong, 90 μ wide at the base, percurrent or very shortly excurrent, prominently convex on the dorsal side and with two sharply serrate lamellae on the back in the upper half; alar cells large, brownish, extending halfway to the costa, basal cells linear, incrassate, strongly porose, upper cells rectangular and linear with rounded ends, 5-6 μ wide by 2-4 times as long, incrassate.

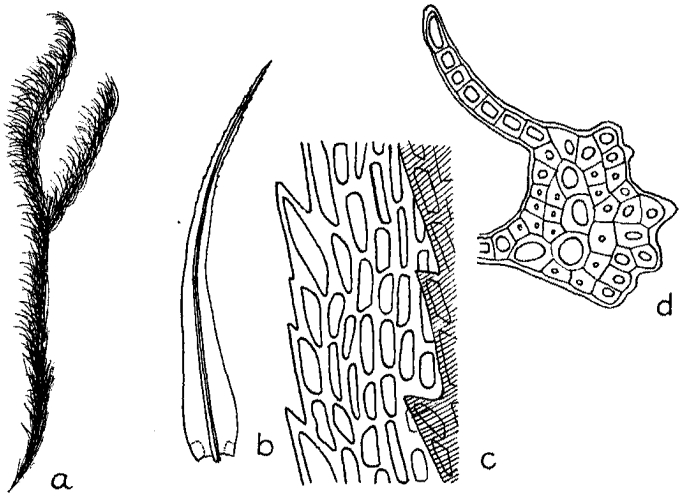

FIGURE 6.—*Dicranoloma brevifolium* Bartram: *a*, plant, × .9; *b*, leaf, × 9; *c*, upper leaf cells, × 377.5; *d*, cross section of costa from upper half of leaf, × 377.5.

Nukuhiva, cool, shaded, moist conditions on *Hibiscus tiliaceus*, cloud zone, elevation 1000 m., July 20, 1921, F. B. H. and E. D. W. Brown no. 537 (type); Nukuhiva, with *Tmesipteris tannensis*, 1922?, E. H. Quayle no. 1305; Nukuhiva, with *Hymenophyllum cuneatum* variety *calyciforme*, September, 1922, E. H. Quayle no. 1305a.

Immediately distinguished from *D. rufifolium* by the shorter leaves with the costa percurrent or barely excurrent and by the shorter areolation of the subula. It is probably nearest *D. platycaulon* (C. Müller) Dixon, but the leaves are shorter and the upper leaf cells more regularly elongate and incrassate.

Leucophanes nukahivense Bescherelle.

Uapou, elevation 350 m., September 7, 1922, W. B. Jones no. 1107, in fruit; Uapou, Mount Tikahoipu, September 11-13, 1922,

E. H. Quayle no. 1179; Nukuhiva, Tovii, elevation 1000 m., at base of fern (*Hymenolepis spicata*), June 1, 1921, F. B. H. and E. D. W. Brown no. 463; Uahuka, Hannay, high ridge, elevation 700 m., November 10, 1922, W. B. Jones no. 1685.

Thyridium obtusifolium (Lindberg) Fleischer.

Nukuhiva, east slope ridge, elevation 3500 feet, 1922?, E. H. Quayle no. 1223; Nukuhiva, 1922?, E. H. Quayle no. 1280; Uapou, Mount Tikahoipu, September 11-13, 1922, E. H. Quayle no. 1179.

Calymperes Aongstroemii Bescherelle.

Fiao, interior of furas forest, high ridge, elevation 700 m., September 20, 1922, W. B. Jones no. 1522.

Calymperes Vriesei Bescherelle.

Nukuhiva, Taiohae (region), elevation 500 m., at base of fern (*Hymenolepis spicata*), June 1, 1921, F. B. H. and E. D. W. Brown no. 463h.

This is a wide extension of the geographical range of the species, but the plants from Nukuhiva agree very well with authentic specimens from Java.

Philonotis Vescoana (Bescherelle) Brotherus.

Nukuhiva, 1922, E. H. Quayle nos. 1268 and 1325.

Hypondendron Vescoanum Bescherelle.

Nukuhiva, Tovii, elevation 600 m., with fern (*Trichomanes pyxidiferum* variety *marchionicum*), October 1, 1921, F. B. H. and E. D. W. Brown no. 614.

Mniodendron tahiticum Bescherelle.

Uapou, top of high ridge, elevation 1200 m., with ferns (*Polypodium hookeri* variety *uapense*), W. B. Jones no. 1210.

Macromitrium eurymitrium Bescherelle.

Nukuhiva, cool, shaded, moist condition, on *Hibiscus tiliaceus,* cloud zone, 1000 m., E. D. W. and F. B. H. Brown, July 20, 1921, no. 537.

Rhacopilum convolutaceum C. Müller.

Nukuhiva, 1922?, E. H. Quayle, nos. 1220, 1251; Nukuhiva, cool, shaded, moist conditions, on *Hibiscus tilaceus,* cloud zone, elevation

1000 m., F. B. H. and E. D. W. Brown no. 537; Uapou, high ridge, elevation 900 feet, September 12, 1922, W. B. Jones no. 1178.

Ptychomnium aciculare (Bridel) Mitten.

Uapou, high ridge, elevation 900 m., September 12, 1922, W. B. Jones no. 1178; Hivaoa, Feani, elevation 900 m., at base of fern (*Oleandra whitmeei*), December, 1921, F. B. H. and E. D. W. Brown no. 980; Hivaoa, elevation 1000 m., on rhizome of fern, December, 1921, F. B. H. and E. D. W. Brown no. 1102.

Garovaglia Powellii Mitten.

Nukuhiva, 1922?, E. H. Quayle no. 1280.

These plants show the characteristic teeth on the dorsal ridges of the leaf plicae and agree perfectly with the type collection from Samoa. The species may be looked for in the Society Islands.

Papillaria helictophylla (Montagne) Brotherus.

Uapou, Mount Tikahoipu, with *Selaginella,* September 11-13, 1922, W. B. Jones no. 1178; Uapou, high ridge, elevation 900 m., September 12, 1922, W. B. Jones no. 1178.

Papillaria Aongstroemiana C. Müller.

Nukuhiva, elevation 800? m., at base of fern, (*Hymenolepis spicata*), 1922, E. H. Quayle no. 1217.

Acroporium Lepinei (Bescherelle) Fleischer.

Nukuhiva, 1922?, E. H. Quayle no. 1280.

Taxithelium falcifolium new species (fig. 7).

Autoicum. Lutescent-viride, nitidum. Caulis fragilis, ad 3 cm. longis, irregulariter pinnatis, ramis flexuosis, ad apicem uncinatis. Folia subfalcata, vix complanata, circa 1.2 mm. longa, e basi contracta, ovato-lanceolata, concava, ecostata; marginibus erectis, papilloso-crenatis, superne minute denticulatis; cellulae elongatae, lineares, parietibus tenuibus, distincte pluripapillatae, ad insertionem breviores parietibus incrassatis, alares 2-4, parum latiores. Folia perichaetialia in subulam minute denticulatum attenuata; seta circa 10 mm. longa, laevis; theca minuta, inclinata, 0.9 mm. longa.

Autoicous. In very dense extensive mats, pale yellowish green, glossy. Stems fragile, prostrate, irregularly pinnate, branches ascending, flexuose, hooked at the tips. Leaves falcate-secund, about 1.2 mm. long, ovate-lanceolate, acuminate, concave, contracted above the insertion, ecostate; margin erect, papillose-crenulate, minutely denticulate above; leaf cells linear, slightly vermicular, 3-4 μ wide by 10-14 times as long, thin-walled, seriate papillose with 3-5 distinct papillae over the lumens, several rows across the insertion shorter,

broader, smooth, slightly porose, alar cells few, 2-4, subquadrate, not well defined. Inner perichaetial leaves about 1.6 mm. long, narrowly lanceolate, gradually narrowed to a long, denticulate, subulate point; seta slender, smooth, reddish, about 10 mm. long; capsule inclined, ovoid, urn 0.7 mm. long; spores smooth, 12-14 μ in diameter.

Type: Eiao, interior of furas forest, high ridge, elevation 700 m., September 20, 1922, W. B. Jones no. 1522.

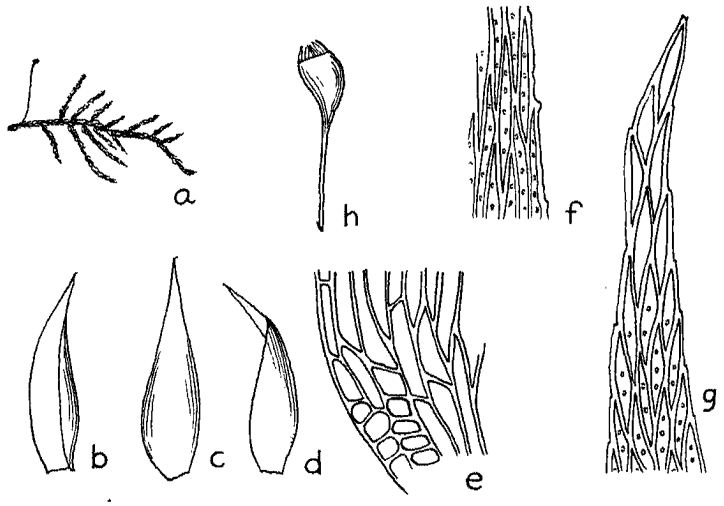

FIGURE 7.—*Taxithelium falcifolium* Bartram: *a*, plant, × .9; *b-d*, leaves, × 25.5; *e*, basal angle of leaf, × 377.5; *f*, upper leaf cells and margin, × 377.5; *g*, apex of leaf, × 377.5; *h*, capsule, × 9.

The crowded, falcate-secund leaves, relatively short-pointed and hooked at the tips of the branches, distinguish this species from *T. Vernieri* (Duby) Bescherelle.

In comparison with *T. Lindbergii* the leaves of *T. falcifolium* are broader, less slenderly acuminate and less sharply toothed on the apical margins.

Ectropothecium sodale (Sullivant) Mitten.

Nukuhiva, 1922?, E. H. Quayle nos. 1220, 1245, 1251, 1268; Nukuhiva, cool, shaded, moist conditions, on *Hibiscus tiliaceus*, cloud zone, elevation 1000 m., F. B. H. and E. D. W. Brown no. 537; Uapou, side of ridge, on living trees, elevation 400 m., September 13, 1922, W. B. Jones no. 1197.

Isopterygium minutirameum (C. Müller) Jaeger variety **brevifolia** Fleischer.

Nukuhiva, 1922?, E. H. Quayle no. 1317; Nukuhiva, cool, shaded, moist conditions in cloud zone, on *Hibiscus tiliaceus,* July 20, 1921, F. B. H. and E. D. W. Brown no. 537.

These collections seem to be identical in every essential particular with Fleischer's no. 449 Musc. Arch. Ind. et Polynes. It is an interesting range extension of a species recently reported from Fiji by Mr. H. N. Dixon and may therefore be expected from some of the intervening parts of Polynesia.

SOCIETY ISLANDS

Fissidens Nadeaudii Bescherelle.

Tahiti, 1922?, E. H. Quayle nos. 213a, 212a.

Campylopus sulphureus Bescherelle.

Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle no. 697; Tahiti, 1922?, Whitney Expedition no. 702.

Both collections are richly fruited and only 2-3 cm. high, much shorter than specimens collected by Tamarii and determined by Bescherelle which are in my herbarium. The leaf structure is so nearly identical, however, that I have but little doubt that they are referable to this species. The leaves are not at all auriculate and the cells at the basal angles are scarcely differentiated from those of the leaf base.

Campylopus nudicaulis Bescherelle.

Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle no. 697a.

These plants agree fairly well with the description of *C. nudicaulis* but in the absence of any authentic specimens for comparison the determination is not sure.

The auriculate leaves, the clearly differentiated alar cells extending to the costa, and the very different basal areolation clearly separate the plant from *C. sulphureus.*

Many of the plants have apical clusters of minute-leaved flagellate branches similar to those produced by other plants of various allied dicranaceous genera. These, no doubt, serve the purpose of asexual reproduction.

Campylopus umbellatus (Walker-Arnott) Bartram.

Tahiti, 1922?, E. H. Quayle nos. 208, 212c.

Holomitrium vaginatum (Hooker) Bridel.

Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quale no. 697k.

Dicranoloma Braunii (C. Müller) Paris.

Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle nos. 154b, 156c.

This is a noteworthy extension in the range of the species. It has recently been found in Fiji so that the distribution of the species is now fairly continuous from Sumatra to Tahiti. *D. Graffeanum* (C. Müller), of Samoa, is, as Mr. Dixon has remarked, probably the same thing and should be reduced to synonymy.

Dicnemon rugosum (Hooker) Schwaegrichen.

Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle no. 155c; Tahiti, Pirae-Moua trail, August 1-3, 1922, E. H. Quayle no. 699b; Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle no. 697a; Tahiti, Whitney Expedition, 1922?, nos. 704, 705.

Leucobryum scalare C. Müller, variety **tjibodense** Fleischer.

Tahiti, Fautaua, July 28, 1922, Whitney Expedition; Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle nos. 162, 165, 166.

So far as I know the nearest recorded station for this species is in the Philippines so that its occurrence in Tahiti is noteworthy.

The leaves of the Tahitian plants are erect and appressed with scarcely any evident falcate tendency, thus approaching Fleischer's variety more nearly than it does the typical form of the species.

Exodictyon Nadeaudii (Bescherelle) Cardot.

Tahiti, upper Papenoo Valley, on tree trunk with ferns, elevation 800 m., May 18, 1927, L. H. MacDaniels no. 1540a.

Thyridium obtusifolium (Lindberg) Fleischer.

Tahiti, Fautaua Canyon, elevation 400-550 m., July 28, 1922, E. H. Quayle no. 663a.

Calymperes tahitense (Sullivant) Mitten.

Tahiti, Pueu, on rocks with ferns, elevation 250 m., May 26, 1927, L. H. MacDaniels no. 1577.

Calymperes Quaylei new species (fig. 8).

C. Motleyi Mitten affine. Differt cellulis majoribus, papillatis, 10-15 μ, costa parum latioribus.

Plants densely tufted, yellowish green above, brown below. Stems simple, up to 1.5 cm. high. Normal leaves erect with incurved points when dry, erect-spreading when moist, about 1.25 mm. long, oblong-ovate, obtuse; margins erect, minutely crenulate with papillae; costa strong, ending just below the apex, scabrous on the back, about 60 μ wide toward the base; upper leaf cells rounded-hexagonal, 10-15 μ in diameter, papillose on both sides, teniolae none, cancellinae shorter than the leaf base, broadly rounded above, in about 5 rows, bordered on the margins with 4-5 rows of short rectangular to quadrate cells similar to those of the lamina, but nearly smooth. Abnormal leaves abruptly contracted to a wide point, broadly rounded and toothed at the apex; costa stronger than in the normal leaves, scabrous on the back to the top of the cancellinae, ending in or below the apex.

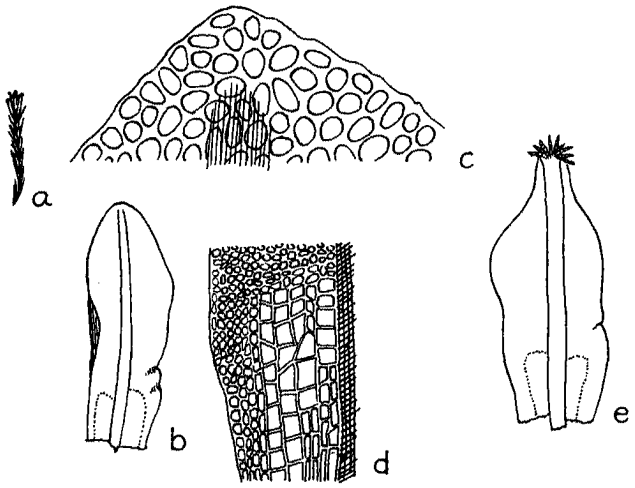

FIGURE 8.—*Calymperes Quaylei* Bartram: *a*, plant, × .9; *b*, normal leaf, × 25.5; *c*, apex of normal leaf, × 377.5; *d*, one side of leaf base, × 120; *e*, abnormal leaf, × 25.5.

Type: Scilly, January 1, 1922, E. H. Quayle no. 227.

The much larger leaf cells and the costa ending below the apex separate this species from *C. tenerum*. It is apparently closer to *C. Motleyi* Mitten, but the relatively broader and shorter leaves and especially the larger, papillose leaf cells will distinguish it at once from this species.

Bryum lepothecium Taylor.

Tahiti, 1922?, E. H. Quayle no. 212b.

Breutelia Eugeniae Aongstrom.

Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle nos. 697e, 698a.

Hypnodendron Vescoanum Bescherelle.

Tahiti, 1922?, E. H. Quayle nos. 96, 212.

Mniodendron tahiticum Bescherelle.

Tahiti, Whitney Expedition 1922, no. 703d; Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle no. 6971.

Spiridens Balfourianus Greville.

Tahiti, 1922?, E. H. Quayle nos. 62, 197, 201.

Zygodon Reinwardtii (Hornschuch) Al. Braun, variety **subintegrifolius** Malta.

Tahiti, Pirae-Moua Aorai trail, August 1-3, 1922, E. H. Quayle nos. 697, 699.

Dr. Malta has very kindly confirmed my determination of this well-marked variety with the comment that, although it could only be indicated from South America when his monograph of the genus *Zygodon* was published, he did not consider it as a form peculiar to that region but rather supposed it to be distributed throughout the range of this polymorphous species.

Macromitrium eurymitrium Bescherelle.

Tahiti, Fautaua, July 28, 1922, Whitney Expedition.

Macromitrium ruginosum Bescherelle.

Tahiti, Pirae-Moua trail, August 1-3, 1922, E. H. Quayle; Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle no. 148d.

Macromitrium subtile Schwaegrichen.

Tahiti, Pirae-Moua Aorai trail, August 1-3, 1922, E. H. Quayle.

Macromitrium owahiense C. Müller.

Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle nos. 697c, 699; Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle nos. 152a, 153b, 154, 165; Tahiti, Whitney Expedition, 1922?, nos. 698, 699c, 704b.

Ptychomitrium aciculare (Bridel) Mitten.

Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation,

September 22-24, 1921, E. H. Quayle nos. 150, 151, 152, 160; Tahiti, 1922?, E. H. Quayle no. 77; Tahiti, Pirae-Moua trail, August 1-3, 1922, E. H. Quayle; Tahiti, south of Orohena, on trees with ferns, elevation 1500 m., L. H. MacDaniels no. 1454.

Rhacopilum cuspidigerum (Schwaegrichen) Mitten.
Tahiti, 1922?, E. H. Quayle no. 211.

Trachyloma tahitense Bescherelle.
Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle no. 147a; Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle no. 697j; Tahiti, Whitney Expedition 1922?, no. 701.

Garovaglia tahitense Bescherelle.
Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle no. 697n.

Symphysodontella cylindracea (Montagne) Fleischer.
Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle no. 156b.

Papillaria helictophylla (Montagne) Brotherus.
Tahiti, 1922?, E. H. Quayle no. 76.

Papillaria Aongstroemiana C. Müller.
Tahiti, Maire Valley, Teahupa, on tree trunks with fern, elevation 200 m., June 7, 1927, L. H. MacDaniels no. 1638; Tahiti, on rocks, 1921-22, F. B. H. and E. D. W. Brown; Tahiti, Whitney Expedition 1922?, 698b, 700; Tahiti, Fautaua Canyon, July 28, 1922, E. H. Quayle no. 661a; Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle nos. 153a, 155, 157a, 161, 159; Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle, nos. 697b, 697l.

Aerobryopsis vitiana (Sullivant) Fleischer.
Tahiti, south of Orohena, on trees with *Lycopodium,* elevation 1400 m., May 17, 1927, L. H. MacDaniels no. 1472.

Floribundaria aeruginosa (Mitten) Fleischer.
Tahiti, 1922?, E. H. Quayle no. 213.

Calyptothecium Urvilleanum (C. Müller) Brotherus.
Tahiti, 1922?, E. H. Quayle no. 98a.

Neckeropsis Lepineana (Montagne) Fleischer.

Tahiti, 1922?, E. H. Quayle no. 98; Tahiti, on rocks, 1921-22, F. B. H. and E. D. W. Brown.

Distichophyllum tahitense Bescherelle.

Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle no. 697-0; Tahiti, Whitney Expedition 1922?, nos. 704c, 706a.

Callicostella vesiculata C. Müller.

Tahiti, Fautaua Canyon, elevation 400-500 m., July 28, 1922, E. H. Quayle no. 663a.

Callicostella papillata (Montagne) Jaeger.

Tahiti, Fautaua Canyon, elevation 400-550 m., July 28, 1922, E. H. Quayle no. 661.

Hypopterygium tahitense Aongstrom.

Tahiti, Pirae-Moua Aorai Trail, August 1-3, 1922, E. H. Quayle.

Thuidium furfurosum (Hooker f. and Wilson) Jaeger.

Tahiti, 1922?, E. H. Quayle no. 77.

New to Tahiti and an interesting range extension of this very plastic species.

In addition to the clearly catenulate branch leaves, the stem leaves are very broadly cordate, often twice as broad as long, and abruptly contracted to a curved subula formed by the excurrent costa. I believed them to represent a new species until Mr. Dixon sent me specimens of *T. furfurosum* from New Zealand showing stem leaves so nearly similar that it seems unwise to separate the collection from Tahiti in the absence of any distinguishing characters.

Thuidium ramosissimum Dixon and Bartram, new species (fig. 9).

Dioicum. Caulis gracilis, 3-4 cm. longis, bi-tripinnatis. Folia caulina triangulari-ovata, marginibus planis, costa ante apicem evanida; cellulis inferioribus papillosis, superioribus laevis, folia ramulina multo minora.

Dioicous. Slender plants growing in extensive mats, yellowish green above, brown below. Stems 4-5 cm. long, bipinnately to tripinnately branched, the ultimate branches filiform and minute leaved, paraphyllia scanty, usually of one row of cells, simple or branched. Stem leaves erect-spreading, about 0.5 mm. long, triangular-ovate from a subcordate base, rather abruptly short acuminate, concave, faintly plicate below; costa thin and faint, ending near the base of the acumen; margins plane, minutely crenulate with papillae; leaf cells irregularly oval-rhomboidal with firm, pellucid walls, nearly or quite smooth above, papillose toward the base, branch leaves smaller, ovate, those of the ultimate

branches about 0.12 mm. long, bluntly pointed, the cells with 2 or 3 short, but very evident papillae.

Tahiti, Fautaua Canyon, elevation 400-550 m., July 28, 1922, E. H. Quayle nos. 663a (type), 663, 662b.

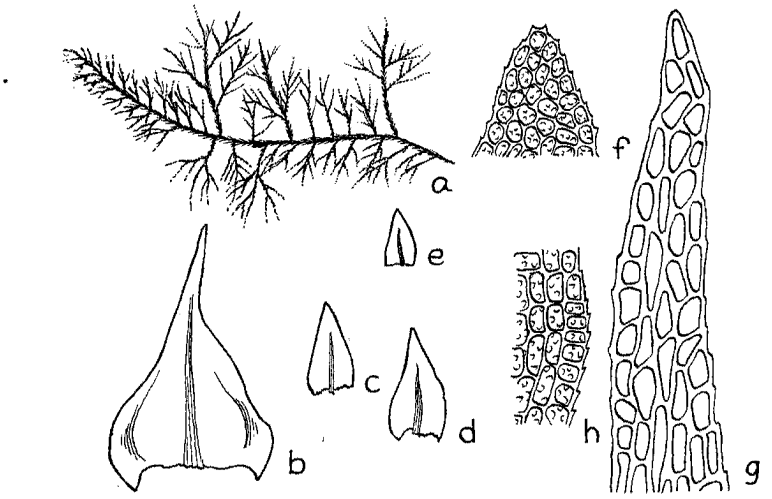

FIGURE 9.—*Thuidium ramosissimum* Dixon and Bartram: *a,* plant, × .9; *b,* stem leaf, × 60; *c-e,* branch leaves, × 60; *f,* apex of branch leaf, × 377.5; *g,* apex of stem leaf, × 377.5; *h,* basal cells and margin of stem leaf, × 377.5.

These plants, though very slender in the ultimate branching, are decidedly more robust than *T. tahitense* Brotherus. I was at first inclined to think they belonged in the section *Thuidiopsis,* but after examining a part of the collection Mr. Dixon is of the opinion that they are better placed in the section *Euthuidium.* Their relationship to the other species is an open question, but it is certain that the plants represent a type previously unknown from Tahiti and obviously distinct from *T. furfurosum.*

Brachythecium longipes Brotherus.

Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle nos. 697d, 697h; Tahiti, Whitney Expedition 1922, nos. 701a, 702b, 703, 704d, 705a, 706d.

This species was noted by Brotherus (Nat. Pflanzenf., ed. 2, vol. 11, p. 366, 1925) in a collection by Nadeaud no. 365, distributed by Bescherelle as *B. tearapense* Bescherelle. My specimen of Nadeaud's

no. 365, determined by Bescherelle, consists of two tufts, one of which has scabrous setae and clearly represents *B. tearapense,* the other of which has long, smooth setae evidently referable to *B. longipes* Brotherus.

As no description of *B. longipes* has been published, so far as I am aware, a brief summary of the characters may be useful. It is apparently an abundant moss along the Pirae-Moua Aorai trail, where numerous and abundant collections in fine fruit were obtained by the Whitney Expedition.

Autoicous. Pale green, glossy. Stems up to 4-5 cm. long, irregularly branched, flattened, about 4 mm. wide with leaves. Leaves ovate-lanceolate, long acuminate, plicate, up to 2.5 mm. long by 1 mm. wide; costa very thin and faint, rarely extending halfway up and often almost entirely lacking; margins plane, denticulate all around; cells very long and narrow, decidedly more lax in a few rows across the extreme base. Seta 2.5-4 cm. long, reddish brown to almost black, smooth; capsule short oblong, brown or blackish, arcuate and horizontal; opercum conic.

The plants resemble *B. lamprocarpum* (C. Müller) Jaeger to some extent but appear to be quite distinct in the consistently longer setae and the larger leaves with an unusually indistinct costa.

Brachythecium tearapense Bescherelle.

Tahiti, 1922?, E. H. Quayle no. 211a.

Entodon Solanderi (Aongstrom) Jaeger.

Tahiti, Fautaua Canyon, elevation 400-550 m., July 28, 1922, E. H. Quayle nos. 660, 662, 662a; Tahiti, Whitney Expedition 1922?, no. 604; Tahiti, on rocks, F. B. H. and E. D. W. Brown.

Meiothecium Rechingeri Brotherus.

Tahiti, Pirae-Moua Aorai trail, August 1-3, 1922, E. H. Quayle.

Although most of the leaves on these plants are definitely obtuse or rounded at the point, a few from every stem examined show a close approach to *M. hamatum* (C.M.) (tab. 219, Bryol. Javanica). The average, however, is constantly shorter and more rounded, so I have tentatively referred these plants to *M. Rechingeri* Brotherus, of Samoa, although the color is a golden brown rather than green. At any rate it is a fine addition to the local flora and new to Tahiti.

Rhaphidorrhynchium Quaylei new species (fig. 10).

Autoicum. Caulis gracilis, irregulariter pinnatis, ramis brevibus, prostratus. Folia ovato-lanceolata, acuminata, superne minute denticulata, ecostata; cellulis

alaribus multo majoribus, oblongis, ventricosis, caeteris elongatis. Seta 4-5 mm. longa, rubra; capsula inclinata, sicca arcuata, sub ore coarctata; operculum subulatum, longirostre.

Autoicous. Slender, pale or silvery green, glossy plants growing in thin mats. Stems irregularly pinnately branched, radiculose on the under side, branches short and complanate, closely appressed to the substratum. Leaves ovate-lanceolate, gradually acuminate, 1-1.25 mm. long, concave; margin erect, minutely denticulate above, entire below; costa none; leaf cells very long and narrow, about 4 μ wide by 10-14 times as long, smooth, alar cells 3-4, large, oblong, vesiculose, pale yellow, supra-alar cells few, irregularly rhomboidal. Inner perichaetial leaves abruptly contracted to a long, filiform, flexuose, denticulate point; seta very slender, bright red, smooth, 4-5 mm. long; capsule ovoid-cylindric, inclined or horizontal, contracted under the mouth when dry, urn about 0.9 mm. long; peristome teeth pale yellow, densely transversely striate, segments of inner peristome carinate, from a basal membrane about half the height of the teeth, cilia one, slightly shorter than the segments; operculum subulate-rostrate, nearly as long as the urn; calyptra cucullate, extending about halfway down the urn; spores pale, smooth, 10-12 μ in diameter.

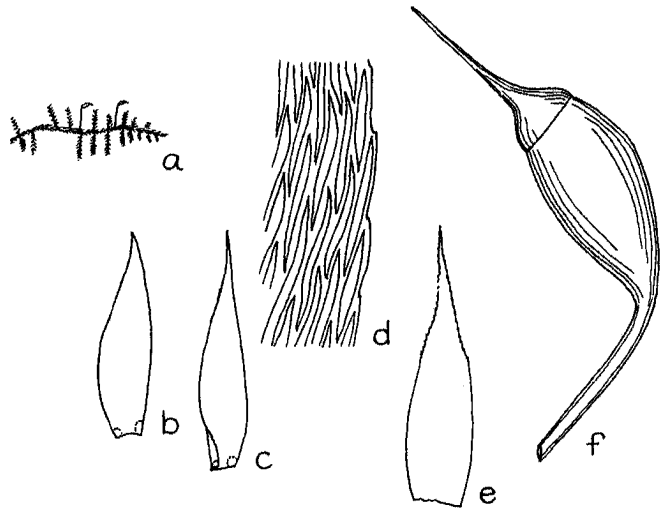

FIGURE 10.—*Rhaphidorrhynchium Quaylei* Bartram: *a*, plant, × .9; *b-c*, leaves, × 25.5; *d*, upper leaf cells and margin, × 377.5; *e*, perichaetial leaf, × 25.5; *f*, capsule and lid, × 25.5.

Type: Tahiti, Fautaua Canyon, elevation 400-550 m., July 28, 1922, E. H. Quayle no. 663.

As far as I know no species of the section *Microcalpe* has been recorded before from Polynesia or in fact from any of the Pacific islands. These plants suggest *R. rufulum* Bescherelle, of Guadeloupe,

but are apparently quite distinct in the pale color, broader leaves, and different perichaetial leaves. My specimen of *R. rufulum* (Duss no. 1266), named by Bescherelle, deviates from the original description in having the setae up to 1 cm. long and the leaf margins sharply denticulate above.

Acroporium Lepinei (Bescherelle) Fleischer.

Tahiti, trail to summit of Moua Aorai, above 1386 m. elevation, September 22-24, 1921, E. H. Quayle nos. 147, 149, 155b, 157, 158, 163; Tahiti, Whitney Expedition 1922?, nos. 702, 705c; Tahiti, Pirae-Aorai trail, August 1-3, 1922, E. H. Quayle, no. 697; Tahiti, south side of Orohena, on tree trunk, May 16, 1927, L. H. MacDaniels no. 1553.

Trichosteleum hamatum (Dozy and Molkenboer) Jaeger.

Tahiti, Fautaua Canyon, elevation 400-550 m., July 28, 1922, E. H. Quayle nos. 661, 666.

These collections, and particularly no. 666, represent a variant with asymmetrical, broadly ovate-lanceolate, deeply concave leaves often conspicuously contracted just above the insertion; the upper cells are short oval with 2-3 large papillae over the lumens. I believe this is only one of the forms of this very variable and widely distributed species.

Taxithelium Vernieri (Duby) Bescherelle.

Tahiti, Fautaua Canyon, shady, damp, elevation 400-550 m., E. H. Quayle no. 669a.

Fleischer reduces this species to a synonym of *T. Lindbergii* (van den Bosch et Lacoste) Renauld and Cardot (Laubm. v. Java, vol. 4, p. 1347), but I feel more inclined to follow Brotherus, (Engler and Prantl, Pflanzenf., ed. 2, vol. 11, p. 443), in keeping them separate.

In *T. Vernieri* the branch leaves are well spaced, distinctly complanate and minutely crenulate to nearly entire on the apical margins. In *T. Lindbergii* the branch leaves are crowded, falcate-secund, and sharply toothed on the apical margins. These distinctions seem to be constant and are well marked in a comparison of Duby's illustration (tab. 271, Bryol. Javanica).

Glossadelphus tahitensis, new species (fig. 11).

Autoicus. Caulis ad 3 cm. longus, irregulariter ramosus. Folia ovata, concava, obtusa, toto ambitu denticulata; costis binis; cellulis linearibus, pluri-

papillosis. Seta ad 2.5 cm. longa, laevis, rubra; capsula oblonga, gibbosa; operculum conicum, apiculatum.

Autoicous; male buds minute, numerous, about 0.25 mm. long, antheridia 6-8 with a few short paraphyses, enclosed in about 6 broadly ovate, obtuse perigonial leaves with lax, smooth cells. Densely tufted plants, yellow above, pale brown below, not glossy. Stems up to 3 cm. long, compactly and irregularly branched, branches flexuose, ascending, blunt at the tips. Leaves ovate, concave, obtuse or broadly rounded at the apex, rarely truncate, 1 mm. long by 0.5 mm. wide; margin erect, denticulate all around and papillose-crenulate; costa double, variable in length, but often extending halfway up the leaf; leaf cells linear, 5 μ wide by 8-12 times as long, with numerous (10-16) minute but distinct papillae over the lumens, the marginal row near the apex shorter and rhomboidal, shorter and more lax in several rows at the extreme base, without any differentiated alar cells. Inner perichaetial leaves ovate-lanceolate, acuminate, 1.5 mm. long, ecostate, lower cells lax and smooth, upper cells papillose; seta red, smooth, flexuose, up to 2.5 cm. long; capsule asymmetrical, short oblong, horizontal, urn about 1 mm. long, arcuate and constricted under the mouth when dry and empty, exothecal cells hexagonal, not collenchymatous; peristome normal; lid conic, apiculate, 0.6 mm. long; spores smooth, 15 μ in diameter.

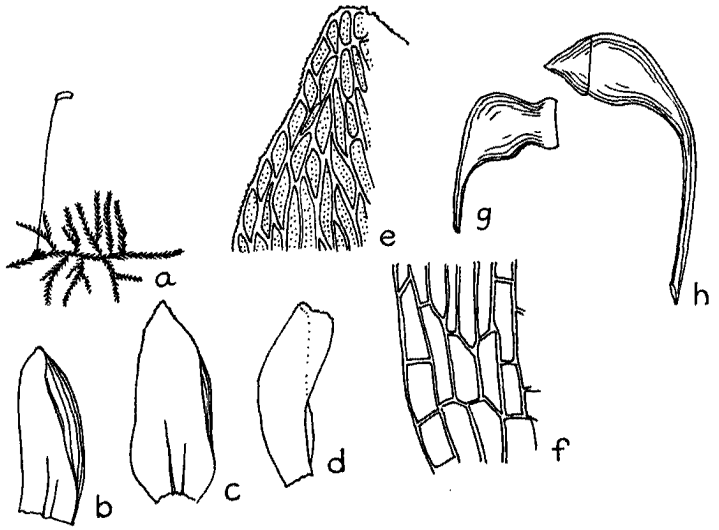

FIGURE 11.—*Glossadelphus tahitensis* Bartram: *a*, plant, × .9; *b-d*, leaves, × 25.5; *e*, apex of leaf, × 377.5; *f*, basal angle of leaf, × 377.5; *g*, dry capsule, × 10.5; *h*, moist capsule, × 10.5.

Type: Tahiti, Pirae-Aorai trail, August 1-3, 1922, Whitney Expedition no. 697.

This is an interesting plant combining the papillose leaf cells of *Taxithelium* with the characteristic blunt, costate leaves of *Glossadel-*

phus. It will be distinguished at once from *G. torrentium* (Bescherelle) Fleischer by the papillose leaf cells.

Ectropothecium sodale (Sullivant) Mitten.

Tahiti, Fautaua Canyon, elevation 400-550 m., July 28, 1922, E. H. Quayle nos. 662c, 666a, 669b, Lake Vaihiria, elevation 650 m., in moist soil at base of a *Polypodium,* June 3, 1927, L. H. MacDaniels no. 1598.

Vesicularia inflectens (Bridel) C. Müller.

Tahiti, Fautaua Canyon, shady, damp, elevation 400-550 m., E. H. Quayle no. 669; Tahiti, Maire Valley, Teahupo, moist, shady, elevation 10 m., June 7, 1927, L. H. MacDaniels no. 1652.

Ctenidium stellulatum Mitten.

Tahiti, trail to summit of Moua Aorai, above 1386 m., September 22-24, 1921, E. H. Quayle no. 147.

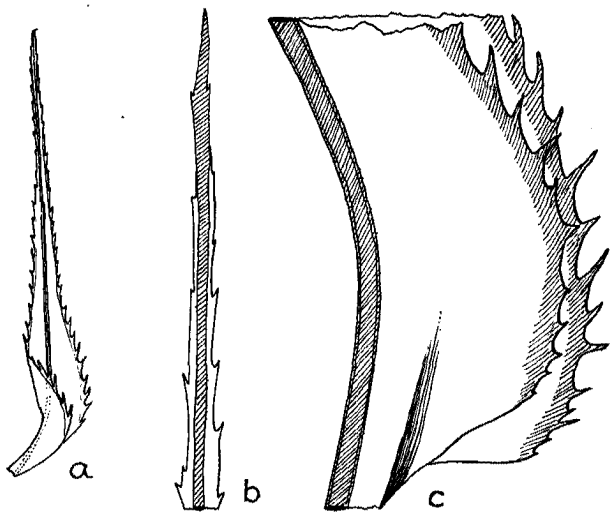

FIGURE 12.—*Spiridens armatus* Bartram: *a,* leaf, × 10.5; *b,* apex of leaf, × 60; *c,* base of leaf, × 60.

COOK ISLANDS

Syrrhopodon Banksii C. Müller.

Rarotonga, May-July, 1929, H. E. and S. T. Parks no. M.10.

Spiridens armatus, new species (fig. 12).

S. Balfouriano affine. Caulis ad 16 cm. altus, parce ramosus; costa in cuspidem brevem excurrens; foliorum margines arcte ciliato-dentati.

The long, curved, cilialike teeth extending down the margins to the top of the short, clasping leaf base seem to clearly separate this species from either *S. Balfourianus* or *S. Reinwardtii.*

Macromitrium Nadeaudii Bescherelle.
Rarotonga, May-July, 1929, H. E. and S. T. Parks no. M.5.

Symphysodon vitianus (Sullivant) Brotherus.
Rarotonga, May-July, 1929, H. E. and S. T. Parks no. 22142.

Eurhynchium vagans (Harvey) Bartram.
Rarotonga, May-July, 1929, H. E. and S. T. Parks no. M.6.

Taxithelium tenuisetum (Sullivant) Mitten.
Rarotonga, May-July, 1929, H. E. and S. T. Parks no. M.8.

TONGA ISLANDS

Brachymenium melanothecium (C. Müller) Jaeger.
Tongatabu, June-August, 1926, W. A. Setchell and H. E. Parks no. M.2.

Macromitrium tongense Sullivant.
Tongatabu, W. A. Setchell and H. E. Parks, June-August, 1926, no. M.1.

Ectropothecium tutuilum (Sullivant) Mitten.
Eua Island, June-July, 1926, H. E. Parks no. M.9.