



HAWAIIAN MOSSES

BY

V. F. BROTHERUS

BERNICE P. BISHOP MUSEUM

BULLETIN 40

HONOLULU, HAWAII
PUBLISHED BY THE MUSEUM
1927

Hawaiian Mosses

By V. F. BROTHERUS

INTRODUCTION

In 1896, the mosses of Hawaii were described by Müller¹, as a result of the study of collections made by D. D. Baldwin and W. Hillebrand and of the examination of the older literature containing notes on Hawaiian flora. To the 146 species listed in this report, Müller² in 1897 added 8 new species. During the last years of his life, Müller³ completed the examination of a collection made by H. Schauinsland and described 11 new species. In 1904, I classified a collection made by D. D. Baldwin and sent to me by my unforgotten friend, the late E. Levier.⁴ This collection comprised 163 species, of which 87 were new records for Hawaii. The list included many new species, but no descriptions; the names consequently remained *nomina nuda*. An almost identical collection, also made by Baldwin, was received through the kindness of Professor A. W. Evans.

Some years later, I reported on a collection made by K. Reehinger,⁵ comprising 14 species, two of them new.

During many years Hawaiian mosses from various sources have accumulated in my herbarium. Special mention may be made of the collection of Father Matthias Newell, sent to me by Rev. D. A. Lillie, and the contributions by J. F. Rock. Professor Dr. C. Skottsberg, who visited Hawaii in 1922, brought some very valuable and abundant material which he asked me to examine. This collection induced me to undertake a revision of all the accumulated Hawaiian material which for lack of time had been laid aside. The result will be found in this paper.

As regards the Baldwin collection, only new and interesting localities for known species and the new species listed by Levier but not heretofore described, are considered. My knowledge of Hawaiian mosses has become considerably deepened since that list appeared. Several species proposed as new in 1904 are here referred to older species. These corrections,

¹ Muller, C., *Bryologica Hawaiica: Flora oder allg. Bot. Zeitung*, Band 82, Heft 4, 1896.

² Muller, C., *Additamenta ad bryologica Hawaiicam: Bull. Herb. Boiss.*, vol. 5, no. 10, 1897.

³ Muller, C., und Brotherus, V. F., *Musci Schauinslandiani, ein Beitrag Zur Kenntnis der Moosflora der Pacifischen Inseln: Nat. Ver. Bremen, Abh.*, 1900.

⁴ Brotherus, V. F., *Musci Hawaiici quos legit D. D. Baldwin: Soc. Bot. Ital., Bull.*, pt. 1, pp. 14-25, 1904.

⁵ Brotherus, V. F., *Musci der Hawaii und Salomonsinseln: Denk. d. math.—naturw. Kl. d. K. K. Akad. d. Wiss. Wien*, vol. 89, 1913.

together with other similar matter, have been listed as notes following the taxonomic discussion. (See p. 36.)

The following abbreviations are used throughout this paper: B.=D. D. Baldwin; H.=A. A. Heller; M.=H. Mann; N.=M. Newell; R.=J. F. Rock; S.=C. Skottsberg.

The drawings for this contribution shown in Plates I-VIII were made by T. Pohl. Proof has been read by C. Skottsberg.

ANDREAEACEAE

ANDREAEA Ehrhardt

Andreaea perpapillosa Brotherus, new species (Pl. I, fig. 1).

Gracilis, caespitosa, caespitibus densis, atrofuscis, opacis. Caulis erectus vel adscendens, vix ultra 1 cm. longus, dense foliosus, simplex. Folia sicca imbricata, humida erecto-patentia, e basi ovali breviter lanceolata, rotundato-obtusa, \pm 0.6 mm. longa, marginibus superne incurvis; enervia; cellulis incrassatis, superioribus lumine rotundato, dorso papilla alta instructis, interioribus lumine lineari, laevibus. Caetera ignota.

Maui: Haleakala, in crater; 2,200 meters (S. 1597).

Species foliis rotundato-obtusis, alte papillosis dignoscenda.

FISSIDENTACEAE

FISSIDENS Hedwig

Fissidens pacificus Aongstroem.

West Maui: in valleys elevation 250 meters (B. 177). Oahu, 750 meters (B. 210).

Area: endemic.

Fissidens (Semilimbium) baldwinii Brotherus, new species.

Dioicus; tenellus, caespitosus, caespitibus laxis, depressis, saturate viridibus, aetate fusciscentibus, opacis. Caulis procumbens, vix ultra 1.5 mm. altus, infima basi fusco-radiculosus, dense foliosus, simplex. Folia 5-9 juga, infima minuta, dein raptim majora, erecto-patentia, homomalla, lanceolato-ligulata, acutiuscula, ad 1.1 mm. vel paulum ultra longa, integerrima, elimbata; nervo pallido, infra summum apicem folii evanido; cellulis minutissimis, rotundatis, minutissime papillosis; lamina vera ultra medium folii producta, lamina dorsalis, ad basim nervi enata ibidemque angustata. Bractee perichaetii longiores, latius vaginantes; lamina vera limbo pluriseriato, superne desinente instructa. Seta ad 2 mm. alta, e basi genuflexa erecta, tenuissima, rubella. Theca horizontalis, minuta, anguste subcylindracea. Operculum oblique aciculare. Calyptra ignota. Planta mascula ignota.

East Maui: on trees; elevation 300 meters (B.).

Species a caeteris sectionis foliis caulinis elimbatis dignoscenda.

DITRICHACEAE

CERATODON Bridel

Ceratodon purpureus (L.) Bridel.

Hawaii: Kilauea, near Bird Park, on aa, elevation 1,200 meters (S. 1732); Mauna Loa, above rest house, 3,450 meters (S. 1283); slope of Hualalai (S. 1714); Hualalai, just below summit (S. 1610); summit of Hualalai; 2,500 meters (S. 1624).—West Maui: 1,100 meters (B. 203).

Area: cosmopolitan.

DICRANACEAE

TREMATODON Michaux

Trematodon latinervis C. Müller.

Oahu: Waianae Mountains (Mann and Brigham). Hawaii: crater of Kilauea, hot fissure, elevation 1,100 meters (S. 1723).

Area: endemic.

MICRODUS Schimper

Microdus filicaulis Brotherus, new species.

Gracillimus, caespitosus, caespitibus densis, fusciscenti-viridibus, vix nitidiusculis. Caulis erectus vel adscendens, ad 2 cm. longus, basi parce radiculosus, densiuscule foliosus, simplex. Folia sicca adpressa, humida suberecta vel erecto-patentia, carinato-concava, e basi brevi, ovali sensim lanceolata, obtusiuscula, ad 1.2 mm. longa, marginibus erectis, integerrimis; nervo validiusculo, infra summum apicem folii evanido; cellulis superioribus minutis, breviter rectangularibus, dein sensim longioribus. Caetera ignota.

Hawaii: Hilo, elevation 60 meters (N).

Species distinctissima, foliis brevibus, siccis adpressis oculo nudo jam dignoscenda.

DICRANELLA Schimper

Dicranella hochreutineri Cardot.

Oahu: Manoa, wet soil (S. 1238). Hawaii: Kohala Mountains (S. 1698); Pahala, slope of Mauna Loa, wet ravine (S. 1364, 1379).

Area endemic.

CAMPLYLOPODIUM (C. Müller) Bescherville

Campylopodium euphorocladum (C. Müller) Bescherville.

West Maui: elevation 1,600 meters (B. 262).

Area: Malayan Archipelago, Pacific islands, East Africa.

CAMPYLOPUS Bridel

Campylopus (Palinocraspis) densifolius Aongstroem (Pl. I, fig. 2).

Hawaii: Kilauea, fern forest (S. 1716 p. p.) and near crater, base of tree, elevation 1,200 meters (Frye 8a). East Maui: 900 meters (B. 42); Haleakala (B. 272). Oahu: Tantalus, near crater (L.); Konahuanui, above Manoa, on the lower slopes (H. 2225, 2276); Manoa Valley, on trees (S. 1231 p. p.); Nuuanu-Kalihi, on ridge (S. 1436); Koolau Mountains, back of Tantalus, on trees; 600 meters (S. 1490; forma ad var. *falcatum* vergens). Kauai: between the Hanapepe and Wahiawa rivers (H. 2574); Kokee (S.).

Area: endemic.

var. *falcatus* Brotherus, new variety.

Robustior. Caulis altior. Folia longiora, plerumque falcata.

Hawaii: Makahanaloa, Kauku, on trunks (S. 1330).

Campylopus purpureo-flavescens Hampe.

Hawaii: Hilo, elevation 1,200 meters (N.). Kauai: forests above Kokee (S. 1735).

Area: endemic.

Campylopus densifolius and *C. purpureo-flavescens* Hampe together with *C. hawaiiico-flexuosus* (C. Müller) Paris, form a section of their own (*Leucolomoidei*) which could be characterized in the following manner:

Caulis \pm distincte rubro-tomentosus. Folia sicca adpressa vel falcata, epilifera; cellulis basilaribus internis anguste rectangularibus, externis linearibus, marginalibus angustissimis, hyalinis, limbum biseriatum, ad dimidiam partem folii longitudinis producto-efformantibus.

Campylopus polytrichoides De Notaris.

Hawaii: koa forest above Kilauea, elevation 1,200 meters (S. 1633).

Area: western and southern Europe, northern Africa, Madeira, Azores.

Campylopus (Trichophylli) skottsbergii Brotherus, new species (Pl. I, fig. 3).

Gracilescens, caespitosus, caespitibus densis, laete viridibus, intus rufescentibus, nitidis. Caulis erectus, ad 12 cm. altus, per totam longitudinem parce rubro-tomentosus, dense foliosus, simplex vel dichotome ramosus. Folia sicca adpressa, humida erecto-patentia, canaliculato-concava, e basi lineari sensim elongate lanceolato-subulata, pilo brevi, stricto, hyalino, laevi vel apice parce serrulato terminata, ad 8 mm. longa; nervo basi \pm $1/3$ folii latitudinis occupante, dorso laevi, e cellulis ventralibus laxis, inanibus, dorsalibus stereideis constructo; cellulis laminalibus ad pilum productis, rhomboideis, basilaribus internis rectangularibus, marginalibus angustissime linearibus, hyalinis, alaribus ovali-hexagonis, teneris, in ventrem dispositis, fuscis. Caetera ignota.

Maui: Puu Kukui, summit bog, elevation 1,750 meters (S. 1740).

THYSANOMITRIUM Schwaegrichen

Thysanomitrium blumii (Dozy et Molkenboer) Brotherus.

Hawaii: Hilo (N.); south side of Hualalai, in forest, on aa; elevation 1,200 meters (S. 1396); Kau desert below Kapapala (S. 1643). Oahu; Koolau Mountains, ridge west of Keawaawa⁶ Valley, 600 meters (S. 1420); Nuuanu Valley, on rocks (S. 1394).

Area: southern India, Ceylon, Sumatra, Java, Celebes, Borneo, Philippines, Formosa, Japan, Pacific islands.

Thysanomitrium geniculatum (Aongstroem sub Campylopo).

Hawaii: Kilauea crater, wet rock face, elevation 1,200 meters (S. 1290); southern slope of Mauna Loa, forests above Pahala; 1,000 meters and 1,200 meters, wet ravine (S. 1374); west of Paho, 1840 flow, on blocks (forma *minor*, S. 1269). Maui: Haleakala, lower Government Ditch Trail (S. 1649, 1655). Oahu: Nuuanu Pali (S. 1427); on rocks (Frye).

Area: endemic.

Thysanomitrium praemorsum (C. Müller) Brotherus.

Hawaii: Hilo (N.); Mauna Loa, elevation 1,400 meters (R.).

Area: endemic.

Thysanomitrium microcephalum (C. Müller) Brotherus.

Hawaii: pahoehoe near Hiulani forest, common, elevation 500 meters (S. 1319).

Area: endemic.

DICRANODONTIUM Bryologia Europae

Dicranodontium falcatum Brotherus, new species (Pl. I, fig. 4).

Robustum, caespitosum, caespitibus densis, lutescenti-viridibus, aetate fuscescentibus, haud nitidis. Caulis ad 8 cm. longus, adscendens, fusco-tomentosus, plerumque simplex. Folia falcata, canaliculato-concava, e basi lata, amplexante subito lanceolata, dein in subulam longissime setaceam attenuata, ad 9 mm. longa, in parte superiore subulae dorsoque serrulata; nervo basi $\pm 1/4$ folii latitudinis occupante, continuo; cellulis laminalibus anguste linearibus, basilaribus internis valde inter se porosis, infimis rectangularibus, haud porosis, laxis, inanibus, spatium bene limitatum efformantibus, marginalibus angustissimis, limbum pluriseriatum efformantibus, alaribus numerosis, rubris, in auriculam dispositis. Caetera ignota.

West Maui: mountain ravines, on trunks, elevation 1,500 meters (B. 108, 247).

Species *D. forbesii* Brotherus habitu similis, sed foliis minutissime serrulatis, auriculatis cellulisque laminae valde inter se porosis jam dignoscenda.

⁶ Keawaawa Valley is here accepted as the name of the valley lying east of Kuliouou Valley in southeastern Oahu.

Dicranodontium hawaiiicum Brotherus, new species (Pl. II, fig. 5).

Gracilescens, caespitosum, caespitibus densis, lutescenti-viridibus, sericeo-nitidis. Caulis erectus vel ascendens, ad 6 cm. longus, inferne fusco-tomentosus, plerumque simplex. Folia erecto-patentia, comalia \pm distincte falcata, canaliculato-concava, e basi lanceolata sensim in subulam longissime setaceam attenuata, ad 7 mm. longa, in parte superiore subulae minutissime serrulata; nervo basi \pm $\frac{1}{4}$ folii latitudinis occupante, continuo; cellulis laminalibus anguste linealibus, basilaribus internis valde inter se porosis, infimis rectangularibus, haud porosis, laxis, inanibus, spatium bene limitatum efformantibus, marginalibus angustissimis, limbum pluriseriatum efformantibus, alaribus numerosis, rubris, in ventrem dispositis. Caetera ignota.

Maui: Puu Kukui, very wet forest, elevation 1,600 meters (S. 1630); Haleakala, Kula pipe line, wet forest, 1,200 meters (S. 1177, 1178); without locality (B.). Oahu: mountain ravines, 900 meters (B. 169 c.).

Species *D. nitido* (Dozy et Molkenboer) Fleischer affinis, sed cellulis basilaribus internis folii valde inter se porosis, alaribus in ventrem dispositis dignoscenda.

var. **atrovirens** Brotherus, new variety.

Caespites ingentes, atrovirides. Folia etiam inferiora falcata.

Hawaii: swamps of Kohala, dense forest (R.).

HOLOMITRIUM Bridel**Holomitrium seticalycinum** C. Müller.

Maui: Puu Kukui, forest, elevation 1,600 meters (S. 1730).

Area: endemic.

Holomitrium brevicalycinum C. Müller.

Hawaii: Makahanaloa, Kauku, epiphytic (S. 1320).

Area: endemic.

DICRANUM Hedwig**Dicranum sandwicense** Sullivant.

Hawaii: above Hilo, elevation 1,200 meters (N.); Kilauea crater, in forest, 1,200 meters (S. 1584) and Volcano House (Frye); Kilauea, stones and soil in forest, 1,200 meters (S. 1292); Mauna Loa, dry forest (R.). West Maui: Puu Kukui, very wet forest, 1,500 to 1,600 meters (forma integrifolia; S. 1353); West Maui, mountain ridges, 1,200 meters (forma foliis subintegris; B. 157) and 900 meters (forma integrifolia; B. 33); West Maui (forma foliis subintegris; M. and B.). Oahu: mountain ridges; 900 meters (B. 169). Waianae Mountains, Palehua, in forest; 650 meters. (S. 1519, 1533, forma foliis subintegris); Koolau Mountains, Keawaawa Valley, on trees (S. 1415).

Area: endemic.

Dicranum speirophyllum Montagne.

Oahu: Nuuanu-Kalihi ridge (S. 1447).

Area: endemic.

LEUCOLOMA Bridel

Leucoloma molle (C. Müller) Bridel.

Oahu: elevation 750 meters (B. 207).

Area: from Sunda Islands to New Guinea, Hongkong, Luzon, Formosa, Japan.

Leucoloma (Euvittata) hawaiiense Brotherus, new species (Pl. II, fig. 6).

Robustiusculum, caespitosum, caespitibus densiusculis, viridibus, nitidiusculis. Caulis adscendens, ad 5 cm. longus, inferne nudus, dein dense foliosus, simplex. Folia falcata, carinato-concava, e basi lanceolata sensim longe subulata, ad 5 mm. longa, subintegra vel apice minute et remote serrulata, limbo externo angustissimo, subcontinuo, hyalino, interno pluriseriato, parce chlorophylloso; nervo tenui, continuo; cellulis laminalibus internis chlorophyllosis ad basin folii descendentibus, superioribus minutis, quadratis, laevibus basilaribus anguste rectangularibus, alaribus numerosis, vix incrassatis. Caetera ignota.

Oahu: Koolau Mountains, Kawaiiki ditch trail, on trees (S. 1460).

Species praecedenti affinis, sed statura robustiore foliisque falcatis oculo nudo jam dignoscenda.

LEUCOBRYACEAE

LEUCOBRYUM Bridel

Leucobryum gracile Sullivant.

Hawaii: Hilo, elevation 450 meters (N.); south side of Hualalai, in forest of aa flow, 1,200 meters (S. 1387). Oahu: Waianae Mountains, Palehua, in forest, 650 meters (S. 1532); Koolau Mountains, Kawaiiki ditch trail, on soil (S. 1480), and back of Tantalus, on trees, 600 meters (S. 1503). Kauai: Alakai swamp (S. 1654).

Area: endemic.

This species is described by Sullivant: Bull. Torr. Club, vol. V., p. 10.

Leucobryum hollianum Dozy et Molkenboer.

Hawaiian islands, without locality (Miss E. S. Boyd; B. 25 p.p.).

Area: Java, Borneo.

Leucobryum pachyphyllum C. Müller.

Hawaii: Hilo, elevation 1,200 meters (N.); Mauna Loa, dry forest, on trees, 1,200 to 1,500 meters (R.).

Area: endemic.

Leucobryum fumarioli C. Müller.

Hawaii: above Hilo, elevation 1,200 meters (N.).

Area: endemic.

Leucobryum solfatarae C. Müller.

Hawaii: south side of Hualalai in forest on aa flow, elevation 1,200 meters (S. 1393 p. p.). Kauai: Alakai swamp (S. 1680, 1728).

Area: endemic.

OCTOBLEPHARUM Hedwig

Octoblepharum albidum (L.) Hedwig.

Oahu: Manoa Valley, on trees (S. 1230).

Area: in all parts of the Tropical Zone, common.

CALYMPERACEAE

SYRRHOPODON Schwaegrichen

Syrrhodon (*Eusyrrhodon*, *Acaules*) **pellucidus** Brotherus, new species
(Pl. II, fig. 7).

Robustusculus, caespitosus, caespitibus densis, fuscescentibus. Caulis erectus, ad 5 mm. vel paulum ultra longus, basi fusco-radiculosus, dense foliosus, simplex vel ramosus. Folia sicca flexuosula, humida erecto-patentia, stricta, canaliculato-concava, e basi elongata, oblonga sensim longe et anguste linearia, acutiuscula, ad 5 mm. vel paulum ultra longa, summo apice tantum minutissime serrulata, limbata, limbo angusto, infra apicem evanido; nervo crasso, infra summum apicem folii evanido, dorso scabro; cellulis laminalibus minutis, quadratis, minutissime verrucosis, pellucidis, eisdem cancellinae totam fere partem vaginantem occupantibus. Caetera ignota.

Hawaiian islands, without locality (B.).

Species *S. tenuifolio* Sullivant affinis, sed foliis summo apice tantum minutissime serrulatis, nervo dorso scabro cellulisque pellucidis dignoscenda.

Syrrhodon kilaueae C. Müller.

Hawaii: Hiulani forest, elevation 500 meters (S. 1304); Makahanaloa, Kakuu, epiphytic (S. 1326); Hiulani forest, elevation 500 meters (S. 1309).

Area: endemic.

Syrrhodon hawaicicus C. Müller.

West Maui: mountain ravines, elevation 1,200 meters (B. 195). Oahu: Manoa Valley, on trees (S. 1231 p. p., 1232).

Area: endemic.

Syrhophodon (Cavifolii) **oahuensis** Brotherus, new species (Pl. II, fig. 8).

Gracilescens, caespitosus, caespitibus densis, pallide fuscescenti-viridibus. Caulis erectus, ad 1 cm. vel paulum ultra longus, basi fusco-radiculosus, dense foliosus, dichotome ramosus, ramis fastigiatis. Folia sicca incurva, humida erecto-patentia, e basi vaginante anguste oblonga sensim linearia, obtusa, ad 1.7 mm. longa, limbata, limbo angusto, hyalino, superne evanido, marginibus incurvis, in parte superiore vaginae fimbriatis, summo apice dentibus paucis aculeiformibus instructis; nervo dorso aculeato, continuo; cellulis laminalibus minutis, quadratis vel rotundato-hexagonis, aculeato-papillosis, vaginalibus laxis, rectangularibus, hyalinis. Caetera ignota.

Oahu: Koolau Mountains, back of Tantalus, on trees, elevation 600 meters (S. 1491).

Species distinctissima, cum nulla alia commutanda.

POTTIACEAE

MOLENDOA Lindberg

Molendoa crassinervis Brotherus, new species (Pl. III, fig. 11).

Robusta, caespitosa, caespitibus densis, late extensis, glauco-viridibus, intus ferrugineis. Caulis erectus, ad 3 cm. longus, fusco-tomentosus, dense foliosus, dichotome ramosus vel simplex. Folia sicca incurva, humida erecto-patentia, e basi brevi sensim lineari-lanceolata, breviter acuminata, acuta, ad 2 mm. longa, integerrima; nervo valido, dorso valde prominente, e basi latiore sensim angustato, infra apicem folii evanido; cellulis minutissimis, quadratis, incrassatis, minutissime papillosis, basilaribus breviter rectangularibus, laevibus. Caetera ignota.

Hawaiian islands: without locality (H.).

Species distinctissima, a congeneribus nervo valido, e basi latiore sensim angustato jam dignoscenda.

ANOECTANGIUM (Hedwig) Bryologia Europae

Anoectangium skottsbergii Brotherus, new species (Pl. III, fig. 10).

Tenellum, caespitosum, caespitibus densis, late extensis, laete viridibus, intus ferrugineis, tomentosus. Caulis erectus, ad 2.5 cm. altus, dense foliosus. Folia sicca adpressa, incurva, comalia \pm distincte spiraliter contorta, carinato-concava, ligulata, obtusissima, brevissime mucronata, ad 1.2 mm. longa et \pm 0.3 mm. lata, marginibus, erectis, integerrimis; nervo subcontinuo, dorso scabro; callulis minutissimis, papillosis, subobscuris. Caetera ignota.

Hawaii: Kilauea, Twin Craters, elevation 1,200 meters (S. 1592); Kilauea crater, wet rock face, 1,200 meters (1289). West Maui: valleys; 300 meters.

Species *A. haleakalae* (C. Müller) Paris (Pl. III, fig. 9) affinis, sed foliis latioribus, ligulatis, obtusis dignoscenda.

TRICHOSTOMUM Hedwig

Trichostomum (*Oxystegus*) **mauiense** Brotherus, new species (Pl. III, fig. 12).

Gracilescens, caespitosum, caespitibus densis, viridibus. Caulis erectus, ad 1 cm. longus, basi fusco-radiculosus, dense foliosus, dichotome ramosus vel simplex. Folia fragilia, sicca incurva, humida patentia, carinato-concava, e basi brevi lanceolato-lineararia, obtusa, mucronata, ad 3 mm. longa, marginibus erectis, integerrimis; nervo valido, lutescente, breviter excedente, laevi; cellulis laminalibus minutis, rotundatis, subobscuris, basilaribus elongate rectangularibus, hyalinis. Caetera ignota.

Maui: Haleakala, near rest house, elevation 3,000 meters (S. 1629).

Species *T. cylindrico* (Bruch) C. Müller affinis, sed foliis obtusis dignoscenda.

PSEUDOSYMBLEPHARIS Brotherus

Pseudosymblepharis mauiensis (C. Müller sub *Trichostomo*).

Oahu: Waianae Mountains, Makaleha Valley (S. 1206). Kauai: Olokele Canyon, wet rocks (S.).

Area: endemic.

GRIMMIACEAE

GRIMMIA Ehrhardt

Grimmia haleakalae Reichardt.

Hawaii: Mauna Loa about rest house (S. 1287); summit or just below summit of Hualalai, elevation 2,500 meters (S. 1603, 1607, 1608, 1611, 1618, 1638, 1736). Maui: crater of Haleakala; 2,200 meters (S. 1703, 1715); Haleakala near rest house, 3,000 meters (S. 1628).

Area: endemic.

Grimmia (*Schistidium*) **scabrifolia** Brotherus, new species (Pl. IV, fig. 13).

Gracilescens, caespitosa, caespitibus densis, faciliter dilabentibus, fuscis. Caulis procumbens, ad 7 cm. longus, inferne denudatus, dein dense foliosus, vage ramosus. Folia sicca adpressa, humida squarrosa, demum patentia, carinato-concava, ovato-lanceolata, obtusissima, ad 2.3 mm. longa, marginibus late revolutis, apice serrulatis; nervo rufescente, infra summum apicem folii evanido, dorso superne scabro; cellulis valde incrassatis, superioribus rotundatis, dein breviter rectangularibus, valde sinuosis, basilaribus internis linearibus, haud sinuosis. Caetera ignota.

East Maui: on ground (B. 236).

Species distinctissima, cum nulla alia commutanda.

RHACOMITRIUM Bridel

Rhacomitrium hypnoides (L.) Lindberg.

Hawaii: Mauna Loa, very common (S. 1278); north side (1279); above rest house; elevation 3,450 meters (S. 1280, 1282, 1285, 1286); east slope, upper limit of ohia (S. 1274); south side of Hualalai, on aa, in forest, social, 1,200 meters (S. 1383). West Maui: Puu Kukui, summit bog, 1,750 meters (S. 1673). West Maui: on open swampy ground, 1,800 meters (B. 78). Kauai: head of Wahiawa Valley (H. 2715); in the bogs (R.); Alakai swamp (S. 1727).

Area: cosmopolitan.

Rhacomitrium fasciculare (Schrader) Bridel var. **erosum** Brotherus, new variety.

Folia latius acuminata, apice \pm distincte eroso-dentata.

Maui: on rocks (B.).

var. **perrobustum** Brotherus, new variety.

Robustum. Folia anguste acuminata, integra vel summo apice eroso-dentata. Forsan species propria.

West Maui: on rocks, elevation 1,065 meters (B. 78).

FUNARIACEAE

FUNARIA Schreb

Funaria (Entosthodon) **subintegra** Brotherus, new species.

Gracilis, caespitosa, caespitibus laxiusculis, viridibus. Caulis erectus, vix ultra 5 mm. longus, basi fusco-radiculosus, comoso-foliosus, simplex. Folia sicca contracta, humida patula, planiuscula, e basi breviter spathulata obovata, acuta, ad 4 mm. longa et ad 1.5 mm. lata, marginibus erectis, superne minutissime serrulatis; nervo tenui, longe infra apicem folii evanido; cellulis superioribus minutis, ovalibus, dein multo laxioribus, basilaribus elongate rectangularibus, marginalibus linearibus, limbum uniseriatum, lutescentem efformantibus. Seta ad 12 mm. alta, tenuissima, rubra. Theca erecta, pyriformis, \pm 2 mm. longa, fusca, gymnostoma. Spori \pm 25 μ , fusci, minutissime papilloși.

Oahu: interior of Manoa Valley, wet soil (S. 1236). West Maui: mountain ridges, on ground, elevation 1,000 meters (B. 127).

Species *F. wichurae* Brotherus affinis, sed foliis acutis nec cuspidatis jam dignoscenda.

Funaria calvescens Schwaegrichen.

Hawaii: Kilauea crater, hot fissure, elevation 1,200 meters (S. 1616).

Area: common in the tropical and subtropical parts of the world.

BRYACEAE

WEBERA Hedwig

Webera (*Lamprophyllum*) **leucostomoides** Brotherus, new species.

Dioica; gracilis, caespitosa, caespitibus densis, fuscescenti-viridibus, opacis. Caulis erectus, fertilis ad 1 cm. longus, innovationibus vix ultra 5 mm. longis, sterilis ad 2 cm. longus, simplex inferne fusco-tomentosus, laxiuscule foliosus, superne propagulis numerosissimis, minutis, obovatis, fuscis instructus. Folia caulina erecto-patentia, carinato-concava, longe decurrentia, anguste lanceolata, sensim acuminata, ad 1.6 mm. longa, comalia longiora et angustiora, marginibus \pm distincte revolutis, superne serrulatis; nervo infra apicem folii evanido; cellulis anguste linearibus, basilaribus laxioribus. Folia innovationum minora, brevius acuminata. Seta 3-4 cm., tenuissima, lutescenti-rubra. Theca, horizontalis, e collo sporangio brevior turgide ovalis, microstoma, fuscidula. Caetera ignota.

West Maui: mountain ravines on ground, elevation 1,400 meters (B. 133).

Species *W. leucostomae* (*Bryologia javanica*) Fleischer affinis, sed propagulis numerosissimis, gemmiformibus jam dignoscenda.

LEPTOBRYUM (*Bryologia Europae*) Wilson**Leptobryum pyriforme** (L.) Wilson.

Hawaii: Kilauea crater, hot fissure, elevation 1,200 meters (S. 1723 p.p.)

Area: Europe, northern and central Asia, Japan, North America, Ecuador, Brazil, Patagonia, Fuegia, Tasmania, New Zealand.

ANOMOBRYUM Schimper

Anomobryum angustirete Brotherus, new species (Pl. IV, fig. 14).

Gracile, caespitosum, caespitibus densis, lutescentibus, nitidis. Caulis erectus, ad 4 cm. longus, \pm alte fusco-radiculosus, dense foliosus, plerumque simplex. Folia imbricata, concava, ovalia, obtusa, ad 1.5 mm. longa, marginibus basi anguste recurvis, superne minutissime serrulatis; nervo sat tenui, ad medium folii vel paulum ultra evanido; cellulis anguste linearibus, incrassatis, flexuosulis, apice papillose exstante, basilaribus laxe rhomboideis vel subrectangularibus. Caetera ignota.

West Maui: valleys, on ground, elevation 240 meters (B. 114).

Species foliis ovalibus, nervo ad medium folii evanido, cellulis laminaribus anguste linearibus dignoscenda.

BRYUM Dillenius, emend. Schimper

Bryum (*Areodictyon*) **mauiense** Brotherus, new species.

Dioicum; caespitosum, caespitibus densis, pallide viridibus, intus fuscescentibus, vix nitidiusculis. Caulis erectus, ad 2 cm. longus, fusco-tomentosus, densiuscule foliosus. Folia flaccida, erecto-patentia, concava, oblonga, breviter acuminata, acuta, ad 1.5 mm. longa, marginibus erectis, integris; nervo tenui, subcontinuo vel

brevissime excedente; cellulis laxis, teneris, rhomboideo-hexagonis, basilaribus rectangularibus, infimis quadratis, rubris. Seta vix ad 1.5 cm., tenuis, rubra. Theca inclinata, pyriformis, \pm 2.5 mm. longa, fusca. Caetera ignota.

West Maui: in valleys, elevation 200 meters (B. 120 p. p.).

Species *B. compressidenti* C. Müller affinis, sed foliis angustioribus, seta brevior et theca minore dignoscenda.

Bryum (Apalodictyon) **megalostegium** Sullivant.

Hawaii: Hilo, seashore (N.). Maui: Haleakala, lower Government Ditch Trail (S. 1718).

Area: endemic.

Bryum erythrocarpum Schwaegrichen.

West Maui: on ground, elevation 1,000 meters (B. 232).

Area: Europe, Algeria, North America.

Bryum (Erythrocarpa) **crassicostatum** Brotherus, new species.

Dioicum; gracilescens, caespitosum, caespitibus densissimis, fusco-tomentosis, fusciscenti-viridibus, nitidiusculis. Caulis erectus, cum innovationibus vix ultra 1 cm. longus, dense foliosus, innovationibus brevibus, aequaliter foliosis. Folia caulina sicca adpressa, humida erecto-patentia, carinato-concava, e basi truncata lanceolata, aristata, ad 2 mm. longa et \pm 0.55 mm. lata, marginibus revolutis, apice minute serrulatis; nervo crasso, in aristam brevem, integram excedente; cellulis angustis, rhombeis et oblongo-hexagonis, basilaribus rectangularibus, infimis rubris; marginalibus angustis, limbum pauciseriatum, lutescentem efformantibus. Seta \pm 3 cm., tenuis, fusciscens. Theca nutans, e collo sporangii longitudinis breviter oblonga, \pm 3 mm. longa, pachydermis, fusca. Peristomium destructum. Operculum ignotum. Spori 10-12 μ , fusciduli, laeves.

East Maui: Haleakala, on ground, elevation 300 meters (B. 54).

Species foliis nervo crasso instructis dignoscenda.

Bryum (Rosulata) **baldwinii** Brotherus, new species.

Dioicum; robustiusculum, caespitosum, caespitibus densiusculis, viridibus, intus fusciscentibus, vix nitidiusculis. Caulis erectus vel adscendens, ad 4 cm. longus, fusco-radiculosus, dense foliosus, simplex. Folia sicca erecta, humida erecto-patentia, carinato-concava, elongate oblonga, breviter acuminata, acuta, \pm 3 mm. longa, marginibus anguste recurvis, apice serrulatis; nervo valido, superne sensim tenuiore, breviter excedente; cellulis anguste rhombeis vel oblongo-hexagonis, basilaribus rectangularibus, marginalibus linearibus, limbum lutescentem, pluri-seriatum efformantibus. Caetera ignota.

West Maui: mountain ravines, on the ground, elevation 300 meters (B. 120); 1,700 meters (B. 262).

Species *B. laevigato* Hooker fil. et Wilson affinis, sed foliorum forma et areolatione dignoscenda.

Bryum decaisnei Dozy et Molkenboer.

West Maui: mountain ridges on trees, elevation 1,200 meters (B. 260); on ground, 1,700 meters (B. 112).

Area: Java.

RHIZOGONIACEAE

RHIZOGONIUM Bridel

Rhizogonium spiniforme (L.) Bruch.

Hawaii: Hilo, woods (Mann and Brigham); Mauna Loa, elevation 1,400 meters (R.); Haena, south of Hilo (S. 1265); Kilauea, fern forest, 1,200 meters (S. 1716) and stones and soil in forest (1293); Hiulani forest, 500 meters (S. 1303 p. p.). East Maui: on trunks, 900 meters (B. 1, 6). Molokai: on ground in damp places, abundant, 900 meters (B.). Oahu: Waialua Mountains, on rotten wood (Mann and Brigham) (19); mountain ridges, on ground, abundant, 900 meters (B.); Konahuanui (H. 2275); Waianae Mountains, Palehua, in forest, 650 meters (S. 1513); Manoa Valley, on trees (S. 1229); Koolau Mountains, Kawaiiki ditch trail, on trees (S. 1461); Koolau Mountains, back of Tantalus, on trees, 600 meters (S. 1482). Kauai: trunks of trees, 1,200 meters (B.), and on rocks in running water, abundant, 240 meters (B.).

Area: common in the tropical and subtropical parts of the world.

Rhizogonium pungens Sullivant.

Hawaii: Hiulani forest, elevation 500 meters (S. 1314). East Maui: on decayed logs, 1,200 meters (B. 6 p. p.). Oahu: Nuuanu-Kalihi ridge (S. 1437); Koolau Mountains, Kawaiiki ditch trail, on trees (S. 1467).

Area: endemic.

BARTRAMIACEAE

BARTRAMIA Hedwig

Bartramia norvegica (Gunn.) Lindberg.

East Maui: Haleakala, on ground in ravines, elevation 2,400 meters (B. 277).

Area: Europe, Caucasus, Himalaya, Yunnan, Rocky Mountains.

Bartramia (*Vaginella*) **mauiensis** Brotherus, new species (Pl. IV, fig. 15).

Synoica; robusta, caespitosa, caespitibus densiusculis, glauco-viridibus, aetate fuscescentibus. Caulis erectus, ad 4 cm. longus, inferne fusco-tomentosus, dense foliosus, simplex vel ramosus. Folia e basi vaginante, superne dilatata in laminam patentem, strictam, lineari-subulatam raptim constricta, parte laminali ad 4 mm.

longa, marginibus erectis, dense et argute serrulatis; nervo distincte limitata, breviter excedente; cellulis laminalibus linearibus, parietibus transversis prominentibus, utrinque papillois. Seta \pm 1.5 cm. longa, rubra. Theca inclinata, asymmetrica. Peristomium destructum, duplex. Spori 30 ad 35 μ , fusci, papillois.

East Maui: Haleakala, elevation 2,400 meters (B. s. n.).

Species *B. patenti* Bridel persimilis, sed foliis dense et argute serrulatis dignoscenda.

PLAGIOPUS Bridel

Plagiopus javanicus (Dozy et Molkenboer) Fleischer.

East Maui: Haleakala, on damp ground, elevation 2,400 meters (B. 219).

Area: Java.

PHILONOTIS Bridel

Philonotis hawaiiica (C. Müller) Brotherus.

Hawaii: Hilo (N.). East Maui: Haleakala (R.). Oahu: without locality (Didrichsen).

Area: endemic.

Philonotis laxissima (C. Müller) Bryologia javanica.

Oahu: Manoa Valley, waterfall (S. 1241).

Area: Java, Philippines.

Philonotis turneriana (Schwaegrichen) Mitten.

Hawaii: Hilo (N.). Kauai: between the Hanapepe and Wahiawa rivers (H. 2515).

Area: Himalaya, Khasia, Java, China, Japan.

Philonotis sullivanii (C. Müller) Paris.

Oahu: Nuuanu Pali (S. 1431).

Area: endemic.

Philonotis macroglobus (C. Müller) Paris.

Hawaii: Mauna Loa above Pahala, wet ravine, elevation 1,200 meters (S. 1371, 1381); Kohala Mountains, wet rocks along forest path near Kamuela (S. 1625). Maui: Haleakala, Kula pipe line, on wet rock wall, 1,200 meters (S. 1171).

Area: endemic.

Philonotis falcata (Hooker) Mitten.

Hawaii: Hilo (N.). Maui: without locality (B.). Hawaiian islands: without locality (Mann and Brigham).

Area: northern India, Tibet, Nilghiri, Philippines, China, Korea, Japan.

BREUTELIA Schimper

Breutelia crassicaulis (C. Müller) Paris.

Maui: Puu Kukui, top bog, elevation more than 750 meters (S. 1358).
Hawaii: Kohala Mountains near Kamuela, in forest (S. 1542).

Area: endemic.

PTYCHOMITRIACEAE

PTYCHOMITRIUM (Bruch) Fürnrohr

Ptychomitrium (Euptychomitrium) **mauiense** Brotherus, new species
(Pl. IV, fig. 16).

Autoicum; robustum, caespitosum, caespitibus densiusculis, rigidis, fuscescentibus, intus nigrescentibus. Caulis erectus, ad 2.5 cm. longus, basi fusco-radiculosus, dense foliosus, simplex vel furcatus, ramis brevibus, fastigiatis. Folia sicca crispata, humida erecto-patentia, canaliculato-concava, e basi ovato-oblonga sensim lineari-lanceolata, acuta, ad 4 mm. longa, marginibus erectis, superne minute et obtuse serratis; nervo valido, infra summum apicem folii evanido; cellulis minutis valde incrassatis, marginalibus minoribus, quadratis, haud incrassatis, limbum biseriatum efformantibus, basilaribus elongatis, valde incrassatis, lumine angustissime lineari, alaribus numerosis, rectangularibus, fuscis. Sporogonia singula vel bina ex eodem perichaetio. Seta vix ultra 8 mm. alta, tenuissima, rubra. Theca minuta, oblongo-elliptica. Caetera ignota.

East Maui: elevation 2,400 meters (B. 188).

Species folii areolatione valde insignis.

ORTHOTRICHACEAE

ZYGODON Hooker et Taylor

Zygodon reinwardtii (Hornschuch) Alexander Braun.

East Maui: Haleakala, on trunks, elevation 2,400 meters (B. 226).

Area: Ceylon, Java.

ORTHOTRICHUM Hedwig

Orthotrichum hawaiiicum C. Müller.

East Maui: Haleakala, trunks, elevation 2,400 meters (B. 100).

Area: endemic.

MACROMITRIUM Bridel

Macromitrium intricatum C. Müller.

East Maui: Haleakala, on trunks, elevation 2,400 meters (B. 217).

Area: endemic.

Macromitrium owahiense C. Müller.

Hawaii: Kilauea, stones in forest (S. 1297); Kohala Mountains above Kamuela, very common on trees (S. 1601); south side of Hualalai in forest on aa flow, elevation 1,200 meters (S. 1386). East Maui: Haleakala, 2,400 meters (B. 218). West Maui: Olowalu crater, common on trunks, 270 meters (B. 17 p. p.). Oahu: Waianae Mountains, Palehua, in forest, 650 meters (S. 1522); near Green Peak (S. 1537); Kuliouou-Keawaawa ridge, on trees (S. 1759). Kauai: forests of Kokee and Alakai swamp (S. 1674).

Area: endemic.

Macromitrium piliferum Schwaegrichen.

Hawaii: Haena, south of Hilo, *Pandanus* forest (S. 1260, 1261); Makahanaloa, Kauku, epiphytic (S. 1321); south side of Hualalai, in forest on aa flow, elevation 1,200 meters (S. 1389). West Maui: (B. 202). Oahu: on rocks (Mann and Brigham 12); Koolau Mountains: Keawaawa Valley, on trees (S. 1155, 1410); woods on Nuuanu-Kalihi ridge, 500-600 meters (S. 1445); Palolo Valley (S. 1186); back of Tantalus, on trees, 600 meters (S. 1504); Manoa Valley, on trees (S. 1228). Molokai: on trees, 1,000 meters (B. 213).

Area: endemic.

Macromitrium (Leiostoma) subsemipellucidum Brotherus, new species.

Gracile, fuscescenti-viride, opacum. Caulis elongatus, repens, dense ramosus, ramis erectis, 1-1.5 cm. longis, dense foliosis, plerumque simplicibus, obtusis. Folia ramea sicca adpressa, apice incurvo, humida erecto-patentia, carinato-concava, e basi oblonga sensim lineari-lanceolata, obtusiuscula, aristatula, ad 1.7 mm. longa, marginibus erectis, integerrimis; nervo sat tenui, lutescente, breviter excedente; cellulis laminalibus minutissimis, quadratis, dense verrucosis, obscuris, basilaribus elongatis, valde incrassatis, lumine angustissime lineari, hyalinis, laevissimis. Bractee perichaetii internae foliis similes. Seta ad 7 mm. vel paulum ultra alta tenuis, rubra, laevissima. Theca minuta, ovalis, microstoma, laevis, fuscidula. Peristomium nullum. Operculum e basi conica breviter rostratum. Calyptra ignota.

West Maui: crater of Olowalu, on trunks, elevation 240 meters.

Species *M. semipellucido* Dozy et Molkenboer simillima, sed peristomio deficiente dignoscenda.

RHACOPILACEAE

RHACOPILUM Palisot

Rhacopilum cuspidiferum (Schwaegrichen) Mitten.

Hawaii: Mauna Loa, elevation 1,400 meters (R.); Hilo (N.); Haena, south of Hilo, *Pandanus* forest (S. 1247, 1258). Oahu: Nuuanu (H. 2043) Koolau Mountains, Kawaiiki ditch trail, on soil (S. 1462, 1469, 1475). Kauai (Clarke).

Area: Pacific islands.

TRACHYPODACEAE

TRACHYPODOPSIS Fleischer

Trachypodopsis ornans (Reichardt) Fleischer.

Maui: Puu Kukui, very wet forest, elevation 1,500-1,600 meters (S. 1354); Haleakala, Kula pipe line, hanging from trees, 1,200 meters (S. 1176).

Area: endemic.

TRACHYPUS Reinwardt et Hornschuch

Trachypodopsis bicolor Reinwardt et Hornschuch.

West Maui: mountain ridges, on trunks (B. 170).

Area: Sikkim, Nilghiri, Ceylon, Sumatra, Java, Lombok, Ceram, Celebes.

Trachypodopsis (*Microtrachypus*) **mauiensis** Brotherus, new species.

Tenellum, caespitosum, caespitibus densis, depressis, fusciscenti-viridibus. Caulis elongatus, repens, hic illic fusco-radiculosus, haud papillosus, dense pinatim ramosus, ramis erecto-patentibus, vix ultra 5 mm. longis, dense foliosis, obtusis. Folia caulina e basi ovata subsensim lanceolato-subulata, in acumen piliforme attenuata, marginibus erectis, subintegris; nervo tenui, infra medium folii evanido; cellulis anguste linearibus, papillis numerosis instructis, obscuris. Folia ramea minora et angustiora, brevius acuminata, mutica vel apiculo hyalino terminata, superne distincte serrulata. Caetera ignota.

West Maui: valleys, elevation 240 meters (B. 204).

Species *T. tenerrimo* Brotherus habitu simillima, sed foliorum forma dignoscenda.

PTEROBRYACEAE

TRACHYLOMA Bridel

Trachyloma tahitense Bescherelle.

West Maui: mountain ravines, on trunks, elevation 1,060 meters (B. 240).

Area: Java, Lombok, New Caledonia, New Guinea, Tahiti.

GAROVAGLIA Endlicher

Garovaglia haleakalae Brotherus, new species (Pl. V, fig. 18).

Gracilescens, lutescenti-viridis, nitidiuscula. Caules secundarii ad 11 cm. alti, arcuato-adscedentes, dense et complanate foliosi, simplices. Folia patentia, concaviuscula, plicata, haud undulata, ovalia, apiculata, ad 3.5 mm. longa et \pm 1.5 mm. lata, marginibus erectis, superne minutissime serrulatis; enervia; cellulis incrassatis, linearibus, superioribus oblongo-ellipticis, basilaribus infimis laxioribus, fusco-aureis,

valde inter se porosis, alaribus oblongis. Bractee perichaetii internae late vaginantes, superne latiores, rotundatae, raptim in subulam brevem, subintegram attenuatae. Theca omnino immersa, oblonga, deoperculata fusca. Caetera ignota.

East Maui: Haleakala (B. 279).

Species *G. weberi* Brotherus habitu similis, sed foliis cellulis superioribus oblongo-ellipticis, alaribus oblongis jam dignoscenda.

METEORIACEAE

PILOTRICHELLA (C. Müller) Bescherville

Pilotrichella mauiensis (Sullivant) Jaeger.

Hawaii: Makahanaloa, Kauku, pendant (S. 1315).

Area: endemic.

METEORIUM Dozy et Molkenboer, emend. Fleischer

Meteorium miquelianum (C. Müller) Fleischer.

Oahu: without locality (Mann and Brigham 25).

Area: Malaya, New Guinea, Japan, China, Nilghiri, Ceylon.

AEROBRYOPSIS Fleischer

Aerobryopsis longissima (Dozy et Molkenboer) Fleischer.

Hawaii: Kohala Mountains above Waimea, on branches (S. 1553); south side of Hualalai, in forest, on aa flow, elevation 1,200 meters (S. 1391). Oahu: Kuliouou-Keawaawa ridge, on trees (S. 1158, 1396).

Area: Sikkim, southern India, Ceylon, Malacca, Yunnan, Philippines.
var. **Dozyana** (C. Müller) Fleischer.

Hawaii: Hiulani forest, hanging from trees, elevation 500 meters (S. 1318).

Area: Java.

BARBELLA (C. Müller) Fleischer

Barbella trichophora (Mont.) Fleischer.

Hawaii: Hilo (N.); Haena, south of Hilo *Pandanus* forest (S. 1257). Maui: Iao Valley, on stones (S. 1626). Oahu: Koolau Mountainis, Keawaawa Valley, on trees (S. 1417, 1418). Kauai: Olokele Canyon, wet places, on twigs (S. 1637).

Area: endemic.

FLORIBUNDARIA C. Müller

Floribundaria floribunda (Dozy et Molkenboer) Fleischer.

Hawaii: Hilo (N.). East Maui: Haleakala, elevation 1,200 meters (B. 129). Oahu: 800 meters (B. 200).

Area: Malaya and Pacific islands, Japan, Philippines, Tonkin, India, Madagascar, Usambara, southern Africa.

Floribundaria (Eufloribundaria) **baldwinii** Brotherus, new species.

Gracilis, lutescens, opaca. Caulis pendulus, ad 10 cm. longus, laxe foliosus, laxe subpinnatim ramosus, ramis patulis, ad 3 cm. longis, laxe et plumose foliosis, simplicibus. Folia caulina erecto-patentia, planiuscula, e basi ovata sensim lanceolato-subulata, plerumque in acumen piliforme attenuata, ad 1.9 mm. longa, marginibus erectis, ubique minutissime serrulatis; nervo tenui, infra medium folii evanido; cellulis anguste linearibus, seriatim papillois, subobscuris, basilaribus infimis laxioribus, saepe luscentibus, laevissimis, alaribus laxis, vesiculososis, ovalibus, laevissimis, luteis, in spatium valde excavatum dispositis. Folia ramea eisdem caulinis similia. Caetera ignota.

Oahu: elevation 760 meters (B. 200).

Species distinctissima, a congeneribus foliis cellulis alaribus laxis, luteis, in spatium valde excavatum dispositis dignoscenda.

NECKERACEAE

NECKEROPSIS Reichardt, emend. Fleischer

Neckeropsis lepineana (Montagne) Fleischer.

West Maui: in valleys, elevation 240 meters (B. 174).

Area: Malayan and Pacific islands, East Africa.

BALDWINIELLA Brotherus

Baldwiniella sandwicensis Brotherus.

Hawaii: Hilo (N.); Hiulani forest, elevation 500 meters (S. 1315). West Maui: on trunks of trees, 900 meters (B. 61). Oahu: Koolau Mountains, Keawaawa Valley, on trees (S. 1405) and dry waterfall (S. 1425); Waianae Mountains, Makaleha, stones in canyon (S. 1211). Kauai: without locality (B. 9).

Area: endemic.

HOMALIODENDRON Fleischer

Homaliodendron dendroides (Hooker) Fleischer.

Hawaii: Mauna Loa, elevation 1,400 meters (R.); Kohala Mountains above Waimea, on trees (S. 1554). West Maui: Puu Kukui, wet forest (S. 1725); on trunks of trees, 900 meters; damp ravines, on

ground, 1,700 meters (B. 8, 29). Oahu: Waianae Mountains, Palehua, 650 meters (S. 1219); Waianae Mountains, Makaleha Canyon (S. 1205); Koolau Mountains, Nuuanu-Kalihi ridge (S. 1435); Kawaiiki ditch trail, on trees (S. 1459). Kauai: on trunks of trees (B. 9).

Area: Pacific islands.

LIMBELLA C. Müller

Limbella tricostata (Sullivant) C. Müller.

Maui: in the river Puohokamoa (R.); Hawaii: Kohala Mountains above Kamuela, waterfall (S. 1600); Kauai: between Kawaiiki and Mohihi, common in stream (S. 1664); near Kokee, common in running water (S. 1635); head of the Wahiawa Valley, in and near a bog (H. 2744).

Area: endemic.

THAMNIUM Bryologia Europae

Thamnium speciosum Brotherus, new species (Pl. V, fig. 17).

Synoicum. Robustum, viride, aetate fuscens, vix nitidiusculum. Caulis primarius repens, fusco-tomentosus. Caules secundarii ad 14 cm. alti, stipite \pm elongato, foliis stipitis remotis, adpressis, minutis, scariosis, ovatis, acutis instructo, dein dense pinnatim vel bipinnatim ramosi, ramis erecto-patentibus, dense et complanate foliosis. Folia caulina erecto-patentia, concava, ovato-ligulata, breviter acuminata, acuta, ad 3.5 mm. longa, marginibus erectis, superne argute et inaequaliter serratis; nervo basi validiusculo, dein sensim tenuiore, sat longe infra apicem folii evanido; cellulis minutis, rhombeis, basin versus sensim majoribus, basilaribus internis breviter linearibus. Folia ramea eisdem caulinis similia, sed minora et argutius serrata. Bractee perichaetii internae erectae, minutae, late ovatae, raptim breviter acuminatae, acutiusculae vel obtusae, integrae. Seta \pm 1 cm. alta, tenuis, rubra. Theca erecta, regularis, breviter oblonga, fusca. Peristomium normale. Operculum e basi conica recte rostratum.

East Maui: Haleakala (B. 130, 178).

Species pulcherrima, a congeneribus inflorescentia synoica jam dignoscenda.

LEMBOPHYLLACEAE

CAMPTOCHAETE Reichardt

Camptochaete (Eu-Camptochaete) **falcifolia** Brotherus, new species (Pl. V, fig. 19).

Gracilescens, rigida, fuscens, nitida. Caulis elongatus, densiuscule foliosus, dense pinnatim ramosus, ramis patulis, vix ultra 1 cm. longis, dense foliosis, breviter ramulosis. Folia caulina falcata, concaviuscula, e basi ovata lanceolato-subulata, marginibus erectis, integris; enervia; cellulis anguste linearibus, apice papillose exstante, basilaribus brevioribus, alaribus minutis, incrassatis, rotundatis vel quadratis. Folia

ramea ovato-lanceolata, breviter acuminata, integra vel subintegra. Seta \pm 1 cm., rubra. Theca suberecta, oblonga, sicca deoperculata sub ore paulum contracta, fusca. Caetera ignota.

Maui: without locality (B.).

Species valde peculiaris, habitu *Ectropothecis* nonnullis persimilis.

HOOKERIACEAE

DALTONIA Hooker et Taylor

Daltonia rufescens Brotherus, new species (Pl. VI, fig. 20).

Robusta, caespitosa, caespitibus densiusculis, rufescentibus, nitidiusculis. Caulis 1 to 3 cm., basi fusco-tomentosus, \pm ramosus, ramis fastigiatis. Folia sicca adpressa, humida erecto-patentia, carinato-concava, e basi oblonga lanceolato-ligulata, breviter acuminata, ad 2.3 mm. longa et ad 0.6 mm. lata, marginibus recurvis, integerrimis; nervo rufescente, sat longe infra apicem folii evanido; cellulis rhombeis et ovali-hexagonis, pellucidis, ad insertionem laxis, vesiculosis, fuscis, ad margines linearibus, limbum luteum, basi 5 seriatum, superne 2-3 seriatum efformantibus. Seta vix ultra 8 mm. alta, tenuissima, rubra, superne scaberula. Theca erecta, e collo brevi ovalis. Spori 25-30 μ , fuscissimi minutissime papilloso.

West Maui: mountain ridges, on trunks, elevation 1,500 meters (B. 148).

Daltonia baldwinii Brotherus, new species (Pl. VI, fig. 21).

Robusta, caespitosa, caespitibus densiusculis, pallide viridibus, vix nitidiusculis. Caulis vix ultra 1.5 cm. longus, basi fusco-tomentosus, simplex vel ramosus, ramis fastigiatis. Folia erecto-patentia, carinato-concava, e basi oblonga lanceolato-ligulata, mucronata, ad 3.2 mm. longa et ad 0.75 mm. lata, marginibus erectis, integerrimis; nervo sat longe infra apicem folii evanido; cellulis laxe ovali-hexagonis, pellucidis, basilaribus majoribus, oblongis, ad margines linearibus, limbum luteum, basi 3-4 seriatum, superne angustiorefformantibus. Seta vix ultra 5 mm. alta, tenuissima, rubra, laevis. Theca erecta, e collo brevi ovalis. Spori 10-12 μ , fusciduli, laeves.

West Maui: mountain ridges, on ferns, 1,500 meters (B. 118).

Species distinctissima, foliis laxe reticulatis, valde pellucidis prima fronte dignoscenda.

Daltonia contorta C. Müller.

East Maui: Haleakala, on trunks, elevation 2,400 meters (B. 229).

Area: Ceylon, Java, Luzon.

DISTICHOPHYLLUM Dozy et Molkenboer

Distichophyllum paradoxum (Montagne) Mitten.

Hawaii: Mauna Loa above Pahala, wet ravine, elevation 1,200 meters (S. 1365); Hiulani forest, carpeting trunks and twigs, 500 meters (S. 1312); Kilauea, Twin Craters, 1,200 meters (S. 1563, 1646, 1658). West Maui: Puu Kukui, in forest (S. 1721); mountain ravines, shaded

ground, 1,500 meters (B. 144); mountain ridges, on ground, 1,400 meters (Riemenschneider 46). Oahu: Koolau Mountains, Kawaiiki ditch trail, on soil (S. 1471); Konahuanui (Mann and Brigham), near the summit (H. 2258).

Area: endemic.

Distichophyllum freycinetii (Schwaegrichen) Mitten.

Hawaii: Mauna Loa, elevation 1,400 meters (R.); Mauna Loa, above Pahala, wet ravine, 1,200 meters (S. 1363); Hilo (N.); Kilauea, Twin Craters, 1,200 meters (S. 1558); Hiulani forest, carpeting trunks and twigs, 500 meters (S. 1318 p. p.). West Maui: mountain ravines in very wet places, 1,400 meters (B. 146) and 1,600 meters (B. 23).

Area: endemic.

Distichophyllum cuspidatum Dozy et Molkenboer.

West Maui: mountain ravines, on ferns, elevation 1,600 meters (B. 118).

Area: Ceylon, Java, Sumatra, Mindanao, New Caledonia, New Guinea, Society Islands.

HOOKERIA Smith

Hookeria megablata C. Müller.

Hawaii: Hilo (N.).

Area: endemic.

HYPOPTERYGIACEAE

HYPOPTERYGIUM Bridel

Hypopterygium sandwicense Brotherus, new species.

Autoicum; robustiusculum, gregarium, viride, demum lutescenti-viride. Caulis primarius elongatus, fusco-tomentosus. Caulis secundarii ad 3 cm. longi, stipite inferne fusco-tomentoso, superne foliis squamaeformibus, remotis praedito, fronde pinnatim ramoso, ramis patentibus, vix ad 1 cm. longis, simplicibus, obtusis. Folia sicca vix mutata, asymmetrica, ovata, breviter acuminata, mucronata, ad 2 mm. longa, e medio ad apicem serrata, limbo biseriato; nervo tenui, longe infra apicem folii evanido; cellulis ovali-hexagonis vel rhombeis, basin versus sensim majoribus. Amphigastria multo minora late ovata, in acumen breve, subulatum attenuata, integra, limbo uniseriata. Seta ad 1.5 cm. alta, lutescenti-rubra. Theca horizontalis, ovalis, brevicollis.

West Maui: mountain ravines, on small trees, elevation 1,500 meters (B. 104).

Species *H. tamarisci* (Swartz) Bridel aliisque speciebus austro-americanis affinis, sed satura robustiore oculo nudo jam dignoscenda.

THUIDIACEAE

THUIDIUM *Bryologia Europae***Thuidium crenulatum** Mitten.

West Maui: mountain ridges, on ground, elevation 600 meters (B. 107).
Hawaii: Kona, in woods (Mann and Brigham 37).

Area: endemic.

Thuidium nanophyllum C. Müller.

Hawaii: Kilauea, Bird Park, on stones, elevation 1,200 meters (S. 1566).

Area: endemic.

Thuidium hawaiiense Reichardt.

Hawaii: Kilauea, fern forest, elevation 1,200 meters (S. 1606 p. p., 1695); Kilauea, soil and stones in forest, 1,200 meters (S. 1291); south side of Hualalai, in forest, on aa flow, 1,200 meters (S. 1388). Maui: Haleakala, Kula pipe line, wet forest, 1,200 meters (S. 1191). Oahu: Waianae Mountains, Makaleha Valley, on stones (S. 1208, 1212), and wet rocks in waterfall (S. 1215); Waianae Mountains, Palehua, in forest, 650 meters (S. 1523); Koolau Mountains, back of Tantalus, on trees, 600 meters (S. 1485); Keawaawa Valley, on trees (S. 1416); Kuliouou-Keawaawa ridge, on trees (S. 1157).

Area: endemic.

Thuidium glaucinum (Mitten) Mitten.

Hawaii: Hilo (N.).

Area: Himalaya, Nilghiri, Ceylon, Assam, Japan.

BRACHYTHECIACEAE

PLEUROPUS *Griffith***Pleuropus wilkesianus** (Sullivant) Brotherus.

Hawaii: without locality (N.); Hualalai, elevation 2,500 meters (S. 1550). West Maui: mountain ravines, 1,100 meters (B. 142). East Maui: Haleakala, on trunks, 900-1,600 meters (B. 128, 159); crater of Haleakala, inside, on south wall, 2,200 meters (S. 1179). Oahu: Koolau Mountains, Keawaawa Valley, on trees (S. 1397); Waianae Mountains, Makaleha Canyon (S. 1204); Nuuanu Pali (S. 1426, 1432). Kauai: on trunks, 450 meters (B. 270); Olokele Canyon, wet rock wall (S. 1652, 1689).

Area: endemic.

Varying in size, length of the seta and of the leaf point. If the leaves are long pointed, the upper cells are narrow. In habit *P. wilkesianus* is like *P. fenestratus* and *P. bonplandii*, but is easily distinguished from these by the thickened walls of the leaf cells.

Pleuropus sciuroides (C. Müller) Brotherus.

Oahu: Waianae Mountains, Palehua, in forest, 650 meters (S. 1529).
East Maui: Haleakala, on trunks, 900 meters (B. 10 p. p. 185).

Area: endemic.

Pleuropus sciurellus (C. Müller) Brotherus.

Hawaii: Hilo (N.); Mauna Loa, dry forest, 1,400 meters (R.).

Area: endemic.

BRACHYTHECIUM Bryologia Europae

Brachythecium oxyrrhynchum (Dozy et Molkenboer) Jaeger.

Oahu: Waianae Mountains, Makaleha Canyon (S. 1196).

Area: Java, Philippines.

var. **sandvicense** Brotherus, new variety.

Folia brevius acuminata, superne distincte serrulata; nervo tenuiore.
Seta ad 4 cm.

East Maui: mountain ravines, elevation 240 meters (B. 180, 194).
Oahu: valleys (B. 153 p. p.).

ENTODONTACEAE

ENTODON C. Müller

Entodon (Erythropus) **tereticaulis** Brotherus, new species (Pl. VII, fig. 28).

Dioicus; robustiusculus, caespitosus, caespitibus rigidis, laxe cohaerentibus, fusciscenti-lutescentibus, nitidis. Caulis procumbens, ad 10 cm. longus, flexuosus, haud radiculosus teres, pungens, parce subpinnatim ramulosus, ramis vix ultra 1 cm. longis, flexuosis, attenuatis. Folia sicca laxe imbricata, humida erecto-patentia, concava, e basi angustiore, breviter decurrente ovato-oblonga, angulo obtuso terminata, ad 2 mm. longa et ad 0.45 mm. lata, marginibus basi anguste recurvis, integerrimis; nervis binis, brevibus vel subnullis; cellulis anguste linearibus, alaribus numerosis quadratis, hyalinis. Caetera ignota.

Maui: Haleakala, on ground, 2,400 meters (B. 172).

Species inflorescentia dioica nec non caule elongato, tereti, parce ramuloso jam dignoscenda.

Entodon reflexisetus C. Müller.

Oahu: Waianae Mountains, Makaleha Valley, on stones (S. 1209).

Area endemic.

PLAGIOTHECIACEAE

STEREOPHYLLUM Mitten

Stereophyllum (Eu-Glossophyllum) **oahuense** Brotherus, new species
(Pl. VIII, fig. 29).

Autoicum; gracilescens, caespitosum, caespitibus laxiusculis, depressis, sordide viridibus, vix nitidiusculis. Caulis repens, ad 4 cm. vel paulum ultra longus, hic illic rhizoideis fasciculatis substrato affixus, densiuscule et complanate foliosus, cum foliis \pm 3 mm. latus, vage ramosus. Folia lateralia patula, asymmetrica, ovato-lingulata, breviter et late acuta, ad 1.7 mm. val paulum ultra longa, apice minutissime serrulata vel subintegra; nervo tenui, ad medium folii evanido; cellulis anguste linearibus, laevissimis, alaribus numerosis, quadratis. Seta ad 8 mm. alta, tenuissima, rubra. Theca erecta, minuta, oblongo-cylindrica, fuscidula. Caetera ignota.

Oahu (F. Didrichsen).

Species distinctissima, foliorum forma, nervo brevi cellulisque anguste linearibus facillime dignoscenda.

PLAGIOTHECIUM Bryologia Europae

Plagiothecium mauense Brotherus, new species.

Dioicum; robustiusculum, caespitosum, caespitibus densiusculis, mollibus, lutescenti-viridibus, opacis. Caulis procumbens, parce radiculosus, laxiuscule et complanate foliosus, cum foliis ad 5 mm. latus, vage ramosus. Folia haud decurrentia, concavuscula, lateralia patula, asymmetrica, ovato-oblonga, breviter acuminata, acuta vel subula brevissima terminata, ad 2.25 mm. longa et ad 1.1 mm. lata, integra; nervis binis, brevibus, tenuibus; cellulis medianis folii 12-15 μ longis et 75-100 μ latis. Caetera ignota.

Maui: on ground, elevation 2,400 meters (B. 221).

Species habitu *P. silvatico* (Hudson). Bryologia Europae simillima, sed foliis anguste areolatis dignoscenda.

CATAGONIUM C. Müller

Catagonium draytoni (Sullivant) C. Müller.

Hawaii: Kilauea, fern forest, elevation 1,200 meters (S. 1641); Makahanaloa, Kauku, epiphytic (S. 1329); Kohala Mountains above Kamuela, in forest (S. 1671). West Maui: mountain ravines, on ground, 1,200 meters (B. 7, 27) and 1,670 meters (B. 261); Puu Kukui, very wet forest, 1,500-1,600 meters (S. 1349). Kauai: Alakai swamp (S. 1692).

Area: endemic.

SEMATOPHYLLACEAE

APTYCHELLA Herzog

Aptychella robusta Brotherus.

West Maui: elevation 1,800 meters (B. 266).

Area: Luzon.

HAGENIELLA Brotherus

Hageniella pacifica Brotherus, new species (Pl. VI, fig. 23).

Gracilescens, caespitosum, caespitibus densiusculis, lutescenti-viridibus, nitidis. Caulis ad 5 cm. longus, inferne parce fusco-radiculosus, subpinnatim ramosus, ramis brevibus, plerumque simplicibus. Folia patula, concava, e basi brevi angustata ovalia, raptim breviter acuminata, acuta, ad 1 mm. vel paulum ultra longa et ad 0.57 mm. lata, marginibus basi anguste recurvis, e medio ad apicem serrulatis; nervis binis, brevissimis vel nullis; cellulis anguste linearibus, apice papillose exstante, alaribus ternis, vesiculosus, oblongis, septo transverse divisus, plerumque fuscis, supraalaribus rectangularibus, hyalinis. Caetera ignota.

West Maui: mountain ravines, elevation 1,400 meters (B. 139).
Hawaii: Mauna Loa above Pahala, wet ravine, 1,200 meters (S. 1372).

Species a *H. sikkimensis* Brotherus statura robustiore, colore folisque patulis oculo nudo jam dignoscenda.

HETEROPHYLLIUM (Schimper) Kindberg

Heterophyllum sandvicense Brotherus, new species (Pl. VI, fig. 22).

Robustiusculum, fusco-aureum, nitidum. Caulis elongatus, parce radiculosus, dense foliosus, pinnatim ramosus, ramis brevibus, simplicibus vel longioribus, dense pinnatim ramulosus. Folia \pm falcata, concava, e basi ovata vel ovali sensim lanceolato-subulata, ad 2.7 mm. longa, marginibus erectis vel basi anguste recurvis, superne serratis; nervis binis, brevissimis vel nullis; cellulis anguste linearibus, laevissimis, basilaribus inter se porosis, fuscis, alaribus magnis, oblongis, vesiculosus, fuscis, supraalaribus minutis, quadratis. Caetera ignota.

West Maui: mountain ridges, on trunks, elevation 1,700 meters (B. 151).

Species pulcherrima, cum *H. affine* (Hooker) Fleischer comparanda, sed statura robustiore oculo nudo jam dignoscenda.

Heterophyllum affine (Hooker) Fleischer.

West Maui: on bushes, elevation 1,800 meters (B. 259).

Area: Mexico, Columbia.

BROTHERELLA Loeske

Brotherella opaedon (Sullivant) Brotherus.

West Maui: Puu Kukui, very wet forest, elevation 1,500 to 1,600 meters (S. 1355); mountain ridges, on trunks, 1,800 meters (B. 168) and 1,200 meters (B. 75). East Maui (B. 190). Kauai: without locality (Clarke 10).

Area: endemic.

RHAPHIDORRHYNCHIUM Bescherelle

Rhaphidorrhynchium (Microcalpe) **integrifolium** Brotherus, new species.

Tenella, caespitosa, caespitibus densiusculis, mollibus, lutescentibus, nitidis. Caulis repens, ramis elongatis, densiuscule et complanate foliosis, parce subpinnatim ramulosus. Folia erecto-patentia, concava, e basi contracta lanceolato-subulata, piliformiter atten-

uata, ad 1.5 mm. longa, marginibus erectis, integerrimis; enervia; cellulis angustissime linearibus, alaribus ternis, oblongis, vesiculosis, fuscis. Bractee perichaetii e basi brevi, late vaginante raptim in acumen longissimum, flexuosum, filiforme, integrum attenuatae. Seta 2.5 cm. tenuissima, rubra. Theca minuta, inclinata, breviter oblonga, atrofusca. Caetera ignota.

Oahu: without locality, elevation 1,000 meters (B. 164).

Species sequenti affinis, sed ramis elongatis, foliisque piliformiter attenuatis, integerrimis bracteisque perichaetii integris dignoscenda.

Rhaphidorrhynchium (Microcalpe) **mundulum** (Sullivant sub Hypno) Brotherus.

East Maui: without locality (B. 187). Oahu: without locality (Mann and Brigham 35).

Area: endemic.

SEMATOPHYLLUM Mitten

Sematophyllum hawaiiense (Brotherus).

Hawaii: Hilo (N.); Kau desert, below Kapapala (S. 1642). Oahu: Waianae Mountains, Palehua, elevation 650 meters (S. 1525).

Area: endemic.

ACROPORIUM Mitten

Acroporium fuscoflavum (C. Müller) Brotherus.

Hawaii: Haena, south of Hilo, *Pandanus* forest (S. 1268); Hiulani forest, elevation 500 meters (S. 1308); south side of Hualalai, in forest on aa flow, 1,200 meters (S. 1393).

Area: endemic.

TRICHOSTELEUM (Mitten) Jaeger

Trichosteleum pickeringii (Sullivant) Jaeger.

Hawaii: Kilauea, Twin Craters, elevation 1,200 meters (S. 1645); (forma fol. cellulis sublaevibus, S. 1559); Haena, south of Hilo, *Pandanus* forest (typicum S. 1245 et forma fol. cellulis valde papillosis S. 1256); Kilauea, Byron's ledge (S. 1160, 1161); Mauna Loa, 1,200 meters (forma fol. cellulis laevibus, R.); Mauna Loa above Pahala, wet ravine, 1,200 meters (S. 1376); Pahoa, 1840 flow, holes in lava (S. 1271). West Maui: Puu Kukui, very wet forest, 1,500 to 1,600 meters (S. 1344); mountain ravines, 1,600 meters (B. 267) and on trunks (forma fol. cellulis laevibus, B. 228). East Maui: on trunks, 240 meters (forma fol. cellulis laevibus, B. 243). Oahu: on the lower slopes of Konahuanui, above Manoa (H. 2273); Waianae Mountains, Makaleha Canyon (forma

fol. cellulis sublaevibus, S. 1361); Koolau Mountains, Palolo Valley (forma fol. cellulis sublaevibus, S. 1185). Kauai: between the Hanapepe and Wahiawa rivers (H. 2576); along the Hanapepe River, near the falls (H. 2514).

Area: endemic.

TAXITHELIUM Spruce

Taxithelium catagonioides (C. Müller) Brotherus.

Hawaii: Kohala Mountains, forest above Kamuela (S. 1708); above Waimea, forest (S. 1557); Makahanaloa, Kauku, epiphytic (S. 1327); Kilauea, on trunks (S. 1296).

Area: endemic.

GLOSSADELPHUS Fleischer

Glossadelphus (Anastigma) **chrysobasilaris** Brotherus, new species (Pl. VII, fig. 25).

Dioicus; gracilis, rigidus, lutescens, nitidiusculus. Caulis prostratus, haud radiculosus, laxiuscule et complanate foliosus, plerumque bipinnatim ramosus, ramis et ramulis patulis, strictis. Folia caulina decurrentia, patentia, concava, asymmetrica, e basi ovali lanceolato-ligulata, acuta, ad 1.9 mm. longa, marginibus erectis, superne argute serratis; nervis binis, tenuibus, inaequalibus; cellulis anguste linearibus, apice papillose exstante, basilaribus infimis luteis, alaribus paucis, minutis, quadratis. Folia ramea et ramulina minora, ovato-lanceolata, breviter acuminata, obtusiuscula vel acuta. Caetera ignota.

West Maui: mountain ravines, elevation 1,400 meters (B. 139).

Species caule bipinnatim ramoso oculo nudo jam dignoscenda.

Glossadelphus (Anastigma) **mauiensis** Brotherus, new species (Pl. VII, fig. 24).

Robustus, caespitosus, caespitibus densis, saturate viridibus, nitidiusculis. Caulis procumbens, ad 10 cm. longus, haud radiculosus, dense et complanate foliosus, cum foliis \pm 2 mm. latus, \pm ramosus, ramis elongatis, erecto-patentibus, obtusis. Folia erecto-patentia, symmetrica cochleariformi-concava, late oblonga, rotundato-obtusa, ad 1.5 mm. longa, marginibus erectis, integerrimis vel summo apice indistincte crenulatis; nervis binis, lutescentibus, ad medium folii evanidis; cellulis anguste linearibus, apice papillose exstante, basilaribus laxioribus, ad insertionem plerumque fusco-aureis, alaribus quadratis. Caetera ignota.

West Maui: mountain ravines, on wet rocks, elevation 1,400 meters (B. 132).

Species distinctissima statura robusta foliorumque forma facillime dignoscenda.

Glossadelphus (Anastigma) **baldwinii** Brotherus, new species (Pl. VII, fig. 26).

Dioicus; robustiusculus, viridis, nitidiusculus. Caulis repens, hic illic fusco-radiculosus, dense et complanate foliosus, cum foliis \pm 2 mm. latus, dense pinnatim ramosus, ramis patulis, vix ultra 1 cm. longis, obtusis. Folia patula, symmetrica,

concava, e basi ovata oblongo-ligulata, plerumque retusa, 1 mm. vel paulum ultra longa, marginibus erectis, superne et praesertim apice grosse serratis, dentibus simplicibus; nervis binis, brevibus vel nullis; cellulis anguste linearibus, apice papillose exstante, basilaribus infimis laxioribus, alaribus haud diversis. Bractee perichaetii lanceolato-acuminatae, apice spinuloso-serratae, dentibus paucis apice bifidis. Seta ad 2.5 cm., tenuissima, sicca flexuosula, rubra, laevissima. Theca inclinata vel horizontalis, turgide ovalis. Operculum e basi alte conica breviter cuspidata.

West Maui: Olowalu crater, on rocks; elevation 240 meters (B. 49).

Species *G. lingulato* (Cardot) Fleischer affinis, sed foliorum forma marginibusque superne simpliciter serratis jam dignoscenda.

Glossadelphus (Anastigma) **limnobioides** Brotherus, new species (Pl. VIII, fig. 27).

Robustusculus, caespitosus, caespitibus densis sordide viridibus, vix nitidiusculis. Caulis procumbens, ad 6 cm. longus, haud radiculosus, dense foliosus, ± ramosus. Folia erecto-patentia, concaviuscula, symmetrica, ovato-lanceolata, breviter acuminata, ± obtusa, ad 1.5 mm. longa, marginibus erectis, superne serrulatis; nervis binis, brevibus vel nullis; cellulis linearibus, laevibus, basilaribus brevioribus et laxioribus, alaribus haud diversis. Caetera ignota.

East Maui: Haleakala (B. 276).

Species *G. zollingeri* (C. Müller) Fleischer affinis, sed foliis symmetricis, obtusis, laxius areolatis jam dignoscenda.

Glossadelphus zollingeri (C. Müller) Fleischer var. **flicaulis** (Fleischer) Fleischer.

East Maui: Haleakala (B. 286).

Area: Java.

HYPNACEAE

ECTROPOTHECIUM Mitten

Ectropothecium (Eu-Ectropothecium) **rockii** Brotherus, new species.

Dioicum; tenellum, caespitosum, caespitibus laxis, mollibus, lutescenti-viridibus, sericeo-nitidis. Caulis repens, hic illic fasciculatim fusco-radiculosus, dense foliosus, pinnatim ramosus, ramis brevibus, simplicibus vel singulis longioribus, pinnatim ramulosis. Folia caulina falcata, e basi lata, subcordata raptim anguste lanceolato-subulata, ad 0.6 mm. longa, marginibus erectis, ubique minutissime serrulatis; enervia; cellulis anguste linearibus, apice papillose exstante, alaribus haud diversis. Folia ramea anguste lanceolato-subulata. Caetera ignota.

Hawaii: Mauna Loa, dry forest on trees; elevation 1,400 meters (R.).

Species pulchella foliis dimorphis, habitu *Ctenidiis* nonnullis sat similis.

Ectropothecium paucipilum Sullivant.⁷

Hawaii: Hilo (N.). Oahu: without locality (Mann and Brigham 33); Koolau Mountains, back of Tantalus, on trees, 600 meters (S. 1492).

Area: endemic.

Ectropothecium arcuatum (Sullivant) Mitten.

Hawaii: Haena, south of Hilo, *Pandanus* forest (S. 1246). East Maui: Haleakala, elevation 240 meters (B. 223). West Maui: rocks in wet places, 1,360 meters (B. 131). Oahu: Koolau Mountains, Kawaiiki ditch trail, on trees (S. 1464, 1473); Keawaawa Valley, on trees (S. 1413). Kauai: Olokele Canyon, wet rock wall (S. 1634).

Area: endemic.

Ectropothecium hawaiiico-cupressiforme (C. Müller) Brotherus.

Hawaii: Mauna Loa, dry forest, on trees, elevation 1,200 meters (R.); Hilo, 300 meters (N.).

Area: endemic.

TAXIPHYLLUM Fleischer

Taxiphyllum gracile Brotherus, new species.

Dioicum; gracile caespitosum, caespitibus lutescenti-viridibus, nitidis. Caulis procumbens, vix radiculosus, dense et complanate foliosus, ramosus, ramis elongatis, parce et breviter ramulosus. Folia falcatula, concaviuscula, e basi ovata sensim lanceolato-subulata, ad 1.3 mm. longa, marginibus erectis, ubique minutissime serrulatis; nervia vel brevissime binervia; cellulis anguste linearibus, apice papillose exstante, alaribus haud diversis. Caetera ignota.

West Maui (B. 162).

Species statura gracili foliorumque forma facillime dignoscenda.

VESICULARIA (C. Müller) C. Müller

Vesicularia graminicolor (Aongstroem) Brotherus.

Hawaii: Hiulani forest, elevation 500 meters (S. 1316). Oahu: Waianae Mountains, Makaleha Canyon, wet rocks in fall (S. 1207, 1273).

Area: endemic.

Vesicularia hanapepeana C. Müller.

West Maui (B. 28). Oahu: Manoa Valley, waterfall (S. 1233).

Area: endemic.

CTENIDIUM (Schimper) Mitten

Ctenidium decurrens (Sullivant sub Hypno) Brotherus.

Hawaii: Kilauea, fern forest, elevation 1,200 meters (S. 1606); Kilauea, soil and stones in forest, 1,200 meters (S. 1294); Mauna Loa,

⁷ Torrey Botanical Club Bull., vol. 5, p. 11, 1878.

dry forest, 1,300 meters (R.); Mauna Loa, above Pahala, wet ravine, 1,200 meters (S. 1370). East Maui: on ground in ravines, 240 meters (B. 152).

Area: endemic.

Ctenidium (Eutenidium) submalacobolum Brotherus, new species.

Gracilescens, caespitosum, caespitibus densiusculis, lutescenti-viridibus, nitidis. Caulis elongatus, flexuosus, dense foliosus, flagelliformiter attenuatus, subpinnatim ramosus, ramis brevibus vel longioribus et sensim longe attenuatis. Folia caulina falcata, breviter decurrentia, e basi late cordata sensim late lanceolata, dein in acumen subpiliforme attenuata, ad 1.5 mm. longa, marginibus erectis, ubique serrulatis; enervia; cellulis anguste linearibus, apice papillose exstante, alaribus numerosis laxis, hyalinis, in ventrem \pm distinctum dispositis. Folia ramea minora, ovato-lanceolata, sensim longe et anguste attenuata. Caetera ignota.

Oahu: trunks of trees, elevation 600 meters (B. 256). East Maui: around roots of trees, 1,700 meters and on trunks, 1,200 meters (B. 74).

Species *C. malacobolo* (C. Müller) Brotherus valde affinis, sed foliis minute serrulatis dignoscenda.

Ctenidium (Euctenidium) elegantulum Brotherus, new species.

Tenellum, caespitosum, caespitibus laxis, intricatis, lutescenti-viridibus, nitidiusculis. Caulis elongatus, flexuosus, interrupte pinnatim ramosus, ramis patulis, brevibus, obtusis. Folia caulina squarrosa, decurrentia, e basi late cordata sensim late lanceolata, dein in acumen subpiliforme attenuata, ad 0.75 mm. longa, marginibus erectis, minute serrulatis; enervia; cellulis anguste linearibus, apice papillose exstante, alaribus paucis minutis, eisdem partis decurrentis laxis, rectangularibus, hyalinis. Folia ramea haud decurrentia, patula, angustiora, ovato-lanceolata, in acumen subulatum sensim attenuata, argute serrata. Caetera ignota.

East Maui. Haleakala, elevation 1,200 meters (B. 129). West Maui: in ravines, on trunks, 1,700 meters (B. 182, 253).

Species *C. hastili* Mitten affinis, sed statura multo minore jam dignoscenda.

HYLOCOMIACEAE

MACROTHAMNIUM Fleischer

Macrothamnium mauicense Brotherus, new species.

Robustum, rigidum, lutescenti-vel fusciscenti-viride, nitidum. Caulis repens, ramis elongatis, adscendentibus, \pm arcuatis, \pm dense pinnatim ramulosis, ramulis patulis, 1-2 cm. longis, plerumque simplicibus, obtusis. Folia caulina horride patula, haud decurrentia, planiuscula, late ovata, raptim in acumen breve, acutum attenuata, ad 1.7 mm. longa et \pm 1.2 mm. lata, marginibus erectis, inferne minute, superne argute serratis; nervis binis, inaequalibus, longiore ad medium folii evanido; cellulis anguste linearibus, apice papilla minuta instructis, ad insertionem in una serie laxis, oblongis, hyalinis vel fuscis, alaribus paucis minoribus, breviter rectangularibus vel quadratis. Folia ramulina multo minora, subrotunda vel late obovata, argutius serrata. Caetera ignota.

West Maui: mountain ravines, elevation 1,300 meters (B. 138); in marshy soil, 1,800 meters (B. 252, 266).

Species *M. macrocarpo* (Reinw. et Hornsch.) Fleischer affinis, sed statura robusta foliisque superne argute serratis dignoscenda.

POLYTRICHACEAE

POGONATUM Palisot

Pogonatum baldwinii (C. Müller) Paris.

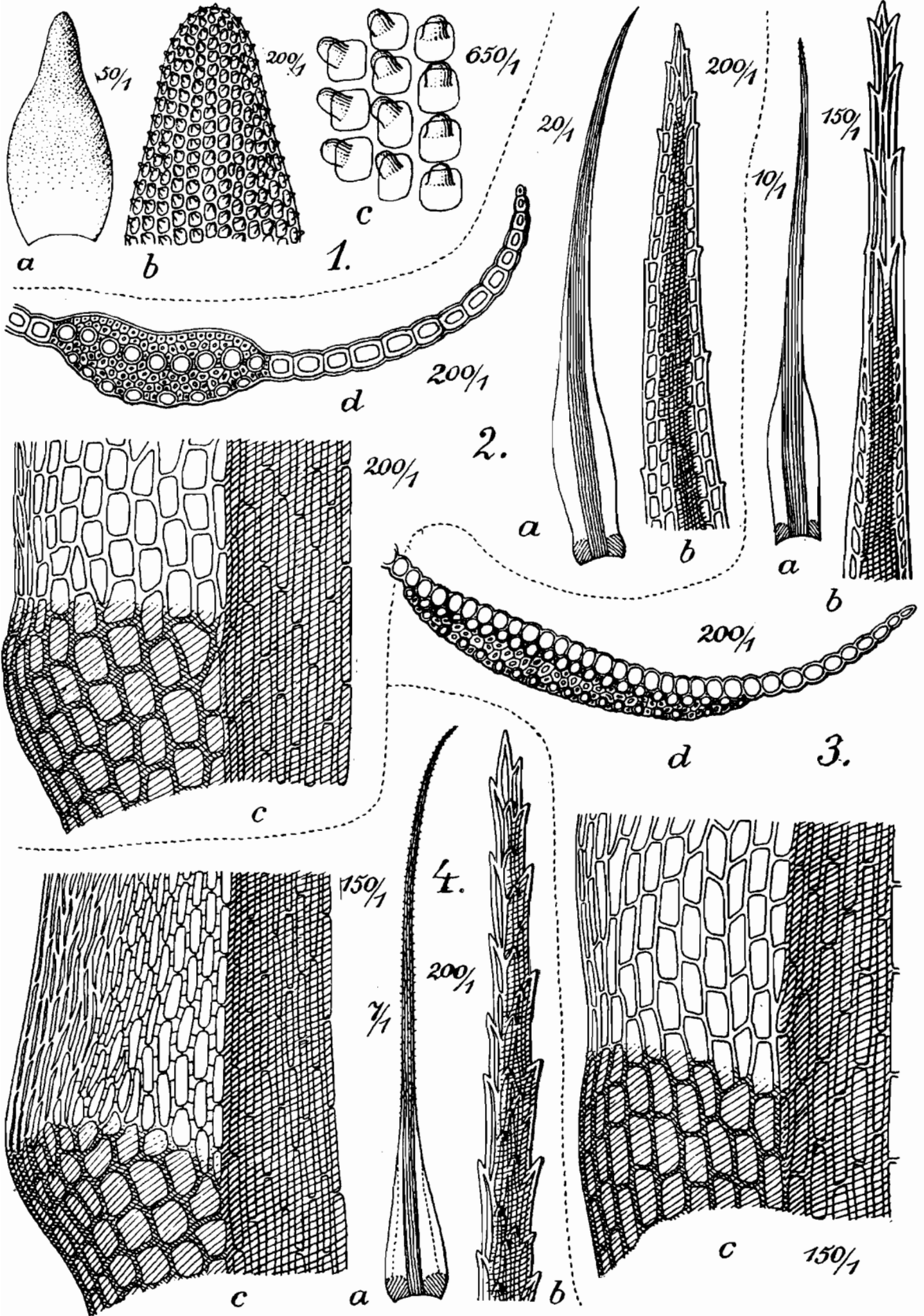
Hawaii: Mauna Loa above Pahala, wet ravine, elevation 1,200 meters (S. 1381). Maui: Haleakala, Kula pipe line, on clay walls, 1,200 meters (S. 1174). Oahu: Koolau Mountains, Kawaiiki ditch trail, on soil (S. 1476).

Area: endemic.

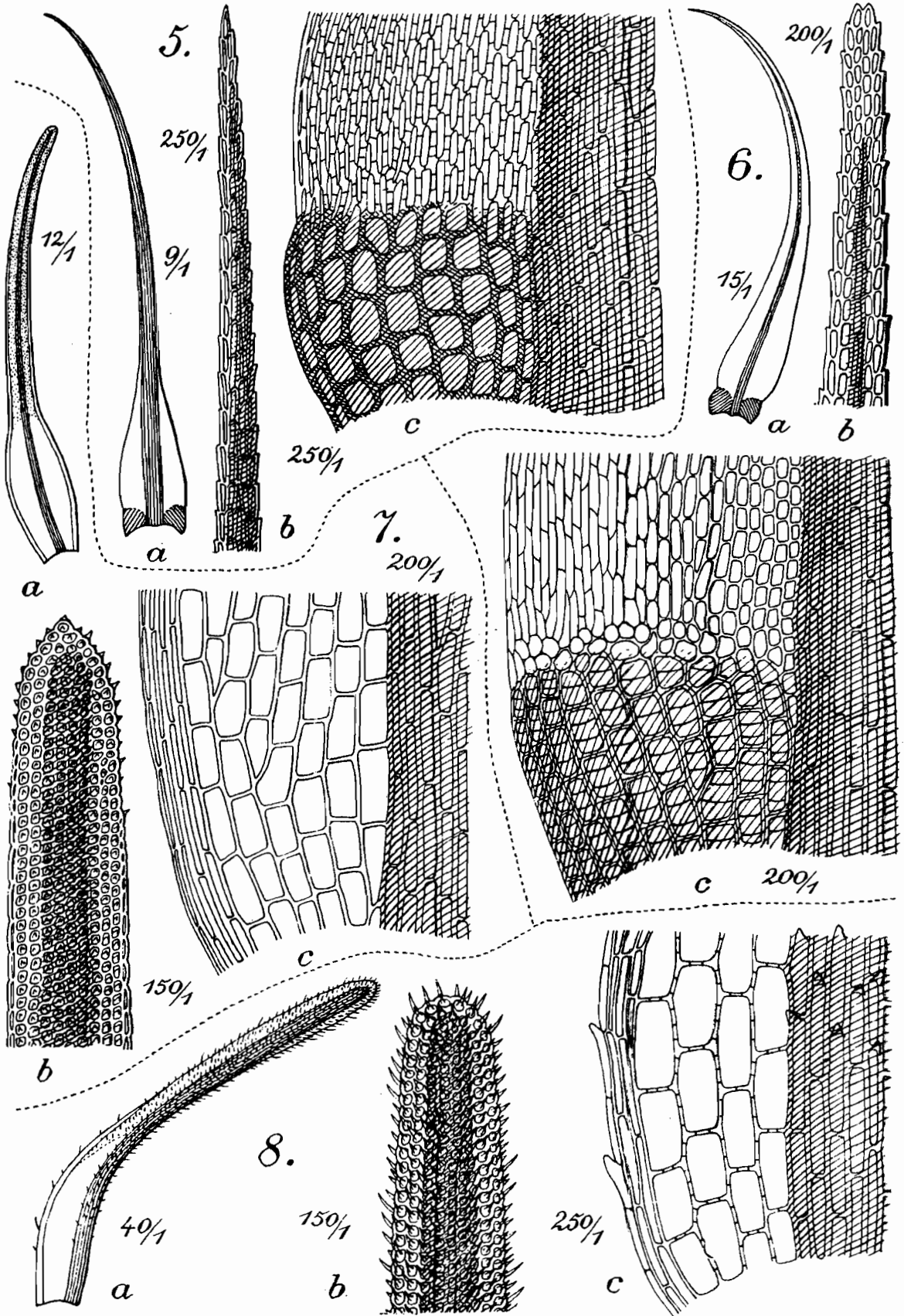
NOTES ON THE TAXONOMY AND NOMENCLATURE
OF SOME HAWAIIAN MOSSES

- Acanthocladium oahuense* Brotherus, new species, in litt. 1899; Levier in Bull. Soc. Bot. Ital. 1904, p. 14 = *Heterophyllum sandwicense* Brotherus.
- Barbula mauiensis* C. Müller in Flora 1896, p. 449 = *Pseudosymblypharis mauiensis* Brotherus.
- Bryum pseudogiganteum* C. Müller, op. cit., p. 439 = *Rhodobryum giganteum* (Hooker) Paris.
- Campylium elegantulum* Brotherus, new species, in litt. 1899; Levier op. cit., p. 15 = *Ctenidium elegantulum* Brotherus.
- Campylopus densiretis* Brotherus, new species, in litt. 1903; Levier op. cit., p. 15 = *C. densifolius* Aongstroem.
- Ceratodon microcarpus* C. Müller op. cit., p. 449 = *C. purpureus* (L.) Bridel.
- Chaetomitrium taxithelioides* Brotherus, new species, in litt. 1903; Levier op. cit., p. 16 = *Glossadelphus baldwinii* Brotherus.
- Daltonia perlimbata* Brotherus, new species, in litt. 1899; Levier op. cit., p. 16 = *D. contorta* C. Müller.
- Distichophyllum hookerioides* Brotherus, new species, in litt. 1899; Levier op. cit., p. 17 = *D. paradoxum* (Montagne) Mitten.
- Ectropothecium flaccidulum* Brotherus, new species, in litt. 1903; Levier op. cit., p. 17 = *Vesicularia hanapepeana* C. Müller.
- Entodon limnobioides* Brotherus, new species, in litt. 1899; Levier op. cit., p. 17 = *Glossadelphus limnobioides* Brotherus.
- Entodon longipes* Brotherus, new species, in litt. 1903; Levier op. cit., p. 18 = *E. reflexisetus* C. Müller forma (seta ad. 4.5 cm. alta).
- Glyphomitrium sandwicense* Brotherus, new species, in litt. 1899; Levier op. cit., p. 18 = *Ptychomitrium mauiense* Brotherus.
- Grimmia rigidissima* C. Müller op. cit., p. 455 = *Rhacomitrium hypnoides* (L.) Lindberg.
- Homalia procera* Brotherus, new species, in litt. 1899; Levier op. cit., p. 19 = *Thamnum speciosum* Brotherus.
- Leptotrichum subglaucescens* C. Müller op. cit., p. 445 = *Saelania glaucescens* (Hedwig).
- Leucodon sandwichensis* C. Müller op. cit., p. 465 = *Neolindbergia sandwichensis* Fleischer.
- Microthamnium chrysobasilare* Brotherus, new species, in litt. 1901; Levier op. cit., p. 20 = *Glossadelphus chrysobasilaris* Brotherus.

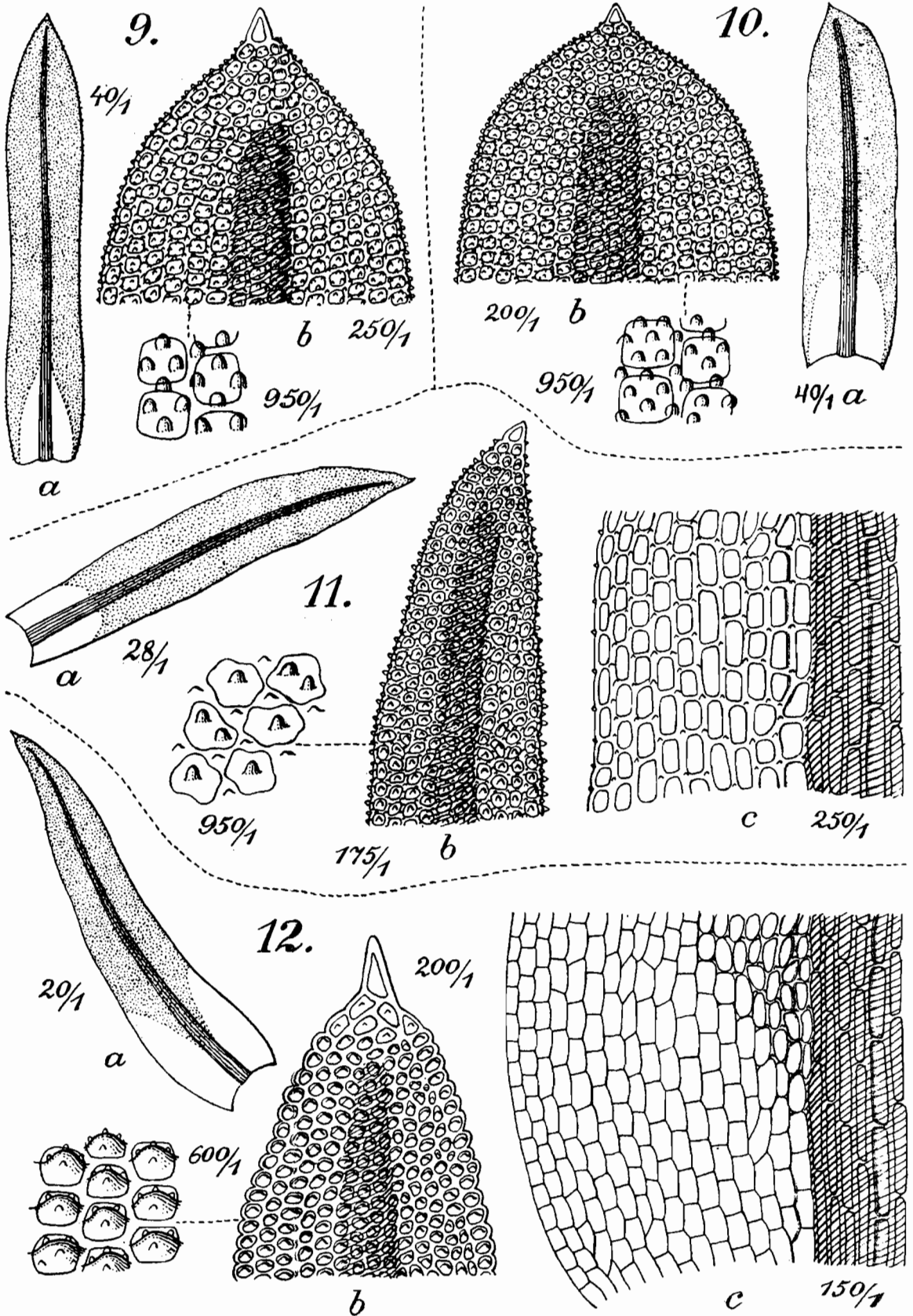
- Microthamnium mauiense* Brotherus, new species, in litt. 1899; Levier op. cit., p. 20 = *Macrothamnium mauiense* Brotherus.
- Meteorium baldwinii* Brotherus, new species, in litt. 1899; Levier op. cit., p. 20 = *Floribundaria baldwinii* Brotherus.
- Mnium prorepens* C. Müller op. cit., p. 437 = *M. rostratum* Schrader.
- Neckera rhynchostegioides* Brotherus, new species, in litt. 1903; Levier op. cit., p. 20 = *Baldwiniella sandwicensis* Brotherus.
- Palamocladium angustirete* Brotherus, *P. longipes* Brotherus, *P. pulchellum* Brotherus et *P. spiripes* Brotherus, new species, 1899; Levier op. cit., p. 21 = *Pleuropus wilkesianus* (Sullivant) Brotherus formae variae.
- Papillaria mauiensis* Brotherus, new species, et *P. tenerrima* Brotherus, new species, in litt. 1901; Levier op. cit., p. 21 = *Trachypus mauiensis* Brotherus.
- Philonotis baldwinii* Brotherus, new species, in litt. 1903; Levier, op. cit. p. 21 = *P. falcata* (Hooker)
- Plagiopus hawaiiicus* Brotherus, new species, in litt. 1903; Levier, op. cit. p. 22 = *P. javanicus* (Dozy et Molkenboer) Fleischer.
- Rhacomitrium erosum* Brotherus, new species, in litt. 1904; Levier, op. cit. p. 22 = *R. fasciculare* var. *robustum* Brotherus.
- Rhacomitrium perrobustum* Brotherus, new species, in litt. 1899; Levier op. cit., p. 22 = *R. fasciculare* var. *robustum* Brotherus.
- Rhaphidostegium filiramcum* Brotherus, new species, in litt. 1901; Levier op. cit., p. 22 = *Rhaphidorrhynchium integrifolium* Brotherus.
- Sciaromium flagellare* Brotherus, new species, *S. flexicaule* Brotherus, new species et *S. porotrichoides* Brotherus, new species in litt. 1899; Levier op. cit., p. 23 = *Limbella tricostata* (Sullivant) C. Müller.
- Sematophyllum microstictum* Brotherus, new species, in litt. 1901; Levier op. cit., p. 23 = *Trichosteleum pickeringii* (Sullivant) Jaeger.
- Tortella dilatata* Brotherus, new species, in litt. 1899; Levier op. cit. p. 24 = *Pseudosymblepharis mauiensis* (C. Müller) Brotherus.
- Trachyloma hawaiiense* Brotherus, new species, in litt. 1899; Levier op. cit. p. 24 = *T. tahitense* Bescherelle.
- Trachypus haleakalae* Brotherus, new species, in litt. 1899; Levier op. cit. p. 24 = *T. bicolor* Reinwardt et Hornschuch.
- Trichosteleum pilotrichelloides* Brotherus, new species, in litt. 1901; Levier op. cit., p. 25 = *Glossadelphus zollingeri* (C. Müller) Fleischer var. *fili-caulis* (Fleischer) Fleischer.



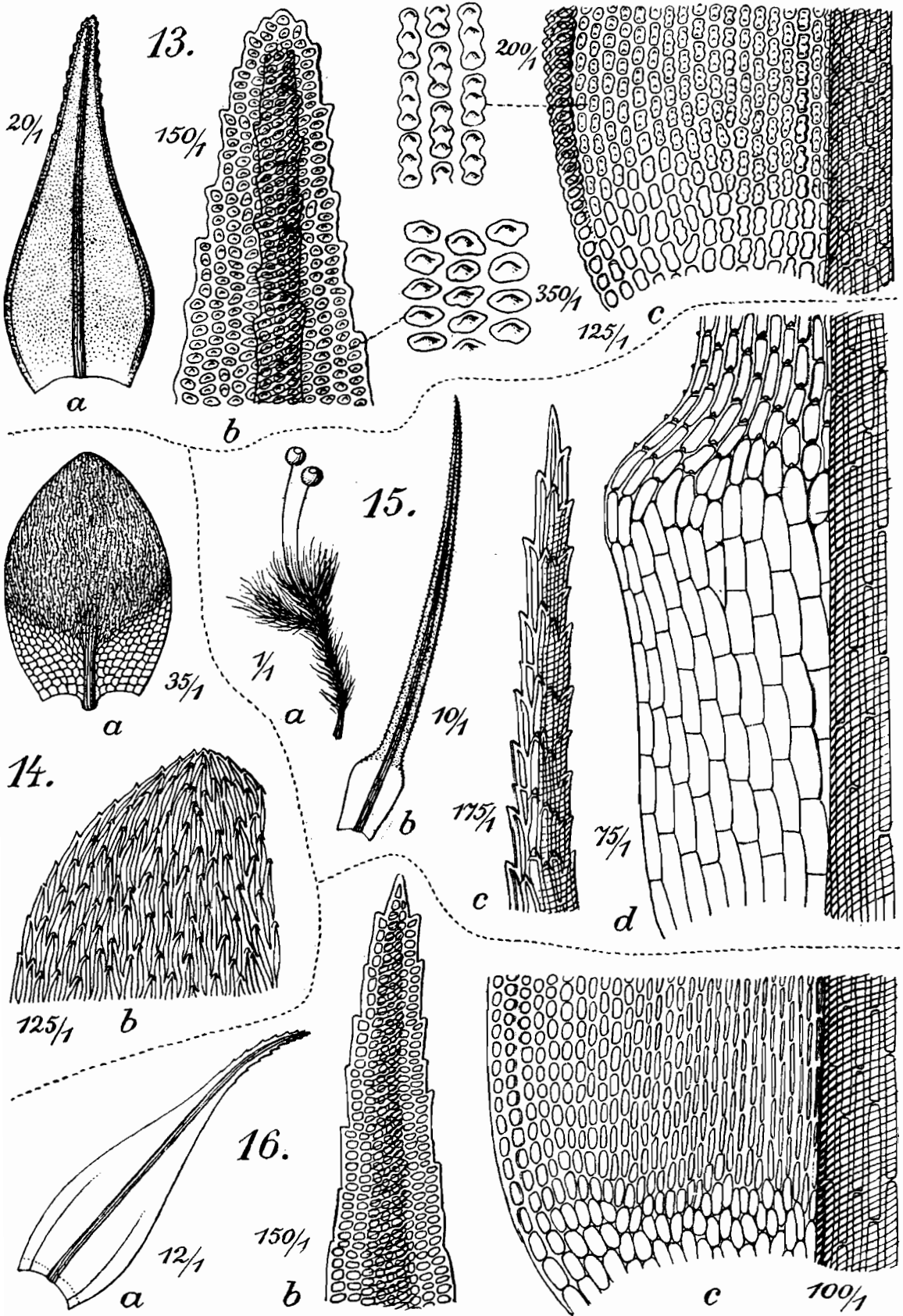
1, ANDREAEA PERPAPILLOSA BROTHERUS: a, LEAF; b, APEX OF LEAF; c, CELLS. 2, CAMPYLOPUS DENSIFOLIUS AONGSTROEM: a, LEAF; b, APEX OF LEAF; c, TRANSVERSE SECTION OF LEAF; 3, CAMPYLOPUS SKOTTSBERGII BROTHERUS: a, LEAF; b, APEX OF LEAF; c, BASE OF LEAF; d, TRANSVERSE SECTION OF LEAF; 4, DICRANODONTIUM FALCATUM BROTHERUS: a, LEAF; b, APEX OF LEAF; c, BASE OF LEAF.



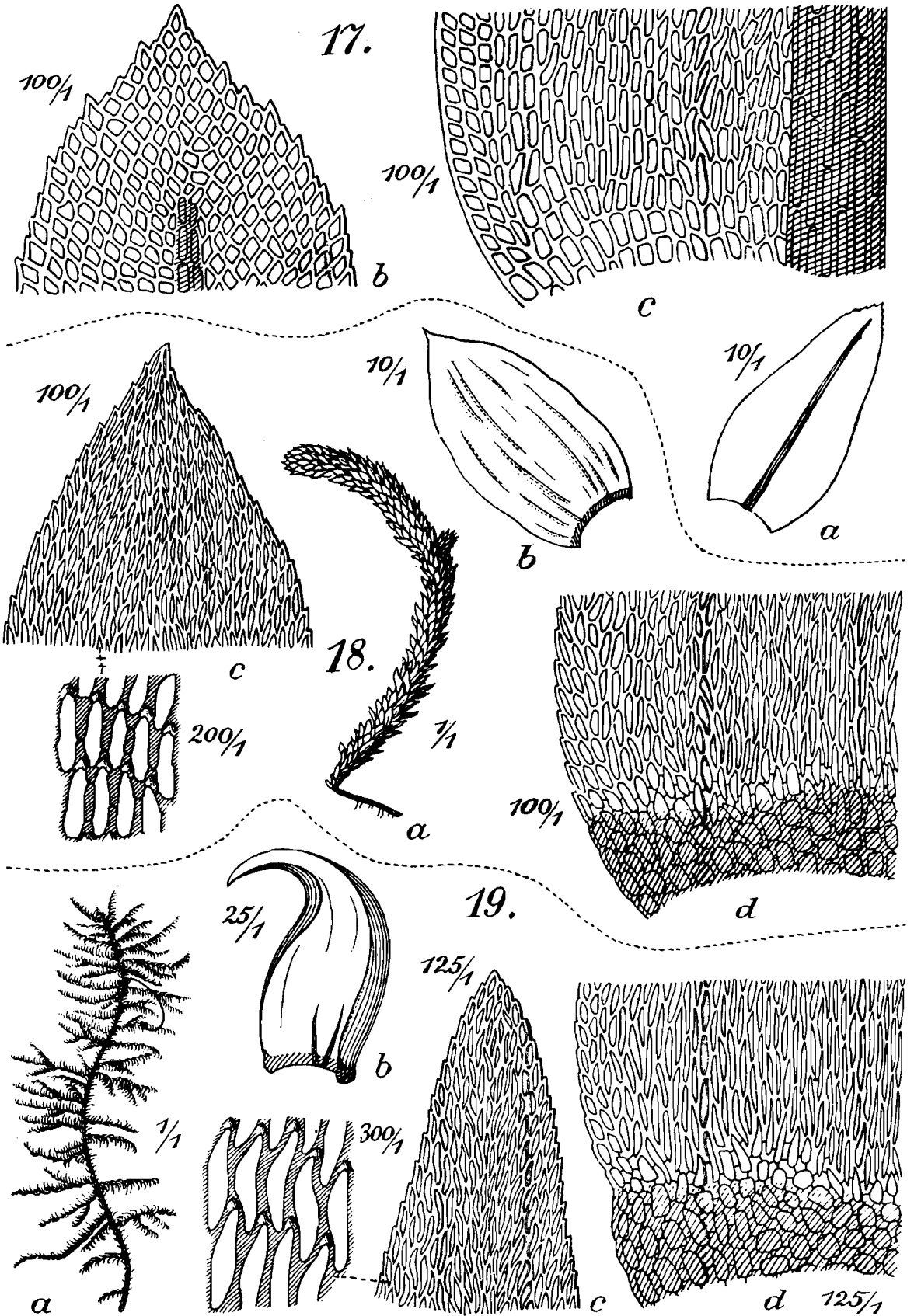
5, DICRANODONTIUM HAWAIIICUM BROTHERUS: a, LEAF; b, APEN OF LEAF; c, BASE OF LEAF; 6, LEUCOLOMA HAWAIIENSE BROTHERUS: a, LEAF; b, APEN OF LEAF; c, BASE OF LEAF; 7, SYRRHOPODON PELLUCIDUS BROTHERUS: a, LEAF; b, APEN OF LEAF; c, BASE OF LEAF; 8, SYRRHOPODON OAHUENSIS BROTHERUS: a, LEAF; b, APEN OF LEAF; c, BASE OF LEAF.



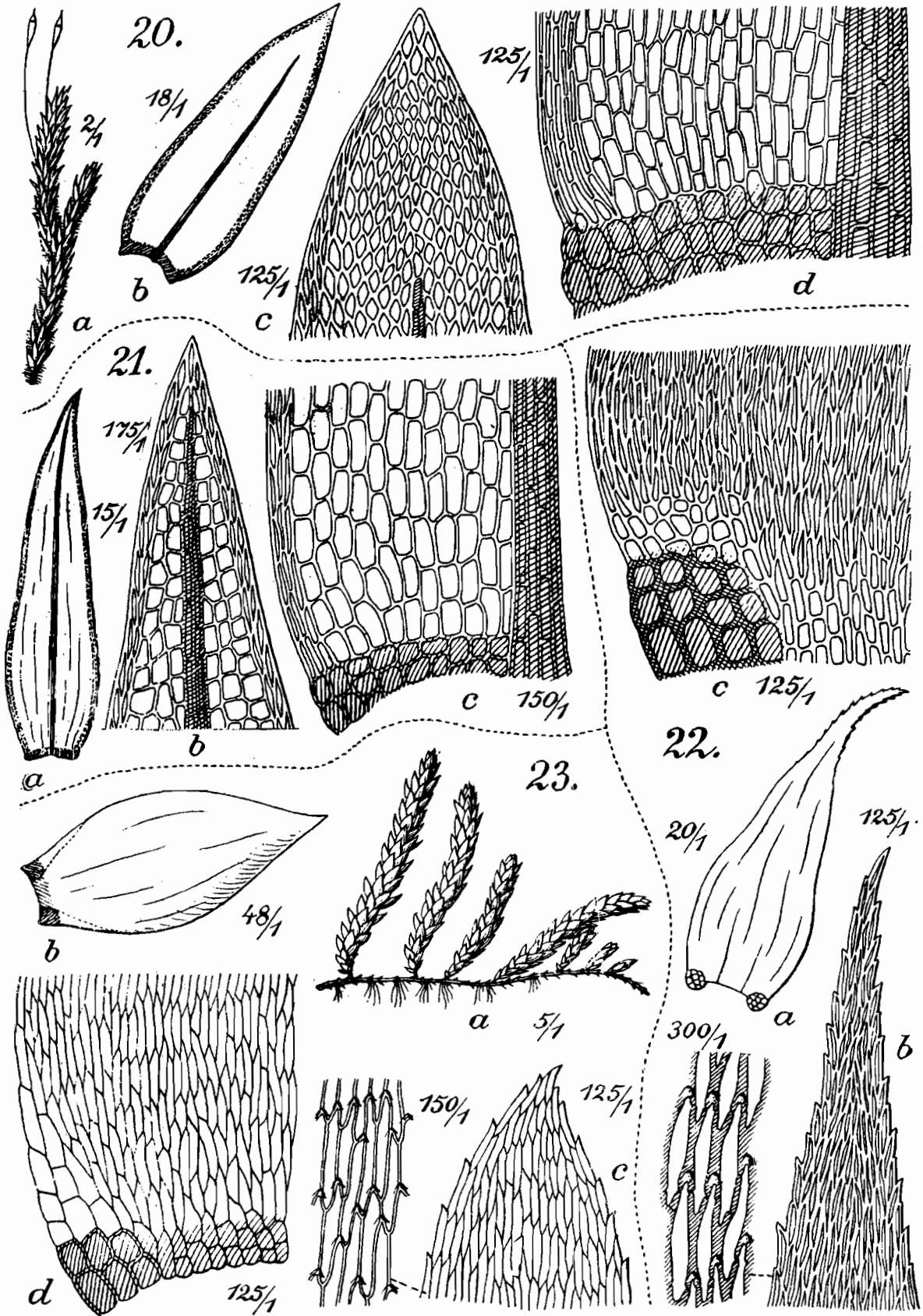
9, ANOECTANGIUM HALEAKALAE C. MULLER: a, LEAF; b, APEX OF LEAF. 10, ANOECTANGIUM SKOTTSBERGII BROTHERUS: a, LEAF; b, APEX OF LEAF. 11, MOLENDOA CRASSINERVIS BROTHERUS: a, LEAF; b, APEX OF LEAF; c, BASE OF LEAF. 12, TRICHOSTOMUM MAUIENSE BROTHERUS: a, LEAF; b, APEX OF LEAF; c, BASE OF LEAF.



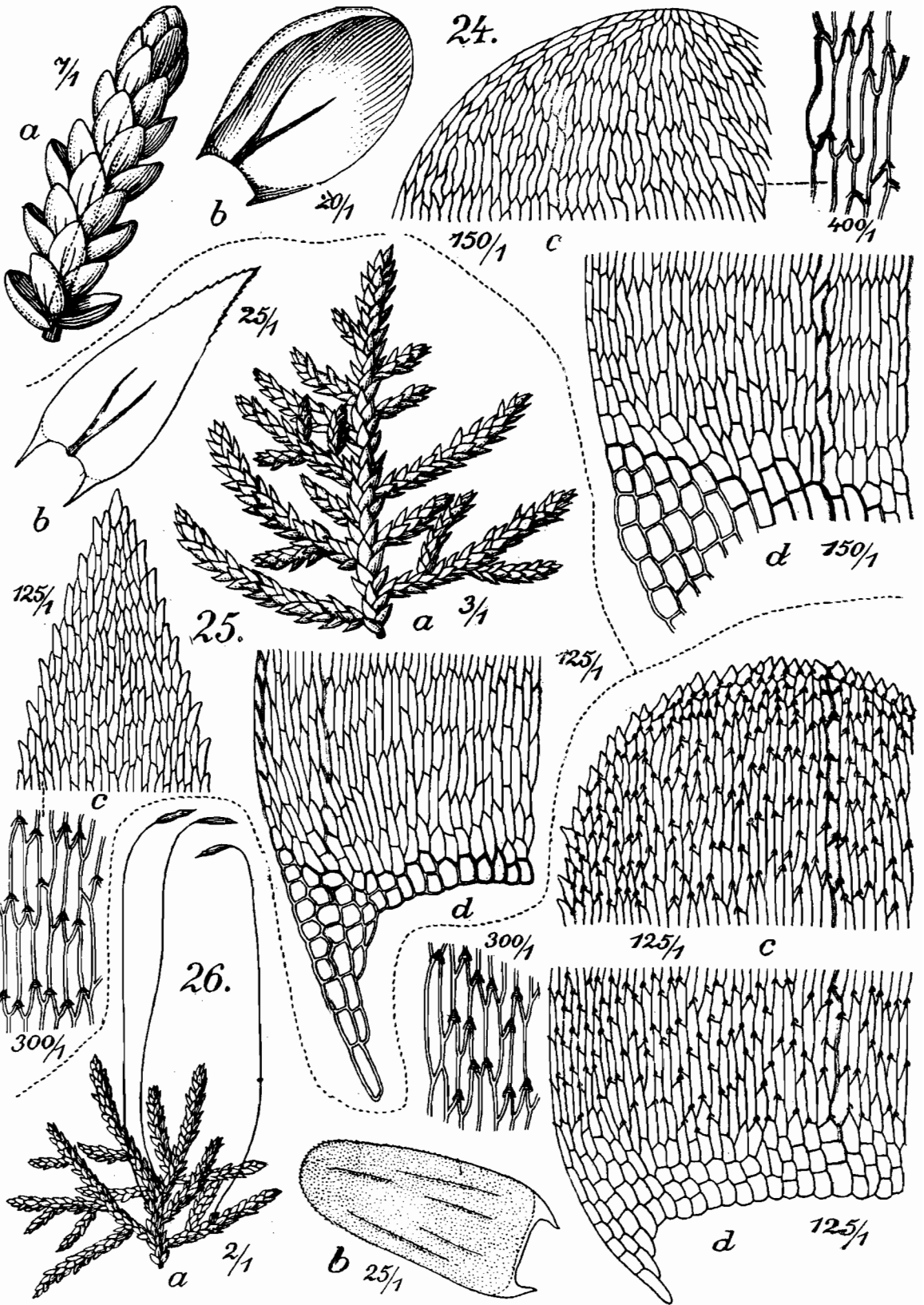
13, GRIMMIA SCABRIFOLIA BROTHERUS: a, LEAF; b, APEX OF LEAF; c, BASE OF LEAF. 14, ANOMOBRYUM ANGUSTIRETE BROTHERUS: a, LEAF; b, APEX OF LEAF. 15, BARTRAMIA MAUIENSIS BROTHERUS: a, FERTILE PLANT; b, LEAF; c, APEX OF LEAF; d, BASE OF LEAF. 16, PTYCHOMITRIUM MAUIENSE BROTHERUS: a, LEAF; b, APEX OF LEAF; c, BASE OF LEAF.



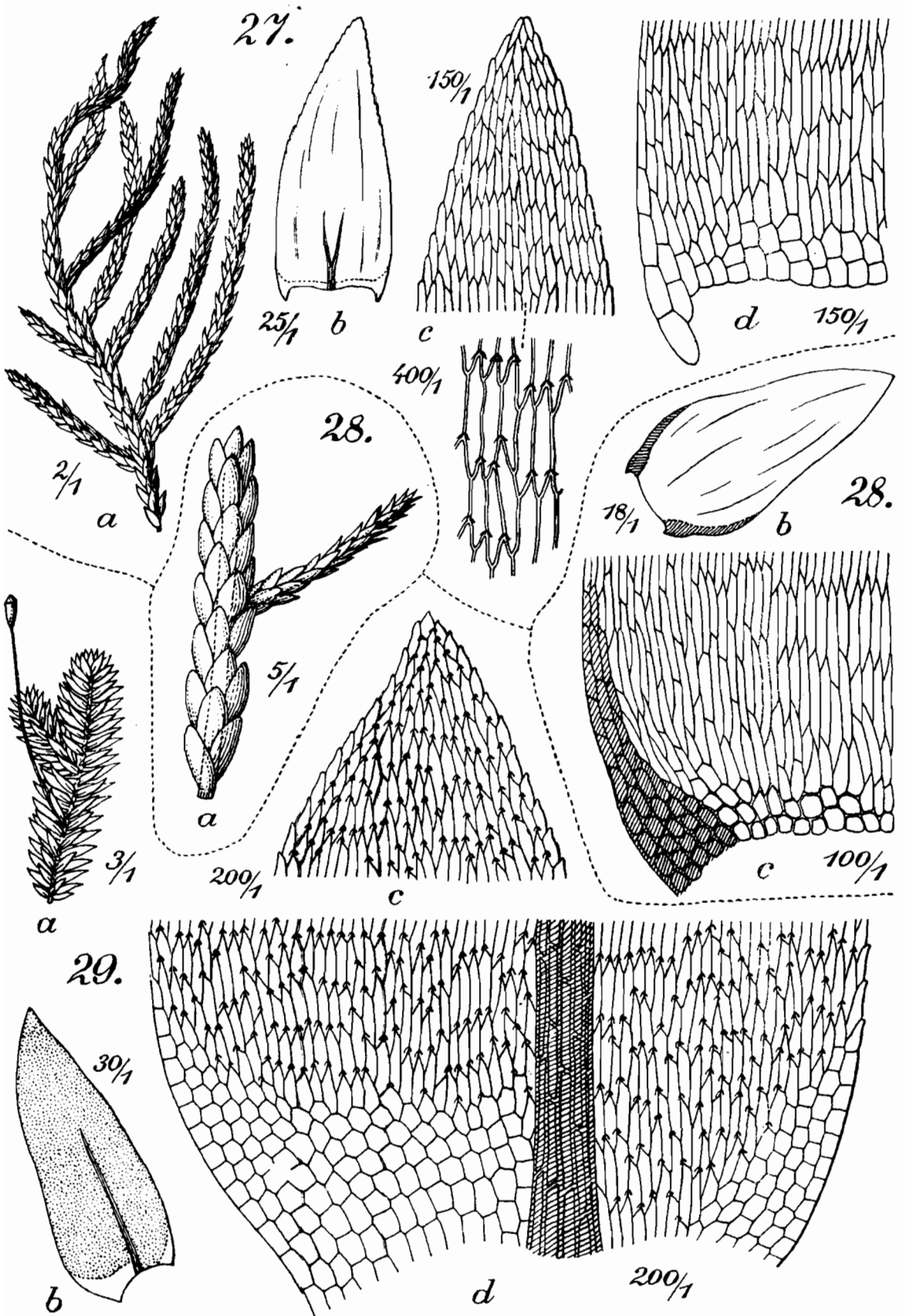
17, THAMNIUM SPECIOSUM BROTHERUS: a, LEAF; b, APEN OF LEAF; c, BASE OF LEAF. 18, GAROVAGLIA HALEAKALAE BROTHERUS: a, FERTILE PLANT; b, LEAF; c, APEN OF LEAF; d, BASE OF LEAF. 19, CAMPTOCHLAETE FALCIFOLIA BROTHERUS: a, FERTILE PLANT; b, LEAF; c, APEN OF LEAF; d, BASE OF LEAF.



20, DALTONIA RUFESCENS BROTHERUS: a, FERTILE PLANT; b, LEAF; c, APEX OF LEAF; d, BASE OF LEAF. 21, DALTONIA BALDWINII BROTHERUS: a, LEAF; b, APEX OF LEAF; c, BASE OF LEAF. 22, HETEROPHYLLIUM SANDWICENSE BROTHERUS: a, LEAF; b, APEX OF LEAF; c, BASE OF LEAF. 23, HAGENIELLA PACIFICA BROTHERUS: a, STERILE PLANT; b, LEAF; c, APEX OF LEAF; d, BASE OF LEAF.



24, GLOSSADELPHUS MAUIENSIS BROTHERUS: a, PART OF STEM; b, LEAF; c, APEX OF LEAF; d, BASE OF LEAF. 25, GLOSSADELPHUS CHRYSOBASILARIS BROTHERUS: a, STERILE PLANT; b, LEAF; c, APEX OF LEAF; d, BASE OF LEAF. 26, GLOSSADELPHUS BALDWINII BROTHERUS: a, FERTILE PLANT; b, LEAF; c, APEX OF LEAF; d, BASE OF LEAF.



27, GLOSSADELPHUS LIMNOBIOIDES BROOTHERUS: a, STERILE PLANT; b, LEAF; c, APEX OF LEAF; d, BASE OF LEAF. 28, ENTODON TERETICAULIS BROOTHERUS: a, PART OF STEM; b, LEAF; c, BASE OF LEAF. 29, STEREOPHYLLUM OAHUENSE BROOTHERUS: a, FERTILE PLANT; b, LEAF; c, APEX OF LEAF; d, BASE OF LEAF.