II.—*Musci.*

By William Mitten, A.L.S.

The first investigation of the mosses of Kerguelen was made by Dr. J. D. Hooker during the voyage of the "Erebus" and "Terror" in the winter of 1840.

From the collections made by him there were described 31 species and varieties, which were arranged as 25 species in 11 genera. Of the whole number six species were considered to be new and undescribed, and the remainder to have been found in other regions. The most remarkable species contained in this collection are the *Schistidium marginatum*, *Weissia stricta*, and *W. tortifolia*.

During the visit of the Challenger, there were collected by Mr. Moseley, in the summer of 1874, 28 species, of which number 20 were additional to those discovered by Dr. Hooker. Sufficient materials were obtained to establish the presence of eight more genera, all previously known to occur in austral lands, four of the species appearing to be new. Twenty-eight species were obtained by Dr. Kidder of the American Transit Expedition, of which number 12 were additions to the Flora, two being described as new. Following the above come the collections made by the Rev. A. E. Eaton, pending the observations of the transit of Venus, which include 38 species, of which 17 were additional to the Flora of Kerguelen Island, three being undescribed, and by this collection three genera were also added; thus raising the whole number of the species of mosses inhabiting the Island to 74. This, considering how much has been added by each collector to those which were previously known, is probably a low estimate of the entire moss flora.

No genera peculiar to Kerguelen are observable in the collections, unless a species here referred to *Blindia* and the *Schistidium marginatum* (here placed in *Streptopogon*) should be so considered. The remaining genera are universal in boreal as well as austral regions, with the exception of the three species of *Dicranum*, all which belong to extra-European sections of that genus. Twenty-three of the Kerguelen mosses are considered identical with species found in the north of Europe and America, of these *Bryum alpinum* and *Brachythecium salebrosum* had not before been identified in the southern hemisphere.

A few distinct and well-marked species have been gathered in Kerguelen Island which are also found at great elevations on the Andes of Quito and of New Grenada. Of these *Mielechhoferia campylocarpa* and *Psilopilum trichodon* are conspicuous instances; they probably inhabit the whole Andine chain. *Bartramia appressa*, *Brachythecium paradoxum*, and *Tortula Princeps* are found also in New Zealand and Tasmania; but with the exception of *Dicranum kerguelense* there is no species which points to any connexion with the mosses of South Africa.

1. **Ditrichium australe,** *Mitt.* l. c. (Cynontodium). Lophiodon strictus, *Hook. f. et Wils. Fl. Antarct.* 130, t. LIX., Fig. 1.

In dense fulvous tufts, with old capsules, *Moseley.* (Lord Auckland's and Campbell's Islands.)

In all the specimens referred to this species the dry young foliage is fulvous, the older brown or black; the terminal leaves are frequently longitudinally twisted, otherwise their direction is the same as when wet; the lower portion of the leaf is in outline of an elliptic oblong figure, from which the nerve is continued in a straight line, and is rather suddenly carried out so as to appear without a margin of leaf; a transverse section shows it to be concave above and convex beneath; the apex is abrupt, rounded, and nearly flat, so as to appear as if dilated, and, as stated in the Flora Antarctica, the species is distinguished from most of its allies by this particular. The substance of the base of the leaf is composed of elongated cells which, although shorter towards the top of the dilated portion, are not dense, so that the entire expansion is of a pellucid fulvous colour, the nerve being everywhere smooth, with a few small teeth at its apex.*

2. **Ditrichium Hookeri,** *C. Muller Syn. I.*, 450 (Leptotrichum).

Royal Sound, with old capsules and young setæ, *Eaton.*

3. **Ditrichium conicum,** *Mont. in Ann. Sc. Nat. Ser.* 3, iv. 100. (Aschistodon.)

Near Vulcan Cave, barren, *Eaton.*

The imbrication of the leaves at the apices of the stems, when dry, so as to form an erect or curved point, renders this species not difficult to recognise in a barren state.

1. **Asiothecium vaginatum,** *Hook. Musc. Exot.* t. 141 (Dicranum).

* In the Journal of the Linnean Society, Sept. 1859, there was confused with the *Leptotrichum australe*, therein mentioned, the following apparently distinct species,—*D. punctulatum*, Mitt.; dioicum ? dense cæspitosum, dichotome ramosum, folia inter se remotiuscula a basi erecta amplexante oblonga cellulis inferioribus elongatis superioribus abbreviatis rotundatis obscuriusculis veluti punctatis, subito in subulam patentem inferne canaliculatam apice angustam planiusculam denticulatam minutissime scabridam sublævem cellulis punctulatis areolatam producta, perichætii alia basi latiora et longiora parte subulato patentiora, theca in pedunculo breviusculo rubro parva ovali-cylindracea erecta leptoderma fulvo-fusca. Flos masculus in ramis terminalis, ovatus, e basibus foliorum dilatatis apice retusis vaginantibus involucratus. Distichium capillaceum, Fl. N. Zealand, II., 73.

Hab.—New Zealand, *Dr. Lyall.* Great Barrier Island, *Hutton and Kirk.* Fagus Forests, *Hopkins, Dr. Haast.*

In size colour and general appearance very similar to *D. australe*, having also the same, but narrower, flattened apices to its leaves; in the recurvation of the subulate portion from the top of the erect base it resembles *D. capillaceum*, and for this species Dr. Lyall's barren specimens were mistaken, although the leaves are not distichous, but so disposed that each fifth leaf occupies the same vertical position on the stem as the first counted from; the outline of the dilated base is not oval-elliptic as in *D. australe*, but oblong obtuse. The fruit in an old state is present on Dr. Haast's specimens; accompanying these fertile stems were many conspicuous male flowers, which do not appear to arise from the lower parts of fertile stems, but seem to be really distinct male plants.

Swain's Bay, *Eaton*.

Small barren stems, but not different from specimens from the Bogotian and Quitenian Andes.

1. **Blindia gracillima,** Mitt. Dioica, laxe cæspitosa. Caulis elongatus, gracillimus, inferne nudus, superne foliis remotiusculis laxe obtectus. Folia anguste lanceoloto-subulata, pagina folii e cellulis angustis elongatis parietibus pellucidis usque ad $\frac{2}{3}$ nervi apice vix denticulati longitudinis anguste continuata; cellulis alaribus in auriculam parvam dispositis rubris; folia perichætialia erecta, basi obovata, convoluta, sensim subulato-attenuata, nervo longius excurrente. Theca in seta brevi flexuosa arcuata pendula, subresupinata, globosa; operculo oblique rostrato; peristomii dentibus rubris latis teneris integris vel rarius pertusis intus lævibus extus parietibus transversalibus prominentibus appendiculatis; annulo nullo; calyptra parva, viridis, nigrescens. B. curviseta, *Mitt. in Linn. Soc. Journ.* XV., 193.

Royal Sound, in lakes, with young and nearly ripe fruit, *Eaton*.

Stems 2–4 inches long, forming loose tufts, the upper portions red, the lower black, denuded of leaves, and forming a loose entangled mass. Leaves at the apices of the stems fulvous and shining, the lower all blackened; in their direction the upper leaves are but little changed when wet or dry; they are $1\frac{1}{2}$–2 lines long; the areolation consists of elongate cells separated by pellucid walls; at the angles of the base of the leaf the alary cells are distinct and red. The nerve becomes indistinguishable at four-fifths of the whole length of the leaf, and is thence continued, and ends without forming a pungent point; leaves of the perichætium longer, and their dilated bases about twice the width of the cauline leaves. Seta 2–$2\frac{1}{2}$ lines, straight in its lower half, thence to the capsule twisted and variously curved. Capsule erect when dry, when wet with a swan's-neck-like curve, and so bent as to become horizontal; when mature spherical without any neck where it is affixed to the seta; colour reddish brown; substance thin but firm. Operculum always obliquely beaked, at length of the same colour as the capsule. Peristome perfectly formed; teeth red, broad at the base, thence with an even outline narrowed to their points, with the exception of a rare perforation there is no trace of their being composed of a double row of cells; at the base of the teeth the transverse divisions are close together, but above this they are much wider, and on turning the tooth on edge it is seen that each dissepiment of the articulations is prominent on the outer side, but not on the inner. Spores small, round. Calyptra coriaceous, brownish-green, deeply cleft, with a spreading base.

Tab. III., Fig. 1, plant of natural size; 2, cauline leaf; 3, perichætium with capsule; 4, portion of peristome; all *magnified*.

2. **Blindia microcarpa,** *Mitt. in Journ. Linn. Soc.*, XV., 65. Monoica, pulvinatim cæspitosa. Caulis dichotomus, fastigiatim ramosus. Folia patentia, stricta, plus minus falcata curvatave, dimidio inferiore lanceolato superiore carinato

anguste attenuato, integerrima, nervo angusto percursa, cellulis elongatis alaribus in auriculam parvam fuscam dispositis areolata; perichætialia brevia, parva, ovata, convoluta, in acumen subulatum producta. Theca in pedunculo gracili foliis caulinis dimidio breviore erecta, parva, ovalis; operculo subulato obliquo demum ore dilatato cyathiformi fusca; peristomii dentibus teneris; calyptra parva, dimidiata. Flos masculus foliis propriis perichætialibus similibus inclusus.

Kerguelen Island, *Moseley*.

This is the species mentioned in the Flora Antarctica, p. 128, under *Weissia contecta*, as being present in the Hookerian Herbarium, its habitat unknown.

In compact, but not coherent tufts. Stems fastigiately branched, about an inch high. Foliage shining, but little altered in direction wet or dry. The minute capsule is scarcely conspicuous amongst the leaves. Leaves at the tops of the stems yellowish green, below brown, erect or slightly falcate, about $2\frac{1}{2}$ lines long, composed of elongate cells with pellucid walls; nerve pale brown and with the pagina gradually attenuated into a very narrow flat entire point; alary cells at the angles of the base distinct, brown, forming sub-quadrate masses. Leaves of the perichætium $\frac{1}{4}$–$\frac{1}{2}$ as long as those of the stem, and quite concealed amongst them. Seta about 1 line long, straight, pale brown. Capsule as it reaches maturity appearing to pass from oval to nearly globular; after the fall of the operculum by the dilatation of its mouth it becomes cyathiform, with no distinct neck. Operculum with a very oblique subulate beak which is longer than the capsule. Peristome-teeth very thin, broad at base, narrowed upwards into entire points; transverse articulations remote. Calyptra small, coriaceous, brownish, scarcely reaching the base of the operculum. Male inflorescence in a small bud below the base of the perichætium.

Tab. III., Fig. ii.: 1, plant of natural size; 2, cauline leaf; 3, perichætium with comal leaf, capsule, and male flower; 4, old capsule; 5, portion of peristome; all *magnified*.

3. **Blindia contecta**, *Hook. f. & Wils. Flor. Antarct.* 404 t. 58, f. 3, (Weissia).

Christmas Harbour, on rocks, barren, *Hooker*.

In this species the perichætium is composed of enlarged leaves as in *Stylostegium*, Schimp., but the capsule which is immersed has a peristome.*

* These three species afford some considerations respecting their mode of fructification. The genus *Blindia*, Bruch et Schimp., at first included only the European *B. acuta*, with the "perichætium vaginans distinctum," the perichætial leaves being as large as the cauline and dilated below. To this was added by C. Müller (in the Synopsis) *B. cæspiticia*, which had been made into the genus *Stylostegium* in the Bryologia Europea, differing from *Blindia* in its gymnostomous capsule immersed in enlarged but not vaginant perichætial leaves, in these particulars analogous to some species of *Grimmia* of the section *Schistidium*, in which *B. cæspiticia* had itself sometimes been placed. The distinction between *Blindia* and *Stylostegium* is reduced by the presence of a peristome in *B. contecta* (which may be said to be a *Stylostegium* with a peristome) by the immersed capsule in *Stylostegium*, and the exserted one in *Blindia*. In *B.*

1. **Dicranum** (Isocarpus, *Mitt.*) **tortifolium,** *Hook. f. et Wils. Fl. Antarct.* 404, *t.* 152, *f.* 5 (Weissia).

Hab., Christmas Harbour, on gravelly banks, *Hooker.* Under the shoot of a waterfall near Vulcan Cove, with old capsules and young setæ, *Eaton.*

In compact tufts 1–1½ inch high. Foliage very green above, below becoming brown. Old capsules black and shining; young calyptras orange brown.

2. **Dicranum** (Isocarpus) **strictum,** *Hook. f. et Wils. Fl. Antarct.*, 404, *t.* 152, *f.* 4 (Weissia).

Christmas Harbour, on rocks near the sea, *Hooker.*

This has been described as dioicous, but the male flower is terminal on a branch arising some distance below the perichætium. The peristome has rather broad thin teeth; in the solitary example which could be examined, the teeth appeared to be partly adherent in pairs, the median line is obsolete. This species is closely related to *D. tortifolium.*

3. **Dicranum** (Hemicampylus, *Mitt.*) **robustum,** *Hook. f. et Wils. Fl. Antarct.* 406, *t.* 152, *f.* 8, *var.* lucidum; D. pungens, *var.* lucidum, *Hook. f. et Wils. l. c.*

Hab. Christmas Harbour, *Hooker, Moseley.*

Known only in a barren state.

3. **Dicranum** (Hemicampylus) **kerguelense,** *C. Muller, Syn. i.* 370. D. Boryanum, *Schwaegr; Hook. f. et Wils. Fl. Antarct.* 406. D. dichotomum, *Beauv. Prodr.* 51 (Cecalyphum).

Christmas Harbour, *Hooker.* On an elevated moor, Royal Sound, *Eaton.*

microcarpa the perichætium is formed of leaves reduced in size like those which usually include the antheridia, and thus another modification of the perichætium is produced, all other particulars being as in *Blindia* proper. Thus, by the difference in the leaves of the perichætium, the species are separable into several groups :—

Stylostegium, B. & S.;—theca in perichætio e foliis caulinis ampliatis immersa.

Blindia, B. & S.;—theca e perichætio e foliis basi vaginantibus caulinorum magnitudinis exserta.

Homogastrium;—theca e perichætio microphyllo exserta.

The differences in the leaves of the perichætium between *Stylostegium* and *Blindia* are analogous to those which exist between the *Grimmiæ* of the sections *Schistidium* and *Grimmia;* between *Hedwigidium* and *Braunia;* between some *Bartramiæ* of the section *Leucomela* and *Eubartramia;* and also between the *Schlotheimiæ* of the sections *Stegotheca* and *Euschlotheimia.* States of the perichætium analogous to that observable in *B. microcarpa* occur chiefly in mosses which produce their fruit from the side of the stem, as *Anœctangium,* and in some species of *Fissidens.* Amongst the Neckeroid mosses perichætia may be observed in otherwise closely resembling species which are analogous to all three of the states here left in *Blindia.* Much time and many words might be saved in the description of mosses in which the perichætium is an important character, if some term at once conveying the essential part of the above information were employed, thus :—

Chanogastriati;—perichætium e foliis elongatis ampliatisque hians=*Stylostegium, Schistidium* (Grimmieæ), *Hedwigia, Hedwigidium, Cryphæa, Neckera.*

Heterogastriati;—perichætium e foliis elongatis inferne convolutis clausum=*Blindia, Dicranum, Hypnum,* &c.

Homogastriati;—perichætium e foliis abbreviatis iis perigonii similibus formatum=*Blindia microcarpa, Anœctangium, Pyrrhobryum,* &c.

In extensive tufts, with stems from 3–4 inches high, and fulvous green foliage, becoming when older, brown.

So far as can be seen from the small specimen in the Hookerian Herbarium of *Cecalyphum dichotomum*, it appears to be the same as the Kerguelen moss, as it was considered by Mr. Wilson. The chief distinction ascribed to *D. kerguelense* is to have the nerve vanishing towards the narrow flat point, and not as in *D. dichotomum* to have the nerve continued into the point and dentate on the back.

1. **Campylopus cavifolius,** *Mitt. Musc. Austr. Amer.* 87.

Kerguelen Island, in dense tufts, barren, *Moseley*. By some error this was enumerated in the Linn. Soc. Journal as *C. appressifolius*.

1. **Ceratodon purpureus,** *Linn. Sp. Pl.* 1575 (Mnium).

Hab.—Royal Sound and near Swain's Bay, in a dark purple almost blackened state, all barren, *Eaton*. (Heard Island, *Moseley*.)

This moss appears to be as common throughout the southern regions as it is in the northern. The southern states have generally a more robust appearance, but when *C. brasiliensis*, Hampe, from Brazil, *C. crassinervis*, Lorentz, from Valdivia, *C. capensis*, Schimp., from the Cape of Good Hope, and *C. convolutus*, Reichardt, from New Zealand, are compared side by side, the conclusion seems irresistible, that they are all forms of one species.

1. **Grimmia** (Schistidium) **apocarpa,** *Linn. Sp. Pl.* 1579 (Bryum).

Christmas Harbour, *Hooker*. Cat Island, Royal Sound, *Eaton*.

A very small state; all the specimens unlike European, but not appearing to be really different.

2. **Grimmia** (Schistidium) **falcata,** *Hook. f. et Wils. Fl. Antarct.* 401, *t.* 151, *f.* 8.

Christmas Harbour, on rocks and stones near a waterfall, *Hooker*.

This is either an aquatic species or an aquatic form of a species of which the form corresponding to rupestral states of *G. apocarpa* is unknown.

3. **Grimmia insularis,** *Mitt. in Journ. Linn. Soc.* XV., 73.

Heard Island, *Moseley*.

4. **Grimmia** (Eugrimmia) **Kidderi,** *James in Bull. U. S. Nat. Mus.*, 3, p. 25.

Near Swain's Bay, *Eaton*.

In small dense black cushions. Stems 3–4 lines high, with a few branches near the base, made up of repeated innovations from the base of the male flower, consisting of closely set widely ovate leaves, without diaphanous points, including a few antheridia. Leaves very small, canaliculate, margins erect, terminated by a short, nearly smooth hyaline point.

This ambiguous moss may be conjectured to represent a species near to the European *G. montana*.

5. **Grimmia** (Dryptodon) **chlorocarpa,** *Brid., Mitt. in Hook. f. Handb. New Zealand Fl.*, II., 426 (sub Rhacomitrium crispulum).

Kerguelen Island, *Moseley*. Hill N.W. of Mount Crozier, barren, *Eaton*.

Very closely related to *G. Symphyodon* and *G. emersa*, C. Müller, and also to *D. crispulus*, Hook. f. et Wils.; all are possibly forms of one species.

6. **Grimmia** (Dryptodon) **crispulus**, *Hook. f. et Wils. Flor. Antarct.* 124, *et* 402, *t.* 57, *f.* 9.

Christmas Harbour, in gravelly beds of rivulets, *Hooker*.

7. **Grimmia** (Rhacomitrium) **lanuginosa**, *Dill.; Brid.* i. 215.

Hab.—Kerguelen Island, *Moseley;* Royal Sound and near Vulcan Cove, barren, *Eaton*.

All the specimens are less robust than those collected by Dr. Hooker in Hermite Island; from the whitening of the tips of the leaves they are very hoary.

Many of the specimens brought from southern regions which appear to differ in only slight particulars from northern states have been described as distinct; of these, *Rhacomitrium firmum* De Notaris, from Chili, is a fulvous brown moss, *R. Geronticum*, C. Müller (Hedwigia, 1870), is possibly the same. *R. senile*, Schimp. (Lechler, 1089, from Magellan), with leaf points crisped and hoary, *R. incanum*, C. Müller (Hedwigia, 1870), from Cape of Good Hope, is, if specimens from the top of Table Mountain belong to it, scarcely in any particular different from Arctic examples.

8. **Grimmia** (Rhacomitrium) **protensum**, *A. Braun; Hook. f. et Wils. Flor. Antarct.* 402.

Christmas Island, barren, *Hooker*.

9. [G. frondosa, *James in Bull. U. S. Nat. Mus.* 3, 25, is another Kerguelen Island species, found by Kidder.]

1. **Orthotrichum crassifolium**, *Hook. f. et Wils. Fl. Antarct., p.* 125, *tab.* lvii. *f.* 8.

Christmas Harbour, common, *Hooker, Moseley;* Royal Sound, *Eaton*.

The specimens from Kerguelen have the points of the perichætial leaves reaching to three-fourths of the length of the capsule, which is thus only emergent, and in this respect they agree with some of the specimens gathered in Hermite Island by Dr. Hooker. No importance can be attached to this particular character, as in Dr. Hooker's specimens from Lord Auckland's Islands, emergent and exserted capsules may be seen on the same stems.

The capsules are either smooth or with a few folds regularly placed on one side, the remainder being smooth, and are more urcolate than any of the specimens collected by Dr. Hooker.

The inflorescence consists, as usual in the genus, of a male flower near the base of the perichætium in all the specimens.

2. **Orthotrichum atratum**, *Mitt. in Linn. Soc. Journ., XV., p.* 66. Monoicum. Caulis humilis, cæspitosus. Folia patentia, sicca incurva, laxe contorta, lanceolata, apice lata obtusiuscule acuta, nervo sub summo apice evanescente, cellulis

fere ubique parvis rotundatis obscuris; perichætialia majora. Theca in pedunculo longitudine perichætii subæquali ovalis, lævis, sicca infra os contracta, inferne collo crasso; operculo convexo, rostro angusto; peristomii dentibus 16, vel plus minus cohærentibus 8. Calyptra nigro-fusca, calva, ad medium usque thecæ descendens, nitida.

Kerguelen Island, *Moseley*.

Stems not more than half an inch high. Leaves a line long; a few of the youngest greenish, the rest all black, coriaceous. Capsule pale straw-coloured, somewhat fleshy, smooth when deoperculate, very slightly contracted just below the mouth at the base, when dry shortly plicate.

In all its parts larger than *O. crassifolium*, with leaves twice as wide, and without the horny appearance; it is, however, more nearly allied to that species than to any other, and approaches in some respects the *O. anomalum*, Hedw., which ascends far towards the Polar regions.

3. **Orthotrichum rupestre**, *Schleich.; Brid.* i. 279.

Royal Sound, with fruit nearly mature, *Eaton*.

The specimen is in good state, and appears to agree in all respects with the European, except that no internal peristome has been found; it does not correspond so well with either of the very closely allied species, *O. Sturmii* or *O. cupulatum*, which agree in being destitute of cilia.

1. **Zygodon Brownii**, *Schwaegr. t.* 317 *b*.

Kerguelen Island, *Moseley*.

The minute scrap rather establishes the fact that a species of the genus inhabits Kerguelen Island than provides materials for identifying with certainty that to which it is here referred.

Tortula (Syntrichia) **Princeps**, *De Notaris;* Barbula Mülleri, *Bruch et Schimp., Bryol. Europ. t.* 28. T. Fuegiana, *Mitt., Journ. of Linn. Soc.*, Sept. 1859. *Musc. Austr. Amer.* 174. Barbula, S. magellanica, *C. Müller* in *Bot. Zeit.* 1862, 349; B. antarctica, *Hampe;* Tortula antarctica, T. cuspidata, *et* T. rubella. *Hook. f. et Wils. Fl. Tasmanica, pl.* clxxii., *f.* 8, 9, 10.

Royal Sound, with abundant mature capsules; Observatory Bay, with older fruit, *Eaton*.

The first examination of the Kerguelen specimens yielded no male inflorescence, they were therefore considered to be *T. fuegiana*, with which in size, colour, and appearance they appeared to be identical, this being supposed to be a dioicous species, as no male flowers were observed in Lechler's Magellan specimens No. 1088, from Cabo Negro. The same specimens were again described by C. Müller as dioicous, under the name of *Barbula S. magellanica*. In seeking for the male flowers amongst Mr. Eaton's abundant specimens, it was, after the examination of many stems, ascertained that although no antheridia were present in the fertile flowers, a small proportion of the stems had a male flower without archegonia, either

terminal on a short branch, or lateral from the growth of innovations. Finally it was discovered that there might be present on the same stem, flowers containing antheridia accompanied by others containing archegonia, and above both these another flower in which both organs were intermixed. Thus, with specimens in small quantity to examine, the inflorescence might be described as monoicous dioicous or synoicous, as might chance to happen to the investigator.

The European *T. Princeps* was at first correctly described by De Notaris as polygamous in the Bryologia Europea, where it is figured as *Barbula Mülleri*. It is there described as hermaphrodite, with a remark in a subsequent note that it occasionally produced flowers containing archegonia only. In Schimper's Synopsis and in the Bryologia Britannica it is simply stated to be synoicous. An examination of De Notaris's original specimen shows synoicous fertile flowers with innovations of the stem terminated by flowers with archegonia alone; in this particular coinciding with British specimens.

The distribution of this species appears to be very wide, and it would seem to be the preponderating if not the only species of the genus in southern regions. From N.W. America it extends to Mexico, Chili, and the Straits of Magellan; in Africa it is found at the Cape of Good Hope, and may be identical with the *Barbula mollis*, Schimp., of the Abyssinian Mountains; it occurs in N.W. India; it inhabits also New Zealand, Tasmania, and Australia, from whence several species have been described as dioicous, viz., *Barbula Latrobeana*, C. Müller (Bot. Zeit. 1864, 358), *B. Preissiania* (ejusd. Synops. I. 642), *B. pandurœfolia* (ejusd. et Hampe, Linnæa 1853, 493). No specimen, however, amongst those sent by Baron F. von Mueller to the Kew Herbarium has been examined without finding its inflorescence monoicous or synoicous. There is also *Tortula S. pusilla*, J. Angstr. from Magellan, described as dioicous ? and *Barbula Lechleri*, C. Müller (Bot. Zeit. 1859, 229), as monoicous. All these species or supposed species may be well distinguishable, but if the certainty of the condition of their inflorescence is removed from their descriptions, the remainder becomes applicable to *T. Princeps*, in which the outline of the leaves even on the same stems is, as in the European *T. ruralis*, subject to a great amount of variation.

2. **Tortula** (Barbula) **serrulata**, *Hook. et Grev. in Brewst. Edinb. Journ.* i. 291, t. 12.

Kerguelen Island; a few small barren stems with other mosses, *Moseley*.

3. **Tortula** (Barbula) **erubescens**, *Mitt. in Hook. f. Handbook of New Zeald. Flora*, ii. 421 (Didymodon).

Kerguelen Island; a few fragments, *Moseley*.

Very closely related to the *T. rubella* so widely distributed in northern regions, differing chiefly in the longer operculum and larger size of the whole plant.

1. **Streptopogon australis**, *Mitt. in Linn. Soc. Journ.* xv. 66. Humilis. Folia inferiora patentia, spathulato-ligulata, obtusiuscule acuta, nervo in apice de-

sinente, margine apicem versus denticulata; superiora duplo latiora, a basi erectiore sensim recurva, patentia, apice cum nervo in acumen longitudine variabile sensim educto, margine superne serrulata.

Royal Sound; a single stem, *Eaton*. Two small stems amongst other mosses without precise locality, *Moseley*.

The small quantity found of this moss would be insufficient to give any idea of what might be supposed to be the usual appearance of the species were it not evidently a close congener to a very ambiguous moss found on thatch in the south of Britain, and which has been known first as a supposed gemmiferous variety of *Leptodontium flexifolium* (Sm.), and since as *Didymodon gemmascens*, Mitt. MSS. From this the Kerguelen species differs in the form of its lower leaves. In the British moss all the leaves are acuminate and tipped with a globular mass of individually obovate green gemmæ of a loose cellular substance, and gemmæ of the same form are present on the points of some of the upper leaves of *S. australis*.

Both species appear to be small, the British one is seldom more than half an inch in height; the entire plant, excepting a few rootlets, and the rarely present archegonia, which are red, is of a yellowish green. In the dry state it affords nothing to attract observation, but when wet, every leaf being terminated by its mass of gemmæ, it is unlike any other European moss, excepting the more robust *Orthotrichum phyllanthum* (Brid.). It comes nearer to some species of *Streptopogon;* the areolation of the leaves of *Calymperes* or of *Syrrhopodon* are widely different. The genus *Streptopogon* founded on *S. erythrodontus* (Tayl.), with the additional species discovered in the Quitenian Andes by Dr. Spruce, and those from the Bogotian Andes by Lindig and Weir, contains a number of species all seeming to have a tufted Orthotrichoid habit. They differ among themselves considerably, some of the Andean species having the leaf with a callous margin which is wanting in others, and the capsule immersed or shortly exserted from perichætial leaves which are not very different from the cauline. *S. mnioides*, Schw. t. 310 (*Barbula*), however, has the perichætium leaves much elongated, and different from those of the stem, simulating those of *Holomitrium*, and on this account should stand apart from the other species, thus—

Streptopogon, *Wils.* Theca in perichætio e foliis caulinis subsimilibus immersa, emergens, vel breviter exserta. Calyptra breviter multifida.

Calyptopogon, *Mitt.* Theca in perichætio e foliis elongatis a caulinis difformibus exserta. Calyptra profunde plurifida.

The first group contains all the species of which the fruit is known, and which correspond to the typical *S. erythrodontus*, together with probably some others which are known only in a barren state, including the two ambiguous species *S. australis* and *S. gemmascens*.

The second group consists of *S. mnioides* alone.

2. **Streptopogon? marginatus**;—Schistidium marginatum, *Hook. f. and Wils. Flor. Antarct.*, 399, *t.* 151. f. vi.

Christmas Harbour, forming large patches on wet rocks, *Hooker*.

This, which appears destitute of peristome, is in other respects more nearly related to *Streptopogon* than to any other genus, and if included in it would occupy a position analogous to that of *Stylostegium cæspiticium* and *S. contectum* before mentioned under *Blindia*.

1. **Entosthodon laxus,** *Hook. f. et Wils. Fl. Antarct.*, 399, t. 151, f. 5. (Physcomitrium).

Christmas Harbour, *Hooker*. Royal Sound, barren, and Swain's Bay, with nearly mature capsules, *Eaton*.

Traces of an internal peristome are present within the external teeth.

1. **Bartramia** (Philonotis) **appressa,** *Hook. f. et Wils. Fl. New Zeald.* ii. 89, t. 86, f. 5.

Royal Sound, barren; Observatory Bay, with a few nearly ripened capsules; and hill N. W. of Mount Crozier, a tall barren slender state, *Eaton*.

2. **Bartramia** (Philonotis) **australis,** *Mitt. in Hook. Handb. New Zeald. Flor.*, 448.

Swain's Bay and Royal Sound, all barren, *Eaton*.

The few small stems growing among other mosses appear to belong to this species.

3. **Bartramia** (Breutelia) **pendula,** *Hook. Musc. Exot.* t. 21.

Kerguelen Island, *Moseley*. Royal Sound; hill N.W. of Mt. Crozier; near Vulcan Cove, with abundant immature fruit, *Eaton*.

4. **Bartramia** (Eubartramia) **patens,** *Brid. Sp. Musc.* iii. 82.

Kerguelen Island, *Moseley*. Royal Sound, with old fruit; and hill N.W. of Mt. Crozier, *Eaton*.

5. **Bartramia** (Eubartramia) **robusta,** *Hook. f. et Wils. Fl. Antarct.* t. 59.

Kerguelen Island, *Moseley*. Royal Sound, with old capsules and young setæ rising, very fine tall specimens, and Swain's Bay, *Eaton*. (Heard Island, *Moseley*.)

[B. flavicans, *Mitt.*, is enumerated by James as amongst the U. S. collections, collected at the rear of the American Transit House.]

1. **Bryum** (Webera) **nutans,** *Schreb.; Hedw. Musc. Frond.* i. t. 4.

Near Vulcan Cove; hill N.W. of Mt. Crozier, a small state with unripe fruit growing amongst *Psilopilum trichodon*, *Eaton*.

2. **Bryum** (Webera) **elongatum,** *Dicks.*

Swain's Bay, a single stem with ripe capsule, *Eaton*.

3. **Bryum** (Webera) **crudum,** *Hedw. Musc. Frond.* i. t. 88 (Mnium).

Kerguelen Island, *Moseley*. Swain's Bay, with fruit just mature, *Eaton*.

4. **Bryum** (Webera) **albicans,** *Wahlenb.*

Christmas Harbour, *Hooker*, *Moseley*. Near Vulcan Cove, *Eaton*.

Specimens all barren.

5. **Bryum** (Eccremothecium) **pendulum,** *Hornsch.*

Royal Sound; and Cat Island, Royal Sound, *Eaton*.

The inflorescence, which is usually synoicous in capsuliferous flowers, is sometimes accompanied by unisexual flowers upon the same stem.

6. **Bryum** (Eccremothecium) **Eatoni,** *Mitt. in Journ. Linn. Soc.*, xv., p. 195. Synoicum. Caulis humilis, gracilis, innovationibus infra comalibus paucis ramosus. Folia erecto-patentia, inferiora minora, superiora elliptico-lanceolata, nervo in acumen tenue læve vel denticulis paucis asperum excurrente, margine limbo tenui e seriebus cellularum elongatarum 4–5 composito anguste reflexo integerrima, cellulis angustis limitibus teneris areolata; folia comalia longiora, basi subauriculato-dilatata, angulis rotundatis laxis areolatis. Seta elongata, recta, apice anguste curvata. Theca pendula, sporangio ovato collo subæquilongo; operculo depresse conico acuminulato; peristomio parvo, dentibus pallidis subsubulatis, apice punctulatis, processibus apice punctulatis ciliisque in unum angustissimum conflatis in membrana usque ad dentium longitudinis $\frac{1}{3}$ exserta impositis, annulo triplici circumdato.

Swain's Bay and Royal Sound, with fruit ripened, *Eaton.*

The very narrow leaves retain the same position in both the wet and dry state, they are narrower than observed in any form of *B. pendulum.*

Tab. III. f. iv.; 1, natural size; 2, cauline leaf; 3, leaf from perichætium; 4, capsule; 5, portion of peristome; all *magnified.*

7. **Bryum** (Eccremothecium) **bimum,** *Schreb.; Bryol. Europ.* t. 21.

Christmas Harbour, *Hooker.* Near Swain's Bay; and Royal Sound, with ripe fruit. *Eaton.*

The specimens vary in size, the stems in some being nearly three inches high, the lower leaves are all blackened.

8. **Bryum** (Eccremothecium) **alpinum,** *Linn.*

Royal Sound, with shining red foliage; and Swain's Bay, all barren, *Eaton.*

The red-leaved specimens are exactly similar to those states of this species which are found in sub-alpine regions in Europe; those states which are found in the plains have never the lustrous appearance which adorns this handsome moss.

The small specimen from Swain's Bay was mistaken for *B. lævigatum,* Hook. f. et Wils. (also a Kerguelen species), to which in colour it has a great resemblance, and the similarity was increased by the points of the upper leaves being broad and obtuse; the lower leaves are, however, of the usual form.

9. **Bryum** (Eccremothecium) **argenteum,** *Linn.*

On sea cliffs near Observatory, barren, *Eaton.*

A small silvery state with the leaf points not produced.

10. **Bryum** (Eccremothecium) **kerguelense,** *Mitt. in Journ. Linn. Soc.* xv. 67.

Monoicum, cæspitosum. Caulis brevis, ramosus. Folia erecto-patentia, imbricata, inferiora rameaque ovali-lanceolata, acuta, carinato-concava, nervo rubro percursa, margine integerrimo, cellulis angustioribus in seriebus duabus limbum subindistinctum formantibus; reliquis suboblongis; comalia longiora latioraque; perichætialia interna minora. Theca in pedunculo breviusculo rubro superne flexuoso

curvato horizontalis, tenui-membranacea, nitida; sporangio ovali collo recto æquilongo sensim angustato; ore satis parvo coarctato; operculo convexo apice brevissime acuto; peristomii dentibus pallidis interni fragmentis externo usque ad medium adhærentibus.

Kerguelen Island, *Moseley*.

Stems including the numerous branches about 3 lines high, and with the foliage about half a line wide. Leaves appressed when dry, a few at the apices of the branches green, the lower all dark brown. Seta 3 lines long. Capsule about $1\frac{1}{2}$ lines long, ochraceous, almost shining. The male flowers are terminal on branches arising below the perichætium.

This small species appears to be nearly allied to *B. demissum*, Hook., but its capsule is symmetrical, and the peristome is different.

Tab. III. fig. iii.; 1, plants nat. size; 2, entire plant; 3, cauline leaf; 4, perichætial and comal leaves; 5, portion of peristome; all *magnified*.

11. **Bryum lævigatum,** var. β., *Hook. f. and Wils. Flor. Antarct.*, 415, t. 154, f. 3.

Christmas Harbour, barren, *Hooker*.

12. **Bryum Wahlenbergii,** *Schwæg.*

Christmas Harbour, common, *Hooker*.

[B. WARNEUM, Bland.; GAYANUM, Mont.; TORQUESCENS, Br. and Sch.; and PALLESCENS, Schwæg., are all enumerated by James as found by Kidder (Bull. U. S. Nat. Mus. 3, 26.]

1. **Mielichhoferia campylocarpa,** *Hook. et Arn. in Hook. Icon. Pl.*, t. 136 (Weissia).

Kerguelen Island, *Moseley*. Near Swain's Bay, with unripe fruit, *Eaton*.

First described from the Andes, where it was gathered by Jameson; it was afterwards found in Mexico, and may be one of those species extending throughout the Andine chain. *M. basillaris*, Bruch et Schimp., from the Abyssinian mountains, with entirely the same stature and appearance, differs in some particulars of the peristomial teeth, and in the nerve of the leaf vanishing below the point.

Plagiothecium antarcticum, *Mitt. in Journ. Linn. Soc.* xv. 71. Monoicum, cæspitosum, ramis ascendentibus. Folia compressa, subfalcata, nitida; caulina ovata, acuminata, integerrima, enervia; ramea ovato-lanceolata, tenuiter acuminata, subenervia; omnia basi subcordata, cellulis angustis elongatis areolata; perichætialia convoluta, late ovata, breviter acuminata. Theca in pedunculo elongato rubro ovalis, inæqualis, suberecta inclinatave; operculo breviter conico; peristomio interno ciliis in unum coalitis inter processus carinatos dentium longitudinis impositis in membranam usque ad dentium dimidiam longitudinem exsertam insidentibus.

Royal Sound, with mature and old fruit, *Eaton*. Marion Island, *Moseley*.

Stems forming extensive soft patches, with shining foliage about half a line wide. Seta about half an inch long, when dry twisted. Capsule obovate, the neck collapsing plicate, and so curved that the whole capsule is inclined; mouth large;

pale peristome prominent. The male flower, as is frequent in this genus, forms one of a cluster of small bud-like flowers at the base of the perichætium.

Closely resembles the European *P. nitidulum, Wahl.*, scarcely differing except in the base of its leaves. This is the species which is mentioned in Hooker's Handbook of the New Zealand Flora, ii. 476, as Hypnum pulchellum Dicks? from the Canterbury Alps.

Tab. III. Fig. v.; 1, plant nat. size; 2, cauline leaf; 3, perichætium with male flower at base; 4, capsule; 5, portion of peristome—all *magnified.*

[P. DONIANUM, *Sm.*, is enumerated by James as having been collected by Kidder in the U. S. Transit Expedition.]

1. **Acrocladium politum,** *Hook. f. et Wils. Fl. Antarct.* ii., t. 154, f. 2 (Hypnum). *Mitt.* l. c.

Hab.—Christmas Harbour, slender, tufted state, *Hooker.* Royal Sound, small and barren, *Eaton.*

This moss resembles some species of *Plagiothecium,* but seems to differ in habit, its branches with conduplicate bifarious leaves having so close a resemblance to those of *Phyllogonium elegans,* Hook. f. et Wils., that it is frequently mistaken for that plant. In the review of the genus *Orthorhynchum,* Reich. by C. Müller (Linnæa Band, 36, p. 28), one of the species to be referred to this genus, the *O. Hampeanum,* C. Muller, sent from Australia Felix by Baron F. von Mueller, must, from the description, be *Acrocladium politum,* of which specimens have been seen from Von Mueller, not however exactly corresponding in locality.

1. **Stereodon cupressiformis,** *Linn.* (Hypnum).

Base of sea cliff, Royal Sound, barren, *Eaton.*

The small specimens obtained exhibit this variable species in that form which in Europe is found on the roofs of buildings or on the ground; they are very unlike *S. chrysogaster,* C. Muller, so common in New Zealand.

1. **Amblystegium uncinatum,** *Hedw.*

Christmas Harbour, *Hooker.* Near Vulcan Cove, a tall robust form with nearly mature fruit; and Royal Sound, a similar state, but barren, *Eaton.*

2. **Amblystegium fluitans,** *Dill.*

West side of Swain's Bay, barren, *Eaton.*

A large state, with all but the terminal leaves of a brown colour.

3. **Amblystegium riparium,** *Linn.*

In the lake at Christmas Harbour, *Hooker.*

Specimen in a very imperfect state. Also found by the U. S. Transit Expedition growing with *Ranunculus crassipes.*

4. **Amblystegium kerguelense,** *Mitt.* Dioicum? Caulis decumbens, ramis confertis ascendentibus pinnatim ramosis. Folia caulina laxe imbricata, stricta vel curvata, ovato-lanceolata, subulato-acuminata, integerrima, nervo basi lato sensim angustato et in acumen evanido percursa; cellulis parvis oblongis limitibusque pellucidis ad angulos paucis rectangulis latioribus areolata; folia ramea

erecto-patentia, angustiora, nervo crassiore. Hypnum filicinum var. et H. serpens, var. *Flor. Antarct.*, p. 419 et 418.

Christmas Harbour, *Hooker*. Near Swain's Bay, barren, *Eaton*.

The single patch of this moss gathered by Mr. Eaton exhibits the species as very closely resembling *A. filicinum*, Linn., when it has not assumed a pinnate form; it is larger than *A. serpens*. The foliage is fulvous, neither wet nor dry is it altered in appearance.

5. **Amblystegium decussatum**, *Hook. f. et Wils. Fl. New Zeald.* ii. t. 90, f. 2. (Hypnum.)

Royal Sound, a slender straggling state, with irregular branches and an upright form, amongst *Bryum pendulum;* near Swain's Bay, an upright state more robust and more branched; near Vulcan Cove, a still larger state, with stems three inches high; all barren, *Eaton*.

All the specimens referred to this species have but little external resemblance to the complete state found fertile in New Zealand, but they agree very closely in the areolation of their leaves, and it is probable they are only slender forms similar to those produced by *A. filicinum*.

1. **Sciaromium conspissatum**, *Hook. f. et Wils. Fl. Antarct.* 419, t. 155, f. 3. (Hypnum).

Christmas Harbour; *Hooker, Moseley*. A short barren state.

All the Kerguelen specimens are smaller than those from the Falkland Islands.

1. **Brachythecium subpilosum**, *Hook. f. et Wils. Fl. Antarct.* 418, t. 154, f. 4. (Hypnum).

Kerguelen Island, *Moseley*.

More robust than the original specimens from Cape Horn, and in this respect nearer to the *Hypnum rutabulum*, var. 5, Fl. Antarct., from the Falkland Islands, which has since been named *H. subplicatum*, Hampe. If, however, the species may be supposed to vary as much in aspect as the European *B. rutabulum*, these slightly larger forms may be fairly considered within the limits of probable variation. Intermediate between the Hermite Island specimens and those from Kerguelen are some barren mosses from Otago, New Zealand, and some others collected in the Australian Alps by Von Mueller, to which it is probable the description of Dr. Hampe's *Hypnum austro-alpinum* may apply, as he says that the seta is thick and rough, and the capsule short, which are the most prominent characters appertaining to *B. subpilosum*.

2. **Brachythecium salebrosum**, *Hoffm.* (Hypnum). Hypnum rutabulum, var. 4, *Hook. f. et Wils. Fl. Antarct.* 417.

Christmas Harbour, *Hooker*. Hill N.W. of Mount Crozier, a fine silky state in large tufts, with stems 2–3 inches long; Swain's Bay, in boggy ground on the west side, a smaller state, all barren, *Eaton*.

This species is distinguished from *B. rutabulum* by the form of the leaves on the principal stems, which are not so dilated at their base, the outline being more nearly

ovate and not deltoid. Specimens collected by Dr. Lyall in the Arctic regions at Beechy Island, correspond very nearly with the Kerguelen moss.

3. **Brachythecium paradoxum,** *Hook. f. et Wils. Fl. Antarct.* 449, t. 155, f. 2. (Hypnum).

Royal Sound, and Swain's Bay, with mature fruit, *Eaton.*

This species, which is found also in New Zealand and Fuegia, varies in size; the Kerguelen specimens are smaller than those from New Zealand; its affinity is with the European *B. velutinum* (Linn.), which is sometimes seen with falcate leaves, and then presents an appearance very different from its more usual state.

1. **Psilopilum trichodon,** *Hook. et Wils. in Hook. Lond. Journ. Bot.* vi. 289. (Polytrichum).

Hill N.W. of Mount Crozier, with narrow capsules, *Eaton.*

Originally described from the Andes of New Grenada, where it was found near the snow by Purdie; it was afterwards gathered by Jameson in a similar situation in the Andes of Quito.

Pogonatum alpinum, *Dill.*

Swain's Bay, with unripe fruit, *Eaton.*

This species occurs also in Australia, and has been described as *P. pseudo-alpinum* (C. Müller, Bot. Zeit. 1855, 750), but it is admitted that the southern specimens differ scarcely if at all from those of the boreal regions.

[CATHARINA COMPRESSA, *C. Müll.*; Polytr. compressum, *Hook. f. et Wils.*, is enumerated amongst the United States Expedition collections.]

1. **Andræa acuminata,** *Mitt.* A. acutifolia, var. γ, *Hook. f. et Wils. Fl. Antarct.* 396.

Christmas Harbour, *Hooker.* Kerguelen Island, with a few mature capsules, *Moseley;* Royal Sound, without fruit, *Eaton.*

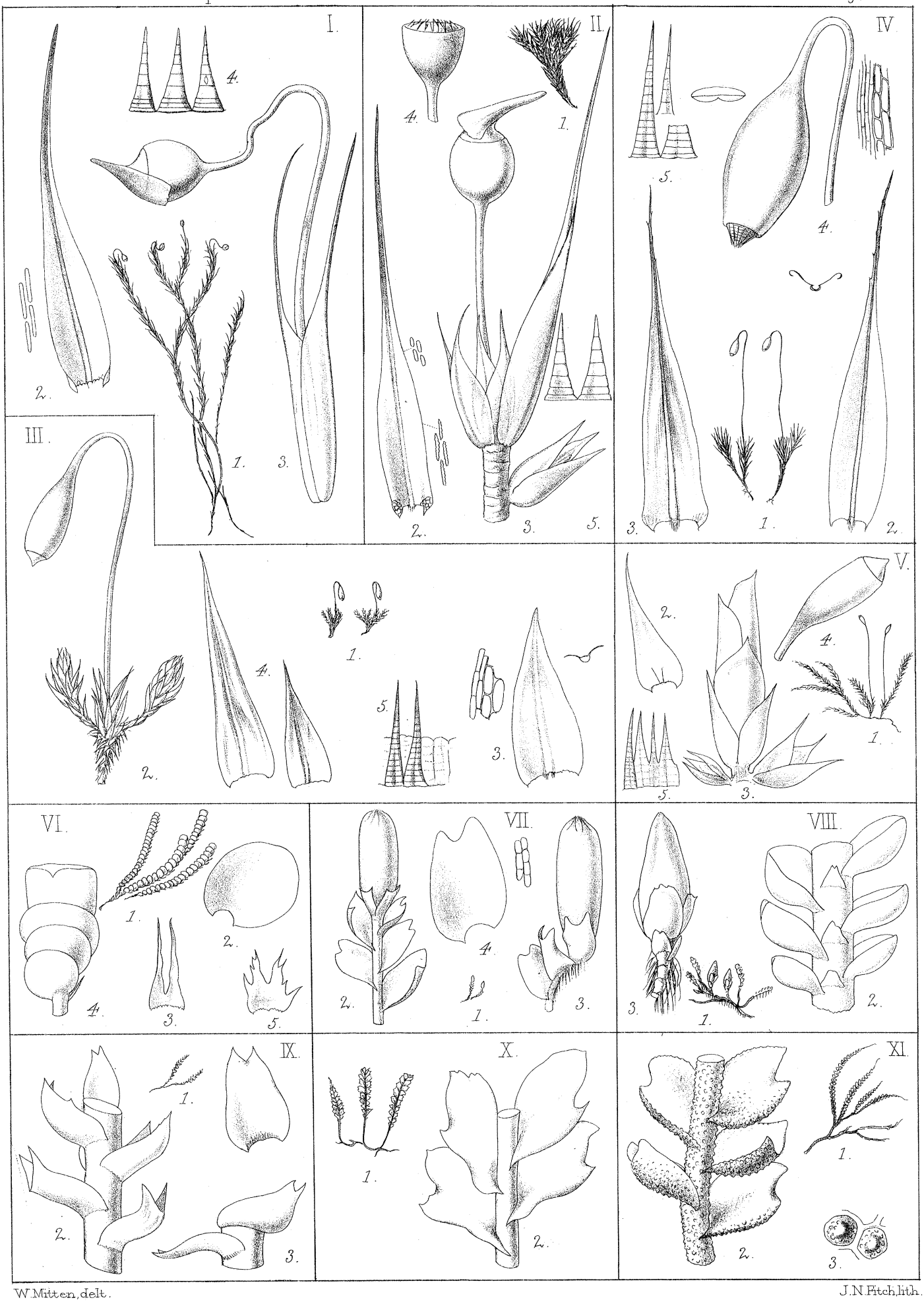
In the outline of its leaves this species resembles *A. marginata,* Hook. fil. et Wils. Fl. Antarct. 396, t. 151, f. 1., but the areolation of their upper portion is different, the cells being about $\frac{1}{3000}$ of an inch long by $\frac{1}{5000}$ wide, those in the corresponding portion of the leaves of *A. marginata* being about $\frac{1}{5000}$ wide, and $\frac{1}{800}$ long.

2. **Andræa squarrosa,** *Mitt. Musc. Austr. Amer.* 629. A. alpina var. 1, *Hook. f. et Wils. Flor. Antarct.* 395.

Christmas Harbour, *Hooker.*

This species has the perichætial leaves in the Kerguelen specimens of the same form as in those collected by Prof. Jameson in the Andes of Quito.

[A. MARGINATA, *Hook. f. et Wils. Flor. Antarct.* 396, t. 151, fig. 1., has been found in Kerguelen Island by Kidder.]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