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A SYNOPSIS OF
THE BRITISH MOSSES.

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Rose Jackson.

March 1899.

A SYNOPSIS
OF
THE BRITISH MOSSES,

CONTAINING DESCRIPTIONS OF ALL THE

GENERA AND SPECIES,

(WITH LOCALITIES OF THE RARER ONES)

FOUND IN

GREAT BRITAIN AND IRELAND,

BASED UPON

WILSON'S "BRYOLOGIA BRITANNICA,"

SCHIMPER'S "SYNOPSIS," ETC.

BY CHAS. P. HOBKIRK,

President of the Huddersfield Naturalists' Society.

London:

L. REEVE & CO.,

5, HENRIETTA STREET, COVENT GARDEN.

MDCCLXXIII.

P R E F A C E .

IT is not my desire that this little volume should be looked upon as anything more than what is expressed in the title, simply "A SYNOPSIS OF THE BRITISH MOSSES," and as a kind of *vade-mecum* to the working Bryologist, as well as a guide to beginners. It is not altogether an original work, nor yet is it a mere compilation, for nearly every species has been carefully examined under the microscope before being described, and then the diagnoses compared with other works, principally that great text-book of British Bryologists, "Wilson's *Bryologia Britannica*." Besides this work, I have also largely consulted, and drawn from, Bruch and Schimper's "*Bryologia Europæa*," Schimper's "Synopsis," Dr. Mueller's "Synopsis," the Proceedings of the Linnean Society, the *Bulletins* of the Royal Botanical Societies of France and of Belgium ; and last, but not least, the valuable papers recently contributed by Dr. Braithwaite to "Journal of Botany," "Grevillea," and the "Monthly Microscopical Journal," and also some papers by Mr. Mitten in the first-named publication.

In the general arrangement of the genera and species, I have mainly followed the "*Bryologia Britannica*," as I did not consider myself justified in departing widely from it, although many of our principal Muscologists look upon it as very faulty ; but I did not hold my authority sufficient to alter what has become a classical arrangement amongst us : and more particularly as both Dr. Braithwaite and the Rev. J. Fergusson are engaged upon more critical examinations, prior to the publication of new and more natural arrangements. The Analysis of the Genera is principally founded upon the same part from Wilson, and is intended not as an arrangement, but merely a key.

In the "Appendix" will be found a few omitted species, and alterations of nomenclature, as well as a few *errata*, which should be noted in the margin at their proper places.

I much regret that, by an oversight, I have omitted to insert var. δ *squarrosulum* under *Sphagnum cymbifolium*, gathered by my friend Mr. Bagnall, in Sutton Park, Birmingham; and the same locality should be added after *Hypnum aduncum*, *H. Sendtneri*, and *H. intermedium*.

I must here express my gratitude and thanks to those gentlemen who have so kindly assisted me in its preparation, both with the loan or gift of specimens of the rarer and newer species, and also for the diagnoses received from several, where specimens were not attainable. Amongst these gentlemen I must specially thank Dr. Hooker for his kind permission to use the Herbarium specimens and Library at Kew, and Mr. J. G. Baker, F.L.S., for his valuable assistance in doing so; also Dr. Braithwaite, F.L.S., Mr. J. Bagnall, of Birmingham; Dr. F. Buchanan White, of Dunkeld; Dr. Fraser, of Wolverhampton; Rev. J. Fergusson, of New Pitsligo; Mr. Carruthers, F.L.S., of British Museum; Mr. G. E. Hunt, of Manchester; Mr. John Sim, of Strachan; Mr. W. Galt, of Edinburgh; M. P. Goulard, of Caen, Calvados; and lastly, all those gentlemen and ladies who so readily came forward as subscribers to the number of upwards of 200, to assist in the publication of the volume.

CHAS. P. HOBKIRK.

HUDDERSFIELD,

February, 1873.

LIST OF CONTRACTIONS USED IN THIS VOLUME.

-
- br. *branches.*
 br. l. *branch leaves.*
 cal. calyp. *calyptra.*
 caps. *capsule.*
 fem. *female.*
 fl. *flower.*
 fr. *fruit or fructification.*
 infl. *inflorescence.*
 innov. *innovations.*
 l. *leaves.*
 m.m. *millimetres.*
 ped. *pedicel or seta.*
 per. perist. *peristome,*
 per. l. and p. l. *perychætical leaves.*
 per. teeth. *teeth of peristome.*
 perig. l. *perigonial leaves.*
 st. *stem.*
 st. l. *stem leaves.*

NOTICE TO COLLECTORS.

It is my intention, as soon as sufficient material can be accumulated, to publish "A Geographical Distribution of the British Mosses," and, in furtherance of this object, I should esteem it a great favor if all collectors throughout the kingdom would kindly be at the trouble of forwarding to me, as early as convenient, complete lists of the Mosses found by themselves or their friends, in their several districts, with any notes they may think desirable respecting them, and, where possible, the range and habitat of the various species. I feel sure I have only to mention this to ensure an abundant return of information for a work which is really wanted, and shall, so far as any exertions on my part can ensure it, be really valuable.

C. P. H.

ANALYSIS OF GENERA.

SECT. I. ACROCARPI.

Fr. terminal (or in a few instances cladocarpous).

DIVISION A. Capsule without a deciduous lid.

a. caps. bursting irregularly.

ARCHIDIUM (3). Perennial; caps. *globular, sessile*; calyptra thin and membranous, irregularly torn in the middle; *spores large*; infl. monoicous; barren fl. gemmiform, two-leaved or naked in axils of perichætical leaves. PAGE 26.

PHASCUM (4). *Annual*. Caps. ovate or roundish, very shortly *pedicillate*; calyptra campanulate; spores *small, roughish*; infl. monoicous; barren fl. gemmiform either at base of plant, or axillary, rarely terminal and discoid. 26.

b. caps. bursting regularly.

ANDREÆA (1). Caps. oval erect, opening by four *longitudinal slits*, sessile on a stalked *vaginula*; calyptra mitriform, thin; spores small, at first clustered together in fours: perennial. 21.

DIVISION B. Capsule with a deciduous lid.

I. PERISTOME NONE.

a. caps. sessile on a stalked *vaginula*.

SPHAGNUM (2). Perennial, aquatic; caps. *globular*,

sessile on the turbinate fleshy stalked vaginula; lid flattish, calyptra surrounding the ripe caps, ruptured near the middle; spores as in *Andreæa*. Infl. monoicous or dioicous. 23.

b. caps. pedicillate; vaginula sessile.

a. caps. cylindrical; lid with a straight beak; calyptra mitriform.

ENCALYPTA (29) (In part). Caps. erect, regular, oblong or ovate-lanceolate, smooth or striate, lid conical with a longish almost filiform beak; calyptra very large, covering the capsule, fringed at base (peris. when present of 16 teeth, inner of 16 alternating erect cilia). Infl. monoicous or dioicous; barren fl. gemmiform, axillary or terminal. 74.

β. caps. oval, lid with an oblique beak; calyptra dimidiate.

GYMNOSTOMUM (5). Perennial; leaves of close firm texture, with small dense areolæ; barren fl. gemmiform, in monoicous species placed near the base of perichætium. 31.

POTTIA (21). Annual or biennial; l. rather succulent, with lax quadrate or rectangular areolæ, the lower ones enlarged. Infl. monoicous; barren fl. near the fertile, naked, or gemmiform with three leaves. 55.

γ. caps. roundish-pyriform; lid obliquely rostrate.

STYLOSTEGIUM. (12). Perennial; caps. on a very short pedicel; calyptra small, cucullate, scarcely covering the lid; l. channelled, secund. Infl. monoicous; barren fl. gemmiform. 38.

ANODUS (11). Annual or biennial; caps. pedicillate; columella free; l. setaceous, erect. 38.

δ. caps. obovate or clavate; lid plane or conical; l. loosely reticulated.

* Calyptra mitriform.

SCHISTOSTEGA (70). Caps. small oval, lid convex; calyptra small, *at length dimidiate*; infl. dioicous terminal, barren fl. gemmiform; l. nerveless, vertically distichous, very tender, areolæ large rhomboid. 135.

PHYSCOMITRIUM (59). Annual or biennial. Primary stem terminated by a discoid barren fl. from below which rises a branch bearing a terminal fertile fl.; caps. clavate, lid convex; calyptra large inflated; l. spreading every way, nerved; areolæ large oblong, acute. 127.

* * Calyptra dimidiate.

ÆDIPIDIUM (69). Caps. with a long tapering apophysis, gradually passing into the fruit stalk; lid plano-convex; infl. monoicous or synoicous; l. succulent broad, obtuse; areolæ roundish hexagonal, larger at base. 135.

ε. caps. globose; lid almost plane.

* Calyptra conico-mitriform, small; l. nerveless.

HEDWIGIA (30). Caps. immersed, sub-sessile; infl. monoicous, barren fl. axillary gemmiform; areolæ small quadrate, longer and flexuose below. 76.

HEDWIGIDIUM (31). Caps. exerted on a short pedicel; barren fl. terminal; stem stoloniferous; l. plicate longitudinally, areolæ longer. 77.

* * Calyptra dimidiate; l. nerved.

BARTRAMIDULA (60). Caps. on a curved pedicel, smooth, cernuous; infl. synoicous; lid small sub-conical; calyptra small cucullate; areolæ lax, oblong-hexagonal. 128.

II. PERISTOME SINGLE.

SUB-DIV. I. Calyptra mitriform.

† Calyptra plicato-striate.

a. teeth four.

TETRAPHIS (38). Perennial, caulescent, cæspitose; per. teeth long rigid, with irregular longitudinal lines; areolæ hexagonal. 98.

TETRODONTIUM (39). Annual, stem none, gregarious; l. few, very minute. 99.

b. Teeth 16, equidistant.

PTYCHOMITRIUM (35). Caps. erect, regular, tapering at base, annulus large, lid conico-rostrate; teeth bifid, not hygroscopic; calyptra deeply furrowed, mitriform, subulate above, shorter than capsule; infl. monoicous; barren. fl. gemmiform, generally axillary. 89.

c. Teeth 16, in pairs.

GLYPHOMITRIUM (34). Calyptra large ventricose laciniate

below, entirely covering the capsule, contracted at the base ;
Infl. as in last ; per. teeth hygroscopic reflexed when dry. 88.

ORTHOTRICHUM (36). (partly) Perennial in round tufts ;
caps. erect, immersed or exserted, pear-shaped or elliptical,
with 8, rarely 16, coloured striæ ; peristome either single
or double, sometimes absent ; outer of 32 teeth, connected so
as to seem 8 or 16, broad and flat, inner of 8 or 16
equal cilia, or 16 alternately shorter ones ; lid short, conico-
rostellate ; calyptra large campanulate, with about eight
furrows, base somewhat torn, and mostly covered with short
hair-like processes, but not contracted. 89.

† † Calyptra smooth, not plicate.

a. Teeth 16, equidistant.

* Perennial, caulescent, cæspitose.

ENCALYPTA (partly) [29.] *vide ante. p. 2.*

SCHISTIDIUM. Caps. immersed, obovate or roundish, mouth
wide ; calyptra small, conico-mitriform, columella adhering
to the deciduous lid ; teeth large, barred, without medial
lines, often perforate. Infl. monoicous or dioicous (included
in *Grimmia*).

GRIMMIA (32). Caps. pedicillate, seta often flexuose,
ovate or oblong, rarely ventricose, sometimes striated, teeth
large lanceolate, barred, perforate, bi-trifid ; calyptra five-
lobed at base, sometimes dimidiate ; columella free. Infl.
monoicous or dioicous. ; areolæ small dense, larger at base.

RACOMITRIUM (33). Caps. oblong, erect, smooth, on a straight pedicel, teeth bi-trifid, sometimes very long, sometimes short, filiform unequal; calyptra large, with a subulate solid papillose beak, lid conico-subulate, straight; leaves with sinuous areolæ. Infl. dioicous. 86.

* * Annual or biennial, gregarious; leaves setaceous.

CAMPYLOSTELIUM (8). Caps. drooping, on a bent seta oblong, smooth; teeth long lanceolate, barred, entire at base, cleft at summit, and connected by a membrane at base; calyptra small, conico-subulate, five-cleft at base. Infl. monoicous; barren fl. gemmiform; areolæ minute, much enlarged and diaphanous at base. 36.

BRACHYODUS (9). Caps. oblong sub-striate, teeth very short truncate, partly confluent, equidistant; lid convex with a slender beak; calyptra conical, three to five-lobed at base, sub-dimidiata. Infl. monoicous gemmiform. St. very short, annual or biennial. 36.

b. Teeth 16, in pairs, plane, reflexed when dry.

SPLACHNUM (65). Caps. sub-cylindrical or ovate, on a very large spongy coloured apophysis; teeth lanceolate oblong obtuse, plane, yellowish; calyptra small, entire or lacerated at base. Infl. generally dioicous; barren. fl. capituliform, naked or with small scattered leaves. 133.

c. Peristome a conical plicate membrane.

DIPHYSCIUM (41). Caps. very large sessile, oblique ovate,

gibbous; calyptra small, entire at base, scarcely covering the conical lid. 99.

SUB-DIV. II. Calyptra dimidiate.

- a.* Calyptra inflexed at base, at first conico-mitriform, caps. clavato-pyriform; teeth 16 or 32 plane, more or less paired, with a medial line.

DISSODON (68). Caps. oval, with a long solid tapering neck, lid conico-convex, obtuse, teeth 32, united into eight bigeminate teeth, or into 16 pairs, linear-lanceolate, incurved when dry; leaves obtuse entire. Infl. monoicous or synoicous, barren fl. gemmiform. 134.

TAYLORIA (67). Caps. with a long clavate or sub-pyriform neck; teeth 16, or 32 cohering in pairs, reflexed when dry; leaves acuminate serrated. Infl. monoicous; barren fl. capituliform. 134.

- b.* Calyptra not inflexed at base.

* Teeth in eight pairs, reflexed when dry.

TETRAPLODON (66). Caps. with a solid clavate or oval apophysis wider than itself; leaves loosely reticulated, acuminate. Infl. monoicous, barren fl. gemmiform or capituliform, 3-5-leaved. 134.

ZYGODON (37) (partly). Caps. erect, pyriform, striated, apophysate. Perist. double, single, or absent; outer teeth

32 united two or four together, representing 16 or 8 plane teeth, inner of 8 or 16 cilia, alternating; calyptra small cucullate smooth oblique, lid obliquely rostrate; leaves minutely dotted. 97.

* * Teeth 16 equidistant, simple, or nearly so.

‡ Caps. pyriform or oval, erect or inclined.

ENTOSTHODON (58). Caps. erect, pyriform, symmetrical; lid plano-convex, teeth short and broad triangular; calyptra inflated below, cucullate; leaves loosely reticulated. 127.

MIELICHHOFERIA (53). Caps. pyriform, inclined or horizontal, on a slender curved seta; calyptra small, not inflated; teeth longer, linear-subulate, confluent and dilated at base. 124.

BLINDIA (13). Caps. roundish, turbinate-erect; teeth 16 lanceolate, remotely barred, entire or perforate, sometimes cleft; calyptra angular at base, afterwards cleft on one side; seta short; perennial cæspitose. 39.

SELIGERIA (10). Caps. roundish pyriform, smooth, teeth lanceolate obtuse, sometimes perforate, without medial line; calyptra small cucullate; leaves setaceous; stems annual or biennial gregarious, not cæspitose. Infl. monoicous, terminal gemmiform. 37.

BRACHYODUS (9). *See page 6.*

RHABDOWEISSIA (7) Caps. shortly oval, eight-striate, wide mouthed, teeth lanceolate or subulate, barred, without medial

line; beak slender, inclined; calyptra cucullate; leaves channelled lax; stems perennial, cæspitose. 36.

WEISSIA (6). Caps. oblong-ovate, smooth, teeth lanceolate or linear-lanceolate, free at base, without medial line, convex, sometimes perforate and bifid; leaves of close texture; stems as above. 33.

ANACALYPTA (22). Caps. oval on a long straight pedicel; teeth united at base by a membrane, plane, lanceolate, entire or perforate, no medial line; leaves succulent with lax areolæ; stem annual or biennial. 57.

‡ ‡ Caps. globose, nearly horizontal.

DISCELIUM (64). Almost stemless; caps. decurrent into the suddenly bent neck; teeth lanceolate, cleft half-way from base upwards; leaves few minute, gemmiform. 133.

CATASCOPIUM (63). Caps. smooth, shining, neck bent, and tapering into the seta, mouth somewhat oblique; teeth short truncate, irregular, barred, with a medial line; leaves numerous, nerved, of firm texture. 132.

CONOSTOMUM (62). Caps. cernuous, obscurely furrowed when dry; teeth linear-lanceolate, barred, converging and united together into a cone; perennial. 132.

* * * Teeth 16, deeply bifid, equidistant.

‡ Caps. erect, symmetrical.

DESMATODON (23). Caps. oval or oblong, sometimes almost pendulous; teeth subulate, united at base by a mem-

brane, bi-trifid; lid rostellate; leaves soft broad, papillose at back. 58.

‡ ‡ Caps. sub-erect, rather unequal.

CYNODONTIUM (15). Caps. ovate-oblong, or obliquely sub-pyriform, smooth, teeth lanceolate, connivent, dilated at base, entire or cleft to base, sometimes barred, deep red; lid rostrate. 39.

ARCTOA (14). Caps. oval or almost turbinate, striate, contracted below the wide mouth when dry; teeth lanceolate subulate, cleft, or perforate and entire, bars not prominent; lid large, obliquely rostrate. 39.

‡ ‡ ‡ Caps. cernuous or inclined, unequal.

DICRANUM (16). Caps. mostly cernuous, smooth or striated, regular, gibbous or curved, with a tapering apophysis, or sometimes strumose, teeth equidistant, confluent at base, incurved, lanceolate, cleft half way into unequal portions, barred, occasionally perforate, with a medial line; lid rostrate oblique; leaves of close texture, nerved and more or less secund; areolation linear at the base. 40.

[DICRANELLA. Plant smaller than in *Dicranum*, and less robust, areolation rectangular at the base, in other respects similar.]

LEUCOBRYUM (17) Caps., lid and peristome as in *Dicranum*. Leaves spongy, composed of a double layer of loose cellular tissue, white or pale glaucous green, sub-sekund, nerve indistinct. 49.

FISSIDENS (71). Caps. cernuous or erect, more or less

truncate, teeth long and tapering from a lanceolate base, cleft half-way into unequal segments, geniculate, barred; fruit in some species *cladocarpous*, leaves vertically distichous. 135.

CERATODON (18). Caps. sub-cylindrical unequal, with a short ventricose or strumose neck; teeth deeply cleft, or of two equal subulate portions connected below by prominent trabeculæ, of two differently coloured laminæ, the outer red, the inner and broader yellow. 49.

‡ ‡ ‡ ‡ Capsule on an arcuate seta.

CAMPYLOPUS (20). Caps. oval or oblong, regular or gibbous on upper side, tapering at base, striated, lid conico-subulate or rostrate, teeth deeply bifid; calyptra large, fringed at base; leaves with a broad nerve. 50.

DICRANODONTIUM (19). Caps. elliptical smooth, teeth linear-lanceolate, cleft nearly to base into unequal portions, obliquely striate; calyptra not fringed at base. 49.

**** Teeth 32, in pairs, narrow or filiform.

DIDYMODON (25). Caps. erect. sub-cylindrical, teeth 32 (16 Wilson) linear-lanceolate, *not obviously united by a basilar membrane*, tender and fugacious, entire or perforate. 58.

TRICHOSTOMUM (26). Caps. erect, sub-cylindrical or oval, smooth, teeth 32 in unequal pairs (often so united as to appear 16 simple or perforate teeth), connected by a narrow basilar membrane, persistent. 60.

DISTICHIMUM (24). Caps. as in last ; teeth 32 (16 Wilson) not confluent at base, linear-lanceolate, entire, perforate or cleft, with a medial line ; leaves *distichous*, setaceous from a sheathing base. 58.

TORTULA (27). Caps. mostly erect ovate-oblong, smooth, teeth 32 very long filiform *twisted*, articulate papillose, outer cellules yellow, inner red, often united into a membrane at base ; leaves not distichous. 63.

CINCLIDOTUS (28). Caps. immersed ovate or oval, smooth, teeth 32 perfect or rudimentary, adhering at top to columella, contorted, anastomising at base. 74.

* * * * * Teeth 32 or 64 equidistant, short, obtuse, connected at apex by a tympanum, formed of dilated apex of columella ; nerve of leaf covered with vertical lamellæ.

† Caps. not angular.

ATRICHUM (42). Caps. cylindrical, erect or cernuous, calyptra narrow, almost naked, spinulose at apex only ; teeth 32 ligulate rigid, united at base by a narrow membrane, leaves not sheathing, lamellæ few, nerve narrow. Columella round. 100.

OLIGOTRICHUM (43). Caps. sub-cylindrical, erect, gibbous, peristome as above ; calyptra slightly setose at apex ; leaves sheathing at base, more lamellated, nerve wider ; columella winged. 101.

POGONATUM (44) Caps. ovate or urceolate, regular,

erect or inclined, calyptra very hairy, peristome as above ;
leaves rigid, densely lammellated, nerve thick and broad.

101.

† † Caps. angular ; teeth 64, rarely 32.

POLYTRICHUM (46). Caps. with a discoid apophysis,
erect, when ripe horizontal ; teeth 64 (in some species 32).
Calyptra very hairy ; leaves as in last. 102.

III. PERISTOME DOUBLE.

a. Caps. plano-convex.

BUXBAUMIA (40). Caps. very large, apophysate, oblique ;
outer teeth irregular reddish, opaque, inner a pale conical
plicate membrane, calyptra small, only covering the conical
obtuse lid, fugacious, entire or laterally cleft. 99.

b. Caps. cylindrical.

ENCALYPTA (partly) (29). *vide ante p. 2.*

c. Caps. oblong.

ORTHOTRICHUM (chiefly) (36). *vide ante p. 5.*

d. Caps. obovate, unequal, mouth oblique.

FUNARIA (57). Caps. obliquely pyriform ventricose, sub-
erect or cernuous ; outer perist. 16, obliquely lanceolate,
teeth trabeculate, longitudinally striate, and connected at

apex by a small circular disc, very hygometric, inner a membrane divided into 16 lanceolate processes opposite to outer; calyptra inflated below. 126.

AMBLYODON (56). Caps. clavate or sub-pyriform, incurved sub-erect; perist. outer, 16 short, erect, obtuse teeth; inner (longer) a membrane divided into 16 carinate processes, without cilia. Calyptra inflexed at base; leaves loosely reticulated. 125.

MEESIA (55). Caps. obovate or clavate, curved, gibbous, sub-erect, neck long, tapering into seta; perist. outer 16 short, obtuse teeth, somewhat united to inner, entire or split along medial line; inner same as last; leaves of close firm texture, strongly nerved. 125.

e. Capsule striated.

ZYGODON (37). *vide ante p. 7.*

AULACOMNION (47). Caps. oval or oblong apophysate, cernuous on a flexuose seta; perist. outer 16 teeth, lanceolate-subulate, barred; inner a thin membrane divided half way into 16 carinate lacunose processes, with cilia two or three together. Branches bearing terminal globular masses (*pseudopodia*) of rudimentary leaves or gemmæ. 105.

BARTRAMIA (61). Caps. globose, rather large, erect or cernuous; rarely pendulous, not apophysate; perist. double, single, or wanting; outer 16 equidistant lanceolate teeth; inner a membrane divided into 16 carinate lanceolate pro-

cesses, splitting along the middle, alternating, sometimes with cilia; calyptra small dimidiate; leaves papillose or muriculate. 128.

f. Caps. smooth, mostly pyriform.

PALUDELLA (54). Caps. oval-oblong, slightly curved, cernuous or sub-erect, lid mammillate; peristome as in *Bryum*, inner without cilia; leaves squarrose. 125.

TIMMIA (46). Caps. obovate, cernuous; perist. outer 16 teeth, inner, a membrane divided half way into 64 filiform processes; variously united at the summits; leaves sheathing, rigid, lanceolate; barren fl. axillary, gemmiform. Infl. monoicous. 104.

ORTHODONTIUM (48). Caps. clavato-pyriform, inclined; perist. outer 16 teeth inflexed when dry; inner deeply divided into 16 narrow carinate processes; leaves very tender, narrow, not sheathing; barren fl. axillary, gemmiform, aggregate. Infl. monoicous. 106.

LEPTOBRYUM (49). Caps. and perist. as in *Bryum*; stems of annual growth without innovations; leaves almost setaceous. Infl. synoicous. 106.

BRYUM (50). Caps. pyriform cernuous or inclined; perist. outer 16 teeth, inner a membrane divided half way into 16 carinate segments with or without cilia; stems perennial, with innovations below the terminal flower; barren fl. gemmiform or naked. 106.

MNIUM (51). Caps. oblong pendulous; perist. as in *Bryum*; stems with innovations from the lower part; leaves large; barren fl. discoid; infl. dioicous or synoicous. 121.

CINCLIDIUM (52). Caps., leaves and stem as in *Mnium*, outer teeth 16 short, inner cupuliform. 124.

SECT. I. *b*. CLADOCARPI.

Fruit terminal on very short lateral branches.

DIV. I. *Peristome none.*

SPHAGNUM (2). *vide ante p. 1.*

DIV. II. *Peristome single.*

MIRLICHHOFERIA (53). *vide ante p. 8.*

FISSIDENS (71) partly. *vide ante p. 10.*

CINCLIDOTUS (28) occasionally. *vide ante p. 12.*

SECT. II. PLEUROCARPI.

Fructification truly lateral.

DIV. I. *Calyptra dimidiate.*

SUB-DIV. I. *Peristome none.*

ANÆCTANGIUM (72). Caps. oval or obovate, erect, with

a short slightly inflated neck ; lid conico-convex with a long slender oblique beak ; stems erect, cæspitose. 139.

SUB-DIV. II. *Perist. single, of 16 teeth.*

HABRODON (77). Caps. oval-oblong erect, calyptra large, lid conical ; st. sub-erect, l. spreading, nerveless, soft and opaque ; per. teeth simple, linear, inserted below mouth of caps., remotely articulate : dioicous. 141.

SUB-DIV. III. *Peristome almost single.*

a. inner peristome very short and indistinct.

LEUCODON (73). Caps. oval erect, on a short pedicel ; calyptra large ; outer teeth 16 bifid or perforate, not hygroscopic ; surculi erect simple ; leaves plicato-striate, nerveless. 139.

PTEROGONIUM (78). Caps. oblong erect, on a long seta ; calyptra small ; outer teeth 16 simple, hygroscopic ; surculi dendroid, with fasciculate curved branches ; leaves not striate. 141.

LEPTODON (75). Caps. oval on a very short seta ; calyptra and vaginula hairy ; teeth 16 linear-lanceolate, entire or fissile, not hygroscopic ; surculi pinnate ; branches curled when dry ; leaves very obtuse. 140.

SUB-DIV. IV. *Peristome double.*

a. Inner perist. of 16 cilia.

ANTITRICHIA (74). Caps. oval, regular, on a short curved

*

seta ; calyptra rather large smooth ; inner peristome of 16 filiform processes ; outer 16 tapering teeth with a medial line ; surculi procumbent, pinnate. 140.

ANOMODON (76). Caps. oval oblong erect, on a long seta ; lid obliquely rostrate ; calyptra small ; perist. as in last : stems erect with erect branches, cæspitose ; leaves of close texture acuminate, nerved. 140.

CYLINDROTHECIUM (81). Caps. cylindrical, regular, erect ; outer teeth 16 inserted below mouth of capsule ; inner of 16 narrow carinate processes ; lid shortly rostellate ; stem procumbent pinnate ; leaves ovate concave, faintly two-nerved at base. 142.

NECKERA (85). Caps. oval-oblong, immersed or pedicellate ; lid obliquely rostrate, outer teeth 16 linear-subulate, long, connivent into a cone ; inner as above ; stems pinnate ; leaves complanate. St. sub-erect from a creeping rhizome. 182.

b. Inner peristome a membrane divided half way into 16 carinate segments with or without cilia.

* Caps. symmetrical, erect or sub-erect.

OMALIA (84). Leaves complanate smooth, falciform, obtuse, serrulate at apex, not undulate (allied to *Neckera*).

LESKIA (82). Perist. outer of 16 narrow barred teeth, inner without (rarely with) intermediate cilia, leaves mostly ovate, nerved or nerveless, entire, spreading every way. 143.

CLIMACIUM (80). Caps. oblong, erect; lid adhering to the persistent columella; outer teeth linear-lanceolate, confluent at base, trabeculate, with a medial line; inner alternate and longer than outer, lacunose without cilia, the two segments of each process united only at apex; stem dendroid, erect. 142.

ISOTHECIUM (79). Caps. oval, sub-erect, symmetrical; lid not adhering to columella; outer teeth 16 barred, with a medial line; inner with intermediate cilia, two or three together; stem dendroid drooping; branches fasciculate or pinnate. 142.

* * Caps. unequal, cernuous.

HYPNUM (83). Caps. cernuous, sometimes nearly erect, rarely pendulous, ovate or oblong, more or less curved, and sometimes slightly apophysate; outer teeth 16 equidistant lanceolate acuminate, barred, inner alternating, often perforate, with intermediate cilia, one, two or three together. 145.

c. Inner perist. a reticulated cone.

DICHELYMA (90). Peristome like *Fontinalis*; caps. scarcely exerted; calyptra long twisted; leaves nerved. 185.

Div. II. *Calyptra mitriform.*

HOOKERIA (86). Caps. ovate or elliptical, cernuous, lid with a straight beak; perist. as in *Leskia*; calyptra not fringed at base; leaves complanate, loosely reticulated. 184.

DALTONIA (87). Caps. erect oval-oblong, obscurely apophysate; calyptra fringed at base; leaves spreading every way; inner perist. divided nearly to base. 184.

CRYPHÆA (88). Caps. oval-oblong or roundish, subsessile, immersed; calyptra conical small, not fringed; peristome as in *Neckera*. 184.

FONTINALIS (89). Caps. ovate or oval, immersed, subsessile; calyptra conical, crenate or slightly lacerate at base, small; outer teeth 16 linear-lanceolate, very long, cohering at apex in pairs, barred, twisted; inner a plicate cone, with 16 angles, consisting of filiform cilia, united by crossbars. 185.

DIVISION I. ACROCARPI. (Genera 1—72.)

1. ANDREAEA. Ehr.

a. L. nerveless.

1. *A. PETROPHILA*. Ehr. (*A. rupestris* Hedw.) St. $\frac{1}{4}$ inch loosely tufted, with fastigiata branches; l. erect imbricate, with a sheathing base, generally secund, ovate or ovate-subulate, tapering above, and rather obtuse; papillose, areolæ dotted; per. l. larger; all reddish brown.

Sub-alpine rocks, frequent.

v. vi.

2. *A. ALPESTRIS*. Schimp. St. taller, densely tufted, with slender branches; l. crowded, very small, patent on all sides when moist, ovate, or ovate-lanceolate, obtuse, areolæ quadrate at margin; per. l. shorter and more obtuse.

Damp alpine rocks. Glen Callater; Perthshire.

3. *A. OBOVATA*. Thed. "Densely tufted, blackish brown, tall and robust; l. somewhat like those of *alpina*, from an imbricate base ovate-panduriform, gradually lanceolate, nearly smooth, glossy, quite entire at margin, areolæ much laxer." Dr. Braithwaite, Jour. of Bot., viii. p. 95.

Glen Callater.

4. *A. ALPINA*. Turner. St. tall 1-3in. densely tufted, with long fastigiata branches; l. imbricate, spreading, reddish or purplish brown, obovate, almost panduriform concave; per. l. larger elliptic sheathing, acute, areolæ dot-like.

Alpine rocks.

v. vi.

b. L. nerved.

5. *A. RUPESTRIS*. Turn. (*A. Rothii* W. & M.) St. scarcely $\frac{1}{2}$ inch, loosely tufted; l. imbricate, falcato-secund, longly subulate from an ovate base, thickly nerved to apex, rigid almost black; per. l. larger convolute.

Alpine and sub-alpine rocks.

v. VI.

6. *A. GRIMSULANA*. Bruch. Much more robust than the last, rufous black; l. lanceolate-acute broader, more solid, falcato-secund; per. l. broadly ovate not acuminate.

Brandsley Falls, Yorkshire, J. G. Baker 1858. Herb. Kew.—Ingleborough.

7. *A. CRASSINERVIA*. Bruch. Tufts depressed deep black, st. prostrate ascending, fragile; l. shining falcato-secund, subulate from an oblong base; nerve thick excurrent into the round papillose *subula*, margin entire, cells quadrate; per. l. erecto-patent convolute nerveless.

Alpine rocks; Hebden Bridge 1865; Scotland; Snowdon 1853.

8. *A. FALCATA*. Schimp. Smaller than last, very fragile black; l. falcato-secund, opaque, from a dilated obovate base abruptly lanceolate-subulate, nerve flattened, ending at or below the apex, which is erose at margin.

Snowdon 1865 and Cader Idris (Schimper); Perthshire (McKinlay).

9. *A. NIVALIS*. Hooker. St. longer tufted slender, l. reddish brown, falcato-secund, lanceolate-subulate, acute, gradually tapering and nerved to apex.

Alpine rocks at limit of perpetual snow; Ben Nevis, &c. Summer.

2. SPHAGNUM. Dill.

[Dr. Braithwaite is at present publishing in the "Monthly Microscopical Journal" a Monograph of this genus, but as he has only got some three or four species described, I regret that I cannot avail myself of his valuable researches, and can only publish such species as are known to me. His division of species is as follows :—

- A. 1 *S. cymbifolium* Ehr.
 B. 2 *S. tenellum* Ehr. 3 *S. rubellum* Wils. 4 *S. neglectum* Angst.
 5 *S. subsecundum* N. von E.
 C. 6 *S. molle* Sulot. 7 *S. rigidum*. N. H. & S.
 D. 8 *S. squarrosum* Pers. 9 *S. teres* Angst.
 10 *S. acutifolium* Ehr. 11 *S. strictum* Lindb.
 12 *S. fimbriatum* Wils. 13 *S. Lindbergii* Schp.
 14 *S. intermedium* Hoff. 15 *S. cuspidatum* Ehr.]

SECT. I. *Leaves obtuse roundish or elliptical.*

a. Utricles of branches lined with spiral fibres.

10. *S. CYMBIFOLIUM*. Ehr. St. 3-12 inches robust tufted solid, covered with a cortical web. Stem l. lingulate-spathulate with a rounded apex; br. l. imbricate broadly ovate concave cucullate and muriculate at apex; caps. large globose on a short seta: dioicous.

Bogs, common.

VI. VII.

b. Branch cells without spiral fibres.

11. *S. COMPACTUM*. Brid. St. erect, 2-4in. dichotomous, densely cæspitose; branches crowded short, almost erect, br. l. ovate-subulate, obtuse, concave, slightly cucullate and smooth at apex, præmorse with 3-4 teeth; st. l. small elliptical: dioicous.

Wet moors.

VII. VIII.

12. *S. TENELLUM*. Ehr. (*S. molluscum*. Bruch.) Stems rarely 2in. slender, soft, fragile, branches similar; l. erecto-

patent reflexed, ovate-oblong, with a broadish border, very concave on the branches, pale yellowish white; utricles of the branches between the leaves recurved at points; caps. small orange-red, on a long pedicel: dioicous.

Wet hollows on peat bogs.

v. vi.

13. *S. RUBELLUM*. Wils. St. 2-5in. slender loosely tufted with slender deflexed sometimes curved branches; st. l. large ovate-oblong concave obtuse sub-secund with a minutely toothed apex; br. l. ovate or oblong-ovate, margins inflexed, capsule almost included: dioicous.

Peat mosses. fr. rare.

vi. vii.

SECT. II. *Leaves acuminate, ovate, or ovate-lanceolate.*

a. Leaves erecto-patent.

14. *S. ACUTIFOLIUM*. Ehr. St. 3-6in. with slender attenuated branches; stem. l. small ovate acute erect; branch l. ovate-lanceolate slightly præmorse with a 3-4 toothed apex, erecto-patent, often with a pinkish tinge, sometimes almost white; pedicel long; monoicous.

Bogs and marshes.

vi. vii.

15. *S. FIMBRIATUM*. Wils. St. slender 6-12in. loosely cæspitose, with slender deflexed branches; st. l. obovate broad very obtuse, and fringed at the summit; br. l. ovate-lanceolate acute erecto-patent, whitish, never reddish; p. l. very large obtuse, cucullate; caps. on a short pedicel, nearly enclosed in the per. leaves: monoicous.

Bogs and marshes.

vi. vii.

16. *S. CUSPIDATUM*. Dill. Ehr. St. 3-12in., flaccid with distant deflexed attenuated branches, the younger ones

cuspidate ; st. l. ovate acute, br. l. lanceolate acute præmorse slightly fringed and bordered ; per. l. broadly ovate, acute, ped. short : dioicous.

Wet bogs.

VI. VII.

17. *S. RECURVUM*. P. Beauv. “ Distinguished from the last by its branch leaves, recurved when dry, elliptical, not attenuated towards the apex ; usually growing out of the water, whilst *S. cuspidatum* is almost submerged.”—G. E. Hunt.

Common in bogs.

var. δ . *laricinum*. Spruce. l. loosely imbricated, slightly undulate when dry, areolæ very minute.

18. *S. CONTORTUM*. Schultz. St. 3-6in. rigid blackish, “ with a single layer of cortical cellules ”, and with crowded generally contorted attenuated branches ; leaves ovate-lanceolate, acute concave, frequently 3-toothed at the apex, the cellules bordered with a row of small pores at the back of the leaf : dioicous.

Bogs and ditches.

VII.

var. γ . *obesum* ; stem more robust, branches thicker and longer, leaves larger.

19. *S. SUBSECUNDUM*. Nees & H. Allied to *contortum*, but more lax in habit, stems more slender, with shorter branches and with the branch leaves generally more or less secund.

20. *S. CURVIFOLIUM*. Wils. MS. Allied to the last ; stem with a cortical layer of two or three rows of cellules, leaves without marginal pores, entire, acute.

b. Leaves squarrose.

21. *S. squarrosus*. Pers. St. 4-12in. rigid, often forked, with long deflexed attenuated branches; l. ovate-acuminate acute, recurved; caps. large on a longish pedicel.
Bogs. VI. VII.

3. *ARCHIDIUM*. BRIDEL.

22. *A. phascoides* Brid. St. $\frac{1}{4}$ in., second year branched sometimes 1in.; fertile branches short, barren ones longer, slender, and with more distant leaves; l. lanceolate pointed, upper ones longest, entire, nerved nearly to or beyond apex; p. l. ovate-lanceolate, toothed near the apex, nerve excurrent.
Moist clayey or chalky banks, &c. III. IV.

4. *PHASCUM*. LINN.

SECT. I. (EPHEMERUM.) Almost stemless, capsule immersed, barren fl. gemmiform at base of, or near to, fertile fl.

a. Growing from a conferva-like thallus, columella fugacious.

23. *P. serratum*. Schreb. "Stemless, leaves lanceolate, nerveless (?) serrated, connivent; capsule large roundish-ovate, sub-sessile." (Wils.)

Sandy banks or fallows.

Spring or Autumn.

var. β . *angustifolium*. "Leaves narrower, linear-lanceolate, obscurely toothed; caps. smaller."

24. *P. coherens*. Hed. Stemless, very minute; l. ovate-lanceolate, keeled, erect, nerved to apex, and serrated about half-way from summit; capsule immersed sub-sessile.
On the ground. Winter.

25. *P. TENERUM*. Bruch. Inconspicuous ; l. broad ovate-lanceolate, slightly denticulate at apex, very flaccid ; caps. small, pale yellow, calyptra conical. Bry. Europ. vol. I.

On the mud of dried-up pools.

Winter.

Weald of Sussex, Mr. Mitten.

26. *P. SESSILE*. B. & S. Very minute, almost stemless ; l. lanceolate-subulate, denticulate more than two-thirds from summit, rigid, with an almost excurrent nerve ; caps. sessile small, rounded, brownish : monoicous.

Clay and chalky heaths, rare.

Autumn, Winter.

var. β . *stenophyllum*. l. shorter, linear-lanceolate, slightly serrulate.

27. *P. RECURVIFOLIUM*. Dicks. Minute, st. almost none ; l. lingulate, rarely linear-lanceolate, erect, frequently recurved, denticulate at the apex, with a strong generally excurrent nerve ; caps. roundish-ovate, nearly sessile.

Heaths and fallows.

Autumn, Winter.

b. Mature plants without confervoid shoots.

28. *P. MUTICUM*. Schreb. Minute, almost stemless ; l. convolute, broadly ovate, tapering pointed, concave, toothed above, nerved nearly to the apex ; caps. round, reddish, erect, sub-sessile.

Moist banks and fallows.

Autumn, Spring.

var. β . *minus*, leaves entire.

29. *P. TRIQUETRUM*. Spruce. Almost stemless ; l. in three rows, lowest minute ovate nerveless, three uppermost (perichæatial) cucullate, pointed, obovate, keeled, margins

reflexed, denticulate above, nerve excurrent; caps spherical, horizontal or drooping, pedicel long, slender, suddenly bent near its union with the capsule.

Cliffs, Sussex coast.

III.

SECT. II. Barren fl. axillary, antheridia naked.

30. *P. FLOERKEANUM*. Web. & M. Almost stemless, very minute; leaves broadly ovate, tapering to a point, lower ones small nerveless, upper ones larger nerve excurrent, margins reflexed; caps. ovate-spherical, shortly beaked, immersed with sub-conical curved-pointed calyptra.

Clay or chalky fields, rare.

IX.—XI.

31. *P. RECTUM*. Sm. Stem short; l. closely crowded, erecto-patent, elliptic-lanceolate pointed with an excurrent nerve, often reddish, margins recurved; caps. exserted, roundish ovoid, on a longish straight pedicel.

Fields and banks near the coast, frequent.

Winter.

32. *P. CURVICOLLUM*. Hedw. St. short reddish; l. erecto-patent, lanceolate, tapering, pointed with an excurrent nerve, entire, margin reflexed; caps. roundish, blunt-pointed, cernuous, exserted, on a longish curved pedicel; cal. dimidiate.

Moist banks and fields.

SECT. III. Barren fl. axillary, gemmiform.

33. *P. CUSPIDATUM*. Schreb. From $\frac{1}{8}$ to $\frac{1}{4}$ in. high, st. simple or branched; l. ovate-lanceolate, cuspidate, erect concave, keeled, with the nerve prominently excurrent; caps. roundish, immersed on a short pedicel.

Moist banks, hedges, and fields, common.

III.

- var. β . leaves longer, lanceolate ; caps. smaller.
 γ . *Schreberianum*. St. elongated, branches dichotomous ; leaves distant spreading.
 δ . *piliferum*. Pedicel curved ; leaves with long white filiform points.
 ϵ . *curvisetum*. Caps. laterally exserted, on a longish curved pedicel.
 ζ . *elatum*. Upper leaves lanceolate, cuspidate caps. sub-pendulous, similar to the last.

34. P. BRYOIDES. Dicks. St. $\frac{1}{8}$ - $\frac{1}{4}$ in. simple or branched ; l. lower, ovate pointed, upper elliptic ovate concave erect, margin reflexed, pointed with the excurrent nerve ; caps. elliptical, with an oblique blunt point, brown, exserted. Barren fl. sometimes terminal on a short branch.

Banks and fields, rare.

Spring.

- var. β . leaves piliferous.
 γ . *curvisetum*. Pedicel curved, longer.
 δ . caps. roundish, pedicel very short.
 ϵ . smaller, with piliferous leaves. (*P. pusillum* Schleich.)
 ζ . *Thornhillii*. "l. spreading sub-reflexed spathulato-lanceolate, margin plane, nerve slightly excurrent ; caps. narrowly elliptical, rostrate, pedicel elongated."

SECT. IV. Barren fl. naked in the axil of a perichæatial leaf.

35. P. PATENS. Hedw. St. $\frac{1}{2}$ in. l. more or less spreading, sometimes recurved, obovate-lanceolate, serrulate near the apex, concave, nerve ceasing below apex ; caps. immersed spherical pointed, pale brown, sub-sessile.

Clay banks and fields.

Autumn.

SECT. V. Stems growing by innovations, caps. therefore often apparently lateral, leaves narrow, almost setaceous.

36. *P. NITIDUM*. Hedw. L. generally erect, linear-lanceolate, keeled, sub-denticulate near apex, nerved (thin) nearly to summit; caps. elliptical, with a short oblique point, sometimes pendulous, on a short pedicel.

Moist banks, &c.

Autumn, Spring.

37. *P. SUBULATUM*. L. St. $\frac{1}{8}$ in. l. lanceolate, sharply tapering from a broadish base, not keeled, with a broad nerve ceasing near the apex; per. l. almost setaceous; caps. roundish-ovoid pale brown, immersed, on a very short pedicel.

Banks and fields, common.

Spring.

38. *P. ALTERNIFOLIUM*. Bruch. & S. St. sometimes with innovations, $\frac{1}{2}$ in. long, or more; st. l. lanceolate acuminate from a broad base; per. l. subulate-setaceous, with a thick nerve, excurrent and forming nearly the upper half of the leaf; caps. ovoid immersed, brownish, with an oblique point.

Banks and fallow ground.

Spring.

SECT. VI. Stems perennial branched; leaves linear-lanceolate firm strongly nerved; caps. with traces of a dehiscent lid; barren fl. gemmiform, terminal on a branch or sometimes axillary.

39. *P. CRISPUM*. Hedw. St. $\frac{1}{4}$ in. cæspitose; with fastigiate branches; l. lanceolate-subulate, grooved erect or spreading, margins involute, nerve excurrent; per. l. very

long, concave at base, sometimes almost secund; caps. roundish, immersed, pale brown, with an oblique beak.

Banks and fields, chiefly limestone. Spring.

40. *P. MULTICAPSULARE*. Smith. St. $\frac{1}{2}$ in., loosely tufted; leaves distant, alternate, spreading, lanceolate, somewhat obtuse, with an excurrent nerve and plane margin; per. l. longer and broader, erect, incurved; capsule ovoid tapering to an oblique short beak, on a longish pedicel, sometimes two together.

Fields, &c., rare. III.

var. β . *Mittenii*. Stems fragile, l. shorter, acute, recurved; p. l. smaller; caps. on a longer pedicel.

41. *P. ROSTELLATUM*. Brid. St. $\frac{1}{8}$ - $\frac{1}{4}$ in, tufted; l. linear-lanceolate, spreading obtuse, nerve excurrent, margin plane; caps. olive-brown ovoid elliptical with a straight beak; pedicel equalling caps. in length: a smaller plant than the last.

Dried beds of pools, &c. Autumn, Spring.

5. GYMNOSTOMUM. HEDW.

SECT. I. Infl. dioicous, margin of l. reflexed or plane, not incurved.

α . St. short, per. l. sheathing; caps. elliptic oblong, narrow at mouth, lid conical, annulus large persistent.

42. *G. TENUE*. Schrad. St. tufted; l. lingulate, sub-erect, upper ones longest entire, nerved nearly to apex; caps. pale brown, lid obtuse.

Sandstone rocks and walls. VII. VIII.

- b. St. taller, branched; per. l. slightly sheathing, caps. oval or ovoid, truncate; lid with a long beak, annulus narrow, persistent.

43. *G. RUPESTRE*. Schw. St. 1-2in. densely tufted, slender, dichotomous; l. linear-lanceolate, spreading obtuse keeled, nerved nearly to apex; capsule erect oval, lid flattish, suddenly rising to a longish scarcely bent beak.

Wet alpine rocks.

Autumn.

var. β . *ramosissimum*. densely tufted, leaves shorter, capsule smaller on a shorter pedicel.

γ . *stelligerum*. loosely tufted, l. fasciculate and stellato-patent at the ends of the branches, linear-lanceolate acute.

δ . *compactum*. leaves fascicled, longer and more obtuse.

44. *G. CURVIROSTRUM*. Hedw. St. $\frac{1}{2}$ -1in. cæspitose branches fastigiate; l. linear-lanceolate, spreading keeled, margins recurved, nerved nearly to apex; caps. broadly ovoid, lid adhering to columella, conical flattened, with a long suddenly bent beak.

Moist sub-alpine rocks.

Autumn.

var. β . *pomiforme*. leaves narrow, caps. more spherical.

γ . *microcarpon*. l. broader, erecto-patent, caps. smaller, roundish-obovate.

δ . *pallidisetum*. st. long slender, l. fascicled, caps. small obovate, with a shorter pedicel and beak.

SECT. II. Infl. monoicous; margins of l. incurved or plane, not reflexed.

a. Caps. contracted at mouth; sporangium adherent to columella forming a closed sac.

45. *G. SQUARROSUM*. Wils. St. $\frac{1}{4}$ in. loosely tufted, l. linear-lanceolate, squarrose, distant, blunt, nerve running out into a mucro; caps. elliptical, sometimes oblique and unequal; lid with a blunt beak.

Clay fields and banks.

Autumn, Spring.

46. *G. MICROSTOMUM*. Hedw. St. $\frac{1}{8}$ to $\frac{1}{4}$ in. densely tufted; l. linear-lanceolate, acute, upper ones longest, nerve excurrent; capsule elliptical, sometimes oblique and gibbous, olive-brown, much contracted, lid with a longish curved beak.

Fields, &c.

Spring.

var. β . *obliquum*. caps oblong, oblique, lid sub-rostrate.

γ . *brevirostre*. caps. oblong symmetrical, lid short conical.

δ . *brachycarpum*. caps. roundish, gibbous.

ϵ . *elatum*. innovations overtopping fruit, caps. roundish small, lid sub-rostrate.

b. Caps. scarcely contracted; sporangium not adherent.

47. *G. TORTILE*. Schw. St. $\frac{1}{8}$ - $\frac{1}{4}$ in. densely tufted with fastigate branches; l. oblong lanceolate, spreading or sub-erect curved, obtuse, pointed with the excurrent nerve; caps. elliptical, with a purple mouth and an inclined beaked lid.

Limestone rocks.

Spring.

var. β . *subcylindricum*. l. linear-lanceolate, caps. oblong.

6. WEISSIA. HEDW.

a. Monoicous.

48. *W. CONTROVERSA*. Hedw. St. $\frac{1}{8}$ - $\frac{1}{4}$ in. branched; l. lower lanceolate, upper linear-lanceolate, margin incurved,

with a slightly excurrent nerve ; caps. oval, erect, lid conical, beak half-length of capsule ; barren fl. gemmiform.

Frequent.

Spring.

var. β . *stenocarpa*. caps. sub-cylindrical narrow.

γ . *densifolia*. densely tufted ; l. crowded narrower.

δ . *amblyodon*. teeth of peristome variable, short and truncate, acute or cleft at apex. yellowish.

ϵ . *gymnostomoides*. teeth of peristome almost wanting.

49. W. MUCRONATA. B. & S. Smaller than last ; l. linear-lanceolate, with plane margins, the nerve slightly excurrent and forming a mucro ; caps. oblong, scarcely striated ; teeth of per. short truncate, perforated, lid with a longish beak ; barren fl. gemmiform.

Fallow (clay) ground.

III. IV.

50. W. CIRRHATA. Hedw. St. $\frac{1}{2}$ -lin. loosely tufted ; l. linear-lanceolate, spreading entire concave, keeled, margin reflexed, not nerved to apex ; per. l. slightly sheathing, shorter ; caps. oval-oblong ; lid with a long beak ; monoicous.

Posts and rocks in mountainous districts.

51. W. CRISPULA. Hedw. St. shorter than last, branched ; l. spreading, frequently falcato-secund, lanceolate-subulate, base wide, concave ; margins plane, not nerved to apex ; caps. oval or oblong without annulus ; lid beaked. Barren fl. gemmiform.

Mountainous rocks.

VI. VII.

SECT. II. Infl. dioicous ; terminal.

52. W. VERTICILLATA. Brid. St. $\frac{1}{4}$ - $\frac{3}{4}$ in., branches fas-

tigiate; l. linear-lanceolate, rigid, denticulate at base, sub-erect, margin plane, with a strong slightly excurrent nerve; teeth of per. incurved, not barred, sometimes perforated; caps. erect, reddish; lid beaked.

Dripping limestone rocks.

VI. VII.

53. *W. CALCAREA*. Müll. St. short, simple; densely tufted, radiculose at base; l. lower small ferruginous, erecto-patent, narrowly lanceolate; upper larger deep green lineal-lanceolate, rather obtuse concave, stoutly nerved nearly to apex, margin minutely crenulate; per. l. lanceolate concave acute; caps. oblong sub-cylindric short-necked erect, on a pale yellow seta, lid conical subulate.

var. δ . *brevifolium*. Schpr. Slender branched; l. lower very minute distant, upper crowded ovate-lanceolate, recurved above; caps. oval.

Damp rocks and walls. Blackhall, nr. Banchory, Dee side. Mr. Sim. var. δ . only and barren. [Dr. Braithwaite.]

54. *W. COMMUTATA*. Mitt. "L. from a sub-oblong base lanceolate, narrowed, keeled with the nerve, which vanishes below apex, cells nearly all elongated and pellucid; per. l. similar"; caps. turbinate, lid with a very oblique longish beak.

Alpine rocks, Nant-y-Fydd, Wrexham (Mr. Bowman.)

55. *W. TRUNCICOLA*. De Not. In large dense bright green tufts; st. 1-2in. dichotomous, reddish, radiculose below; l. erect when moist and often secund on the young shoots, rather soft, papillose at back, from a narrowly lanceolate base gradually subulate channelled, thinly nerved nearly to apex, margin not revolute, sharply denticulate above and

on the back of the nerve; strongly cirrhate and twisted when dry; basal cells large cylindraceo-vesicular, the rest small quadrate or sub-hexagonal, filled with chlorophyll. [Dr. Braithwaite, Jour. Bot., ix., 290.]

Base of an oak trunk in Sutton Park, Birmingham. J. Bagnall, 27th Aug., 1870.

7. RHABDOWEISSIA. BRUCH. & S.

56. *R. FUGAX*. B. & S. St. $\frac{1}{4}$ - $\frac{1}{2}$ in. tufted; l. linear-lanceolate, acute, toothed near apex, margins plane; caps. ovate, somewhat striated; teeth of per. subulate, fugacious; lid with an oblique beak longer than capsule.

Sub-alpine rocks, in crevices.

VI. VII.

57. *R. DENTICULATA*. B. & S. St. longer than last, loosely tufted; l. lingulate or linear-lanceolate, strongly toothed half-way from apex; caps. more distinctly striated when dry, teeth of per. lanceolate, persistent.

Alpine and sub-alpine rocks.

8. CAMPYLOSTELIUM. BRUCH. & S.

58. *C. SAXICOLA*. B. & S. Minute; l. elongate, linear-lanceolate, crowded entire, twisted, nerved nearly to summit; caps. elliptical drooping, on a geniculate pedicel, annulus double, calyptra 5-cleft. at base.

Sandstone rocks, rare.

XI.

9. BRACHYODUS. NEES. & H.

59. *B. TRICHODES*. N. & H. Very minute; l. lanceolate-subulate, almost setaceous; erect, with an excurrent nerve

forming half the leaf; caps. erect, furrowed; per. very short, annulus large, lid flattish with a long beak.

Sub-alpine sandstone rocks.

Spring.

10. SELIGERIA. BRUCH & S.

60. *S. PUSILLA*. Bruch. & S. Minute, $\frac{1}{8}$ in. stems loosely tufted, simple or dichotomous; l. lanceolate-subulate, very narrow, thinly nerved nearly to apex; per. with teeth distantly barred; caps. on an upright pedicel, turbinate when dry, with a flattish beaked lid.

Shady limestone rocks.

IV. V.

61. *S. TRISTICHA*. Brid. Densely cæspitose, rigid; l. exactly tristichous, crowded, rigid, narrowly lanceolate, muticous, base whitish; caps. yellowish-brown sub-spherical, with a tumid neck, lid large with a long oblique or arcuate beak; per. teeth narrower than in *calcareæ*.

Calcareous stones and rocks.

Summer.

Blair Athol, Glen Tilt, and Ben-y-Gloe. Rev. J. M. Crombie.

62. *S. PAUCIFOLIA*. Carruthers. (*S. subcernua*, Schp.; *S. calcicola*, Mitt.) Densely gregarious, low; leaves crowded erecto-patent, lower ones lanceolate, upper subulate from a narrow oblong base, margins plane, nerve exerted, areolæ dense, rectangular; caps. elliptical sub-cernuous on a long seta, unsymmetrical, lid with a long beak; male fl. at base of female plant.

Limestone rocks and stones.

VI.

Chalk Downs, Sussex, Mr. Mitten; Near Wetherby, 1801, Dickson.

[63. *S. ACUTIFOLIA*. Lind. Very small; l. and per. l. from a more or less sheathing base abruptly narrowed into a

subterete setiform acute pointed awl, formed by the excurrent nerve, crenulate; seta 1 mm. long; caps. small, scarcely exerted, pyriform with a short neck, lid with a short scarcely oblique beak];—type not British but

var. β . *longiseta*, Lindb. Plant larger, seta 2-3 mm. long, caps. exerted, beak of lid longer and more oblique—gathered by Mr. Wilson, 14th May, 1831, and sent by him to Dr. Lindberg.

64. *S. CALCAREA*. B. & S. St. short, more robust, than No. 60, l. ovate-subulate, obtuse, dull green with a thicker nerve; caps. turbinate, shortly beaked, on a short stiff pedicel; peris. teeth, broader obtuse, closely barred.

Chalk cliffs.

IV. v.

65. *S. RECURVATA*. B. & S. St. minute gregarious; l. lanceolate-subulate, somewhat flexuose, acute, nerve excurrent generally; caps. obovate elliptical; pedicel curved drooping.

Sandstone rocks, rare.

IV. v.

11. ANODUS. BRUCH. & S.

66. *A. DONIANUS*. B. & S. St. minute, $\frac{1}{8}$ in. gregarious; l. almost setaceous, lanceolate-subulate, very minutely toothed; per. l. bluntish and rather shorter; caps. cup-shaped or turbinate, mouth wide; Cal. dimidiate; perist. none, lid with a short beak.

Sandstone rocks, rare.

IX.

12. STYLOSTEGIUM. WILS.

67. *S. CÆSPITICIUM*. B. & S. St. $\frac{1}{4}$ - $\frac{1}{2}$ in. densely tufted; branches fastigiate; l. somewhat falcate and secund, ovate-

lanceolate, acuminate; per. l. larger with a sheathing base entire, nerve predominant; caps. roundish-pyriform glossy; lid obliquely beaked, adherent to columella.

Alpine rocks, in crevices.

VII.

13. BLINDIA. WILS.

68. *B. ACUTA*. B. & S. St. $\frac{1}{2}$ -3in. tufted; l. subulate or lanceolate-setaceous, rigid, glossy, subsecund, nerve thick; per. l. sheathing; caps. roundish-pyriform, on a short reddish pedicel; lid with a longish beak.

Moist alpine or sub-alpine rocks.

Summer.

var. β . *breviseta*. "Stem shorter, caps. on a very short pedicel." Wils.

γ . *rupicola*. pedicels arcuate.

trichodes. Braithwaite. l. longer and more falcate. Wet rocks, near Bolton.—Whitehead.

14. ARCTOA. BRUCH. & S.

69. *A. FULVELLA*. B. & S. St. $\frac{1}{2}$ -2in. densely tufted; l. somewhat secund, often falcate, subulate-setaceous dull green, sometimes slightly toothed at apex, nerve predominant, per. l. large sheathing; caps. ovate, sometimes gibbous, 8-furrowed, lid obliquely beaked; barren fl. gemmiform: monoicous.

Fissures of alpine rocks.

VII. VIII.

15. CYNODONTIUM. BRUCH & S.

70. *C. BRUNTONI*. B. & S. St. $\frac{1}{2}$ -1in. tufted, branches fastigiate; l. linear-lanceolate or lanc-subulate, keeled, sometimes minutely denticulate at apex, margin reflexed, twisted when dry, nerved almost or quite to apex; per. l.

sheathing; caps. erect obovate or elliptical; lid with a long oblique beak.

Subalpine rocks.

VI.

16. DICRANUM. HEDW.

a. (DICRANELLA. Schimp.)

SECT. I. Stem long, rooting in all parts; leaves spreading flexuose, papillose on both sides, crenulate in margin, not nerved to apex; infl. monoicous; beak of lid shorter than caps.

71. D. POLYCARPUM. Ehr. L. bent, flexuose, often recurved, lanceolate-subulate or linear-lanceolate, keeled, margin recurved, somewhat papillose, denticulate at apex, nerve excurrent; caps. erect, symmetrical, striated, with a tumid neck.

Alpine rocks.

VII. VIII.

var. *β.* *strumiferum*. caps. unequal, base strumose.

SECT. II. St. rooting in all parts, leafy; l. spreading, nerve slightly excurrent; infl. monoicous; caps. strumose.

72. D. VIRENS. Hedw. St. 1-3in. branched; l. erect ovate-lanceolate at base, sheathing, running to a long sub-denticulate, almost setaceous prolongation, margins recurved, nerve thick sub-excurrent; caps. cernuous strumose smooth oblong and curved; lid beaked.

Moist alpine rocks; Ben Lawers.

VI. VII.

var. *β.* *Wahlenbergii*. l. flexuose, much attenuated, above narrower and longer, yellowish; caps. short, with a very prominent struma.

- γ. serratum.* stems taller; l. recurved from a sheathing base, coarsely serrated.
- δ. compactum.* st. shorter and slender; l. shorter lanceolate from an ovate base, entire, or very slightly toothed at apex; caps. gibbous on a shorter pedicel.
- ε. gracilescens.* l. narrower; caps. smaller.

SECT. III. L. squarrose, or patent spreading.

73. D. PELLUCIDUM. Hedw. St. 1-2in. loosely tufted; l. distant, lanceolate, margins undulate, denticulate, papillose obtuse; caps. shortly ovate; lid conical rostrate; dioicous.

Wet stones in streams.

X. XI.

var. *β. fagimontanum.* st. short, branches slender, l. shorter.

γ. serratum. l. crenato-serrate, with a more acute point; caps. oval or oblong, lid with a slender beak.

74. D. CRISPUM. Hedw. St. $\frac{1}{4}$ in. gregarious, l. subulate from a broadish sheathing base setaceous above, long, spreading flexuose, minutely dentate, nerved to apex; caps. almost erect, oval or obovate, striate; lid with a long oblique subulate beak: monoicous.

Moist sandy banks, not common.

X. XI.

75. D. GREVILLIANUM. B. & S. L. with a broad sheathing base, suddenly lanceolate-subulate prolonged, wide-spreading and wavy, entire, nerve broad; caps. ovate, sub-striate, strumose; lid with a beak longer than capsule: monoicous.

“Glen Tilt. at foot of Ben-y-Gloe, 1823, not since found.”
—Wils. VIII. IX.

[I have a specimen gathered by Dr. A. O. Black, marked “Esk-no-more.”]

76. *D. SCHREBERI*. Hedw. St. $\frac{1}{2}$ -lin. sub-cæspitose, branched sparingly; l. base broad, suddenly lanceolate-subulate, spreading flexuose keeled, denticulate at apex; caps. ovate-oblong, scarcely strumose, cernuous; lid conical, shortly rostrate; dioicous.

Clayey or sandy soil near streams, rare. X. XI.
Lancashire, Cheshire, and near Glasgow.

77. *D. SQUARROSUM*. Schrad. St. 1-3in. dichotomous; l. lanceolate from a broad sheathing base obtuse, undulate, entire concave recurved, nerve narrow, reaching nearly to apex; caps. ovate-oblong cernuous; lid long conical, with a short beak.

Wet mountainous places. VIII. IX.

78. *D. CERVICULATUM*. Hedw. St. $\frac{1}{4}$ in. sparingly branched; l. spreading flexuose, almost setaceous from a broadish amplexicaul base, entire, nerved into the subula; caps. roundish-ovate gibbous, strumose; lid with a long oblique or curved subulate beak.

Sandy banks or on turf, frequent. VI. VII.

var. β . *pusillum*. st. shorter, simple; l. smaller sub-erect; caps. smaller and less gibbous.

SECT. IV. L. secund or sub-secund.

79. *D. VARIUM*. Hedw. St. $\frac{1}{4}$ in. cæspitose; l. lanceolate, entire keeled sub-denticulate at apex, margin reflexed,

nerve scarcely excurrent; caps. inclined, ovate or oblong, slightly tumid; lid shortly beaked; seta twisted to the right.

Moist banks.

XI. XII.

var. β . *tenuifolium*. l. narrow, obscurely nerved.

γ . *tenellum*. st. slender, scarcely branched; l. falcato-secund, distantly denticulate.

δ . *callistomum*. l. scarcely secund, caps. erect, obovate truncated, lid almost as long as caps.

80. "D. FALLAX. Wils. MS. Closely resembles the last. L. more distant, with impressed wings and less elongated setaceous points, and a more dilated flattened nerve, uppermost sub-secund. Caps. nearly symmetric erect or sub-cernuous, with a shorter conical lid: dioicous." [Dr. Braithwaite, Jour. Bot., VIII., 227.]

Banks.

III. IV.

Anglesea (Wilson); Cotterall Wood (Hunt); Park Gate, Cheshire (Miss Jelly).

81. D. RUFESCENS. Turn. St. short bright red, scarcely branched; l. linear-lanceolate, obscurely toothed, reddish, margins plane, secund, pellucid; caps. erect ovate or obovate, slightly tumid, with a conical beaked lid. Seta twisted to the left; dioicous.

Moist sandy banks.

X. XI.

82. D. SUBULATUM. Hedw. St. $\frac{1}{2}$ -1in. l. falcato-secund, setaceous from an oblong lanceolate base, entire; caps. ovate gibbous oblique striate when dry, seta red; dioicous.

Moist shady sandy banks; common on the mortar of walls, &c.

IX. X.

83. *D. CURVATUM*. Hedw. Cæspitose; st. bi-tripartite; l. setaceous from a shortly ovate semi-sheathing base, channelled, apex denticulate, falcato-setaceous; caps. erect or sub-erect, ovate-oblong, slightly gibbous, distinctly striate. [Sch. Syn. p. 75. Bry. Eur. vol. I.]

Walls.

Autumn and Spring.

Llanberis, N. Wales (W. Wilson).

84. *D. HETEROMALLUM*. Hedw. St. $\frac{1}{2}$ -lin. simple or branched, in silky tufts; l. lanceolate-setaceous, slightly dentate at apex; caps. obovate gibbous, obliquely plicate when dry; lid with a long beak, seta pale yellowish; dioicous.

Moist banks and walls.

XI. XII.

var. β . *strictum*. l. erecto-patent, straight, not secund; seta longer flexuose.

γ . *interruptum*. larger; stem interrupted leafy; l. spreading or secund.

δ . *sericeum*. Schp. plants taller; l. diverging almost on all sides, pale green or yellowish, often strongly and remotely toothed. Soccoth Hill, Arrochar (McKinlay).

b. (EU-DICRANUM.)

SECT. I. FALCATÆ. Densely tufted, st. dichotomous and fastigiate, decumbent at base with few or no radicular fibres; l. lanceolate-subulate, secund or falcato-secund, nerve predominant above; caps. cernuous, neck strumose or ventricose, lid with a long beak: monoicous.

85. *D. STARKII*. Web. & M. St. 1-3in. branched; l. subulate-setaceous from a lanceolate base, falcato-secund,

entire, nerve strongly predominant, caps. oblong arcuate, gibbous, strumose, striate, sub-cernuous.

Alpine rocks.

VIII.

var. β . *molle*. taller; l. wider lanceolate, purplish brown; nerve not predominant.

Summit of Ben Nevis.

86. *D. FALCATUM*. Hedw. St. shorter, dichotomously branched and fastigiate; l. strongly falcato-secund, from a lanceolate base subulato-setaceous, denticulate at apex, nerve predominant, caps. shortly obovate, strumose, almost smooth when dry; lid large beaked.

Alpine rocks.

VIII. IX.

87. *D. BLYTTII*. Br. & S. St. branched fastigiate; l. flexuoso-patent, or sub-secund, from an erect base lanceolate-subulate, soft, entire, nerve predominant, per. l. sheathing; caps. sub-cernuous, ovate, incurved, without striæ, strumose, lid rostrate; per. teeth narrow inflexed when dry.

Alpine and sub-alpine rocks.

VIII.

SECT. II. *ORTHOCARPA*. Densely cæspitose; st. 1 or more inches high, dichotomous, with or without radicular fibres; l. secund, lanceolate-subulate, smooth glossy, nerve excurrent or nerveless. Caps. erect cylindrical; neck long symmetrical; lid conical at base.

88. *D. GLACIALE*. Berg. Monoicous, in wide tufts, without radicular tomentum, erect, 2-5 in. high, l. erecto-patent, straight glossy, lowest minute lanceolate nerveless, upper oblong at base, lanceolate-subulate, deeply concave,

margin inflexed entire, basal angles auricled, orange, nerve narrow compressed; per. l. sheathing, suddenly narrowed into a long subula; caps. cernuous, cylindraceous, more or less incurved strumose, not striate; lid rostrate.

Alpine rocks; Ben Nevis, Clova, Ben-y-Gloe.

[Dr. Braithwaite, Jour. Bot. VIII., 228.]

89. *D. VIRIDE*. Sull. et Lesq. Dioicous, in dense cushions, or cæspitose, reddish and tomentose at base, above dark green; branches dichotomous; l. lineal-lanceolate subulate, nerve running out in the concave awl; per. l. sheathing; areolæ densely chlorophyllose, enlarged at base; caps. erect, oblong, slightly incurved, lid with a long beak.

Trunks of trees: rarely on sandstone rocks.

fig. Schpr. Musci. Eur. novi, &c. fasc. III. IV.

Staffordshire (Mr. Bloxam).

90. *D. SCOTTIANUM*. Turn. St, 2 or 3in. robust; l. erecto-patent, sub-secund incurved lanceolate-subulate, slightly twisted at apex when dry, concave entire, nerve strong excurrent; caps. elongated, slightly curved, tapering at base, lid obliquely rostrate.

Rocks in mountainous districts.

VII. VIII.

91. *D. LONGIFOLIUM*. Hedw. Cæspitose, tufts pale green or whitish; stem arcuate or geniculate ascending, slightly radiculose; l. long falcato-secund, rarely spreading, subulate from a lanceolate base, with a slender nerve, margin and back serrate at apex; per. l. convolute sheathing; caps. elongate-cylindrical, upright or sub-incurved, without striæ, brown; beak subulate, annulus narrow: dioicous.

Sub-alpine rocks.

Autumn.

Ben Lawers, 1866 (Dr. Stirton).

92. *D. CIRCINNATUM*. Wils. Dioicous, in loose irregular light green tufts; st. 3-6in. dichotomous, geniculate or ascending, with radicles from base of leaves. L. very long, secund, arcuate from an oblong sheathing base decurrent at angles, longly subulate concave; nerve flattened, covering one-fifth of base and all the subula, which is denticulate; base laxly areolate in middle, with narrower cells at margin. [Dr. Braithwaite, l. c. 230.]

Fr. unknown.

Ben Voirlich, Clova, Ben Nevis, Lennox Castle.

SECT. III. SCOPARIÆ. St. loosely or densely matted, tall, with proliferous radicular fibres; l. long spreading or secund, lanceolate-subulate, glossy, denticulate at apex; nerve with or without dorsal lamellæ; caps. cernuous bent; lid with a long beak.

93. *D. FUSCESCENS*. Turn. St. 2-3in. loosely tufted; l. spreading, sub-secund, flexuose, canaliculate, minutely toothed at apex, nerve excurrent; caps. oblong incurved, furrowed when dry; lid with a very long beak.

Alpine and sub-alpine rocks.

VIII.

94. *D. SCOPARIUM*. Hedw. St. 2-4in. loosely tufted dichotomous; l. secund or falcato-secund, carinato-concave, margins inflexed, serrate at apex; nerve with about four prominent ridges at back, serrate at apex; per. l. larger convolute; caps. cylindrical, slightly curved; lid with a long beak.

Shady banks and rocks, common.

VII. VIII.

var. β . *orthophyllum*. stem erect; l. erecto-patent or sub-secund straight.

γ. curvatum. branches curved ascending, l. more falcate; caps. shorter.

95. *D. MAJUS.* Turn. St. 4-6in. loosely cæspitose; l. falcato-secund; concave dentato-serrate at apex; caps. horizontally cernuous, curved, furrowed when dry; lid and calyptra very long; fruitstalks pale aggregate.

Shady banks, &c., in woods.

VII. VIII.

SECT. IV. *UNDULATA.* St. very tall, with radicular fibres; l. large glossy, spreading every way or secund, lanceolate below, linear-subulate above; nerve flattish, with lamellæ at back.

96. *D. PALUSTRE.* Brid. St. 3-4in. erect branched sub-fastigiate; l. spreading, sub-secund, linear-lanceolate undulated, terminal ones crowded into a cuspidate cluster on the barren shoots; serrate at apex; nerve thin and narrow, not reaching to apex, and without ridges; caps. sub-erect, slightly curved, sub-cylindrical, striate.

Marshy places and moist banks.

IX.

var. *β. juniperifolium.* with shorter, wider, and more rigid leaves.

γ. polycladum. branches slender flagelliform; l. small imbricate.

97. *D. SCHRADERI.* Schwaeg. St. 3-6in.; l. sub-secund, rather obtuse, carinato-concave, subrugose, toothed on margin and keel, sub-papillose at back near apex; caps. oval-oblong incurved; lid rostrate.

Turfy bogs, rare.

IX.

98. *D. SPURIUM*. Hedw. St. 1-2in. loosely caespitose; l. ovate-lanceolate, acuminate, undulate serrate, papillose at back; not nerved to apex; caps. sub-cylindrical arcuate, slightly strumose, striate; lid with a long curved beak.

Moors and bogs.

VI.

17. *LEUCOBRYUM*. Hampe.

99. *L. GLAUCUM*. Hampe. St. 1-6in. or more, dichotomous fragile, fastigiate; l. subulate from an ovate lanceolate base, erect, rather obtuse, and apiculate; caps. cernuous, strumose, furrowed when dry.

Moist heaths, woods, rare in fr.

18. *CERATODON*. BRID.

100. *C. PURPUREUS*. Brid. St. $\frac{1}{4}$ -2in. caespitose, branched; l. oblong-lanceolate, margin recurved, nerve excurrent; caps. elliptic-oblong, irregular, purple, angular when dry on a purplish red seta; lid conical.

Banks, &c., common.

IV. V.

101. *C. CYLINDRICUS*. B. & S. St. $\frac{1}{4}$ in. gregarious; l. subulate from a dilated ovate amplexicaul base, flexuose, minutely toothed above, nerve predominant; caps. cylindrical, smooth, erect or slightly curved, on a pale slender seta; lid conical.

Sandy banks, not common.

IV. V.

19. *DICRANODONTIUM*. BR. & S.

102. *D. LONGIROSTRE*. B. & S. St. 1-3in. blackish; l. falcato-secund, subulato-setaceous from an ovate sheathing base, denticulate above on predominant nerve; caps. elliptic-oblong, smooth, on a thick curved or flexuose seta.

Mountainous woods, rare.

X.

20. CAMPYLOPUS. BRID.

[The diagnoses of species are taken from Dr. Braithwaite's Paper in Jour. of Bot. VIII., pp. 386-393.]

a. Leaves hoary at point.

103. *C. ATROVIRENS*. De Not. (*C. longipilus*. Brid. pro parte: Wils. Bry. Brit.; et Schimp. Musc. Eur. Nov.) Dense tufts 1-3in. high, above yellowish green, below brownish, at base black. Stem erect, dichotomous, with few radicles at base; l. lower, lax, shorter, the rest densely crowded, erecto-patent, lanceolate, very longly subulato-setaceous, channelled below, auricled; nerve excurrent into a hoary hispid arista, channelled at back, one-third width of leaf base; cells of auricles dilated, castaneous, central colorless, above these sub-rectangular, uppermost oblongo-elliptic. Fem. fl. 2. 3 at apex of innovations.

Wet rocks, and moorlands in mountainous districts.

E. S. & I.

104. *C. BREVIPILUS*. B. & S. In dense broad tufts, when dry glossy yellow green above, fuscous below, $\frac{3}{4}$ -1 $\frac{1}{4}$ in. high, almost free from radicles, fastigate; l. erect densely crowded, narrowly lanceolate-subulate, very concave, the point denticulate at margin and back, not auricled; nerve one-third width of leaf base excurrent into a short hair point; per. l. wider sheathing, narrowed into a hispid hair, margin recurved above base. Areolæ lax; basal cells quadrate, above rhomboidal flexuose, marginal very narrow; fem. fl. solitary.

Heathy places. Sussex, Hants, Cheshire, York, Arran.

105. *C. INTROFLEXUS*. Brid. (*C. longipilus*. Bry. Eur. pro parte. *C. polytrichoides*. De Not. *D. ericetorum*. Mitt.)

Densely tufted, olivaceous brown below, innov. yellow green with hoary tips; $\frac{3}{4}$ -1 $\frac{1}{2}$ in. high, sparingly radiculose, dichotomous; l. imbricated, erecto-patent, lanceolate-subulate, channelled; not auricled; wings but little incurved, comal leaves broader lanceolate-acuminate, lowest muticous, rest prolonged into a diaphanous spinuloso-denticulate arista shorter than the leaf. Nerve three-fourths width of limb, lammelluligerous at back. Basal cells hyaline large and empty, gradually becoming obliquely oval and minute, chlorophyllose, a few fuscous alar cells in comal leaves; per l. oblong convolute, subulate at apex. Thecæ aggregated on short peduncles, oval, unequal, rough at base, lid obliquely rostrate. Calyp. reaching middle of capsule, sparingly fimbriate.

Dry heaths and stony places. Cornwall, Jersey, Scotland, Ireland.

b. Leaves unicolorous.

* auricled at base.

106. C. SHAWII. Wils. MS. Tufts lax, yellow-green above, blackish brown below, 1-2in. high. Stems robust, with numerous radicles. L. erecto-patent, straight, rigid, from a somewhat contracted linear base, lanceolate, longly subulate, suddenly narrowed at one-third their length; margin involute above, apex acute, with a few minute denticulations. Nerve two-thirds width of base. Cells at basal wings enlarged lax reddish brown, exterior rows hyaline, above rectangular, and then rhomboido-elliptic. Leaves falcate when growing in dry places.

Outer Hebrides, 1866 (Mr. Shaw).

107. C. ALPINUS. Schmpr. Densely cæspitose, 2-3in.

high, stem erect, dichotomous, with rufous radicles from back of leaf-base at base of innovations. L. rigid, fragile, and deciduous, erect or slightly secund, lowest lanceolate, becoming larger upwards and longly subulate, subtubular, subula sharply or obsolete serrate. Nerve half width of base. Auricles very large decurrent, cells orange brown, central hyaline, above laxer narrowly hexagono-rectangular, and at last quadrate without chlorophyll, solid and yellowish.

Moist heaths and rocks. Wales and Scotland.

108. *C. FLEXUOSUS*. Brid. Tufts dense yellowish green. Stems $\frac{1}{2}$ - $1\frac{1}{2}$ in. high, erect dichotomous, with rufous purple radicles to apex, bearing gemmæ intermixed. L. patent straight or secund, sub-falcate, lower lanceolate upper subulate, uppermost very long and toothed at apex all concave, glossy, red when old. Nerve one-third width of base; angles not decurrent, with short wide fuscous cells, others hexagono-rectangular, upper quadrate and chlorophyllose; per. l. nine; inner sheathing longly subulate, with a narrower nerve, calyptra fuscous at apex. Caps. oval, regular, or gibbous, short-necked olivaceous, with eight striæ, sulcate when dry; lid conico-rostrate; annulus broad double.

Sub-alpine moist rocks and peaty soil.

XI.

109. *C. PARADOXUS*. Wils. MS. Tufts $\frac{1}{2}$ -1 in. high, fastigiate, dull yellowish green above, pale brown below; st. with short lateral ramuli, and few rufous radicles. L. erecto-patent (erecto-appressed when dry) uppermost longest slightly secund lanceolate-subulate, concave; apex usually of two teeth, with a few irregular ones below on each side. Nerve one-third width of base. Lamina extended to apex; basal cells thin enlarged hyaline when young, afterwards

fuscous, above rectangular, in 14-16 longitudinal rows, thickened and quadrate towards apex.

Peaty soil, Cheviots (barren), Boyd and Hardy, 1868.

110. *C. SETIFOLIUS*. Wils. Tufts lax soft, bright or yellowish green above, blackish below, without radicles. St. 5-10in. slender, erect, geniculate. L. distant erecto-patent or sub-secund, glossy, from a lanceolate base gradually running into a very long subula, sometimes half twisted; uppermost with wings serrate. Nerve half width of base; auricles very large and inflated, the cells partly fuscous, partly hyaline, hexagonal, above hexagono-rectangular, upper rhombic chlorophyllose; fl. of each sex collected in capitula; males 3-4, fem. numerous.

Wet places, and clefts of rocks. I. S.

111. *C. SWARTZII*. Schpr. Tufts dense soft yellowish green, brownish below, without radicles. St. 2-3in. slender; l. erecto-patent, straight or slightly secund, lowest lanceolate, upper lanceolate-subulate, entire at apex, base somewhat sheathing, auricles hyaline inflated decurrent. Nerve two-thirds of base, finely sulcate at back towards apex. Basal areolæ narrow, auricular very lax hexagono-rectangular hyaline, above subquadrate.

Granite alpine rocks. Wales, Scotland.

* * L. not auricled.

§ St. radiculose.

112. *C. FRAGILIS*. B. & S. Tufts pale green glossy, st. $\frac{1}{2}$ -2in. fragile. L. densely crowded erecto-patent rigid incumbent when dry, lower lanceolate, upper extended into a subula, toothed at apex, wings recurved above. Nerve very

broad. Basal areolæ lax pellucid narrow rectangular, above minute quadrate, no distinct alar cells. Caps. solitary, bent down, oval, symmetric, fuscous, when dry plicate, contracted below the mouth, lid conico-subulate oblique, red; calyp. whitish, rufous at apex.

Sandstone rocks and moist heaths.

var. β . *densus*. (B. & S.) st. taller, l. shorter, with more acute entire points and laxer cells.

113. *C. SCHIMPERI*. Milde. Tufts dense compact. St. 1-2in. slender light silky green above, fuscous below. L. erecto-patent, appressed when dry, straight rigid, lanceolate-subulate, channelled, denticulate only at apex. Nerve very broad. Basal cells lax rectangular hyaline, very narrow at margin, above elliptic.

Alpine hills. Scotland.

114. *C. PYRIFORMIS*. Brid. (*C. turfaceus*. B. & S.) Tufts flat oliveaceous or bright green, finally tawny. St. $\frac{1}{2}$ -1in. slender erect, radiculose only at base. L. less crowded, gradually larger upwards, erecto-patent, lower lanceolate, middle lanceolate-subulate, upper from a lanceolate base setaceous. Nerve one-third base, thin channelled at back. Areolæ resembling *C. flexuosus*, but thinner, hyaline at base. Fr. several from same apex; caps. ovate olivaceous, fulvous when ripe, sulcate, lid obliquely rostrate; calyp. whitish, tip brown.

Moist heaths and sides of ditches.

var. β . *Mülleri*. Juratzka. L. caducous, calyptra without fringe.

§ § St. very short, not radiculose.

115. *C. BREVIFOLIUS*. Schpr. St. $\frac{1}{2}$ in. yellowish green, with caducous ramuli. L. short rigid erect lanceolate, longly acuminate, concave, obsolete toothed at apex. Nerve half base; basal areolæ hyaline lax rectangular, gradually shorter and more quadrate, lower ones with their transverse walls much thickened.

Dry and stony places. Scotland.

21. POTTIA. EHRH.

116. *P. PUSILLA*. Hedw. (*P. cavifolia*. Ehr.) St. very short and simple or branched; l. erecto-patent concave, obovate or elliptical; caps. oval, on a short seta; lid obliquely rostrate.

Banks and mud walls.

III.

var. β . stem short, l. somewhat acuminate, scarcely piliferous.

γ . *incana*. N. & H. l. with long hair-like points.

117. *P. MINUTULA*. B. & S. Very minute, l. carinate, spreading, ovate-lanceolate, with recurved margins; caps. small, ovate-truncate; lid flattish conical, not beaked.

Fallow fields.

Winter and Spring.

var. β . *rufescens*. l. narrower reddish.

γ . *conica*. l. ovate-lanceolate, with a short mucro, caps. narrower at mouth.

118. *P. TRUNCATULA*. L. St. $\frac{1}{8}$ in., l. spreading obovate-acuminate or oblong lanceolate, with a slightly excurrent

nerve; caps. obovate, truncate, with a wide mouth; lid convex obliquely rostrate.

Fallow soil.

II. III.

var. β . *major*. caps. oval oblong, stem smaller.

γ . *sub-cylindrica*. l. ovate-lanceolate; nerve much excurrent; caps. sub-cylindrical.

119. *P. CRINITA*. Wils. St. $\frac{1}{4}$ in. tufted; l. obovate-oblong obtuse; nerve excurrent into a very long hair-like point; caps. elliptic-oblong, scarcely contracted, calyp. smooth.

Rocky and moist places.

120. *P. WILSONI*. B. & S. St. $\frac{1}{4}$ in. in tufts, l. ovate-oblong, obtuse; nerve excurrent into a longish mucro; caps. elliptic-oblong, contracted at mouth; lid shortly and obliquely rostrate; calyp. rough at apex.

Sandy banks.

II.

121. *P. LITTORALIS*. Mitt. (Jour. Bot. ix., 4.) L. oblong-spathulate obtuse or acute, lower pale, upper green, nerve excurrent, longer in lower leaves; areolæ in upper part of leaf small obscure, smooth, lower oblong pellucid; caps. oblong-oval, mouth less than greatest diameter; lid rostrate slightly twisted; male fl. bud-like.

Aldington, near Brighton, Hastings.

122. *P. ASPERULA*. Mitt. (l. c.) L. obovate-spathulate, acute, but not acuminate, nerve excurrent into a short point; areolæ upper rounded rather obscure, each with several elevated points, lower oblong smooth pellucid; caps. oval, lid rostrate slightly twisted; antheridia naked in axils of comal leaves.

Henfield, Sussex; Penzance (Curnow), Jersey (Piquet).

123. *P. VIRIDIFOLIA*. Mitt. (l. c.) (*P. pallida*, Braith. Jour. Bot. VIII., 255, non Lindberg.) L. obovate-spathulate obtuse or slightly acute; nerve not very stout, excurrent into a short point; margin recurved at middle; areolæ, upper hexagonal or nearly square, obscure, with minute protuberances, lower oblong hyaline smooth; caps. oblong on a short seta; lid rostrate; antheridia in axils of comal leaves.

Plymouth (Holmes).

124. *P. HEIMI*. B. & S. St. $\frac{1}{8}$ - $\frac{1}{4}$ in. cæspitose, branched; l. spreading, oblong-lanceolate, margin not recurved; caps. obovate or oblong truncate, lid obliquely rostrate, adherent to columella.

Moist banks near the sea.

IV. V.

22. ANACALYPTA. RÖHL.

125. *A. STARKEANA*. N. & H. Minute, gregarious; l. spreading ovate-lanceolate, entire, margin recurved; nerve excurrent; caps. small oval brown; lid convexo-conical; per. teeth obtuse perforate.

Banks and fields.

I. II.

var. β . *brachyodus*. caps. narrower; per. teeth very short truncate.

126. *A. CÆSPITOSA*. Bruch. Minute cæspitose; l. oblong-lanceolate or ovate, concave, plane, nerve excurrent; caps. ovate yellowish brown, lid with a long beak; per. teeth perforate.

Woolsonbury Hill, Sussex (chalk).

III.

127. *A. LANCEOLATA*. RÖHL. St. $\frac{1}{4}$ - $\frac{1}{2}$ in. cæspitose; l.

spreading ovate-lanceolate acute, margin recurved, entire; nerve excurrent into a longish mucro; caps. ovate; lid conical obliquely rostrate; per. teeth very variable, rather long, with a medial line.

Moist limestone banks, walls, &c.

III.

128. *A. LATIFOLIA*. N. & H. St. short, gregarious, bulb-like; l. imbricate, broadly roundish-ovate, pointed or obtuse, concave, nerve ceasing below apex: caps. oval-oblong, lid long, rostrate.

Alpine rocks, in crevices.

Spring.

var. β . *pilifera*. l. with hair-like points.

[23. *DESMATODON*. BRID.—*Vide* "TORTULA."]

24. *DISTICHIUM*. B. & S.

129. *D. CAPILLACEUM*. B. & S. St. 1-2in. cæspitose; l. subulate-setaceous, spreading; caps. erect, ovate-oblong or almost cylindrical, reddish brown; per. teeth, narrow, articulate, bi- or tri-fid.

Scotch and Welsh mountains.

Summer.

130. *D. INCLINATUM*. B. & S. St. shorter than last, and less cæspitose; leaves same, per. l. 1, 2, or 3 together; caps. oval, olive brown, inclined or cernuous; per. teeth larger lanceolate, articulate, entire or perforate, bi-trifid.

Irish and Scotch mountains.

VI. VII.

var. β . *tenue*. smaller in all its parts.

25. *DIDYMODON*. BR. & S.

1. Monoicous.

131. *D. RUBELLUS*. B. & S. St. $\frac{1}{4}$ -lin. cæspitose, lower

leaves reddish, upper dull green, all oblong-lanceolate, spreading, margin recurved, keeled, nerved nearly to apex; caps. pale brown, cylindrical; lid with a short oblique beak; antheridia naked in axils of per. l.

Shady walls, rocks, &c.

x.

132. *D. JENNERI*. Schp. St. 1-1½ in. caespitose, brownish black below; br. fastigiate; l. spreading cirrulate linear-lanceolate concave, keeled, serrate, nerved to apex; areolæ minute rectangular transparent at base; caps. oval oblong, slightly drooping, lid with a short obtuse beak.

Ross-shire (Jenner and Howie). [Referred by Wilson, and others, to *Cynodontium polycarpon*.]

2. Dioicous.

a. L. lanceolate, rigid.

133. *D. LURIDUS*. Hornsch. St. ¼-1 in. caespitose; l., lower ovate-lanceolate, upper larger and broader, with entire recurved margins, keeled, acute, nerved (reddish) almost or quite to apex, areolæ small roundish; caps. symmetrical oblong on a shortish seta twisted to the right; lid conical pointed; per. teeth small irregular.

Limestone walls, &c., rare.

xii.

b. L. narrow, not rigid.

134. *D. CYLINDRICUS*. B. & S. ¼-1 in.; l. spreading flexuose, linear-lanceolate, margin undulate and minutely crenulate; areolæ small opaque, gradually enlarged towards the base, there diaphanous; caps. erect, narrow, cylindrical; lid long conico-rostrate, per. teeth linear-lanceolate, fugacious.

Damp shady rocks. E. S. & I.

x.

135. *D. FLEXIFOLIUS*. Hook. & Tayl. Barren stems long trailing, fertile $\frac{1}{2}$ in; l. spreading, flexuose, more so when dry, oblong or ligulate, margin reflexed below, and serrate at apex, nerve not reaching apex; areolæ round; caps. small cylindrical, somewhat curved, lid with a short beak; per. teeth short.

High moorlands, Buxton, Alderley Edge, Ben Ledi.

III. IV.

var. *gemmescens*. Mitt. MS. Nerve excurrent into an apiculus, which bears a cluster of egg-shaped or oblong gemmæ.

Old thatch, Amberley, Sussex (Mitten).

136. *D. RECURVIFOLIUS*. Tayl. "Stems elongate, loosely cæspitose; l. squarrose, crisped and undulate when dry; elliptic oblong or ligulate, pale margined serrulate, nerve sub-excurrent; areolæ small dense opaque, elongate and pellucid at base." Ireland, 1842; fruit not known (Wilson).

26. TRICHOSTOMUM. BR. & S

SECT. I. L. lanceolate or ligulate: dioicous.

137. *T. TOPHACEUM*. Brid. St. $\frac{1}{4}$ -lin. densely cæspitose, branches fasciculate; l. lanceolate (the upper ones obtuse), concave keeled, margins recurved; nerve not reaching to apex; caps. sub-cylindrical erect, regular; lid with an oblique beak; per. teeth variable, sometimes only 16, somewhat fugacious.

Moist places and rocks.

XI.

138. *T. BRACHYDONTIUM*. Bruch. (*T. mutabile*. olim.)

L. broader, lanceolate or ligulate, crisped, not cucullate, margin slightly undulate, nerve excurrent into a prominent mucro; caps. ovate-oblong erect, regular; lid obliquely rostrate; per. teeth very short and irregular.

139. *T. CRISPULUM*. Bruch. St. $\frac{1}{4}$ -lin., l. lower-lanceolate, distant; upper crowded, longer, linear-lanceolate concave cucullate at apex, crisped when dry; nerve prolonged into a short mucro; caps. oval, erect, regular; lid with an oblique beak; perist. t. in unequal pairs.

Limestone rocks near the sea; Ormes Head; Anglesea; Bristol. VI. VII.

var. β . *brevifolium*. l. shorter, lanceolate, acuminate, caps. smaller.

γ . *angustifolium*. l. narrowly linear-lanceolate crowded, apiculate.

140. *T. FLAVO-VIRENS*. Bruch. Muller. St. short, with innovations from summit (interruptedly comose); l. oblong-ligulate, obtuse mucronate, margins entire undulate incurved; fruit-stalk red, slightly flexuose; thick nerve prolonged into a short mucro; caps. oblong cylindrical pale yellowish brown, with a red mouth; per. t. elongate, regular, in pairs. Lid acuminate, half as long as caps. with an oblique beak.

Shoreham, Sussex; Plymouth (Holmes), Malahide (Dr. Moore). [W. Mitten. Jour. Bot., vi., p. 97.]

141. *T. LITTORALE*. Mitten. St. elongate, tufted, more or less interruptedly comose; l. erecto-patent, oblong-ligulate obtuse, channelled, recurved towards apex, with nerve excur-

rent into a short mucro; basal cells hyaline oblong and rectangular.

Ireland; Whitsand Bay, Cornwall; Hastings. (loc. cit. p. 99.)

142. T. (DITRICHUM) TENUE. Hedw. Dwarf, branched. L. from an erect base, patent or secund, narrowly lanceolate, uppermost lanceolate subulate; per. l. sheathing half their length, quite entire; caps. oblong erect or a little curved, lid conic rostrate.

Carn Lochan and Mael Giridy, 1863 (Crombie); Clova (Fergusson). [Dr. Braithwaite, Jour. Bot. VIII. 228.]

β. glaciale. in long broad tufts with broader erecto-patent leaves. (This is *Ditrichum zonatum* Lorenz.)

SECT. II. L. subulate from a lanceolate base.

A. dioicous.

143. T. TORTILE. Schrad. St. $\frac{1}{4}$ in. gregarious, subflexuose; l. mostly secund, somewhat falcate, margin reflexed, nerve excurrent into the slightly toothed apex; caps. small cylindrical, erect, regular or curved; lid conical, slightly rostrate; per. teeth irregular, purplish red.

Sandy places, rare; Belfast, Yorkshire, Sussex. x. xi.

144. T. FLEXICAULE. Br. & S. St. 1-3in. flexuose, cæspitose, with fastigiate branches; l. longer and more setaceous than in last, flexuose, concave, usually secund, nerve broad, excurrent, toothed at apex; caps. erect, small, ovate-oblong; annulus present; per. teeth long irregular.

Scotch and Derbyshire mountains (calcareous). vi.

var. *β. densum.* densely cæspitose; l. straighter.

145. *T. HOMOMALLUM*. B. & S. St. scarcely $\frac{1}{2}$ in. cæspitose; l. subulato-setaceous from a broadish base, mostly secund, nerve broad, much excurrent; caps. erect oblong-ovate, brown on a long red seta; annulus present; lid short conical obtuse; basilar membrane of perist. very narrow.

Sandy banks.

Autumn.

B. *monoicous*.

146. *T. SUBULATUM*. Bruch. St. $\frac{1}{4}$ in. cæspitose; l. subulato-setaceous from an ovate base, spreading or somewhat secund, with a long excurrent nerve; caps. oval, lid large obliquely rostellate; seta somewhat flexuose; annulus none; basilar membrane very narrow; antheridia axillary naked.

Cornwall (Rev. — Tozer).

Spring.

147. *T. GLAUDESCENS*. Hedw. St. $\frac{1}{2}$ in., branches fastigiate; l. glaucous, linear-lanceolate, margin plane (upper crowded into a tuft or coma), nerve sometimes excurrent into the denticulate apex; caps. oblong-oval, pale brown, with a long beaked lid; basilar membrane very narrow; barren fl. gemmiform.

Scotch mountains.

Summer.

27. TORTULA. SCHREB.

SECT. I. ALOIDELLA. L. rigid, covered on the upper side with articulated cellular filaments or gemmæ arising from the broad nerve.

148. *T. STELLATA*. Schreb. 1771. (*T. rigida*. Schultz.) St. minute, loosely cæspitose; l. spreading from an upright

base oblong obtuse, margin inflexed membranaceous; caps. erect elliptical; lid with a long oblique beak; calyp. half as large as capsule; per. teeth long, and much twisted: dioicous.

Limestone walls.

XI. XII.

149. *T. AMBIGUA*. Br. & S. (larger in all its parts than last.) L. ligulate lanceolate, apex cucullate, margin incurved; caps. erect cylindrical; lid rostrate; calyp. very short; per. teeth filiform, little twisted; arcuato-incurved when dry: dioicous.

Walls and banks (marly).

XI. XII.

150. *T. ALOIDES*. Br. & S. St. as above; l. spreading, narrowly lanceolate, acute, with a strong nerve; caps. cylindrical inclined; lid conical, bluntly rostrate; per. teeth scarcely twisted, when dry widely spreading: dioicous.

Clay banks.

XI. XII.

SECT. II. *CUNEIFOLIÆ*. L. broadly or spathulato-lanceolate.

151. *T. LAMELLATA*. Lindb. (*Pottia cavifolia* var. *gracilis*. Bry. Brit.) St. very short cæspitose; l. rather lax erectopate, concave, lower smaller, roundish oval, piliferous, upper larger oval spathulate, nerve excurrent into mucro; caps. oblong sub-cylindrical, striate when dry, on a long red seta; lid with a long rather oblique beak; perist. that of a true *Tortula*, but so fragile as to have escaped notice, and always falling off with the operculum according to Dr. Schimper: monoicous.

Banks and walls, Oxford (Boswell) Pontefract, Edinburgh (Nowell); Aldrington (Davies).

II.

152. *T. ATROVIRENS*. Smith. Lindb. [*Didymodon nervosus*, Hook & T. *Desmatodon nervosus*, Bry. Brit.] St. $\frac{1}{4}$ in. densely cæspitose, branched; l. spreading oval or oblong concave, margins revolute, nerve thick, prolonged into a short mucro; areolæ small roundish larger and diaphanous at base; caps. oval-oblong, lid large conical with an oblique beak.

Dry banks, &c., near the sea.

153. *T. CUNEIFOLIA*. Dicks. Gregarious; st. simple; l. upper crowded oblong-lanceolate, acuminate, nerve sometimes excurrent, soft, pellucid, areolæ loose; lower broadly ovate aristate; caps. oblong erect, lid obtuse short; basilar membrane of perist. broadish: monoicous.

Banks, sea coast, rare.

III. IV.

154. *T. MARGINATA*. B. & S. St. simple gregarious or cæspitose; l. oblong-lanceolate or linear, margin thickened, nerve sometimes excurrent into a mucro; caps. oblong, lid very large, shortly rostrate; basilar membrane narrow.

Sandstone walls, rare.

V. VI.

155. *T. VAHLIANA*. Schultz. Small, gregarious or cæspitose; l. lower oblong, upper oblong wedge-shaped, nerve excurrent subulate, margin reflexed; caps. narrow elongate cylindrical, brown, sometimes slightly incurved; lid shortly subulate, annulus broad; basilar membrane of perist. tessellate: monoicous. Differs from *muralis* in its broader softer leaves, narrower capsule, and longer basilar tube.

Damp clayey ground, on road sides, &c.

Spring.

Sussex, 1863 (G. Davies); Woking, Surrey (Sheppard and Westell.)

var. β . *subflaccida*. (*T. oblongifolia*, Bry. Brit.) L. with margins more or less revolute, crenulate, with minute papillæ.

156. *T. CANESCENS*. Br. Simple gregarious or cæspitose, hoary; l. lower obovate, upper oval-oblong, all concave, with a recurved margin, and nerve excurrent into a long hair-like point; caps. small oblong erect, with a long oblique conical lid; basilar membrane broadish: monoicous.

Fairlight Glen, Hastings (Mr. Jenner).

157. *T. MURALIS*. Timm. Short, cæspitose; l. oblong obtuse, margin recurved, nerve excurrent into a long hair-like point; caps. oblong erect, with a long rostellate lid; basilar membrane narrow: monoicous.

var. β . *incana*. caps. small; l. oval-lanceolate, with long hair points.

γ . *æstiva*. l. long linear-lanceolate, nerve scarcely excurrent.

δ . *rupestris*. larger and much branched; l. larger oblong, piliferous, caps. longer, curved.

Walls and stones (δ limestone).

IV. V.

SECT. III. *BARBULA*. L. naked, narrowly or ovate-lanceolate, in some species slightly cirrhate when dry.

158. *T. MUCRONATA*. Brid. [*Cinclidotus riparius* β . *terrestris*. Bry. Brit.] St. 1-2in. radiculose, branches fastigiate; l. erecto-patent, long lingulate, concave, minutely papillose on both sides, margin slightly recurved, nerve thick

excurrent into a mucro; areolæ upper minute, rectangular and hyaline at base; caps. erect cylindrical incurved, lid with an oblique beak: dioicous.

Stones in streams. Anglesea, Bristol, Surrey, Sussex, in fr. (Davies.) IV.

159. T. UNGUICULATA. Hedw. St. $\frac{1}{8}$ -lin. cæspitose, dichotomous; l. oblong-lanceolate, obtuse, margin recurved, nerve excurrent into a short mucro; caps. oblong cylindrical erect on a long reddish seta; lid with a subulate beak: dioicous.

Clay banks and hedges. XII.

var. β . *cuspidata*. stems shorter, l. narrower, with a longer mucro.

γ . *apiculata*. l. spreading recurved, mucro long.

δ . *microcarpa*. caps. small oval or oval-oblong.

ϵ . *obtusifolia*. more robust, l. shorter, broader obtuse, mucro almost or altogether absent; caps. sub-cylindrical.

ζ . *fastigiata*. with long fastigiate innovations; l. larger, slightly undulate.

160. T. CONVOLUTA. Hedw. Cæspitose; l. spreading oblong-lanceolate, plane or somewhat undulate in margin, nerve not excurrent; per. l. strongly convolute, sheathing; caps. inclined oblong-ovate, on a yellowish seta; lid with a long oblique beak: dioicous.

Walls, &c.

V. VI.

161. T. REVOLUTA. Schwaeg. Densely cæspitose, l. crowded erecto-patent oblong lanceolate, nerve excurrent from the

blunt apex, margin strongly revolute; caps. reddish brown oval-oblong, with a scarcely oblique lid; seta red: dioicous.

Walls, mostly limestone. v.

162. *T. HORNSCHUCHIANA*. Schultz. Loosely cæspitose, l. crowded, spreading, ovate-lanceolate, gradually tapering to an acute point, formed by slightly excurrent nerve, margins slightly revolute; caps. oblong slightly curved, annulus narrow: dioicous.

Rocks, walls, and banks, not common. iv. v.

163. *T. VINEALIS*. Brid. St. more tufted than in *T. fallax*; l. strictly patent with a stouter nerve, which is obscure towards the acute apex; the latter usually tipped with a pointed hyaline cell; appressed when dry, not crisped or contorted; caps. sub-cylindrical: dioicous. (W. Mitten, in Jour. Bot. v. 324.)

Walls. iv. v.

164. *T. INSULANA*. De Not. (*T. vinealis* β . *flaccida*. Bryol. Brit. 124.) St. loosely cæspitose; l. linear-subulate from a lanceolate appressed base, recurved or hooked, obliquely patent, acute, margin recurved below, above plane, nerve excurrent; contorted when dry; caps. oblong erect; lid conical attenuate, somewhat obtuse, half as long as capsule: rare in fruit. (loc. cit. 328.)

England and Ireland.

* [*T. GRACILIS*. Schw. Stem cæspitose, branches fastigiate; "l. erecto-patent, imbricated when dry, carinato-concave, margin recurved, nerve excurrent; per. l. larger, sheathing subulate, and flexuose at apex; caps. ovate-oblong or ovate; perist. scarcely contorted, with a broadish basilar

membrane."—Wils. Bryol. Brit. p. 123. Inserted from Wilson, but has not yet been certainly found in Britain.]

Spring.

165. *T. RIGIDULA*. Hedw. (*Trichost. rigidulum*, var. β . *densum*. Bryol. Brit. 114.) l. lanceolate carinate, rigid, bristly, not appressed and imbricate, when dry slightly curved and loosely contorted; nerve stout continued into a thick obscure point, not really excurrent; fruit similar to No. 164. (loc. cit. 327.)

Scotland, York, Sussex, and Cornwall.

166. *T. SPADICEA*. Mitt. (*Trichostomum rigidulum*. Bryol. Brit., p. 114.) St. robust 1-2in.; l. patent from the base, lanceolate-subulate, canaliculate, margin recurved below; incurved and closely imbricate when dry; nerve percurrent and distinct to apex; per. l. lower half erect broadly ovate, upper narrow, recurved; caps. erect cylindrical on a red seta; lid shortly subulate, twisted; teeth narrow, on a short membrane: dioicous. (loc. cit., p. 326.)

Rocks and stones near water. Scotland, Ireland, Bolton Abbey. Autumn, Winter.

167. *T. FALLAX*. Hedw. St. $\frac{1}{2}$ -lin. cæspitose; l. lanceolate from a broadish base, keeled, margin recurved, somewhat squarrose, gradually tapering and nerved to apex; per. l. sheathing; caps. variable both in size and shape, usually subcylindrical, with an obtuse rostrate lid often as long as itself: dioicous.

Clay and limestone banks.

XI. XII.

168. *T. REFLEXA*. Brid. [*T. fallax*. δ . Bry. Brit.] St. loosely cæspitose; l. tristichous, recurved and falcate, slightly

twisted, from an oblong base lanceolate, keeled, strongly papillose on both sides, margin reflexed below, nerve vanishing below apex; caps. erect cylindrical regular; lid subulate beaked: dioicous.

Calcareous rocks and walls, rare in fr.

Scotland, Yorkshire, Derbyshire; Rydal Water (Baker).
[Dr. Braithwaite, Jour. of Bot. ix., 293.]

169. *T. RUFA*. (Lorenz). Braithwaite. "St. 2-5in, often prostrate at base, sparingly dichotomous, dense leaved. L. recurved when moist, solid from an ovate base lanceolate, gradually apiculate, margin strongly recurved, nerve vanishing just below apex; cells at base rhomboid pellucid, at apex minute quadrate papillose. ..Reported from Ben Lawers by Dr. Stirton, but I have not seen British specimens."—[Dr. Braithwaite, l. c. 293.]

170. *T. RECURVIFOLIA*. Mitt. (*T. gigantea*, Lindb.). "In large fuscous green tufts, blackish brown at base. St. 3-8in. simple or bi-tripartite, robust dense leaved, with a few radicles. L. trifarious squarroso-recurved, when dry twisted and crisped, elongate lanceolate concave, margin strongly revolute, nerve strong, reaching apex; basal cells elongate with sinuous walls, above irregularly stellate." (l. c. 293.)

Dripping alpine rocks. Ben Bulbin, Sligo (Moore).

Buxton in fruit, June, 1865. G. E. Hunt.

SECT. IV. SYNTRICHIA. Lower portion of peristome forming a long tube.

171. *T. PRINCEPS*. De Not. (*T. Mulleri*. B. & S.) St. 1-2in., cæspitose, with brownish radicles; l. erecto-patent,

oblong broad, concave, fawn-coloured, margin reflexed; nerve excurrent into a short scabrous hair point from a rounded obtuse apex; caps. cylindrical, straight or curved on a purplish seta; one-half perist. tubular: synoicous.

Rocks, Scotland.

Spring.

172. *T. RURALIS*. Hedw. Cæspitose, branches dichotomous; l. squarrose, recurved ovate-oblong keeled, nerve excurrent into a long scabrous hair point from the obtuse apex, margin slightly recurved; caps. sub-cylindrical slightly curved; quite one-half perist. tubular; lid long conical: dioicous.

Walls and roofs.

III. IV.

173. *T. LÆVIPILA*. Brid. Cæspitose; l. spreading obovate oblong or almost panduriform, margin slightly recurved below, nerve reddish, excurrent into a longish white hair point from the obtuse apex; caps. cylindrical, slightly curved, lid conical; one-third perist. tubular: monoicous.

Trunks of trees and rocks.

V. VI.

174. *T. INTERMEDIA*. Brid. (*T. ruralis* β *minor*, Wils. Bry. Brit.) Smaller and densely cæspitose or sub-pulvinate; l. erecto-patent, oblong spathulate apex obtuse, nerve excurrent into a long scabrous hair point; caps. shorter than in 172: dioicous.

Limestone walls, Scotland and N. Wales.

Spring.

175. *T. PAPILLOSA*. Wils. Cæspitose; l. spreading obovate concave, margin plane (involute when dry), nerve thick papillose on the back, and excurrent into a smooth hair

point from suddenly tapering apex ; a few hyaline cells at base : fr. not known.

Wales, Sussex, and Hampshire.

176. *T. LATIFOLIA*. B. & S. L. obovate-spathulate or almost panduriform, soft and flaccid, with a scarcely excurrent nerve, notched at the obtuse apex ; caps. cylindrical slightly curved, with a long rostrate lid ; quite one-third of perist. tubular ; annulus small : dioicous.

Roots of trees, stones, &c. ; fruit rare.

Spring.

177. *T. SUBULATA*. Brid. Cæspitose, simple or branched ; l. oblong-lanceolate, narrowed and pellucid at base, margin plane, sometimes with a row of larger cells, nerve excurrent into a short mucro, apex sometimes slightly toothed ; caps. very long cylindrical curved with a short lid ; half peristome tubular : monoicous.

Sandy hedge-banks, walls, &c.

v. vi.

SECT. V. *TORTUOSÆ*. L. strongly twisted and cirrhate when dry.

178. *T. TORTUOSA*. W. & M. St. $\frac{1}{2}$ -3in. tufted ; l. very long linear-lanceolate, crowded flexuose, margin plane and undulated, with an excurrent nerve ; per. l. narrow and tapering cirrhate ; caps. straight or incurved, erect or inclined, ovate-oblong, on a longish seta : dioicous.

Limestone rocks, Derbyshire.

vii.

179. *T. HIBERNICA*. Mitt. St. 2in. branched ; l. at apices of branches sub-comose and stellate ; base dilated and clasping above, thence patent or patienti-divergent, straight, rarely incurved or recurved, channelled, cirrhate when dry ;

ovate-lanceolate below, thence lineal-subulate, acute, nerve yellow continued to apex. (loc. cit. p. 329.)

Mountains near Dunkerran, common, but always sterile. (Dr. Taylor.)

180. T. NITIDA. Lindb. 1864. (*Trichost. diffractum*, Mitt. 1868.) Dioicous, densely pulvinate: stem rigid branched; l. crowded erecto-patent, arcuate when dry, more or less elongate, oblong, obtuse, channelled, margin plane slightly undulate, nerve terete prominent on back, excurrent; areolation minute, loose and cuneiform at base; fr. not known. (l. c. IX., 294.)

Clifton, Torquay, Plymouth.

181. T. SINUOSA. Mitt. Jour. of Bot. v., 327. (*Dicranella*, Wils. MS.; *Trichostomum*, Lindb.) Densely cæspitose, fuscous below, l. long linear-lanceolate or subulate patent from a very short pellucid base, margin slightly recurved below, above denticulate, nerve continued into a thick obscure blunt point, often broken off; basilar cells all oblong and rectangular; fr. not known.

Shady places at roots of trees, Sussex, Cornwall, Bangor.

182. T. FRAGILIS. Wils. (*Trichostomum*, Müll. Syn.) Stem erect simple or dichotomously branched, radiculose tomentose at base; l. crowded lanceolate-subulate, nerve excurrent, margins plane; areolæ minute, large and hyaline at base; caps. erect, ovate-oblong, regular or slightly incurved; lid conical with a long oblique beak; fruit rare. (l. c. IX., 294.)

Clefts of rocks and on the ground. Ben Lawers.

Summer.

183. *T. squarrosa*. De Not. St. lin. cæspitose; l. squarrose, lanceolate, recurved, with a broad sheathing base, margin undulate, with large diaphanous cells, somewhat serrulate at apex; nerve scarcely excurrent; capsule sub-cylindrical, narrow, slightly curved; lid conical, half as long as capsule; seta lin. long: dioicous.

Chalk. Ireland and S. of England; fr. not known in this country.

28. CINCLIDOTUS. B. & S.

[*C. riparius*. Walker Arnott. Acrocarpous; branches fasciculate; "l. spreading oblong-lanceolate, obtuse, with thickened margins, very shortly mucronate, nerve excurrent; caps. exerted on a short thick pedicel, elliptic oblong; lid obliquely conico-rostrate; perist. with numerous subdivisions."] Bry. Brit. 138.

Not found in Britain, but

IV.

var. β . *terrestris* has been frequently found, and is now referred to *Tortula mucronata*, to which refer.

184. *C. fontinaloides*. P. Beauv. Cladocarpous; st. 2-5in., in long straggling tufts, generally floating; l. crowded, spreading, flexuose, lanceolate, acute, with a thickened margin and strong excurrent nerve; per. l. larger sheathing ovate-lanceolate, thinner; caps. immersed, with a conical beaked lid; calyp. persistent, thick, split on one side.

Stones in rivulets, &c.

III. IV.

29. ENCALYPTA. SCHREB.

a. Monoicous.

1. Peristome wanting.

185. *E. commutata*. N. & H. Stems about lin.

branched radiculose; l. squarrose, from an erect ovate base lanceolate, concave, acute, nerve excurrent; caps. smooth cylindrical, with a long beaked lid; calyp. jagged but not fringed at base.

Alpine summits. Scotland.

VII. VIII.

2. Peristome single.

186. *E. VULGARIS*. Hedw. St. about $\frac{1}{2}$ in. branched, radiculose; l. spreading, elliptic-lanceolate, oblong, acute or obtuse, nerve sometimes excurrent; margin plane; caps. smooth cylindrical; base of calyptra entire; perist. very fugacious.

Limestone walls, rocks, &c.

III. IV.

var. β . perist. none, leaves apiculate (common).

γ . perist. none, l. obtuse and concave at apex.

δ . perist. none, l. obtuse; caps. oblique.

ϵ . perist. none, l. piliferous.

187. *E. CILIATA*. Hedw. St. about $\frac{1}{2}$ in. radiculose; l. oblong-ovate, margin recurved below, and toothed near apex; gradually tapering to a point formed by the excurrent nerve, undulate; caps. cylindrical, smooth; perist. persistent; calyptra fringed at base.

Sub-alpine rocks.

VI. VII.

188. *E. RHABDOCARPA*. Schw. St. $\frac{1}{2}$ -1in. radiculose; l. spreading, erect and crisped when dry, oblong-lanceolate, nerve generally more or less excurrent into a mucro, margins plane; caps. oblong-cylindrical, striate, ribbed when dry; perist. persistent; calyp. slightly toothed at base, and roughish at apex.

Mountains in Scotland and Ireland.

VII. VIII.

b. Dioicous : perist. double.

189. *E. STREPTOCARPA*. Hedw. St. 1-2in. radiculose ; l. sub-erect, ligulate, obtuse and cucullate at apex, nerve not excurrent ; per. l. lanceolate-subulate from an ovate base ; caps. oblong narrowed above, spirally striate, and twisted when dry ; perist. outer teeth filiform, inner cilia ; calyp. toothed or fringed at base, and roughened at apex.

Limestone and mortared walls ; rare in fr.

VIII.

30. HEDWIGIA. Ehr.

190. *H. CILIATA*. Hedw. Monoicous ; dichotomously branched, rooting at base only ; l. crowded, spreading, sometimes secund, ovate-lanceolate, concave, margin recurved below, apex diaphanous, prolonged to a blunt point and strongly toothed on each side ; per. l. with apex laciniate ; caps. immersed globose ; lid convex with a short beak ; calyp. conical, sometimes hairy.

Rocks in mountainous districts. N. Wales, Arthur's Seat, &c.

III.

Bry. Brit. gives as varieties—

β . *leucophæa*. l. more crowded and spreading, wider and with longer diaphanous points.

γ . *secunda*. procumbent slender ; l. more distant, secund, sub-muticous.

δ . *viridis*. l. scarcely secund ; spreading, deep green, scarcely diaphanous at apex.

ϵ . *striata*. l. plicate much recurved ; lid conical.

31. HEDWIGIDIUM. B. & S.

191. *H. IMBERBE*. B. & S. St. 1-3in. irregularly, not dichotomously branched, flagelliferous; l. ovate-lanceolate, acuminate, imbricate when dry, margin recurved, apex not diaphanous, but slightly crenate; caps. exerted on a short seta, spherical or obovate; lid with a blunt slightly oblique beak; calyptra cucullate, reddish.

Rocks. Wales and Ireland.

x. XI.

32. GRIMMIA. EHR. B. & S.

SECT. I. SCHISTIDIUM. Caps. smooth, immersed on a very short straight seta, calyptra small, cleft at base into several lobes.

192. *G. CONFERTUM*. B. & S. Cæspitose; intense green above, blackish below; l. ovate-lanceolate, tapering in the upper ones to a short hair point; margins slightly recurved and thickened, nerve strong, deeply channelled on its upper side; caps. small ovate, with a rostellate lid, almost pellucid; per. teeth much perforated, pale or orange red.

Rocks, Scotland.

II. III.

β. urceolare. caps. urceolate; leaves with white points.

γ. obtusifolium. l. all obtuse, shorter and broader.

δ. incana. (*G. pruinosa*. Wils. MS.) more robust, per. l. broader with long hair points; caps. more elongate, per. teeth stronger, nearly entire red. [Dr. Braithwaite, Jour. Bot., N. S., vol. I., 195.] Trap rocks. King's Park (Greville); Arthur's Seat, Edinburgh (Bell); Fife (Howie).

193. *G. APOCARPUM*. B. & S. Loosely cæspitose; l. spreading lanceolate acuminate from an ovate erect base, upper ones with white points, margins much recurved; nerve ceasing below apex; per. l. larger with a thinner nerve; caps. elliptical, not pellucid, with an oblique beaked lid; per. teeth dark red; calyptra divided at base.

Rocks and walls, sometimes on trees.

XI.—III.

var. β . *gracile*. per. l. secund, others sub-sekund or spreading, stem decumbent elongated.

γ . *rivulare*. st. fasciculate, l. ovate-lanceolate dark green obtuse; caps. turbinate. (By streams.)

δ . *strictum*. l. reddish brown, rigid.

194. *G. MARITIMUM*. B. & S. Cæspitose, dull green or brownish; l. rigid, not hair-pointed, straight lanceolate acuminate, keeled; nerve strong, reddish brown, excurrent, margin plane; caps. obovate with a rostellate lid; per. teeth large and perforate.

Rocks near the sea. Scotland.

XI. XII.

SECT. II. GASTERO-GRIMMIA. Plants very short pulvinate; caps. slightly emerging, ventricose on one side, on a short curved seta; calyptra five-lobed or cucullate.

195. *G. ANODON*. B. & S. In small hoary cushions; l. lower minute loosely imbricate, ovate lanceolate muticous, upper larger, broadly oblong-lanceolate concave, nerve excurrent into long serrated hair; basal cells elongate pellucid, above quadrate opaque; caps. immersed, oval gymnostomous, strongly ventricose; lid plano-convex: monoicous.

Walls and dry limestone rocks. Arthur's Seat (Bell).

196. *G. CRINITA*. Brid. In loose flat silky tufts; l. imbricate, lowest lanceolate, muticous, upper obovate-oblong channelled, the broad diaphanous apex continued into a long hair, nerve not reaching apex; basal cells elongate diaphanous, upper large rounded thickened; caps. ovate, lightly striate, sub-cernuous, furrowed when dry; lid convex with an obtuse point; cal. dimidiate, two-lobed: monoicous. [Dr. Braithwaite, Jour. Bot. N. S., vol. I., 195.]

Mortar of old walls and limestone rocks. Near Hatton, Warwick, 1872 (J. Bagnall).

SECT. III. EU-GRIMMIA. L. ending in a hair point; caps. plicate, exerted on a curved seta; cal. multifid at base, or with a single cleft at side.

197. *G. ORBICULARIS*. B. & S. Densely pulvinate; l. oblong lanceolate, rounded obtuse at apex, with nerve excurrent into a long hair point, basal cellules large; caps. almost spherical drooping on a curved yellowish seta, slightly striate; lid small convex; annulus narrow; per. teeth trifid, more distantly barred than the next; calyptra dimidiate: monoicous.

Limestone rocks.

II. III.

198. *G. PULVINATA*. Sm. Densely pulvinate; st. $\frac{1}{2}$ -lin. l. elliptic lanceolate, margin recurved, apex rather obtuse, terminated by the nerve excurrent into a long hair point; caps. drooping reddish brown, ovoid, eight-furrowed; lid convex with a straight beak; calyptra lobed at base; per. teeth dark red bi-trifid, annulus large: monoicous.

Rocks and walls.

III. IV.

β. obtusa. lid short obtuse; caps. shorter.

199. *G. SCHULTZII*. Brid. L. crowded, sub-secund, lanceolate, tapering into a long rough diaphanous point, margins recurved; caps. slightly obovate, furrowed, on a very short curved seta; annulus large; per. teeth long tapering, deeply bifid; monoicous.

Sub-alpine rocks. E. S. W.

IV. V.

200. *G. SUBSQUARROSA*. Wils. MS. Dr. F. B. White. Bot. Soc. Edin. Trans. IX., 142. In lax dark green tufts, fuscous at base; st. $\frac{1}{3}$ - $\frac{3}{4}$ in. with dichotomous short curved branches; l. patent squarrose, erect and appressed when dry, lowest from an ovate base gradually lanceolate, muticous, upper longer and extended into a long denticulate hair point, nerve strong, margin recurved; basal cells quadrate hyaline, marginal narrow and elongate, above minute rounded quadrate. Fr. not known. [Dr. Braithwaite, l. c., p. 196.]

Rocks. Kinnoul Hill, Perth (Dr. B. White); Moncrieff Hill (Dr. Stirton); Arthur's Seat and Braid Hills, &c.

201. *G. ROBUSTA*. Fergusson MS. In large loose tufts, black below, dark green and hoary above; br. fastigiate; l. erecto-patent, appressed when dry, keeled at back with the strong nerve, margin recurved below; lower short muticous, lanceolate from a contracted ovate base, upper longer, gradually tapering into a long smooth hair point; cells quadrate thickened, at centre of base longer, with a single row at margin of basal wing hyaline. [Dr. Braithwaite, l. c. p. 196.]

Alpine rocks. Clova (Fergusson); Fairhead, Ireland, (Dr. Moore); Cardross and Bowling (Dr. Stirton); Ross-shire (Hunt).

202. *G. CONTORTA*. Wahl. In small deep green soft tufts, black below and radiculose; l. patent incurved, curled when dry, lineal subulate from a lanceolate base, with short diaphanous hair points, keeled, margin recurved below: basal cells diaphanous elongate hexagono-rectangular, above sinuous and quadrate; per. l. erect sheathing; caps. small oval smooth yellowish, cernuous on a subarcuate seta, erect when dry, lid convex conical obtuse orange-red: dioicous. [Dr. Braithwaite, l. c. p. 197; Schp. Syn. 210.]

Quartz rocks. Cheviots (Hardy); Cloch-na-ben (Sim); Glen Callater, &c. (Fergusson).

203. *G. TORQUATA*. Grev. (*G. torta*. N. & H. Bry. Brit.) Loosely tufted elongate; st. 1-2in. dichotomous; l. lanceolate-acuminate, spirally twisted when dry, channelled, occasionally hair-pointed; fruct. not known.

Alpine rocks. E. I. S.

204. *G. FUNALIS*. Schwgn. (*G. spiralis*. H. & T. Bry. Brit.) Densely pulvinate; st. $\frac{1}{2}$ -lin. slender; l. oblong or ovate-lanceolate, erecto-patent, upper ones tapering into a long hair point, nerve not excurrent; caps. ovoid, smooth, eight-furrowed when dry; lid short apiculate; annulus large compound; calyp. five-lobed at base; per. teeth closely bifid: dioicous.

Dry alpine rocks. E. S. I.

x. xi.

205. *G. MUHLENBECKII*. Schpr. Loosely pulvinate and cæspitose; st. tall erect or procumbent dichotomous and rooting at base; l. densely crowded, patulous, erect when dry, elongate-lanceolate, keeled with the strong nerve, margin plane, lower with a short, upper with a long, rough hair

point with recurved teeth; basal cells elongate, upper rounded quadrate; caps. small oval glossy, rugulose when dry yellowish brown, lid convex with a short beak, red. [Dr. Braithwaite, l. c., p. 197. Schp. Syn. p. 212.] VII.

206. *G. TRICHOPHYLLA*. Grev. Loose yellowish green tufts, $\frac{1}{4}$ -1 in. l. linear-lanceolate from an erect base, flexuose, tapering into a long diaphanous point, margin recurved at base, nerve not excurrent; caps. ovate-oblong, furrowed when dry, lid with a long straight beak; annulus larger; per. teeth bifid; calyp. lobed: dioicous.

Walls. E. S. I.

IV. V.

207. *G. HARTMANNII*. Schp. Loosely cæspitose, green above, black below; st. elongate procumbent rigid, arcuate ascending, dichotomous; l. elongate-lanceolate; upper ones secund, prolonged into a short smooth hair point, somewhat concave, margin more or less recurved; basal cells sinuoso-rectangular hyaline, above quadrate opaque; fruit not known. [Dr. Braithwaite, l. c. p. 197. Sch. Syn. 214.]

Shaded quartzose rocks. Wales and Scotland.

208. *G. ELATIOR*. B. & S. Robust, loosely cæspitose; fuscous green, hoary at top; st. sparingly branched elongate, from decumbent naked base ascending; l. very long curved patent, from oblong carinato-concave base longly lanceolate, margin revolute, ending in a long smoothish hair point; basal cells linear-rectangular, wider towards margin, above rounded opaque; caps. ovate ten-ribbed, when dry oblong deeply furrowed; lid conical muticous or sub-aciculate: dioicous. [Bry. Eur. III. Dr. Braithwaite, l. c. 197.]

Granite rocks. Clova, 1868 (Fergusson).

SECT. IV. GUEMBELLIA. L. not curling, generally piliferous; caps. smooth on a straight seta; cal. multifid at base or cucullate.

209. *G. DONNIANA*. Sm. Stems $\frac{1}{4}$ – $\frac{1}{2}$ in. tufted, l. erecto-patent, lanceolate-elongate narrow, tapering into a roughened hair point, margin plane; per. l. longer; caps. erect oval-oblong, slightly exserted, pale yellowish brown, lid obtuse conical; annulus small; per. teeth broad, sometimes perforate: monoicous.

Mountain rocks and walls. E. S. W. III. IV. X.

var. β . *sudetica*. l. with longer hair points; caps. immersed; lid conico-acuminate.

γ . *elongata*. l. scarcely hair-pointed, caps. on a longish seta.

210. *G. UNGERI*. Juratzka. Compact irregular blackish green, hoary tufts; st. short simple or dichotomous; l. erecto-patulous, lower smaller muticous, upper larger lanceolate from an obovate base, ending in a long smooth hair point, margin plane; basal cells quadrate hyaline, above quadrate, then opaque and indistinct; caps. small oval smooth, without annulus, exserted on an erect pale brown seta; lid conical obtuse, calyp. cucullate: monoicous. [Dr. Braithwaite, l. c., 198.]

On earth in crevices of rocks at 1600 feet at Ballater (Rev. J. Fergusson).

211. *G. OVATA*. W. & M. St. $\frac{1}{2}$ in. or more, branched fastigiate; l. spreading, erect when dry, lanceolate tapering into a roughish hair-point, nerve broad indistinct, margin recurved below; caps. ovoid erect exserted reddish brown,

annulus large, lid rostellate, with a groove round its base ; per. teeth narrow, cleft and perforate : monoicous.

Alpine rocks. Breadalbane and Clova; Snowdon; Charnwood Forest. x.—III.

212. *G. LEUCOPHEA*. Grev. Dark green hoary tufts; st. $\frac{1}{2}$ in.; l. erect, spreading, when dry closely imbricate, upper ovate or elliptical concave, with very long hair points and plane margins, lower ones muticous; caps. smooth elliptical or oblong erect, exserted, with a short conico-rostellate lid, and large dehiscent annulus : dioicous.

Scotland, Devon.

IV.

213. *G. COMMUTATA*. Hueb. Loosely tufted, blackish green, hoary at top; stems slender flexuose, naked below; l. lower small loosely imbricate, upper much longer ovate lanceolate, from a broad upright base declining, shortly hair-pointed; per. l. three internal erect sheathing, longly pointed; basal cells rectangular, upper quadrate; caps. ovate or ovate-globose erect, smooth, exserted, lid acutely and obliquely rostrate, annulus broad. [Schp. Syn. p. 109. Dr. Braithwaite, l. c. 198.]

Dry quartzose rocks. Moncreiff Hill, Perth (Dr. Stirton); Dunkeld (Dr. B. White); Clova, in fr. (Fergusson.)

Spring.

214. *G. MONTANA*. B. & S. St. slender dichotomous; l. erecto-patent oblong-lanceolate with a long hair-point, very concave, margin erect; basal cells diaphanous quadrato-hexagonal, above minute rounded thickened opaque; caps. erect on a short seta, ovate small brown very smooth; lid, obliquely rostrate; calyptra large cucullate long-beaked,

annulus simple; per. teeth irregularly torn. [Dr. Braithwaite, l. c. 199.]

Sandstone and granite rocks. Deeside, Aberdeenshire, 1869 (Prof. Barker and Mr. Roy); Bolt Head, Devonshire, in fruit (Mr. Holmes).

215. *G. ELONGATA*. Kaulfuss. In loose cushioned tufts, black below, innovations olive green with hoary tips. St. slender, repeatedly dichotomous, naked below without radicles. L. patulous, lower lanceolate muticous, upper elongate-lanceolate obtuse with the apex diaphanous, margin erect, basal cells rectangular hyaline at margin, becoming minute and quadrate above; caps. ovate erect smooth pale brown, on a straight seta; lid conical obtuse, annulus narrow; per. t. lanceolate red entire or slightly perforate; calyp. multifid, long beaked. [Dr. Braithwaite, l. c. 199.)

Alpine rocks. Glen Callater and Glen Phee, Clova, 1868 (Fergusson); near Glasgow (Dr. Stirton).

216. *G. UNICOLOR*. Grev. St. 1-2in. loosely caespitose, naked below; branches brittle flexuose; l. erect channelled lanceolate-subulate from an ovate base, obtuse, not hair-pointed, rigid, margin incurved, broadly nerved to apex; caps. ovate, nearly erect, with a large annulus and a long straight or slightly inclined beak: dioicous.

Alpine rocks, Clova.

iv. (?)

217. *G. ATRATA*. Miel. St. caespitose, 1-2in., l. blackish, rigid, erecto-patent lanceolate-subulate, carinate, margin reflexed, scarcely so obtuse as the last, with a thinner nerve scarcely reaching to apex. Caps. elliptic-oblong on a longer

seta, with a large annulus and short rostellate lid : dioicous.
Alpine rocks. Snowdon, Glen Callater. x.—iv.

33. RACOMITRIUM. B. & S.

A. Dichotomously branched, innovations simple fastigate.

218. R. (DRYPTODON) PATENS. Bridel. Bry. Univ., I., 192. (*Grimmia patens*. Bry. Brit., p. 158.) In dark green or fuscous tufts; st. 2-4in. branched, decumbent and naked below; l. spreading or slightly secund, oblong-lanceolate, gradually tapering to a blunt apex, margin recurved below, nerve strong two-winged at back; per. l. shorter; caps. almost obovate smooth, furrowed when dry, on a pale flexuose seta; annulus large; cal. five-lobed : dioicous.

Moist alpine rocks. S. I. W. iv. v.

219. R. ELLIPTICUM. B. & S. Blackish rigid tufts; st. 1in. decumbent and naked below; l. spreading from an erect base lanceolate oblong, strongly nerved to apex, margins plane thickened; caps. erect roundish smooth, on a short thick seta; lid large conical with a long slender subulate beak : dioicous.

Moist alpine rocks. Scotland, Wales, Ireland. xi.—iv.

220. R. ACICULARE. Brid. St. 1-3in. cæspitose, decumbent and naked at base, branches very leafy; l. spreading or secund, ovate-oblong or broadly lanceolate, obtuse, sometimes toothed at apex, to which the nerve does not reach; caps. erect oblong smooth, with a small mouth, and on a longer and thinner seta, lid with a long straight subulate beak : dioicous.

Wet mountainous rocks by streams. xi.—iv.

var. β . *denticulatum*. l. distinctly and distantly toothed at apex.

221. *R. PROTENSUM*. A. Braun. St. less rigid than last, and leafy at base; l. generally secund lanceolate-subulate obtuse, nerved to apex; per. l. sheathing; caps. sub-cylindrical thinner, on a pale seta; lid with a long subulate beak; calyp. lobed at base; dioicous.

Moist alpine rocks. Wales, Derbyshire, Yorkshire. IV.

222. *R. SUDETICUM*. B. & S. St. slender, decumbent and naked at base, l. spreading recurved keeled lanceolate tapering into a long whitish diaphanous denticulate point; caps. small ovoid on a short seta, lid with a shorter acute beak. IV.

B. Branches irregular, with lateral ramuli; innov. not fastigiate.

* L. without diaphanous points.

223. *R. FASCICULARE*. Brid. St. 1-2in., decumbent at base, with upright innovations, fasciculate; l. crowded, from a broadish erect base lanceolate spreading, muticous, margins recurved, areolæ long narrow sinuous; caps. elliptical with a long subulate lid; calyp. copiously papillose.

Rocks. III.

* * L. with diaphanous points.

224. *R. HETEROSTICHUM*. Brid. St. $\frac{1}{2}$ -1in., base decumbent, branches scarcely fasciculate; l. sometimes secund, lanceolate tapering to a long white denticulate point, margin recurved, areolæ long and sinuous below, above sub-quadrate; caps. sub-cylindrical, mouth very small; calyp. somewhat papillose at apex only; lid short obliquely rostrate.

Rocks and walls. E. W. I. III.

var. β . *alopecurum*, l. with short hair points; caps. smaller.

γ . *gracilescens*. l. obtuse, caps. small, on a short seta.

225. *R. MICROCARPON*. Brid. St. slender fasciculate with short branches; l. spreading falcato-secund, lanceolate tapering to a short point, areolæ all long and sinuous; caps. small ovate, thin and pale, with a robust rostrate lid. Highlands of Scotland.

226. *R. LANUGINOSUM*. Brid. St. very long and slender, fasciculate; l. lanceolate tapering into a long strongly dentate point, sometimes secund or spreading from an erect base; areolæ sinuous; caps. small ovoid, on a short roughish seta, and with a long straight rostrate lid; calyp. papillose above.

Mountains, walls, rocks, and heaths. III.

227. *R. CANESCENS*. Brid. St. 2-4in. decumbent at base; l. ovate-lanceolate tapering into a long denticulate point, recurved from an erect base, areolæ sinuous; caps. ovoid eight-striate when dry, with a very long subulate lid; calyp. papillose above.

Stony and sandy heaths. III.

var. β . *prolixum*. older innovations only with fasciculate ramuli.

γ . *ericoides*. covered with fasciculate ramuli; l. squarrose.

34. GLYPHOMITRIUM. SCHWG.

228. *G. DAVIESII*. Schwg. St. $\frac{1}{2}$ in. cæspitose; l. linear-lanceolate spreading entire, margin thickened and reflexed

below, strongly nerved to apex, areolæ minute, larger at base; caps. erect, almost globose, with a reddish mouth and long rostrate lid; per. teeth converging when moist, reflexed when dry; calyp. large, laciniate at base.

Clefts of rocks.

VI. VII.

Giant's Causeway; Llanberis; Glenaribuck, May, 1863 (W. Galt and McCartney); New Kilpatrick, Killin (McKinlay); Ardtun Mull (Dr. Black); Skye (Hunt); Blairlogie; Craigallion; Campsie Hills (Thompson and Galt).

35. PTYCHOMITRIUM. B. & S.

229. *P. POLYPHYLLUM*. B. & S. St. 1-2in. tufted; l. linear-lanceolate from a broadish base, spreading, nerved to the dentate acute apex; caps. elliptical on a long twisted seta; calyp. plicate; lid long subulate.

Mountainous rocks and walls.

III. IV.

36. ORTHOTRICHUM. B. & S.

A. Caps. on a very short seta, immersed or shortly exerted; ochrea distinct, calyptra with about ten furrows.

1. Caps. with 16 furrows.

230. *O. CUPULATUM*. Hoffm. St. under 1in.; l. spreading lanceolate keeled, lower brownish, nerve distinct; caps. obovate, urceolate when dry, with a shortly beaked lid; calyp. hairy; perist. simple, of 16 free equidistant teeth, spreading when dry.

Rocks and walls.

IV. V.

2. Caps. with eight furrows.

231. *O. STURMII*. Hop. & Hornsch. In loose cushions; st. short and erect, or longer and prostrate; l. patent and

recurved when moist, incumbent when dry; margin sub-revolute, acutely costato-carinate; caps. generally immersed, obovate, with eight obsolete striæ, when dry eight-ribbed and constricted below the mouth; calyp. more or less hairy, shining; per. teeth simple 16 equidistant, erect when dry, slightly incurved. [Bry. Eur. III., t. 109.]

Trap rocks. S. I. (Dr. Wood.) Summer.

232. *O. SHAWII*. Sch. Resembles the last, but differs by its leaves being less solid and of looser texture at base; cells in one row always (not in two); by the fewer hairs on its shorter glossy white calyptra; and by its per. teeth densely papillose white and reflexed when dry. [Supp. Bry. Eur., fasc. I. II.]

On an ash tree at Kilkerran Castle, Argyleshire, 1860 (J. Shaw). VI.

233. *O. OBTUSIFOLIUM*. Schrad. In loose yellowish green tufts, brownish below; l. patulous oblong from an ovate base, apex obtuse hyaline and minutely serrulate, concave, margin incurved, papillose at back, per. l. broader and less obtuse: caps. oval immersed with eight orange striæ; cal. long naked whitish, with a brown tip; lid convex acuminate; per. teeth eight bi-geminate reflexed when dry, alternating with eight cilia: dioicous. (Bry. Eur. III., t. 208.)

On trunks of trees. York, Bristol. v.

234. *O. PUMILUM*. Swartz. (*O. fallax*, Br. Wils. B. & S. but not Schp. Syn.) Minute pulvinate; l. lanceolate acute, carinate, margin revolute; per. l. longer erect; caps. oblong, with eight orange striæ, neck gradually tapering into the seta; cal. long shining brown at apex; per. teeth eight bi-geminate yellow, densely papillose, reflexed when dry.

Ash trees at Inverkip and Dailly, Ayrshire.

235. *O. FALLAX*. Schp. Syn. 264, *non* Bruch. (*O. pumilum*, Dicks, Bry. Brit. B. & S., Müller, &c.) Differs from the above in having a more oblong thicker capsule, with deeper yellow striæ, with its neck shorter abrupt, not gradually narrowed, and with a shorter more inflated calyptra; l. elliptic-lanceolate and obtuse.

On trees, not common. E. I.

236. *O. TENELLUM*. Bruch. St. $\frac{1}{2}$ in. tufted; l. spreading, lanceolate-oblong or ligulate, obtuse; caps. yellow-brown, exserted, sub-cylindrical, not contracted at mouth when dry, broadly and distinctly striate; calyp. with a few short hairs, conico-campanulate, yellow; perist. yellow, eight teeth and eight cilia.

Trees, E. I. W.

v. VI.

237. *O. PALLENS*. Bruch. St. erect short tufted; l. spreading, lanceolate or ligulate obtuse, margins revolute; caps. elliptic-oblong with a large apophysis, scarcely exserted, slightly contracted at mouth when dry; striæ broad; calyp. large pale yellow hairless. Perist. of eight yellow teeth and 16 cilia.

Trees. York.

VI.

238. *O. STRAMINEUM*. Horns. St. short tufted; l. spreading, narrowly lanceolate acuminate, keeled, margin reflexed; caps. ovate-pyriform slightly exserted, striæ broad; calyp. large campanulate purple-tipped, slightly hairy; perist. 8 teeth, and 16 (sometimes only eight) cilia; vaginula hairy.

Trees and rocks. E. S. W.

VI. VII.

239. *O. FASTIGIATUM*. Bruch. St. longer, tufted with fastigiate branches; l. broader lanceolate, gradually tapering

to a point, sub-erect; caps. almost pyriform, scarcely exserted, with broad striæ; calyp. brownish yellow hairy; per. teeth eight, and 16 broad short cilia.

Solitary trees, Yorkshire and Sussex.

v. vi.

240. *O. AFFINE*. Schrad. St. $\frac{1}{2}$ -lin. tufted branched; l. spreading, oblong-lanceolate, with a blunt point, margin revolute and slightly undulate, strongly papillose on both sides; caps. elliptic-oblong, somewhat exserted, contracted when dry, striæ narrow. Perist. eight pale teeth and eight filiform cilia; calyp. large greenish yellow hairy.

Trees, walls, &c., common.

vi. vii.

241. *O. RUPESTRE*. Schl. St. lin. or more, cæspitose, creeping at base; l. broadly lanceolate, spreading, slightly recurved; caps. pyriform, mouth large, scarcely exserted, striæ indistinct; calyp. large yellow, with long hairs; perist. 16 pale teeth in pairs (equidistant when dry), and eight cilia.

Mountainous rocks.

vii. viii.

var. β . *rupicola*. "l. sub-erect, caps. smaller."

γ . "stem longer; caps. exserted, calyp. very hairy."

242. *O. SPECIOSUM*. Nees. St. lin. or more, tufted, branched; l. spreading, lanceolate, somewhat pointed, papillose, margins recurved; caps. shortly exserted elliptic-oblong, faintly striate at summit, lid conical beaked; calyp. large yellowish, with long hairs; perist. eight yellowish teeth, and eight cilia.

Trees, rare. Montrose and Corrie Mulzie.

vii. viii.

243. *O. LYELLII*. Hook. St. 2in. or more, loosely tufted, with erect branches; l. much spreading long linear-

lanceolate, wavy, scarcely serrate at apex, and studded with papillæ and brownish gland-like bodies ; caps. elliptic-oblong, with a distinct tapering apophysis, and faint striæ ; calyp. very large, brown tipped, with a few long whitish hairs. Perist. 16 pale teeth, and 16 red-toothed cilia.

Old tree trunks, rare in fr.

VII.

244. *O. RIVULARE*. Turn. St. long tufted, often floating ; l. oblong-ovate flaccid, sometimes sub-secund, obtuse, with a strong nerve and small papillæ ; margin recurved below ; caps. pyriform, broadly striate, almost immersed ; perist. eight teeth in pairs, afterwards nearly equidistant, and 16 cilia ; calyp. large dull green hairless.

Rocks and tree trunks at edges of streams. E. W. I.

IV. V.

245. *O. SPRUCEI*. Mont. St. $\frac{1}{4}$ in. tufted ; l. oblong-ovate or ligulate, apex rounded and tipped with an apiculus, scarcely reflexed, thinly nerved, not papillose ; caps. pyriform, scarcely exerted, contracted at mouth when dry, striæ broad ; lid with a short beak ; calyp. reddish tipped, large, hairless ; perist. 16 teeth, in pairs, yellowish, and eight, sometimes 16, cilia.

Trees near rivers. York, Matlock, Glasgow.

V. VI.

246. *O. DIAPHANUM*. Schrad. St. scarcely $\frac{1}{2}$ in. tufted ; l. spreading, ovate-lanceolate, tapering to a slender diaphanous serrulate point, margin recurved ; caps. somewhat pyriform, almost immersed, faintly striate ; calyp. generally naked ; perist. 16 equidistant teeth, sometimes split at apex, and 16 cilia.

Walls, trees, and palings.

IV.

3. Caps. without furrows.

247. *O. LEIOCARPUM*. B. & S. St. 1-3in. tufted, branched; l. spreading, lanceolate, pointed, margin strongly revolute; caps. large pale brown, obovate, perfectly smooth and not contracted at mouth when dry, scarcely exserted; calyp. hairy, sometimes naked; perist. 16 teeth and 16 erose cilia.

Trees.

IV. V.

[N.B.—Notwithstanding the note in Lin. Soc. Jour., vol. XI. p. 465, I retain the name *leiocarpum* instead of *striatum*, as all the species in this section have a *striate* calyptra.]

B. Caps. on a long seta, much exserted.

1. Calyp. naked.

248. *O. PULCHELLUM*. Sm. St. $\frac{1}{4}$ in. tufted; l. spreading, soft, crisped when dry, linear-lanceolate bluntish, margin recurved; caps. pale, oval, with eight reddish striæ; perist. 16 reddish teeth in pairs, and 16 cilia; calyp. pale, without hairs, purplish at tip.

V.

Trunks of trees.

2. Calyp. very hairy, furrowed; ochrea indistinct; l. dilated at base, and crisped when dry.

249. *O. SAXATILE*. Brid. (*O. anomalum*, Bry. Brit., p. 177.) St. erect sparingly branched; l. narrow lanceolate sharply acuminate, nerve thick, areolæ narrow at base; caps. narrow sub-cylindrical, much exserted, with eight long striæ prominent when dry, and then with eight shorter alternating spurious ones just below the mouth; per. teeth in pairs; calyp. hairy. [Supp. Bry. Eur. fasc. I. II.]

Limestone walls and rocks.

Spring.

250. *O. ANOMALUM*. Hedw. Sp. Musc. (*non* Bry. Brit.)
St. erect simple, slightly branched; l. lower patulous remote, upper erecto-patent, lanceolate from an ovate base, margin revolute; caps. ovate-oblong, 16-striate; calyp. brownish hairy; per. t. pale equidistant erect when dry. [Bry. Eur., III., t. 210. Schp. Syn. 262.]

Trap rocks, Aberdour, Fifeshire (Dr. Wood); Conway.

Summer.

251. *O. LUDWIGII*. Schw. St. $\frac{1}{2}$ in. creeping; l. sub-patent or spreading, narrowly linear-lanceolate from an ovate base, contorted when dry, margin slightly undulate; caps. obovate, striate only at summit, much contracted at mouth when dry; perist. 16 teeth in pairs, afterwards equidistant, occasionally with short cilia.

Trees. Scotland, Ireland.

VIII. IX.

252. *O. CRISPULUM*. Hornsch. St. very minute tufted; l. small, linear-lanceolate, scarcely crisped when dry; caps. pyriform, small, thin, with eight inconspicuous striæ.

Trees, not common. Yorkshire, Sussex, English lakes.

V. VI.

253. *O. CRISPUM*. Hedw. St. about 1in. tufted; l. linear-lanceolate from an ovate base, slightly waved at margin, very much contorted when dry; caps. clavate, contracted at mouth when dry; apophysis gradually tapering into the thick seta; eight broad striæ; perist. eight teeth, and eight, sometimes 16, cilia.

Trees.

VII. VIII.

254. *O. CALVESCENS*. Wils. Differs from *Bruchii* by its shorter leaves more narrowly reticulated; calyp. scarcely

hairy; caps. with a long tapering neck, lid more convex and shortly beaked; from *crispum* by its longer seta and shorter caps. not contracted at mouth when dry, and by its smooth glossy calyptra.

Trees.

VI.

Killarney (Dr. Moore and Dr. Carrington); Dailly and Loch Doon (J. Shaw).

255. *O. BRUCHII*. Brid. St. short tufted; l. spreading sharply linear-lanceolate from an ovate base, contorted when dry, sometimes wavy; caps. pyriform on a long seta, with eight broad striæ, and contracted at mouth when dry; calyp. blackish yellow, with many furrows and very hairy; perist. of 16 teeth in pairs, and eight, very seldom 16, cilia.

Trees. Scotland, Yorkshire, Westmoreland, &c. VII. VIII.

256. *O. DRUMMONDII*. H. & G. St. longer, creeping, l. linear-lanceolate from a narrow ovate base, blunt-pointed, scarcely crisped, margin hardly recurved; caps. oblong-pyriform, deeply striate, and contracted at mouth when dry, on a long seta; calyp. with long stiff hairs; perist. of 16 teeth in pairs, and no cilia.

Trunks of young trees. S. I. E.

VIII.

257. *O. HUTCHINSIÆ*. Sm. St. about $\frac{1}{2}$ in. tufted; l. erecto-patent broadly lanceolate, nerved to blunt apex, margin scarcely reflexed; caps. clavate-pyriform, with eight broad striæ, slightly contracted at mouth when dry; apophysis tapering; calyp. large, very hairy. Perist. 16 teeth in pairs, and eight short cilia, sometimes wanting.

Mountainous rocks. W. I. S. E.

VII.

258. *O. PHYLLANTHUM*. B. & S. St. 1 in. tufted; l. linear-lanceolate without a broad base, nerve extending to

apex or exserted, where it is generally covered with gemmæ, crisped when dry; fruit not known.

Rocks and trees, generally near the sea.

37. ZYGODON. HOOK. & T.

A. Peristome absent.

1. Caps. on a short seta.

259. Z. LAPPONICUS. B. & S. St. $\frac{1}{2}$ -in. cæspitose radiculose; l. spreading, linear-lanceolate keeled, contorted when dry, nerve ceasing near apex; per. l. ovate-lanceolate; caps. scarcely exserted turbinate, deeply eight-striate, urceolate when dry; lid with a short oblique beak: monoicous.

Crevices of alpine rocks. S. W. Summer.

260. Z. MOUGEOTII. B. & S. St. more than 1 inch cæspitose, scarcely radiculose; l. fasciculate recurved, narrowly linear-lanceolate, margin reflexed below, nerved to apex, not contorted when dry; caps. turbinate urceolate when dry, eight-striate; lid with a long very oblique beak: dioicous.

Moist shady rocks. Summer.

2. Caps. on a longer seta.

261. Z. VIRIDISSIMUS. Brid. St. $\frac{1}{2}$ -lin., fastigiate, radiculose below; l. much spreading recurved, widely lanceolate, somewhat contorted when dry, nerve sometimes slightly excurrent; caps. obovate obscurely eight-striate; lid with a long oblique beak: dioicous.

Trees and rocks. III. IV.

B. Peristome present.

1. Inner perist. fugacious.

262. *Z. CONOIDEUS*. Dicks. St. very short, cæspitose, fastigiate, densely radiculose; l. somewhat spreading, not recurved, widely lanceolate, with plane margins, and nerved nearly to apex; caps. pyriform, tapering below, eight-striate, lid with a long straight beak; perist., outer eight short recurved teeth, inner eight yellowish cilia, often absent: dioicous.

Trees. S. I. E.

v.

2. Inner perist. persistent.

263. *Z. FORSTERI*. Dicks. St. $\frac{1}{4}$ - $\frac{1}{2}$ in. densely tufted, with whitish radicles; l. erecto-patent, elliptic-lanceolate, nerved to apex or slightly excurrent; areolæ hexagonal (not as in all the previous ones, dot-like), oblong and diaphanous at base; caps. pyriform, striate; lid with a long inclined beak; perist., outer eight acute bi-geminate teeth, inner eight alternating cilia: monoicous.

Trees. South of England, rare.

Spring.

264. *Z. GRACILIS*. Wils. MS. St. lin. or more, tufted, branched; l. lanceolate twisted when dry, with plane margins, and denticulate near the apex; areolæ close and punctate above, large and pellucid below.

Old walls. Malham (J. Nowell) in fr., Sept., 1866.

[I have no specimen in fruit.]

38. TETRAPHIS. HEDW.

265. *T. PELLUCIDA*. Hed. St. $\frac{1}{2}$ -1in.; l. lower. ovate-acuminate, nerved, reddish, upper larger ovate-lanceolate

entire, nerve ceasing below apex, margins plane; stems bearing gemmiferous cups, l. of which are obcordate; caps. (fruit not found in England) elliptical, with a red border at mouth, on a long reddish seta.

Decaying stumps and roots of trees, common. VIII. IX.

39. TETRADONTIUM. SCHW.

266. *T. BROWNIANUM*. Schwg. St. almost none, with long linear radical leaves or ramuli; per. l. ovate-acuminate, entire, shortly and faintly nerved; caps. oval-oblong, lid with an acute oblique beak.

Sandstone rocks. III. IV. (Wilson says VII.)

40. BUXBAUMIA. HALLER.

267. *B. APHYLLA*. Hall. "Stem almost none, buried; l. lower roundish, deeply toothed, upper fringed with long ciliary processes; caps. plano-convex, roundish ovate, reddish; outer perist. irregularly sub-divided, thick and cellular." [Wilson.]

Scotland, Yorkshire, &c.; rare. v.

268. *B. INDUSIATA*. Brid. "Resembling the last, but caps. more erect, not flattened on the upper surface, of uniform texture and yellowish green colour, covered with a soft membrane, which ruptures on the upper surface, the margins rolling back, somewhat like the indusium of a fern; annulus narrow." [Dr. Braithwaite, Jour. Bot., VIII., 226.]

On the ground and rotten trunks, chiefly in pine woods.

Near Ballater, 1847 (Cruikshank); Craigendinnie Hill, Aboyne, 1867 (Dickie and Roy).

41. DIPHYSCIUM. W. & M.

269. *D. FOLIOSUM*. W. & M. St. almost none; l. long

narrow linear, flexuose, with an obscure nerve, margin plane, sometimes toothed near apex; per. l. with a pale thin blade, nerve excurrent into a long rough bristle, and the innermost divided at apex into long jointed cilia; caps. immersed, ovate, oblique, gibbous; lid conical pointed; per. teeth white.

Shady mountainous rocks.

VIII.

42. ATRICHUM. P. BEAUV.

a. Monoicous.

270. *A. UNDULATUM*. P. Beauv. St. 1-2in. l. ligulate, margin undulate, thickened, with bi cuspid spinulose teeth, which also occur on back near apex, where lamellate nerve ceases; caps. cylindrical curved; lid with a long curved beak.

Grassy places, common.

X. XI.

var. β . *attenuatum*. l. narrow, more crisped when dry; caps. smaller.

b. Dioicous.

271. *A. ANGUSTATUM*. Brid. St. shorter, l. narrower, densely reticulate, serrate at apex *only*, less hispid beneath, with numerous lamellæ on nerve; caps. sub-erect cylindrical straight or curved, lid dark purple, shortly rostrate. [Schp. Syn. p. 434.]

Bare sandy ground, heaths, &c.

Winter.

Braes of Doune, fr. (McKinlay); Sussex—male (Mitten).

272. *A. TENELLUM*. Roth. St. short; l. elongate, oblong-lanceolate, upper ones narrowly lingulate, scarcely undulate, smooth beneath, margins dentate below the middle, sub-

cirrhate when dry, nerve thinly lamellate; caps. obovate-oblong, sub-cernuous, lid with a long beak; per. teeth large. [Bry. Eur. iv., 412. Syn. 435.]

Bare moist sandy places, and dried-up pools. Autumn.
Loch Goil Head; Killin, Perthshire.

273. *A. CRISPUM*. James. (*laxifolium*, Wils. MS.) St. simple, slender; l. lower small somewhat spathulate; upper much larger oblong-lanceolate, slightly undulate, border thickened, toothed; nerve reaching apex, scarcely lamellate; areolæ larger, hexagonal or rounded; caps. obovate-oblong, sub-erect or inclined, wide-mouthed, teeth very short irregular, seta red. [Dr. Braithwaite, Jour. Bot., VIII., 225.]

Lancashire; Oakmere, Cheshire; Saddleworth, Yorkshire; Dartmoor. Male plant only found in Britain.

43. OLIGTRICHUM. DE C.

274. *O. HERCYNICUM*. De C. St. $\frac{1}{2}$ -1 in; l. rigid erecto-patent, lanceolate, sheathing, margins inflexed, lamellæ of nerve undulate, and spinulose at back; caps. erect cylindrical, plicate and oblique when dry; lid conical pointed.

Alpine and sub-alpine barren soil. VI. VII.
Scotland; Todmorden (Nowell).

44. POGONATUM. P. Beauv.

275. *P. NANUM*. Brid. St. short, not branched at apex; l. rigid spreading, lanceolate-obtuse, sheathing, serrulate above; caps. almost globose, erect or inclined, lid with a curved or oblique beak; columella not winged.

Moist shady sandy banks. X. XI.

var. β . *longisetum*. l. long, linear-lanceolate, seta very long; caps. oval-oblong.

276. *P. ALOIDES*. Brid. St. less than 1-in., branched at apex; l. rigid spreading, lanceolate, sheathing, serrate on margin and back; caps. erect, somewhat ovate-urceolate or cylindrical; lid conical beaked; columella with four wings; hairs of calyp. whitish.

Moist banks.

x. xi.

var. β . *minus*. smaller generally; "hairs of calyp. confluent below capsule."

277. *P. URNIGERUM*. Brid. St. 1-4in. branched above, reddish below; l. spreading linear-lanceolate from a short broader sheathing base, acute serrate; caps. narrowly cylindrical regular papillose, lid convex with a short beak.

Mountainous banks and sides of streams.

x. xi.

var. β . *crassum*. l. broader, caps. oval-oblong, lid with a longer beak.

278. *P. ALPINUM*. Brid. St. much longer, branched above, decumbent below; l. linear-lanceolate from a sheathing base, gradually tapering, serrate, back spinulose, margin inflexed; caps. generally inclined, ovoid, tumid, smooth, lid small, with a long curved beak.

Sub-alpine localities. E. S. I.

vi.

var. β . *arcticum*. caps. oblong subcylindrical.

δ . *campanulatum*. st. short, l. narrower and shorter; caps. apophysate; calyp. campanulate.

45. POLYTRICHUM. BRID.

A. Caps. six-angled; apophysis indistinct.

279. *P. SEXANGULARE*. Hoppe. Barren st. 2-6in., fertile shorter; l. short incurved rigid, linear-lanceolate

from a broader base, margins plane, incurved, almost cucullate at serrulate apex; caps. short, at first upright, afterwards cernuous, sometimes six, sometimes only four or five-angled; lid rostrate; calyp. short, and shortly villous.

Summits of Scotch mountains.

VIII. IX.

Ben Lawers; Cairngorm, &c.

280. *P. GRACILE*. Menzies. St. about $\frac{1}{2}$ in. densely tufted; l. lanceolate from a broad sheathing base, serrate, with prominent lamellæ on upper surface; caps. ovate, obscurely four, five, six-angled; lid conico-rostrate; calyp. small.

Turbaries, &c., frequent.

VI.

281. *P. FORMOSUM*. Hedw. St. 3-6in. loosely tufted; l. spreading linear-lanceolate from a broad sheathing base, acute, serrate, lamellate; caps. four, five, six-angled, fawn-coloured; lid long conical; calyp. large.

Woods.

VI.

var. β . *pallidisetum*. st. and l. shorter; caps. narrower, on a short pale seta.

B. Caps. four-angled; apoph. very distinct.

282. *P. COMMUNE*. L. St. 6 or 8in. simple; l. spreading reflexed, linear-lanceolate, sheathing, whitish and membranous at base, serrate on margin and back; nerve broad; per. l. with long wavy hair points; caps. short, upright, afterwards cernuous, on a very long seta; lid variable in size; calyp. large reddish.

Tufty and marshy places.

VI.

var. β . *perigoniale*. smaller; outer per. l. longer; dry heaths.

γ . *minus*. st. short; l. shorter, less spreading; per. l. less striking; calyp., caps., and seta smaller: dry heaths.

γ . β . *fastigiatum*. st. branched fastigiate; l. as in var. γ . Very dry heaths.

283. *P. JUNIPERUM*. Hedw. St. 1-6in.; l. reflexed, spreading, linear-lanceolate, almost bristle-pointed, margin entire, except a few teeth at apex, much inflexed from middle upwards, somewhat spinulose at back; caps. roughish, horizontal when dry, on a seta 2in. or more long; calyp. large.

Heaths.

v. VI.

284. *P. STRICTUM*. Menzies. (*P. juniperum*. β . *strictum*, Bry. Brit.) "St. more slender, densely matted, branched, closely interwoven with whitish tomentum; l. straight, erecto-patent, imbricate when dry, shorter and narrower, pale glaucous green; caps. shorter cuboid, acutely angled, rufous orange; calyp. brownish or white." [Dr. Braithwaite, Jour. of Bot., VIII., 225.]

Mountain moors, common.

285. *P. PILIFERUM*. Schreb. St. about lin. simple; l. lower short appressed, upper much longer, lanceolate, prolonged into roughish hair points, margins entire inflexed; caps. faintly angular, almost ovate, on a short seta; calyp. long, reddish.

Dry heaths.

v. VI.

46. *TIMMIA*. HEDW.

286. *T. AUSTRIACA*. Hedw. St. 2-3in.; l. linear-lanceolate from a reddish-brown sheathing dilated base, margins strongly serrate; caps. ovate pyriform, inclined, striate

when dry, on a seta 2in. long; lid rounded mammillate; per. teeth inner smooth entire.

Rocks, very rare. Forfarshire. Summer.

287. *T. MEGAPOLITANA*. Hedw. St. loosely caespitose, brownish below; l. from a whitish sheathing base, spreading and recurved, linear-lanceolate concave opaque serrate, cirrhate when dry; per. l. internal ovate-lanceolate thinner; caps. oblong horizontal, somewhat striate when dry; lid convex, not apiculate; per. teeth internal with numerous appendiculate cilia. [Schp. Syn., 431.]

Ben Lawers, 1866 (Dr. Stirton). Summer.

47. AULACOMNION. SCHW.

288. *A. PALUSTRE*. Schw. St. 2-4in. branched, beset with reddish radicles; l. oblong-lanceolate, denticulate at apex, flexuose undulate, crisped when dry, papillose on both sides; caps. ovate-oblong, gibbous, cernuous, curved; lid conical, with a blunt beak; barren fl. discoid: dioicous.

Turfy bogs and marshes. v. VI.

var. β . *imbricatum*. "l. broader imbricate, entire, not twisted when dry.

γ . *fasciculare*. st. with many short innovations and fasciculate leaves; ramuli flagelliform from axils of fl. leaves.

δ . *polycephalum*. "st. decumbent branched; pseudopodia elongated numerous."

289. *A. ANDROGYNUM*. Schw. St. less than 1in., nearly simple; l. lower lanceolate, upper longer, all denticulate at apex, not flexuose nor crisped when dry, papillose, margin

recurved; caps. almost cylindrical, gibbous, inclined, furrowed; lid short, conical; pseudopodia numerous; barren fl. gemmiform.

Dry shady woods and banks.

v. VI.

48. ORTHODONTIUM. SCHW.

290. *O. GRACILE*. Schw. St. $\frac{1}{2}$ in. slender, tufted; l. long linear setaceous, carinate, flexuose, entire, faintly nerved nearly to apex; caps. obovate-clavate, gradually tapering at base into the seta, inclined; lid long, beaked; calyp. very small.

Sandstone rocks. Yorkshire and Cheshire.

III.

49. LEPTOBRYUM. WILS.

291. *L. PYRIFORME*. Wils. St. scarcely $\frac{1}{2}$ in.; l. lower lanceolate entire, upper linear-setaceous, flexuose, serrate at summit, nerve sometimes reaching apex; caps. pyriform pendulous, on a slender flexuose seta; lid convex mammillate.

Rocks. Cheshire.

v. VI.

50. BRYUM. H. & T.

Synopsis specierum.

I. *L.* erect narrow; not nerved to apex (except No. 1).

A. Caps. narrow, inclined.

a. monoicous.

1. *acuminatum*.
2. *polymorphum*.
3. *elongatum*.

b. synoicous or dioicous.

4. *crudum*.

B. Caps. pyriform pendulous.

a. monoicous or synoicous.

5. nutans.

b. dioicous.

6. annotinum.

7. carneum.

II. L. ovate, not nerved to apex.

a. dioicous.

8. Wahlenbergii.

9. Ludwigii.

b. monoicous.

10. Marattii.

11. calophyllum.

III. L. mostly ovate, nerved to apex.

A. synoicous or monoicous.

12. lacustre.

13. Warneum.

B. dioicous.

14. pseudotriquetrum.

15. neodamense.

16. alpinum.

17. Mühlenbeckii.

18. turbinatum.

19. latifolium.

20. Duvallii.

21. pallens.

22. barbatum.

IV. L. ovate, nerve excurrent.

A. monoicous.

23. uliginosum.

24. pallescens.

25. Sauteri.

B. synoicous.

a. inner perist. imperfect.

26. cernuum.

27. inclinatum.

b. inner perist. perfect.

28. intermedium.

29. bimum.

30. torquescens.

C. dioicous.

31. obconicum.

32. capillare.

33. Donianum.

34. Billarderii.

35. cæspiticium.

36. murale.

37. sanguineum.

38. atropurpureum.

39. apiculatum.

V. L. very concave, imbricate, nerve mostly ceasing below apex, dioicous.

A. caps. symmetrical.

40. julaceum.

41. argenteum.

42. Funkii.

B. mouth of caps. oblique.

43. Zierii.

44. demissum.

VI. L. broad roundish bordered.

45. Tozeri.

VII. L. very large, in a terminal rosaceous tuft.

46. roseum.

SECT. I.

292. (1) *B. ACUMINATUM*. B. & S. St. $\frac{1}{2}$ -lin., simple or branched; l. rigid, lower ovate-lanceolate, upper linear-lanceolate larger, margins recurved, nerved to serrulate apex, sometimes secund; caps. almost horizontal, narrowly clavate, tapering at base; lid sharply conical. (There are many varieties.)

Crevice of rocks and mountainous districts.

VIII.

293. (2) *B. POLYMORPHUM*. B. & S. St. $\frac{1}{4}$ - $\frac{1}{2}$ in., seldom branched; l. lower ovate-lanceolate, small, scattered, upper oblong lanceolate longer, crowded, apex in all serrate; caps. oblong pyriform horizontal or drooping, with a short neck; lid mammillate. (Many varieties.)

Scotch and Welsh mountains.

Summer.

294. (3) *B. ELONGATUM*. Dicks. St. $\frac{1}{4}$ -lin., one innovation from floral apex; l. lower ovate-lanceolate scattered, upper longer linear-lanceolate, all serrate at apex; caps. very long and slender, clavate, with a long distinct neck, inclined, upright when dry; lid convex beaked; inner perist. with cilia.

Rocks and walls in mountainous districts.

VIII.

295. (4) *B. CRUDUM*. Schreb. St. 1-2in. cæspitose, radiculose below; l. lower ovate-lanceolate, with plane margins and reddish nerve, upper gradually passing upwards into linear-lanceolate, with serrate apex; caps. oval-pyriform, from sub-erect to horizontal or even pendulous; lid convex apiculate; inner perist. with cilia. The leaves are generally shining and transparent.

Mountainous banks and rocks.

VII.

296. (5) *B. NUTANS*. Schr. St. $\frac{1}{4}$ -2in. with innovations; l. spreading, with margins reflexed below, lower ovate-lanceolate entire, upper linear-lanceolate serrulate at apex; caps. pyriform or elliptical, with a short neck; lid small mammillate; inner perist. with cilia: synoicous.

Sandy heaths, &c.

(Four var. are given in Bry. Europ.)

297. (6) *B. ANNOTINUM*. Hed. St. $\frac{1}{2}$ -1in. cæspitose; l. lower lanceolate erecto-patent entire, upper longer, serrulate at apex, margins reflexed below; caps. narrow pyriform, with a long tapering neck; lid conical pointed; barren fl. terminal; inner perist. with cilia; annulus distinct compound.

Sandy banks and quarries.

V. VI.

298. (7) *B. CARNEUM*. L. St. $\frac{1}{4}$ in. cæspitose, reddish; l. lower ovate-lanceolate, upper narrower, all serrate at apex, and loosely reticulate, margin not reflexed; nerve reddish; caps. ovate-oblong or shortly pyriform on a thick succulent reddish seta, sharply curved at summit; lid convex, shortly pointed; annulus none; perist. large, dark-coloured when dry.

Moist clay banks.

IV.

SECT. II.

299. (8) B. WAHLENBERGII. Schw. St. $\frac{1}{2}$ -lin. reddish cæspitose; l. lower ovate-acuminate, upper lanceolate, all serrate at apex, margins scarcely reflexed, areolæ loose; caps. broadly pyriform, with a short neck, and wide-mouthed when dry, sub-pendulous; annulus none or imperfect; per. teeth large, inner with cilia; lid small conical.

Wet banks and rocks.

v.

300. (9) B. LUDWIGII. Spreng. St. about 1in. decumbent and blackish below; l. lower ovate, passing upwards into ovate-lanceolate and lanceolate, serrulate at apex, margins reflexed below; caps. obovate-pyriform, sub-pendulous on a reddish slender seta 1in. long; lid conical, somewhat obtuse; inner perist. with cilia.

Scotch and Welsh mountains.

ix.

var. β . *gracilis*. Goat Fell; Ben Lawers, Ben Lomond; Snowdon.

301. (10) B. MARRATTII. St. about $\frac{1}{4}$ -in. gregarious; l. broadly elliptical, blunt-pointed entire; per. l. narrower and longer; caps. small turbinate almost globose, tapering at neck into the slender seta, from which it is pendulous; lid bluntly beaked; perist. outer red, inner imperfect, adhering to outer.

Southport, 1854.

ix.

302. (11) E. CALOPHYLLUM. R. Br. St. about $\frac{1}{4}$ in. reddish gregarious; l. broadly elliptical or ovate, sharply pointed, concave, entire, almost nerved to apex; caps. oval-oblong, neck not tapering, pendulous; lid small conical,

slightly pointed; per. teeth outer brownish, inner free, mostly without cilia.

Southport, with the last.

IX.

SECT. III.

303. (12) *B. LACUSTRE*. Brid. St. $\frac{1}{4}$ in. cæspitose; l. lower ovate-apiculate, upper ovate-lanceolate, all entire, very concave, margins recurved; per. l. narrower; caps. roundish pyriform, with a tapering neck, slightly pendulous; lid small pointed; annulus present; inner perist. partially adherent, sometimes with cilia; synoicous.

Moist sandy places. Yarmouth; Suffolk.

v. vi.

304. (13) *B. WARNEUM*. Bland. St. about $\frac{1}{4}$ in. tufted; branched; l. ovate-acuminate, scarcely concave, serrate at apex, margins recurved; caps. obovate pyriform pendulous, bordered at mouth when dry; lid small convex pointed; inner perist. with cilia: monoicous or synoicous.

Muddy places. Scotland, Southport.

viii. ix.

305. (14) *B. PSEUDO-TRIQUETRUM*. Schw. St. 1-3in. branched, erect; l. lower ovate-lanceolate, upper narrower and longer concave, all bordered, margins recurved, occasionally serrulate at apex, and slightly decurrent; nerve sometimes excurrent; caps. sub-cylindrical, pendulous; lid small mammillate.

Wet mountainous rocks. S. W.

vii.

306. (15) *B. NEODAMENSE*. Itzig. Regensb. Fl. 1841, I. p. 360.) St. slender, cæspitose and tomentose elongate, reddish and almost naked below, leafy above; l. lower roundish oblong obtuse, apex and margins involute; upper

crowded, shortly oblong, inflated at base, margins revolute below, all cucullate; caps. oblong-pyriform pendulous, on a long seta.

Southport Sands, where liable to inundation.

307. (16) *B. ALPINUM*. L. St. $\frac{1}{2}$ -2in. caespitose simple; l. imbricate lanceolate, margins recurved, serrulate at apex; caps. oblong-pyriform pendulous, deep red, on a bent and arcuate seta, lid mammillate; whole plant reddish and shining.

Sub-alpine moist rocks. fr. rare.

VI.

308. (17) *B. MUHLENBECKII*. B. & S. St. $\frac{1}{2}$ in. or more; tufted, branched, radiculose; l. almost elliptical, blunt-pointed, conical, almost cucullate at apex, margin reflexed; nerved almost to apex; caps. oblong tapering, pendulous, reddish brown; lid convex pointed.

Scotch mountains (Dr. C. Smith and Dr. Stirton).

309. (18) *B. TURBINATUM*. Hedw. St. $\frac{1}{2}$ -3in. sometimes branched; l. lower ovate-lanceolate, upper longer and narrower, concave, margins not recurved; nerve not always reaching apex; caps. globoso-pyriform pendulous, when dry contracted at mouth, reddish brown; lid convex pointed.

Manchester; Fakenham; Norfolk.

VI. VII.

var. β . *prælongum*. st. elongate, l. pale green, caps. ventricose larger.

310. (19) *B. LATIFOLIUM*. Schl. (*B. turbinatum*, var. γ , Bry. Brit.) St. elongate, decumbent at base; l. imbricate, broadly oblong-acuminate, very concave, shining, serrulate at apex, margined, nerve excurrent; caps. longer than the last,

on a long seta, geniculate at base. [Schp. Syn., 380. Bry. Eur., iv., t. 372.]

Boggy places.

VI.—VIII.

Ben More ; Shetland (McKinlay).

311. (20) *B. DUVALII*. Voigt. St. tufted, decumbent when old, elongate, branched ; l. patulous, remote, broadly ovate-lanceolate, decurrent, cirrhate when dry, scarcely nerved to apex ; per. l. inner lanceolate erect ; caps. obovate-oblong regular pendulous from a long slender seta, contracted at mouth when dry ; lid mammillate. [Bry. Eur., iv., t. 371.]

Boggy places.

VIII. IX.

Glen Lyon, Ben Lawers, Hartfell, Helvellyn.

312. (21) *B. PALLENS*. Swartz. St. $\frac{1}{4}$ -lin. branched ; l. reddish, remote patulous ovate-lanceolate, slightly decurrent, keeled, serrulate at apex, margins thickened and recurved, nerve almost excurrent ; caps. oblong pyriform, with a long tapering neck, pendulous, mouth small, but not contracted ; lid small convex, pointed.

Near springs and ditches.

VI.

var. β . *microstomum*. "caps. regular, sub-clavate, mouth smaller."

313. (22) *B. BARBATUM*. Wils. MS. St. about lin. branched, slender, red, and copiously beset with reddish-brown radicles from base to summit ; l. sub-erect, ovate, rather suddenly tapering into a longish sparsely toothed subula, uppermost broader, more shortly pointed, spreading, all concave, strongly nerved, margins plane, not recurved ; areolæ very lax and transparent. The only specimen I have bears no fruit.

Ben Ledi (Dr. Stirton).

SECT. IV.

314. (23) *B. ULIGINOSUM*. B. & S. St. $\frac{1}{2}$ -1in. cæspitose, branched; l. green oval-lanceolate, tapering at both ends, margin reflexed below, excurrent nerve toothed; caps. clavate unequal pendulous, tapering into the long curved seta; mouth oblique; lid convex pointed.

Wet places near streams.

VIII.

315. (24) *B. PALLESCENS*. Schw. St. 1-2in. branched, cæspitose, with purplish radicles below; l. ovate-lanceolate, margin reflexed, generally serrate at apex; upper with nerve scarcely excurrent, lower reddish; caps. pyriform, pendulous, tapering, contracted at mouth when dry; lid conical pointed; inner perist. with cilia.

Rocks and walls.

VII. VIII.

var. β . *boreale*. caps. smaller, sub-erect.

γ . *contextum*. st. long, much branched; caps. ventricose, shorter, sub-pendulous.

δ . *subrotundum*. stem and l. smaller; caps. almost globose; seta curved.

316. (25) *B. SAUTERI*. B. & S. St. cæspitose, much branched; l. erecto-patent, ovate acuminate or oblong-lanceolate, elongated, very concave, margins plane, nerve thick excurrent into a mucro; wings at base with hyaline cells; per. l. narrower; caps. slightly incurved, pendulous solid sanguineous; lid shortly conical. [Müller, Syn. I., 280.]

Teesdale (Spruce); Scotland (Mitten).

317. (26) *B. CERNUUM*. Hedw. St. $\frac{1}{2}$ -1 $\frac{1}{2}$ in; tufted, branched, very radiculose; l. ovate acuminate concave, nerve much excurrent, sometimes serrulate at apex, margins

recurved; caps. oblong-oval or pyriform, mouth small, neck not tapering, pendulous; lid small conical; inner perist. adherent to outer; annulus large.

Walls and rocks.

v.

318. (27) *B. INCLINATUM*. B. & S. St. short, tufted branched; l. ovate-lanceolate, entire, acuminate; caps. almost elliptical or pyriform, with a small mouth; lid conical, sharply pointed; perist. inner generally without cilia, and free.

Walls, banks, and decayed trees.

v.

319. (28) *B. INTERMEDIUM*. Brid. St. about $\frac{1}{2}$ -in. tufted, branched; l. imbricate, somewhat spreading ovate-lanceolate, acuminate, point sometimes toothed, margins recurved; caps. pyriform narrow sub-pendulous, tapering into a longish neck; lid conical pointed; inner perist. with cilia.

Walls and rocks, frequent.

VI.—XII.

320. (29) *B. BIMUM*. Schreb. St. $\frac{1}{2}$ -1in. tufted, sometimes branched, with purplish radicles; l. ovate-lanceolate, shortly apiculate, occasionally serrate at apex, margins recurved; caps. oblong-pyriform, tapering at neck, pendulous, constricted at mouth when dry; lid large convex apiculate.

Wet and boggy places.

VI. VII.

var. β . *cuspidatum*. l. with long bushy points, margined.

Walls, &c.

321. (30) *B. TORQUESCENS*. B. & S. St. $\frac{1}{4}$ -1in. tufted, radiculose; l. lower ovate-lanceolate, upper ovate, all shortly pointed, entire, margin recurved, slightly twisted

when dry ; caps. large obconical or clavate, sub-pendulous, neck tapering ; lid pointed.

Rocks and walls ; rare.

VI. VII.

322. (31) *B. OBCONICUM*. Hornsch. St. short tufted, branched ; l. oblong-ovate pointed, concave, entire, margin recurved, not twisted when dry ; caps. obconical, pendulous ; neck long tapering ; lid convex apiculate.

Walls. Barnard Castle, 1843 (Spruce).

VI. VII.

323. (32) *B. CAPILLARE*. Hed. St. $\frac{1}{4}$ -1in. tufted ; l. lower ovate-oblong, upper obovate-oblong, all with longish slender points, concave, much contorted when dry, margin bordered with smaller cellules, reflexed, sometimes serrulate at apex ; caps. sub-clavate or obovate, tapering, pendulous, only slightly constricted at mouth when dry ; lid pointed.

Walls, rocks, trees, &c., frequent.

VI.

var. β . *majus*. st. longer, l. broader, and with a wider margin, caps. larger and thicker. (Wilson says this is the most frequent English form.)
On walls.

γ . *minus*. l. concave imbricate ; caps. smaller.

δ . *flaccidum*. l. lower, purplish, flaccid, not contorted when dry, distinctly serrate at apex.

324. (33) *B. DONNIANUM*. Grev. St. shorter than last, branched ; l. ovate-oblong, slightly pointed, not contorted, but slightly twisted when dry, margin thickened, serrulate at apex ; caps. long clavate, constricted at mouth when dry, sub-pendulous, lid pointed.

Sandy banks and rocks, rare. Warrington (Wilson) ; Hurst-pier-point (Mitten) ; Winchelsea (Jenner).

325. (34) *B. BILLARDERII*. Schw. St. $\frac{1}{2}$ -lin. branched, radiculose; l. crowded in tufts at top of branches and stems, ovate-oblong, serrate and recurved at apex, apiculate, margins recurved below; caps. pyriform, broadest below the middle, tapering at neck, pendulous; lid conical pointed.

Hurst-pier-point, on old ant-hills; barren. Summer.

326. (35) *B. CÆSPITICIUM*. L. St. $\frac{1}{4}$ -lin. tufted, branched; l. ovate-lanceolate, pointed, generally serrulate at apex, margin recurved but not thickened, erect when dry, upper ones largest; caps. oblong-obovate, pendulous, slightly constricted when dry; lid large mammillate.

Walls, rocks, roofs, &c.

327. (36) *B. MURALE*. Wils. St. $\frac{1}{4}$ in. tufted, branched; l. ovate-lanceolate, concave, shortly pointed, margins plane; loosely imbricate; caps. oblong-pyriform pendulous, deep purple or almost black when ripe; neck tapering; lid large mammillate.

Mortar of old walls.

v. VI.

Marple, Killarney, N. Wales, Oxford, 1863 (H. Boswell).

328. (37) *B. SANGUINEUM*. Ludwig. St. $\frac{1}{4}$ in.; l. distant, ovate-lanceolate pointed, generally serrulate at apex, margins scarcely recurved; caps. oblong or pyriform pendulous, blood-red when ripe; lid pointed.

Heathy ground and walls.

VI. VII.

var. β . *radiculosum*. caps. obconical, seta geniculate at base.

329. (38) *B. ERYTHROCARPON*. Brid. *non* Schw. (*B. atropurpureum*. W. & M.) St. $\frac{1}{4}$ - $\frac{1}{2}$ in. branched; l. erectopatent, ovate concave, pointed, margin reflexed, entire, lower

often reddish; caps. oval or oblong, neck not tapering, pendulous, dark red or purplish when ripe; lid conical pointed.

Banks and walls.

v.

330. (39) *B. APICULATUM* (?) Schw. (There seems some doubt as to what the barren form found on the Slemish mountains is; I give Wilson's description from Bry. Brit., p. 245.) "L. erecto-patent when dry, elliptic-lanceolate, concave, nerved to apex."

SECT. V.

331. (40) *B. JULACEUM*. Sm. St. 1-3in. tufted, with long filiform branches; l. ovate or ovate-elliptical, larger above, concave entire, margin not recurved, not nerved to apex; caps. oblong-obovate or pyriform, pendulous; lid small, convex, pointed.

Alpine and sub-alpine wet rocks.

VIII. IX.

var. β . *concinatum*. st. shorter, nerve excurrent into a recurved point. Near Kennare (Dr. Taylor); Teesdale (Spruce); Ochills (Lyle).

332. (41) *B. ARGENTEUM*. L. St. $\frac{1}{4}$ - $\frac{1}{2}$ in. tufted; in silvery white patches; l. lower ovate, upper ovate-lanceolate, all entire except at apex, nerve not reaching pointed tapering apex; margins not recurved; areolæ very lax; caps. oval-oblong, reddish purple, pendulous, neck not tapering; lid faintly pointed.

Roofs, walls, ground, &c.

X. VI.

var. β . *majus*. st. longer, l. greenish, without points.

γ . *lanatum*. smaller, l. with long points, without chlorophyll, silvery white. Largo, Scotland (C. Howie).

333. (42) *B. FUNKII*. Schw. Gregarious; st. branched, branches julaceous; l. crowded at summit of branches; st. and br. leaves ovate, cochleariform, nerve excurrent into a short point; comal leaves ovate-oblong acuminate, shortly cuspidate: areolæ lax; caps. obovate or globoso-pyriform, inclined on a flexuous seta.

Walls, &c. Sandy shore, Southport (Wilson). v. VI.

334. (43) *B. ZIERII*. Dicks. Silvery reddish tufts, st. $\frac{1}{2}$ -lin., branches julaceous; l. roundish ovate-acuminate, entire, margins not recurved, not nerved to apex; areolæ lax; caps. large clavate-pyriform, gibbous, with a long slender tapering neck, incurved cernuous; lid small, conical, acute; inner perist. longest, with imperfect cilia.

Crevices of mountainous rocks. E. S. I. x. XI.

335. (44) *B. DEMISSUM*. Hook. St. $\frac{1}{4}$ in. tufted; l. ovate-acuminate, erect when dry, margin recurved, nerve generally excurrent; per. l. lanceolate, with longer points; areolæ lax; caps. clavate-pyriform, much incurved, cernuous; seta "curved above like a swan's neck"; inner perist. longest.

Rocks. Breadalbane Mts.; rare. VIII. IX.

SECT. VI.

336. (45) *B. TOZERI*. Grev. St. $\frac{1}{4}$ - $\frac{1}{2}$ in. gregarious; l. lower obovate narrow, upper crowded wider apiculate, all bordered, entire; nerved (reddish) half-way; caps. obovate or pyriform pendulous; lid conical.

Shady banks, rare in fr. III. IV.

SECT. VII.

337. (46) *B. ROSEUM*. Schreb. St. 1-3in., l. lower, small, scattered lanceolate; upper in a large rosaceous tuft, spathu-

late, apiculate, serrate above, margin recurved, nerved nearly to apex; caps. clavate-oblong or obovate pendulous; lid mammillate.

Sandy shady banks.

XI. XII.

51. MNIUM. B. & S.

A. L. sharply serrated.

a. Margin cartilaginous.

338. M. AFFINE. Bland. St. 1-3in. simple, erect, radiculose; barren shoots procumbent; l. lower oval-lanceolate, decurrent, scattered, upper much larger, crowded, oblong-elliptic pointed, border narrow, simply spinuloso-serrate, nerved nearly or quite to apex; those of barren stems roundish two-ranked; caps. ovate-oblong pendulous; lid convex, pointed: dioicous.

Shady woods, banks, walls.

IV. V.

var. *β. elatum.* stem and seta longer; marshy places.

γ. rugicum. sterile shoots, erect, shorter; l. shorter, concave, obtusely serrate.

339. M. CUSPIDATUM. Hedw. St. $\frac{1}{2}$ -lin. tufted, erect, radiculose, barren shoots procumbent; l. lower ovate or obovate, scattered, upper ovate-lanceolate longer and narrower; all acuminate, with simply serrate margins; nerved nearly or quite to apex; caps. ovate, inclined or pendulous; lid convex obtuse: synoicous.

Shady rocks and walls.

III. IV.

340. M. ROSTRATUM. Schr. St. $\frac{1}{2}$ -lin. decumbent at base (barren long erect or creeping); l. lower ovate, upper

oval-oblong, obtuse, in a terminal spreading tuft, all simply and bluntly serrate, undulate, nerve slightly excurrent into a mucro; caps. oval, inclined or pendulous; lid with a long curved beak: synoicous.

Moist shady rocks, &c., common.

IV.

341. *M. RIPARIUM*. Mitt. M.S. St. $\frac{1}{2}$ -lin., reddish below; l. orbiculate or broadly elliptical, much decurrent, apex rounded and tipped with a mucro; lower obscurely bordered, upper strongly so and simply spinuloso-dentate, nerve thin but distinct, reddish, reaching apex; areolæ large hexagonal chlorophyllose. (I have no fruited specimen.)

Watery places. Sussex (Mitten).

342. *M. SPINOSUM*. Voigt. St. robust, sub-ligneous; branches flagelliform sub-arcuate; l. lower small squamiform, obtuse, margins plane; upper obovate or oblong, acuminato-spathulate, larger, crisped when dry; serration bigeminate, spinulose, nerve excurrent; caps. oval-oblong, reddish-brown, slightly inclined or horizontal; lid conical, with an obtuse beak: dioicous.

Roots of trees, and shady sub-alpine rocks. Summer.
Ben Lawers (McKinlay).

343. *M. ORTHORHYNCHUM*. Brid. St. $\frac{1}{4}$ -1in. simple; l. lower scattered ovate-acuminate, decurrent, upper ovate-lanceolate, doubly spinuloso-serrate; all undulate and crisped when dry; caps. oval or sub-pyriform horizontal; lid conical, with a blunt beak: dioicous.

Woods, shady banks, &c. Yorkshire, Sussex. Spring.

344. *M. SERRATUM*. Brid. St. $\frac{1}{2}$ -1in. purplish, erect; l. lower reddish on nerve and border, all varying from lanceo-

late to ovate, acuminate, doubly spinuloso-serrate; per. l. lanceolate; caps. ovate or oval, cernuous; lid large conical, with a short beak: synoicous.

Moist shady rocks and banks.

v. vi.

345. *M. HORNUM*. L. St. 1-3in. simple; l. linear-lanceolate, acuminate, rigid, slightly decurrent, doubly spinuloso-serrate, nerve also spinulose, not reaching apex; caps. large oblong-ovate, cernuous; lid convex mammillate; seta curved at summit: dioicous.

Shady moist banks and woods, common.

v.

346. *M. UNDULATUM*. Hed. St. 1-3in. decumbent at base, sometimes branched; l. oval-oblong or ligulate, upper very long, all undulate, decurrent, and simply serrate, nerved generally to apex; caps. generally several together, oval or oblong pendulous; lid convex, pointed: dioicous.

Moist shady banks and woods.

iv. v.

b. L. without a cartilaginous border.

347. *M. STELLARE*. Hed. St. $\frac{1}{2}$ -2in. erect; l. oval-acuminate or ovate-lanceolate, simply serrate, decurrent, scarcely nerved to apex; caps. solitary, ovate, horizontal or cernuous; lid convex blunt: dioicous. (Does not fruit with us.)

Shady rocks and banks. Yorkshire, Surrey.

v. vi.

B. L. nearly entire, not bordered.

348. *M. CINCLIDIOIDES*. Hueb. St. 2-4in. sometimes with slender branches; l. lower oval obtuse, scarcely pointed, upper large oval ligulate obtuse (marginal cells

narrower), almost entire, slightly undulate, nerved nearly to apex; caps. oval pendulous; lid convex pointed: dioicous.

Wet and boggy places on mountains, Clova, &c. Summer.

C. L. entire, with a cartilaginous border.

349. *M. PUNCTATUM*, Hed. St. $\frac{1}{2}$ -3in., erect, radiculose; l. obovate or roundish obtuse, obscurely pointed, upper in a somewhat rosaceous tuft; generally nerved to apex; caps. oval pendulous; lid conical, with a longish beak: dioicous.

Wet shady places.

II. III.

350. *M. SUBGLOBOSUM*. B. & S. St. 1in. or more, erect; l. obovate or roundish obtuse, not nerved to apex; border narrow sub-cartilaginous; caps. roundish, contracted at mouth, sub-pendulous; lid small conical beaked: synoicous.

Marshes and bogs.

III.

52. CINCLIDIUM. SWARTZ.

351. *C. STYGIUM*. Sw. St. 1-4in. tufted, erect, with purplish radicles; l. roundish obovate, obtuse, pointed, rigid, very narrow at base, border cartilaginous, nerved to or beyond apex; caps. obovate or pyriform, pendulous, on a long seta, lid convex obtuse, sometimes pointed; synoicous.

Bogs. Malham Tarn (Nowell, Wilson).

VI. VII.

53. MIELICHHOFERIA. N. & H.

352. *M. NITIDA*. Horn. "L. erecto-patent, larger and more crowded above, ovate-lanceolate, serrated at apex; caps. sub-erect pyriform; lid conical, very short."

var. β . *gracilis*. more densely tufted; l. shorter, more crowded, imbricate; caps. erect. [Wils. Bry. Brit., p. 263.]

Type not British; var. β . only found at head of Glen Callater, 1830 (Dr. Greville); again in same locality, 1868 (Fergusson and Roy); Ingleby, Yorkshire, 1862 (Mudd.)

54. PALUDELLA. EHR.

353. *P. squarrosa*. Brid. St. 2-6in. radiculose; l. obovate-lanceolate, pointed, recurved above the middle, squarrose, nerved to and serrulate at apex, margins recurved below; caps. elliptic-oblong gibbous, with a short thick neck, inclined; lid mammillate.

Boggy places. No fr. found in Britain. Summer.

55. MEESIA. HEDW.

354. *M. uliginosa*. Hedw. St. $\frac{1}{2}$ -1in. radiculose, br. fastigiate; l. lanceolate or linear obtuse (upper longer), entire, margin recurved, scarcely nerved to apex; caps. pyriform, with a long tapering neck, incurved, inclined; lid conical truncate; seta very long.

Wet and boggy places. VII. VIII.

[It is very questionable whether *M. longiseta* has ever been found in the British Islands.]

56. AMBLYODON. P. BEAUV.

355. *A. dealbatus*. P. B. St. $\frac{1}{2}$ -1in.; l. lanceolate broad, acute, margins plane, slightly serrulate at apex, below which the strong nerve ceases; caps. clavate or pyriform, incurved, inclined, mouth oblique, lid conical, seta very long.

Wet mountainous places. S. I. VI. VII.

57. FUNARIA. SCHREB.

1. Caps. cernuous on a straight seta, annulus none.

356. F. HIBERNICA. Hook. St. $\frac{1}{4}$ - $\frac{1}{2}$ in.; l. oblong-oval, gradually tapering to an acutely serrate point, nerved nearly to apex; caps. pyriform, longer than in next species, on a seta twisting to left its whole length when dry; lid concave.

Chalky soil. Cork, Matlock, Conway. iv. v.

357. F. MUHLENBERGII. Schw. St. shorter than last; l. ovate-lanceolate, suddenly tapering to a long bluntly serrate point, nerved nearly to apex; caps. pyriform, on a seta when dry twisted at base to left, above to right; lid convex obtuse with a reddish border.

Limestone walls, banks, &c. iv. v.

2. Caps. furrowed when dry, on a long arcuate seta, annulus present.

358. F. HYGROMATRICA. Hedw. St. $\frac{1}{4}$ -1in.; l. lower scattered, upper ovate-lanceolate, concave, clustered into a bulb-like tuft, nerved to apex, margins reflexed; caps. broadly pyriform, incurved, mouth oblique, with a corrugate border; lid convex, with a red border.

Banks and walls, old cinder heaps, &c., common. v.—ix.

var. β . *patula*. st. slender branched; l. undulate, spreading, twisted when dry.

γ . *calvescens*. seta long and straight; caps. slender, almost erect.

359. F. MICROSTOMA. B. & S. Habit of last, but smaller; l. in a comal bud; caps. pyriform, turgid, not much

furrowed when dry; mouth very small, with a smooth border; inner perist. very imperfect.

Damp stony places.

VIII. IX.

Maresfield, Sussex, 1864 (Mr. Mitten).

58. ENTOSTHODON. SCHW.

360. *E. TEMPLETONI*. Schw. St. about $\frac{1}{4}$ -in.; l. lower distant ovate-acuminate, upper in a rosaceous tuft, obovate, acuminate, not nerved to apex, scarcely serrulate; caps. clavate-pyriform, upright, neck tapering, lid plano-convex.

Crevices of rocks and shady places. E. S. I. W. VII.

361. *E. MINIMUM*. Hunt. (Mem. Lit. and Sci. Soc., Manchester. vol. v., p. 100, 1871-2.) St. $\frac{1}{8}$ $\frac{1}{4}$ in. erect, gregarious; l. lower obovate, margin reflexed, nerve thin, not reaching apex; upper oblong, sub-erect, sub-canaliculate, margin recurved, crenulate above, nerve strong, nearly reaching apex; areolæ large elongate hexagonal below, above shorter; caps. obconical when dry, smooth, with a distinct neck and wide mouth; seta erect, $\frac{1}{8}$ - $\frac{1}{4}$ in.; perist. half immersed, of 16 slender linear subulate teeth; dioicous.

Sandstone walls. Glasnevin, Dublin (D. Orr.) VIII.

59. PHYSCOMITRIUM. BRID.

362. *P. ERICETORUM*. De Not. St. $\frac{1}{4}$ -in.; l. lower, distant, small, upper in a tuft, larger, obovate-lanceolate, with a thickened distantly serrate margin, not nerved to apex; caps. small, pyriform, erect, lid almost flat.

Heaths, banks, stream sides, &c.

III. IV.

363. *P. FASCICULARE*. B. & S. St. about $\frac{1}{2}$ -in. tufted;

l. ovate-oblong or lanceolate, pointed serrate, not bordered ; caps. obovate or pyriform, tapering at base ; lid convex.

Fallow fields.

IV.

364. *P. PYRIFORME*. B. & S. St. about $\frac{1}{4}$ in., tufted ; l. lower distant ovate-lanceolate, above spathulate, pointed, serrate, uppermost longer erect, not nerved to apex ; caps. globose-pyriform erect, mouth small, lid conical, calyptra sub-persistent, toothed at base.

Moist banks and ditches.

IV.

365. *P. SPHÆRICUM*. B. & S. St. scarcely $\frac{1}{4}$ -in. ; l. oval-oblong or slightly spathulate, acute, concave, entire ; upper ones largest, nerved nearly to apex ; caps. sub-globose, mouth large ; lid large conical ; calyp. lobed below.

Dried-up mud.

IX.—XI.

Mere, Cheshire, 1834 (Wils.), J. Whitehead, Oct., 1870.

60. BARTRAMIDULA. B. & S.

366. *B. WILSONI*. B. & S. St. about $\frac{1}{4}$ -in. branched ; l. ovate-lanceolate, acuminate, somewhat secund, nerved nearly to or beyond apex, serrulate above ; caps. globoso-pyriform, generally pendulous, not striate ; lid convex or conical.

Turfy soil on mountains. S. W. I.

X.

61. BARTRAMIA. HEDW.

1. Caps. erect, perist. single.

367. *B. STRICTA*. Brid. St. loosely tufted, glaucous green ; l. erecto-patent, rigid when dry, lanceolate-subulate, nerve excurrent into a serrate arista ; caps. ovate-globose

furrowed when dry, seta four-sided at summit, twisted to right when dry; lid convex or mammillate. [Bry. Eur., iv., t. 316. Schp. Syn., 417.]

On the ground and stones.

Early summer.

Maresfield, Sussex (Mitten), 1862.

2. Caps. cernuous, perist. double.

a. Branches fastigiate. Monoicous.

368. *B. RIGIDA*. Bals. & Not. St. $\frac{1}{4}$ - $\frac{1}{2}$ in.; br. erect or recurved; l. erecto-patent, straight, rigid, lanceolate, finely serrulate, nerve excurrent, caps. large, sub-spherical, furrowed when dry, and cernuous; lid conical pointed; seta erect; inner perist. sometimes imperfect.

Shady banks, mountains.

IX. X.

b. Br. fasciculate: dioicous.

* *L.* plicate and sheathing at base.

369. *B. ARCUATA*. Brid. St. 1-4in., with reddish brown radicles; l. ovate-lanceolate from a broad erect sheathing base, scabrous, serrulate, spreading; caps. sub-globose, almost pendulous, on an arcuate seta, furrowed when dry.

Waterfalls and wet rocks.

IX. X.

* * *L.* not sheathing or plicate. (*Philonotis*.)

370. *B. (PHILONOTIS) FONTANA*. Brid. Stem 1-6in., with reddish black radicles; l. ovate-acuminate, short and appressed or lanceolate secund, or spreading and longer (generally plicate at base), nerve almost excurrent; perig. l. obtuse, nerveless; caps. sub-globose large, furrowed when dry.

Springs and wet places.

VI.

var. β . *alpina*. st. short, l. ovate-lanceolate, mucronate.

γ . *falcata*. l. falcato-secund, nerve thick.

δ . *pumila*. plant smaller in all its parts.

371. B. (PHILONOTIS) CÆSPITOSA. Wils. MS. St. 1-2in. reddish, cæspitose, radiculose below; l. falcato-secund, lanceolate acuminate, gradually tapering from base upwards, concave, margins sub-serrulate not recurved, nerved to apex, areolæ lax, largest at basal angles; perig. l. in a stellate tuft, almost triangular from a very broad base, finely sub-serrulate, nerved to apex.

Walton swamp, Cheshire (Wilson): male plant only.

372. B. (PHILONOTIS) ADPRESSA. Fergusson. "Plant widely cæspitose, erect, 2-3in. either dull, glaucous green, or reddish; l. papillose, erect when moist, with one wide plica on each side of nerve, incurved towards apex, slightly twisted when dry, widely ovate from an amplexical base, not acuminate, apex either obtuse or cucullate, with a very slight mucro, or in the more slender forms rather acute, margin denticulate slightly reflexed; nerve very thick continuous; areolæ small, ovoid above, shorter and wider towards the base." [G. E. Hunt. Mem. Lit. & Sci. Soc., Manchester, vol. v., 102, 1872.]

Glen Prossen, &c., Clova (Fergusson); Glas Mheal, Perthshire 2500 ft. (Hunt).

373. B. (PHILONOTIS) SERIATA. Mitt. *Musc. Ind. Orient.* "L. spirally arranged, from a sub-erect base, patent towards apex, ovate acute plicate, margin distinctly reflexed; areolæ linear above, small and ovoid towards base; perig. l. from an erect dilated base, widely spreading, cordate-

triangular obtuse, areolæ small obscure elongate-quadrangular, above large linear and reddish at base; nerve thick, indistinct, continuous or vanishing below apex, margin slightly denticulate." [Hunt. loc. cit., p. 103.]

Springs at head of Clova; Ben-na-Bourd (Gardiner).

374. B. (PHILONOTIS) CALCAREA. B. & S. St. about 2in.; l. ovate--lanceolate, tapering gradually from middle upwards, concave rigid secund, margin serrulate, not reflexed, strongly nerved to apex; areolæ large oblong, long hexagonal at base; perig. l. acute, triangular from a broad erect base, nerved to apex: caps. sub-globose, inclined or cernuous.

Wet places.

VII.

c. Branches dichotomous and fastigiate.

* monoicous.

375. B. POMIFORMIS. Hedw. St. $\frac{1}{2}$ -2in.; l. spreading linear-lanceolate, not concave, doubly spinuloso-serrate, rough, crisp when dry, nerve slightly excurrent; caps. sub-globose, cernuous, lid small conical.

Dry sandy banks.

V.

var. β . *crispa*. "l. longer, less crowded, branches often longer than fruit-stalk."

376. B. HALLERIANA. Hedw. St. 1-3in., radiculose below; l. spreading or secund, linear-subulate from a broad pale erect sheathing base, rough, serrate, nerve excurrent; caps. sub-globose, on a short curved seta.

Moist alpine and sub-alpine rocks.

VI. VII.

* * Synoicous.

377. *B. GRACILIS*. Floerke, 1799. (*B. Oederi*, Swartz, 1800). St. 1-3in.; l. linear-lanceolate, recurved from an erect, not sheathing base, crisped when dry, margins recurved, serrate above, keeled, smooth; caps. small globose, oblique, lid convex.

Moist shady rocks.

v.

378. *B. ITHYPHYLLA*. Brid. St. $\frac{1}{2}$ -2in.; l. from an erect broad base sharply bent back and lanceolate-subulate, rigid, serrulate, not crisped when dry, broadly nerved to apex; caps. globose, almost erect or cernuous.

Alpine and sub-alpine rocks.

vi.

62. CONOSTOMUM. SWARTZ.

379. *C. BOREALE*. Swartz. St. $\frac{1}{2}$ -2in. tufted, radiculose; l. imbricate lanceolate acuminate, keeled, serrate, nerve excurrent into a mucro; caps. globose, gibbous, cernuous; lid large beaked.

Summits of Scotch mountains.

viii. ix.

63. CATOSCOPIUM. BRID.

380. *C. NIGRITUM*. BRID. St. lin. or more (Wilson says 2-6in. or more), radiculose; l. lanceolate acute, margin reflexed entire, nerved nearly to apex; upper ones largest; caps. small globose, dark-coloured or black, cernuous; lid small conical.

Moist alpine rocks, &c.

Wilson says "fruits March (?)" My specimen from Fife is August.

64. DISCELIUM. BRID.

381. *D. nudum*. Brid. Stemless; l. few, ovate-lanceolate, entire, concave, round the base of the seta, generally buried; seta $\frac{1}{2}$ -lin.; caps. sub-globose reddish, cernuous, small; lid conical acute.

Clay banks and beds.

II.—IV.

Near Manchester (Cayley); Todmorden (Hobkirk).

65. SPLACHNUM. B. & S.

382. *S. vasculosum*. L. Stem $\frac{1}{4}$ -lin. radiculose; l. roundish-ovate, obtuse, or ovate acuminate, entire, narrow at base, not nerved to apex, areolæ lax; caps. small cylindrical on a large globular apophysis; lid convex: dioicous.

Elevated wet places.

VII.

383. *S. ampullaceum*. L. St. about lin.; l. lower lanceolate, upper larger obovate or oblong-lanceolate, all serrate or sometimes entire, acuminate, nerved nearly to apex; areolæ lax; seta dilated above into a turbinate apophysis, bearing the small cylindrical caps; the whole shaped like the ancient *ampulla*; lid conical; mono- or dioicous.

On dung in peaty places.

V. VI.

384. *S. sphericum*. Hedw. St. $\frac{1}{2}$ -lin.; l. roundish obovate, acuminate, scarcely serrate, lower smaller, nerved nearly to apex; apophysis not tapering, roundish ovate, about same width as cylindrical capsule; lid mammillate: dioicous.

Dung in moist peaty places.

V. VI.

66. TETRAPLODON. B. & S.

385. *T. MNIOIDES*. B. & S. St. $\frac{1}{2}$ -3in. tufted; l. sub-erect obovate or nearly elliptical, suddenly narrowed into a long piliferous point, concave, entire, nerved to apex; caps. elliptical on a large obovate apophysis of about same width; lid conical obtuse.

Moist mountainous situations, on dung, &c. v.

386. *T. ANGUSTATUS*. B. & S. St. $\frac{1}{2}$ -2in. tufted; l. sub-erect, ovate-lanceolate concave, narrowed into long tapering points, serrate; caps. ovate on an obconical apophysis; lid conical obtuse.

Dung on mountains, rare. VII. VIII.

67. TAYLORIA. HOOKER.

387. *T. SERRATA*. B. & S. St. scarcely 1in.; l. erecto-patent, recurved above, oblong obovate, lower ovate-lanceolate acuminate, serrate above, not nerved to apex; caps. oval on a long tapering apophysis; lid convex obtuse.

var. γ . *tenuis*. "l. broader and shorter, caps. smaller on a more slender stalk, much contracted when dry, columella exerted." Wils.

Normal form not found in Britain—only var. γ on turfy soil on Scotch mountains. VII. VIII.

68. DISSODON. GREV.

388. *D. FROELICHIANUS*. Grev. "St. cæspitose or scattered; l. ovate-oblong obtuse, nerve ceasing below apex; caps. (with apophysis) clavato-pyriform; lid conical; teeth of perist. in pairs." [Wils. Bry. Brit., 296.]

Doubtful native; said to have been found on Ben High,

Aberdeen, by Mr. Dickson, but the specimen in Herb. Turner is not certain.

389. *D. SPLACHNOIDES*. Grev. St. 1-4in. radiculose; l. erecto-patent, oval-oblong or lingulate obtuse, margin plane, not nerved to apex; caps. obovate with a short tapering neck; lid conical pointed; columella exerted when dry.

Wet mountainous bogs. Scotland.

VIII.

69. *ÆDIPODIUM*. SCHW.

390. *Æ. GRIFFITHIANUM*. Schw. St. $\frac{1}{4}$ - $\frac{1}{2}$ in, tufted; barren often much longer; l. obovate-roundish, obtuse, fringed below, not nerved to apex; caps. obovate or pyriform, neck tapering into a thick succulent seta; lid convex obtuse.

Crevices of mountainous rocks.

VII. VIII.

70. *SCHISTOSTEGA*. MOHR.

391. *S. OSMUNDACEA*. W. & M. St. $\frac{1}{4}$ - $\frac{1}{2}$ in.; l. bifarious, insertion vertical, lanceolate, pale green; caps. small, subglobose, mouth large; lid convex; young plant, when growing in caves, emitting a beautiful golden green light.

Sandstone caves and banks, not rare.

III.

71. *FISSIDENS*. HEDW.

I. Fructif. terminal.

a. Monoicous.

392. *F. EXILIS*. Hedw. St. $\frac{1}{8}$ in. simple; l. few, lower small ovate, upper lanceolate-oblong oblique, acute, margin not bordered, serrulate, nerved to apex, dorsal wing not

reaching to base of leaf; caps. elliptic-oblong, erect, lid conical obliquely rostrate.

Shady banks and woods, not frequent. E. S. I. I.—III.

393. *F. VIRIDULUS*. L. St. $\frac{1}{4}$ in. about; l. lanceolate acute, entire, bordered, crisped when dry, dorsal wing not reaching to base, nerved nearly to apex; caps. oval-oblong erect; lid conical with a blunt point; perist. immersed; barren fl. on a short branch.

Shady banks, rivulets on stones, &c. VIII. IX.

394. *F. INCURVUS*. Schw. St. $\frac{1}{4}$ in. about, ascending from a decumbent base; l. lanceolate oblong apiculate, narrowly margined, nerve ceasing near the serrate apex; caps. oval oblique, curved, rarely erect, lid conical rostellate; perist. not immersed; barren fl. sessile at base of stem. [Schp. Syn. 104.]

Shady banks, Cheshire; Hurst-pier-point. II. III.

var. *Lylei*. l. scarcely margined, narrow; perist. immersed. Cheshire, rare.

395. *F. PUSILLUS*. Wils. St. shorter; l. erect, acute, narrow; caps. sub-erect; perist. immersed.

Sandstone rocks.

396. *F. CRASSIPES*. Wils. St. $\frac{1}{4}$ – $\frac{3}{4}$ in.; plant more robust; l. larger, broader, and more numerous; caps. obovate roundish on a short seta, erect.

Sluices. Sandford, near Oxford. X. XI.

397. *F. BRYOIDES*. Hedw. St. $\frac{1}{4}$ – $\frac{1}{2}$ in.; l. lanceolate

apiculate, with a thickened margin, dorsal wing reaching to, and broad at, the base, strongly nerved to or beyond apex; caps. elliptical erect, symmetrical; lid conical, acutely rostellate; barren fl. axillary.

Shady banks, frequent.

I.—III.

b. Dioicous.

398. *F. OSMUNDIOIDES*. Hedw. St. 1-2in. tufted, erect, radiculose; l. lower scattered, small, upper larger crowded, ovate-lanceolate obtuse, apiculate, margin not thickened, almost entire, not nerved to apex, the latter sometimes toothed; caps. small oval-oblong, sub-erect; lid large convex rostrate.

Wet mountainous rocks.

X. XI.

399. *F. ASPLENIOIDES*. Hedw. St. (in var. β . only found in Britain) 3-12in.; l. linear-lanceolate or ligulate entire, obtuse, incurved when dry; caps. sub-erect obovate, slightly incurved; lid rostrate, as long as capsule; barren fl. axillary or terminal."

var. β . *polyphyllos*. "branches arcuate, l. wider, rather acute, more strongly nerved, serrulate at apex, barren fl. numerous axillary." [Wils. Bry. Brit.] Moist shady rocks on mountains.
W. I.

II. Fructif. lateral.

400. *F. ADIANTOIDES*. Hedw. St. 1-2in. branched, leafy; l. ovate-lanceolate, finely serrulate below, dentate at apex, nerved almost or quite to apex; border sometimes

thickened; caps. oval-oblong, constricted at mouth when dry, cernuous; lid with a long beak: monoicous.

Shady wet rocks and bogs.

X.—IV.

401. *F. TAXIFOLIUS*. Hedw. St. about $\frac{1}{2}$ in. fasciculate from base; l. lanceolate, pointed, not bordered, finely crenulate, nerved almost to apex; caps. almost ovate, inclined on a seta curved at summit, and inserted at base of stem, lid large convex with a long oblique beak: monoicous.

Moist shady banks.

XII.—II.

402. *F. DECIPIENS*. De Not. St. about $\frac{1}{2}$ -in. fasciculate from base; l. lower distant, coultter-shaped, upper imbricate patulous, oblong-ligulate acute or mucronulate, dorsal wing narrow, nerve strongly excurrent, excavate; the cultriform lobe of the upper leaves obliquely acute, longer than half the leaf, upper part strongly serrate; caps. ovate, somewhat constricted at base, erect or inclined; lid large rounded beaked: dioicous. [De Notaris, *Epilogo Briol. Ital.* 1869, p. 480.]

Damp rocks and old walls.

403. *F. TAMARINDIFOLIUS*. Donn. St. about $\frac{1}{2}$ in. fasciculate, slender; l. elliptical "sub-falciform apiculate," with an entire pellucid cartilaginous border, nerved to apex; caps. ovate-oblong curved inclined; lid short conical, with a bluntish point.

Banks, &c.

II. III.

DIVISION II. PLEUROCARPI.

72. ANÆCTANGIUM. B. & S.

404. *A. COMPACTUM*. Schw. St. 1-4in. densely tufted, slender; l. short, lanceolate spreading from an erect base, acuminate, slightly serrulate near the base only, nerved to or beyond apex; caps. oval-oblong erect; lid long convex, with a slender oblique beak.

Crevices of moist alpine rocks.

Autumn.

405. *A. HORNSCHUCHIANUM*. Hoppe. "St. elongate cæspitose; l. linear-subulate from a dilated base, channelled, entire; caps. roundish pyriform: lid rostrate." Wils. "L. upper part of dilated base is always more or less distinctly crenate or serrulate, from thence to the apex entire." W. Mitten, *Jour. of Bot.*, vol. v., p. 329. [Mr. Mitten refers Dr. Taylor's plant from Ireland to *Tortula Hibernica*, by which name it is described under that genus.]

73. LEUCODON. SCHW.

406. *L. SCIUROIDES*. Schw. St. or branches lin. from a creeping rhizome; l. imbricate, ovate, entire, tapering to a point, plicate, somewhat secund; per. l. longer, all nerveless; caps. long elliptical erect; lid conical beaked.

Trees, walls, rocks, &c.

IX.

407. *L. LAGURUS*. Hook. St. $\frac{1}{2}$ -lin., tomentous; l. ovate, suddenly contracted to a piliferous point, concave, serrulate near apex, nerved half-way; caps. cylindrical; lid with a short curved beak.

Trees and rocks.

var. β . *borealis*. "st. not tomentous; l. auriculate and serrate at base, more concave and more suddenly attenuated, with longer points; faintly two-nerved at base only." Wils. N. Uist, Hebrides, 1851.

74. ANTITRICHIA. BRID.

408. *A. CURTIPENDULA*. Brid. St. 3-8in. straggling, pinnately branched; l. ovate, concave, sharply curved to a roughly toothed point, which ends in a double hook in the younger ones, nerved half way, margins recurved; caps. roundish elliptical drooping; lid with an oblique beak.

Rocks and trees.

IV.

75. LEPTODON. BRID.

409. *L. SMITHII*. Brid. St. 1-3in. creeping, branches pinnate or bi-pinnate; l. ovate, rounded and obtuse at apex, entire, margin recurved below, nerved more than half way; per. l. erect ovate subulate; caps. elliptical horizontal on a short curved seta; lid with an oblique beak.

Trees. Devon, &c.

IV.

76. ANOMODON. H. & T.

410. *A. VITICULOSUS*. H. & T. St. 1-2in. from a creeping rhizome rigid; l. more or less secund or spreading from an ovate base lingulate or subulate, obtuse, entire, nerve pellucid, almost reaching apex; caps. almost cylindrical erect, on a yellowish seta; lid large conical rostrate.

Shady limestone rocks, trees.

XI.

411. *A. ATTENUATUS*. Hueb. (*Hypnum*, Schreb. *Leskea*, Hedwig.) St. 1-2in. procumbent with incurved branches;

l. imbricate, sometimes secund, ovate-lanceolate from a narrow base, acute, scarcely nerved to apex; per. l. narrower nerveless; areolæ minute opaque; caps. cylindrical erect; lid conical, with an oblique beak: dioicous.

Damp rocks and rotten tree trunks. Den of Airlie, Forfarshire (Fergusson), 1868.

412. *A. LONGIFOLIUS*. Hartm. Rhizomes slenderer than No. 410, branches sub-fasciculate; l. somewhat secund, from an ovate base lanceolate tapering, very acute, nerved to apex; caps. ovate-oblong on a short seta; lid large conical rostellate.

Scotch mountains; fr. not found in Britain. Autumn.

77. HABRODON. SCHP.

413. *H. NOTARISII*. Schpr. (*Pterogonium perpusillum*, De Not.) St. creeping, irregularly branched; l. spreading squarrose opaque, imbricate and shining when dry, from an ovate base longly acuminate, nerveless, entire; per. l. internal with erose margins; caps. oval-oblong erect, slightly striate, and contracted at mouth when dry; lid conical erose. [Supp. Bry. Eur. fasc. III. IV.]

Trunks of elm and white thorn. Spring.

Windermere and Devon (J. Nowell); Killin, Perthshire (A. McKinlay), July, 1865; Ben Lawers (Hunt).

78. PTEROGONIUM. SWARTZ.

414. *Pt. FILIFORME*. Hedw. St. creeping, with incurved fasciculate branches; l. imbricate or secund, elliptical, concave, papillose at back, serrulate at pointed apex, margin

recurved; nerved half way, or shortly two-nerved at base; caps. elliptical erect; lid conical, obliquely rostrate.

Mountainous rocks and tree trunks. S. I. Spring.

415. *Pt. GRACILE*. Sw. Rhizome creeping, with arcuate stems, and incurved fasciculate branches; l. spreading, (appressed when dry) ovate, concave, acute, serrate near apex, margin not recurved, slightly two-nerved at base; caps. oblong, longer and thicker than last; lid conical, shorter, not rostrate.

Shady sub-alpine rocks and walls, and trees. XI.

79. ISOTHECIUM. BRID.

416. *I. MYURUM*. Dill. St. 1-2in. from a creeping stoloniferous rhizome, with fasciculate branches; l. elliptical concave, not tapering but serrulate at apex, nerved half way, singly or forked; per. l. erect; caps. ovate, erect, with a long rostrate lid: dioicous.

Trees and rocks. X.

80. CLIMACIUM. W. & M.

417. *C. DENDROIDES*. W. & M. St. 1-3in. erect, with long spreading branches; l. ovate-lanceolate, serrulate at apex: st. l. acute, br. l. obtuse, nerved nearly to apex; per. l. nerveless, entire; caps. erect ovate-oblong, with a pointed beak.

Boggy places. X.—I.

81. CYLINDROTHECIUM. BRY. EUR.

418. *C. MONTAGNEI*. Bry. Eur. Müller. St. 1-2in., branches pinnate, recurved, cuspidate; l. elliptical acute entire, rather obtuse, faintly two-nerved at base, margin recurved below; marginal basal cells large and pellucid;

caps. cylindrical, erect, on a long seta, and with a blunt lid : dioicous.

Limestone hills. S. E.

Autumn.

82. LESKEA. HED.

A. L. not striate.

a. l. nerveless, or faintly two-nerved.

419. *L. MONILIFORMIS*. Wahl. St. $\frac{1}{2}$ in. slender tufted, branched; l. imbricate, nearly round, obtuse, very concave, nerveless, denticulate at base; per. l. ovate-lanceolate; caps. almost erect, small, oval-oblong, with a short beak.

Alpine rocks. E. S. I.

Summer.

420. *L. APICULATA*. Hueb. [*MYURELLA*.] Loosely cæspitose, soft and fragile; l. loosely imbricate or patent, ovate, very concave, often with a recurved apiculus, opaque; perist. pale, small. [*Bryol. Eur.*, v. t. 560.]

Moist rocky ground. Ben Lawers.

Summer.

421. *L. MICANS*. Wils. [*HYPNUM*. *Bry. Brit.* 402.] St. prostrate, very slender, filiform, branched; l. almost orbicular, concave, apiculate, serrulate, sometimes faintly two-nerved at base; fruit not known.

Shady rocks. S. of Ireland.

422. *L. POLYANTHA*. Hedw. Stem short creeping, branched; branches incurved above; l. crowded sub-secund, ovate-acuminate, suddenly apiculate, with apiculus sometimes slightly serrulate, nerveless; caps. elliptic-oblong erect, broader below, with a conical bluntish lid and long calyptra : monoicous.

Trees. E. S. W.

VII. VIII.

b. l. nerved.

423. *L. PULVINATA*. Wahl. St. $\frac{1}{2}$ in. procumbent, slenderly branched; l. imbricate elliptic-ovate, narrowed below, concave entire, nerved half-way, or two-nerved at base; areolæ large, almost hexagonal; per. l. nerveless; caps. almost erect, oval oblong; lid conical pointed, falling early: monoicous.

Roots of trees near rivers, &c.

v. vi.

424. *L. POLYCARPA*. Ehr. St. longer, densely tufted; almost pinnately branched; l. imbricate, sub-secund, ovate, tapering, stoutly nerved nearly to apex, margin entire, reflexed below; per. l. erect, striate; caps. cylindrical, erect, lid conical acute: monoicous.

Roots of trees.

v. vi.

var. β . *paludosa*. generally more lax; caps. longer.

B. L. striate.

425. *L. SERICEA*. Dill. St. 1in. or more, creeping, branched; branches erect, curved; l. imbricate, sub-secund, lanceolate, long tapering, scarcely nerved to apex; areolæ very narrow; caps. almost erect, cylindrical, tapering above, on a rough seta; lid conical, obliquely beaked: dioicous.

Walls, rocks, and trunks of trees.

xI.—III.

426. *L. RUFESCENS*. Hall. St. 1-3in. erect, branched, with reddish-brown foliage; l. imbricate, almost erect, lanceolate, long tapering, often almost piliferous, nerveless, margins plane; caps. generally erect cylindrical, on a long smooth seta; lid shortly conical: dioicous.

Moist shady alpine rocks. S.

x.

427. *L. SUBRUF*A. Wils. St. about 1in. or less, erect, branched; foliage, young green, older brownish; l. almost erect, sub-secund, lanceolate, long tapering, nerveless, entire; caps. ovate, tapering below, almost erect; lid conical pointed; dioicous. Fruit not found in Britain.

Sub-alpine rocks.

Summer.

83. HYPNUM. DILL.

Sub-genus I. *THUYIDIUM*. St. erect, pinnate or bipinnate, with numerous branched villi; l. densely papillose on the back; nerve single.

a. St. simply pinnate.

428. *H. (THUYIDIUM.) ABIETINUM*. Dill. St. 2-4in. rigid, reddish, not always erect; br. slightly drooping crowded; l. imbricate, erecto-patent, more or less secund; st. l. ovate or cordate acuminate, serrulate near apex, plicate; br. l. narrower, less plicate; all papillose on back and keel, nerved nearly to apex; areolæ dot-like; caps. oblong-cylindrical, arcuate, cernuous; lid conical: dioicous.

Alpine rocks, chalk hills, &c.

Spring.

429. *H. (THUYIDIUM) BLANDOVII*. W. & M. St. 3in. erect, flexible; br. slender, spreading; l. loosely imbricate, erect from a spreading base, broadly ovate or sub-cordate, acute, narrowed at base almost to a pedicel, keeled, serrulate, not papillose on keel, thinly nerved nearly to apex, margin recurved: areolæ larger, sub-hexagonal; caps. oblong, curved, cernuous; lid conical, with a blunt point: monoicous.

Bogs, rare.

v.

430. H. (THUYIDIUM) DECIPIENS. De Not. (*H. rigidulum*. Ferg.) St. 2-4in. rigid, villous, with short attenuate branches; st. l. distant, sub-squarrose, deltoid-ovate, suddenly acuminate auricled, concave serrate, papillose on both sides, sometimes secund above; br. l. smaller, crowded, ovate or ovate-lanceolate, spreading or secund, nerved half-way or more; areolæ large hexagonal and pellucid at base, above oval-elongate confused (Fergusson).

Springs and streams. Ben Lawers (Dr. Stirton), 1866; Clova, 2800 ft. (Fergusson), 1868; Auchinblae, 800 ft. (Sim and Fergusson); Glas Mheal, Perthshire, 2500 ft. (G. E. Hunt). All barren.

b. St. bi- or tri-pinnate: dioicous.

431. H. (THUYIDIUM) DELICATULUM. L. St. elongate, erect or procumbent, bipinnate; br. drooping, often rooting at apex; l. broadly cordate or ovate acuminate, sub-striate, papillose or muricate on back and keel, nerved nearly to apex, which is finely serrulate; caps. sub-cylindrical curved, cernuous, pale brown, lid large conical, not rostrate.

Limestone and chalk rocks, &c.

VII. VIII.

432. H. (THUYIDIUM) TAMARISCINUM. Hedw. St. elongate, arched, procumbent, interruptedly tri-pinnate; br. not rooting; st. l. cordate acuminate, plicate; br. l. ovate, obtuse; all papillose at back, but not so much so as last; serrulate near and nerved almost to apex; caps. oblong-cylindrical, curved, cernuous, purplish red; lid large conical, with a long beak.

Woods and banks, frequent.

XI.

Sub-genus II. *PTYCHODIUM*. Branches sub-pinnate ; l. patent and secund, often deeply sulcate, thinly nerved to apex ; areolæ shortly linear, quadrate at the angles ; caps. cernuous, horizontal, ovate ; per. teeth dense and narrow, lamellose, cilia rudimentary.

433. H. (*PTYCHODIUM*) *PLICATUM*. Schl. St. creeping, tomentous ; branches ascending incurved ; l. ovate, imbricate, pointed, margin recurved ; per. l. twice as large ; caps. ovate-oblong, small, on a half-inch reddish seta : dioicous.

Alpine rocks. S. iv. (?)

Sub-genus III. *CAMPTOTHECIUM*. Stems trailing in part, sub-erect, branched ; l. silky, striate, thinly nerved, areolæ narrowly linear ; caps. cernuous, on a smooth or rough incurved seta ; lid shortly rostrate or conical ; internal perist. with long cilia.

434. H. (*CAMPTOTHECIUM*) *LUTESCENS*. Dill. St. about 3in. irregularly branched, sometimes pinnate ; l. narrowly lanceolate, tapering to a long point, entire, nerved nearly to apex ; caps. oblong arcuate, on a rough seta ; lid conical, beaked : monoicous.

Rocks and woods (limestone and sandstone). iv.

435. H. (*CAMPTOTHECIUM*) *NITENS*. Dill. St. 2-4in. erect, almost pinnate, radiculose ; branches short spreading ; l. erecto-patent, lanceolate, long tapering, acute, not nerved to apex, entire, margin recurved ; caps. arcuate oblong, on a long smooth seta ; lid conical : dioicous.

Bogs. E. S. iv. v.

Sub-genus IV. BRACHYTHECIUM. Plants upright or prone, irregularly branched; l. silky, patent or sub-secund, more or less decurrent, thinly nerved, striate; areolæ narrowly hexagono-rhomboid, generally quadrate at basal angles; caps. ovate, sub-globose, or oblong, often turgid, lid conical.

a. Seta smooth.

436. H. (BRACHYTHECIUM) MILDEANUM. Schp. St. $\frac{1}{2}$ to 1in. erect branched; l. sub-erect, long lanceolate, gradually tapering from a broadish base into a long slender point, almost piliferous, plicate when dry, margins plane, thinly nerved more than half way; areolæ long and narrow, broader at base and quadrate at basal angles; caps. obovate-oblong or unsymmetrical, much curved cernuous, constricted at mouth when dry, on a red twisted seta; lid conical, tapering to a blunt apex, tipped with an apiculus.

Sands. Southport, Fifeshire, Dublin, Cornwall. x. xi.

437. H. (BRACHYTHECIUM) SALEBROSUM. Hoffm. St. 1-2in. procumbent sub-pinnate; l. shortly ovate-acuminate, serrulate, only slightly striate, nerved more than half-way; caps. ovate cernuous curved, lid conical, scarcely beaked: monoicous.

Trees.

xi.

Near Kirkham Abbey, Yorks. (R. Spruce); Sussex (Mitten).

438. H. (BRACHYTHECIUM) GLAREOSUM. Bruch. St. about 2in. sub-procumbent, branches sometimes sub-pinnate; l. erecto-patent from an ovate base, gradually tapering into a

long slender, sometimes twisted, sub-serrulate apex, margin reflexed below; caps. ovate-oblong, cernuous arcuate; lid conical, with a distinct beak: dioicous.

Woods and shady banks.

XI.

439. H. (BRACHYTHECIUM) ALBICANS. Dill. St. about 2in. upright; l. spreading, appressed when dry, ovate-acuminate, concave, entire, nerved more than half-way; caps. ovate small, scarcely curved, cernuous, on a slender seta; young foliage pale green, greyish brown below: dioicous.

Sandy grassy places.

XI. XII.

b. Seta rough.

440. H. (BRACHYTHECIUM) VELUTINUM. Dill. St. short creeping, with erect branches; l. sub-secund, ovate-lanceolate, prolonged into a short serrulate taper point; nerved half way or more, margin reflexed below; per. l. almost piliferous; caps. roundish ovate cernuous; lid conical pointed; monoicous.

Walls, sandy hedge banks, roots of trees, &c.

XI. XII.

441. H. (BRACHYTHECIUM) REFLEXUM. Seliger. St. more or less arched, procumbent, and rooting at extremities; branches sub-pinnate, slender, incurved; l. shortly ovate-cordate, acuminate, serrate, nerved almost or quite to apex, margin reflexed, areolæ large; caps. small, roundish-ovate, horizontal; lid conical pointed: monoicous.

Scottish mountains.

Spring.

442. H. (BRACHYTHECIUM) RUTABULUM. Dill. St. long, loosely tufted, procumbent, and rooting at extremities, with erect branches; l. ovate, concave, acuminate, serrulate, striate when dry; thinly nerved, above half way; caps.

ovate oblong, arcuate, cernuous on a very rough seta; lid bluntly pointed: monoicous.

Banks, walls, and trees. Common.

IX.—III.

var. δ . *plumulosum*. Sch. l. narrower, tapering, not acuminate. Sands, Southport.

443. H. (BRACHYTHECIUM) CAMPESTRE. B. & S. St. loosely cæspitose, prostrate or ascending, much branched; l. erecto-patent, longly ovate-lanceolate, more or less subulato-acuminate, serrulate, thinly nerved more than half way, plicate, shining; per. l. recurved squarrose from the middle, piliferous; caps. oblong-cylindrical subarcuate, on a slightly roughened seta. (Sch. Synopsis, 543.)

Grassy places, fields, &c.

Winter and Spring.

Maresfield, Sussex (Mr. Mitten); Spec. in Herb. Kew. "Newchurch, Over, Cheshire, W. W. Dec. 13, 1837."

444. H. (BRACHYTHECIUM) RIVULARE. Bruch. St. arched, slender; branches slender, incurved, sub-pinnate; l. deltoid-ovate, gradually tapering, not suddenly acuminate, serrate, nerved above halfway, decurrent: caps. short roundish ovate arcuate, cernuous; lid large conical acute rostellate: dioicous.

Stones, &c., by rivulets in shady woods; sometimes in water, when the st. are often very elongate. IX.

445. H. (BRACHYTHECIUM) POPULEUM. Hedw. St. creeping, sub-pinnate; l. narrowly ovate-lanceolate, tapering to a long serrulate point, margin reflexed, nerved to apex; caps. small roundish ovate, slightly cernuous or nearly erect; lid conical, very acute, sub-persistent on the ripe fruit: monoicous.

Walls, rocks, trees, &c., frequent.

IX.—II.

var. β . *nutans*. Brid. branches longer, caps. distinctly cernuous.

446. H. (BRACHYTHECIUM) PLUMOSUM. Swartz. St. creeping; branches long, frequently erect, subpinnate; l. ovate, concave, acuminate, sub-secund, serrulate near apex, nerved above half way; caps. small roundish ovate, cernuous, seta roughish at summit only; lid conical acute: monoicous.

Sub-alpine shady rocks, stones in rivulets, walls, &c.

x.—III.

Sub-genus V. SCLEROPODIUM. Areolation vermicular, slightly dilated and excavate at angles; caps. on a rough seta, sub-erect or cernuous, turgid, ovate or oblong and sub-incurved.

447. H. (SCLEROPODIUM) CÆSPITOSUM. Wils. St. densely tufted, creeping; branches slender, short, incurved; l. sub-secund, ovate, small, concave, serrulate, nerved above half-way; caps. sub-cylindrical, slightly arcuate, sub-erect; lid long rostellate; dioicous.

Damp walls and roots of trees.

XI.

Lancashire, Yorkshire, Cheshire, Sussex.

448. H. (SCLEROPODIUM) ILLECERRUM. L. St. procumbent, sometimes sub-pinnate, branches incurved obtuse; l. roundish-ovate, pointed, very concave, imbricate, serrulate, tip slightly recurved; nerve reaching above half way, its tip slightly projecting from back of leaf; caps. ovate oblong cernuous, somewhat ventricose; lid bluntly conical apiculate: dioicous.

Banks and rocks near the sea.

XI. XII.

Hampshire, Anglesea.

Sub-genus VI. EURYNCHIUM. More or less pinnately branched; areolæ narrowly rhomboid or sub-vermicular, dilated at the angles; caps. cernuous and horizontal, on a smooth or rough seta; lid with a long beak.

a. Striatae. l. sub-scariose, shining, more or less distinctly sulcate; areolæ long and narrow.

1. Seta smooth.

449. H. (EURYNCHIUM) MYOSUROIDES. L. (*Isothecium myosuroides*. Bry. Brit. 323.) St. slender; branches fasciculate incurved; l. somewhat spreading, from an ovate base lanceolate acuminate, serrulate, nerved more than half way; caps. elliptic-oblong, more or less inclined, on a twisted or curved seta; lid conical, with a short beak: dioicous.

Trunks of trees and rocks.

XI.

450. H. (EURYNCHIUM) STRIGOSUM. Hoffm. St. 1in. sub-erect or creeping, scarcely pinnate; l. roundish-ovate or cordate, concave, rather obtuse, serrate, nerved above half way, margin recurved below; caps. sub-cylindrical, curved, small; lid conical, with a longish curved beak: parasitico-monoicous.

Roots of trees, rocks, &c.

XI.

Cornwall (Tozer in Herb. Hook.)

Spring.

451. H. (EURYNCHIUM) DIMORPHUM. Brid. St. 1-2in. procumbent, branches very slender, more or less pinnate; st. l. ovate-acuminate, spreading recurved; br. l. ovate, concave obtuse, sub-erect, all serrulate and shortly two-nerved; areolæ quadrate on margin, the rest larger, longer

and less opaque; caps. oblong, almost horizontal; lid conical, without beak: dioicous.

Ben Lawers. Barren.

Summer (?)

452. H. (EURYNCHIUM) CATENULATUM. Schwg. St. about $\frac{1}{2}$ in. creeping, with erect very slender branches; l. very small, ovate acute, entire concave, margin recurved below, broadly nerved half-way or more; caps. oval-oblong slightly curved, sub-erect or cernuous; lid large, with a distinct beak: dioicous.

Alpine and sub-alpine rocks.

Summer.

Scotland; Yorkshire. Fr. not known in Britain.

453. H. (EURYNCHIUM) HETEROPTERUM. Bruch. St. procumbent, more or less pinnate, often rooting at apex; l. ovate-acuminate, small, more or less secund, denticulate, somewhat papillose at back; nerved singly half way, or short and forked; caps. oblong, scarcely curved, almost erect; lid with a long beak: dioicous.

Moist rocks near waterfalls.

XI.

Ireland, Wales, Todmorden.

454. H. (EURYNCHIUM) CIRCINNATUM. Brid. St. short, sub-erect arched: branches curved and drooping; l. very small ovate, pointed, sub-secund, serrulate at apex, thickly nerved nearly to apex; areolæ oval, smaller and quadrate at base; caps. oblong cernuous, curved; lid large, with a long oblique or curved beak: dioicous.

Shady limestone rocks and walls.

III.

455. H. (EURYNCHIUM) STRIATULUM. Spruce. St. short creeping, tufted; branches short crowded, erect; l. erecto-patent, ovate, long taper pointed, serrate, sub-striate,

strongly nerved more than half way; basal areolæ opaque minute; caps. oblong cernuous; lid roundish, with a long pointed beak: dioicous.

Shady limestone rocks and roots of trees.

XII.

456. H. (*EURYNCHIUM*) *STRIATUM*. Hedw. Much larger than the last in all its parts; stems loosely tufted, arched, sub-pinnate; branches drooping; l. gradually tapering from a broad cordate base, almost squarrose, serrate, striate, nerved more than half way; caps. almost cylindrical, curved, cernuous; lid large, with a long slender curved beak: dioicous.

Woods and shady banks.

XII.

2. Seta rough.

457. H. (*EURYNCHIUM*) *GRASSINERVIUM*. Tayl. St. creeping, branches erect; l. spreading ovate, sharply pointed serrate concave, margin reflexed, nerve thick, reaching more than half way, sometimes forked: caps. elliptic-oblong small curved, cernuous; lid large, with a very long slender oblique beak; dioicous.

Shady limestone rocks.

XI.

458. H. (*EURYNCHIUM*) *PILIFERUM*. Vaill. St. 2-3in. slender, procumbent, branched; l. imbricate erecto-patent, elliptical serrulate, suddenly contracted into a long serrulate, almost piliferous point, concave, nerved half way; caps. oblong cernuous, slightly arcuate, lid with a long beak.

Shady banks and woods. Fr. rare.

XI.

459. H. (*EURYNCHIUM*) *CIRRHOSUM*. Schwg. Stems erect or procumbent, with a few erect branches; l. imbricate

elliptic, more oblong than the last (of which it may be only a variety, though very different in many points), entire except the long narrow points, which are serrulate and suddenly geniculate or reflexed where the point joins the blade; concave, nerved half way. Never been found in fruit.

Summit of Ben Lawers, 1823 (Dr. Arnott).

b. Prælongæ. l. opaque, scarcely sulcate, areolæ almost as broad as long; seta rough.

* Synoicous.

460. H. (EURYNCHIUM) SPECIOSUM. Brid. St. creeping, with short erect, almost complanate branches; l. ovate serrulate, nerved almost to acute apex, bright green; caps. ovate or obovate, cernuous; lid with a long pointed beak.

Stones near springs, sometimes in water.

XII.

* * Dioicous.

461. H. (EURYNCHIUM) PRÆLONGUM. Dill. St. long, arched or procumbent, often bipinnate, branches slender; l. squarrose recurved, broadly cordate, and suddenly tapering to a long point, amplexicaul, nerve carried nearly to base of point; br. l. lanceolate acuminate, all serrate: per. l. nerveless; caps. small oval-oblong, obliquely cernuous; lid with a long tapering slender beak.

Moist shady banks.

XI.

462. H. (EURYNCHIUM) HIANUS. Hedw. Sp. Musc. 272. t. 70. L. roundish ovate, spreading, areolæ large. [Mueller Syn. II., 447.]

Sussex (Mr. Mitten).

463. H. (*EURYNCHIUM*) *PUMILUM*. Wils. St. creeping, filiform; br. slender, sub-pinnate sub-complanate; l. minute ovate, shortly pointed, spreading sub-serrulate, faintly nerved half way; per. l. smaller, recurved; caps. short roundish ovate, cernuous; lid rather large, with an oblique beak.

Shady rocks and hedge banks. E. S. I. XI.

464. H. (*EURYNCHIUM*) *STOKESII*. Turn. St. densely cæspitose, branches ascending, simple below, above densely pinnate and bipinnate; st. l. distant, acutely cordate, shortly acuminate, and triquetrous, recurved; br. l. ovate-lanceolate, erecto-patent, all thinly nerved, and serrate; caps. oblong ventricose horizontal, olive-coloured; lid with a long straight subulate beak from a conical base. (Syn. 562. Bry. Eur. v. 526.)

Stones and rocks in woods, &c. Autumn.

465. H. (*EURYNCHIUM*) *SWARTZII*. Turn. St. creeping, with short erect branches; l. uniform, ovate not acuminate, serrate, nerved more than half way; caps. roundish ovate, cernuous, reddish brown; lid with a long oblique beak.

Moist banks and rocks; frequent. XI.

Sub-genus VII. HYOCOMIUM. St. prostrate; l. broadly obcordate, with a long apiculus, decurrent, shortly two-nerved; areolæ, above flexuoso-linear, middle narrowly rectangular, angles broadly hexagonal or rectangular; caps. on a thick seta, oval, turgid, cernuous; lid mammillate.

466. H. (*HYOCOMIUM*) *FLAGELLARE*. Dicks. St. 1in. or more, arched pinnate; br. sub-fasciculate, recurved; st. l.

squarrose, broadly cordate-acuminate, slightly striate; br. l. less spreading, sub-secund, roundish-ovate, less acuminate; all sharply serrate and mostly two-nerved at base, or nerveless; per. l. almost erect, much narrower; caps. ovate-oblong, curved, cernuous, on a rough seta: dioicous.

Moist shady rocks by cascades, &c.

x. xi.

Sub-genus VIII. RHYNCHOSTEGIUM. Plants low cæspitose, with scattered branches; l. soft, shining, nerveless or simply nerved; areolæ elongate, narrowly hexagono-rhomboid; caps, horizontal cernuous; lid with a subulate beak.

a. Demissæ. St. prostrate, l. complanate, oblong-lanceolate, nerveless, entire; caps. thin walled; seta smooth: monoicous.

467. H. (RHYNCHOSTEGIUM) DEMISSUM. Wils. St. filiform; br. short slender: l. elliptic-lanceolate, acute, sub-secund above, margin reflexed; caps. small, narrowly elliptical, horizontal cernuous; lid obliquely rostrate.

Shady mountainous rocks.

vii. viii.

b. Tenellæ. st. creeping; l. narrowly lanceolate, caps. solid walled, seta rough or smooth: monoicous.

468. H. (RHYNCHOSTEGIUM) TENELLUM. Dicks. St. and br. very short creeping; l. erecto-patent, narrowly lanceolate acuminate, almost setaceous, light green, entire, nerved more than half-way; caps. ovate cernuous, on a smooth seta; lid beaked.

Walls and rocks, principally limestone.

x.

469. H. (RHYNCHOSTEGIUM) TEESDALII. Sm. St. slender, creeping; br. erect; l. sub-complanate, narrowly lanceolate, rigid, slightly serrulate near apex, broadly nerved nearly to apex; caps. ovate cernuous, on a rough seta; lid almost as large as caps., beaked.

Moist shady rocks near waterfalls.

III.—VI.

c. Depressæ. Pl. low cæspitose soft; l. broadly oblong, thinly nerved; seta smooth.

* Dioicous.

470. H. (RHYNCHOSTEGIUM) DEPRESSUM. Bruch. St. prostrate pinnate; br. thickest in middle—both very short; l. complanate crowded ovate-oblong, slightly concave and finely serrulate, shortly two-nerved; caps. ovate, curved, cernuous; lid as long as caps. and long beaked.

Rocks and stones, especially limestone.

Spring.

Caergwrle, N. Wales, Oct., 1871, in fruit (C. L. Higgins.)

* * Monoicous.

471. H. (RHYNCHOSTEGIUM) CONFERTUM. Dicks. St. creeping sub-pinnate; br. erect; l. slightly secund or complanate, ovate acuminate concave serrulate, thinly nerved quite or more than half way; caps. ovate-oblong cernuous; lid short, with a very long curved beak.

Rocks, walls, trees, &c., frequent.

x.

472. H. (RHYNCHOSTEGIUM) MEGAPOLITANUM. Bland. Much larger than the last, and remotely branched; st. l. remote, br. l. crowded; lower oblong lanceolate, the others more or less sharply acuminate from a broad ovate base, slightly serrulate, nerved more than half way; caps. oblong

cylindrical incurved, arcuate when dry; lid with a short thick beak. [Schp. Syn. 469, Bry. Eur. v. t. 511.]

Sandy shores. Southport, Dublin, Sussex. Spring.

473. H. (RHYNCHOSTEGIUM) MURALE. Dill. St. short, creeping, with erect crowded branches; l. closely imbricate, roundish ovate, concave, faintly serrulate, cucullate at apex, which is slightly mucronate, not acuminate, nerved half way; caps. ovate, somewhat cernuous; lid flattish, with a long beak.

Walls, &c., chiefly limestone. x.

474. H. (RHYNCHOSTEGIUM) RUSCIFOLIUM. Dill. St. creeping, with long irregular procumbent branches; l. complanate and sub-secund, ovate, with a cordate base, serrate, stoutly nerved nearly to apex; caps. shortly ovate cernuous; lid convex, with a very long beak.

Rocks and stones in rivulets, frequent. xi.

Sub-genus IX. THAMNIUM. Dendroid from a creeping rhizome; l. sub-complanate, nerved, areolæ minute, quadrate or rhomboid at apex, narrowly oblong at base; caps. short and sub-arcuate with the seta, turgidly ovate, lid with a long beak; inner perist. with long appendiculate cilia.

475. H. (THAMNIUM) ALOPECURUM. Dill. St. 2-3in. naked below, pinnately branched above; l. spreading ovate-lanceolate, somewhat concave, serrate, strongly nerved nearly to apex; caps. shortly ovate, cernuous or erect, lid with a long oblique beak: dioicous.

Moist woods, rocks, &c. xi.

Sub-genus X. **PLAGIOTHECIUM**. St. generally prostrate, or partially erect, branched; l. complanate or secund, thin, silky, nerveless or shortly two-nerved; areolæ long hexagono-rhomboid; caps. sub-erect or cernuous, more or less incurved; lid convexo-conical or rostrate; per. teeth pale thin, internal a membrane with narrowish processes; cilia none or obscure.

A. Per. teeth distantly articulate, without cilia: dioicous.

476. H. (**PLAGIOTHECIUM**) **LATEBRICOLA**. Bry. Eur. (*Leskea*, Bry. Brit.) St. short, slender, sparsely branched, sub-erect; l. sub-secund ovate-lanceolate, tapering acute, entire, slightly concave, decurrent, faintly two-nerved; margin recurved; caps. elliptic-oblong, turbinate when dry; lid short, acutely conical.

Moist shady woods, decaying trunks, and ferns. Winter.

B. Per. teeth densely articulate, internal with entire ciliary processes.

a. Monoicous.

477. H. (**PLAGIOTHECIUM**) **PULCHELLUM**. Dicks. St. short densely tufted, sub-erect, br. fastigiate; l. crowded, secund, lanceolate, gradually tapering from base to apex, entire, generally nerveless; caps. oblong, sub-erect, curved; lid conical, scarcely beaked.

Mountainous shady rocks, &c.

VI.—X.

478. H. (**PLAGIOTHECIUM**) **MÜHLENBECKII**. B. & S. St. short, tufted, sub-erect, with recurved fasciculate branches; l. complanate, spreading, deltoid-ovate or sub-cordate,

tapering, dark green, finely serrulate, nerveless, or shortly two-nerved; caps. oblong, slightly inclined, tapering below, striate when dry; lid short conical.

Alpine rocks. S. I.

VII.

479. H. (PLAGIOTHECIUM) SILESIACUM. Seliger. St. and branches procumbent, the latter arcuate; l. secund, mostly pointing upwards, ovate-lanceolate, longer tapering than the last, concave, distinctly serrulate, slightly and shortly two-nerved; caps. long sub-cylindrical, not striate when dry, curved, cernuous; lid conical pointed.

Stems of decaying trees, rocks, &c.

IV. V.

Kent; Yorkshire.

480. H. (PLAGIOTHECIUM) DENTICULATUM. Dill. St. prostrate, with sub-fasciculate branches; l. complanate, obliquely ovate pointed, sometimes sub-serrulate at apex, margin recurved below, shortly two-nerved; caps. oblong, sub-erect; lid acutely conical.

Sub-alpine woods, banks, wet rocks, &c.

Summer.

var. β . *obtusifolium*. l. elliptical, more or less obtuse, slightly concave. Alpine rocks.

γ . *succulentum*. l. with almost plane margins: synoicous. Todmorden, Warrington.

b. Dioicous.

481. H. (PLAGIOTHECIUM) ELEGANS. Hook. St. prostrate, br. distichous, fasciculate or pinnate; l. complanate, ovate-lanceolate, tapering to a slender serrulate point, sometimes oblique, nerveless, or faintly two-nerved; caps. small

ovate elliptical, curved, more or less pendulous; lid conical, shortly beaked.

Shady banks and rocks, usually barren.

III. IV.

var. β . *collinum*. "st. erect tufted; l. sub-secund."

482. H. (PLAGIOTHECIUM) SYLVATICUM. Dill. St. longer, about 1 inch, decumbent branched; l. sub-complanate, sometimes sub-secund, ovate-lanceolate, not acuminate, entire, distinctly two-nerved nearly half-way; caps. cylindrical, curved, inclined, or horizontal; lid long, shortly beaked.

Roots of trees in woods, &c.

IX.

483. H. (PLAGIOTHECIUM) UNDULATUM. Dill. St. and br. procumbent, 2in. or more; l. complanate, ovate, acute, not acuminate, entire, undulate, faintly two-nerved, whitish green; caps. cylindrical, tapering at base, cernuous or horizontal, striate when dry, lid with a short beak.

Woods and moist places.

IV.—VII.

Sub-genus XI. AMBLYSTEGIUM. Plants small prostrate, sparingly branched; l. soft, generally opaque, simply nerved, rarely nerveless; areolæ hexagono-rhomboidal parenchymatous, or tubular prosenchymatous; caps. sub-erect or incurvo-cernuous, oval and sub-arcuate cylindrical, opaque, on a smooth seta; lid large, tumidly conical, obtuse; internal perist. generally integrate, cilia more or less perfect, rarely none.

1. L. opaque, areolæ all parenchymatous.

a. Dioicous.

484. H. (AMBLYSTEGIUM) SPRUCEI. Bruch. St. short, slender, with few branches; l. distant narrowly ovate-

lanceolate, long pointed, margin almost entire, concave, nerveless; per. l. larger, with longer points, distinctly serrulate at apex; caps. erect elliptical, turbinate when dry, mouth wide; lid long conical pointed. [*Leskea*. Bry. Brit.]

Shady sub-alpine rocks, rare.

Spring (?)

Teesdale, Todmorden.

485. H. (AMBLYSTEGIUM) ATRO-VIRENS. Dicks. St. prostrate, irregularly branched, the latter slightly incurved, rigid, sub-erect; l. imbricate, somewhat secund, ovate-lanceolate, with long tapering points, margin recurved below, subserrulate above; thickly nerved almost to apex; "caps. sub-cylindrical short curved and subcernuous, lid conical."

Alpine rocks, &c., rare in fruit. Scotland.

Spring.

b. Monoicous.

486. H. (AMBLYSTEGIUM) CONFERVOIDES. B. & S. St. creeping, very slender, sub-pinnate, sparingly branched; br. capilliform; l. scattered sub-secund, more or less spreading, ovate-lanceolate, acuminate, entire, nerveless; per. l. longer, erect; caps. cernuous, oval-oblong, slightly incurved, pale brown, semi-pellucid; lid convex, obliquely apiculate; annulus small deciduous.

Stones in shady places, limestone.

Summer.

Dovedale (Dr. Fraser, 1866); Westmoreland.

487. H. (AMBLYSTEGIUM) SERPENS. Dill. St. creeping, sub-pinnate, with slender sub-erect branches; l. spreading, ovate-lanceolate, tapering into long points, entire, faintly nerved half way, or sometimes nearly to apex: caps. oblong, cylindrical or obovate, curved, cernuous, reddish at mouth; lid conical acute.

Walls, moist banks, trees, &c., common.

IV. v.

488. H. (AMBLYSTEGIUM) RADICALE. P. Beauv. St. creeping, with sub-erect rigid branches; l. spreading, ovate-lanceolate from a cordate or deltoid base, twice as large as last, and strongly nerved almost to the long tapering apex; per. l. larger serrate; seta long (sometimes 2in.); caps. oblong, much curved, cernuous, not red at mouth; lid conical, with a short sharp beak.

Moist ground amongst grass. Wales. iv. v.

489. H. (AMBLYSTEGIUM) IRRIGUUM. Hook. St. procumbent rigid, sometimes pinnate; l. spreading, secund, gradually tapering to a point from a deltoid-ovate somewhat decurrent base, sub-serrulate, strongly nerved nearly to apex; caps. oblong, cernuous, curved, when dry more so, and contracted at mouth; annulus persistent; lid conical, blunt pointed.

Stones in rivulets and streams. iv.

490. H. (AMBLYSTEGIUM) FLUVIATILE. Swartz. St. procumbent, with simple, prostrate, not rigid branches; l. ovate or ovate-lanceolate, acute, entire, concave, strongly nerved almost to apex; caps. slender, elliptical, elongate, sub-erect, only slightly curved; lid conical.

Rocks and stones in mountain streams. v. vi.

2. L. areolæ narrow, rhomboido-hexagonal, prosenchymatous at base only, rectangulo-6-gonal.

491. H. (AMBLYSTEGIUM) RIPARIUM. Dill. St. longer, creeping, with sub-pinnate sub-erect branches; l. spreading, sub-complanate, ovate-lanceolate entire, nerved two-thirds or more; caps. oblong cylindrical curved, cernuous, contracted at mouth when dry; lid conical pointed.

Stones, &c., near pools, sometimes in water. v. vi.

Sub-genus XII. eu-HYPNUM. St. erect or procumbent, sometimes radiculose and pinnate; l. patent, squarrose, or falcato-secund, nerve various or none; areolæ narrowly linear, often dilated, and transparent at base; caps. incurved cernuous on a smooth seta; lid convexo-conical, mammillate, rarely rostrate; perist. perfect.

Sect. I. Branches straggling or sub-pinnate; l. squarrose-divaricate or stellate and patent.

a. Monoicous.

492. *H. HALLERI.* L. Jun. St. creeping, with pinnate erect branches; l. crowded lanceolate, recurved from a roundish ovate base, acuminate, serrulate, almost squarrose, faintly two-nerved at base or nerveless; caps. oblong curved cernuous; lid conical, blunt.

Alpine rocks, rare.

VIII.

493. *H. POLYMORPHUM.* Hedw. "St. procumbent, branches simple, erect, slender; l. spreading, almost squarrose, sub-secund, ovate-lanceolate, acuminate, entire, nerveless; caps. oblong, curved, cernuous, lid conical." [Bry. Brit.]

Limestone walls, banks and rocks.

v.

b. Dioicous.

494. *H. ELODES.* Spruce. St. elongate, slender, with sub-pinnate slender sub-erect branches: l. distant, spreading; br. l. lanceolate-subulate, apex almost setaceous, secund; st. l. wider, less secund; all entire, nerved nearly or quite to

apex : caps. cylindrical curved cernuous ; lid conical.

Wet places and bogs.

IV. V.

[Wilson states the leaves to be sub-denticulate at *base only*, whilst his figure is evidently *serrulate* above and entire at base. I can find no indications of denticulation, even under a $\frac{1}{4}$ inch, except perhaps an occasional slight protusion of an odd cell here and there, but this cannot be called even denticulate.]

495. H. CHRYSOPHYLLUM. Brid. St. creeping pinnate ; l. almost squarrose sub-secund, from a cordate ovate base, tapering into long setaceous points, entire, nerved more than half way, rarely absent ; areolæ not enlarged or diaphanous at base ; caps. large cylindrical, curved, cernuous ; lid conical.

Fallow ground, chalk hills, &c.

V.—IX.

496. H. STELLATUM. Dill. St. 1-2in. erect, densely tufted : branches irregular or sub-pinnate, cuspidate ; l. squarrose, recurved, rather suddenly tapering into a long point from a deltoid-ovate base, with a few large diaphanous cells at basal angles, nerveless, entire ; caps. oblong curved cernuous ; lid convex pointed.

Marshes and bogs.

V. VI.

c. Polygamous.

497. H. POLYGAMUM. Bry. Eur. St. 1in. or more, procumbent, sub-pinnate ; l. spreading, almost squarrose, ovate-lanceolate, tapering into shorter points than last two, entire, nerved about half way, areolæ larger at base ; caps. oblong, sub-cernuous, or almost erect ; lid conical pointed.

Wet swampy places.

V.

var. β . *stagnatum*. “st. longer, sub-erect, more pinnate ; l. with a longer nerve ; seta longer, often 3in. or more.”

Sect. II. St. pinnately branched; l. falcato-secund, nerve single, areolæ linear.

a. Dioicous.

† Stems and branches strongly hooked at apex.

498. *H. ADUNCUM*. Dill. L.* (*H. exannulatum*, Gümbl.) St. 2-4in. erect, sub-pinnate; br. short, simple, few; l. crowded, narrow, falcato-secund, lanceolate-acuminate, striate, faintly sub-serrulate near the base; nerved nearly to apex; basal cells larger and inflated, gradually passing into the long narrower ones above; capsule sub-cylindrical, curved, cernuous, on a seta lin. long or more.

Marshes and marshy heaths.

IV. V.

499. *H. KNEIFFII*. B. & S. (*H. aduncum*, Hedw. Stirpes, IV., t. 24, and Schp.) St. 2-6in. long, erect, sub-pinnate; l. falcato-secund, somewhat distant, lanceolate-acuminate, occasionally faintly sub-serrulate near the base, thinly nerved two-thirds the length, not striate, basal angles decurrent excavate, of lax sub-quadrangle cells, those above elongate rectangular; caps. cylindrical oblong arcuate, broadly annulate.

Swamps and marshes.

VI.

* This name has been wrongly given to some half-dozen different species; but I am informed by Dr. Braithwaite (in lit. 29, Mch. 1872), that he has recently consulted the original specimen of Dillenius on which Linnæus founded the species, and from his examination the synonymy of this group must be altered as above. The diagnoses of this and the next four species are from his pen; the name *aduncum* should be retained as being older than *exannulatum*.

500. *H. SENDTNERI*. Schpr. (*H. aduncum*, ϵ *hamatum* and ζ *giganteum*, Bry. Eur.) St. 3-6in. simple, pinnate; l. falcato-secund, broadly oblong lanceolate, hooked above, distinctly auricled at sub-decurrent angles, glossy, lightly sulcate only when dry, nerve vanishing below apex; basal cells rectangular, hyaline, yellowish, at angles brownish-yellow lax; caps. ovate-oblong, erect at base, arcuate.

Bogs. Scotland, and near Birmingham.

var. β . *Wilsoni*. St. very tall, sometimes 1ft., yellow green, with slender, nearly simple branches; l. larger, with a filiform acumen, auricles very small.

501. *H. VERNICOSUM*. Lindb. 1861. (*H. pellucidum*, Wils. MS.; *H. aduncum*, var. *tenue*, Bry. Brit.) St. erect, rather rigid, pinnate; l. shorter falcato-secund, the apical ones involute, ovate, oblong-lanceolate, distinctly sulcate, neither auricled nor decurrent, very glossy, yellow green, nerve vanishing far below apex; cells very narrow, vermicular, purplish at base; caps. oblong cernuous, arcuate.

Wybunbury Bog, Cheshire.

502. *H. INTERMEDIUM*. Lindb. (*H. Cossoni*, Schpr.) In habit like *H. Sendtneri*, var. β . St. elongate, flexuoso-erect, interruptedly pinnate; branches very unequal; l. falcato-secund, ovate-oblong, becoming lanceolate, not furrowed, with minute decurrent auricles, nerve vanishing far below apex; cells very narrow vermicular opaque; outer per. l. squarrose; fr. as in *Sendtneri*.

Bogs, frequent.

† † Branches and stems scarcely hooked.

503. H. LYCOPODIOIDES. Neck. St. about 2in. erect, sub-pinnate, rather rigid; l. falcato-secund, ovate-acuminate, tapering to an acute point, but not apiculate, concave, entire, nerved nearly to apex, not striate; caps. oblong cernuous, lid conical.

Bogs and marshes : fr. rare. v.

var. β . *falcatum*. l. more crowded, more falcate, nerve stronger. Near Copgrove, Yorkshire.

b. Monoicous.

504. H. FLUITANS. Dill. St. 6-12in. erect or floating, pinnate, slender; branches short deflexed; l. falcato-secund, lanceolate, tapering from an ovate base, acuminate, slightly serrulate near apex, thinly nerved more than half way, areolæ enlarged at base; caps. small oblong curved sub-cernuous, on a very long seta; lid conical, acute.

Marshes, bogs, &c. iv. v.

505. H. REVOLVENS. Swartz. St. 2-4in. erect or procumbent, sub-pinnate; l. crowded circinnate falcate, ovate-lanceolate, acuminate, concave, serrulate near apex, deep red or purplish; nerve stronger, more than half way; areolæ not enlarged at base; caps. oblong cernuous, on a shorter seta; lid conical acute.

Bogs and marshes. iv. v.

506. H. UNCINATUM. Hall. St. about 2in. slender, erect or procumbent, sub-pinnate; l. circinnate secund, very narrow, lanceolate, setaceous from a broader base, plicate,

serrulate, nerved nearly to apex; caps. cylindrical, curved, cernuous, lid conical.

Sub-alpine walls and rocks.

v. vi.

Sect. III. St. regularly pinnate, radiculose, tomentose; l. thickly nerved, opaque; caps. sub-arcuate.

507. *H. COMMUTATUM*. Dill. St. 4in. or more, procumbent; br. about $\frac{1}{2}$ in.—both more or less uncinatate; radicles brownish; l. circinnate, secund, tapering to a slender long point from an ovate base, plicate, twisted when dry, finely serrulate, nerved more than half way, areolæ narrow; caps. large oblong, lid conical: dioicous.

Wet shady places.

iv.

508. *H. SULCATUM*. Schpr. Loosely cæspitose; st. rigid, without radicles, sub-pinnate; l. partly broadly elongate-lanceolate, partly sharply lanceolate from broadly ovate base, all reflexed hamulose; nerve strong. [Schp. Syn. 699.]

Mountainous places. Ben Lawers, July, 1865 (G. E. Hunt.)

509. *H. FALCATUM*. Brid. (*H. commutatum* var. *condensatum*, Bry. Brit.) St. 2-3in. cæspitose, erect, sparingly branched; l. as in *commutatum*, but less circinnate and more rigid, undulate, nerved nearly to apex; capsule small, curved cernuous. [Bry. Eur. vi., 607. Schp. Syn., 613.]

Sub-alpine places and bogs.

v. vi.

510. *H. FILICINUM*. Dill. St. 2-4in. sub-erect, slender, pinnate, with purplish radicles; l. spreading, falcato-secund, st. l. deltoid-ovate, tapering; br. l. ovate-lanceolate—all

serrulate, scarcely twisted when dry, nerved to or beyond apex; areolæ oval, rather large, larger rhomboid and pellucid at base; caps. oblong curved, cernuous, lid conical acute: dioicous.

Marshes, wet rocks.

IV.

var. β . *vallisclausæ*. Brid. l. sub-secund, nerve very strong and excurrent. Ormeshead; Derbyshire.

Sect. IV. St. robust, without radicles, irregularly pinnate; l. scariose, shining, strongly rugose; areolæ vermicular above, the rest small quadrate; caps. sub-arcuate, lid rostrate, annulus broad.

511. *H. RUGOSUM*. Dill. St. 2-3in. rigid, erect, densely tufted; br. recurved; l. crowded, falcato-secund, serrulate and recurved at margin, lanceolate-acuminate from a broad base, rugose at back, nerved more than half way; caps. sub-cylindrical curved, pale reddish brown; lid large yellowish, with an oblique beak: dioicous.

Limestone and other rocks; barren in England. Spring (?)

Sect. V. St. creeping, cæspitose, pinnate, l. curved secund, areolæ loosely rhomboid; caps. incurved cernuous, compressed below mouth when dry.

512. *H. INCURVATUM*. Brid. St. short slender, branches curved upwards; l. ovate-lanceolate, tapering, all pointing upwards, entire, shortly two-nerved; caps. small, ovate, horizontal; lid short, conical, acute: monoicous.

Shady walls and stones.

VI. VII.

Sect. VI. St. more or less regularly pinnate; l. falcato-secund, two or singly nerved, or nerveless, areolæ narrowly linear, quadrate at basal angles; caps. sub-cylindrical incurved; lid large, shortly rostellate.

a. Monoicous.

513. H. BREADALBANENSE. Buchanan White. "St. procumbent or sub-erect, covered with villi; vaguely pinnate; l. secund ovate-lanceolate concave, nerve strong single, reaching about half way, margin of base slightly recurved; sub-denticulate."

Breadalbane Mts. and Ben Lawers 1865 (Dr. F. B. White).
Fruit not known.

514. H. HAMULOSUM. Frölich (?) St. 1in. or more, procumbent pinnate; br. hooked at apex; l. circinnate-secund, much curved, tapering into a long slender sub-serrulate point from an ovate-lanceolate base, nerveless; caps. sub-cylindrical curved, tapering at base, lid conical pointed:
Alpine grassy declivities. Summer.

var. *β. micranthum.* smaller, l. shorter pointed, and faintly two-nerved; caps. more oval, with an obtuse lid. Ben Lawers, &c.

b. Dioicous.

515. H. RUPESTRE. Buchanan White. St. procumbent, covered with very short villi, irregularly pinnate; l. strongly falcato-secund, lanceolate acuminate from a wide base, much curved; obscurely two-nerved, margin plane, scarcely denticulate.

Ben Lawers, August, 1865.

Fr. unknown.

516. *H. BAMBERGERI*. B. & S. Rather small dense tufts, yellowish green above, passing to yellow-fuscous at base; st. without radicles or villi, sub-pinnate, br. few fastigiate; l. densely crowded secund, strongly circinnate, ovate-lanceolate elongate, entire, with a long point, faintly two-nerved, one usually larger than the other; alar cells few, rather obscure, yellow, upper linear elongate; fr. not known.

Near summit of Ben Lawers, July, 1867 (Dr. Fraser).

517. *H. IMPONENS*. Hedw. Cæspitose, sub-pinnate, l. imbricate, circinnate secund, filiform from a broad ovate-oblong base, margin reflexed below, and minutely serrate, obsoletely two-nerved; br. l. much narrower, and at apex of br. convolute, and hamato-incurved; per. l. nerveless filiform flexuose apiculate; caps. sub-erect cylindrical incurved; lid convexo-conical, acutely pointed yellowish, annulus broad. [Bry. Eur. vi., 597. Schp. Syn. 625.]

Woods and stony ground.

Autumn.

Reigate Heath (Mr. Mitten), 1864.

518. *H. CUPRESSIFORME*. Dill. St. about lin. procumbent; l. falcato-secund, pointing downwards, sharply acuminate from an ovate-lanceolate base, slightly serrulate, nerveless or faintly two-nerved; per. l. erect, almost piliferous; caps. sub-cylindrical cernuous, curved, lid conical, cuspidate.

Walls, rocks, trunks of trees, &c.

XI. XII.

var. β . *compressum*. st. slender pinnate, reddish, with compressed foliage; l. pale green, serrulate at apex; seta long slender; caps. short, elliptic oblong.

γ . *minus*. pinnate; br. slender: l. narrow, falcate serrulate, margin recurved, caps. small erect. Trunks of trees.

- δ. *filiforme*. br. prostrate, filiform, slender; l. falcate, serrulate; caps. short; lid with a shorter point. Rocks. Killarney, &c.
- ε. *lacunosum*. more robust; br. thickened; l. larger sub-coriaceous, yellowish brown.
- ζ. *longisetum*. slender, l. pale, serrulate; seta elongate, caps. short ovate.
- θ. *mammillatum*. caps. with a short conical or mammillate lid.

519. *H. RESUPINATUM*. Wils. St. creeping, sub-pinnate; l. erecto-patent, secund, pointing upwards, ovate-lanceolate, tapering to a point, entire, nerveless; caps. oblong erect, almost symmetrical; lid with an oblique beak.

Walls, rocks, trees, &c.

x. XII.

520. *H. LINDBERGII*. Mitt. Jour. of Bot. 1., p. 123. (*H. pratense*, Bry. Brit. 399.) "St. sparingly branched in an irregular manner, without any appearance of becoming pinnate; l. loosely compressed ovate or ovate-lanceolate, acute, but with a broad point,* margins entire, nerveless; cells at angles enlarged and pale; caps., according to Lindberg, is on a rather thick seta 1 lin. long, turgid ovate, when dry plicate."

"Damp sandy ground among thin grass, not in bogs. The fr. has been gathered once by Dr. Klinggraff in June, in W. Prussia."

* Some of the leaves, even on authenticated specimens, have longer and narrower points (acuminate), but in no case that I have seen are they denticulate.

“ *H. pratense* differs from above in its irregularly pinnate stems, more compressed foliage, l. lanceolate with a narrow point denticulate at apex, and the enlarged basal cells of same colour ; not found in Britain.”

521. *H. ARCUATUM*. Lindb. (*H. pratense*, var. β . Bry. Brit.] “ L. more falcato-secund, scarcely complanate.”

Clay soils, common.

Sect. VII. Prostrate or ascending, rooting, regularly pinnate ; l. hamate, circinnato-secund ; caps. cernuous, solid, lid convexo-conical.

522. *H. MOLLUSCUM*. Dill. St. soft, 1-2in. sub-erect ; l. circinnate secund ; st. l. cordate ; br. l. ovate-lanceolate—all tapering acuminate, striate, serrulate, and faintly two-nerved, crisped when dry ; caps. ovate, horizontal ; lid conical, large, sharply pointed.

Moist banks and limestone rocks, common.

XI.

Sect. VIII. St. erect, rigid, villose, regularly pinnate ; l. hamate ; caps. oblong, incurved, solid.

523. *H. CRISTA-CASTRENSIS*. L. St. sub-erect, 3-4in. pectinate ; st. l. ovate-acuminate, br. l. narrowly lanceolate-acuminate, strongly striate, serrulate near apex—all circinnato-secund, faintly two-nerved, margin reflexed ; caps. oblong curved, cernuous, lid conical, pointed ; dioicous.

Woods and alpine rocks.

VII. VIII.

Sect. IX. St. soft cæspitose, prostrate, branched ; l. falcato-secund, rarely spreading, faintly nerved ; areolæ linear ; per. l. long, deeply sulcate ; caps. incurved cernuous, lid convexo-conical or mammillate.

a. Monoicous.

524. *H. PALUSTRE*. Dill. St. creeping; br. ascending, crowded, curved, cuspidate and convolute at apex; l. generally secund, sometimes almost falcate, elliptic-entire, strongly concave, pointed; either nerveless, shortly two-nerved or singly nerved half way; per. l. erect, distinctly striate; caps. ovate, slightly curved; cernuous; lid conical, pointed.

Stones and rocks in streams.

v.

var. β . l. imbricate, not secund.

γ . *subsphaericarpon*. l. strongly nerved nearly to apex; caps. roundish ovate, tumid.

525. *H. DILATATUM*. Wils. (*H. molle*, Bry. Eur.) Plant of somewhat firm growth; l. rotundo-ovate, rather concave, suddenly apiculate, texture very close, areolæ long and very narrow; nerve double, short slender, but well defined (*vide* G. E. Hunt). Caps. ovate cernuous curved, lid conical.

At a low elevation. N. Wales, Yorkshire, Berkshire, Clova, Braemar.

526. *H. MOLLE*, Dicks. (*H. alpestre* (?) Bry. Eur., *non* Swartz.) Very weak and flaccid, the tufts falling to pieces on removal from the water; l. varying from ovate to rotundo-ovate, flat, or sometimes very slightly reflexed towards apex, gradually tapering upwards, or very rarely suddenly apiculate; texture somewhat loose, areolæ larger and wider than in last; nerve rather long and thick, ill-defined, single or double (*vide* G. E. Hunt). Caps. as above.

Great elevations. Ben-mac-Dhui, Ben Nevis.

[The above two diagnoses are from a paper by Mr. G. E. Hunt, on Perthshire and Braemar Mosses in *Trans. Lit. and Phil. Soc. and Manchester*, 1868-9, p. 320.]

527. *H. ARCTICUM*. Sommerfelt. St. 1-2in. creeping; br. elongate, simple, obtuse; l. spreading, green above, purplish below, small, broadly ovate or roundish, somewhat obtuse, entire, strongly two-nerved about half way, sometimes nerves blended into one; caps. ovate, cernuous, tapering into the seta; lid conical.

Alpine rivulets.

VI.

528. *H. EUGYRIUM*. Schpr. St. short, much branched; l. crowded, st. l. drooping on two sides, broadly oblong-lanceolate, shortly acuminate; br. l. flexuoso-falcate, plano-concave, elongate-lanceolate narrower, serrulate at apex; nerve thin, unequally bifid; areolæ vermicular excavate, fulvous, and rectangular at the decurrent angles; per. l., external spreading, internal erect, longly lanceolate, with erose apices; caps. ovate-oblong cernuous, turgid, lid mammillate; annulus broadly bi-triseriate. [Bry. Eur. VI., t. 579. Schp. Syn., 639.]

Stones in waterfalls.

Summer.

N. Wales, Devonshire, Killarney.

b. Dioicous.

529. *H. OCHRACEUM*. Turn. St. 2-4in., tufted filiform, sub-erect, sparingly branched; l. yellowish-green sub-secund, sometimes falcate, distant, ovate-lanceolate, pointed, concave, nerve forked, extending half way; per. l. squarrose recurved; caps. oblong, tapering at base, cernuous; lid conical.

Stones in alpine and sub-alpine streams, &c.

V. VI.

Sect. X. Erect or procumbent, stem simple or more or less pinnate; l. patent, rarely sub-complanate, or sub-secund, thinly single-nerved, or shortly

two-nerved, shining; areolæ linear; caps. incurved cernuous; lid mammillate or convexo-conical.

1. St. more or less regularly pinnate; l. patent or loosely imbricate.

a. Monoicous.

530. *H. CORDIFOLIUM*. Swartz. Bright green above, reddish brown below; st. 3-6in. erect, sub-pinnate; br. short slender; l. spreading, almost squarrose, convolute and cuspidate at tip of branches, distant, cordate-ovate, obtuse, or slightly apiculate, concave entire, strongly nerved almost to apex; cells scarcely enlarged at base; caps. oblong, suddenly horizontal, not tapering at base; lid conical.

Marshes and ditches.

IV. V.

b. Dioicous.

531. *H. GIGANTEUM*. Schp. St. erect, thick, often 1ft. long, densely pinnate; st. l. patent, broadly cordate-ovate, strongly nerved to apex; cells linear, excavate and quadrate at basal angles; br. l. lingulate narrow, terminal ones twisted and subulate; per. l. oblong-lanceolate; caps. oblong-cylindrical, sub-incurved, horizontal, on a long seta; annulus none; lid mammillate. [Schp. Syn. 642.]

Marshes. Hale Moss and Wybunbury Bog. Summer.

532. *H. SARMENTOSUM*. Wahl. St. lin. or more, procumbent, sub-pinnate; br. short cuspidate; foliage red or purplish; l. much crowded, sub-erect, elliptic-oblong, scarcely pointed, concave, entire, nerved almost to apex; areolæ large, quadrate and pellucid at basal angles; caps. ovate-oblong, cernuous.

Wet alpine rocks.

Spring (?)

533. *H. CUSPIDATUM*. Dill. St. 2-6in. erect, pinnate; terminal foliage cuspidate; l. spreading, almost squarrose, when young erect appressed and convolute; ovate, obtuse, entire, nerveless or shortly two-nerved; cells enlarged and pellucid at basal angles; caps. oblong, much curved, tapering below; lid conical acute.

Marshes.

v. vi.

534. *H. SCHREBERI*. Dill. St. 4-6in. erect, pinnate, deep red, with slender curved branches, somewhat cuspidate at summit; l. convolute, afterwards erecto-patent, elliptical, concave, obtuse, shortly two-nerved; cells enlarged at basal angles; caps. ovate-oblong curved cernuous; lid conical, pointed.

Woods and shady banks.

x. xi.

535. *H. PURUM*. Dill. St. 4-6in., not coloured, erect, pinnate; br. slightly curved, not cuspidate at apex; l. closely imbricate, broadly elliptical, concave, with recurved points, almost boat-shaped, entire, nerved half way; caps. ovate, suddenly horizontal; lid conical.

Shady banks.

x. xi.

2. St. almost simple, or sparingly branched;
l. closely imbricate when dry: dioicous.

536. *H. STRAMINEUM*. Dicks. St. 2-4in. erect, filiform, with few erect branches; l. erecto-patent, elliptic-oblong, obtuse, entire, concave, thinly nerved nearly to apex; cells enlarged quadrate and pellucid at basal angles; caps. small, ovate, curved, cernuous; lid short, conical.

Marshes amongst *Sphagnum*; rare in fr.

iv. v.

537. *H. TRIFARIUM*. W. & M. St. 2-3in. erect or trailing, sparingly branched; l. very closely imbricate,

fragile when dry; generally but not always trifarious, roundish obtuse, inflated, entire, nerved almost to apex; caps. oval-oblong, curved, cernuous; lid conical.

Alpine bogs and turfy rills.

VI. (?)

Sect. XI. Fastigiate, sparingly branched; l. imbricate secund, ventricose, faintly nerved.

538. *H. SCORPIOIDES.* Dill. St. 3-4in. erect or procumbent, irregularly pinnate; branches short; l. crowded, imbricate, falcato-secund, large, roundish-ovate, ventricose, apiculate, entire, nerveless or faintly and shortly two-nerved, purplish brown or lurid; caps. short oblong curved, tumid, cernuous, on a long seta; lid conical, pointed.

Bogs.

V.

Sub-genus XIII. *HYLOCOMIUM.* St. woody, pinnate or bipinnate, or sparingly branched; l. scariousē, shining, sulcate, thinly two-nerved, without radicles; cells narrow, linear, broader at base; caps. ovate or ovate-globose, coriaceous, lid mammillate, perist. large, perfect.

a. irregularly bi-tripinnate, l. loosely imbricate; lid rostrate.

539. *H. (HYLOCOMIUM) SPLENDENS.* Dill. St. 2-6in., erect or procumbent, interruptedly bi-tripinnate, villous, reddish; fol. reddish or fulvous green; st. l. roundish-elliptical, with long wavy points; br. l. with a short point or muticous—all imbricate concave serrate, shortly two-nerved, margin recurved below; caps. ovate, curved, cernuous; lid convex, tapering into a long beak: dioicous.

Grassy banks, woods, &c.

IV.

b. irregularly pinnate, l. patent, lid mammillate or shortly beaked.

540. H. (HYLOCOMIUM) UMBRATUM. Ehrh. St. arched, sub-erect, with branched villi, irregularly bi-pinnate; l. yellowish green, glossy, cordate-acuminate, serrate, plicato-striate, nerve unequally bifurcate; caps. short, roundish, obovate, curved, cernuous; lid conical, acute: dioicous.

Alpine woods on stones.

XI.

541. H. (HYLOCOMIUM) OAKESII. Sulliv. St. arched, irregularly and distantly pinnate, with branched villi; l. larger, elliptical, concave, not cordate, plicato-striate, serrate, and sharply acuminate, singly nerved half-way or shortly two-nerved, margin recurved; per. l. squarrose; caps. roundish ovate, gibbous above, cernuous; lid conical, shortly beaked: dioicous.

Alpine rocks.

Autumn (?)

542. H. (HYLOCOMIUM) BREVIROSTRE. Ehrh. St. 2-6in. arched, erect, with branched villi, irregularly bi-pinnate; st. l. distant, almost squarrose, plicato-striate, cordate, and suddenly acuminate; br. l. ovate-acuminate, not so suddenly acuminate, striate—all serrulate and two-nerved half-way; caps. roundish ovate, cernuous; lid conical, tapering into a rather long inclined beak: dioicous.

Mountainous woods.

X. XI.

c. L. squarrose.

543. H. (HYLOCOMIUM) SQUARROSUM. Dill. St. 2-3in. reddish, slender, more or less erect, irregularly pinnate; br. drooping; st. l. squarrose, recurved, ovate, gradually tapering and very acute, faintly striate below; br. l. nar-

rower, less recurved, and squarrose—all serrulate and shortly two-nerved: caps. roundish-ovate, drooping; lid conical, with a short sharp point: dioicous.

Banks and woods.

XI.

544. H. (HYLOCOMIUM) TRIQUETRUM. Dill. St. 6in. or more, rigid, reddish, erect, sub-pinnate; br. long straggling; st. l. squarrose or sub-secund, striate; br. l. spreading, scarcely striate—all triangular acuminate from a cordate, amplexicaul-base, serrulate and two-nerved half way; caps. roundish ovate, cernuous; lid conical, acute: dioicous.

Woods, &c.

XI.

d. L. secund, or falcato-secund.

545. H. (HYLOCOMIUM) LOREUM. Dill. St. 6-12in. slender, erect, or procumbent, more or less pinnate; br. drooping straggling; l. squarrose, recurved, more or less secund at summit of stem and branches, ovate-lanceolate, with a long acumen, not cordate or amplexicaul; plicato-striate below; shortly and faintly two-nerved, sometimes nerveless; caps. small roundish ovate; lid conical, sharply pointed: dioicous.

Mountainous woods.

XI.

84. OMALIA. BRID.

546. O. TRICHOMANOIDES. Dill. St. about 1in. irregularly pinnate; l. crowded, sub-secund, complanate, oval, serrulate at obtuse rounded apex, faintly nerved half way; caps. small sub-cylindrical, sub-erect, lid with an oblique beak.

Trunks of trees and shady rocks.

X. XI.

85. NECKERA. Hedwig.

547. N. COMPLANATA. Bry. Eur. St. 1-2in. pinnate; br.

short crowded attenuate; l. complanate, not undulate, obliquely ovate-oblong, suddenly apiculate from broadish apex, faintly and shortly two-nerved; caps. roundish elliptical, tapering below, erect; lid large, obliquely rostrate: dioicous.

Trunks of trees, walls, &c.

x.—xii.

548. *N. CRISPA*. Dill. St. 4-6in. pinnate, from a creeping rhizome; l. complanate, undulate, ovate-oblong or ovate-ligulate, somewhat obtuse and pointed, serrulate at apex, faintly and shortly two-nerved or singly nerved half way; caps. roundish ovate erect; lid with a long oblique beak: dioicous.

Mountainous rocks, trees.

xi.—iv.

549. *N. PUMILA*. Huds. St. 1-2in. sub-pinnate, with slender flagellæ and short complanate branches; l. complanate undulate, ovate-oblong, tapering, apiculate or acuminate, somewhat concave, serrulate, margin recurved, shortly two-nerved or nerveless; caps. elliptical, erect, on a very short seta; lid with a short beak: dioicous.

Trunks of trees and rocks.

x. xi.

550. *N. PHILIPPEANA*. Schp. Primary stem creeping densely pinnate, secondary ascending remotely pinnate; l. densely imbricate, complanate, strongly and elegantly undulate, ovate-lanceolate, sharply narrowed into a longer or shorter flexuose apiculus, nerveless; areolæ small linear. [Bry. Eur. v. 445. Schp. Syn. 471.] Possibly only a variety of *N. pumila*.

Bark of a young ash tree, Valley of Hirnant, Bala, N. Wales (Rev. H. H. Higgins), July, 1872, barren; Scotland.

551. *N. PENNATA*. Hall. St. 2in. pinnate, with complanate longer branches; l. complanate undulate, ovate-

lanceolate, tapering to a slightly serrulate point, otherwise entire, nerveless, or sometimes shortly and faintly two-nerved; caps oblong or oval immersed, lid with a short oblique beak : monoicous.

Trunks of trees, rare.

Spring.

86. HOOKERIA. SMITH.

552. *H. LUCENS*. Dill. St. 1.3in. procumbent, with irregular complanate branches; l. complanate, large roundish ovate, obtuse, entire, nerveless; areolæ large, hexagonal, pellucid; caps. roundish elliptical, almost pendulous; lid conical, suddenly tapering into a long straight beak : monoicous.

Moist banks, stones in streams, &c.

XI. XII.

553. *H. LÆTEVIRENS*. H. & T. St. shorter and more slender, procumbent, sub-pinnate; l. complanate, loosely imbricate, smaller, ovate, suddenly and shortly acuminate, with a thickened border; doubly nerved above half-way, serrulate at apex; areolæ smaller, hexagonal; caps. smaller, drooping, roundish, elliptical; lid as above : monoicous.

Caves, wet rocks, and by rivulets.

XI. XII.

87. DALTONIA. HOOKER & TAYLOR.

554. *D. SPLACHNOIDES*. H. & T. St. $\frac{1}{4}$ in. tufted, erect, br. fastigiate; l. crowded, sub-erect, linear-lanceolate, acuminate, slightly keeled, entire, nerve vanishing below apex; per. l. small ovate; caps. small oval oblong, sub-erect, lid large, with a long straight beak.

Sub-alpine moist shady rocks and trees, rare.

X. XI.

88. CRYPHÆA. MOHR.

555. *C. HETEROMALLA*. Dill. St. 1in. decumbent, sparingly branched, sub-pinnate; l. spreading, imbricate,

slightly recurved, broadly ovate, pointed, concave, thickly nerved nearly to apex; per. l. elliptic, with an excurrent nerve; caps. oblong immersed, appearing secund; lid conical, pointed: synoicous.

Trunks of trees.

var. β . *aquatilis*. st. elongate, l. roundish ovate obtuse; stones in running streams, or trees.

89. FONTINALIS. DILL.

556. *F. ANTIPYRETICA*. L. St. very long, often 1ft., with long spreading branches; l. ovate-lanceolate, very concave, keeled, nerveless, all on each branch with one margin reflexed on the same side, the other plane, sometimes serrulate near apex; caps. oval or ovate, immersed; lid long conical acute.

Streams and stagnant water.

VI. VII.

557. *F. SQUARROSA*. L. St. shorter, but elongate; br. numerous, crowded fasciculate, not spreading; l. lanceolate or oblong-lanceolate, concave, not keeled, margin not reflexed, nerveless, entire; caps. similar to last.

Mountain rivulets.

VI. VII.

90. DICHELYMA. MYRIN.

558. *D. CAPILLACEUM*. Dicks. St. 3-6in. slender, brittle, with a few distichous spreading branches; l. erecto-patent, secund, subulate-setaceous, keeled, with a long excurrent nerve; per. l. long convolute, nerveless; caps. short oval, almost immersed; lid large conical, beaked.

Alpine rivulets.

Summer.

APPENDIX.

I. ADDITIONAL SPECIES.

SPHAGNUM LARICINUM. Spruce. (*S. neglectum*, Angst.)
St. 4-6in. solid, *the bark* pale, of 2-3 layers of cells. Br. fascicles more or less crowded, of 3-4 br., of which one or two are divergent, the others pendent, but not appressed nor acute. St. l. small ovate, cucullate at apex, at last minutely fimbriate, patent or reflexed; basal cells hyaline utricular, the middle and lateral very narrow, the apical rhomboid, with scarcely any fibres or pores; br. l. sub-secund, recurved at point, ovate, shortly and bluntly acuminate, the point with 3-5 teeth, margin recurved above, rather broadly bordered; hyaline cells serpentine elongate, with many threads and pores; caps. scarcely exerted. [Dr. Braithwaite, Monthly Micros. Jour., 1872, p. 159.]

Deep bogs.

Terrington Carr, Yorkshire, 1846 (Spruce); Holyhead (Wilson); Braemar, 1868 (Hunt).

DICRANUM UNDULATUM. Ehr. St. naked and decumbent at base; l. patulous, upper falcato-secund or appressed and slightly secund from a broad oblong base, lanceolate, gradually narrowed into a dagger-shaped point ending somewhat abruptly in the acute apex, beautifully undulate in the upper half, carinate; margin revolute below, coarsely serrate above with spinulose irregular teeth; nerve flattened, narrow and extended to apex, narrowly two-winged and *serrate* at back; cells elongate oblong or elongate hexagonal, those of central base sub-quadrangle and hyaline. [Dr. Braithwaite, in *Grevillea*, 1., 108.]

Stockton Forest, near York, 1842 (Spruce); again 1872 (Mr. Anderson). It has doubtless been frequently overlooked or mistaken for *D. scoparium* or *D. Bonjeanii* (*palustre*).

BRYUM (WEBERA) BREIDLERI. Juratzka. Dioicous. St. 1½ in. reddish brown and procumbent below, light green above, l. ovate, decurrent, erecto-patent, concave, serrate towards apex, margin recurved, thinly nerved nearly to apex, areolæ narrow-elongate, upper acute at both ends, lower quadrate; male fl. terminal discoid, outer perig. l. spreading elliptic-lanceolate, saccate at base, margin strongly recurved, apex cucullate serrate; inner obovate, suddenly acuminate; perich. l. linear-lanceolate, strongly nerved; caps. oval pendulous, glaucous green when young, pale reddish brown when ripe, on a slender seta geniculate at base. [Hunt. Mem. Lit. and Phil. Soc., Manchr., 1871-2, p. 101.]

Wet *debris* of slaty rocks near springs. VII. VIII.

Glen Callater, Loch-na-gar, Carnlochan Glen (Hunt).

BRYUM. (WEBERA) SCHIMPERI. Wils. (*non* Bry. Eur.) L. more rigid, erect, narrow, lanceolate, less decurrent, nerve stronger, continued almost to apex; areolæ a little longer and more obscure. [Hunt, l. c.]

Debris of micaceous rock. VII.

Ben Lawers, Perthshire Mts., Snowdon.

II. ALTERATIONS OF NOMENCLATURE, AND SYNONYMS.

No. 54. *W. truncicola* De Not. =

DICRANUM MONTANUM. Hedw. "Having shown the specimen to Prof. Lindberg during his recent visit, he

informed me that he was under the impression that Juratzka had referred it to *Dic. montanum*; and on comparing the two I find they are truly identical. The species is, however, none the less an addition to our flora.....its place will be next to *D. strictum*." [Dr. Braithwaite, in *Grevillea* I., p. 75.]

No. 71. *Dicranum polycarpum*. β . *strumiferum* =
ONCOPHORUS STRUMIFER. Brid.

ONCOPHORUS. BRID.

L. spreading flexuose from a sub-decurrent base; caps. cernuous incurved, neck shortly and widely strumose, not striate.

O. STRUMIFER. Brid. "This is again restored to the rank of a species, as it differs from *O. polycarpus* (*Dicranum*) in the caps. being more or less cernuous, constantly strumose at base, with a compound annulus, and in the leaves having papillæ only on the upper surface." [Dr. Braithwaite, Jour. Bot. VIII. 228.]

84. DICRANUM HETEROMALLUM. δ . *sericeum*.

Add as a synonym, *Dicranodontium sericeum*. Schp.

85. *D. Starkii*. β . *molle* =

D. ARCTICUM. Schp. Its general appearance better distinguishes it from *D. Starkii* than its microscopical characters. It is *quite erect*, growing in large loose patches, stems 3-4in., elastic, very robust; foliage of a fine purplish brown colour; leaf wider below, and more suddenly contracted upwards, with a thinner nerve; fruits earlier. [Hunt. l. c. p. 321.]

Ben-mac-dhui and Ben Nevis.

92. D. CIRCINNATUM. Wils.

Add as synonyms *Dicranodontium aristatum*. Schp. *D. asperulum*. Mitt.

96. *D. PALUSTRE*. Brid. Dr. Braithwaite points out in *Grevillea* I., 109, that La Pylaie's specimens of this moss (Bridel Bryol. Univ. I. 814) belong to *Camvylopus flexuosus*, as shewn by De Notaris in his Epil. Bryol. Ital.; and that hence the name *D. BONJEANII*, De Not. is to be preferred. The synonymy would then stand :—

96. *D. BONJEANII*. De Not. Syllab. Musc. 213 (1838); Muell. Synopsis I., 369 (1849). *D. palustre*. Bry. Eur. and Bry. Brit., p. 79 (*non* Bridel.) *D. undulatum*. Turn. Musc. Hib.

The following amended diagnosis of this species is from the same author (in *Grev.* I., 109) :—“ Seta solitary; st. erect; l. more or less erecto-patent, straight, from a broad linear flat base, broadly oblong-lanceolate, gradually narrowed into a strap-shaped point, tapering into an acute apex, lightly undulate above, canaliculate; margin acutely serrate above, teeth uniform in shape and direction; nerve very narrow, vanishing below apex, *smooth* at back; basal cells short quadrate, brownish, above elongate-hexagonal or parallelogramic, uppermost elliptic-oblong.”

361. *E. minimum*, Hunt. is now ascertained to be *SPLACHNOBRYUM WRIGHTII*, Muell., and can hardly be considered as indigenous, “for the spores have most probably been mixed with soil attached to some exotic, and thus accidentally scattered on the wall where it was found.”— [Braithwaite.]

SPLACHNOBRYUM. C. Muell. Verhand. Zool. Bot. Ges. Wien, 1869. p. 501.

“Calyp. dimidiate, enclosing the whole theca and embracing spirally the upper part of the seta, cleft at side, smooth,

fugacious. Perist. simple, arising below mouth of caps., teeth 16 very narrow, linear-lanceolate acicular, with the articulations remote. Columella immersed. Dioicous, male fl. gemmaceous, without paraphyses. Plants small slender, with distant spathulate leaves.

S. WRIGHTII. Muell. l. c. (*Entosthodon minimus*, Hunt. l. c. *Amblyphyllum Hibernicum*, Lindb. MS.)

“ St. $\frac{1}{4}$ - $\frac{1}{3}$ in. simple sub-flexuose, pale red, slightly radiculose; l. bright green distant (base narrow, slightly decurrent), patent, flattish, obovate or spathulate, rounded at apex, margin reflexed below, entire or minutely serrulate in male, crenulate above in female plant, nerve thick, prominent at back, vanishing below apex; cells large lax, pellucid, smooth, incrassate, rhombo-rectangular at base, rhomboidal above, smaller and nearly circular at margin; caps. erect, obconical at base, sub-cylindrical, wide-mouthed, pale brown; seta slender, twisted to left; lid conical acute. [Dr. Braithwaite, l. c.]

III. ERRATA.

- p. 57. Head line, “c” inverted.
 ,, 71. line 9, for “obtuse,” read “acute.”
 ,, 81. ,, 5 from bottom, specific name should begin with a capital M.
 ,, 99. for “TETRADONTIUM” read “TETRODONTIUM.”
 ,, ,, last line, before “long” read “l.”
 ,, 127. line 17, for “hexaganal” read “hexagonal.”
 ,, 141. ,, 6 from bottom, for “Nowell” read “Nowell.”
 ,, 152. ,, 5 ,, ,, for “EURYNCHUM” read “EURYNCHUM.”
 ,, 139. ,, 3, for “ANÆCTANGIUM” read “ANÆCTANGIUM.”

GLOSSARY

OF THE

PRINCIPAL TERMS USED IN THIS VOLUME.

- Acuminate.* taper-pointed.
- Acute.* pointed, scarcely tapering.
- Alar.* (cells) at basal angles.
- Annulus.* an elastic ring round mouth of caps.
- Apicu-lus* (-late.) a very short point.
- Apophysis.* an excrescence; a swelling at base of capsule.
- Arcuate.* arched or curved.
- Areolæ.* the leaf cells.
- Arista.* a short bristly point.
- Auricles* (of leaf). short lobes on each side of base.
- Bifarious.* two-ranked.
- Cæspitose.* tufted or matted together.
- Calyptra.* the outermost covering, or veil, of the capsule.
- Capsule.* the fruit, enclosing the spores.
- Carinate.* keeled.
- Cernuous.* nodding.
- Chlorophyll.* the green matter filling the cells.
- Cilia.* hair-like divisions of the inner peristome.
- Circinnate.* curved nearly into a circle.
- Cirrhose.* having a very narrow hair-like wavy point.
- Clavate.* club-shaped.
- Columella.* the central pillar of caps. round which the spores are grouped.
- Comal.* the large topmost leaves of some stems.
- Complanate.* flat.
- Convolute.* rolled together.

- Cucullate* (*cucullus*). hooded.
- Cuspidate*. with a short bristly point.
- Decurrent*. (of leaf.) running down the stem.
- Dendroid*. tree-like.
- Dentate*. toothed.
- Denticulate*. with smaller teeth.
- Diaphanous*. semi-transparent.
- Dichotomous*. forked.
- Dimidiate*. split up one side.
- Dioicous*. barren and fertile flowers on different plants.
- Distichous*. inserted in two opposite rows.
- Divaricate*. widely spreading.
- Dorsal*. at the back.
- Erose*. as if bitten or gnawed out.
- Excurrent*. (of nerve.) continued beyond the apex of leaf.
- Exserted*. standing out from the leaves.
- Falcate*. falchion-shaped, or much bent.
- Fasciculate* (stems or branches). of unequal height.
- Fastigate* (do.) reaching to same height.
- Filiform*. thread-like.
- Fugacious*. falling early.
- Gemmiform* or *Gemmaceous*. like a bud.
- Geniculate*. suddenly bent like the leg when kneeling.
- Gibbous*. bunched or swelling out.
- Granulate*. roughly dotted on surface.
- Gregarious*. growing together, but not matted.
- Hamate, Hamulose*. bent like a hook.
- Hyaline*. glassy.
- Hygrometric* (*Hygroscopic*). moving when moistened.
- Imbricate*. overlapping each other like tiles.
- Immersed* (of caps.) when almost buried in the leaves.
- Inflexed*. bent inwards.

- Julaceous.* resembling a slender glossy worm.
- Lamina.* the blade of the leaf.
- Lid.* the cover to the mouth of caps.
- Ligulate.* strap-shaped.
- Lingulate.* tongue-shaped.
- Mitriiform* (of calyp.) mitre-shaped, not split up the side.
- Monoicous.* barren and fertile fl. on same plant, but not on same receptacle.
- Mucro.* a short terminal point.
- Mucronate.* terminated with a mucro.
- Muriculate.* roughened with sharpish prominences.
- Muticous.* without a point.
- Ochrea.* the filmy sheath surrounding base of seta.
- Pagina.* the blade of the leaf apart from the nerve.
- Panduriform.* fiddle-shaped.
- Papillose.* roughened with blunt roundish prominences.
- Percurrent.* extending the entire length.
- Perichætium.* the leafy involucre at base of seta, surrounding the vaginula in fertile fl.
- Perigonium.* the leaves surrounding the barren fl.
- Peristome.* the teeth at mouth of caps. covered by the lid before it falls.
- Plicate.* furrowed.
- Præmorse.* ending suddenly, as if bitten off.
- Pyriform.* pear-shaped.
- Quadrata.* square.
- Radicles,* small rooting fibres.
- Radiculose.* covered with radicles.
- Rhizome.* a creeping subterranean stem.
- Rhomboid* (*rhombus*). an oblique square.
- Rostellate.* with a very short beak.
- Rostrate.* with a longer beak.

- Rugose.* wrinkled or crumpled.
- Scariose.* dry and chaffy (opposed to tender and succulent).
- Secund.* all turned to one side.
- Seta.* the fruit-stalk.
- Setaceous.* bristle-shaped.
- Spathulate.* somewhat resembling a battle-door.
- Strumose.* swollen at base.
- Sub-* in a slight degree; *e. g.* "sub-serrate" slightly serrate.
- Subula.* an awl.
- Subulate.* awl-shaped.
- Sulcate.* furrowed.
- Synicous.* male and female fl. on same receptacle.
- Terete.* cylindrical.
- Thæca.* the capsule.
- Tomentose.* covered with down.
- Truncate.* having the point cut off.
- Tumid.* swollen.
- Turbinate.* shaped like a peg-top.
- Vaginula.* the cellular sheath surrounding the base of the seta.
- Vermicular.* narrow and wavy (like a worm).
- Villi.* short leafy processes on the stem amongst the leaves.
- Villous* covered with villi.
- Uncinate.* bent like a hook.
- Undulate.* wavy.

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