PRECURSORY STUDIES ON MALAYSIAN MOSSES
II. A PRELIMINARY KEY TO THE MOSS GENERA [1])

by

R. VAN DER WIJK

(Botanical Laboratory, University of Groningen)

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1. Introduction

For identifying the mosses collected in different localities of the Malaysian region, the need was felt for a key to the genera. In the preliminary one that I constructed to this end the genera were taken in the delimitation accepted in the second edition of Brotherus, Natürl. Pflanzf. In addition to the latter the genera published after 1925 and therefore not included in Brotherus l. c. are taken into account. In revising the families for *Flora Malesiana* I will doubtless be compelled to alter the position of some of the species and the delimitation of some of the genera, and at the end of series III of *Flora Malesiana*, which will contain the Mosses, I therefore intend to give a final key. I sincerely hope that the preliminary key will in the meantime have been tested by different bryologists, and that they will let me profit by their remarks. For this reason it is published here.

The analytical key is based as far as possible on vegetative characters, especially on the shape of the leaf cells. The principal features of the sporophyte are noted, but are not, as a rule, made use of as alternatives. This applies particularly to those alternatives that lead to the main groups. Only when no reliable vegetative characters could be found, have characters of the sporophyte, especially those of the peristome, been used. The habitat of each genus, not its distribution in the Malaysian region, is indicated in the key.

A survey of the botanical terms used in this key will be published in the first instalment of *Flora Malesiana.*

The main key is long, too long for quick use. Therefore an introductory key has been added which is confined to the main alternatives. The end numbers of this key (in italics) correspond to the numbers of the general key with which one should continue. The general key can of course be used without reference to the introductory one. In the general key one will find between brackets the number b e f o r e which the same number with

[1]) I in Rev. Bryol. Lich. 26: 8—19. 1957.

the alternative appears, e. g. 19.(25) means that the second number 19 is to be found above the (first) number 25 of the key.

Bryologists using this key, are requested to send their remarks to the author.

2. Introductory Key

1. Stem and leaves absent 2
1. Distinctly leafy plants.
2. Leaves distichous 4
2. Leaves polystichous.
3. Branches in fascicles (*Sphagnum*) 9
3. Branches if present not in fascicles.
4. Greater part of the leaf composed of the broad rib, in cross section with three or more layers of dimorphic cells . . . 11
4. Leaf cells one layered or seldom two-layered.
5. Leaves ventrally with longitudinal lamellae 20
5. Leaves ventrally without lamellae.
6. Inner basal leaf cells hyaline, large, sharply differentiated from the small laminal cells 26
6. Inner basal leaf cells not sharply differentiated from the laminal cells.
7. Amphigastria present 30
7. Amphigastria absent.
8. Smaller dorsal leaves present 34
8. Dorsal leaves not differently developed.
9. Rib dividing the leaf into two unequal parts. (*Mniomalia*) 36
9. Leaves equilateral.
10. Leaf cells strongly sinuose or nodulose 38
10. Leaf cells not sinuose.
11. Acrocarpous mosses.
12. Leaf cells prosenchymatous.
13. Leaf cells elongated rhombic 46
13. Leaf cells narrowly linear.
14. Alar cells differentiated 64
14. Alar cells not differentiated 75
12. Leaf cells parenchymatous.
15. Leaf cells wide, hexagonal or rectangular.
16. Leaf cells hexagonal 92
16. Leaf cells rectangular 94
15. Leaf cells small, quadrate, rounded, hexagonal or rectangular.
17. Primary stem creeping 112
17. Primary stem erect.
18. Alar cells differentiated 116
18. Alar cells not differentiated.
19. Leaf cells smooth 121
19. Leaf cells more or less papillate or mamillate . 140
11. Pleurocarpous mosses.

11. Pleurocarpous mosses.
20. Alar cells absent or indistinctly developed.
21. Leaf cells prosenchymatous.
22. Leaf cells linear.
23. Leaf rib absent.
24. Leaf cells smooth 181
24. Leaf cells more or less papillate to mamillate . . . 193
23. Leaf rib single or double 197
22. Leaf cells elongated rhombic.
25. Rib absent 222
25. Rib single or double.
26. Leaf cells smooth 233
26. Leaf cells more or less papillate 238
21. Leaf cells parenchymatous.
27. Leaf cells small 245
27. Leaf cells wider 269
20. Alar cells distinctly developed.
28. Leaf cells prosenchymatous.
29. Leaf cells linear.
30. Rib absent.
31. Apical branch leaves rolled up into an acute point . . 281
31. Apical branch leaves not uprolled into an acute point.
32. Leaf cells smooth.
33. Leaves tristichous (*Tristichella*) 283
33. Leaves several-ranked.
34. Leaf cells thin-walled 284
34. Leaf cells thick-walled 304
32. Leaf cells papillate to mamillate.
35. Leaf cells thin-walled 320
35. Leaf cells thick-walled 328
30. Rib present.
36. Rib double 333
36. Rib single.
37. Leaf cells smooth 336
37. Leaf cells more or less papillate to mamillate . . . 349
29. Leaf cells elongate rhombic.
38. Leaf rib absent.
39. Leaf cells thin-walled 356
39. Leaf cells thick-walled 370
38. Leaf rib single or double.
40. Leaf cells thin-walled 377
40. Leaf cells thick-walled 381
28. Leaf cells parenchymatous 390

3. General Key

1. Stem and leaves absent or very short, scarcely visible to the naked eye. Protonema well-developed, persistent.
2. Growing on leaves. Protonema brownish, strongly dichotomously

branched, often with gemmae on special stalks. Capsule rarely present, small, ellipsoid, suberect. Seta about 2 mm long, smooth.
Ephemeropsis Goeb.

2. Growing on rotten wood or on humus soil. Protonema brownish-green, gemmae absent. Capsule large, obliquely ovoid, flattened on the upper surface, inclined. Seta 20 mm, papillose. Male plants minute.
Buxbaumia Hedw.

1. Distinctly leafy plants of various shapes and sizes. Protonema occasionally persistent, usually absent.

3.(9) Leaves distichous (= alternately two-ranked).

4. Leaves equitant (= transversely inserted with stem-clasping leaf base and usually complanate).

5. Dorsal surface of leaf in the median line with a winglike expansion (= dorsal lamina).

6. Dorsal lamina long, extending beyond the sheathing basal portion (= duplicate lamina) for ½ or more of its length. Peristome teeth 16, divided to one half into two or three subulate segments. Ground-, rock- and tree-mosses, sometimes aquatic.
Fissidens Hedw.

6. Dorsal lamina short, not extending beyond the duplicate lamina. The latter broadly bordered with elongate, rhombic, hyaline cells. Peristome teeth entire, narrowly subulate. **Sorapilla** Spruc. et Mitt.

5. Leaves without a dorsal lamina.

7. Leaf rib present, single. Leaves from a broadened base more or less subulate. Lid conical, obtuse or acute. Peristome teeth 16, divided to their base into two filiform segments. Calyptra cucullate. Ground- and rock-mosses. . . . . **Ditrichum** Br. et Schimp.

7. Leaf rib very short or absent. Leaves cymbiform, obtuse or shortly acute. Lid conical, rostrate. Peristome teeth entire. Calyptra mitriform. On bark and on branches. **Orthorrhynchium** Reichdt.

4. Leaves not equitant.

8. Leaf cells small, rounded or 4—6-sided (10—20 μ), incrassate. At least the branch leaves distichous. On trees, and on the ground, rarely on rocks . . . . . **Rhizogonium** Brid.

8. Leaf cells larger and wider (15—40 μ), rounded-hexagonal. Only the leaves of the flagellae distichous. On the ground, on rocks and on trees. . . . . **Mnium** Hedw.

3. Leaves polystichous (= inserted in three, five or more rows), sometimes complanate and then looking more or less distichous.

9. Branches grouped together in fascicles, usually hanging, but at tips of stems crowded and erect. Leaf rib absent. Leaf cells in one layer, but dimorphous: large, hyaline, usually fibrillose cells filling up the meshes of the network formed by the long, much narrower chlorophyllose cells. In peat bogs, on heaths and in wet or damp places . . . . . **Sphagnum** Ehrh.

9. Branches, if present, not in fascicles. Leaf cells usually chlorophyllose, if hyaline then not fibrillose.

10. (19) Greater part of the leaf composed of the broad rib,, which

in cross section shows three or more layers of dimorphous cells: small, angular, chlorophyllose cells in one or in three layers (= chlorocysts), covered by large, porous, hyaline cells in two or more layers (= leucocysts). Leaf lamina narrow, one-layered, hyaline, resembling a narrow leaf border.

11. Leaf rib with a narrow median band of stereids, ressembling a secondary midrib. Chlorocysts 4-sided, one-layered, each situated at the junction of 4 leucocysts. Tree-mosses. **Leucophanes** Hamp.

11. Leaf rib without a median band of stereids.

12. Chlorocysts, at least in the upper part of the rib forming three layers, irregularly 3—7-sided.

13. Leaves distinctly in three, spirally arranged rows, from a sheathing base gradually attenuated into a linear apical part, obtuse, entire, smooth, very fragile, usually broken off halfway down. Dorsal and ventral layer of chlorocysts covered by a single layer of large leucocysts. On trees and on tree-ferns. **Arthrocormus** Doz. et Molk.

13. Leaves several-ranked, from an obovate sheathing base attenuated into a lanceolate apical part, usually very papillose. Dorsal and ventral layer of chlorocysts free on both surfaces. Bark-mosses . . . . . **Exodictyon** Card.

12. Chlorocysts forming a single layer, covered by one or more layers of leucocysts on both surfaces.

14. Chlorocysts in a median layer regularly arranged between the leucocysts. Hyaline lamina forming a very narrow border (at most 6 rows of cells) or lamina absent.

15. Chlorocysts in cross section triangular, arranged in a zigzag manner and each situated at the junction of three leucocysts. Leaves linear, thick and broad, dorsally convex, ventrally plane. Capsule cylindrical, erect. Peristome teeth 8, sometimes divided to their base. Calyptra cucullate. On bark, frequently on palms . . . . . **Octoblepharum** Hedw.

15. Chlorocysts in cross section quadrangular, each situated at the junction of 4 leucocysts. Peristome teeth 16, entire or divided, or peristome absent.

16. Leaves imbricate, appressed, broad-linear, hairpointed or apiculate. Stem creeping, branched like a pleurocarpous moss. Capsule lateral on short branches. Calyptra conical-mitriform, entire at base. Bark-mosses. **Cladopodanthus** Doz. et Molk.

16. Leaves erect-spreading or squarrose.

17. Leaves small, erect-spreading, lower part oblong, upper part narrowly lanceolate. Capsule terminal, hemisphaerical, immersed. Lid conical, longly and straightly rostrate. Calyptra narrowly conical, densely fimbriate at base. Peristome absent . . . . . **Ochrobryum** Mitt.

17. Leaves larger and broader. Capsule emerged on an elongated seta. Peristome teeth 16.

18. Leaves usually shortly acuminate. Calyptra turgid, cucullate, entire at base. Capsule ovoid, dorsiventral, inclined, 8-furrowed when dry. Peristome teeth divided to about the middle into two segments, longitudinally striate or papillose. On bark and on shady ground . . . . . **Leucobryum** Brid.

18. Leaves sharply acuminate, often cucullate at apex. Calyptra conical-mitriform, longly fimbriate at base. Capsule cylindrical, radial, erect. Peristome teeth entire, finely papillose. On bark or on ground . . . . . **Schistomitrium** Doz. et Molk.

14. Chlorocysts irregularly arranged, not always in a median layer. Hyaline lamina distinct, $^1/_4$—$^1/_3$ the width of the leaf base. Leaves lanceolate, auriculate. Terminal leaflets often with clusters of gemmae. Calyptra mitriform, ciliate at base. On rotten trunks. **Brothera** C. Muell.

10. Leaf cells one-layered, or seldom two-layered, except in the rib, if present. Lamina cells all similar, or the cells of the leaf base, in the leaf corners (alars cells) or along the margin differently developed.

19.(25) Ventral surface of leaves with longitudinal lamellae on the more or less broadened rib.

20. Leaves usually long, 1—4 cm, longly sheathing. Lamellae numerous, 40—80. Capsule ovoid, dorsiventral. Peristome a bushlike tuft of numerous, filiform, somewhat twisted bristles. Calyptra longhaired. Usually very robust ground-mosses. **Dawsonia** R. Brown

20. Leaves of different size, but usually not so extremely long. Peristome, if present, composed of 32—64 teeth, connected above with a membrane, covering the mouth of the deoperculated capsule (epiphragm). Capsule cylindrical or prismatic.

21. Leaves with a distinctly sheating base. Calyptra usually hairy. Lamellae numerous, straight.

22. Peristome teeth 32. Capsule rounded or two-sided complanate.

23. Rib on dorsal side toward apex dentate. Capsule cilindrical or spherical. Neck without stomata. Calyptra densely longhaired. Ground-mosses . . . . . **Pogonatum** Beauv.

23. Rib dorsally smooth. Capsule two-angled, in cross section semilunulate. Neck short, with stomata. Calyptra smooth or shorthaired. Old setae laterally placed as a result of innovations. On stones in wet places. **Polytrichadelphus** (C. Muell.) Mitt.

22. Capsule prismatic, mostly quadrangular. Neck hemispherical or discoid, with large stomata. Peristome teeth 64. Ground-mosses or growing in swamps and peat . . . **Polytrichum** Hedw.

21. Leaves without a sheathing base or indistinctly sheathing. Lamellae 2—12. Calyptra naked or with a few scattered hairs.

24. Leaves with a thickened border, marginal teeth usually two-ranked. Rib near apex dorsally dentate. Lamellae 2—3, straight. Ground-mosses . . . . . **Atrichum** Beauv.

24. Leaves not bordered. Lamellae 2—12, sinuose. Rib dorsally with a few rudimentary, serrate lamellae. Ground-mosses. **Oligotrichum** Lam. et Cand.

19. Leaves ventrally without longitudinal lamellae.
25.(29) Inner basal leaf cells hyaline, large, sharply differentiated from the small, chlorophyllose, more or less papillose lamina cells.
26. Primary stem creeping, secondary stems erect or procumbent. Leaf margin with a broad, hyaline border. Seta terminal on secondary stems. On bark . . . . . **Thyridium** Mitt.
26. Primary stem erect, usually simple. Leaf border narrow or absent. Seta terminal on primary stem, seldom pseudo-lateral.
27. Abnormal leaves with a rib excurrent in a thick point, bearing clusters of filiform gemmae.
28. Clusters of gemmae inserted midways between base and apex of the elongated rib. Leaf margin narrowly bordered. Peristome single. Calyptra cucullate, deeply lobed. On bark. **Calymperopsis** (C. Muell.) Fleisch.
28. Clusters of gemmae terminal on the elongated rib. Leaf margin not bordered. Peristome absent. Calyptra campanulate, plicate and twisted, reaching down to below the neck of the capsule. On bark in forests . . **Calymperes** Swartz
27. Abnormal gemmiferous leaves absent. Peristome single. Leaf margin usually narrowly bordered. Capsule erect, cylindrical. Calyptra mitriform. On bark, seldom on rocks. **Syrrhopodon** Schwaegr.
25. Inner basal leaf cells not sharply differentiated from the lamina cells; if different in shape or colour then changing gradually.
29.(33) Amphigastria (= smaller leaves on the ventral surface of the stem) present.
30. Secondary stems simple or rarely dichotomously branched. Amphigastria in one row. Seta very short, lateral.
31. Secondary stems caudate at the apex, with numerous filiform gemmae. Peristome teeth with a zigzag median line, finely papillose. On tree-trunks. **Cyathophorella** (Broth.) Fleisch.
31. Secondary stems not caudate and without gemmae. Peristome teeth perforated in the median line, transversely striate. On bark . . . . . **Cyathophorum** Beauv.
30. Secondary stems pinnate, fanlike or dendroid. Amphigastria usually in two rows. Seta at least 5 mm. Peristome teeth with a zigzag median line. Leaf margin bordered with linear cells.
32. Primary stem growing in a horizontal direction, secondary stems dendroid. Rib ending about two thirds up the leaf lamina. Seta usually elongate. Basal membrane distinct. Cilia well-developed. On rotten trunks, on bark or seldom on rocks . . . . . **Hypopterygium** Brid.
32. Primary stem vertically creeping, secondary stems pinnate or fanlike. Rib percurrent or excurrent. Seta short. Basal membrane low. Cilia absent. On bark. **Lopidium** Hook. f. et Wils.
29. Amphigastria absent.

33. Dorsal leaves, at least on sterile branches, much smaller than lateral leaves, mostly in two longitudinally rows.
34. Leaf margin bordered.
35. Leaf border yellowish. Lateral leaves elliptic. Rib percurrent. Leaf cells uni-papillate. Capsule folded near the mouth when dry, erect. Peristome teeth densely papillose. Cilia absent. On bark and on forest ground . . . . . **Powellia** Mitt.
35. Leaf border reddish. Lateral leaves oblong, acute. Rib reddish, ending halfway. Leaf cells smooth. Capsule smooth, inclined. Peristome teeth densely lamellate, papillose. Cilia 2. Ground-mosses . . . . . **Epipterygium** Lindb.
34. Leaf margin not bordered. Rib longly excurrent. Capsule deeply furrowed when dry. Peristome teeth transversely striate. Cilia 3. Tree- and rock-mosses . . . . . **Rhacopilum** Beauv.
33. Dorsal leaves, if developed, not different in size or shape from the lateral leaves.
36. Rib excurrent, dividing the leaf lamina into two unequal parts. Leaves complanate, in 8 rows and obliquely inserted but apparently distichous. Upper leaf margin convex, bordered, lower margin not bordered. On bark and on damp rocks. **Mniomalia** C. Muell.
36. Rib, if present, dividing the leaf lamina into two nearly equal parts.
37.(43) Leaf cells strongly sinuose or nodulose (*i. e.* inner surface of the longitudinal walls corrugated or undulate), at least the basal ones.
38.(42) Only the basal cells sinuose or nodulose.
39. Leaves tristichous. Leaf cells smooth. Capsule pseudolateral. Lid longly and obliquely rostrate. On rocks. **Reimersia** Chen.
39. Leaves in several rows.
40. Capsule opening by 4 vertical slits. Stem very fragile when dry. Darkbrown mosses growing on siliceous rocks. **Andreaea** Hedw.
40. Capsule opening by a lid. Plant not blackish.
41. Leaves with a hyaline border of elongated cells, in 3—5 rows, ending halfway up the lamina. Leaf cells finely papillose, basal leaf cells narrowly linear, yellowish-red. Capsule unknown. On calcareous rocks. **Chionoloma** Dix.
41. Leaves completely bordered with several rows of narrowed, not elongated cells. Leaf cells mammillose. Lid longly and obliquely rostrate, shed with the columella attached. Peristome absent. On rocks . . **Hymenostyliella** Bartr.
38. Leaf cells usually all sinuose.
42. Branches equal in length. Rib convex. Peristome teeth entire or slightly divided or peristome absent. On calcareous and siliceous rocks and stones . . . . . **Grimmia** Hedw.
42. Primary stem with many short branches. Rib broad and flat. Peristome teeth divided to their base into two filiform segments. Mostly on siliceous soil and rocks. **Rhacomitrium** Brid.

37. Leaf cells not sinuose.
43.(176) Stems erect, usually simple or with a few erect short branches. Seta terminal on stem and branches (*acrocarpous mosses*).
44.(80) Leaf cells in the upper half of the leaf prosenchymatous (= elongated with *acute* ends): elongated rhombic, elongated rectangular or narrowly linear.
45.(63) Leaf cells elongated rhombic or elongated rectangular in the upper half of the leaf.
46. Small plants, branching sparingly by innovations below the perigamium. Capsule spherical, sessile, capsule wall bursting open irregularly or decaying gradually. Capsule long enveloped by the delicate calyptra, which at maturity is irregularly split and whose remnants remain behind at the base of the capsule. Spores few, about 16 per capsule, and very large (100—200 μ). Ground-mosses . . **Archidium** Brid.
46. Not all of the above characters present. Spores usually much smaller.
47. Upper leaf cells narrow and incrassate, lower cells widely rectangular and thin-walled. Branches julaceous. Leaves ovate, obtuse or acute, not bordered. Rib ending below apex. Ground- and rock-mosses . . **Anomobryum** Schimp.
47. Leaf cells all thin-walled or all incrassate.
48. Upper leaves horizontally spreading, forming a conspicuous rosette.
49. Mosses extending by underground stolons or by prostrate old stems from which upright stems arise. Capsule cylindrical, horizontal to inclined, two or more in the same perigamium. Ground-mosses.
Rhodobryum (Schimp.) Hamp.
49. Stem not stoloniferous. Capsule ellipsoid, obovoid, pyriform or clavate, usually single in a perigamium. Ground- and rock-mosses, rarely on tree-trunks.
Bryum (Hedw.) Schimp.
48. Upper leaves suberect or erect-spreading, not forming rosettes, but sometimes in comal tufts.
50. Leaves narrowly lingulate, blunt or subacute. Seta long, erect. Capsule cylindrical. Peristome teeth divided to their base into two filiform, papillose segments. Pale-coloured or bluish-green. On walls and on rocks.
Wilsoniella C. Muell.
50. Leaves oblong, lanceolate or broadly spathulate, but never narrowly lingulate.
51.(57) Peristome usually single.
52. Exostome absent. Endostome a low basal membrane with 16 appendiculate processes. Lid small, mammillate. Ground- en rock-mosses . . **Mielichhoferia** Hornsch.
52. Endostome absent. Exostome teeth 16.

53. Alar cells differentiated.
54. Leaf rib broad, about $^1/_3$ the width of the leaf base. Peristome teeth divided to one half into longitudinally striate segments. Capsule ellipsoid. On ground, on rocks, on rotting tree-trunks and in peat . . . . . **Campylopus** Brid.
54. Leaf rib narrow. Peristome teeth almost entire, smooth. Capsule shortly pyriform with a thick, brown neck. On wet, non-calcareous rocks and stones . . . **Blindia** Br. et Schimp.
53. Alar cells not differentiated.
55. Seta short or absent, capsule immersed. Segments of the papillose, nearly to their base forked peristome teeth, united at tips. Ground-mosses . . . . . **Garckea** C. Muell.
55. Seta distinctly developed, capsule elevated.
56. Stem simple or bearing short julaceous branches, arising from the terminal tuft. Leaves shortly ovate-lanceolate to subulate. Capsule ovoid to cylindrical, radial, erect. Lid conical, acute or rostrate. Ground- and rock-mosses.
Aongstroemia Br. et Schimp.
56. Stem usually simple, small. Leaves ovate-spathulate, apex rounded or blunt. Capsule spheroidal to cylindric. Lid conical, mammillate. On ground and on rocks.
Splachnobryum C. Muell.

51. Peristome double.
57. Capsule erect or somewhat inclined.
58. Leaves lanceolate.
59. Leaf cells narrow. Lid gently arched. Peristome teeth papillose, united in pairs. Endostome processes narrow, as long as the exostome teeth, cilia well-developed. Ground- and rock-mosses.
Pseudopohlia Williams
59. Leaf cells widened. Capsule furrowed. Lid obliquely rostrate. Peristome teeth not paired, smooth or papillose. Endostome processes longer than the exostome teeth. On rotten tree-trunks.
Orthodontium Schwaegr.
58. Leaves oblong-elliptic to spathulate. Leaf cells widened. Lid conical or arched with an acumen. Peristome teeth not paired. Endostome processes often, cilia always rudimentary. Ground- and tree-mosses . . . . . **Brachymenium** Schwaegr.
57. Capsule distinctly inclined to pendulous.
60. Leaf cells narrowly rhombic to linear. Upper leaves forming a terminal tuft. Endostome short, often rudimentary. Lid mammillate or shortly acute. On ground and on rocks.
Pohlia (Hedw.) Lindb.
60. Leaf cells widely rhombic to hexagonal.
61. Capsule pyriform, dorsiventral. Lid flat or arched. Calyptra turgid, cucullate, entire. Stem short, leaves budlike, broadly spathulate. Ground-mosses . . . . . **Funaria** Hedw.
61. Capsule ovoid, shortly cylindric, pendulous. Calyptra small, cucullate, fugacious.

62. Leaves longly lanceolate. Upper leaves not forming a tuft. Ring absent. Stomata cryptoporous. Cilia nodose. Ground-mosses.
Mniobryum (Schimp.) Limpr.

62. Leaves oblong-elliptic or spathulate or lanceolate. Upper leaves often forming a tuft. Ring present. Stomata phaneroporous. Cilia appendiculate, but often rudimentary or absent. Ground- and rock-mosses, rarely growing on trees.
Bryum (Hedw.) Schimp.

45. Leaf cells narrowly linear in the upper half of the leaf.

63. (75) Alar cells differentiated.

64. (68) Leaves bordered.

65. Leaves longly subulate, erect or falcate. Perichaetial leaves not sheathing.

66. Rib broad ($^1/_3$—$^2/_3$ the width of the leaf base) and plane. Seta cygneous or undulate. Peristome teeth divided to their base into two filiform segments. On forest ground, rotting tree-trunks and non-calcareous rocks.
Dicranodontium Br. et Schimp.

66. Rib narrow, convex. Seta straight. Peristome teeth divided to or beyond the middle into two segments. On forest ground and on trees, sometimes in swamps . . **Dicranoloma** Ren.

65. Leaves ovate, shortly acute. Rib slender. Perichaetial leaves highly sheathing.

67. Alar cells yellow to yellow-brown. Leaf border, indistinctly, 1—2 rows of cells. Leaf margin plane, except near apex. Spores large (225 μ), many-celled, conical. Tree-mosses.
Dicnemon Schwaegr.

67. Alar cells hyaline. Leaf border distinct, 4—5 rows of cells. Leaf margin involute. Spores one-celled. **Werneriobryum** Herz.

64. Leaves not bordered.

68. (72) Perichaetial leaves very highly sheathing, reaching the base of the capsule.

69. Spores many-celled. Primary stem creeping. Rib very short or absent.

70. Leaf cells narrow, incrassate, pitted. Peristome teeth striate, divided at least to the middle, segments united at tips. On trees.
Synodontia Dub.

70. Leaf cells narrow and incrassate, but not pitted. Peristome teeth usually highly papillose, red or pale, broadly lanceolate, entire. Mostly on trees . . . . **Eucamptodon** Mont.

69. Spores one-celled. Primary stem erect.

71. Leaves broadly lanceolate, narrowed to base. Rib very slender or absent. Peristome absent. Usually on trees, seldom on ground . . . . . **Braunfelsia** Par.

71. Leaves ovate-lanceolate. Rib valid, excurrent, hairpointed. Peristome teeth short, papillose, not striate.
Brotherobryum Fleisch.

68. Perichaetial leaves subulate, not highly sheathing.

72. Leaves plicate, at least at base. Stems irregularly or subpinnately branched. Leaf cells papillate. Capsule ovoid to subspherical. Peristome double. Peristome teeth papillose. On wet rocks, on moist ground, in swamps . . . . . **Breutelia** Schimp.

72. Leaves concave, not plicate. Leaf cells smooth or rough.

73. Capsule ovoid, radial, erect. Peristome double. Exostome teeth paired. Endostome processes as long as the exostome teeth. Cilia appendiculate. Lid gently arched, not mamillate. Ground- and rock-mosses . . . . . **Pseudopohlia** Williams

73. Capsule cylindrical or pyriform. Peristome single. Peristome teeth longitudinally striate or seldom papillose or smooth.

74. Peristome teeth entire, perforated, or slightly divided, smooth or finely papillose. Capsule shortly pyriform with a thick brown neck. On wet calcareous rocks and stones. **Blindia** Br. et Schimp.

74. Peristome teeth divided at least to the middle. Seta absent, capsule immersed. Peristome teeth smooth. Spores ellipsoid, 50 μ. **Cryptodicranum** Bartr.

63. Alar cells not differentiated.

75. Leaf cells thick-walled, at least the upper cells.

76. Leaves ovate, closely appressed, branches julaceous. Upper leaf cells narrow, incrassate, lower cells widely rectangular and thin-walled, always smooth. Rib ending far below apex. Capsule usually pendulous. Ground- and rock-mosses. **Anomobryum** Schimp.

76. Leaves lanceolate, plicate, at least at base. Leaf cells papillate. Rib percurrent or excurrent. Capsule inclined. On wet rocks, on moist ground, in swamps . . . . . **Breutelia** Schimp.

75. Leaf cells thin-walled.

77. Peristome single.

78. Leaves from a half-sheathing base first spreading, then ascending. Capsule often furrowed when dry. Peristome teeth broad, longitudinally striate at base, divided to about the middle. Ground-mosses . . . . . **Dicranella** Schimp.

78. Leaves erect-spreading. Capsule not furrowed when dry. Peristome teeth entire, papillose. Ground-mosses. **Microdus** Schimp.

77. Peristome double.

79. Leaf cells with papillosely projecting upper ends. Seta short, 1 mm. Capsule immersed, erect, spherical. On trees and on rocks. **Leiomela** (Mitt.) Broth.

79. Leaf cells smooth. Seta elongate, up to 7 cm. Leaves on stem and branches gradually increasing in size towards the terminal tuft. Capsule ovoid, inclined to pendulous. Endostome processes shorter than the exostome teeth. Cilia nodulose. Lid archedly conical, mammillate or apiculate. On ground and on rocks. **Pohlia** Hedw.

44. Leaf cells in the upper half of the leaf lamina parenchymatous: quadrate, hexagonal, rectangular, rounded, sometimes more or less elongated, but never distinctly prosenchymatous.

80. (111) Leaf cells wide hexagonal or rectangular.
81. (94) Leaf cells hexagonal, regular or shortly elongate.
82. (89) Leaf cells regularly hexagonal.
83. Leaf rib absent. Leaves hyaline, minute. Leaf margin lobed. Stem very short, almost invisible to the naked eye. Protonema persistent, brown-green. Capsule large. Peristome double. On rotten wood or on humus soil . . . . **Buxbaumia** Hedw.
83. Leaf rib single, well-developed.
84. Leaf cells papillate or mammillate. Basal leaf cells elongate, hyaline. Leaves shortly spathulate, apex rounded. Leaf margin entire. Peristome absent. On limestone rocks. **Gymnostomiella** Fleisch.
84. Leaf cells smooth.
85. Leaf margin bordered. Capsule short-necked.
86. Primary stem long creeping, branches erect.
87. Leaf rib ending far below apex. Seta very short. Calyptra naked. Tree-mosses . . . . **Orthomniopsis** Broth.
87. Leaf rib percurrent or excurrent. Seta elongate. Calyptra densely and longly pilose. Tree-mosses. **Orthomnium** Williams
86. Primary stem erect, the upper leaves forming a rosette, unbranched or sometimes with differently leaved stolons. Border cells incrassate. Lid conical. Ground-, rock- and tree-mosses, also growing in swamps . . **Mnium** Hedw.
85. Leaf margin not bordered.
88. Capsule with a well-developed hypophysis (*i. e.* with a swollen neck, when ripened much broader than the theca and of a different colour). Peristome teeth when dry doubled back on to the theca. On excrements of carnivores, on humus . . . . . **Splachnum** Hedw.
88. Capsule with a larger or shorter neck but without a hypophysis. Peristome teeth when dry not bent back on the theca. On excrements of carnivores and on humus. **Tayloria** Hook.
82. Leaf cells elongately hexagonal.
89. Exostome absent. Endostome a low basal membrane with 16 appendiculate processes. Lid small, mammillate. Ground- and rock-mosses . . . . . **Mielichhoferia** Hornsch.
89. Endostome absent or peristome absent.
90. Peristome teeth 32, not trabeculate, pale with yellow-red axis.
91. Leaf margin dentate or serrate. Rib homogenous, consisting of two layers of equal cells with a wide lumen. Ground-mosses. . . . . **Rhacelopodopsis** Thér.
91. Leaf margin nearly entire. Rib heterogenous. Ground- and rock-mosses, also on decaying wood. **Rhacelopus** Doz. et Molk.
90. Peristome teeth 16, articulated, or peristome absent.

92. Capsule with an obovate or obconical hypophysis. Rib ending below apex. Growing on excrements. **Tetraplodon** Br. et Schimp.
92. Capsule without hypophysis, short-necked. Ground- and rock-mosses.
93. Stem simple or with julaceous branches below the perigamium. Leaves shortly ovate-lanceolate to subulate. Leaf cells with numerous or lage chloroplasts. Capsule ovoid to cilindric, radial, erect. Lid conical, acute or rostrate. Calyptra cucullate. Ground- and rock-mosses . . . . . **Aongstroemia** Br. et Schimp.
93. Stem short, leaves budlike, broadly spathulate. Leaf cells with scanty chloroplasts. Capsule pyriform, dorsiventral, inclined. Lid flat or arched, not rostrate. Calyptra turgid cucullate, entire. Ground-mosses . . . . . **Funaria** Hedw.

81. Leaf cells rectangular.
94. Alar cells differentiated.
95. Leaf cells papillate. Leaves plicate, at least at base. On wet rocks, on moist ground, in swamps . . . **Breutelia** Schimp.
95. Leaf cells usually smooth.
96. Leaves broadly bordered with narrow linear cells. Rib very broad, occupying one-third to two-thirds the width of the leaf base. Seta cygneous. Peristome teeth divided to their base. On forest ground, on tree-trunks and on non-calcareous rocks. **Dicranodontium** Br. et Schimp.
96. Leaves not bordered. Peristome teeth divided to their base into two filiform segments, longitudinally striate at base. Capsule ellipsoid. Growing on wet clay . . . **Atractylocarpus** Dix.
94. Alar cells not differentiated.
97. Leaves with a thickened double-toothed border. Rib denticulate on back. Capsule nearly spherical, longitudinally furcate, inclined to horizontal. Ground- and rock-mosses, mostly in swamps or soaking wet places near springs . . . . **Philonotis** Brid.
97. Leaves not bordered.
98.(108) Leaf cells smooth.
99. Lid absent. Leaves oval-oblong, imbricate. Perichaetial leaves lanceolate-subulate, forming a terminal tuft. Seta short, capsule immersed. Calyptra cucullate, covering only the upper part of the capsule. Ground-mosses . . . . . **Pleuridium** Brid.
99. Lid present, dehiscent.
100. Leaves broad, oblong to spathulate.
101. Leaf apex acute. Rib broad, $^1/_4$ the width of the leaf base, excurrent with rounded apex. Leaves oblong. Branches julaceous. Peristome absent. On meadows in high mountainous regions . . . . . **Aongstroemiopsis** Fleisch.
101. Leaves lingulate-spathulate with rounded apex or blunt. Rib narrow, ending below apex. Peristome single. On ground and on rocks . . . . . **Splachnobryum** C. Muell.
100. Leaves lanceolate-subulate.

102. Capsule with a tapering neck about twice as long as the theca, with numerous stomata in the spongy neck-tissue. Seta mostly erect. Calyptra turgid, cucullate. Ground-mosses.
Trematodon Michx.

102. Capsule short-necked. Stomata sparse in neck-portion or totally absent.

103. (108) Leaf margin entire.

104. Peristome single.

105. Upper leaves forming a tuft. Seta elongate, cygneously curved. Leaves from a broader sheathing base abruptly subulately acuminate. Leaf rib biconvex with stereids on both sides. Peristome teeth divided to the middle, segments not united. Ground-mosses . . **Microcampylopus** C. Muell.

105. Upper leaves not forming a conspicuous tuft.

106. Seta cygneously curved. Leaf rib biconvex with stereids on both sides. Leaves from a sheathing base elongately subulate. Peristome teeth divided to the middle, longitudinally striate at base. Ground-mosses.
Campylopodium (C. Muell.) Besch.

106. Seta long, erect, straight. Leaf rib broad and flat. Leaves from a non-sheathing base longly subulate-caniculate. Peristome teeth papillose, divided to their base into two filiform segments. Ground- and rock-mosses . . **Ditrichum** Timm.

104. Peristome double.

107. Leaves narrowly lanceolate. Leaf cells essentially smooth, the cuticula only somewhat striate-papillose. Stem triangular with a wide-celled hyalodermis. Seta 10—15 mm. On limestone rocks . . . . . **Plagiopus** Brid.

107. Leaves oblong-lonceolate. Hyalodermis absent. Seta very long (30—40 mm). In wet places . . . . **Meesia** Hedw.

103. Leaf margin more or less dentate serrate. Rib excurrent. Endostome well-developed. On ground and on rocks in wet places.
Fleischerobryum Loesk.

98. Leaf cells more or less papillate to mammillate.

108. Hyalodermis of stem wide-celled. Capsule inclined to pendulous.

109. Leaves deeply longitudinally plicate, especially at base. Leaf cells papillate over the lumen. Stem covered by a dense felt of rhizoids. Capsule subspherical. Peristome usually double. On wet rocks, in swamps . . . . . **Breutelia** Schimp.

109. Leaves not plicate. Papillae confined to the ends of the leaf cells. Only the basal part of the stem with rhizoids. Capsule spherical. Peristome absent . . **Bartramidula** Br. et Schimp.

108. Hyalodermis of stem small-celled or absent.

110. Seta elongate. Capsule erect or inclined, furrowed when dry. Peristome double. Ground- and rock-mosses. **Bartramia** Hedw.

110. Seta short, 1 mm, capsule immersed, not furrowed. Leaf cells with papillosely projecting upper ends. Endostome rudimentary. On trees and on rocks . . . . . **Leiomela** (Mitt.) Broth.

80. Leaf cells small: quadrate, rounded, hexagonal or rectangular, seldom elongately hexagonal or rectangular.
111. Primary stem creeping with erect branches.
112. Leaves bordered with hyaline, elongate or quadrate cells. Central basal leaf cells quadrate, incrassate, different from the elongated marginal cells. Capsule cylindric. Calyptra mitriform, small, smooth. Bark-mosses, seldom on rocks.
Micromitrium Schimp.
112. Leaves not bordered.
113. Capsule emergent on an elongated seta.
114. Calyptra campanulate, longitudinally pluri-plicate, entire or rarely split open on one side, smooth or hairy. Capsule erect, spherical to oblong-ovoid. Peristome double, sometimes single or absent. Predominately tree-mosses.
Macromitrium Brid.
114. Calyptra conical-campanulate, never plicate, lower margin lobed. Capsule erect, ovoid to cilindric. Tree- and rock-mosses . . . . . **Schlotheimia** Brid.
113. Capsule immersed. Leaves dimorphous: leaves of primary stem and of sterile branches lanceolate, acute, spirally arranged, on fertile branches ovate and 5-ranked. Tree-mosses.
Desmotheca Lindb.
111. Primary stem erect, seldom branched.
115. (120) Alar cells differentiated, forming a distinct group, hyaline or brownish.
116. Leaves with a hyaline border of elongated cells. Capsule cilindric, radial, erect or somewhat inclined.
117. Leaf cells densely papillate. Basal leaf cells linear, almost hyaline, the insertion cells often coloured. Tree-mosses.
Leucoloma Brid.
117. Leaf cells smooth. Alar cells incrassate, hyaline basal cells absent. On forest ground, on trees, sometimes in swamps.
Dicranoloma Ren.
116. Leaves not bordered.
118. Rib very broad, occupying one third to two thirds the width of the leaf base. Lid longly and obliquely rostrate.
119. Leaves from a lanceolate lower part attenuated into a subulate apical part. Capsule deeply furrowed. Peristome teeth divided to the middle. On dry ground, on rotting trunks, in peat . . . . . **Campylopus** Brid.
119. Leaves oblong, passing into a lanceolate upper part. Capsule rough at base. Peristome teeth divided to their base. Ground- and rock-mosses . **Thysanomitrium** Schwaegr.
118. Rib narrow. Lid straightly or obliquely rostrate. Leaves from a sheathing base abruptly narrowed. Perichaetial leaves very long pointed. On trees and rocks.
Holomitrium Brid.
115. Alar cells not or scarcely differentiated.

120. (140) Leaf cells smooth.
121. (135) Leaf margin entire or finely crenulate.
122. (126) Leaf margin completely incurved or recurved.
123. Leaves lingulate-spathulate.
124. Leaves hairpointed. Capsule ovoid. Lid arched. Peristome teeth short on a basal membrane. On bark, seldom on rocks. **Leptostomum** R. Brown.
124. Leaves not hairpointed. Basal leaf cells rectangular. Capsule cilindric. Lid longly rostrate. Peristome absent. Ground- and rock-mosses . . . . . **Hyophila** Brid.
123. Leaves ovate-lanceolate, acute or obtuse.
125. Darkbrown, non-radiculose mosses with very fragile stems when dry. Capsule erect. Lid and peristome absent. Growing on siliceous rocks . . . . . **Andreaea** Hedw.
125. Dull green mosses, radiculose below. Capsule inclined, opening with a lid. Peristome teeth divided nearly to their base, papillose, bordered. On various substrata. **Ceratodon** Brid.
122. Leaf margin plane.
126. Basal leaf cells elongate with acute ends, hyaline or opaque.
127. (133) Basal leaf cells hyaline.
128. Leaves from a sheathing base elongate-subulate, strongly recurved when dry. Peristome teeth more or less paired, divided to the middle. On bark and on branches. **Symblepharis** Mont.
128. Leaves without a sheathing base. Peristome teeth not paired.
129. (132) Leaves lingulate. Leaf apex obtuse or nearly acute.
130. Leaf cells collenchymatously thickened. Peristome teeth 32, solid, not trabeculate. Ground-mosses. **Pseudorhacelopus** Broth.
130. Leaf cells not collenchymatous. Peristome teeth 16, trabeculate or peristome absent.
131. Leaves strongly crisped when dry. Capsule ovoid, smooth. Peristome absent. On rocks, rarely trees.
131. Leaves not crisped when dry. Leaf apex obtuse. Peristome teeth 32, filiform, twisted to the left from a high tesselated basal membrane. On walls, rocks, and roadsides, seldom on bark . . . . . **Tortula** Hedw.
129. Leaves ovate-lanceolate to linear-subulate. Leaf rib percurrent.
132. Leaves strongly crisped when dry. Rib smooth on back. Peristome single. Peristome teeth smooth or obliquely striate. Capsule small, ovoid, with 8 rib-like prominent dark-coloured streaks, whose cells differ from the cells of the intervening areas. Growing in cracks of siliceous rocks. . . . . **Rhabdoweisia** Br. et Schimp.
132. Leaves not crisped when dry. Rib papillose on back. Capsule obovoid, on laterally placed short branches. Growing on volcanic rocks. **Anoectangium** (Hedw.) Br. et Schimp.

127. Basal leaf cells not hyaline.
133. Peristome usually double, peristome teeth 8 and more or less divided or 16 and paired. Leaf border one row of cells, only present on the lower margin. Central basal cells narrow linear, incrassate, different from the quadrate, hyaline, thin-walled marginal cells. Capsule 8-ribbed. Calyptra long-haired. Bark-mosses, rarely on rocks . . . . . **Ulota** Mohr.
133. Peristome single. Peristome teeth 16, not paired, divided into three segments, papillose. Seta erect, straight. Capsule spherical, wide-mouthed, smooth. On calcareous rocks in water. **Tridontium** Hook.
126. Basal leaf cells rectangular, hyaline.
134. Leaves oblong, obtuse. Marginal cells yellowish, in several rows, strongly incrassate. Capsule ovoid. Peristome absent. Lid rostrate. Rock-mosses . . . . . **Merceya** Schimp.
134. Leaves elliptic-oblong. Marginal cells not differently developed. Capsule ellipsoid or cylindrical with 8 deep longitudinal folds, small-mouthed, puckered. Peristome double or absent. Tree-mosses, seldom on rocks . . . . **Zygodon** Hook. et Tayl.
121. Leaf margin serrate or dentate in one or in two rows.
135. Basal leaf cells elongate or rectangular.
136. Basal leaf cells hyaline or yellow.
137. Peristome teeth 32, solid, not trabeculate. Capsule spherical or cylindrical. Calyptra densely hairy. Epiphragm developed. Ground-mosses . . . . . **Pogonatum** Br. et Schimp.
137. Peristome teeth 16, trabeculate or peristome absent. Calyptra naked, seldom few-haired. Epiphragm none. On bark, seldom on rocks . . . . . **Zygodon** Hook. et Tayl.
136. Basal leaf cells never hyaline, usually incrassate.
138. Leaves lanceolate from a sheathing base. Basal leaf cells linear. Peristome teeth 16, divided to their base into two filiform segments, papillose. Tree-mosses. **Rhamphidium** Mitt.
138. Leaves lanceolate-subulate from a narrowed base. Leaf margin sharply double-toothed. Peristome teeth 32, solid, formed by U-shaped cells. Ground-mosses . . . . **Atrichum** Beauv.
135. Basal leaf cells not differently devedoped.
139. Cells of leaf margin several-layered, incrassate, darkened, double-toothed. Peristome teeth with distinct lamellae and with a zigzag median line. Seta long. On trees and on ground, rarely on rocks . . . . . **Rhizogonium** Brid.
139. Leaf margin one-layered, recurved. Exostome absent. Endostome with filiform processes, irregularly united, hyaline. **Hymenodontopsis** Herz.
120. Leaf cells more or less papillate or mammillate.
140. Leaves bordened with elongated or shortened cells.
141. Leaf border ending halfway up the margin, hyaline. Leaf cells seriately papillate over the lumen. Leaves extremely long-acicular, very fragile. Capsule unknown. **Stephanodictyon** Dix.

141. Leaf border complete. Leaves linear from a short, hyaline, clasping base, flexuose. Rib broadened, 150 μ below, excurrent in a short cuspidate point. Capsule unknown.
Pachyneurum Bartr.

140. Leaves not bordered.
142. Leaves tristichous. Perichaetial leaves highly sheathing. Leaf cells densely and highly papillose. Ground- and rock-mosses.
Triquetrella C. Muell.

142. Leaves arranged in several rows.
143. Capsule opening by 4 vertical slits. Stem very fragile when dry. Darkbrown mosses, growing on siliceous rocks.
Andreaea Hedw.

143. Capsule opening by a lid or fracturing irregularly or capsule unknown.
144. Leaf lamina 2—3-layered.
145. Leaves spirally curved and hooked when dry. Perichaetial leaves not differently developed. Seta elongate. Peristome teeth erect or steeply inclined to the left. On calcareous soil and rocks . . . . . **Timmiella** De Not.

145. Leaves crisped when dry. Perichaetial leaves long-linear-subulate, the apex usually long-hairpointed and fimbriate. Capsule immersed. Peristome double. Ground- and rock-mosses.
Diphyscium Mohr.

144. Leaf lamina one-layered.
146. (169) Leaf margin entire or scarcely and finely crenulate.
147. (152) Leaves oblong-spathulate to lingulate. Leaf apex usually obtuse or somewhat acute.
148. Calyptra cylindrical-campanulate, enveloping the whole capsule. Leaves densely and strongly papillose. Spores large, verrucose. Ground- and rock-mosses.
Encalypta Hedw.

148. Calyptra usually cucullate, if campanulate then not enveloping the whole capsule.
149. Seta long, very slender. Capsule smooth.
150. Leaves crisped when dry. Ring persistent. On rocks.
Merceyopsis Broth. et Dix.

150. Leaf margin strongly incurved when dry. Ring unrolling. On walls, on rocks and on ground. **Hyophila** Brid.

149. Seta shorter. Capsule with 8 or 16 prominent coloured streaks.
151. Mouth of capsule small, strongly puckered. Calyptra small, cucullate, usually smooth. On bark or on rocks.
Zygodon Hook. et Tayl.

151. Mouth of capsule not puckered. Calyptra campanulate, more or less pilose, longitudinally sharply plicate. Tree- and rock-mosses . . . . . **Orthotrichum** Hedw.

147. Leaves lanceolate or linear-subulate. Leaf apex usually acute or acuminate.

152 (167) Basal leaf cells rectangular or elongate.
153. (162) Basal leaf cells rectangular.
154. Green protonema persistent. Leaf cells papillate. Basal cells hyaline. Capsule densely covered with large pustules. Lid absent. Spores 35—40 μ, brown, papillose. In open places between grasses . . . . . **Trachycarpidium** Broth.
154. Green protonema fugacious. Lid present.
155. Capsule cylindrical or pyriform.
156. Capsule distinctly with 8 or 16 deep folds when dry.
157. Capsule pyriform, wide-mouthed. Peristome absent. Leaf margin recurved at base. On rocks.
Amphidium (Nees) Schimp.
157. Capsule cylindrical, mouth of capsule small, strongly puckered. Peristome single, double or absent. On bark and on rocks . . . . . **Zygodon** Hook. et Tayl.
156. Capsule not folded. Peristome teeth entire or divided to base, papillose. Red to reddish-brown ground- and rock-mosses.
Didymodon Hedw.
155. Capsule ovoid, obovoid or slightly cylindrical, not folding when dry.
158. Capsule on laterally places short branches. Rib percurrent, papillose on back. On volcanic rocks.
Anoectangium (Hedw.) Br. et Schimp.
158. Capsule terminal on the primary stem.
159. Perichaetial leaves highly sheathing. Leaf cells finely papillate. Calyptra plicate. On trees and on rocks.
Glyphomitrium Brid.
159. Perichaetial leaves not differently developed.
160. Basal leaf cells hyaline.
161. Leaves crisped when dry. Peristome teeth short, undivided or peristome absent. Ground-mosses and growing in cracks of rocks . . . . . **Weisia** Hedw.
161. Leaves not crisped when dry. Peristome teeth 16, usually long lanceolate, sometimes divided. On calcareous rocks.
Gyroweisia Schimp.
160. Basal cells not hyaline. Capsule ovoid to spheroidal. Peristome absent. On limestone rocks. **Gymnostomum** Hedw.
153. Basal leaf cells elongate with acute ends.
162. Peristome absent.
163. Leaf margin plane. Capsule oblong-cylindrical, narrowly mouthed. On bark . . . . . **Leptodontopsis** Broth.
163. Leaf margin incurved or recurved.
164. Seta distinctly developed. Mouth of capsule after the removal of the lid closed for a long time with a membrane (hymenium). On the ground and in clefts of walls and rocks.
Hymenostomum R. Brown
164. Seta very short, capsule immersed. Lid persistent or absent. Hymenium none. Ground-mosses . . . **Astomum** Hpe.

162. Peristome present.
165. Leaves from a broader sheathing base longly and slenderly acuminate. Peristome teeth perforated or divided into 2—4 segments, short, densely papillose. Rib excurrent. Ground-, rock- and tree-mosses . . . **Pseudosymblepharis** Broth.
165. Leaves without a sheathing base, leaf apex obtuse, mucronate. Peristome teeth entire or divided to their base.
166. Leaves fragile. Peristome teeth entire, spirally papillosely striate. Basal membrane none. On wet rocks. **Oxystegus** (Lindb.) Hilp.
166. Leaves not fragile. Peristome teeth divided to their base, remotely papillose. Ground-, wall- and rock-mosses. **Trichostomum** Hedw.
152. Basal leaf cells not or scarcely different from the upper laminal cells.
167. Leaves narrow-lingulate. Leaf cells transparent. On rocks, roots and on branches in streams . . . . . **Hydropogon** Brid.
167. Leaves lanceolate. Leaf cells not transparent.
168. Leaf rib dorsally rough, very scabrous. On walls and on stones. **Semibarbula** Hilp.
168. Rib dorsally smooth or slightly papillose. Ground- and rock-mosses . . . . . **Barbula** Hedw.
146. Leaf margin serrate or dentate or strongly crenate, at least at apex.
169. Leaf margin plane.
170. Basal leaf cells elongate or rectangular.
171. Leaves longly decurrent. Capsule narrowly cylindric, fusiform, plicate . . . . . **Pleurozygodontopsis** Dix.
171. Leaves not decurrent. Peristome teeth usually present, entire. Capsule cylindric, small-mouthed, strongly puckered, folded when dry. On bark and on rocks . . **Zygodon** Hook. et Tayl.
170. Basal leaf cells usually not different from the laminal cells. Leaves ovate-lanceolate, long-hairpointed. Exostome absent. Endostome without cilia. Mostly on treeferns. **Hymenodon** Hook. f. et Wils.
169. Leaf margin partly or completely recurved or incurved.
172. Leaves oblong-lingulate, mostly obtuse.
173. Leaf margin recurved. Basal leaf cells elongate, hyaline or yellow.
174. Perichaetial leaves highly sheathing. Peristome teeth 16, divided to their base, smooth or finely papillose. Ground-, rock- and tree-mosses . . . . . **Leptodontium** Hamp.
174. Perichaetial leaves not differently developed. Peristome teeth 32, twisted to the left from a high tesselated basal membrane, papillose or transversely striate. On walls, rocks and roadsides, rarely on bark . . . . . **Tortula** Hedw.
173. Leaf margin incurved. Basal leaf cells rectangular.
175. Leaves broad-lanceolate to spathulate. Peristome absent. On walls, rocks and on ground . . . . . **Hyophila** Brid.
175. Leaves from a spathulate base oblong-lanceolate. Peristome teeth 16, lanceolate, paired, smooth. On rocks. **Rhabdoweisiella** Williams

172. Leaves linear-lanceolate, obtuse, mucronate, crisped when dry. Basal leaf cells elongate, hyaline. Peristome teeth divided to their base. Ground- and rock-mosses . . . . **Trichostomum** Hedw.

43. Primary stem often creeping, usually copiously pinnately or irregularly branched. Capsules at the apices of short lateral branches of limited growth (*pleurocarpous mosses*).

176. (277) Alar cells absent or indistinctly developed.

177. (245) Leaf cells prosenchymatous, linear or elongated rhombic.

178. (221) Leaf cells linear.

179. (197) Leaf rib absent or very short and double.

180. (193) Leaf cells smooth.

181. (188) Leaf cells thin-walled.

182. Seta very short, capsule immersed. Peristome teeth smooth. Lower basal leaf cells forming a transversal band of subisodiametric, brown-reddish cells. Tree-mosses.
Symphysodon Doz. et Molk.

182. Seta distinctly developed, capsule elevated. Peristome teeth papillose or transversely striate.

183. Paraphyllia present, subulate. Secondary stems woody, more or less arborescent, pinnately or bipinnately branched. Capsule elongate, cylindrical. Peristome teeth densely papillose. Leaves apt to turn white papery in spots, giving the plant a characteristic look. On trunks and on branches.
Trachyloma Brid.

183. Paraphyllia absent.

184. Perichaetial leaves highly sheathing. Branch leaves elliptic-lanceolate, complanate. Gemmae on tips of branches. Capsule 8-ribbed. Peristome teeth transversely striate. Calyptra mitriform, deeply lobed. On bark and on leaves.
Hampeella C. Muell.

184. Perichaetial leaves erect, abruptly or gradually subulate, never sheathing.

185. Marginal leaf cells in one row elongate, forming an indistinct border. Primary stem almost regularly pinnate. Branch leaves more or less complanate, not homotropous. Ground- and rock- and tree-mosses.
Vesicularia (C. Muell.) C. Muell.

185. Marginal leaf cells not differently developed.

186. Secondary stems long, pendulous. Leaves concave, oblong-lanceolate, longly acuminate, obliquely spreading, somewhat complanate. Peristome double. Very slender tree-mosses . . . . . **Barbella** (C. Muell.) Fleisch.

186. Secondary stems creeping or procumbent.

187. Secondary stems usually pinnately branched. Branch leaves radially arranged, not complanate falcate and homotropous near apex. On forest ground, tree-trunks and rocks . . . . . **Ectropothecium** Mitt.

187. Secondary stems usually irregularly branched. Branch leaves spreading, complanate, not homotropous. Mostly on rotten tree-trunks, sometimes on stones or on rocks. **Isopterygium** Mitt.
181. Leaf cells thick-walled.
188. Leaves longitudinally plicate or undulate.
189. Peristome teeth papillose. Endostome with low basal membrane and filiform processes.
190. Inner perichaetial leaves highly sheathing. Capsule totally immersed. Calyptra mitriform. Bark-mosses. **Garovaglia** Endl.
190. Inner perichaetial leaves small. Capsule shortly elevated. Calyptra cucullate. Tree-mosses . **Endotrichella** C. Muell.
189. Peristome teeth transversely striate Endostome with highly developed basal membrane and broad, keeled processes. Calyptra conical. Spores 35 × 45 μ. Bark-mosses. **Euptychium** Schimp.
188. Leaves concave or plane, not plicate.
191. Secondary stems long, pendulous. Leaves oblong-lanceolate, longly acuminate, obliquely spreading, somewhat complanate. Peristome double. Very slender tree-mosses. **Barbella** (C. Muell.) Fleisch.
191. Secondary stems erect, suberect or creeping.
192. Secondary stems disposed in one plane, pinnate or bipinnate. Leaves oblong-lanceolate, shortly acuminate. Leaf base with a band of isodiametric, reddish-brown cells. Peristome teeth smooth. Endostome rudimentary, only a short basal membrane without processes. Tree-mosses. **Symphysodontella** Fleisch.
192. Secondary stems simple or irregularly branched. Leaves ovate-lanceolate, subulate acuminate. Peristome teeth papillose. Endostome with 16 filiform processes. Tree-mosses. **Endotrichella** C. Muell.

180. Leaf cells more or less papillate or mammillate.
193. Leaf cells thin-walled with papillately projecting upper ends. Leaves elliptic, complanate. Capsule smooth. Lid conical, acute. Peristome double. On decaying wood, rarely on rocks or on humus soil . . . . . **Isopterygium** Mitt.
193. Leaf cells thick-walled. Branch leaves oblong-lanceolate to lingulate, squarrose or spreading, seldom complanate.
194. Seta short or absent. Leaves longitudinally plicate or undulate.
195. Leaf margin entire. Marginal cells shortened. Capsule nearly immersed, furrowed when dry. Peristome absent. Rock-mosses. **Hedwigidium** Br. et Schimp.
195. Leaf margin dentate or serrate, at least in part, either near base or near apex. Capsule totally immersed in the perichaetium. Calyptra mitriform, several-lobed, naked, covering only the lid. Bark-mosses . . . . . **Garovaglia** Endl.
194. Seta longer than 1 cm (up to 3 cm). Leaves concave, not plicate.
196. Primary stem more or less regularly pinnate. Branches short, more or less complanate. Leaves lingulate, rounded or short-pointed. Seta smooth or somewhat rough. Calyptra cucullate, naked. On wet rocks and stones . . **Glossadelphus** Fleisch.

196. Primary stem densely tomentose, richly pinnately branched. Branches elongate, radially arranged or complanately foliate. Leaves oval-oblong or lanceolate, short-pointed or abruptly long-pointed. Seta papillose or spinose. Calyptra conical-mitriform, spinose and ciliate. On trunks, on branches and on leaves. **Chaetomitrium** Doz. et Molk.

179. Leaf rib single or double, at least longer than one fourth the length of the leaf.

197. Leaf base auriculate. Peristome teeth smooth. Endostome brown-yellow with well-developed processes. Tree-mosses. **Calyptothecium** Mitt.

197. Leaf base not auriculate.

198. (211) Leaf cells smooth.

199. Leaf margin entire.

200. Leaf cells thin-walled, basal leaf cells forming a band of isodiametric coloured cells. Peristome teeth united in pairs, smooth. Endostome very thin, hyaline, without processes. Tree-mosses . . . . . **Symphysodon** Doz. et Molk.

200. Leaf cells thick-walled. Rib ending halfway up or higher.

201. Secondary stems simple, obtuse. Leaf lamina plicate, when dry. Leaves cordate, oval. Peristome single. Seta 5 mm. On bark. **Jaegerinopsis** Broth.

201. Secondary stems pinnately branched. Leaf lamina never plicate, concave. Leaves oblong-lanceolate, acuminate. Peristome teeth smooth. Endostome rudimentary. Seta short or absent. Tree-mosses . . . . **Symphysodontella** Fleisch.

199. Leaf margin dentate or serrate.

202. (210) Leaf cells thin-walled.

203. Rib double, ending below apex. Peristome teeth transversely striate. Seta elongate, smooth. Tree- and rock-mosses. **Hookeriopsis** (Besch.) Jaeg.

203. Rib single.

204. Secondary stems long, pendulous.

205. Leaves horizontally spreading, oblong-lanceolate, gradually narrowed into a long capillary point. Seta short, smooth or papillose. Tree-mosses. **Barbella** (C. Muell.) Fleisch.

205. Leaves squarrosely spreading.

206. Leaves stem-clasping. Leaf tip often recurved. Calyptra conical, hairy or seldom cucullate and naked. Basal membrane low, without cilia. Tree-mosses. **Meteoriopsis** Fleisch.

206. Leaves half-stem-clasping. Leaf tip twisted. Calyptra unknown. Basal membrane as high as length of processes, with 2—3 cilia. Tree-mosses. **Aerobryum** Doz. et Molk.

204. Secondary stems erect or prostrate.

207. Primary stem creeping, secondary stems erect, arborescently branched.

208. Leaves strongly longitudinally plicate, ovate-lanceolate. Capsule immersed. Peristome teeth smooth. On bark.
Pterobryum Hornsch.

208. Leaves not or indistinctly plicate. Capsule longly exserted. Peristome teeth papillose or striate.

209. Paraphyllia subulate. Rib dorsally smooth, ending halfway. On trunks and on branches . . . . . **Trachyloma** Brid.

209. Paraphyllia absent. Rib percurrent or shortly excurrent, dorsally strongly toothed. Bark-, rock- and ground-mosses.
Hypnodendron (C. Muell.) Lindb.

207. Primary and secondary stems creeping, irregularly branched. Seta elongate, usually sinuose. Peristome teeth transversely striate. Ground- and stone-mosses. **Rhynchostegium** Br. et Schimp.

202. Leaf cells thick-walled.

210. Secondary stems very long, 20—30 cm, arborescently branched. Paraphyllia subulate. Leaf rib percurrent, dorsally dentate. Seta 5—15 mm, capsule elevated. Bark-mosses.
Pterobryella (C. Muell.) C. Muell.

210. Secondary stems usually simple, elongate, undulate, not densely crowded, often with lateral flagellae. Paraphyllia absent. Seta very short, capsule immersed. Tree-mosses. **Jaegerina** C. Muell.

198. Leaf cells more or less papillate or mammillate.

211. (219) Rib single.

212. Secondary stems erect, arborescently branched.

213. Capsule smooth. Lid conical or shortly rostrate. On forest ground.
Sciadocladus Lindb.

213. Capsule more or less distinctly ribbed. Lid longly rostrate. On bark, on rocks and on forest ground.
Hypnodendron (C. Muell.) Lindb.

212. Secondary stems erect or pendulous, simple or pinnately branched.

214. Secondary stems simple, elongate, undulate, not densely crowded, often with lateral flagellae. Leaves longitudinally plicate. Seta very short, capsule immersed. Tree-mosses. **Jaegerina** C. Muell.

214. Secondary stems more or less pinnately branched. Flagellae absent.

215. Branch leaves upwards transversely undulate. Branches somewhat complanately foliate. Perichaetial leaves hairpointed.

216. Leaves gradually narrowed. Peristome teeth papillose. On bark and on leaves, seldom on rocks. **Aerobryopsis** Fleisch.

216. Leaves oblong-lanceolate, abruptly narrowed into a long narrow point. Rib exceeding the middle of the leaf lamina. Peristome teeth yellow, densely transversely striate. On bark.
Aerobryidium Fleisch.

215. Branch leaves not undulate. Perichaetial leaves shortly acuminate.

217. Leaves squarrosely spreading. Branchlets never complanate. Tree-mosses . . . . . **Meteoriopsis** Fleisch.

217. Leaves erect-spreading, never squarrose. Branchlets often somewhat complanate.

218. Leaves lanceolate, gradually narrowed into a long capillar point. Glossy plants. Leaf cells smooth or faintly papillate. Calyptra usually mitriform and naked, seldom cucullate and hairy. Tree-mosses . . . . . **Barbella** (C. Muell.) Fleisch.
218. Leaves ovate-lanceolate, acuminate. Dull plants. Leaf cells seriately papillate. Calyptra cucullate, sparingly pilose. On bark, on branches and on leaves, rarely on dead twigs or on humus soil. **Floribundaria** C. Muell.

211. Rib double.
219. Branches dimorphous: complanate branches with double-toothed leaves and narrowed branches with indistinctly dentate leaves and with gemmae. Calyptra stifly haired. On bark. **Dimorphocladon** Dix.
219. Branches similar. Marginal row of leaf cells once dentate.
220. Leaves several-rowed. Leaves oblong-lanceolate. Leaf cells with papillosely projecting ends. Leaf ribs short. Seta papillose or spinose. Lid longly rostrate. Calyptra conical-mitriform, spinulose, often ciliate. On trunks, branches and on leaves. **Chaetomitrium** Doz. et Molk.
220. Leaves in several rows, pseudodistichous. Leaves oval, ribbed to about the middle. Leaf cells strongly papillate, papillae in series. Seta smooth. Calyptra cucullate, smooth. Peristome teeth transversely striate. On bark and decaying wood. **Pseudohypnella** (Broth.) Fleisch.

178. Leaf cells elongated rhombic.
221. (231) Rib absent or very short and double.
222. (227) Leaf cells smooth.
223. Leaf cells thin-walled.
224. Basal leaf cells or basal marginal cells differently developed as the laminal cells. Seta rough with convex cells. Lid longly and finely rostrate. On decaying bark and on the base of tree-trunks . . . . . **Leucomium** Mitt.
224. All laminal cells similar to each other.
225. Branches complanately leaved. Leaves ovate-lanceolate, shortly or longly acuminate. Seta smooth. Lid convex or conical, shortly acute. Ground-, rock- and tree-mosses. **Vesicularia** (C. Muell.) C. Muell.
225. Branches not complanately leaved.
226. Leaves lanceolate, acuminate. Capsule ovoid. Seta smooth. On decaying trunks, seldom on rocks. **Sauloma** (Hook. f. et Wils.) Mitt.
226. Leaves ovate-triangular. Capsule unknown. One large alar cell, hidden in the stem . . . . **Crepidophyllum** Herz.
223. Leaf cells thick-walled. Leaves octostichous, appearing tetrastichous, lingulate or spathulate, obtuse. On roots, on base of trees, on rocks, rarely on ground. **Homalia** (Brid.) Br. et Schimp.
222. Leaf cells papillate or mamillate.
227. Leaf cells thin-walled, papillate at the upper end.

228. Leaf margin entire. Leaves lanceolate, concave, subulate. Capsule small, ovoid or spherical, verruculose. On calcareous substrata, more rarely on bark . . . . . **Trachythecium** Fleisch.
228. Leaf margin finely dentate.
229. Leaf cells papillate at the upper end. Leaves oblong, shortly or longly acuminate, spreading. Branches strongly complanate. Ground- and bark-mosses . . . . **Taxiphyllum** Fleisch.
229. Leaf cells with mamillately projecting ends. Leaves lanceolate, falcate, homotropous near apex. Branches all-roundly foliate. On forest ground, tree-trunks and on rocks. **Ectropothecium** Mitt.
227. Leaf cells thick-walled. Leaf margin dentate.
230. Branches pinnately disposed. Branch leaves undulately, finely acute. Seta smooth. Endostome absent. Bark-mosses. **Microctenidum** Fleisch.
230. Branches uni-laterally arranged. Branch leaves distichous, spreading. Seta upwards papillose. Peristome double. Bark-mosses. **Ctenidiadelphus** Fleisch.
221. Rib single or double, at least longer than $^1/_4$ the length of the leaf.
231. (241) Rib single.
232. (238) Leaf cells smooth.
233. Very robust, scarcely branched plants. Leaves densely and sharply serrate, with a sheathing nerveless base. Capsule on a very short seta. On trees and rotting wood. **Spiridens** Nees.
233. Slender plants or more or less robust. Leaf margin entire. Seta 4 mm or longer, capsule always emergent.
234. Leaf cells thin-walled. Leaves ovate or linear-lanceolate, serrate near apex. Leaves of stem and branches radially arranged. Exostome absent. Endostome a low basal membrane with 16 appendiculate processes. Lid small, mammillate. Ground- and rock-mosses . . . . . **Mielichhoferia** Hornsch.
234. Leaf cells thick-walled.
235. Secondary stems very complanate.
236. Leaves broadly lingulate with truncate or rounded apex, sometimes with a small acumen, usually undulate. Secondary stems elongate, irregularly pinnate. Peristome teeth papillose. Tree- and rock-mosses . . . **Neckeropsis** Reichdt.
236. Leaves lingulate-spathulate, obtuse. Secondary stems usually dichotomously branched, seldom pinnate. Peristome teeth transversely striate. Tree- and rock-mosses. **Homalia** (Brid.) Br. et Schimp.
235. Leaves of secondary stems several-ranked, not complanate.
237. Leaf margin recurved towards apex. Lid conical, blunt. Exostome teeth shorter than the endostome processes. Endostome processes perforated, smooth. Tree-mosses. **Rhegmatodon** Brid.
237. Leaf margin wholly recurved. Lid conical, acute or shortly rostrate. Endostome absent or rudimentary. On trees, rarely on rocks . . . . . **Forstroemia** Lindb.

232. Leaf cells more or less papillate.
238. Branchlets somewhat complanately leaved. Primary stem pendulous, irregularly branched. Rib ending about halfway. Leaf cells unipapillate over the lumen. On bark and leaves, sometimes on rocks . . . . . **Aerobryopsis** Fleisch.
238. Leaves of branchlets radially arranged.
239. Primary stem pendulous, irregularly pinnate. Leaves appressed.
240. Leaf cells pluri-papillate on the cell wall and over the lumen. Branches imbricately foliate. Plants dull. Seta smooth. Tree-mosses . . . . . **Papillaria** (C. Muell.) C. Muell.
240. Leaf cells uni- or bi-papillate over the lumen. Branches densely leaved and turgid. Plants more or less shining. Seta papillose. Tree-mosses . . . **Meteorium** Doz. et Molk.
239. Primary stem adscending, more or less regularly pinnate. Leaves laxly imbricate, contorted when dry. Paraphyllia sparingly developed. Ground- and tree-mosses. **Claopodium** (Lesq. et Jam.) Ren. et Card.
231. Leaf rib double.
241. Leaf cells smooth.
242. Leaf margin indistinctly bordered with one row of narrowed cells. Branches radially leaved. Peristome teeth papillose with a zigzag median line. Calyptra mitriform, lobed, smooth. Tree-mosses . . . . . **Actinodontium** Schwaegr.
242. Leaves not bordered. Branches complanately foliate. Peristome teeth transversely striate. Calyptra conical, mitriform, small, smooth. Tree- and rock-mosses. **Hookeriopsis** (Besch.) Jaeg.
241. Leaf cells more or less papillate to mammillate.
243. Leaf cells finely unipapillate at the upper end.
244. Primary stem creeping, pinnate or irregularly bipinnate. Leaves with recurved apex. Creeping along branches of trees. **Chaetomitriopsis** Fleisch.
244. Primary stem creeping with procumbent, nearly dendroid secondary stems. Leaf apex straight, leaves often narrowed below apex. On forest floor . . **Macrothamnium** Fleisch.
243. Leaf cells unipapillate over the lumen. Leaves oblong, shortly acuminate. Rib ending near apex. On tree-trunks and decaying wood, rarely on rocks . . . **Callicostella** (C. Muell.) Mitt.
177. Leaf cells parenchymatous: small and narrow or wider quadrangular to hexagonal.
245. (269) Leaf cells small: quadrate, hexagonal or rounded.
246. Leaf rib double, ending below the apex. Leaf cells usually unipapillate over the lumen. Branches complanately foliate. Capsule horizontal to pendulous. Calyptra conical-mitriform. On tree-trunks and decaying wood, rarely on rocks. **Callicostella** (C. Muell.) Mitt.
246. Leaf rib single or absent.
247. Leaf cells thin-walled.

248. Leaf cells densely and finely papillate. Secondary stems simply or bi-pinnately branched. Leaf margin dentate or seldom entire. Rib percurrent, smooth at back. On shady ground.
Thuidiopsis (Broth.) Fleisch.

248. Leaf cells smooth.
249. Leaf margin bordered. Primary stem creeping, branches erect.
250. Leaf rib ending far below apex. Seta very short. Calyptra naked. Tree-mosses . . . . . **Orthomniopsis** Broth.
250. Leaf rib percurrent or excurrent. Seta elongate. Calyptra densely and longly pilose. Tree-mosses. **Orthomnium** Williams
249. Leaves not bordered. Leaves ovate-lanceolate, leaf apex rounded or acute. Leaf margin toward apex finely to coarsely dentate. Usually on wet ground, near springs and waterfalls, rarely aquatic . . . . . **Thamnium** Br. et Schimp.

247. Leaf cells thick-walled.
251 (252) Leaf cells smooth.
252. Leaf rib strongly undulate above. Secondary stems snaillikely inrolled when dry. Leaves lanceolate, shortly acuminate, upwards widely serrate. On tree-trunks and on rocks.
Herpetineurum (C. Muell.) Card.

252. Leaf rib not undulate.
253. Leaf margin bordered.
254. Leaf border consisting of a few rows of cells extending up to about one third the length of the lamina. Peristome absent or consisting of two narrow membranes. Calyptra mitriform, small, smooth. Chiefly bark-mosses, rarely on rocks.
Micromitrium Schimp.

254. Leaf border reaching the apex.
255. Leaf border two-layered, widely dentate. Very robust, scarcely branched mosses. Leaves of branches radially arranged. Seta short. On trees and on rotting wood.
Spiridens Nees.

255. Leaf border one-layered, nearly entire. Slender, simple or sparingly branched mosses. Branches complanately leaved. Seta elongate, thin, undulate. Tree-mosses. **Leskeodon** Broth.

253. Leaves not bordered.
256. Branches complanately leaved. Leaves in 8 rows, pseudotetrastichous.
257. Leaves broadly lingulate, with truncate or rounded apex, sometimes with a small acumen, usually undulate. Secondary stems elongate, irregularly pinnate. Peristome teeth papillose. Tree- and rock-mosses . . . **Neckeropsis** Reichdt.
257. Leaves lingulate-spathulate, obtuse. Secondary stems usually dichotomously branched, seldom pinnate. Peristome teeth transversely striate. Tree- and rock-mosses.
Homalia (Brid.) Br. et Schimp.

256. Leaves of branches in several rows, radially arranged.
258. Primary stem short.

259. Basal leaf cells elongate. Secondary stems sparely irregularly branched. Seta 1—3 cm. Endostome absent. Tree-mosses. **Bescherellea** Dub.

259. Basal leaf cells short. Secondary stems irregularly branched. Leaf cells smooth. Seta short. Lid conical, obtuse. Exostome teeth shorter than endostome processes. Tree-mosses. **Rhegmatodon** Brid.

258. Primary stem elongate.

260. Secondary stems single.

261. Calyptra campanulate, longitudinally plicate, entire or rarely split open on one side, smooth or hairy. Capsule erect, spherical or oblong-ovoid. Peristome double, sometimes single or absent. Predominately tree-mosses . . . . . **Macromitrium** Brid.

261. Calyptra conical-campanulate, never plicate, lower margin lobed. Capsule erect, ovoid to cylindric. Peristome double. Tree- and rock-mosses . . . . . **Schlotheimia** Brid.

260. Secondary stems pinnate, bipinnate or branched like a fan. Leaves more or less distinctly in 8 rows, lingulate, leaf apex obtuse but usually with acumen. Tree-mosses. **Himantocladium** (Mitt.) Fleisch.

251. Leaf cells more or less papillate or mammillate.

262. Paraphyllia absent.

263. Capsule immersed. Leaves dimorphous: leaves of primary stem and of sterile branches lanceolate, acute, arranged in several rows; leaves of fertile branches ovate and 5-ranked. Tree-mosses. **Desmotheca** Lindb.

263. Capsule emerged on a shorter or longer seta.

264. Leaves in 5 rows. Leaf margin entire, only finely serrulate, with projecting papillae. Rib ending in or just below apex. Seta smooth. Tree- and rock-mosses. **Anomodon** Hook. et Tayl.

264. Leaves in several rows.

265. Primary stem erect, sparingly branched. Rib percurrent, papillose on back. Lid longly rostrate. On volcanic rocks. **Anoectangium** (Hedw.) Br. et Schimp.

265. Primary stem creeping, branches erect or procumbent.

266. Basal leaf cells elongate, very incrassate with a semilunular lumen, sometimes with large papillae. Calyptra campanulate, plicate. Tree-mosses . . . . . **Macromitrium** Brid.

266. Basal leaf cells not differentiated. Sometimes an intralaminal band of elongated cells in several rows extending for some distance from the base upwards. Seta papillose. Calyptra unknown. Tree-, rarely ground- and rock-mosses. **Pinnatella** (C. Muell.) Fleisch.

262. Paraphyllia present, usually numerous.

267. Calyptra conical-campanulate, deeply lobed, spinose. Rib in branch leaves being placed more to one side of the leaf lamina. On rotten wood, on roots and on bark . . . **Pelekium** Mitt.

267. Calyptra cucullate, smooth. Rib in branch leaves dividing the lamina into two equal parts.

268. Paraphyllia few, squarrose, lanceolate, not branched. Branches regularly or irregularly simply pinnate. Leaves spreading and curved when dry. Ground- and rock- and tree-mosses. **Claopodium** (Lesq. et Jam.) Ren. et Card.

268. Paraphyllia numerous, simple or variously branched. Branches densely bi- or tri-pinnate, very short ones only simply pinnate. Leaves appressed or incurved when dry. On forest ground, on bark and on roots . . . . . **Thuidium** Br. et Schimp.

245. Leaf cells wider: regularly hexagonal or more or less elongate hexagonal without acute ends.

269. Leaf cells regularly hexagonal, smooth, thin-walled. Leaves bordered, usually complanate.

270. Leaf rib when present, single, forked or unforked.

271. Leaf rib unforked or absent. Leaf margin entire.

272. Leaf rib ending about halfway or nearer to the apex. Leaf apex acute or rounded. Peristome teeth transversely striate with furrowed median line. Seta smooth. On moist ground, rocks- and tree-trunks . . **Distichophyllum** Doz. et Molk.

272. Leaf rib short or absent. Leaves usually hairpointed.

273. Seta papillose. Peristome teeth papillose with zigzag median line. Lid shortly rostrate. Endostome processes weakly keeled. Leaf rib absent. Growing among other mosses. **Distichophyllidium** Fleisch.

273. Seta smooth. Peristome teeth pale, smooth. Lid longly rostrate. Leaf rib absent. Endostome processes strongly keeled. On decaying wood . . . **Archboldiella** Bartr.

271. Leaf rib single at base, forked above, forks unequal. Leaf margin dentate. Peristome teeth furrowed in the median line. Seta densely spinose. On rotting tree-trunks, wet rocks, humus soil . . . . . **Eriopus** (Brid.) C. Muell.

270. Leaf rib double, ending below the apex. Leaf margin bordered, slightly dentate. Peristome teeth transversely striate with furrowed median line and with many lamellae. Seta smooth. Ground-, rock- and tree-mosses . . . . **Cyclodictyon** Mitt.

269. Leaf cells hexagonal, elongate.

274. Leaf rib absent or very short and double.

275. Leaves 5-ranked, complanate. Leaf margin entire, with an indistinct border in one row. Leaf cells smooth. In shining oily looking tufts on moist and shady forest ground. **Hookeria** Sm.

275. Leaves several-ranked, complanate. Leaf margin dentate, not bordered. Leaf cells papillate; papillae in series on the cell wall. On bark, rarely on ground. **Ectropotheciella** Fleisch.

274. Leaf rib distinct, at least one fourth the length of the lamina single or double.

276. Leaf rib single, ending far below apex. Leaf margin bordered. Peristome teeth densely papillose, with longitudinal zigzag line, unforked. On bark and on branches. **Daltonia** Hook. et Tayl.

276. Leaf rib double, ending about the middle of the lamina. Leaf margin not bordered. Peristome teeth transversely striate, perforated in the median line. Tree- and rock-mosses.
Hookeriopsis (Besch.) Jaeg.

176. Alar cells distinctly developed, different in size or in shape to the laminal cells.

277 (390) Leaf cells prosenchymatous: linear or elongated rhombic.

278. (354) Leaf cells linear.

279 (332) Rib absent in branch leaves.

280. Leaves spreading or imbricate, at the straight or hooked tips of stem and branches rolled up into an acute point.

281. Leaves lanceolate, acuminate. Leaf cells usually incrassate, smooth or somewhat scabrous. Peristome double. Peristome teeth not paired, transversely striate. Capsule small, inclined or suberect. On trunks and on branches, more rarely on rocks and on forest ground . . . . **Acroporium** Mitt.

281. Leaves oblong-elliptic, acuminate. Leaf cells thin-walled, smooth. Endostome absent. Peristome teeth in pairs, bordered, smooth. Capsule erect. On bark.
Schraderella C. Muell.

280. Apical branch leaves not uprolled into an acute point.

282. (319) Leaf cells smooth.

283. Leaves tristichous. Leaf apex with two rows of spines on back. On branches . . . . . **Tristichella** Dix.

283. Leaves several-ranked.

284. (304) Leaf cells thin-walled.

285. (294) Alar cells large, usually hyaline, in one horizontal row, seldom with a few small cells in a second row above.

286. Leaf margin entire, seldom finely dentate near apex.

287. Leaves falcate, homotropous. Branches irregularly disposed. Lid longly rostrate. On tree-trunks, less frequently on rocks or humus ground.
Rhaphidorrhynchium Besch.

287. Leaves erect-spreading, oblong-elliptic.

288. Leaf apex blunt or with a short or subulate point. Capsule inclined to horizontal. Neck of capsule smooth. Exothecial cells collenchymatous. Seta smooth. On trees, rarely on rocks . . . **Sematophyllum** Mitt.

288. Leaf apex more or less abruptly narrowed into a short or long lanceolate to aristate point. Capsule pendulous. Neck of capsule verrucose. Exothecial cells thin-walled or collenchymatous. Seta papillose. Tree-mosses.
Rhaphidostichum Fleisch.

286. Leaf margin distinctly dentate, at least near apex.

289. Leaves falcate, homotropous.

290. Branch leaves oblong to lanceolate, abruptly passing into a rather long, nearly filiform subulate point. Alar cells undivided. Peristome teeth perforated in the

median line. Exothecial cells more or less collenchymatous. Neck of capsule verrucose. On bark and on tree-trunks.
Warburgiella C. Muell.

290. Branch leaves elliptic, gradually attenuated into a narrowly subulate point. Alar cells sometimes with transverse walls. Peristome teeth with a zigzag median line. Exothecial cells parenchymatous. Neck of capsule smooth. Tree-mosses.
Brotherella Loesk.

289. Leaves spreading, erect or squarrose.
291. Leaves longitudinally plicate.
292. Leaves squarrose, sharply dentate. Gold-green, shiny, densely pinnate plants. Capsule unknown. On shrubs and rotten trunks.
Ptychophyllum Broth.

292. Leaves erect spreading, finely dentate near apex. Seta strongly papillose above. Capsule tuberculate at base. On rotten trunks.
Pseudopiloecium Bartr.

291. Leaves not plicate.
293. Leaves lanceolate, gradually apiculate. Basal margin above the alar cells with a few hyaline cells. Seta smooth. On tree-trunks.
Acanthocladium Mitt.

293. Leaves elliptic, abruptly narrowed into a long cuspidate point. Seta upwards papillose. Tree-mosses. **Rhaphidostichum** Fleisch.

285. Alar cells forming a group of equally developed larger or smaller cells in several horizontal rows.
294. Alar cells incrassate.
295. Filiform gemmae present.
296. Small, slender plants. Primary stem creeping, secondary ascending, often with caudate tips, bearing smooth gemmae. Capsule small, ovoid. Lid shortly rostrate. Peristome teeth densely papillose with circular perforations in the median line. Endostome processes linear. On bark and decaying wood.
Aptychella Herz.

296. Slender plants. Primary stem longly creeping, secondary stems erect, unbranched. Branches with clusters of papillose brood-filaments near tips. Capsule oblong-ovoid. Lid rostrate. On bark and humus ground . . . . . **Clastobryella** Fleisch.

295. Gemmae absent. Leaves longly acuminate, very concave. Capsule ovoid, smooth. Lid finely and thinly rostrate. Peristome teeth smooth. Endostome only a low basal membrane without processes. Tree-mosses . . . . . **Myurium** Schimp.

294. Alar cells thin-walled.
297. Alar cells forming a very large group, in oblique rows, ending about halfway on the margin. Leaves oval, shortly acuminate. Branches julaceous, densely and regularly pinnate. Peristome teeth transversely striate below, vertically striate upwards. On trees and on rocks . . . . . **Erythrodontium** Hamp.

297. Alar cells forming a much smaller group, sometimes nearly absent.
298. Leaves complanate.

299. Peristome teeth cribrosely perforated. Leaves ovate-oblong. Capsule erect, narrowly cylindrical. Lid obliquely rostrate. On trees.
299. Peristome teeth usually not perforated, papillose or striate. **Cribrodontium** Herz.
300. Leaves ovate-lanceolate, obtuse or short-pointed, seldom longer acuminate. Capsule ellipsoid, erect. Basal membrane low. Peristome teeth differently striate. On tree-trunks and calcareous rocks . . . . . **Entodon** C. Muell.
300. Leaves ovate, longly acuminate. Secondary stems procumbent, simple or irregularly branched. Peristome teeth transversely striate. Basal membrane high. On rocks, on trees and trunks, and on forest floor . . . . **Plagiothecium** Br. et Schimp.
298. Leaves erectly or squarrosely spreading, not complanate.
301. Leaves longitudinally plicate, narrowly ovate-lanceolate, acuminate. Peristome teeth transversely striate at base, higher up obliquely to longitudinally striate and papillose at tip. Endostome without processes. On trees. **Campylodontium** Doz. et Molk.
301. Leaves not or finely plicate.
302. Paraphyllia numerous, polymorphous. Alar cells yellow or brownish, incrassate, sharply limited. Leaves coarsely serrate above. On decaying wood. **Heterophyllium** (Schimp.) Kindb.
302. Paraphyllia absent.
303. Primary stem creeping, densely regularly pinnate, seldom irregularly branched. Capsule small, ovoid to ellipsoid, smooth, inclined. On forest ground, tree-trunks and on rocks. **Ectropothecium** Mitt.
303. Primary stem creeping, densely pinnate. Capsule oblong-ovoid, wide-mouthed, horizontal to inclined. With tumid, obtuse branches. On rocks . . . **Foreauella** Dix et Vard.
284. Leaf cells thick-walled.
304. Alar cells large, hyaline or brown, in one row with or without smaller cells in a second horizontal row.
305. Leaf margin entire, more or less recurved.
306. Alar cells incrassate, reddish brown and yellow. Capsule erect, ovoid. Peristome teeth yellow. Endostome pale, basal membrane high with short processes. Lid cupulate, shortly rostrate. On bark . . . . . **Clastobryophilum** Fleisch.
306. Alar cells either thin-walled or thick-walled. Capsule erect, ovoid to oblong-cylindrical. Peristome teeth pale, papillose or smooth. Endostome absent. Mostly tree-, rarely rock-mosses. **Meiothecium** Mitt.
305. Leaf margin more or less dentate.
307. Leaves more or less distinctly bordered, upwards widely and sharply dentate. Alar cells often divided. Capsule very large, ellipsoidal, horizontal. On forest ground, on roots, decaying trunks and on bark . . . **Trismegistia** (C. Muell.) Broth.

307. Leaves not bordered, subhomotropous to falcate. Seta smooth or upwards verrucose. Alar cells undivided. Capsule small, ovoid, inclined. On tree-trunks . . . . . **Mastopoma** Card.

304. Alar cells forming a group of equally developed, larger or smaller cells in several horizontal rows.

308. Perichaetial leaves highly sheathing, ending at the base of the capsule.

309. Leaf cells incrassate and pitted. Peristome teeth striate, divided at least to the middle, segments united at tips. On trees. **Synodontia** Dub.

309. Leaf cells narrow, incrassate but not pitted. Peristome teeth usually highly papillose, red or pale, broadly lanceolate, entire. Mostly on trees . . . . . **Eucamptodon** Mont.

308. Perichaetial leaves short, not highly sheathing.

310. (314) Leaf margin entire.

311. Leaves falcate, homotropous at least at apex of branch.

312. Capsule long-cylindric, inclined to pendulous. Alar cells parenchymatous, coloured, not chlorophyllose, forming a distinctly limited group. Leaves oval-oblong, shortly or longer acuminate. Branches almost regularly pinnate. On various substrata . . . . . **Hypnum** Hedw.

312. Capsule ovoid to cylindric, erect. Alar cells chlorophyllose.

313. Leaves ovate-lanceolate, not plicate. Branches irregularly pinnate. Peristome teeth transversely striate. Endostome well-developed. On bark, seldom on siliceous rocks. **Pylaisia** Br. et Schimp.

313. Leaves lanceolate, distinctly plicate. Branches nearly regularly pinnate. Peristome teeth finely papillose. Endostome absent. On stones in rivulets . . **Stereodontopsis** Williams

311. Leaves erect-spreading or imbricate, oval, abruptly shortly acuminate. Alar cells forming a small, concave group, hyaline. Capsule ellipsoid, inclined to horizontal. Lid convex, verrucose. On rocks . . . . . **Elmeriobryum** Broth.

310. Leaf margin more or less serrate or dentate.

314. Alar cells incrassate.

315. Leaves falcate, homotropous. Capsule inclined to pendulous, long-cylindric. Leaves oval-oblong, shortly or longly acuminate. On various substrata . . . . **Hypnum** Hedw.

315. Leaves erect-spreading, deeply plicate. Capsule ovoid, erect. Secondary stems with filiform papillose gemmae. Peristome teeth transversely striate. Tree-mosses. **Piloecium** C. Muell.

314. Alar cells thin-walled or very small.

316. Leaves dimorphous: stem leaves with fragile, decurrent auricles, abruptly lanceolate, branch leaves narrower, lanceolate, not auriculate. Capsule ovoid, inclined to pendulous, dorsiventral. Tree- and rock-mosses in dense, plumose mats. **Ctenidium** (Schimp.) Mitt.

316. Stem and branch leaves equally developed.

317. Leaves longitudinally plicate.
318. Leaves oblong. Peristome teeth papillose. Endostome absent. Seta 15 mm, papillose. On stones in streams.
Stereodontopsis Williams
318. Leaves ovate-lanceolate. Peristome double. Seta absent or very short. Leaves ovate, obtuse or shortly acute. Peristome teeth transversely striate. Basal membrane distinct, with broad, keeled processes. Spores 35—45 μ. Tree-mosses.
Euptychium Schimp.
317. Leaves concave or flat, not plicate, falcate, homotropous. Paraphyllia numerous, often branched. Peristome teeth papillose. Capsule longly cylindrical. On tree-trunks . **Stereodon** Mitt.
282. Leaf cells more or less papillate to mammillate.
319. (328) Leaf cells thin-walled.
320. (326) Alar cells few and large, in one horizontal row with or without smaller cells above.
321. Leaves usually falcate. Lid longly and finely rostrate.
322. Leaf cells with papillately projecting upper ends. Seta smooth. On tree-trunks, less frequently on rocks and humus ground.
Rhaphidorrhynchium Besch.
322. Leaf cells uni-papillate or seriate over the lumen.
323. Primary stem creeping, secondary stems erect. Filiform papillose gemmae at the tip of branches. Leaves ovate-lanceolate, shortly or longer acuminate. Peristome teeth smooth or papillose. Bark- and leaf-mosses.
Clastobryella Fleisch.
323. Primary and secondary stems creeping. Exothecial cells collenchymatous.
324. Leaf cells uni- or seriate-papillose over the lumen. Seta strongly scabrous above. Neck more or less verrucose. On bark and rocks, rarely on decaying wood.
Trichosteleum (Mitt.) Jaeg.
324. Leaf cells unipapillate over the lumen. Seta smooth. Neck verrucose. Branch leaves oblong or lanceolate, abruptly passing into a rather long, nearly filiform subulate point. Alar cells undivided. On bark and on tree-trunks.
Warburgiella C. Muell.
321. Leaves spreading.
325. Leaves complanate. Leaf cells uni- or pluri-papillate over the lumen, or with protuding upper ends. Lid shortly rostrate. Exothecial cells not collenchymatous. On decaying wood, seldom on rocks . . . . . **Taxithelium** Spruc.
325. Branches radially leaved. Leaf cells sparingly papillate. Lid obtuse, verrucose or more or less rostrate. Leaves lanceolate, abruptly narrowly acuminate. Basal margin above the alar cells with a few hyaline cells. On tree-trunks.
Acanthocladium Mitt.
320. Alar cells usually small, equally developed.

326. Leaves yellowish bordered, oblong, acute or hairpointed, entire or dentate at apex. Alar cells incrassate. Leaf cells densely and finely papillate. On rocks in wet places and in peat.
Rhacocarpus Lindb.

326. Leaf margin not bordered.

327. Leaf cells papillate, papillae in a single series on the cell walls. Capsule unknown. Tree-mosses.
Ectropotheciopsis (Broth.) Fleisch.

327. Leaf cells minutely papillate by the projecting ends or nearly smooth. Capsule inclined to pendulous, small, ovoid. On tree-trunks, rarely on rocks or forest ground, growing in flat mats.
Ectropothecium Mitt.

319. Leaf cells thick-walled.

328. Alar cells few, very large, in one horizontal row, incrassate. Secondary stems erect, densely pinnate, often flagelliform. Filiform, papillose gemmae at tip of branches. Peristome teeth smooth. On bark and humus ground. **Clastobryum** Doz. et Molk.

328. Alar cells in several horizontal rows, equally developed, usually thin-walled or scarcely developed.

329. Leaves more or ess longitudinally plicate. Branch leaves squarrosely spreading or falcate. Peristome teeth transversely striate. Tree- and rock-mosses in dense, plumose mats.
Ctenidium (Schimp.) Mitt.

329. Leaves not plicate. Secondary stems creeping.

330. Leaves lingulate, rounded or short-pointed. Leaf cells with papillately projecting upper ends. Usually complanate. Mostly in wet places on rocks and on stones.
Glossadelphus Broth.

330. Leaves shortly or longly acuminate.

331. Leaf cells papillate, papillae in series over the lumen or occasionally on the cell walls. Leaves ovate or lanceolate. Lid shortly rostrate. On bark, decaying wood, seldom on rocks.
Taxithelium Spruc.

331. Leaf cells only with papillate projecting upper ends. Leaves oval. Lid conical, acute. On forest ground and in meadows.
Gollania Broth.

279. Leaf rib well-developed, to $^1/_4$ or more of the length of the lamina, single or double.

332. Rib double. Leaf cells smooth or more or less papillate at the upper ends.

333. Primary stem elongate, pendulous, more or less complanately leaved, densely or remotely pinnate. Leaf ribs short, $^1/_4$—$^1/_3$. Capsule erect, ellipsoid, spinose. On branches. **Symphyodon** Mont.

333. Primary stem creeping, secondary stems creeping or procumbent, pinnately or irregularly branched. Capsule smooth.

334. Leaves cordate, longly acuminate, finely serrate. Capsule ovoid to cylindrical, inclined to pendulous. On bark and on rocks.
Microthamnium Mitt.

334. Leaves cordate, shortly acuminate, upwards sharply serrate. Capsule cylindrical, erect. On bark. **Leptohymenium** Schwaegr.
332. Rib single.
335. (349) Leaf cells smooth.
336. Leaf cells thin-walled.
337. Leaves longitudinally plicate.
338. Secondary stems irregularly branched, rigid when dry. Leaves erect spreading, cordate, longly acuminate. Capsule erect, cylindrical. Lid longly rostrate. Peristome teeth transversely striate or papillose. Endostome processes on a high basal membrane. Tree-mosses . . . . . **Pleuropus** Griff.
338. Secondary stems more or less pinnately branched. Leaves broadly lanceolate, erect-spreading or imbricate. Capsule inclined to horizontal, ellipsoid, curved, gibbose. Lid convex, obtuse or acute. Peristome teeth transversely striate. Ground-, stone- and rock-mosses . . **Brachythecium** Br. et Schimp.
337. Leaves not plicate.
339. Lid longly rostrate. Seta rough.
340. Leaf rib dorsally ending in a spine. Leaves ovate-oblong, shortly acuminate. Branches usually complanately leaved. On rocks, on ground and on bark.
Oxyrrhynchium (Br. et Schimp.) Warnst.
340. Leaf rib dorsally smooth. Leaves narrowly lanceolate, longly acuminate. Leaves of branches radially arranged. On damp walls, on rocks, trunks and branches.
Rhynchostegiella Br. et Schimp.
339. Lid acute or shortly rostrate. Leaves ovate-lanceolate, obtuse or shortly pointed. Capsule ovoid, mostly inclined to horizontal. On tree-trunks and on rocks. **Stereophyllum** Mitt.
336. Leaf cells thick-walled.
341. Secondary stems erect, dendroid, arborescently or pinnately branched. Lid longly rostrate.
342. Leaf rib on dorsal side distinctly serrate, percurrent or excurrent. Leaves lanceolate, subulately acuminate. Secondary stems brown-tomentose. Capsule horizontal to pendulous, longly cylindrical, ribbed. On forest ground, rotting trunks, rarely on moist rocks . . . . . **Mniodendron** Lindb.
342. Leaf rib on dorsal side smooth. Leaves oval-oblong, obtuse. Secondary stems julaceous. Leaf rib ending halfway up the lamina. Capsule inclined, ovoid, smooth.
Porotrichodendron Fleisch.
341. Secondary stems not dendroid: simple or regularly or irregularly pinnately branched.
343. Secondary stems horizontally spreading or hanging, simple or scarcely branched. Leaves ovate, short-pointed, very concave, appressed. Endostome rudimentary. Tree-mosses.
Pterobryopsis Fleisch.
343. Secondary stems creeping or procumbent.

344. Alar cells thin-walled.
345. Leaves longitudinally plicate. Leaves ovate-lanceolate, longly subulate. Secondary stems richly pinnately branched, incurved when dry. Peristome teeth papillose. Endostome processes on a low basal membrane, very short. Tree- and rock-mosses. **Homalothecium** Br. et Schimp.
345. Leaves not plicate. Leaves lanceolate, falcate, longly subulate. Growing in water, in wet places on various substrata. **Drepanocladus** (C. Muell.) Broth.
344. Alar cells thick-walled.
346. Leaf margin entire or indistinctly dentate near apex.
347. Alar cells chlorophyllose. Leaves oblong, longly acuminate, not bordered. On forest ground, grassy places, on base of tree-trunks and on rocks . . . . **Cirriphyllum** Grout.
347. Alar cells yellow to yellow-brown. Leaves oval. Leaf border in 1—2 rows, indistinct. Spores many-celled, conical, 225 μ. Ground- and bark-mosses . . . . **Dicnemon** Schwaegr.
346. Leaf margin distinctly dentate or serrulate.
348. Leaves erect-spreading to imbricate, ovate, shortly acuminate. Tree- and rock-mosses . . . . . **Isothecium** Brid.
348. Leaves spreading, broadly ovate, blunt or acute. In running water or on wet rocks . . . . **Platyhypnidium** Fleisch.

335. Leaf cells more or less papillate to mammillate.
349. Secondary stems more or less pendulous.
350. Leaves longitudinally plicate. Secondary stems simple or irregularly pinnate. Leaf cells papillate, papillae in series on the cell walls. Seta papillose. Peristome teeth papillose. Tree-, rarely rock-mosses . . . . . **Trachypus** Rw. et Hornsch.
350. Leaves not plicate.
351. Secondary stems simply or bi-pinnate. Leaf cells uni-papillate over the lumen. Seta papillose. Peristome teeth smooth. Tree-mosses . . . . . **Diaphanodon** Ren. et Card.
351. Secondary stems irregularly pinnate. Seta short, smooth. Leaf cells seriately papillate over the lumen. Peristome teeth transversely striate at base. On bark, on branches and leaves or on humus ground . . . . . **Floribundaria** C. Muell.
349. Secondary stems creeping or erect.
352. Leaves longitudinally plicate. Secondary stems richly irregularly branched. Seta papillose. Tree- and rock-mosses. **Homalothecium** Br. et Schimp.
352. Leaves not plicate.
353. Secondary stems erect, scarcely branched. Leaf rib slender, percurrent. Leaf cells uni-papillate over the lumen. Seta smooth. Peristome teeth normally developed. Tree-mosses. **Pseudospiridentopsis** (Broth.) Fleisch.
353. Secondary stems ascending. Leaf rib ending slightly above midleaf. Leaf cells minutely papillate at apical angles. Seta

minutely scabrous. Peristome teeth short, rudimentary. Endostome processes linear. On bark . . **Schwetschkea** C. Muell.

278. Leaf cells elongate rhombic.
354. (376) Rib absent or very short and double.
355. (370) Leaf cells thin-walled.
356. (366) Leaf cells smooth.
357. (360) Leaf margin entire.
358. Alar cells thin-walled. Leaves of branches radially arranged.
359. Leaves oval, short-pointed, spreading. Secondary stems irregularly branched. Peristome teeth papillose. Endostome absent. On trees, rarely on rocks. **Meiothecium** Mitt.
359. Leaves longly elliptic, erect-spreading. Secondary stems regularly pinnate. Peristome teeth obtuse, smooth, bordered. Endostome processes filiform on a low basal membrane, cilia absent. On trees and on branches. **Chionostomum** C. Muell.
358. Alar cells thick-walled. Clusters of filiform gemmae at the end of branches. On bark and branches or on leaves. **Clastobryella** Fleisch.
357. Leaf margin more or less dentate to serrate.
360. Alar cells large, in one horizontal row with or without horizontal rows of somewhat smaller cells above. Leaves toward apices finely serrate. Basal membrane high. Tree-mosses . . . . . **Brotherella** Loesk.
360. Alar cells equal in size, forming a distinct group.
361. Branches complanately leaved.
362. Secondary stems irregularly branched. Leaves oblong. Seta yellowish. Peristome teeth paired, papillose. Endostome absent. On bark and branches. **Pterogonidium** C. Muell.
362. Branches regularly pinnate. Leaves ovate-oblong. Seta red. Peristome teeth transversely striate, yellow, bordered. Endostome with low basal membrane and narrow processes, cilia absent. On trees. **Plagiotheciopsis** Broth.
361. Leaves of branches radially arranged.
363. Primary stem creeping, secondary stems horizontal or pendulous, usually irregularly branched. Endostome rudimentary, filiform or totally absent. Spores 40—50 μ. Tree-mosses . . . . . **Pterobryopsis** Fleisch.
363. Primary and secondary stems creeping.
364. Secondary stems regularly pinnate. Leaves oblong-lanceolate, acuminate, spreading. Rib ending halfway or nearly reaching the apex. Tree-mosses. **Schwetschkea** C. Muell.
364. Secondary stems simple.
365. Leaves ovate, abruptly acuminate, squarrose. Seta red. Peristome double. Peristome teeth papillosely striate. On bark . . . . . **Rhizohypnella** Fleisch.

365. Leaves ovate-lanceolate, erect-spreading. Seta pale-yellow. Peristome single. Peristome teeth papillose. Tree-mosses. **Fabronia** Radd.

356. Leaf cells more or less papillate to mammillate.

366. Leaves oblong, acute or hairpointed, yellowish bordered, entire or dentate near apex. Alar cells of equal size, incrassate. Leaf cells densely and finely papillate. On rocks in wet places and in peat. **Rhacocarpus** Lindb.

366. Leaves not bordered. Alar cells few but large, in one horizontal row with or without horizontal rows of smaller cells above.

367. Leaf cells uni- or pluri-papillate over the lumen.

368. Branch leaves 5-ranked, complanate. Leaf cells papillate, papillae in series. Capsule on a short seta. Lid longly rostrate. On rotten logs . . . . . **Taxitheliella** Dix.

368. Branch leaves several-ranked, branches not complanate.

369. Leaf cells seriately papillate or uni-papillate. Capsule small, ovoid, pendulous. Seta usually strongly scabrous above. Exothecial cells collenchymatous. Lid finely and longly rostrate. On bark and decaying wood. **Trichosteleum** (Mitt.) Jaeg.

369. Leaf cells unipapillate over the lumen or at the upper end. Capsule ellipsoidal, erect. Seta smooth or remotely papillose. Exothecial cells not or indistinctly collenchymatous. Lid shortly rostrate. Alar cells incrassate. On bark, on branches and on leaves . . . . . **Clastobryella** Fleisch.

367. Leaf cells only with papillately projecting upper ends. Peristome single. Leaves oval, short-pointed. Peristome teeth papillose. On trees, rarely on rocks . . . . . **Meiothecium** Mitt.

355. Leaf cells thick-walled.

370. Leaf cells smooth.

371. Alar cells incrassate, hyaline or coloured.

372. Leaves more or less distinctly bordered, toward apex widely and sharply dentate. Alar cells often divided. Seta long sinuous. Capsule very large, ellipsoidal, horizontal. On forest ground and on bark . . . . . **Trismegistia** (C. Muell.) Broth.

372. Leaves not bordered.

373. Paraphyllia numerous on the secondary stems. Leaves erect-spreading, longitudinally plicate. On bark. **Glyphothecium** Hamp.

373. Paraphyllia absent or scarcely developed. Peristome teeth transversely striate. Lid rostrate from a conical base. Tree-mosses. **Macrohymenium** C. Muell.

371. Alar cells more or less incrassate, chlorophyllose, gradually changing into the laminal cells. Leaves ovate-lanceolate. Capsule ovoid-cylindric, erect. Peristome teeth transversely striate. On bark, seldom on siliceous rocks . . **Pylaisia** Br. et Schimp.

370. Leaf cells papillate or mammillate.

374. Secondary stems erect, arborescently branched. Leaves ovate-oblong, shortly or longly pointed. Perichaetial leaves highly sheating. Alar cells incrassate. Tree-mosses. **Camptochaete** Reichdt.

374. Secondary stems ascending, irregularly branched or regularly pinnate.
375. Leaves imbricate, branches julaceous. Leaf cells with papillately projecting upper ends. Alar cells chlorophyllose. Peristome teeth papillose. On bark and on rocks.
Trachyphyllum Gepp.
375. Leaves subcomplanate. Leaf cells uni-papillate over the lumen. Alar cells hyaline. Peristome teeth transversely striate. On forest ground, on trees and on exposed roots.
Acanthorrhynchium Fleisch.
354. Rib single or double to $^1/_3$ or more of the length of the leaf lamina.
376. (381) Leaf celss thin-walled.
377. Leaf cells smooth.
378. Leaves longitudinally plicate, narrowly lanceolate with broad cordate base. Primary stem and secondary stems creeping or procumbent, irregularly branched. Paraphyllia developed. Ground-, rock- and tree-mosses. **Brachythecium** Br. et Schimp.
378. Leaves not plicate.
379. Leaf margin entire. Secondary stems erect or procumbent. Alar cells rectangular, hyaline. Peristome teeth paired, papillose. Endostome processes filiform, smooth, basal membrane none. Tree-mosses . . . . . **Anacamptodon** Brid.
379. Leaf margin more or less dentate to serrate. Leaves lanceolate, narrowed into a long, undulate hairpoint. Peristome teeth transversely striate. Endostome processes short on a high basal membrane. On bark . . . . **Merrilliobryum** Broth.
377. Leaf cells more or less papillate to mammillate. Leaf margin usually distinctly dentate to serrate.
380. Rib single, more or less elongate. Leaves oblong, lingulate, obtuse or acute. Secondary stems creeping, branches usually complanate and obtuse. Capsule inclined to horizontal. Peristome teeth transversely striate. Endostome processes keeled and perforated. On tree-trunks and on rocks.
Stereophyllum Mitt.
380. Rib double, short or ending about the middle of the leaf blade. Leaves ovate-cordate, shortly acute. Secondary stems bipinnate, usually treelike with ascending branches. On forest ground.
Macrothamnium Fleisch.
376. Leaf cells thick-walled.
381. (388) Leaf cells smooth.
382. Secondary stems hanging to horizontal.
383. Secondary stems irregularly branched, not complanate. Leaf rib ending below apex. Capsule immersed. On bark.
Pilotrichopsis Besch.
383. Secondary stems simply or bi-pinnate, very complanately foliate. Leaves 8-ranked, mostly transversely undulate. Leaf rib of different length. Capsule immersed or somewhat emerged. Tree- and rock-mosses . . . . **Neckera** Hedw.

382. Secondary stems creeping, or procumbent or erect.
384. Branches complanately foliate. Leaves oblong-spathulate, toward apex coarsely serrate. On bark . . **Homaliodendron** Fleisch.
384. Leaves of branches radially arranged.
385. Secondary stems erect, simple or scarcely branched. Seta short, straight. Peristome teeth papillose. On bark. **Forstroemia** Lindb.
385. Secondary stems irregularly to arborescently branched.
386. Leaves longly acuminate. Seta elongate. Peristome teeth united in pairs, smooth, without lamellae. Calyptra cucullate, hairy. On bark . . . . . **Pireella** Card.
386. Leaves shortly and usually narrowly acuminate.
387. Endostome rudimentary or absent. Spores 40—50 μ. Tree-mosses . . . . . **Pterobryopsis** Fleisch.
387. Endostome hyaline, with a high basal membrane and with lanceolate, subulate processes. Spores small. On bark and on rocks . . . . . **Isothecium** Brid.
381. Leaf cells more or less papillate to mammillate.
388. Leaf rib double, short or ending about the middle of the leaf lamina. Leaves ovate-cordate, shortly acute. Secondary stems irregularly bipinnate, nearly tree-like with ascending branches. On forest ground . . . . . **Macrothamnium** Fleisch.
388. Leaf rib single.
389. Leaves strongly transversely undulate. Secondary stems simple or scarcely branched. Capsule ovoid. Seta papillose. Ground- and rock-mosses . . . . . **Neolindbergia** Fleisch.
389. Leaves not undulate, longitudinally plicate. Leaf base with large, incurved auricles. Secondary stems irregularly pinnate. Capsule ellipsoid. Seta tuberculate. Tree-mosses. **Trachypodopsis** Fleisch.
277. Leaf cells parenchymatous: rectangular, quadrate, rounded or hexagonal.
390. (397) Leaf cells small: rounded, quadrate or angular.
391. Leaf cells thin-walled.
392. Leaf margin hyaline-bordered, more or less dentate. Leaf cells unipapillate. Leaf rib percurrent. Endostome processes papillose, keeled, cilia 3, nodulose. Ground- and tree-mosses. **Duthiella** C. Muell.
392. Leaf margin not bordered. Leaf cells smooth. Leaf rib ending halfway or nearly reaching the apex. Leaves oblong-lanceolate, acuminate. Cilia absent. Tree-mosses. **Schwetschkea** C. Muell.
391. Leaf cells thick-walled.
393. Secondary stems hanging, irregularly branched. Leaf rib ending below apex. Capsule immersed. On bark. **Pilotrichopsis** Besch.
393. Secondary stems creeping, procumbent or erect.
394. Leaf rib valid, percurrent. Leaves ovate, shortly acuminate with rounded apex. Secondary stems erect, simple. Bark- and rock-mosses . . . . . **Pseudoleskeopsis** Broth.

394. Leaf rib narrow.
395. Branch leaves complanate. Secondary stems simply, bi- or tripinnate. Leaves octostichous (apparently tetrastichous), oblong-spathulate with rounded apex. Leaf rib ending halfway. Bark-mosses . . . . . **Homaliodendron** Fleisch.
395. Branch leaves several-ranked, not complanate.
396. Capsule ovoid or ellipsoid, terminal on elongated branches. Calyptra conical. Peristome teeth densely papillose. Endostome absent. Spores 20—25 μ. Tree-mosses. . . . . **Acrocryphaea** Br. et Schimp.
396. Capsule short-cylindric, on short branches. Calyptra conical campanulate. Peristome double. Spores 25—30 μ. On bark, seldom on rocks or on stones . . . . . **Cryphaea** Mohr.
390. Leaf cells wide: hexagonal, usually regularly hexagonal.
397. Branches complanate with dimorphous leaves. Peristome absent. Leaf apex rounded, obtuse. Calyptra covering only the upper part of the theca. On bark . . . . **Solmsiella** C. Muell.
397. Leaves of branches radially arranged. Exostome absent, endostome pale, papillose, with medianly perforated processes. Rib short or absent. On roots and on bark . . **Austinia** C. Muell.