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Species
of
European and Northamerican Bryineæ (Mosses)
synoptically described
by
Prof. N. Conr. Kindberg, Ph. D.

Part. 2.
Aerocarpous.

Linköping,
Linköpings Lithografska Aktiebolag
1897.
Fam. 15. **Schistostegaceae.**


Fam. 16. **Eustichiacae.**


Leaves entire: lower short truncate or apiculate, upper acuminate; costa not excurrent. Perichaetial leaves very much longer, long-subulate distantly crenulate, often hyaline at apex. Capsule globose chestnut-colored scarcely emergent above the points of perichaetial leaves; pedicel shortish arcuate when moistened. Dioecious very r. fruit. — Shaded sandstone rocks r. *Amer.* U. S.: *Sullivant; Cheney, fruit; Roell; Mrs Britton. Eur.* Iceland: *Vahl*; *Schimper.*

Fam. 17. **Polytrichaceae.**

68. *Catharinea* Ehrhart.


1. *Lepidophyllae.*

A. Leaves broader at base. Capsule strangulate; calyptra smooth.


B. Leaves narrowed at base. Capsule not or slightly strangulate; calyptra scabrous at apex.
a. Leaves limbate by 2 rows of linear cells; costa dentate above at back. Capsule cylindric.

2.C.undulata L. — Bryum L.; Catharinea Weber et Mohr; Atrichum Br. eur.


Leaves lanceolate or oblong-lanceolate short-acuminate sub-obtuse, entire below middle, faintly chlorophyllose and often subpellucid, patent when moistened, less large and less undulate than in the both last and gen. olive-green; lamellae us. 5—7. Capsule less large and nearly straight; pedicel red shortish. Dioecious. Male plants abundant in separate tufts with cup-shaped flowers; perigonal leaves with thick costa. — Sandy and clayey earth, often on rocks and stone-walls. Eur. pr. in southern distr. Switzerl! Amer. more common. Can.: Macoun. U. S.: Wetherby.

*C.C.xanthopelma C. Mueller. — Atrichum Lesq. et Jam.


b. Leaves indistinctly limbate by one row of linear cells; costa nearly smooth. Fruiting stem unknown.

5.C.Crosulata C. M. et Kindb.; Atrichum cat. Canad. m.


2. Leiophyllae.


Leaves large distant obtuse obtuse oval-oblong or oblong-
lanceolate, denticulate above middle, narrowed at base; lamellae us, 3; costa smooth at back. Capsule subcylindric or subclavate; pedicel not long. Stem often high. R. fruiting. — Clay soil or among grass near water. Eur. r. Engl.: Rogers. Amer. less r. Can.: Macoun (fruit.).


Leaves somewhat small crowded acute not broad, suboblong or oblong-lanceolate not much narrowed below, denticulate also below middle; lamellae 3—5; costa dentate above at back. Capsule small oblong; pedicel not long. Stem about 1 c. m. or lower. — Wet sandy soil in lower regions. Eur. princ. in northern distr. Sweden not r.!

69. **Oligotrichum** Lamarek et De Candolle.  

A. Leaves narrow subvaginant us. brown, faintly crisped when dry.

a. Leaves with short lamellae at back.

1. **O. hercynicum** Ehrh. — *Catharinea* Ehrh.; *Oligotrichum* Lam. et D. C.

Leaves dentate above at borders and at back, gradually narrowed, subulate or acute; lamellae of upper side 8—12 cohering, those of under side 3—5 near base. Capsule suboblong not or slightly strangulate; pedicel not long; calyptra often with many hairs. — Sandy ground princ. in alps. Eur. less r. in northern distr. Norway! Amer. r. Alaska: J. M. Macoun.

2. **O. integrifolium** Kindb. revue bryol. 1894.


b. Leaves with long lamellae at back.

3. **O. aligerum** Mitten; *Sullivant* icon. m.

Leaves longer than in the both last, sublinear subulate or acute, dentate at least above middle of borders; lamellae of upper side 5—8 near costa, those of under side 3—5 near costa and 4—5 near borders. Capsule strangulate narrowly ovate-oblong or subcylindric; lid rostrate; pedicel thin very long; calyptra with few hairs in upper part. — Clay banks in alp. regions r. Amer. Can. Brit. Col.: Macoun.

B. Leaves broad large not sheathing, green; cirrate-crisped when dry; lamellae long also at back, 3—6 near costa on upper side, 2—3 near costa and sometimes 1—2 rudimentary near borders at back.
4.0.parallelum Mitten. — Atrichum Mitt.; Sull. ic. m.; Oligotrichum Kindb. l. c.
Leaves sub lanceolate (or in male plant oval-oblong) acute or short-acuminate, dentate to below middle, marked with longitudinal stripes at back; costa scarcely percurrent also in the nearly similar perichetal leaves. Capsule as in the last but thicker; lid rostrate; pedicel thick longish; calyptra unknown. — Wet rocks in alps r. Amer. Brit. Col. in higher alp. region: Macoun. Eur. Norway: E. Nyman.


70. Psilopilum Bridel.

71. Bartramiopsis Kindb. revue bryol. 1894.
Leaves linear-lanceolate short-acuminate, sharply dentate to the sheath, not much loosely disposed, more or less incurved when dry, nearly straight and spreading when moist; lamellae 4—8. Stem 2—3 centim. long nearly eradiculose, naked and filiform below. (Described to specimens from Japan). »Capsule erect short cylindric-ovate constricted below mouth; pedicel short*: Lesq. et Jam. — Amer. Alaska: Lesq. et Jam. (Japan: Bisset, determin. Mitten).

1.B.sitkana Kindb. l. c.

A. Leaves short-acuminate sheathing; marginal teeth large with a single red cell at apex; lamellae 20—30. Stem and pedicel not long.


Differs from the last: Leaves shorter, more distinctly sheathing, bright or glaucous green, more strongly crisped; cells of sheath nyaline; lamellæ about 20. — Roadsides r. *Amer.* Can. Brit. Col.: Macoun.

B. Leaves long acuminate not sheathing; marginal teeth large with 2—3 red cells; lamellæ about 40. Stem and pedicel very long.


C. Leaves short-acuminate short-sheathing; marginal teeth not large, formed by one single cell, finally pale yellow not red; lamellæ about 20. Capsules unknown. Stem not long.


Leaves dark green not long, linear-lanceolate acute, dentate above gen. to middle, broadly bordered by wings of lamina often nearly all around; cells of sheath subquadrate not chlorophyllose; costa short-excurrent dentate at back. — On base of trees r. *Eur.* Engl.: Dixon, com. Braithwaite.

73. *Polytrichum* L.

A. Calyptra short-acuminate densely hairy.

a. Capsule papillose. Leaves often incurved when dry, r. aristate.

I. *Aloidella*. Capsule without angles and apophysis.

b. Capsule smooth. Leaves rigid not incurved, gen. aristate.

II. *Pogonatum*. Capsule without angles and apophysis, green when unripe, finally blackish or r. brown. Stem us. branched. Apical cell of lamellæ thick-walled subglobose papillose.

III. *Eu-Polytrichum*. Capsule (ripe) with 4—6 angles and
us, distinct apophysis, soon becoming brown. Stem us, simple. Apical cell of lamellae smooth or unipapillate.

B. Calyptra long-acuminate sparingly hairy.


1. Aloidella C. Mueller syn.

A. Leaves incurved when dry; cells of lamellae smooth thin-walled; costa not excurrent. Stem us. short simple. Protonema often persistent.

a. Upper leaves long narrow subulate, broadly sheathing; wings of lamina very broad; lamellae about 10.

1. P. pennsylvanicum Hedwig; C. M. syn. — Pogonatum brevicaule Beauvois; Sulliv. icon. musc.


b. Leaves broad obtuse not long; lamellae numerous.

2. P. nanum Schreber. — P. subrotundum Hudson; Braithwaite.

Leaves subobtuse faintly crenulate above; wings of lamina somewhat broader below. Capsule finally short-piriform. Stem simple not high. — Sandy or clayey soil. Eur. not r. in lower regions. Sweden!

3. P. brachyphyllum Richard. — Pogonatum Sulliv. icon. m.


Leaves sharply dentate us. somewhat short, less broad than in the both last and gen. longer acuminate; wings of lamina narrow. Capsule oblong-piriform or subcylindric. Stem often somewhat high r. branched. — Sandy soil. Eur. not r. Sweden, Germany, Switzerland.

B. Leaves not incurved but gen. appressed when dry, us. sharply dentate with narrow wings; lamellae numerous, their apical cell thick-walled papillose or crenulate. Stem r. simple.

a. Leaves sharply dentate. Stem us. branched.

5. P. urnigerum L. — Pogonatum Beauvois.

Leaves acute more or less acuminate, gen. not aristate, often somewhat long; apical cell of lamellae globose. Perichaetial leaves aristate. Capsule subcylindric us, large and not wide-

6. **P. dentatum** Menzies; C. M. syn. — Pogonatum Sull. ic. m.

b. Leaves faintly denticate. Stem often simple.

7. **P. capillare** Richard. — Pogonatum Sulliv. ic. m.


II. Pogonatum Bridel, in part.

A. Leaves falcate when moist, patent or spreading when dry; lamellae about 60. Outer perichetal leaves very much longer. Pedicel of capsule finally brown.

Leaves very long, bordered by the wings of the strongly dentate lamina, long-subulate; awn long rough reddish. Perichetal leaves rough near apex, the inner shorter more acute. Capsule oblong-cylindric strangle, larger than in **P. alpinum**; lid large conic-subulate, half as long as capsule. Higher and more robust than allied species. — Rocks and earth prin. in alp. region r. Amer. Pacif. distr. Can. to 1350 metr. a.s.: J. Macoun. Alaska: J. M. Macoun.

B. Leaves straight or faintly curved when moist, more or less appressed when dry; lamellae about 30. Perichetal leaves not longer. Pedicel yellowish.
a. Leaves distinctly bordered by the wings of lamina, acuminate, gen. long and not strongly appressed when dry.


*P. brevifolium* R. Brown.


12. P. Vanhoeffeni Kindb. in Biblioth. botan. 42 (1897).

Leaves entire or only near apex (scarcely in upper third of lamina) dentate, not long but long-acuminate, very narrowly bordered by lamina, nearly appressed when dry, not much open when moist; awn short rough red-yellow. Perichaetial leaves much narrower with not few lamellae. Capsule obovate oblique; lid scarcely shorter than half capsule. Stem us. sparingly divided above, often to 8 c. m. high; pedicel scarcely 3 c. m. Tufts brownish. — Amer. r. Greenl.: E. Vanhoeffen.

b. Leaves bordered by wings of lamina only near apex, short acute bu. gen. obtusate, appressed when dry.


Leaves entire or with very few teeth near apex; awn very


Differs from the last in more distinct and dentate awn of leaves; capsule oval often oblique; stem divided somewhat high.


III. *Eu Polytrichum.*

A. Capsule green and not distinctly angled when unripe, us. 6-angled when ripe. Leaves channelled or with inflexed wings, not appressed when dry; awn red-brown or indistinct; apical cell of lamina not papillate. Stem simple.

15. **P. sexangulare** Floerke. — *P. septentrionale* C. M. syn.


16. **P. gracile** Dickson; Menzies.

Leaves long subulate-acuminate dentate to the sheath, us. green; wings broad-prime. below; lamelle about 40; awn brownish not long. Perichetial leaves hyaline-bordered. Capsule round-oval finally cubic; apophysis sometimes less distinct; lid broad-conic when young, finally apiculate or rostellate; pedicel long yellowish or finally reddish. Spores about 0.02 m. m. Stem us. tomentose below, often high. — Turfy soil and rocks also in alps. *Eur.* not r. Sweden, Norway! *Amer.* not common. Can.: Macoun.

B. Capsule 4-angled prismatic soon becoming brown. Leaves acuminate acute with distinct wings.

a. Leaves entire or above with few teeth, channelled or convolute; apical cell of lamelle unipapillate. Perichetial leaves hyaline above.

17. **P. juniperinum** Willdenow.

Leaves long long-subulate gen. entire, very patent or curved when moist, us. not appressed when dry; lamelle about 50; costa rough above at back; awn long rough wholly red.

18. **P. strictum** Banks.


21. **P. piliferum** Schreber.

Leaves short entire short-acuminate or subobtusate, appressed when dry; lamellae about 30; costa smooth; awn long wholly whitish nearly smooth. Perichetal leaves not lamellate. Capsule short-prismatic or cubic, inclined or suberect. Stem short simple, naked at least in lower half; the foliated part subclavate. — Dry heaths also in alp. regions common. Eur. Sweden, Norway! Amer. Can.: Macoun.

b. Leaves denticulate not convolute, long and long-subulate,
us. plane; lamellae very numerous, their apical cell not papillate; awn red-brown. Stem and pedicel us. long.

22. *P. attenuatum* Menzies. — *P. formosum* Hedwig.

Leaves plane crowded, dentate to a long sheath, us. green; wings very narrow; apical cell of lamellae suboval. Perichetal leaves green not or faintly hyaline in lamina; awn rough. Capsule us. long rectangular-prismatic brown; lid short broad-conic with short point; pedicel reddish. Spores about 0.01 m. in. — Dry woods often in subalp. districts. *Eur.* not r. *Swed.* Amer. r. Can.: J. Macoun; Waghrone. Alaska: J. M. Macoun.

*P. pallidisetum* Funck.

Capsule short-prismatic yellowish; lid nearly flat with narrowly conic beak; pedicel yellowish or pale red. — Woods r. *Eur.* Sweden, Germany! Amer. »U. S.«: Lesq. et Jam.


25. *P. commune* L.

Leaves plane crowded, dentate to the sheath, us. rufescens, often falcate when moist; apical cell of lamellae often emarginate. Perichetal leaves hyaline, us. serrulate near apex; awn entire. Capsule long or short; lid short-rostellate with us. narrow beak. Stem not often tomentose, us. very long. — Heaths and turf-moors prime. in lower regions, less often in alps. *Eur.* common. Sweden! *Amer.* less common. Can.: Macoun (a var. with shorter stem and us. blackish calyptra).

*P. perigoniale* Michaux.


A. Pedicel of capsule smooth.

1. G. bellulcida L. — Mnium L.; Georgia Rabenhorst.


2. G. cuspitata Kindb. revue bryol. 1893.


Fam. 18. Georgiaceae.

74. Georgia Ehrhart.


IV. Polytrichadelphus Mitten.

26. P. conorhynchi Kindb. cat. Canad. m.


Leaves dentate above often to the middle of the prominent lamina, not appressed; awn short smooth also in perichaetial leaves; lamelle about 30, their apical cell thick-walled suboval smooth. Perichaetial leaves subconvolute densely lamellate at the short point. Capsule subovoid-cylindric strangulate finally brown; peristomial membrane elevate; lid long-rostrate; pedicel yellowish. Resembling P. alpinum and P. sexangulare. — Swampy places in higher alp. region. Amer. Pacif. distr. r. U. S.: Roell; Nowell.
B. Pedicel rough.

3. **G. trachypoda** Kindb., 1. c.


II. **Tetrodontium** Schwägrichen.

5. **G. Brownii** Dickson. — Bryum Dicks.; Georgia C. M.

Fam. 19. **Fissidentaceae**.

75. **Fissidens** Hedwig.

A. Leaves nerveless hyaline narrowly limbate.

I. **Aneuron**. Pedicel of capsule terminal. Plants minute.

B. Leaves costate.

II. **Pachyfissidens**. Leaves pluristratose not limbate, large and entire.

III. **Aloa**. Leaves unistratose not limbate.
   a. Peristomial teeth wholly deflexed when dry.
   b. Peristomial teeth suberect or inflexed when dry.
   aa. Capsule terminal; lid very short conic obtuse.
   2. **Obtusifolii**. Leaves broad-obtuse entire and small.

Plants small.

bb. Lid of capsule rostrate or rostellate, gen. long.

3. **Adiantoidei**. Capsule gen. not terminal. Leaves serrate
above and denticulate below, r. nearly entire, us. large and papillose at back.

4. Osmundoidei. Capsule terminal or (in F. taxifolius) basilar. Leaves uniformly crenulate all around, gen. not large.

IV. Eu-Fissidens. Leaves unistratose limbate (in F. exiguus sometimes not limbate), gen. small and entire or at apex faintly denticulate. Capsule terminal or (in F. floridanus) lateral; lid gen. rostellate (in F. rufulus very short obtuse).

I. Aneuron Kindb.

1. F. hyalinus Hooker et Wilson; Sulliv. icon. musc.
   Leaves entire in few pairs: lower very small, uppermost suboblong subacute much larger; wings short sinuolate; cells large round-hexagonal. Capsule oval-ovate or suboblong; lid as long; teeth deeply cleft; calyptra conic covering only the beak. — Moist rocky ledges r. Amer. »U. S. Ohio»: Sullivant.

II. Pachyfissidens C. Mueller.

2. F. grandifrons Bridel.

III. Aloma Kindb.

1. Camptodontii.

3. F. Closteri Austin; Sulliv. icon muscor.
   Leaves entire short-ovate subacute often with wanting lamina, very minute and pellucid. Capsule narrow subelavate erect or inclined; lid rostrate. Calyptra mitriform or cucullate. Plant minute. — On the ground r. Amer. »U. S.: Austin»: Sullivant.

4. F. pauperculus Howe.
   Leaves uniformly crenulate, suboblong or short-lanceolate subacute, larger than in the last; cells chlorophyllose pellucid. Capsule narrow subcylindric often slightly curved, cernuous. Calyptra cucullate. Plants small not or very loosely tufted. — Stony ground r. Amer. U. S. California: M. A. Howe.

2. Obtusifoli.

5. F. obtusifolius Wilson; Sull. ic. m. — F. Arnoldi Ruthe.
3. Adiantoidei.

A. Leaves long sublinear or oblong-lanceolate more or less pellucid. Capsule large; pedicel long-exserted.

   Capsule oval-oblong; lid nearly as long; teeth deeply cleft; pedicel lateral. Leaves strongly serrate above, denticulate below, often hyaline at margins, us. large; costa subpercurrent. Stems us. erect and tufted, forming large mats, gen. radiculose below. — Rocks and earth common. *Eur.* Sweden, Switzerland. *Amer.* Can.; Macoun.

*F. cristatus* Wilson. — *F. decipiens* Notaris; Sulliv. icon. musc.

*F. subtaxifolius* Kindb. in bull. soc. bot. ital. 1896.
   Leaves minutely serrate above, nearly entire below; costa percurrent or subexcurrent. Stems (as in *F. taxifolius*) short decumbent without rhizoids above base, not forming cohering mats. Capsules not found. — On clayey earth. *Eur.* Switzerland near Lugano!

7. **F. serrulatus** Bridel.
   Capsule subcylindric; lid shorter; teeth deeply cleft; pedicel terminal on the stem, or on short lateral branches. Leaves as in *F. adiantoides* but more densely crowded, always large. Tufts loose not radiculose. R. fruiting. — Earth and rocks r. *Eur.* Italy: Bottini. Portugal: Levier.

8. **F. polyphyllus** Wilson.

9. **F. polypodioides** Hedwig; Sulliv. ic. musc.
   Capsule piriform-clavate with very wide mouth, not stragulate; lid shorter; teeth deeply cleft; pedicel as in *F. serrulatus*. Leaves entire large densely crowded; costa subpercurrent. Stem often long and simple, radiculose only at base. Differs from the 3 preceding species in annulus of capsule revoluble. R. fruiting. — Wet rocks r. *Amer.* »U. S. southern states»: Sulliv. (Venezuela: Fendler, com. C. Mueller).
B. Leaves short suboblong nearly opake below, pellucid at apex. Capsule small; pedicel scarcely exserted above upper stem-leaves.

10. *F. subbasilars* Hedwig; Sullivant ic. musc.

4. Osmundoidei.

A. Leaves gen. large; costa excurrent. Stems not tufted. Pedicel of capsule basilar.


B. Leaves not large; costa not excurrent. Pedicel terminal.
   a. Tufts tomentose often high. Calyptra mitriform lobate.

Leaves suboblong subobtuse often apiculate, not opake, in many pairs; costa subpercurrent. Capsule oblong-oval. — Wet rocks and heaths also in alps. *Eur.* not r. Sweden, Norway! *Amer.* Can.: Macoun.

b. Stems low not tomentose, not or very loosely tufted. Calyptra cucullate.


*F. Hallii* Austin.
»Plants somewhat larger; dioecious. — *Amer.* r. U. S. Texas: E. Hall»: Lesq. et Jam.


16. *F. Donnelli* Austin. — *F. pauperculus* Howe ?

IV. Eu-Fissidens.

A. Inner leaf-cells opaque.

a. Lid of capsule very short obtuse.

17. *F. rufulus* Bryol. eur. — *F. ventricosus* Sulliv. icon. m.

b. Lid rostrate.

18. *F. limbatus* Sullivant.
Leaves small oblong-lanceolate apiculate or short-acuminate, pale-limbate entire; cells seriate; costa subpercurrent. Capsule asymmetric suboval green; lid half as long; teeth deeply cleft; pedicel terminal. Stem 2—5 m. m. long. — *Amer*. Pacif. distr. r. U. S.: Roell; Howe.

»Leaves long cultriform crenulate at apex; costa not percurrent. Capsule oblong-oval; lid long-rostrate; pedicel lateral. Stem 1—3 c. m. long. — *Amer*. r. U. S. south states: Garber»: Lesq. et Jam.

B. Leaves more or less pellucid, not large. Lid shorter than half capsule. Plants small.

a. Leaves with thick broad limb. Stem us. somewhat long.

20. *F. rivularis* (Spruce as var.) Bryol. eur.
Leaves broadly cultriform acute or abruptly short-acuminate entire with pale limb; costa percurrent. Capsule straight cer-
Leaves as in the last but with yellowish limb, sometimes crenulate near apex; costa not percurrent. Capsule us. straight erect. Stem to 4 cm. long. Dioecious or monoecious with not axillary male flowers. — In water r. Eur. Switzerland. France: Berthoumieu; Camus.
*F. Mildel Schimper. — Polygamous. — Eur. r. Switzerland:
Culmann, com. Husnot.
b. Leaves gen. with thin narrow limb, not gradually acuminate; costa gen. not excurrent. Stem us. very short.
22. F. bryooides L. — Hypnum L.; Fissidens Hedwig.
*F. cyprius Juratzka.
»Polygamous. — Eur. r. Italy: Limpricht.
23. F. incurvus Starke.
*F. tamarindifolius Don. — Hypnum Don; Fissidens Bridel.
*F. pusillus Wilson.
*F. minutulus Sullivant icon. musc.
*F. Bambergeri Schimper; Husnot muscol. gall.
Leaves somewhat small and not long, often incompletely

*F. texanus* Lesquereux.


24. *F. algarvicus* Solms Laubach; Husnot m. gall.

Differs from *F. incurvus* *pusillus* in narrower leaves, the upper sublinear more acuminate and broadly limbate; cells sometimes suboval. — Clayey soil r. Eur. France: Corbière, com. Husnot.


*F. subimmarginatus* Philibert; Husnot muscul. gall.


c. Leaves gradually acuminate; costa excurrent.


>Leaves in 3—4 pairs: upper narrowly linear-lanceolate limbate by 2—3 rows of linear cells, rigid when dry; basal lamina incomplete; cells irregular hexagonal larger than in *F. incurvus* *pusillus*. Capsule erect suboval, when dry cylindric; lid unknown. Plant minute. — Eur. Sardinia: Venturi.

76. *Conomitrium* Montagne.

1. **C. Julianum** Savi. — Fontinalis Savi; *Conomitrium* Mont.


2. **C. Hallii** Sullivant et Lesquereux; Sull. icon. m.

Differs from the last: Leaves much narrower, setaceous gradually narrowed, in 5—10 pairs; wings shorter; outer basal
cells narrower, short-rectangular in many rows. Capsule oval-oblong on elongate branches, with a not longer lid; pedicel 3–4 times longer; teeth more distant, long subulate not cleft; calyptra short cucullate. Tufts blackish green when dry. Stem about 3 centim. long. — Submerged stones and logs r. Amer. U. S.; Leiberg, com. Mrs Britton.

Fam. 20. **Splachnaceae**.

77. **Splachnum** L.

I. **Umbracularia**. Apophysis open umbraculiform very large.
   Leaves from round-oval base abruptly long-acuminate.

II. **Ampullaria**. Apophysis inflated not open, very much broader than capsule; pedicel reddish.

III. **Pseudo-Kaplodon**. Neck solid, not much broader or sometimes a little narrower than capsule; pedicel yellowish.

I. **Umbracularia** C. Mueller.

1. **S. rubrum** Montin.

2. **S. Inteum** Montin.
   »Can.: Drummond*: Macoun.

3. **S. melanocaulon** (Wahlenberg as. var.) Schwägrichen.
   Capsule and pedicel brownish; apophysis pale yellow soon becoming plane. — Very r. Eur. »Lapland»: Wahlen. Amer.
   »Can.: Rocky mts: Macoun and Mitten.

II. **Ampullaria** C. Mueller.

4. **S. ampullaceum** L.

5. **S. vasculosum** L.
   Capsule with globose purplish finally blackish red apophysis; pedicel not much long. Leaves broad gen. suboval with broad short obtuse acumen, r. denticulate; the lower broader.

III. Pseudo-Haplodon Kindb.


Capsule with reddish yellow finally blackish (globose, ovoid or piriform) neck; pedicel often very long, sometimes very short. Leaves subulate-acuminate gen. oblong sometimes denticulate; the lower very much smaller. — Princ. in northern alps. Eur. Norway not r. Austria: Venturi. Amer. Can.: Drummond; Macoun.

78. Haplodon (R. Brown, Lindb. as subg.) Kindb. n. genus.

1. H. Wormskioldii Hornemann. — Splachnum Horn.


79. Tetraplodon Bruch et Schimper.

A. Leaves long narrow gradually subulate-acuminate us. dentate or denticulate. Pedicel thin not much emerging above the tufts.

1. T. angustatus L. fil. — Splachnum L. fil.; Tetraplodon B. S.


2. T. australis Sullivant et Lesquereux; Sull. ic. m.

Capsule finally brown scarcely shorter, in dry state broader, than neck; pedicel brownish capillary. Leaves very narrow sometimes fimbriate, r. nearly entire; costa gen. percurrent, in uppermost leaves often excurrent. Tufts low less dense. — Amer. r. U. S.: Austin, com. Mrs Britton. »Can.»: Lesq. et Jam.

B. Leaves broad entire abruptly narrowed. Pedicel subfiliiform somewhat thick and exserted above the very compact tufts.

3. T. uninoides L. fil. — Splachnum L. fil.; Tetraplodon B. S.

Capsule green-yellow or pale red finally red; neck red-rufous much longer; pedicel reddish often long. Leaves suboblong;


80. **Dissodon** Greville et Arnott.

A. Leaves distant. Capsule with properistome; pedicel setaceous very long. Spores about 0,03 m. m.


B. Leaves crowded entire. Capsule without properistome; pedicel thickish not long. Spores about 0,04 m. m.


81. **Tayloria** Hooker.

A. Leaves with excurrent costa. Peristomial teeth not left.


B. Costa of leaves not excurrent.

a. Peristomial teeth entire appressed to capsule when dry.

2. **T. serrata** Hedwig. — Splachnum H.; Tayloria B. S. Leaves obovate or suboblong short-acuminate acute. Capsule suboblong yellowish brown not much thicker than neck when
dry; teeth yellowish brown loosely appressed when dry; lid convex; pedicel somewhat thick. — In bogs or on base of trees. Eur. not r. in southern alps. Switzerl. Austria; Schimper. Amer. Can.: J. Macoun; Moser. Alaska: J. M. Macoun.

3. T. tenuis Dickson. — Splachnum Dicks.; Tayloria Schimper.

Differs from the last: Capsule shorter, brownish, suboval or finally subglobose and much thicker than neck when dry; teeth blackish brown strongly appressed when dry; pedicel thinner. — Turfy soil princ. in northern distr., r. Eur. Norway! Sweden; E. Adlerz; A. Grape. Switzerl.: Schimper. Amer. Can.: Macoun; Waghorne.

b. Peristomial teeth soon partite, deflexed or patent, very hygroscopic.


Leaves oblong or oblong-lanceolate us. short-acuminate. Capsule us. oblong-cylindric; neck much narrower but. us. not longer; columella often long-exserted; teeth dark red; lid us. conic often rostellate; pedicel thin. — Peat-bogs or wet earth on rocks in alps r. — Eur. Norway! Amer. Can.: Allen, com. Macoun.

* T. acuminata (Huebener as var.) Hornschuch.

Leaves long-acuminate. Capsule suboval often shorter than neck; columella not exserted; lid sometimes convex. — Bogs in alps r. Eur. Norway! Amer. Can.: Macoun; Drummond n. 47; Waghorne in herb. C. M.

82. Oedipodium Schwægrichen.

1. O. Griffithii Dickson. — Bryum Dicks.; Oedipodium Schw.

Leaves obovate not recurved, often with sinuous borders. Capsule subglobose orange-brown; lid subconvex; columella not exserted; neck 1—2 c. m. long. Stem often with obovate axillary buds — Crevices of rocks and wet peaty soil in alps r. Eur. Scotl.: H. Boswell; T. Rogers. Sweden and Norway: E. Nyman. Amer. »Greenl.«: Berggren.

Fam. 21. Dicranaceæ.

83. Octoblepharum Hedwig.

1. O. albidum Hedwig.

Leaves patent from short broad base abruptly narrowed to the slightly channelled linear short-acuminate near apex serrate acumen; outer basal cells rhomboidal hyaline, the others somewhat dusky subquadrate. Capsule small oval long-rostrate.

84. Leucobryum Hampe.

A. Leaves thick entire; marginal cells gen. short-rectangular, the lowest longer.

1. L. glaucum L. — Bryum L.; Leucobryum Schimper.
   Leaves from oval-oblong concave or channelled base gradually tapering to a longer sublinear channelled or subconvolute acumen, not appressed when dry, patent when moist. Capsule oblong-cylindric often retuse, more or less distinctly strumose, sulcate when dry. Plants glaucous green or whitish. Dioecious & fruiting. — Wet heaths and woods common. Eur. Sweden, Switzerl. Amer. Can.: Macoun. U. S.: Wetherby.

2. L. minus Sullivant; Bescherelle.

B. Leaves thin sinuolate; marginal cells long-rectangular.

3. L. leanum Sullivant. — Campylopus Sull. ic. m.; Leucobryum Kindb.
   Leaves from narrowly oblong base tapering to a subulate near apex sinuolate, channelled or convolute acumen, erect-patent. Stem often with head-like shoots; their leaves small oval-oblong or linear. Tufts low glaucous or whitish. Capsules unknown. — Decayed logs r. Amer. U. S.: Purpus, com. Cardot.

85. Distichium Bruch et Schimper.

1. D. capillaceum Swartz; — Mnium Sw.; Distichium B. S.

2. D. inclinatum Ehrhart. — Swartzia E.; Distichium B. S.
   Lower leaves with shorter point; perichaetial more gradually acuminate. Capsule suboval finally red-brown, more or less inclined; teeth red. Tufts less or not glossy. — Rocks prin. in alp. and northern districts. Eur. not r. Norway, Switzerl. France: Husnot. Amer. Can.: Macoun; Waghorne.
36. **Aongstroemia** Bruch et Schimper.

1. **A. longipes** Sommerfelt. — Weisia Somf.; Aongstroemia B. S.


87. **Trematodon** Michaux.

I. **Eu-Trematodon**. Capsule subcylindric; neck long abruptly narrowed; teeth long with prominent basal tube; pedicel long.

II. **Pseudo-Bruchia**. Capsule round-oval when ripe; neck short gradually narrowed; teeth short broad without prominent tube; pedicel short.

I. **Eu-Trematodon**.

A. Capsule not much shorter than neck. Leaves entire; costa long-excurrent.

1. **T. ambiguus** Hedwig. — Dieranum H.; Trematodon Hornschuch.

Leaves from ovate or ovate-oblong not truncate base abruptly narrowed to a subulate in upper part by costa filled acumen. Perichetial leaves gradually acuminate; costa more or less excurrent often denticulate at apex. Peristomial teeth red us. cleft. — Wet sand or peat-bogs prin. in northern distr. *Eur.* Sweden not r.l.; Miss O. Cron. Norway; W. Baur. Germany: Huebner. *Amer.* r. Can.: Macoun; Waghorne.

2. **T. acicularis** Kindb. revue bryol. 1896.

Leaves broadly suboval truncate above, pointed by costa; perichetial nearly similar but larger and longer. Peristomial teeth orange split in middle; basal tube red. — Bogs r. *Amer.* Can. Brit. Col.: Macoun.

B. Capsule with twice longer neck. Leaves often denticulate; costa not or scarcely excurrent.

3. **T. longicollis** Michaux.

II. Pseudo-Bruchia Kindb.

4. T. brevicollis Hornschuch.

88. Ditrichum Timm.

A. Leaves sheathing; costa rough at back.


B. Leaves not sheathing; costa smooth. Perichetal leaves not (exc. D. vaginans and D. homomallum) sheathing.

II. Selania. Leaves carinate often covered with a glaucous meal. Monoeious.

III. Leptotrichium. Leaves not carinate. Often dioecious.

1. Xanthopodia. Pedicel of capsule yellow. Leaves long-subulate; costa long-excurrent. Monoeious or paroeious.


I. Trichodon Schimper.

Leaves abruptly narrowed to a long subulate-setaceous denticulate by the long-excurrent costa nearly filled point, curled or patent when dry; cells narrow-rectangular. Capsule smooth narrow-cylindric curved when young; teeth red papillose articulate; pedicel long yellowish or pale red. Tufts low tomentose. — Wet sand prin. in alps. Eur. Norway, Sweden, Switzerland; Austria: Breidler. Amer. Can.: Macoun.

Leaves abruptly narrowed to the entire or indistinctly denticulate not long acumen, which in upper part is filled by the short-excurrent costa, not or faintly flexuous; cells short-rectangular at least the upper; pedicel red short; «peristomial teeth pale brown hyaline smooth indistinctly articulate»: Lindb. l.c. Tufts dense but not tomentose, about 3 c.m. high when barren, lower when fertile. — On earth in arctic districts r. Amer. Greenl.: Berggren. Eur. Spetsbergen; R. Gyllencreutz. — The barren specimens are resembling Ceratodon purpureus, but leaves not are revolute; in fertile ones from Spetsbergen few capsules are evolute (but unripe), their lids very short obtuse.
II. "Saéliania" Lindberg.


Leaves sublinear or narrowly ovate-lanceolate acute serrulate above, patent when dry; cells gen. short-rectangular or quadrate; costa percurrent. Capsule oblong-cylindric straight sulcate when dry; teeth purple, remotely nodose above; pedicel yellowish red. Tufts not high. — Earth on rocks prin. in alps not r. Eur. Sweden, Norway, Switzerland; Austria; Venturi. Amer. Can.: J. Macoun. Alaska: J. M. Macoun. Greenl.: Vanhoefen.

III. Leptotrichum Hampe; Schimper.

1. Xanthopodia.

A. Leaves gradually narrowed from ovate or lanceolate base, denticulate above.


* D. *Breidleri* Limpricht (plant hybrid ?) — Agrees with *D. pallidum* in shape of leaves and in yellow pedicel. Differs from it: Plants scarcely 4 m. m. high, stem 1 m. m. Capsule oval not striate; lid obtuse subpersistent; teeth short small brittle; annulus not distinct; pedicel thick not much exserted above upper leaves. — On wet earth. Eur. Austria, in
few specimens together with *Didrichum pallidum* and *Pleuridium palustre*: Breidler.*: Lümprecht Laubm. Deutschl.

**B.** Leaves entire abruptly narrowed from ovate base.

6. **D. subulatum** Bruch. — Leptotrichum Bruch; Didrichum Lindb.

Leaves otherwise as in *D. pallidum*. Capsule smaller, suboval faintly sulcate; annulus none; pedicel not long. — Clayey places on rocks r. Eur. southern districts. France: Philibert. Italy: Bottini; Arcangeli.

2. **Erythropodia.**

**A.** Tufts very tomentose, us. high and glossy. Leaves gen. large; alar cells sometimes distinct subquadrate; costa long-excurrent.


Leaves long-subulate often denticulate, not appressed; cells irregular gen. narrow: basal shorter often reddish; costa often broad. Capsule brown. R. fruiting. — Rocks and stony ground, common. Eur. Sweden, Norway, Switzerland Austria, fruit.: Venturi. Amer. Can.: Drummond; Macoun.

* D. densum (Schimper as var.) Kindb.

Leaves shorter and less patent; cells gen. short, upper suboval. Tufts more dense and less glossy. — Eur. prin. in northern districts. Sweden common, often fruiting!; M. Huss. Amer. Can.: Macoun.

**B.** Tufts not or sparingly radiculose, us. low and not glossy. Leaves gen. not large; alar cells not distinct.

a. Leaf-cells gen. narrow, rectangular.

aa. Perichetial leaves sheathing. Peristome without basal tube.

8. **D. vaginans** Sullivant. — Trichostomum Sull. ic. m.; Didrichum Hampe.

Leaves from ovate base gradually short-subulate or acute, entire or nearly so, appressed when dry, erect when moist; cells narrow; costa percurrent or short-excurrent. Tufts eradiculose not glossy, 1 or r. 2 c. m. high. — Earth and wet rocks r. Eur. Norway: Geheeb, com. C. Mueller. Belgium: Gravet. France: Lamy, com. Husnot. Amer. Can.: Macoun.


Leaves (at least on fruiting stem) long subulate gen. entire, us patent; cells gen. narrow; costa (at least on leaves of fruit. stem) long-excurrent. Tufts us. low. Sterile shoots often short-subulate with subpercurrent costa. — Sandy ground prin.

* D. zonatum Bridel. — Weisia Brid.; Ditrichum Limpricht.

bb. Pericentral leaves not sheathing. Peristome with distinct basal tube.

Leaves gen. somewhat long-subulate and not or sparingly denticulate, sometimes slightly recurved, us. not appressed when dry; costa percurrent or short-excurrent. Tufts eradiculose. — Sandy places also in alps. Eur. Sweden, Switzerland. France: Husnot m. gall. Amer. Can.: Macoun; Waghorne.

* D. pusillum Hedwig. — Trichostomum H.; Ditrichum Timm.
Stem lower; leaves shorter and less patent; costa scarcely excurrent. — Eur. not r. Sweden: M. Huss. France: Husnot m. gall. Amer. Can.: Macoun; Drummond; Macoun.

* D. nivale C. Mueller. — Leptotrichium C. M.; Ditrichum Limpricht.

b. Leaf-cells round-quadrate. Capsules unknown.

11. D. elatum Kindb. n. sp. — Leptotrichium flexicaule *brevifolium Kindb. cat. Can. m.
Leaves small, gen. entire, from short base abruptly tapering to the not much longer acute or subulate acumen, appressed when dry, patent when moist; costa percurrent. Tufts loose radiculose not glossy, to 6 c. m. high. — Alp. rocks r. Amer. Can. Rocky mts: Macoun.

89. **Cynodontium** Schimper.

I. **Eu-Cynodontium.** Capsule striate; teeth long persistent. Leaves carinate much recurved.

II. **Oreoweisia.** Capsule smooth; teeth short brittle. Leaves carinate faintly recurved near base.

III. **Pseudo-Philonotis.** Leaves concave not recurved. Stem julaceous. Capsule unknown.

I. **Eu-Cynodontium.**

A. Leaves strongly mamilllose on both sides, broadly acuminate gen. obtuse at apex; alar cells indistinct. Capsule (exc. *C. strumulosum*) not annulate.

a. Capsule costate; teeth papillose. Leaves long large.

1. **C.gracilescens** Schimper syn. — Oncophorus Lindb.; Braithwaite brit. mossfl. in part.


b. Capsule small faintly striate; teeth smooth; pedicel short straight. Leaves small short.

3. **C.schisti** Wahlenberg. — Weisia Wng; Cynodontium Lindb.


4. **C.alpestre** Wahlenberg. — Dicranum Wng; Cynodontium Lindb.


5. **C.strumulosum** C. M. et Kindb. cat. Can. m.

Leaves crenulate above, somewhat longer than in the last: lower gen. acute, upper obtuse; perichetial somewhat long-
acuminate. Capsule oblique subobovate gen. strumose; annulus distinct; teeth cleft. Stem higher than in the last. — Limestone rocks r. Amer. Can. Rocky mts: Macoun.

B. Leaves faintly mamilllose and subulate-acuminate; alar cells us. distinct; costa nearly smooth at back. Capsule us. annulate; teeth cleft.

b. Capsule not strumose gen. not large. 7. C. polycarpum Ehrhart. — Dicranum E.; Cynodontium Schimper. Leaves more or less denticulate us. long. Capsule us. finally subcylindric and sulcate, less often oblique; teeth as in the last; pedicel us. not long and often thin. Tufts more or less radiculose. — Rocks not r. Eur. Sweden, Norway, Switzerland! Finl.: Lindberg. Amer. Can.: Macoun; Drummond; Waghorne. Greenl.: Vahoeffen.

* C. torquescens Bruch. — Dicranum Bruch; Cynodontium Limpricht; Oncophorus polycarpus *nigricans Kindb. Laubm. Schwed. u. Norw.

* C. fallax Limpricht.
Differs from C. polycarpum: Leaves smaller nearly pellucid, reflexed only at one border, gen. smooth and entire. Capsule small not distinctly annulate; pedicel scarcely 1 c. m. long. Stem eradiculose very short. — Amer. r. Can.: Drummond n. 103, com. Macoun.
II. Oreoweisia Schimper.


10. C. robustum Venturi. — Dicranoweisia Vent. revue bryol. 1882; Cynodontium Kindb.

»Doubly or triply larger than the last. Differs in leaves smooth; capsule ovate; tufts 3—4 c. m. high or higher, fuscous below, yellowish above. — Eur. Portugal: Venturi.

B. Leaves short broad: upper crisped, lower nearly spirally twisted about stem (as in Anoectangium) when dry.


12. C. obtusatum Kindb. — Oreoweisia Kindb. rev. bryol. 1896; O. serrulata var. tenuior C. M. et Kindb. cat. Can. m. Leaves obtuse broader and shorter than in the last, subovate not acuminate, strongly recurved below, very mammillose, densely mammillose-serrulate above; basal cells mostly short, gen. not pellucid; costa percurrent. Tufts very tomentose to the short green tops. Capsules and flowers unknown. Differs from the resembling Dicranodontium pellucidum *fagimontanum* in smaller and shorter not sheathing leaves, nearly spirally twisted about stem, not or (the uppermost) r. crisped. Resembles also Anoectangium. — Damp rocks r. Amer. Can: Macoun.

III. Pseudo-Philonotis Kindb.

13. C. boreale Hagen and Limprecht. — Philonotis fontana var. borealis Hagen; Ph. borealis Limprecht; Cynodontium Kindb. Leaves small subovate short-acuminate acute; cells subquadrate (or the basal short-rectangular) larger than in other species and more or less pellucid; costa percurrent serrulate at back. Lower leaves smooth pellucid nearly entire, sometimes

90. **Dichodontium** Schimper.

A. Leaves obtuse or subacute at apex; perichetial similar but more distinctly sheathing. Male plants in separate tufts; perigonal leaves with percurrent costa.

1. **D.pellucidum** L. — Bryum L.; Dichodontium Schimp.

Leaves channelled from suboblong base sublinear or sometimes ovate-oblong, undulate and scarcely reflexed, us. nearly crowded; inner basal cells narrow hyaline, the others quadrate; costa percurrent. Capsule oblique inclined; teeth purplish below, orange above; lid rostellate; pedicel long yellowish or pale red. Tufts dark or brown green. Dioecious. Leaves very variable in size.


* D.fagimontanum* (Bridel as var.) Kindb. as subsp.


2. **D.flavescens** Dickson. — Bryum Dicks.; Dichodontium Lindb.


B. Leaves acute at apex; the perichetial much different. Male plants mixed with fertile; perigonal leaves with not percurrent costa.

3. **D.subflavescens** Kindb. in Hedwigia 1896 p. 59.

Leaves channelled from suboblong base tapering to an attenuate acumen, serrate often to below middle, long distant nearly smooth; cells and costa as in the last. Capsule symmetric erect; teeth dark purplish; pedicel long pale red. Perichetial leaves narrower than the others, long-acuminate and gen. subulate, in upper part of acumen nearly filled by the percurrent or excurrent costa. Perigonal leaves large long-acuminate.

91. Dieranum Hedwig.

A. Capsule straight (in *D. hyperboreum* faintly oblique) not strumose. Leaves not undulate; cells gen. not porose.


I. *Arctoa*. Leaves channelled; alar cells us. distinct; costa narrow more or less excurrent. Capsule not large; teeth often spreading when dry; pedicel short-emergent.

II. *Metzleria*. Leaves convolute above; alar cells not well-defined; costa very broad long-excurrent. Capsule small; teeth not spreading; pedicel exserted. Plants small.

b. Dioecious. Leaves sometimes denticulate us. large. Pedicel of capsule long. Stem radiculose also above base.

aa. Leaves with narrow or not very broad costa; alar cells persistent.

III. *Orthodicranum*. Leaves channelled or convolute above; upper cells subquadrate. Pedicel of capsule straight; peristomial teeth cleft. Tufts us. green.

bb. Leaves with very broad long-excurrent costa.

IV. *Paraleucobryum*. Leaves subconvolute above, persistent; alar cells persistent us. brown, the others few short-rectangular; costa thick formed by 3 layers as in *Leucobryum glaucum*, middle layer consisting by small green cells. Pedicel of capsule straight; teeth often partite. Tufts whitish green. Calyptra very long.

V. *Pseudo-Campylopus*. Leaves channelled persistent; alar cells persistent brown, the others numerous rectangular; costa not thick. Pedicel of capsule straight; teeth cleft. Tufts green or brownish.

VI. *Dieranodontium*. Leaves channelled soon deciduous; alar cells fugitive pale, the others numerous rectangular; costa not thick. Pedicel of capsule arcuate; teeth often partite. Tufts green or brownish.

B. Capsule curved or oblique sometimes strumose. Leaves often undulate when dry; cells often porose.

VII. *Eu-Dieranum*. Peristomial teeth cleft. Leaves with narrow or not much broad costa.


aa. Leaves carinate above.

3. *Carinatifolia*. Leaves gen. broad at base, often undulate; costa subpercurrent. 

bb. Leaves channelled at least below, not carinate above.

4. *Scopariformia*. Leaves not distinctly convolute above, broad at base, not long-subulate, sometimes undulate; costa r. excurrent.

5. *Fuscescentiformia*. Leaves not distinctly convolute, narrow gen. long-subulate, not undulate; costa often excurrent.

6. *Convolutiformia*. Leaves convolute above, not undulate, broad or narrow; costa not r. excurrent.

I. Arctoa Bruch et Schimper.

Leaves us. flexuous or falcate, sometimes nearly straight; alar cells not well-defined, the others gen. long; costa often denticulate above. Capsule small straight strangulate not or faintly striate; teeth spreading when dry. Tufts us. yellowish. — Rocks in alp. region r. Eur. Norway! Spetsbergen: Berggren. Sweden, in Lapland (a var. with green shorter leaves and less emergent capsule: »D. Anderssonii« Wichura); E. Nyman. Amer. U. S.: Roell.

2. *D. hyperboreum* Gunner. 
Leaves flexuous or nearly straight, larger than in the last: alar cells not well-defined; uppermost cells short; costa not or indistinctly denticulate. Capsule somewhat oblique sulcate wide-mouthed not constricted, larger than in the last; teeth erect. Tufts blackish or brown when dry. — Fissures of rocks in northern alp. regions r. Eur. Norway! »Sweden«: Lindberg. Amer. Greenl.; Berggren.

II. Metzleria Schimper, as genus.

Leaves narrowly ovate-oblong somewhat flexuous; cells rectangular: outer basal narrower; costa smooth. Capsule oblong-oval not sulcate; calyptra long. Tufts pale brown. Resembling a small *D. albicans* or a *Dicranella*. — Rocks in alp. region

III. Orthodicranum C. Mueller.

A. Leaves brittle and channelled.
   a. Leaves not subulate-acuminate; costa long-excurrent.

4. **D. fulvum** Hooker.

5. **D. viride** Sullivant et Lesquereux. — Campylopus Sull. et Lesq.; Dicranum Bruch et Sch.; D. subfulvum Ren. et Card.?
   Leaves entire or r. near apex denticulate, us. not crisped or sometimes nearly straight; cells short or the lowest long; costa gen. less broad. Tufts us. green. Very r. fruiting. »Capsule not striate«: Schimper. — Us. on trees r. on rocks. **Eur.** r. Switzerland! France: Husnot. Sweden: P. Larsson. Norway: Bryhn. **Amer.** Can. eastern districts: Macoun; Moser.

6. **D. strictum** Schleicher.
   b. Leaves long-subulate; costa short-excurrent or percurrent.

7. **D. subulitfolium** Kindb. bull. Torr. club XVII.
   Leaves entire, flexuous when dry; cells as in the last; costa narrow. Tufts pale green. — Logs in woods r. **Amer.** Can. Vanc. isl.: Macoun.

B. Leaves gen. not brittle, us. crisped when dry; lower cells gen. long; costa narrow.
   a. Leaves short-subulate, denticulate to below middle, rough at back, channelled.

8. **D. montanum** Hedwig.
   Leaves with not excurrent costa. Tufts very dense us. green often low. — Decayed trunks. **Eur.** common. Sweden, Norway, Switzerland! **Amer.** r. Can.: Macoun; Waghorne.
   b. Leaves long-subulate, nearly entire, not rough at back, us. convolute above.
9. **D. flagellare** Hedwig.


10. **D. scottii** Turner.


c. Leaves acute or short-subulate nearly entire, not rough at back. Capsules unknown.

11. **D. miquelonense** Renaud et Cardot.

Leaves short often subconvolute above, appressed when dry, the uppermost gen. obtuse; nearly all cells short; costa narrow, gen. not excurrent. Stem 2—3 c. m. high. — Rocks r. Eur. Miquelon isl.: Delamare, com. Cardot.

12. **D. crispatulum** (Roell as var., in Hedwigia 1897 p. 42) Kindberg n. sp.

Differs from the last: Leaves not or slightly involute above, crisped or flexuous when dry; lower cells short-rectangular or longer. Stem about 1 c. m. high. — Amer. r. U. S. New Jersey: J. Roell.

IV. Paraleucobryum Lindberg.

13. **D. albacans** Br. eur. — D. enerve Thedenius (older name); Campylopus Hallii Lesq. and C. frigidus Lesq.? 

Leaves ovate-oblong acute not much shorter than the excurrent part of costa, entire or r. faintly denticulate near apex, straight and appressed or sometimes falcate, rigid but not brittle; alar cells dilated brown nearly reaching to costa. Capsule smooth erect not large. Stem tomentose, high when sterile, low when fruiting; such specimens are resembling *D. alpinum* or a small *Campylopus*. Very r. fruit. — Alp. rocks r. Switzerl. fruiting! Norway! Amer. Can. Brit. Col. fruit.: Macoun.

V. Pseudo-Campylopus Kindb.

A. Lamina of leaves not or scarcely shorter than the excurrent part of costa; alar cells not reaching to costa. Leaves gen. not rigid; costa gen. not occupying more than the half of lamina at base.

14. **D. longifolium** Ehrhart.

Leaves soft nearly entire or faintly denticulate, gradually
acuminate; excurrent part of costa more or less serrulate. Perichetial leaves subconvolute abruptly apiculate. Capsule somewhat large; pedicel us. long. Tufts sparingly radiculose us. green or brown-green. Not r. fruiting. — Rocks and stumps. *D. Sauteri* Schimper.


* D. pachytrichum * Kindb. cat. Can. m. (as var.).


B. Lamina of leaves much shorter than the excurrent part of costa; alar cells reaching to it. Leaves rigid; costa very broad at base. Tufts us. tomentose.


Leaves brittle more or less curved; awn strongly serrate, its upper part sublinear. Capsule as in *D. longifolium*. Tufts more or less radiculose us. green. — Rocks r. Eur. Norway Dovrefjeld etc.! Sweden Dalsland near Rostock!; Uddewalla: P. Larsson. Germany: Roell.

VI. Dicranodontium Bruch et Schimper.


18. *D. asperulum* Mitten. — *D. virginicum* Austin; *Dicranodontium aristatum* Schimper; *D. Millspaughii* Britton.

Leaves and stem brittle. Leaves narrower than in the last, less gradually tapering to the also in lower part serrulate acumen, less flexuous or nearly straight when dry; lower cells (above the alar) dilated nearly uniform. Tufts us. pale brown, very soft and silky-like. Very r. fruiting. — Rocks r. *Eur.*


VII. Eu-Dicranum.

1. Falcatiformia.

A. Capsule sulcate when dry.


B. Capsule not sulcate.

a. Leaves distinctly falcate also when dry.


b. Leaves flexuous not falcate.


22. *D. pumilum* Sauter. — *Aongstroemia Sauteri* C. M.

Leaves sometimes slightly denticulate; cells gen. short, the alar not much distinct; costa sometimes percurrent. Pedicel of the indistinctly necked capsule short. Perichetial leaves long-
aristate. Tufts blackish about 0.5 c. m. high or lower. Much smaller than the last. — Eur. Austria: Sauter; C. M. Amer. Can. Labrador: Waghorne. U. S.: Roell.

2. Molliformia.


3. Carinatifolia.

A. Costa of leaves strongly serrate at back. Upper leaf-cells often long.
   a. Capsules sulcate us. clustered 3—4 together. Leaves decurrent more or less distinctly undulate when dry.

Leaves very distinctly undulate also when moist, strongly serrate above middle, recurved at one side near base, us. long-subulate, often nearly straight and spreading when dry; angular cells diversiform, the alar brown dilated; other cells long and porose; costa with serrate ridges at back. Inner perichetal leaves nerveless. Tufts green. — On ground in woods. Eur. gen. common (in Great Britain r.). Sweden, Switzerl. Amer. common. Can.: Macoun.

* D. ontariense Kindb. n. subsp.
Leaves less spreading, not recurved, strongly serrate only in upper part of acumen. Capsule solitary. — Amer. Can. r.: Macoun.

Leaves tapering to a long sublinear in upper part serrate acumen, not recurved, flexuous or crisped when dry, often indistinctly undulate; cells very chlorophyllose not porose: lower angular yellow, alar uniform dilated us. hyaline, other lower basal long, the others short irregular but the apical often long. Tufts green or yellowish. — Damp woods and peat-bogs. Amer. not r. Can.: Macoun; Roell.

b. Capsules solitary r. in pairs. Leaves not decurrent r. undulate.

Leaves narrowed to a long subulate in upper half strongly

27. **D. consobrinum** Renauld et Cardot.

28. **D. scopariiforme** Kindb. bull. Torr. club XVI.
   Leaves broadly acuminate or short-subulate, strongly serrate in upper part of acumen, not brittle, often curved r. undulate; alar cells brown dilated, the others gen. oblong-oval or narrower, r. porose; costa with serrate ridges at back. Inner perichetal leaves nerveless, emarginate or crenulate above. Capsule smooth. Tufts green. — Amer. r. Can. Rocky mts: Macoun. U. S. Michigan: Purpus, com. Roell.

29. **D. camptophyllum** Kindb. n. sp.
   Leaves tapering to a long subulate in upper half strongly serrate acumen, falcate and not crisped when dry; cells not porose: those of acumen subquadrate, the alar yellow dilated subrectangular reaching to costa; other basal cells long. Perichetal leaves obtuse or abruptly tapering to a gen. longer, narrow-subulate or subfiliform awn with long-excurrent costa. Capsule solitary not sulcate. Tufts green above. — Amer. r. Can. Northern Labrador: Macoun 1896.


* **D. rupineola** Kindb. n. subsp.
   Leaves subulate-acuminate; costa percurrent, serrulate at back.


b. Leaves brittle and narrow; angular cells uniform dilated fugitive faintly yellowish; other basal cells long hyaline. Capsule short-pedicellate.

32. *D. leucobasis* C. M. et Kindb. 1. c.


4. Scopariiformia.

A. Leaves rough or denticulate at back of lamina, us. crisped and often undulate when dry; costa sometimes excurrent. 33. *D. elatum* Lindberg. — D. robustum Blytt (the inventor).

Leaves long, tapering to a long spinulose-serrulate brittle acumen, dentate at back; acumen with narrow-subulate often circinate point; cells of angles diversiform, the inner narrow; other cells of lower part long, the upper short irregular; costa very rough at back near arax, often excurrent. Capsules clustered 3—4 not striate when wholly ripe. Plants yellowish green very robust us. high. — Bogs and humid woods r. *Eur.* Norway! Sweden! Lindberg.

34. *D. spurium* Hedwig.

Leaves gen. not long, ovate-lanceolate acute or from subovate base abruptly acuminate, subpapillose at back, very faintly serrate at the us. short acumen; cells as in the last; costa abbreviate or subpercurrent, faintly rough at back. Capsule solitary striate. Tufts yellowish green not high. — Dry heat's
and woods on sandy soil, r. on rocks. Eur. not r., common in northern distr. Sweden, Norway, Switzerland. Amer. Can. not r.: Macoun; Waghorne.

B. Leaves smooth at back of lamina, not crisped; costa not excurrent.

a. Leaves not undulate gen. short.


Leaves ovate-oblong or broadly ovate-lanceolate acute, entire or near apex indistinctly denticulate, sometimes nearly appressed when dry, smaller than in the last; cells gen. short also near base; costa smooth at back. Tufts low green. — Dry rocks or earth r. Amer. Can.: Macoun; Waghorne.


Leaves narrowed below, from oblong base short-acuminate obtuse, very short, crenulate (not serrate) above middle, appressed when dry; cells thick-walled not porose; the outer alar brown, the inner hyaline; other cells lanceolate or the upper oblong, the apical sometimes oval; costa very narrow, serrulate above at back. Capsules unknown. Tufts blackish when dry with straw-yellow tops, nearly eradiculose. Habit of Calliergon sargentosum. — Earth in woods r. Amer. Can. Brit. Col.: Macoun.

— In the resembling Monocranium dicranoides C. M. (from Chile, com. C. M.) leaves are long-acuminate, peristomial teeth entire, not cleft.

b. Leaves long gen. broadly acuminate or short-subulate, sometimes undulate.

aa. Leaves distinctly decurrent; cells not porose, those of decurrent part narrow; costa smooth at back. Tufts nearly without rhizoids. Capsules unknown.

37. D. leioneuron Kindb. bull. Torr. club XVI.

Leaves gen. quite entire, sometimes subobtuse at apex, convolute in middle, suberect when dry, not undulate; angular cells diversiform, the inner pellucid sometimes pale yellow; other cells long narrow; costa very narrow. Tufts yellowish. — Swampy woods r. Amer. Can. Anticosti: Macoun.

bb. Leaves gen. not distinctly decurrent; cells us. porose; costa more or less denticulate at back. Inner perichaetial leaves longer than the awn. Pedicels long solitary or r. in pairs. Tufts radiculose.

38. D. scoparium L. — Bryum L.; Dicranum Hedwig.
Leaves faintly serrulate in upper part of acumen, more or less curved and patent but not spreading when dry, r. undulate; angular cells diversiform, the alar brown more dilated, the inner pale yellow or less often hyaline; other cells gen. long, the uppermost sometimes suboblong; costa us. with 2 serrate ridges at back near apex. Perichetial leaves not long-aristate. Capsule not sulcate. Tufts us. green, sometimes blackish. — Dry places common, less often in bogs and somewhat r. in alp. regions Eur. Sweden, Norway, Switzerland. Amer. Alaska: J. M. Macoun. Can.: J. Macoun; Wagborne. U. S.: Sullivant, com. C. Mueller; Roell.

*D. involutum* Kindb. n. subsp.


40.*D. undulifolium* C. M. et Kindb. l. c.

Leaves nearly entire, often obtuse at apex, nearly appressed and slightly undulate when dry; cells as in the last; costa not lamellate but denticulate at back near apex. Tufts golden glossy, sparingly radiculose. Capsules unknown. — In alps r. Amer. Can. Rocky mts 2500 metr. a. s.: Macoun; Vanc. isl.: Roell. U. S.: Roell.

41.*D. augustum* Lindberg; Kindb. rev. bryol. 1896.


42.*D. Roelli* Kindb. in Hedwigia 1896 p. 60. — D. Bonjeani var. Roelli Barnes.

Differs from *D. Bonjeani* in leaves neither spreading nor undulate and their costa sometimes bilamellate. — More allied to *D. scoparium*; differs from it in leaves faintly crenulate at

Var. Schlothaueri Barnes.


43. D. subpalustre C. M. et Kindb. l. c.


44. D. hyalinum Kindb. in Hedwigia 1896, p. 61.

Leaves faintly denticulate near apex, narrower and somewhat long-acuminate; alar cells nearly hyaline rectangular not well-defined; other cells hyaline not porose, narrow-linear except the oval apical; costa faintly denticulate near apex, narrow above but very dilated at base, not excurrent. Tufts loose very sparingly radiculose. Capsules unknown. — Alp. region r. Amer. U. S. Nat. Park 2100 metr. a. s.: Roell.

5. Fuscescentiformia.

A. Inner perichetial leaves longer than the awn.

a. Leaves very long and not crisped but falcate or nearly straight when dry, sometimes brittle; costa very narrow. Capsule large; pedicel very long. Tufts shining very high.

45. D. majus Smith.


Leaves with sublinear in upper half serrulate acumen, narrower
than in the last; cells as in the last; costa not distinctly ex-
current and nearly smooth. Capsule sulcate solitary. Inner
perichetal entire, attenuate to awn. Tufts us. golden glossy.
— Damp rocks. Amer. Pacif. dist. not r. Alaska: J. M. Mac-

* D. angustifolium Kindb. l. c. in part.

Capsule not sulcate. Leaves nearly entire. — Damp rocks

b. Leaves less long and not brittle, us. flexuous or crisped
when dry; costa sometimes somewhat broad. Capsule solitary
gen. less large; pedicel not much long. Tufts us. low and not
shining.

47. D. fuscescens Turner.

Leaves with subulate in upper part more or less serrulate
acumen, flexuous or crisped; cells u... not porose; angular cells
diversiform, the inner hyaline; other cells of base long, the
upper gen. short; costa faintly rough at back, us. excurrent
and somewhat broad. Capsule us. oblique striate or sulcate.
Tufts us. grayish green when dry. — Decayed trunks or damp
rocks in woods not r. Eur. Sweden, Norway! Amer. Can.: Ma-

* D. congestum Bridel.

Leaves less serrulate with sublinear acumen; cells us. porose;
costa us. subpercurrent narrower. Capsule less striate. Tufts
us. green. — Not r. Eur. Sweden, Norway, Switzerl. Finl.: 

* D. Sendtneri Limpricht.

Leaves nearly entire less flexuous, sometimes subconvolute;
cells porose, upper gen. narrow. Capsule nearly straight. — 

* D. subbrevifolium Kindb. n. subsp.

Leaves larger, subconvolute nearly entire; costa not excurrent.


Leaves with somewhat broad short-subulate nearly wholly
serrulate acumen, faintly flexuous, larger than in D. fuscescens;
upper and middle cells porose gen. narrow, the others as in
the mentioned species; costa distinctly rough at back, not
excurrent, narrow. Capsule oblique somewhat large and finally
sulcate. Tutts greenish and high. — Damp subalp. rocks r.
Leaves entire nearly straight and suberect, only the upper
flexuous, narrower than in *D. fuscescens*; angular cells nearly
uniform dilated; other cells very porose, gen. long; costa very
narrow, nearly smooth at back or slightly rough in the excur-
rent part. Tufts soft and silky, green or dark green, nearly
eradiculose. Capsules unknown. Habit of *D. spadiceum*; differs
from it prin. in not convolute leaves. — Rocks in alps r. Amer.
Lapland, and Norway: E. Nyman.
* *D. subspadiceum* Kindb. n. subsp.
Leaves straight erect subconvoluted, denticulate near apex and
at the excurrent part of costa. Tufts brown with yellowish
branch-tops. Capsules unknown. — Rocks in alp. region r.
B. Perichetial leaves shorter than the awn.
50. *D. sulcatum* Kindb. bull. Torr. club XVII; *D. trachyphyllum*
Ren. et Card.
Leaves brittle not large, more or less flexuous when dry;
cells porose, the uppermost short, the lower long; costa broader
than in *D. fuscescens*, sometimes excurrent. Capsule sulcate.
51. *D. crisulatum* C. M. et Kindb. cat. Canad. m.
Differs from the last: Leaves narrower, more crisped when dry;
cells not porose, the uppermost irregular sometimes sub-
oblong; costa very narrow gen. percurrent. — On earth or trees
52. *D. perichaitiale* Kindb. in Hedwigia 1896 p. 61.
Differs from the both last in the leaves larger and broader,
norther crisped nor flexuous, only the uppermost subfla.
cate, less often brittle; cells larger, narrow-linear, not or sparingly
porose; costa distinctly denticulate at back, not excurrent, nar-
rower than in *D. sulcatum*; capsule larger. Resembles *D. scopa-
A. Leaves serrulate in upper part of acumen.
  a. Leaves long-subulate; costa somewhat long-excurrent.
  Tufts tomentose; tomentum often reddish.
53. **D. Muehlenbeckii** Bryol. eur.
Leaves flexuous; cells gen. not porose, the angular dilated nearly uniform, the inner pale yellow; other cells of lower part gen. narrow, the middle and upper short mixed with some long near apex; costa faintly rough at back. Capsule often nearly smooth. Often more robust and high than in the resembling **D. fuscescens**. — Rocks princ. in alp. or northern districts, not common. *Eur.* Norway, Switzerl. France; Husnot. Germany: Kolb, com. Warnstorf. *Amer.* Can.: Macoun. U. S.: Roell.

b. Leaves not long-subulate; costa gen. percurrent. Tufts sparingly radiculose.

54. **D. rhabdocarpum** Sullivant.

55. **D. dipteroneuron** C. Mueller in Flora 1887.
Leaves flexuous somewhat small; alar cells brown, the others narrow or the uppermost oval; costa with 2 serrulate ridges at back, sometimes short-excurrent. Capsule smooth not large; pedicel short. Habit of **D. brevifolium**. — *Amer.* r. Greenl.: C. Wensk, com. Roell. U. S.: Roell. »Alaska: Krause: C. M.

B. Leaves gen. entire, r. indistinctly denticulate near apex. Capsule sulcate.

a. Leaves somewhat large; costa gen. percurrent. Tufts not densely radiculose. R. fruiting.

56. **D. brevifolium** Lindberg.
Leaves flexuous short-subulate, sometimes less distinctly convolute; angular cells dilated nearly uniform, outer brown, inner pale yellow; other cells gen. short; costa nearly smooth at back. Sometimes more robust and high than in the resembling **D. fuscescens**. — Rocks princ. in alp. or northern districts, r. *Eur.* Sweden, Norway! Finl.: Brotherus. *Amer.* Can.: Macoun.

57. **D. spadiceum** Zetterstedt. — *D. neglectum* Juratzka.
Leaves open-erect not flexuous, somewhat long-subulate; angular cells diversiform, the inner hyaline sometimes reaching to costa; other cells gen. long nearly uniform; costa smooth sometimes short-excurrent. Tufts often brown. Habit of **D. molle** and **D. scoparium**. — Rocks in alp. regions r. *Eur.* Norway,

b. Leaves small; costa excurrent smooth at back. Tufts dense tomentose. Capsule not large.

58. *D. elongatum* Schleicher.

Leaves us. from somewhat broad base short-subulate and entire, nearly all appressed when dry; angular cells diversiform, the alar brown; other cells narrow except the gen. short upper; costa somewhat broad and not long-excurrent. Capsule faintly curved. Tufts green or brownish us. very high. - Swamps and wet rocks princ. in alps. Eur. nearly common in northern alps. Sweden, Norway! Amer. Can.: Drummond; Macoun; Waghorne. Greenl.: Wensk, com. Roell.

* D. dovenense* Kindb. n. subsp.

Leaves narrower with longer subula, entire and not brittle, nearly all appressed when dry; nearly all cells narrow except the alar; costa longer-excurrent. Capsule faintly curved. - Eur. Norway in Dovrefjeld.

* D. subfragilifolium* Kindb. n. subsp.


* D. attenuatum* Kindb. n. subsp.

Leaves larger, gradually tapering to a somewhat long subula, nearly entire and often brittle, the uppermost flexuous; costa short-excurrent. Capsule more or less curved. Habit of *D. fragilifolium*. Tufts low. — Amer. Can. Labrador: Waghorne.


Leaves from narrow base very long-subulate, entire and brittle, gen. straight erect or the uppermost flexuous; alar cells r. well-defined, the others gen. rectangular or some few short; costa narrow very long-excurrent. Capsule oblique us. arcuate, larger than in *D. elongatum*. Tufts low us. green or pale brown. Habit of *D. strictum*. — On logs in northern princ. subalp. districts r. Eur. Norway! Sweden: S. O. Lindberg; E. Nyman. Amer. Can.: Drummond; Macoun; Waghorne.

c. Leaves small entire; costa percurent smooth at back. Tufts densely radiculose. Capsule small. Habit of *D. elongatum*.

60. *D. groenlandicum* Bridel. — D. labradoricum C. M.; D. tenuinerve Zetterstedt.

61. D. Sphagni Wahlenberg fl. lappon.
Leaves as in the last but somewhat larger, more gradually narrowed, looser appressed or subflexuous; cells as in the last but the angular more distinct and brown; costa less narrow. Capsule straight or slightly curved. Tufts somewhat low, not very compact, often green. — Swamps r. Eur. Norway! Amer. Can.: Waghorne.

92. Campylopus Bridel.
I. Thysanomitrium. Leaves often falcate; alar cells short dilated, separated from leaf-borders by narrow (marginal) cells; other cells rectangular; costa long-excurrent somewhat narrow.
II. Anotis. Leaves not falcate; alar cells gen. wanting (or indistinctly evolute), the angular narrow gen. not much defined from the other basal ones; upper cells short irregular; costa very broad but often short-excurrent.
III. Eu-Campylopus. Leaves sometimes falcate; alar cells short dilated well-defined; other cells short gen. irregular; costa sometimes (in C. flexuosus) not or scarcely excurrent. Leaves involute above.


II. Anotis Kindberg.
A. Leaf-base whitish glossy. Leaves and branchlets brittle. Leaves appressed when dry.
2. C. fragilis Dickson. — Bryum Dicks.; Campylopus Br. eur.
Leaves not involute above; upper cells gen. rhombic; costa gen. long-excurrent, sulcate at back, faintly denticulate at apex. Tufts tomentose not high. R. fruiting. — Rocks, esp. of sandstone, and turfy soil. Eur. not r. Switzerl!
B. Leaf-base more or less dusky. Leaves and branchlets r. brittle. Leaves gen. (exc. C. Schimperi) not appressed.
   a. Leaves not involute above; costa long-excurrent. Not r. fruiting.
      b. Leaves involute above; costa gen. less long-excurrent. Very r. fruiting.

5. C. Heinrici Renauld et Cardot.
   Differs from the last: »Leaves brittle; upper cells longer rectangular; costa longer excurrent, not sulcate»: Ren. et Card. — Amer. r. »U. S.«: R. et C.

   III. Eu Campylopus.
   A. Leaves somewhat short, distinctly denticulate above at lamina, flexuous when dry; costa long-excurrent gen. without hyaline hairpoint. Capsules unknown.

7. C. Donnellii Austin. — Dicranum Aust.; Campylopus Lq. et Jam.

8. C. subleucogaster C. M. — Dicranum (Campylopus) C. M.
   »Differs from the last in its dirty yellow color, leaves less open and less abruptly narrowed, costa broader; terminal branchlets bristle» Lesq. et Jam. — »Leaves distinctly auricled; upper cells quadrate; costa serrulate at apex. Tufts loose, about 3 c. m. high. Stem with very short, densely crowded branches at apex. — Amer. r. U. S., Alabama: Mohr«: C. M. in Flora 1875.
B. Leaves long gen. entire or (in C. Mildei and C. setifolius) denticulate above, us. appressed when dry; costa long-excurrent.
  a. Upper leaves us. with long whitish hairpoint.
9.C.introflexus Hedwig. — Dicranum H.; Campylopus Brid.;
  C. polytrichoides Notaris; C. leucotrichus Sull. icon. m.
  Leaves straight rigid not distinctly auricled, us. appressed when dry;
  basal lamina not involute; upper cells rhomboidal-oblong or often curved;
  costa very broad, deeply sulcate. Male plants with short reddish perigonal leaves.
  Tufts radiculose us. green or yellowish, sometimes blackish. Very r. fruiting.
10.C.brevipilus Br. eur.
  Differs from the last: Leaves less rigid, sometimes faintly flexuous;
  basal lamina partly involute; costa not deeply sulcate, less broad;
  hairpoint short sometimes wanting. Tufts nearly eradiculose us. yellowish.
11.C.atrovirens Notaris.
  Leaves not rigid, sometimes flexuous or falcate, us. auricled;
  upper cells gen. oblong or vermicular; costa not deeply sulcate, not very broad.
  Tufts sparingly radiculose us. blackish or dark green. Very r. fruiting.
  France: Husnot.
* C.adustus Notaris.
  Leaves nearly straight, less distinctly auricled; upper cells often rhomboidal.
  Switzerl. in higher subalp. region near Faidol.
12.C.gracilicaulis Mitten.
  Differs from C. atrovirens in not auricled leaves; upper cells
  often rhombic. »Capsule immersed in the cornal leaves»: Lesq.
* C.angustiretis Austin. — Dicranum Austin; Campylopus
  Lesq. et Jam.
  »Leaf-cells much longer, sublinear, the alar dirty red. Amer.
  U. S., Florida»: Lesq. et Jam.
  b. Leaves without distinct (hyaline) hairpoint, sometimes
  (exc. C. Mildei) falcate or r. (in C. setifolius) flexuous.
13.C.Mildei Limpricht.
  Leaves nearly appressed when dry, straight, less rigid than
  in C. introflexus, sometimes denticulate above; auricles gen. not
  much distinct; upper cells oval-rhombic; costa not much deeply
sulcate. Stem more or less radiculose, often very long. Tufts gen. green above, brown below. Capsules unknown. — Dry and moist rocks r. Eur. Switzerl. near Lugano
Leaves not rigid, denticulate above; auricles large; upper cells rhombic; costa not sulcate, very rough in upper part. Capsules clustered; calyptra unknown. Tufts nearly eradiculose, blackish or dark green; stem very long. Very r. fruiting. — Rocks r. Eur. Irel.: G. A. Holt.
*C.nieans Wulfsberg.
C. Leaves gen. denticulate above, us. flexuous when dry; costa not hyaline at apex, us. subpercurrent.
17.C.flexuosus L. — Bryum L.; Campylopus Bridel.
Leaves often auricled; upper cells suboval-rhomboidal, the alar us. brown-yellow; costa occupying about half lamina at base, sulcate only at apex. Tufts us. brown-tomentose. Less r. fruiting. — Turfy soil and moist sandstone rocks. Eur. not r. Switzerl! Amer. r. *U. S.*: Sulliv.
*C.zonatus Molendo.
Leaves more distinctly denticulate; alar cells purplish (asomentum of stem); costa narrower. — Eur. r. France: Le Jolis.
*C.paradoxus Wilson.
*C.tallulensis Sull. et Lesq.; Sulliv. icon. m.
Leaves narrower, denticulate near apex; costa percurrent.

93. Dicranella Schimper.

I. Anisothecium. Leaves spreading, from sheathing base horizontally patent or deflexed. Capsule inclined; pedicel red.

II. *Pseud-Oncophorus*. Leaves flexuous or erect-patent, not spreading. Capsule inclined distinctly necked and strumose; pedicel yellow (reddish only when old).

III. *Eu-Dicranella*. Leaves not spreading. Capsule not distinctly necked; pedicel red or (in *D. heteromallia*) yellow.

I. Anisothecium (Mitten) Lindberg.

A. Leaves large gradually tapering to the broad acumen. Stem us. high. R. fruiting.

1. *D.squarrosa* Starke. — Dicranum St.; Dicranella Schimp.


B. Leaves less large abruptly tapering to the long subulate acumen. Stem us. low.

2. *D.Schreberi* Swartz. — Dicranum Sw.; Dicranella Schimp.; Cynodontium canadense Mitten; Dichodontium Lq. et Jam.


II. *Pseud-Oncophorus* Kindb.


Leaves from half-sheathing base abruptly narrowed to a long subulate acumen, us. flexuous or crisped; cells narrow irregular; costa broad long-excurrent. Capsule finally plicate; teeth cleft to middle. Tufts yellowish green. — Bare soil on wet heaths and in ditches. *Eur*. common. Sweden! *Amer*. Can.: Macoun.

* *D.pusilla* Hedwig. — Dicranum H.; Dicranella Sch.

>Plants smaller. Leaves shorter, nearly straight and not


Diffs from *D. cerviculata*: Plants smaller. Leaves shorter nearly straight and not flexuous; upper cells suboblong; costa broader, filling the whole acumen. Capsule very small and not striate, less distinctly strumose; teeth nearly entire or faintly cleft. Stem very short. — Arctic distr. r. *Amer.* Alaska: J. M. Macoun.

6. *D. cerviculata* l. c.

Diffs from *D. cerviculata*: Leaves gradually narrowed; cells short quadrate, only the inner basal narrow; costa narrower and well-defined, only in perichaetial leaves distinctly excurrent. Tufts dark green. — *Amer.* r. Can. Hudson Strait: R. Bell, com. Macoun.

III. *Eu-Dicranella.*

A. Leaves channelled; costa long-excurrent.

a. Leaves abruptly acuminate from the us. half-sheathing base

7. *D. secunda* Swartz. — Dicranum Sw. 1795; Dicranella Lindberg; D. subulata (Hedwig 1801) Schimper.


* D. curvata* Hedwig. — Dicranum H.; Dicranella Sch.


Leaves crenulate all around with subovate base, crisped or curved when dry; basal cells long linear, upper oblong-quadrate; costa denticulate above. Capsule inclined or suberect; teeth
orange nearly partite; lid short subobtuse or apiculate; annulus scarcely loosed; pedicel pale red. Stem very short. — Earth in higher alp. region r. Amer. Can. Rocky mts 1950 metr. a. s.: Macoun.

b. Leaves gradually acuminate from not sheathing base. Pedicel yellow.

10. **D. heteromalla** L. — Bryum L.; Dicranella Sch.

Leaves flexuous or straight when dry, sometimes denticulate; lower cells long, upper shorter; costa broad us. denticulate near apex. Capsule nitid orange more or less oblique and inclined, r. suberect, finally sulcate; teeth cleft to middle; lid long-rostrate. Tufts us. green often soft and silky-like. — Damp earth and rocks common. Eur. Sweden, Norway, Germany, Switzerland. Amer. Can.: J. Macoun; Waghorne. Alaska: J. M. Macoun. U. S.: com. Macoun (a variety with longer not distinctly sulcate capsule).

* **D. Fitzgeraldi** Renauld et Cardot.


B. Leaves carinate gradually acuminate not sheathing; costa gen. not excurrent. Capsule not or indistinctly striate. Tufts low us. not shining.

a. Leaves entire, recurved below; alar cells us. dilated.

11. **D. rubra** Dickson. — Bryum Dicks.; Dicranella Brotherus; D. varia Schimper; D. Howeii and D. Langloisii Renauld et Cardot.


* **D. callistoma** Dickson. — Bryum Dicks.; Dicranella Sch.


Differs from *D. rubra* *callistoma*: Capsule annulate; teeth nearly partite. Upper leaves much longer than the lower. —

b. Leaves serrulate above, not recurved; alar cells not defined.

13. D. rufescens Dickson. — Bryum Dicks.; Dicranella Sch.

Leaves longer upwards, nearly straight or curved: the uppermost narrowly ovate-lanceolate; cells less narrow than in D. rubra. Capsule symmetric blood-red us. erect; teeth cleft nearly to middle; lid rostellate us. half as long as capsule; annulus none. Tufts often rufescent. Male plants resembling a Phaseum.


* D. humilis Ruthe.

Capsule inclined and curved when dry. Leaves pale green, the upper more flexuous. — Sandy and clay soil r. Eur. Norway: N. Bryhn.

94. Dicranoweisia Lindberg.

A. Leaves recurved gradually acuminate; costa not excurrent. Peristomial teeth not cleft; annulus revoluble.


B. Leaves not recurved. Peristomial teeth us. cleft; annulus indistinct.

a. Leaves abruptly acuminate; costa not excurrent. Capsule straight symmetric. Perichetial leaves very short.


Differs from the last: Leaves with sublinear not long often


4. **D. Roellii** Kindb. in Hedwigia 1896 p. 59.


95 **Oncophorus** Bridel.

1. **O. virens** Swartz. — Bryum Sw.; Oncophorus Brid.; Cynodontium Schimper; C. Demetrii Ren. et Card. ?


2. **O. Wahlenbergii** Bridel.


* **O. compactus** Funck. — Dicranum Funck; Oncophorus Kindb.

Leaves entire smaller. Stem and pedicel shorter; capsule
96. Rhabdoweisia Bryol. eur.
A. Peristomial teeth brittle us. with broad base. Leaves gradually acuminate us. entire.
1.R.striata Schrader. — Grimmia Schrad. 1799; Rhabdoweisia Kindb.; Weisia fugax Hedwig 1801.
B. Peristomial teeth persistent subulate. Leaves obtusate serrulate above.
2.R.crispata Dickson. — Bryum Dicks. 1793; Rhabdoweisia Kindb.; Weisia denticulata Bridel 1806.
Leaves sublinear gen. obtuse, broader and more strongly serrulate than in the last, not much curled; cells larger. Capsule oval rufous or reddish; teeth sometimes cleft; pedicel finally pale red. — Wet rocks r. Eur. France cascade d'Enfer near Bagnères de Luchon 1855! Engl.: T. Rogers.
97. Oreas Bridel.
Leaves entire sublinear acuminate or with broader base, recurved below. Capsule suboval rostellate; pedicel arcuate when moist. Tufts very dense often high. — Rocks in alp. regions r. Eur. Switzerl! Austria; Schimper.

Fam. 22. Seligeriaceae.
98. Seligeria Bruch et Schimper.
II. Eu-Seligeria. Peristome present. Leaves entire or (sometimes in S. pusilla) faintly crenulate.
I. Anodus Bryol. eur.
1.S.Donii Smith. — Gymnostomum Sm.; Seligeria C. M.
Leaves channelled shortish; costa long-excurrent. Capsule

II. Eu-Seligeria.
A. Leaves long subulate-acuminate plurifarious; costa us. excurrent.
   a. Stem very short. Capsule piriform or subclavate.
3. *S. pusilla* Ehrhart. — Afzelia Ehrh.; Seligeria B. S.
   *S. acutifolia* Lindberg.
   Leaves with more distinctly excurrent costa. Pedicel often very short. — *Eur.* r. Engl.: Rogers.
4. *S. puncifolia* Dickson. — Bryum Dicks.; Seligeria Carruthers; Braithwaite; S. subermen Schimper.
   b. Stem somewhat high about 1 c. m. Capsule subglobose or oval.
5. *S. polaris* Berggren.
   *Differs from S. recurvata in the stem higher, to 1 c. m.; angular leaf-cells dicanoid; capsule oval scarcely emergent*
above perichetial leaves; tufts very dense. — Eur. r. Finl.: Lindberg.

B. Leaves short us. obtuse. Stem low.
   a. Leaves obtuse, tristichous prin. on sterile shoots. Stem and shoots somewhat elongate. Capsule piriform with straight pedicel; teeth obtuse.
   7. S. tristicha Bridel. — Weisia Brid.; Seligeria B. S.

   Leaves sublinear, broader than in the last; costa not distinctly excurrent. Perichetal leaves abruptly acuminate; costa percurrent or short-excurrent. — Eur. r. Norway in northern district: Schlegel and Arnell; E. Nyman.
   b. Leaves plurifarious. Stem and shoots very short.
   9. S. calcarea Dickson. — Bryum Dicks; Seligeria B. S.
      Leaves subovate abruptly attenuate; costa excurrent. Capsule piriform erect; teeth obtuse; pedicel straight. — Calcareous or schistaceous rocks r. Eur. Switzerl. France: Husnot m. gall. Amer. Can.: Drummond; Macoun.

*S. crassinervis* Lindberg.
   Capsule inclined; teeth acute; pedicel slightly curved at apex. — Eur. r. Sweden: Lindberg.

10. S. diversifolia Lindberg. — S. compacta Philibert rev. bryol. 1897 ?
   Leaves (also the perichetal) sublinear or narrowly ovate-oblong, gradually attenuate obtuse; costa not excurrent. Capsule erect narrowly piriform; teeth subobtuse; pedicel straight. — Calcareous rocks r. Eur. Finl.: Brotherus.

*S. obliquula* Lindberg.
   Capsule broader; teeth acute; pedicel slightly curved when dry. — Alp. rocks r. Eur. Norway in Dovrefjeld: Kaurin.

11. S. campylopora Kindb. cat. Canad. m.
   Leaves as in the last but the upper perichetial acute or subsacute. Capsule narrowly piriform finally sulcate; pedicel strongly arcuate when moist. — Calcareous rocks r. Eur. A. Blytt and H. W. Arnell. Amer. Can.: Macoun; Waghorne.


100. Trochobryum Breidler et Beck.

1. T. carniolicum Breidler et Beck.
    Leaves subovate-oblong; the upper flexuous or deflexed with a many times longer costa. Capsule rotundate or round-oval not sulcate; teeth blood-red truncate; lid systylic convex with short thick point; pedicel erect. — Moist calcareous rocks r. Eur. Serbia: Ilie, com. C. Mueller.


2. Stylostegium. Capsule immersed; lid often systylic; peristome none. Monoecious.

I. Eu-Blinda.

1. B. acuta Hudson. — Bryum Huds.; Blindia Br. eur.
    Leaves broadly ovate-lanceolate gradually acuminate, nearly straight, gen. not much longer than the excurrent part of costa; alar cells red large quadrate; costa us. smooth. Perichetial leaves abruptly acuminate larger. Capsule suboval-piriform or globose with short neck; lid red-rostrate; teeth red; annulus not distinct; pedicel straight reddish. Tufts us. brown. — Wet rocks prin. in alps. Eur. not uncommon. Sweden, Norway, Switzerland Amer. Can.: Macoun; Moser; Waghorne. Greenl.: Vanhoeffen.

2. B. flexipes (Renauld et Cardot as var.) Kindb. n. sp.

II. Stylostegium Bryol. eur.

    Leaves suboblong gradually acuminate nearly straight; alar cells brown subquadrate; costa long-excurrent. Perichetial leaves less gradually acuminate and very much larger; costa short-excurrent. Capsule obovate or turbinate; lid yellow-rostrate;

Fam. 23. **Grimmiaceae.**

102. **Grimmia** Ehrlhart.

**A.** Leaves spirally twisted about stem when dry.  
1. **Streptophyllum.** Leaf-cells more or less sinuous. Capsule exserted smooth; pedicel longer, us. deflexed; lid not sygylic; peristome present. Dioecious r. fruiting.  
**B.** Leaves not spirally twisted.  
2. **Eu-Grimmia.** Leaf-cells not distinctly sinuous. Capsule shorter than the gen. exserted pedicel; lid not sygylic; peristome present.  
   **a.** Leaves smooth obtuse entire and not sheathing, appressed when dry and not patent when moist; cells large; hairpoint very short or wanting. Dioecious.  
      1. **Molliformes.** Leaves large. Tufts gen. loose. Stem elongate.  
      2. **Velutinae.** Leaves very small. Tufts compact pulvinate very low.  
         **b.** Leaves smooth or (in *G. cespiticia*) papillose, us. acuminate, patent when moist; cells small; hairpoint often long. Often monoecious. Tufts us. pulvinate.  
   3. **Pulvinatae.** Leaves gradually narrowed or obtuse, not sheathing; cells us. short. Capsule often striate; pedicel often curved.  
   4. **Alpestriformes.** Leaves abruptly narrowed from half-sheathing base; basal cells often long. Capsule not striate; pedicel r. curved.  
   **c.** Leaves papillose crenulate, appressed when dry; cells small.  
   5. **Andreaeoidae.** Capsules unknown.  

**III. Pseudo-Racomitrium.** Leaves ovate-lanceolate or sublinear; cells (princ. the upper basal) sinuous, the inner basal narrow-linear. Capsule as in *Eu-Grimmia.*  
   **a.** Leaves carinate above, often recurved below.  
      **aa.** Leaves (princ. the younger) papillose. Dioecious.  
      1. **Papillosa.** Leaves not crisped but often nearly appressed when dry. Pedicel of capsule arcuate.  
      **bb.** Leaves smooth. Often monoecious.  
      2. **Crispulae.** Leaves very narrow sublinear us. crisped. Pedicel of capsule arcuate or straight. Dioecious very r. fruiting.
3. **Trichophylloideae.** Leaves less narrow, ovate-lanceolate not crisped. Capsule often striate-sulcate; pedicel arcuate when moist. Plants often robust.

   b. Leaves channelled above, not recurved.

5. **Unicoloriformes.** Leaves smooth us. narrowly ovate-lanceolate, not or faintly crisped; upper cells us. opaque. Pedicel straight or arcuate, sometimes not emergent. Dioecious.

IV. **Pseudo-Schistidium.** Leaf-cells sometimes sinuous. Capsule immersed longer than pedicel; lid not styloic.
   1. **Piliferae.** Leaves channelled or near apex carinate, recurved below at both sides; cells sinuous. Peristome present. Dioecious.
   2. **Crinitae.** Leaves concave not recurved; cells often not sinuous. Peristome present or wanting. Us. monocoeious.

V. **Schistidium.** Leaf-cells sometimes sinuous. Capsule immersed longer than pedicel; lid styloic. Monoecious.
   1. **Platyphylloideae.** Leaves channelled; cells gen. not sinuous.
   2. **Apocarpaceformes.** Leaves carinate; cells not r. sinuous.
      1. Streptophyllum Kindb.
   A. Leaves sublinear-subulate, gradually or nearly gradually narrowed from the not distinctly sheathing and (when moist) not appressed base; hairpoint short often wanting.

1. **G. torquata** Hornschuch.

2. **G. prolifer** C. M. et Kindb. cat. Can. m.
   Leaves nearly gradually narrowed, spreading when moist; cells thin-walled faintly yellowish: basal narrow-rectangular and more or less sinuous, upper subquadrate not sinuous; costa faintly pellucid. Tufts cohering; blackish below. Capsules unknown. Stem sometimes proliferous with long green loosely foliated shoots. — Alp. rocks r. Amer. Can. Brit. Col.: Macoun; N. Foundl.: Waghorne.
B. Leaves abruptly narrowed from sheathing base; upper cells short quadrate not sinuous; hairpoint often long.


Leaves with subulate acumen, shorter than in *G. tortifolia* and not large, us. brown when moist; cells not yellow: basal rectangular, middle short-rectangular or subquadrate sinuous, upper dusky very small and not well-defined; costa brown opaque; hairpoint often long. Capsule with arcuate pedicel. Tufts not cohering, blackish or r. pale brown. Less r. fruiting. — Alp. rocks. Eur. not r. Norway, Switzerland! Sweden: R. Hartman. France: Husnot. Amer. Greenl.: Berggren.


Leaves small and short, subovate-oblong with acute or subobtuse acumen, us. dark green when moist; cells gen. not yellow: nearly all quadrate and not distinctly sinuous, only the lowest basal rectangular hyaline; upper cells well-defined larger than in the last and not dusky; costa not opaque; hairpoint very short us. wanting. Capsules unknown. Tufts densely cohering, dark green when dry. — Alp. rocks r. Eur. Norway in Dovrefjeld!

*G. calvescens* Kindb. enum. bryin. dovr. — G. imberbis Kindb. botan. notiser.


*G. pellucida* Kindb. in Hedwigia 1896 p. 64.


*G. pseudo-torquata* Kindb. n. subsp.

*G. Ryani* Kaurin.

Resembling a large form of *G. funalis* and more robust. Leaves large broadly ovate-lanceolate acute, gen. brownish or the uppermost pale yellow when moist; basal and middle cells sinuous and rectangular; costa brown opake; hairpoint often present. Capsule with arcuate pedicel. Tufts gen. not or loosely cohering when moist, brown when dry, often high. — Alp. rocks r. *Eur.* Norway!; Ryan, com. E. Nyman.

II. Eu-Grimmia.

1. Molliformes.


Leaves crowded not carinate, oval-ovate or broadly ovate-oblong; those of stem gen. acute, those of branches obtuse; the acute leaves often furnished with a short hairpoint, the others muticous. Perichetial leaves short-acuminate often with longer hairpoint. Capsule smooth suboval not wholly exserted above perichetial leaves; lid short-apiculate; pedicel straight longer than capsule; calyptra cucullate. Tufts cohering and brown-green when dry, about 2 c. m. or lower. R. fruiting. — Moist alp. rocks r. *Eur.* Norway: Hj. Holmgren, detector of this species. Sweden: E. Nyman. France: Husnot. *Amer.* Greenl.; Berggren.

*G. submersa* Kindb. n. subsp.

Leaves obtuse muticous decurrent loosely disposed; the perichetial obtuse or subacute r. with short hyaline point. Capsule wholly exserted. Tufts dark green, less or not cohering. Stem 3—5 c. m. or much longer. Very r. fruiting. — Rocks in alp. rivulets r. *Eur.* Norway!; Kaurin.

2. Velutine.


Leaves broad-ovate subobtuse, carinate above, not recurved; cells subquadrate, the upper dusky; hairpoint sometimes present. Capsule suboval red-brown not striate; lid conic; pedicel arcuate or finally erect. Tufts dark green when dry, about 0,5 c. m. high. — *Amer.* r. U. S. Calif.: Mrs Mann, com. C. Mueller.


Leaves as in the last but recurved all around and not carinate; cells subquadrate pellucid; hairpoint r. present. Tufts brown and velvetlike when dry, low as in the last but more compact. Capsules unknown. — Dry rocks r. *Amer.* Can. Brit. Col.: Macoun.
3. Pulvinatae.

A. Leaves carinate above. Pedicel of capsule arcuate when young and moist. Us. monoecious.

Leaves gen. ovate-oblong, more or less recurved below. Capsule emergent brown striate either oval-oblong rostellate or broad-oval with mammilate lid; calyptra mitriform. Tufts 1—2 c. m. high. — Rocks and stone-walls in lower districts. Eur. not uncommon. Sweden, Germany, Switzerland; Greece: Heldreich. Amer. Can.: Macoun.

Leaves narrower, recurved all around, often with propagula; basa' cells rectangular. Capsule smooth; lid rostellate. Dioecious. — Amer. r. Idaho: Leiberg; Britton l. c.


B. Leaves neither carinate nor recurved. Capsule not striate; pedicel not arcuate when moist. Dioecious.

Leaves broadly ovate-lanceolate obtuse concave; basal cells subquadrate; hairpoint nearly smooth and long. Capsule oval reddish brown scarcely emergent; lid short-apiculate; annulus revoluble; calyptra mitriform. Tufts about 1,5 c. m. high. — Siliceous rocks. Eur. not r. in lower districts. Sweden, Switzerland.

*G. sarcocalyx* Kindb. cat. Canad. m.
Leaves with more distinctly denticulate hairpoint. Capsule broad-oval more emergent by the twice longer pedicel; lid obliquely rostellate. — Subalp. regions r. Amer. Can.: Macoun.

Leaves ovate-lanceolate channelled; lowest basal cells short-rectangular; hairpoint short or none. Capsule oblong pale brown small; lid apiculate or rostellate; calyptra cucullate; pedicel curved when dry. Tufts about 1,5 c. m. high, blackish when dry. — Rocks in alp. region r. Amer. Can. Brit. Col.: Macoun. U. S.: Roell.


Leaves ovate-oblong obtuse, not recurved below, suberect when moistened; hairpoint very short and us. wanting. Capsule oblong-cylindric chestnut-brown; lid conic; pedicel straight. Tufts olive-green 0.5—2 c. m. high, very dense. Dioecious. — Rocks and stone-walls r. Eur. Switzerl!. Austria: Schimper. France: Husnot.

*G. arctica C. Mueller.

> Leaves shorter, cucullate at apex. — Amer. Greenl.: C. M. in Lange, Greenl. fl.

B. Leaves not or (sometimes in G. alpestris) faintly sulcate, smooth.

a. Leaves channelled, not recurved below. Capsule long-exserted. Us. dioecious.


Leaves ovate-oblong, involute above, suberect when moist, appressed when dry, the uppermost not larger; basal cells gen. short, the upper short opake; hairpoint not long. Capsule suboblong brownish; lid apiculate; annulus indistinct; pedicel straight. Tufts cohering us. blackish when dry, about 3 c. m. high. — Amer. r. Greenl.: Berggren. Can. Cypress hills; Macoun.
*G.labradorica* Kindb. n. subsp.

Tufts about 1 c. m. high, brown-green. Inner (lower) basal leaf-cells long. Lid of capsule obliquely rostellate. — *Amer.*

r. Can.: Northern Labrador: Macoun 1896.


Leaves very broad at base, broadly ovate-oblong, us. recurved in upper part, patent when moist, the uppermost not larger; basal cells short somewhat large, the upper short opaque; hairpoint us. wanting, in perichetal leaves somewhat long. Capsule oblong-oval brownish; lid muticous or obliquely rostellate; annulus indistinct; pedicel us. curved when dry. Tufts us. cohering, blackish when dry, about 1 c. m. high. — Rocks in alp. region r. *Amer.* Pacif. distr. Can.: Macoun. U. S.: Roell; Henderson, com. Cardot.

**b.** Leaves carinate. Capsule us. not exserted above perichetal leaves.

17 *G.montana* Bryol. eur.


18 *G.alpestris* Schleicher.

Leaves broadly ovate-lanceolate or ovate-oblong, not recurved below, gen. patent when moist; basal cells short; hairpoint long nearly smooth. Capsule brown us. oblong-cylindric; lid muticous; annulus indistinct; pedicel straight. Tufts us. cohering, blackish or grayish green when dry, glaucous green when moist, about 1 c. m. high. Us. dioecious. — Alp. rocks. *Eur.* less r. Norway, Switzerl., Spain! *Amer.* r. Can.: Macoun.

*G.Ungerri* Juratzka.


*G.subsulcata* Limpricht.

Leaves ovate-lanceolate recurved below at both sides, spreading when moist; inner basal cells quadrate, the alar rectangular; hairpoint long rough. Capsules unknown. Tufts fuscous-green above, 1—3 c. m. high. Stem with brood-corpuscles. — Rocks r. *Eur.* Engi.; H. Boswell. Belgium: Gravet.
5. *Andreaeoidae.*

×Leaves obtuse muticous concave not carinate and not recurved; appressed when dry; the uppermost suddenly larger from ovate-oblong base gradually acuminate; the lower and those of shoots ovate-oblong very small; upper cells round-oval, lower gen. rectangular; costa with brood-corpuscles. Capsules unknown. Tufts reddish or blackish brown. Stem 1,5 c. m. high or lower with numerous shoots. Allied to *G. torquata*, but leaves not are twisted. — Rocks in alp. region r. *Eur.* Austria: Breidler.:

III. Pseudo-Racomitrium Kindb.

1. Papillose.

Leaves ovate-lanceolate acute, recurved below to middle on both sides; middle cells subquadrate or short-rectangular; alar cells rectangular; costa papillosa; hairpoint nearly smooth often long. Capsule oval sulcate or costate; lid rostrate; pedicel often not emergent above perichetal leaves. Plants robust often high. Tufts loose, blackish below, fuscous green above. — Rocks prin. below alps. *Eur.* not r. Sweden, Switzerl.! Norway: M. N. Blytt. *Amer.* *Greenl.:* Vahl.:

Leaves more distinctly papillos, less acute, more appressed when dry; hairpoint short or wanting. Tufts lower (about 3 c. m.) blackish green more dense. Capsules not found. — Alp. rocks r. *Eur.* Norway!

*G. anomala* Hampe.
×Leaves subobtuse often with brood-corpuscles at apex; hairpoint short dentate or wanting. — Alp. rocks r. *Eur.* Austria and Switzerl.:

Leaves ovate-lanceolate acute, not distinctly recurved below at one side, subfalcate when moistened; nearly all cells rectan-

> Leaves curved at apex, revolute to above middle; lower cells short. Capsule globose. Plants small. — Eur. r. Italy: Notaris: C. M.

2. Crispuleae.


Diffs from the last: Leaves falcate muticous not thickened at borders; cells brown, the lower less elongate; costa brown, stouter and subexcurrent. Tufts loose blackish. > Capsule larger; annulus none: Lesq. et Jam. — Higher alp. region r. Amer. U. S. Calif.: Bolender, com. C. Mueller.


Leaves sublinear subobtuse with thickened borders, crisped when dry, patent-erect when moist; cells pale green in younger state: the middle short-rectangular, the upper round-quadrate sinuous, the alar subquadrate; costa very stout; hairpoint very short nearly smooth us. wanting. Capsule oblong-cylindric or oval; annulus broad; pedicel straight. Tufts very tomentose, blackish when dry, brown-green when moist, often high. — Alp. region princ. on copper-rusty rocks r. Eur. Norway, Spain! Austria: Schimper.

3. Trichophylloideae.

**A.** Leaves narrow, not recurved below, nearly flat at borders. Tufts dense and cohering, about 1—2 centim. high. Capsule small not striate.
a. Capsule nearly immersed, scarcely emergent above pericentral leaves; calyptra cucullate. Dioecious.

Leaves long, nearly appressed when dry; nearly all cells sinuous, middle rectangular; hairpoint long nearly smooth. Capsule very small; lid with short conic or oblique beak. Tufts 1—2 c. m. high. Leaves often with brown branched brood-filaments. — Amer. r. Can. Brit. Col.: Macoun.

b. Capsule distinctly emergent, yellowish; calyptra mitriform. Monoecious.

27. G. apiculata Hornschuch.

Differs from the last: Leaves with longer hairpoint; nearly all cells narrow. Capsule oblong with wider mouth; lid with longer beak. Tufts about 2 c. m. high. — Higher alp. region r. Eur. Austria: Breidler.

Leaves subacute very narrow sublinear; cells faintly sinuous nearly all short, the lowest rectangular; hairpoint long smooth. Capsule subovate; lid obtuse muticous. Tufts less than 1 centim. high. — Rocks and stone-walls also in alp. region r. Eur. Switzerland Belgium: Schimper.

B. Leaves more or less recurved. Stem often long.

a. Angular (alar) leaf-cells indistinct or uniseriate. Dioecious. Leaves with obsolete or wanting hairpoint.

Differs from other species in the at back bilamellate costa of leaves.
Leaves long, recurved below middle at both sides, nearly appressed when dry; nearly all cells us. sinuous, the middle and alar subquadrate or short-rectangular, the inner basal long. Capsule subovate pale brown not striate; lid rostrate. Tufts us. loose and green; stem 5—10 c. m. long, r. shorter. Resembles some species of Racomitrium. Not r. fruiting. — Moist quartzose rocks also below alps. Eur. not r. Sweden common, Norway, Switzerland, Spain! Amer. Can.: Drummond; Macoun.
*G. subsimplex* Kindb. bull. soc. bot. ital. 1895.

Stem nearly simple, 3—4 c. m. high. Leaves less appressed when dry, not recurved below at one side, sometimes with brood-corpuscles; upper cells not sinuous. Capsules unknown. Habit of *G. Hartmani*. — Siliceous alp. rocks r. *Eur.* Switzerl. near Goeschenen!


Leaves long, not recurved above at least at one side, faintly crisped and not appressed when dry; nearly all cells sinuous, the middle rectangular, the upper subquadrate. Capsule small oval, striate or plicate when dry; lid with very short oblique beak. Tufts 3—6 c. m. high, dark green, finally blackish brown. — Rocks in brooks of higher alp. region r. *Amer.* Pacif. distr. Can. 1800—2100 metr. a. s.: Macoun.


32. *G. trichophylla* Greville.


33. *G. Muehlenbeckii* Schimper.


34. *G. californica* Sullivant.

G. Watson} Lesquereux et James.

*Leaves scarcely hair-pointed. Capsule oval-oblong. — Amer.

U. S. Calif.; Lesq. et J.

35. G. depilata Kindb. cat. Canad. m.

Leaves somewhat small, gen. obtuse and hairless, r. with obsolete hairpoint, recurved below at both sides; middle cells quadrate, the upper round-quadrate not sinuous. Capsule oval not sulcate, often with oblique beak. Tufts dense dark brown or dark green above, 3—4 c. m. high. — Not much distinct from the last, but approved by C. M. — Dry rocks r. Amer. Pacif. distr. Can. Vanc. isl.: Macoun. U. S.: Roell.


Plants robust. Tufts loose.

aa. Monoecious. Capsule costate. Stem about 3—4 c. m. long.


Leaves recurved below at both sides, more or less flexuous when dry, the uppermost very long, middle cells rectangular, the upper subquadrate distinctly sinuous; hairpoint us. long and rough. Capsule oval. Perichetal leaves subulate-acuminate. Tufts blackish below, yellowish green or brown above. — Siliceous rocks also below alps. Eur. Sweden, Switzerland.


37. G. Hartmani Schimper.

Leaves long, not distinctly recurved below at one side, more or less flexuous; middle and upper cells roundish-quadrate sinuous, nearly all basal short, the alar not hyaline; hairpoint short rough or wanting, often destructed by brood-corpuscles. Capsule oval. Tufts us. green and 5—10 c. m. high. Very r. fruiting. — Rocks often below alps. Eur. not r. Sweden common, Switzerland. Corsica fruiting: Philibert.

38. G. arcuatifolia Kindb. bull. Torr. club XVI.

Leaves long, recurved below at both sides, distinctly falcate when moist, not flexuous when dry; middle cells rectangular, upper subquadrate not sinuous. Upper leaves gradually larger upwards; hairpoint short rough. Capsules unknown. Tufts dark green above, about 5 c. m. high. — Dry rocks r. Amer. Can., Vanc. isl.: Macoun.

39. G. canadensis Kindb. n. sp.

Leaves somewhat long, recurved below at both sides, flexuous when dry; middle cells rectangular, the upper subquadrate
distinctly sinuous, the alar hyaline very numerous. Capsule small oval. Tufts yellowish or brownish green, 4—5 cm. high. Branches curved. — Amer. r. Can. Vanc. isl.: Macoun.


Leaves long, recurved nearly all around, nearly appressed when dry; cells yellow, the upper short and not or faintly sinuous, the alar few, the inner basal long; hairpoint short and rough, sometimes wanting. Tufts brownish. Stem 5—10 cm. long. Habit of **G. patens**. — Amer. r. Can. Vanc. isl.: Macoun. (U. S.: Leiberg ?)

4. **Ovataformes.**

A. Tufts cohering, us. pulvinate. Stem 1—2 cm. high. Gen. monoecious, us. fruiting.


Lower leaves small, the upper ovate-lanceolate, recurved below at one side, nearly appressed when dry; middle and upper cells short indistinctly sinuous, the alar quadrate or short-rectangular; hairpoint us. long and nearly smooth, sometimes wanting. Capsule brown oblong-oval; lid rostellate; annulus deciduous; calyptra us. mitriform. Tufts us. greenish. Monoecious. — Rocks also below alps. Eur. common in northern districts. Sweden, Norway, Switz. ! Amer. Can.: Macoun.

* **G. Hausmanni** Notaris.


42. **G. sessitana** Notaris.


43. **G. Donii** Smith.

Leaves not long, not recurved at base; upper cells subquadrate sinuous, middle short-rectangular, the alar and the very narrow (inner) basal longer; hairpoint long nearly smooth. Capsule oval pale-yellow; lid mamillate; calyptra us. mitriform; pedicel not or scarcely emergent above perichetal leaves. Tufts small dusky or blackish green, us. about 1 cm. high or lower. Monoecious. — Alp. regions. Eur. gen. r. Norway! Amer. r. Can.: Macoun.
44. **G. microtricha** C. M. et Kindb. 1. c.


B. Tufts not or loosely cohering, 3—8 c. m. high. Gen. dioecious r. fruiting.
   a. Leaves sublinear subobtuse, appressed when dry; lower cells not sinuous; hairpoint us. indistinct.

45. **G. elongata** Kaulfuss.

Leaves somewhat e'ort and short-acuminate, faintly recurved below at one side; cells yellow in younger state: upper round-quadrate sinuous, middle and alar short-rectangular; hairpoint short often wanting. Capsule oval pale brown; lid short-conic obtuse. Tufts blackish when dry, brown-green when moist, somewhat low and more cohering in fruiting state. — Alp. region r. **Eur.** Norway! Austria: Venturi. **Amer.** Can.: Macoun.

b. Leaves ovate-lanceolate acute, nearly appressed when dry; nearly all cells (exc. at base near costa) sinuous. Upper leaves with short hairpoint.

46. **G. microcarpa** Gmelin. — Bryum Gm.; Grimmia Lindb.; Racomitrium sudeticum Br. eur.

Leaves more or less recurved below; upper and middle cells short, the alar uniseriate quadrates more dilated. Capsule sub-oval small; lid rostrate. Perichetial leaves with sublinear acumen. Tufts blackish or dark brown when dry. — Moist alp. rocks gen. r. **Eur.** Norway, Spain! **Amer.** Can. Brit. Col.: Macoun.

47. **G. attenuata** C. M. et Kindb. — Racomitrium C. M. et Kindb. 1. c.

Leaves recurved nearly all around, suberect and nearly straight when moist; upper cells short, the middle rectangular, the alar long narrow often pluriseriate. Capsule suboval; lid subobtuse or apiculate. Tufts fuscous green above, blackish below. Habit of **G. elatior.** — Alp. region r. **Amer.** Can. Brit Col.: Macoun.

c. Leaves sublinear acute appressed when dry; lower basal cells not sinuous; hairpoint of upper leaves long. Dioecious. Capsules unknown.
48. *G. Stirtoni* Schimper; Braithwaite.

Leaves not recurved; lower basal cells rectangular, the others small subquadratc. — Rocks r. *Eur. Scotl.*; Braithwaite.

5. Unicoloriformes.

A. Lower leaf-cells very sinuous.

49. *G. elliptica* Turner. — Dicranum Turn.; Grimmia Arnott; Racomitrium Br. eur.


B. Lower leaf-cells not sinuous.


50. *G. unicolor* Hooker.

Leaves often faintly crisped when dry; cells faintly sinuous, nearly all short yellow, uppermost opake very small. Capsule brown oval-oblung; lid rostellate; calyptra us. mitriform. Tufts about 4 c. m. or higher, blackish or brown-green when dry. R. fruiting. — Wet rocks often near cascades prince. in alps. *Eur. less r. Norway, Switzerl. Amer. r. Can.: Macoun.*

b. Leaves acute with often long hairpoint. Pedicel arcuate. Tufts densely cohering.

51. *G. Olneyi* Sullivant icon. muscor.

Leaves appressed when dry, upper very long; cells greenish: inner basal rectangular, alar quadratc, middle less distinctly sinuous, upper opake very small. Capsule brown oval; lid rostrate; calyptra cuculate; pedicel short not emergent; annulus revoluble. Tufts 2—3 c. m. high us. grayish green. — *Amer. r. Can.: Macoun. U. S.: Sullivant et Lesq., com. C. Mueller.*


Differs from the last: Leaves longer and subflexuous, less appressed when dry; middle cells distinctly sinuous. Pedicel longer; calyptra mitriform. — *Amer. r. U. S. New Jersey*: Austin, com. Macoun.


Leaves brittle nearly appressed; nearly all cells short: basal short-rectangular larger, alar rectangular hyaline, middle quadratc sinuous, upper opake very small; hairpoint rough, in uppermost leaves long. Capsule pale brown small oblong; lid obliquely rostellate; calyptra unknown; pedicel short but emer-
gent. Tufts fuscous about 1 c. m. high. — Granitic blocks in subalp. region r. Eur. Portugal: E. Levier.

IV. Pseudo-Schistidium Kindb.

1. Pilifere.

54. *G. pilifera* Palisot de Beauvois; C. M. — Weisia Roehling; Grimmia pennsylvanica Sulliv. icon. musc.

Leaves long ovate-lanceolate acute, not appressed but faintly flexuous when dry; upper cells subquadrate sinuous, the others rectangular exc. the subquadrate alar; hairpoint brown below, not long. Capsule oval; lid rostrate; calyptra mitriform; pedicel straight; annulus broad revoluble. Tufts loose brown about 2 c. m. high. — Amer. Can.: Drummond n. 56, com. Macoun. U. S.: Austin, com. Macoun; Sullivant, com. C. Mueller.

2. Crinitæ.

A. Annulus of capsule broad revoluble; peristome present.

a. Leaves short obtusate obtuse concave; cells sinuous. Capsule red-brown, rugose when dry; pedicel curved; calyptra cuncillate. Monoecious.

55. *G. crinita* Bridel.


b. Leaves somewhat long-acuminate acute carinate above; cells sinuous. Capsule pale yellow not rugose; pedicel straight; calyptra mitriform. Monoecious.

56. *G. triforimi* Carestia et Notarisi.

Lower leaves small; upper larger and broadly ovate-lanceolate, not appressed when dry, us. curved when moistened; cells yellowish small quadrates exc. the rectangular lower basal, alar hyaline numerous; hairpoint nearly smooth, in upper leaves long. Capsule subglobose-cyathiform; lid convex mamillate. Tufts green 1—2 c. m. high. — In alps r. Eur. Switzerl. Italy: Carestia, com. Geheeb.


c. Leaves gen. long-acuminate, sometimes papillose near apex; cells not sinuous. Pedicel of capsule straight. Dioecious.

58. G. tergestina Tommasini.

Leaves with thickened borders, ovate-lanceolate somewhat large: upper with long faintly denticulate hairpoint; basal cells narrow-rectangular, the others short; costa not dilated above. Capsule brown suboval; lid rostellate. Tufts pulvinate often 2—3 c. m. high, grayish when dry. — Calcareous rocks and stones r. Eur. southern distr. Switzerland: Austria: Schimper; Roell. Italy: Bottini. France: Philibert.

B. Leaves smooth gen. obtusate: lower obtuse muticous. Pedicel of capsule curved; annulus narrow persistent. Monoeccious.

a. Peristome present.

59. G. plagiopodia Hedwig.

Upper leaves oblong with nearly smooth not long hairpoint; cells not sinuous. gen. short, basal larger. Capsule pale brown subglobose or broad-oval; lid nearly flat or subconvex, mammillate or apiculate; teeth orange. Tufts green or brown-green not cohering, scarcely 1 c. m. high. — Dry rocks prince. of sandstone. Eur. less r. in southern distr. Germany: Schimper; Schulze. France: Husnot m. gall. Amer. r. Can.: Macoun.

*G. Brandegei Austin.

Perichetal leaves hyaline above often to ridged; hairpoint rough very long. Capsule subglobose; pedicel very short. — Amer. r. Can.: Macoun.

b. Peristome us. warting.

60. G. anodon Bryol. eur.

Upper leaves narrowly ovate-oblong acute with long nearly smooth hairpoint; cells not sinuous: basal narrow-rectangular, the others short; costa broader above. Capsule red-yellow broad-oval, finally subpomiform; lid low subconvex mammillate or apiculate; peristome none. Perichetal leaves larger and longer; basal cells very long. Tufts not or loosely cohering grayish green about 1 c. m. high. — Dry rocks also in alps. Eur. less r. Norway! Germany: Schimper. Austria: Venturi. Amer. r. Can.: Macoun.


Differs from the last: Leaves broader, ovate or broadly ovate-oblong obtuse without hairpoint; cells often sinuous gen. sub-

1. Platiphyloideae.

A. Leaves not appressed when dry; hairpoint wanting.

a. Leaves denticulate near the obtuse apex, broadly acuminate.

62. G. rivularis Bridel.


b. Leaves entire nearly subulate.

63. G. maritima Turner.

Leaves ovate-lanceolate recurved crowded us. crisped when dry; the upper with us. excurrent costa. Capsule as in the last; teeth orange; lid rostellate; calyptra us. cucullate. Tufts dense pulvinate 1—2 c. m. high. — Rocks near sea or larger lakes. Eur. not r. Sweden! Ireland: Schimper. France: Le Jolis. Amer. Can.: Macoun; Roell; Waghorne.

* G. Agassizii Sulliv. et Lesq. — Schistidium S. L.; Grimmia Lq. et J.; G. crassinervis C. M.

Leaves less crisped; costa not or indistinctly excurrent. Lid of capsule sometimes with shorter point. — Amer. Can.: J. Macoun; Waghorne. Alaska: J. M. Macoun.

64. G. cinctidondontea C. Mueller

Leaves narrowly ovate-lanceolate not recurved, loosely disposed, falcate when moistened; costa long-excurrent. Capsule subglobose; teeth red; lid rostellate; calyptra mitriform; C. M. Tufts not cohering; stem about 4—5 c. m. long. — Amer. r. Pacif. distr. U. S.: Roell, com. C. Mueller.

B. Leaves entire nearly or completely appressed when dry, often with hairpoint. Stem erect.

a. Stem-leaves short obtuse ovate or ovate-oblong.

65. G. platiphylla Mitten.

Leaves subovate muticous more or less recurved and not large, appressed when dry, not curved when moistened; peri-
ochetal not much larger. Capsule subglobose; teeth red; lid short-pointed or mamillate; calyptra cucullate. Tufts 1—3 c. m. high, somewhat loose us. green. — Alp. rivulets r. Eur. Norway! Amer. Can.: Macoun.


Leaves small ovate-oblong muticous or with short rough hairpoint, not recurved, nearly appressed when dry, curved when moistened; perichetal not much larger with longer hairpoint. Capsule subglobose or broad-oval; teeth orange; lid short-pointed; calyptra mitriform. Tufts dense 1—1,5 c. m. high. — Higher subalp. region r. Eur. Switzerl!

b. Stem-leaves ovate-lanceolate. Tufts dense.


Leaves somewhat large acuminate, recurved only in middle, with nearly smooth often long hairpoint; perichetal larger and more recurved. Capsule subglobose finally turbinate; teeth orange often rudimentary or wanting; lid mamillate; calyptra mitriform. Tufts 0,5—1,5 c. m. high often green. — Rocks and stone-walls r. Eur. Switzerl., Italy! Austria; Breidler.

68. G. alpicola Swartz.

Leaves not large, broadly acuminate subobtuse and recurved, muticous or with indistinct hairpoint; perichetal not much larger. Capsule suboblong often nearly exserted; teeth red; lid short-pointed; calyptra cucullate. Tufts 1—5 c. m. high us. brown or brown-green. — Moist alp. rocks r. Eur. Switzerl., Norway! Amer. Can.: Macoun.


Leaves small narrowly acuminate nearly subulate, not distinctly recurved, with an often long rough hairpoint; perichetal green larger and longer. Capsule oblong; teeth orange very crizbose. Tufts 1—1,5 c. m. high dark green or grayish when dry. — Alp. rocks r. Amer. Can. Brit. Col.: Macoun.

2. Apocarpaceae.

A. Leaves prince. the youngest serrulate above often to middle; cells sinuous; costa rough at back.

70. G. graciles Schleicher.

Leaves not large, ovate-lanceolate broadly acuminate recurved, nearly appressed when dry, curved when moistened; perichetal larger; hairpoint rough often long. Capsule oblong; teeth fer-
ruginous below, pale yellow above; lid rostellate; calyptra cucul-
late or mitriform. Tufts loose often pale brown. Stem 2—10 c. m. long, sometimes decumbent. — Rocks also in alps not r. 
71. G. pseudo-rivularis Kindb. n. sp. 
Differs from the last: Leaves larger and broader, narrowed to a short-subulate point, patent when dry; cells less sinuous; costa subexcurrent rough only in upper part. Capsule oval; teeth red; calyptra mitriform. Stem long decumbent. Tufts green. — Amer. r. Can.: Macoun. 
* G. lancifolia Kindb. n. subsp. — G. coloradensis Austin ? 
Leaves narrower and less acute sometimes with obsolete rough hairpoint; costa not excurrent. Stem not long. — Wet rocks r. Amer. Can.: Macoun.
B. Leaves entire or near apex faintly serrulate, us. curved when moistened; costa smooth or near apex faintly rough. Stem us. erect.
a. Leaves recurved, the perichetial much larger.
72. G. apocarpa L. — Bryum L.; Grimmia Hedwig. 
Leaves broadly acuminate us. ovate-lanceolate and not appressed when dry, gen. with rough hairpoint; cells us. papillose and faintly sinuous. Capsule suboval; teeth red; lid rostellate; calyptra mitriform. Tufts us. loose. — Rocks also in alps common. Eur. Sweden, Norway, Switz. ! Amer. Can.: Macoun; Waghorne.
* G. pachyneurula C. M. et Kindb. l. c. 
73. G. pruinosa Wilson. — G. ambiguus Sulliv. icon. m. 
74. G. atrofusca Schimper. 
Leaves small short ovate or oval-oblong us. muticous, appressed when dry; cells not sinuous. Capsule sub-lunul; teeth reddish orange short and not perfectly evolute; lid rostellate; calyptra mitriform. Tufts loosely cohering about 2 c. m. high,
blackish when dry. — Higher alp. region princ. on summits r. Eur. Switzerl. 1700 metr. a. s.l

b. Leaves not recurved; the perichetial much larger.

75. G. atricha C. M. et Kindb. l. c.

Leaves small short ovate-oblong subtuse muticous, appressed when dry. Capsule suboblong; teeth yellow or hyaline above, orange near base; lid rostrate. Tufts densely cohering about 1 c. m. high, dark green or fuscous when dry. — Alpine rocks r. Amer. Can. Brit. Col. 1250 metr. a. s.; Macoun.

c. Leaves recurved; the perichetial not much larger.

76. G. conferta Funck.

Leaves broadly ovate-lanceolate subacute smooth not large, often with rough hairpoint, us. appressed when dry; cells not distinctly sinuous. Capsule oblong-oval; teeth orange; lid apiculate; calyptra mitriform. Tufts dense but loosely cohering, 1—2 c. m. high, fuscous when dry. — Rocks not common. Eur. Sweden! Lindberg. Switzerl! Amer. Can.: Macoun; Waghorne.

* G. tenera Zetterstedt.


103. Racomitrium Bridel.

A. Leaves with papillose hyaline hairpoint or acumen. Beak of calyptra rough above.

1. Lanuginosa. Leaves fimbriate at acumen; green cells smooth. Capsule longer than beak; pedicel rough.

2. Canescentia. Leaves serrulate at acumen; all cells us. somewhat long papille. Capsule gen. not longer than beak; pedicel smooth.

B. Leaves hairless or with a serrulate not papillose hairpoint. Capsule gen. longer than beak; pedicel smooth. Beak of calyptra sometimes wholly rough (viz. in R. fasciculare).


4. Lævifolia. Leaves smooth us. with long hairpoint.

1. Lanuginosa.


Leaves long ovate-lanceolate recurved below; green cells gen. narrow, the alar rectangular; costa smooth. Pedicel short. Stem ramose often to 10 c. m. long. — Stone and stony ground also

2. Canescentia.

2. *R. canescens* Weis. — Hypnum Weis; Racomitrium Brid.
Leaves from broad ovate-oblong base gen. abruptly tapering to a subacute acumen, recurved nearly all around; upper and alar cells subquadrate, the others rectangular; costa rough at back, us. abbreviate; hairpoint r. short or indistinct. Pedicel us. long. — Stone ground also in alps common. Eur. Sweden, Norway, Switzerland! Amer. Can.: J. Macoun; Waghorne. Alaska: J. M. Macoun. U. S.: Roell.

* R. subfasciculare* Kindb. n. subsp.

* R. muticum* Kindb. bin. To. r. club XVII.


3. Papillosa.

A. Leaves very broadly acuminate or obtusate, arrounded at the us. dentate apex, short broad and channelled, without hairpoint; costa not percurrent. Stem without nodose branchlets.


Leaves us. green or blackish when dry; upper cells rotundate. Capsule suboval; teeth deeply cleft; pedicel somewhat long. — Wet stones also in alps. Eur. nearly common. Sweden, Switzerland, Spain! Amer. Can.: J. Macoun; Waghorne. Alaska: J. M. Macoun.


B. Leaves narrowly acuminate entire.
a. Capsule large subcylindric; pedicel about 2 c. m. long. Leaves long gradually acuminate acute or subacute carinate, often with hairpoint; costa gen. percurrent. Stem r. with short nodose branchlets.


8. R. levieri Kindb. n. sp. Leaves dark green or finally blackish brown, acute at apex, not recurved above or at one side, appressed when dry; upper cells subquadrate, the lower rectangular; costa finally brown; hairpoint none. Perichetial leaves more or less acuminate; costa percurrent or slightly excurrent. Peristomial teeth deeply cleft not partite. Stem without short branchlets. Tufts blackish brown when dry. — Alp. granite rocks r. Eur. Portugal: E. Levier.

b. Capsule small gen. suboval; pedicel about 1 c. m. or shorter. Leaves gen. without hairpoint us. carinate.

aa. Leaves not recurved above or at one side, obtuse or subobtuse at apex; upper cells subquadrate; hairpoint none or indistinct. Peristomial teeth deeply cleft not partite. Stem without nodose branchlets.

10. R. depressum Lesquereux.

Resembling the last. Leaves broadly ovate, lanceolate above, obtuse, sometimes slightly denticulate at apex; upper cells broadly ovate. Capsule subcylindric immersed on a very short pedicel. Stem very long. — Amer. r. U. S.: Calif.: Bolender:
Lesq. et Jain.

11. R. Macounii Kindb. bull. Torr. club XVI.

Leaves long, subobtuse at apex, not recurved at base, crisped when dry; hairpoint none or indistinct; costa percurrent finally brown. Capsule suboval exserted; pedicel 0,5 c. m. long. Tufts finally rusty or reddish brown. — Rocks and boulders in alp. region r. Amer. Can. Brit. Col. 2100 metr. a. sea: J. Macoun.

bb. Leaves recurved nearly all around, long and acute; cells us. narrow. Peristomial teeth partite. Stem often with short nodose branchlets.


Leaves longer subulate than in R. fasciculare, blackish when dry, the upper faintly crisped; cells narrow; costa percurrent or subcurrent; hairpoint none. Tufts dense 2—3 c. m. high. Pedicel very short gen. immersed. Habit of Grimmia microcarpa. Arctic district r. Amer. Alaska: Palmer; J. M. Macoun.

15. R. Jenseni Kindb. 1. c. — R. sudeticum var. papillosum Jensen.


4. *Levifolia*.

A. Leaves channelled, thickened at upper borders.


*R. obtusum* Smith. — *Trichostomum Sm.*; *Racomitrium Lindb.*


B. Leaves carinate above with not thickened borders.


*R. micropoides* Kindb. n. subsp.


Leaves as in the last; cells narrow-rectangular distinctly sinuous. Capsule small gen. suboval; teeth partite; pedicel short.
Stem with short branchlets. Tufts us. green. — Dry rocks princ. in northern alps. **Eur.** Sweden common, Norway, Switzerland. **Amer.** Can.: Drummond; Macoun; Waghorne.

104. **Campylostelium** Bryol. eur.

1. **C. saxicola** Weber et Mohr. — **Dichranum** W. M.; Campylostelium Br. eur.

Leaves from suboblong base tapering to the longer but not much narrower sublinear obtuse acumen, crisped when dry; lower basal cells large rectangular, the others small quadrate; costa narrow not excurrent. Capsule oblong-cylindric; teeth red-yellow long narrow; lid long-rostrate; calyptra lobate; pedicel yellow sometimes curved. Stem very short. Monoecious with yellow male flowers at base of stem. — Rocks princ. of sandstone, often together with **Brachydontium**, r. **Eur.** England, W. H. Pearson. **Amer.** Can.: Macoun.

*C. strictum* Solms Laubach.


105. **Coseinodon** Sprengel.

A. Leaves more or less distinctly plicate above. Dioecious.

1. **C. eribrosus** Hedwig. — **Grimmia** H.; Coseinodon Spruce.

Leaves broadly ovate-lanceolate or from subovate concave base slightly tapering to the involute scarcely longer gen. obtuse acumen, not recurved; alar cells not defined, the other basal short-rectangular pellucid, the upper subquadrate somewhat dusky; costa not excurrent. Perichetal leaves very much larger, more plicate, shorter-acuminate; hairpoint long, at base very broad. Capsule half-emergent obovate finally inclined, orange not striate; teeth orange cribrose (perforated as a sieve as in the other species), deflexed or patent when dry. Tufts compact loosely cohering about 1 c. m. high. Habit of **Grimmia crinita**. — Schistose and siliceous rocks. **Eur.** not r. Norway, Switzerland. **Amer.** r. Can.: Macoun.

*C. humilis* Mildes.

Leaves somewhat narrower r. or slightly plicate; hairpoint more rough. — Peristomial teeth sometimes less perforated. **Eur.** r. France, Switzerland.

B. Leaves not plicate. Monoecious.

2. **C. Wrightii** Sullivant icon. muscor.

Leaves very concave from subovate base abruptly narrowed subobtusate, often crenulate above, sometimes reflexed below, appressed when dry, erect when moist; cells short-rectangular;

3.C.Rauli Austin. — C. Renaudii Cardot.


Leaves ovate-lanceolate channelled, recurved below; basal cells subquadrate much larger than the upper; hairpoint long rough; costa percurrent. Perichetal leaves sublinear much longer. Capsule not or scarcely emergent above the hairpoints, oblong-cylindric smooth or slightly striate yellow or orange-colored; lid rostrate or rostellate; annulus none; pedicel straight or r. curved, longer than capsule. Stem 2—3 c. m. long or shorter. Tufts dense glaucous green. — Dry alp. rocks. Amer. Can. Pacif. distr.: Macoun. U. S. Calif.: corr. Macoun. (Mexico: Fendler, herb. Sulliv., com. C. Mueller).

106. Brachystelium Reichenbach; C. M.

A. Perichetal leaves not convolute. Peristomial teeth papillose indistinctly articulate not deflexed.


II. Notarisia. Leaves not plicate, entire or slightly sinuolate. Peristomial teeth often entire or irregularly cleft. Plants small. Habit of Weisia.

B. Perichetal leaves convolute. Peristomial teeth smooth articulate, deflexed when dry.

III. Glyphomitrium. Leaves entire not plicate. Plants small.

J. Ptychomitrium Bruch.

1.P.polyphyllum Dickson. — Bryum D.; Brachystelium Hornschuch.

Leaves from ovate-oblong subconcave broadly recurved base somewhat abruptly tapering to a long carinate nearly subulate acumen, incurved or nearly straight when moist; outer basal
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cells short-rectangular, the inner narrower, the alar brown; costa scarcely percurrent. Capsule oblong; teeth reddish below, yellowish in upper half; pedicel flexuous or arcuate when young and moistened; calyptra not long. Spores about 0,01 m. m. — Rocks and stonewalls. Eur. not r. in southern distr. France, Switzerl. Norway: R. Hartman. Spain: Lever.


II. Notarisia Hampe.


Leaves entire not involute, from short concave base contracted to the broad-subulate channelled or near apex carinate acumen, gen. acute; cells of acumen nearly opake, the marginal basal often subquadrat; other basal cells rectangular also pellucid, the inner not much narrower, the lower larger often yellowish princ. the alar; costa distinct nearly to apex. Capsule oblong with indistinct neck; pedicel rigid. Spores 0,02 m. m. — Rocks r. Eur. Portugal: Solms Laubach, com. Nathorst (Teneriffa, com. Hau not).

* B. Drummondi Hooker et Wilson. — Grimmia H. W.; Brachystelium C. M.; Ptychomitrium Sull. ic. m.


4. B. incurvum Schwägrichen. — Weisia Schw.; Brachystelium C. M.; Ptychomitrium Sull. ic. m.

Leaves entire, from short concave base contracted to the sublinear involute and at borders thickened acumen, gen. obtuse; cells of acumen opake, the lower basal rectangular hyaline; costa faint above. Capsule oval with short or indistinct neck; pedicel often curved when moistened. Spores about 0,01 m. m. Smaller than the last. — Rocks princ. of sandstone, r. Amer. U. S.: Fitzgerald, com. Renauld. »Can.: Macoun»: Lesq. et Jam.

* B. glyphomitriloides Balsamo et Notaris. — Grimmia B. et N.; Brachysteleum C. M.; Ptychomitrium pusillum Br. eur.

Leaves linear from ovate base; costa vanishing far below apex. Capsule oval; neck a third as long; teeth joined in pairs at base, sometimes connate their whole length; calyptra covering the capsule to its base. Plants very small. — On stones (?). Amer. U. S.; E. Hall: Lesq. et Jam.

III. Glyphomitrium Bridel.


Leaves narrow sublinear not or slightly reflexed below, from suboblong not well-defined base gradually tapering to a long subulate carinate acumen; nearly all cells quadrate not opaque; only the lowest rectangular not much larger; costa percurrent. Perichetial leaves suboblong apiculate; costa subexcurrent. Capsule subglobose or obovate; neck nearly half as long; teeth broad; calyptra covering capsule; annulus none. Leaves sometimes with brood-filaments. Spores 0,03—0,04 m. m. — Basaltic roks r. Eur. Scotl.; Schimper. Engl.; W. H. Pearson. Irel.: Stewart, com. Le Jolis.


Leaves lanceolate tapering to an acute or blunt point; borders recurved below to middle; basal cells oblong, the angular narrower. Perichetial leaves very broadly ovate. Capsule oval; pedicel shorter than in the last. — Amer. r. Can.; Drummond: Lesq. et Jam.


Leaves suboblong or broadly ovate-lanceolate, acute or very short-acuminate, carinate at least above, not distinctly involute; cells small rotundate, the few not well-defined alar subquadrate; costa not wholly percurrent. Perichetial leaves nearly similar but with short-rectangular cells at angles near base. Capsule subglobose-ovoid brown smooth; lid nearly flat, long-rostrate; annulus none; pedicel short. Calyptra long-rostrate reaching below the unripe capsule, finally concave and cucullate. Spores very large about 0,06 m. m. Tufts green or brown green. Dioecious. — On trees. Amer. Can. r.: Macoun. U. S.: Roell; Sullivant, com. C. M.; Fitzgerald, com. Renauld.


108. Scouleria Hooker.

A. Leaves broad, thinly or indistinctly limbate only below. Peristome gen. persistent at least partly.

1. S. aquatica Hooker. — Grimmia Scouleri C. M.

Leaves ovate-lanceolate, broader at base, below middle tapering to the contracted broad point, sharply serrate to it from middle, blackish (or only the uppermost green) and strongly appressed when dry; marginant cells opake very distinct; other cells gen. dusky thick-walled, exc. few linear not porose inner basal. Inner perichetal leaves shorter and less dusky. Perigonal leaves short suboval very obtuse. — Wet rocks r. Amer. Can.: Macoun. U. S.: Henderson, com. Cardot.

2. *S. muelleri* Kindb. cat. Canad. m.

Leaves subelliptic, broader near middle, with very short rounded broad point, sharply serrate from it to below middle, olive green and sometimes less strongly appressed when dry; cells subpellucid, the marginant pale orange not well-defined, the linear inner basal numerous porose. Inner perichetal leaves very pellucid from short dilated entire base tapering to a sublinear serrate acumen. — Wet rocks r. Amer. Can. Pacif. distr. Brit. Col. near Revelstok 1890 and Vanc. isl. 1893: Macoun.

*S. catilliformis* C. Mueller.


- Differs from *S. muelleri*: Leaves obtusely crenulate, patent when dry; upper cells dusky, the lower subpellucid, the marginant opake, the linear inner basal few not porose. Capsules unknown. — Wet rocks r. *Amer.* Pacif. distr. Can. Selkirk mts. 1885 and 1890: Macoun. (Determined by C. M.)

B. Leaves narrow thickly limbate all around. Peristome very short and brittle soon deciduous or adhering to lid.
4. S. marginata Britton.

Leaves narrowly ovate-lanceolate channelled or faintly carinate above, serrate at the obtuse acumen, blackish and nearly appressed when dry; nearly all cells uniform subquadrate exc. the outer rectangular near borders; uppermost cells more opake. Perichaetial leaves similar but longer acuminate. — Rocks above the water-line r. Amer. U. S. Calif.: Marshall A. Howe.

Fam. 24. Weisiaceæ.


A. Basal tube of peristome elongate. Pedicel straight.


2. Ruraliformes. Leaves us. lingulate-spathulate, with hairpoint (exc. B. mutica); basal cells us. long. Us. dioecious.


B. Basal tube of peristome very short or indistinct.

a. Leaves mamillose. Peristome sometimes not contorted. Pedicel straight or curved.

II. Timmiella. Leaves long sublinear, often serrulate above, neither reflexed nor limbate, curled when dry; basal cells rectangular; costa r. excurrent. Capsule cylindric often large.

b. Leaves papillose. Peristome not contorted. Pedicel straight or curved.

III. Zygotrichia. Leaves ovate-oblong or ovate-lanceolate reflexed r. with hairpoint; basal cells large rectangular.

1. Orthopodiaæ. Pedicel straight. Spores about 0.02 mm. Leaves not limbate.

2. Camptopodiaæ. Pedicel arcuate when moist. Spores about 0.04 mm. Leaves broadly yellow-limbate.

c. Leaves papillose or smooth. Peristome us. contorted. Pedicel straight.

aa. Capsule placed on short lateral branches. Leaves broadly limbate below by narrow hyaline cells, serrulate above.

IV. Pleurochæte. Leaves not reflexed, curled when dry; costa not excurrent. Peristome much contorted. Dioecious.

bb. Capsule terminal. Leaves gen. entire r. denticulate, us. curled when dry.

V. Tortella. Leaves neither reflexed nor limbate, from dilated base gen. longly acuminate, without hairpoint; basal cells
long hyaline ascending higher at margins than the others; costa us. excurrent.

VI. Tortula. Leaves sometimes reflexed or limbate, gen. sublingulate or sublinear, sometimes with hairpoint; basal cells not higher ascending at margins.

1. Cuneifolia. Leaves smooth not limbate without hairpoint, not or near base slightly reflexed; basal cells long. Stem longish. Spores about 0,015 m. m.

2. Limbata. Leaves papillose limbate (by several cell-rows, without hairpoint, not reflexed; basal cells long. Stem very short. Spores about 0,01 m. m.

3. Muraliformes. Leaves papillose reflexed to above middle, sometimes limbate by one cell-row, often with hairpoint; basal cells long. Spores about 0,01 m. m. Stem us. short.

4. Unguiculata. Leaves papillose not (or only by one cell-row) limbate, without hairpoint, not or only below the middle reflexed; basal cells sometimes short-rectangular. Spores about 0,01 m. m. Stem often long.

VII. Eu-Barbula. Leaves not limbate, without hairpoint, gen. from dilated base acuminate, us. reflexed and not large; cells small us. short, the basal not higher ascending. Capsule small us. oblong. Tufts us. dense.

1. Platyneuron. Leaves strongly revolute often nearly to costa, entire and us. spirally twisted about stem, small and us. brownish; costa thick. Perichetial leaves sometimes sheathing or subconvolute. Stem low. Dioecious.

2. Streblotrichum. Leaves not or not strongly revolute, not sheathing, r. denticulate. Perichetial leaves convolute. Pedicel often yellow.


4. Pseudo-Didiymodon. Leaves gen. (not strongly) reflexed, r. denticulate; the perichetial not sheathing. Dioecious.
   a. Acutæformes. Leaves (at least the perichetial) with long-excurrent costa.
   b. Purpureaformes. Leaves neither crisped nor curved, small and us. red; costa gen. not excurrent.
   c. Fallaciformes. Leaves curved us. crisped; costa not excurrent. Annulus of the capsule us. indistinct. Tufts greenish or rufescent.
   d. Vinealiformes. Leaves curved and crisped; costa some-
times short-excurrent. Annulus revoluble gen. broad. Tufts greenish, rufescent or reddish.

I. Syntrichia C. Mueller.

1. Ruraliformes.

A. Leaves short not distinctly carinate; lower basal cells uniform hyaline (in B. levipila the outer sometimes narrower and not hyaline); hairpoint often smooth, sometimes (in B. mutica) wanting. Peristome contorted, longer than basal tube. Dioecious or (B. alpina and sometimes B. levipila) monoecious. Stem not high.

a. Leaves muticous nearly flat, sometimes reflexed near base.


b. Leaves us. short and smooth hairpoint, involute (at least when dry) above, flat below.

2. B. papillosa Wilson. — Tortula Wils.; Barbula C. M.


c. Leaves us. with hairpoint, not involute, reflexed below.

aa. Peristome not much contorted, much longer than tube.

3. B. alpina Br. eur.


*B. pagorum Milde.


Differs from B. alpina: Leaves nearly flat at borders, obtuse

5. B. rotundo-emarginata C. M. et Kindb. l. c.
   bb. Peristome several times contorted, not much longer than tube.


7. B. brachyangia C. M. et Kindb. l. c.
   Differs from the last: Leaves more reflexed; costa red rough; hairpoint pale red at least below, slightly denticulate above. Capsule short suboblong; peristome not seen. Tufts reddish brown. Dioecious. — Amer. r. Can. Anticosti: Macoun.
   B. Leaves gen. long and distinctly carinate; hairpoint denticulate. Dioecious or (B. Muelleri) synoecious.
   a. Leaves faintly carinate; basal cells somewhat short and wide nearly uniform, the outer often less pellucid and not much narrower. Synoecious or polygamous.

8. B. Muelleri Bruch. — B. princeps C. M.
   b. Leaves distinctly carinate; basal cells long uniform hyaline not porose. Dioecious.

   Leaves long sublinear-lingulate more or less acuminate or acute; costa faintly rough; hairpoint red nearly smooth. — On
10. B. pseud-aciphylla Kindb. in Hedwigia 1896 p. 63.
Leaves long sublinear-lingulate obtuse; costa very rough; hairpoint red only at base or in upper half. Capsule narrower than in the last; peristome not seen. — Rocks in alp. region r. Amer. Brit. Col. and Rocky mts: Macoun. U. S.: Roell.
e. Leave distinctly carinate; basal cells diversiform. Dioecious.
aa. Leaves large long narrow, reflexed nearly all around, us. curved when moistened.
11. B. ruralis L. — Bryum L.; Barbula Hedwig.
Leaves broadly limbate below, very papillose, us. obtuse and sublinear-lingulate; outer basal cells (princ. in elder leaves) narrower and porose; costa red very rough above; hairpoint hyaline or only at base red. Peristome red twice contorted; gen. not shorter than tube. Tufts rusty red below. — Stones, sand, trees and roofs. Eur. common but in alp. regions r. Sweden, Switzerland! Amer. Can. eastern districts: Macoun.
*B. ruraliformis* Bescherelle.
*B. alaskana* Kindb. n. subsp.
*B. rubicundula* Kindb. n. subsp.
Leaves shorter, all red; the lower with very short red point; costa less rough. Habit of *B. alpina*. — Calcareous rocks r. Eur. Sweden in island Oeland!
13. B. submegalocarpa* Kindb. in Hedwigia 1896 p. 64.
Differs from *B. ruralis*: Leaves longer narrow and less reflexed above, from broader base attenuate or sublinear; outer basal cells golden yellow not porose; hairpoint often red in

Leaves narrowly limbate below, sublinear-lingulate obtuse, nearly smooth at the borders, not much twisted when dry; the outer marginal cells in 1 or 2 rows hyaline, inner marginal in 2 or 3 rows yellow porose and longer; costa red-brown smooth or indistinctly papillose, more rough near apex; hairpoint gen. wanting, in uppermost leaves denticulate long hyaline or at base red. Capsule narrower than in B. ruralis; peristome pale red much contorted and very much longer than tube; pedicel very thin and not long. Tufts high brown. — Rocks r. Amer. Can. Rocky mts: Macoun.

bb. Leaves somewhat short and less reflexed, not or scarcely curved when moistened.

Leaves sublinear-lingulate broadly limbate below gen. reflexed to above middle; upper cells smaller than in B. ruralis; costa brown-red less rough; hairpoint of upper leaves us. very long denticulate or r. short. Peristome us. twice contorted. Tufts olive-green, lower than in B. ruralis. — Stones princ. calcareous.


Leaves somewhat small sublingulate narrowly limbate below by pale green cells, often nearly flat or slightly reflexed; costa nearly smooth us. brown; hairpoint thin faintly rough not long. Capsule somewhat small; teeth once contorted. Tufts brown-green us. not high. — On trees or r. on stones. — Eur. not r. Sweden, Norway, Switzerl. Amer. r. Can.: Macoun; Roell.

* B. papillinervis C. M. et Kindb. l. c.
Upper leaves subacute; costa reddish more papillose. Capsule short suboblong. — Amer. r. Can.: Macoun; Waghorne.
* B. leptotricha C. M. et Kindb. l. c.
Leaves with nearly smooth hairpoint. — Amer. r. Can.: Macoun.

2. Subulataeformes.
A. Leaves us. not reflexed; costa smooth us. excurrent. Peristome shorter than tube.
17. **B. subulata** L. — Bryum L.; Barbula Beauvois.

Leaves oblong-lanceolate acuminate acute; costa long-excurrent.


**B.** Leaves reflexed nearly all around; costa papillose gen. percurrent. Peristome longer than tube.

19. **B. inermis** Montagne. — Tortula Mont.; Barbula C. M.

3. Canescentes.

20. **B. canescens** Bruch.


II. Timmiella Notaris.

**A.** Leaves with not excurrent costa, often serrulate above.

Leaves large subacute. Capsule large long oblong-cylindrical; teeth red once contorted; annulus narrow; pedicel red. Stem not high, nearly naked below. Tufts dusky or yellowish green. Monoecious or r. syneocious. — On earth and stone-walls r.


Leaves large acute or short-acuminate. Capsule as in the last; teeth red not or slightly twisted; annulus none; pedicel red, pale above. Paroecious or monoecious. Resembles the last. — On stones r. Eur. princ. in Mediterr. distr. Switserl. Portugal: Levier. France: Anthouard.


B. Leaves with excurrent costa.


Leaves acute longer than in the last, denticulate to below middle. Capsule cylindric; teeth pale not twisted; annulus broad; pedicel yellowish flexuous. Tufts pale green about 3 c. m. high. Dioecious. — Earth r. Amer. Can. Vanc. isl.: Macoun; Roell, com. Brotherus.

III. Zygotrichia.

1. Orthopodiæ.


* B. brevicaulis Bridel. — Desmatodon Brid.; Barbula Kindb.


* B. glacialis Funck. — Desmatodon Funck; Barbula Kindb.


2. Camptopodia.


IV. Pleurochaeta Lindberg.

29. **B. squarrosa** Bridel.


V. *Tortella* C. Mueller.

A. Leaves rigid very brittle, the lower not crisped. Dioecious r. fruiting.


- Leaves long long-acuminate nearly subulate; costa long-excurrent. Capsule subcylindric somewhat large; teeth red much contorted; pedicel long often very thin. Tufts yellowish green often high. — Wet earth prin. in alps. Eur. Sweden, Norway, Switzerl! Amer. Can.: Macoun; Waghorne; Drummond 142.


B. Leaves us. crisped and soft (in *B. tortuosa* sometimes
brittle); costa short-excurrent. Dioecious or (B. cespitosa) monoeious.

a. Lower leaves very small, the upper suddenly much larger. Peristome not or slightly twisted. Tufts low yellowish green.

32. B. flavovirens Bruch. — Trichostomum Bruch; Barbula Kindb.; Tortula Lindb.


*B. viridiflava Notaris. — Trichostomum Not.; Barbula Kindb.


33. B. inflexa Bruch. — Trichostomum Bruch; Barbula Kindb.; Tortula Lindb.

Differs from the last: Upper leaves incurved at apex; costa excurrent to an hyaline point. Capsule suboblong; teeth red slightly twisted; pedicel yellow above. — Calcareous rocks r. Eur. Italy: Venturi.

b. Leaves gradually larger upwards. Peristome us. contorted.

34. B. tortuosa L. — Bryum L.; Barbula Weber et Mohr.

Leaves gen. long longly acuminate and nearly subulate, r. shorter and brittle; costa very short-excurrent. Capsule oblong-cylindric or subcylindric; teeth red us. several times contorted; pedicel yellow above. Tufts us. high and yellowish green. — Rocks princ. calcareous. Eur. common. Sweden, Norway, Switzerland. Amer. not r. Can.; Macoun.

»Trichostomum Bambergeri Schimper. — Leaves brittle sublinear or the upper long-acuminate subulate, sometimes broader acuminate with some teeth and large hyaline cells at apex. Capsule oblong-cylindric; teeth red not twisted. Stone-walls r. Eur. Austria: Bamberger and Breidler»: Limpricht. — A doubtful species, »Didymodon mutabilis var.«: Venturi et Bottini.


Leaves shorter than in B. tortuosa, from broader base sublinear gen. obtuse or sometimes cucullate at apex. Capsule
shorter, suboblong often curved; teeth red less contorted; pedicel yellow above. Tufts dense yellowish green or brown not high. — Calcareous earth. Eur. not r. Norway, Switzerland, Greece: Heldreich. France: Boulay.

36. **B. inclinatula** C. M. et Kindb. l. c.

Leaves as in the last but nearly straight when moist and more involute above; the perichaetal whitish much broader. Capsule narrow-cylindric not large, nearly straight; teeth much contort d. Tufts loosely cohering about 0.5 cm high. — Sandy soil in alps r. Amer. Can. Brit. Col.: Macoun.

37. **B. caespitosa** Schwägrichen. — B. cirrata Bruch.


VI. **Tortula Bridel**, in part.

1. **Cuneifolia**

38. **B. cuneifolia** Dickson. — Bryum Dicks.; Barbula Brid.


Leaves suboval-ovate sometimes acute or apiculate, slightly reflexed below, larger than in the last and not crisped; costa not excurrent finally red-brown. Capsule as in the last; peristomial tube more prominent. Monoecious. — Arctic. Pacif. distr. r. Amer. Alaska: J. M. Macoun.


Leaves oblong or lingulate-lanceolate obtuse inflexed above; cells scarcely papillose; costa percurrent. Capsule oblong-oval; teeth partita. Habit of **Trichostomum arenaceum**. Dioecious. — Amer. r. U. S.»: Lq. et Jam.
2. Limbatae.

A. Leaves limbaty by yellow narrow-rectangular cells.

41. **B. marginata** Br. eur. — Tortula Spruce.

*B. limbata* Lindberg. — Tortula Lindb.
> Leaves larger, broader limbate. — Eur. r. Italy: Rabenhorst:
Husnot mus. ol. Gall.

*B. Egelingi* Schliephacke.

B. Leaves limbate by subquadrate us. hyaline cells.

42. **B. Solmsii** Schimper.

Leaves oblong-lanceolate short-acuminate acute, the lower with yellow marginal cells; costa percurrent. Peristome half-twisted. — Rocks r. *Amer.* Can.: Macoun.

*B. subcarnifolia* C. M. et Kindb. l. c.

3. Muraliformes.

A. Leaves somewhat large. Tufts us. loose.

44. **B. muralis** L. — Bryum L.; Barbula Timm.
Leaves sublinear or oblong-ligulate obtuse, reflexed to the hairpoint, often limbate by one cell-row; upper cells opaque; costa us. excurrent. Capsule oblong-cylindric; teeth reddish 2 or 3 times contorted; annulus double. Tufts us. glaucous green and very loose. Us. monoecious. — Stones, stone-walls and roofs. *Eur.* nearly common in lower districts. Sweden, Germany, Switzerland, Italy! *Amer.* r. »U. S.»: Lesq. et Jam.

*B. baetiva* Schultz.
Leaves long lanceolate-ligulate subacuminate green; costa short-excurrent or subpercurrent. Peristome gen. once contorted. Us. dioecious. — *Eur.* not r. Sweden, Switzerland!
Bticinensis Kindb. revue bryol. 1892.

B. Leaves small, less reflexed. Tufts densely cohering.

46. B. Blandandi Lesq. et Kindb. l. c.

4. Uinguiculata.
A. Annulus of capsule double. Leaves often limbate by one cell-row. Monoecious.

47. B. Vahlil Schultz. — Tortula Wilson; Braithwaite.

B. Annulus not distinct. Leaves not limbate. Dioecious.
a. Perichetal leaves not sheathing.

Leaves obtusate at apex (obtuse or subacute) reflexed below middle, sublinear or subovate-oblong or broadly oblong-lanceolate, suberect when moist; upper cells opaque; the basal narrow-rectangular; costa as. excurrent r. percurrent. Perichetal leaves

49. B. Cruegeri Sonder.

Differs from the last: Leaves patent when moist; basal cells short-rectangular; costa very slightly excurrent; only the innermost perichetal leaves acute and very short with not excurrent costa. — On earth r. Amer. U. S.: Langlois, com. Cardot (Cuba: Wright, herb. Sullivant, com. C. Mueller).

b. Perichaetial leaves half-sheathing. All leaves obtuse; costa not excurrent.

50. B. amplexa Lesquereux.


VII. Eu-Barbula.

1. Platyneuron Kindb.

A. Leaves us. doubly revolute. Peristome us. contorted.

51. B. Hornschuchii Schultz.


52. B. revoluta Schrader. — Tortula Schrad.; Barbula Brid.

Leaves ovate-lanceolate acuminate subobtuse, revolute to apex and nearly to costa; prominent lamina very narrow; costa percurrent or slightly excurrent often broader above. Perichaetial leaves half-sheathing subconvolute; costa not excurrent. Capsule oblong-oval; teeth nearly twice contorted. Tufts dense. — Princ. on calcareous stonewalls. Eur. in lower and warmer districts. France! Italy: E. Adlerz. Germany: Herpell. Spain: Levier.

* B. obtusula Lindberg.

53. *B. platyneura* C. M. et Kindb. 1. c.


54. *B. revolvens* Schimper. — Desmatodon Husnot m. G.


* B. Leaves simply not spirally revolute. Peristome half-twisted.

55. *B. atrovirens* Smith. — Grimmia Sm.; Barbula Schimper; Desmatodon nervosus Br. eur.


56. *B. subtorquescens* C. M. et Kindb. 1. c.

Differs from the last: Leaves less opake and more obtuse not revolute near apex; prominent lamina broader; costa gen. percurrent not broader above. Capsule cylindric. Tufts somewhat higher, very compact. — Rocks r. Amer. Can Gaspe coast and Assa: Macoun.

2. *Streblotrichum* Palisot de Beauvois.


57. *B. convoluta* Hedwig. — B. Clostet Austin ?


* B. commutata Juratzka. — Trichostomum undatum Schimper.

58. *B. chrysopoda* C. M. et Kindb. l. c.


b. Peristome not twisted; annulus revoluble. Leaves mamilllose not crisped; cells gen. subquadrate: lower basal rectangular; costa long-excurrent. Tufts to 2 c. m. high.

60. *B. chloropus* Bridel. — Ceratodon Brid.; Barbula Kindb.

Lower leaves subovate; the upper ovate-lanceolate attenuate not reflexed. Perichetial leaves convolute with subulate point. Capsule erect suboblong; striate when dry; lid shorter; teeth reddish yellow. Tufts dense. — On earth r. *Eur.* France: Schimper; Philibert.

B. Pedicel red.

a. Leaves entire reflexed nearly all around. Stem very short.


Leaves smooth ovate-oblong or broadly ovate-lanceolate acuminate acute; cells subquadrate subhyaline; costa percurrent or slightly excurrent. Inner perichetial leaves convolute obtuse or with short obtuse point; costa faint not percurrent. Capsule not seen; pedicel red. Dioecious. — *Eur.* Switzerl.: L. Mari.


62. *B. paludosa* Schleicher. — *Tortula crocea* Bridel; Lindb.

Leaves papillose sublineur-lanceolate broadly acuminate acute, denticulate above (at least the perichetial), not or slightly twisted when dry; basal cells long yellowish; costa percurrent or slightly excurrent, in perichetial leaves distinctly excurrent. Capsule oblong striate when dry; lid rostrate; teeth much contorted; annulus none. Stem reddish-tomentose often with propagula. Resembles somewhat *Dichodontium*. — Wet calcareous rocks. *Eur.* princ. in southern districts. Switzerl. Austria: M. Huss; Venturi. France: Husnot.


Leaves faintly papillose narrowly ovate-lanceolate gradually subsubulate, entire, crisped when dry; cells subquadrate or
c. Leaves entire not or indistinctly reflected. Stem very short.
aa. Leaves papillose. Peristome rudimentary or wanting.

64.B.bicolor Br. eur. — Gymnostomum Br. eur.; Barbula Lindb.
Leaves ovate-lanceolate acuminate acute marked with orange stripes at base; basal cells short-rectangular yellow or brown-yellow; costa percurrent or short-excurrent. Capsule oblong-cylindric plicate when dry; annulus revoluble. Spores large. Tufts dense. Dioecious. — Crevices of calcareous rocks in higher alp. reg. r. Eur. Switzerl.: Schimper; Culmann.


65.B.agraria Hedwig. — Bryum Swartz.

66.B.Raui Austin.
Leaves smooth spatulate-ovate acuminate or apiculate; basilar areolation loose; costa subexcurrent. Perichaetial leaves convolute often blunt; costa thin. Capsule oblong-cylindric plicate when dry; lid long; annulus narrow. Dioecious. — Rocks r. Amer. U. S.; Lesq. et J.

Leaves nearly smooth from oblong half-sheathing base linear-lanceolate obtusate mucronulate, faintly crisped; basal cells short-rectangular hyaline; costa excurrent. Perichaetial leaves from oblong sheathing base acuminate not mucronate. Capsule oblong; teeth rufous; calyptra rough. Dioecious. Habit of B. unguiculata. Stem very short. — Amer. r. U. S.; C. M.

3. Leptobarbula Schimper.


69. B. macrostega Sullivant. — Trichostomum Sull. icon. muscor. (not mentionned in Lesq. et J. man.); Barbula Kindb. Differs from the last: Leaves abruptly tapering to a somewhat broad but attenuate obtusate acute and near apex denticulate acumen. Capsule cylindric inclined or faintly curved; lid longer; teeth (as in B. corsica and B. sparsidens) spreading above. — Amer. r. »U. S.: Sullivant.

4. Pseudo-Didymodon Kindb.
   a. Acutaformes.

A. Peristome wanting; annulus revoluble. Leaves faintly papillose, straight when moist.

70. B. rubiginosa Mitten.

*B. subiemadophila* C. M. et Kindb. l. c.
Leaves subpellucid above, more spreading when moist; the perichetial with shorter base. Peristome and annulus not seen. — Amer. r. Can. Brit. Col.: Macoun.

71. B. melanocarpa C. M. et Kindb. l. c.

B. Peristome contorted.

a. Leaves smooth straight when moist. Peristome once contorted; annulus us. indistinct.
72. **B. acuta** Bridel. — Tortula Brid. 1806; Barbula Brid. 1819; Tortula gracilis Schleicher 1807; Barbula Schwaegerlichen.


73. **B. viridis** Schimper.


74. **B. artocarpa** Lesquereux.


b. Leaves faintly papillose straight when moist. Peristome twice contorted; annulus distinct.

c. Leaves faintly papillose or nearly smooth, curved when moist; lower basal cells pellucid rectangular.


75. **B. icmadophila** Schimper; Braithwaite.


e. Leaves faintly papillose or nearly smooth, curved when moist; lower basal cells pellucid rectangular.


76. **B. pseudo-rigidula** Kindb. cat. Can. m.

Leaves from short ovate base long-acuminate, reflexed below, twisted when dry; costa brown. Inner perichetial leaves from oblong base narrowly acuminate. Capsule brown subcylindric.

77. B. subgracilis C. M. et Kindb. l. c.


78. B. Waghornei Kindb. n. sp.
Leaves from short ovate half-sheathing base long-acuminate acute entire, slightly reflexed above base, faintly curled when dry; costa red. Tufts brown-red radiculose. Habit of Didymodon rubellus. — Amer. r. N. Foundl.: Revd A. C. Waghorne.

A. Leaves long sublanceolate.

79. B. purpurea C. Mueller.
Upper leaves gradually longer, from oblong base broadly lanceolate subobtuse, revolute to above middle, subtorquate when dry; cells small reddish quadrate; costa purplish thick excurrent. Capsule oval; teeth scarcely contorted; calyptra long. Tufts small purple; stem short naked below. — Rocks r. U. S. Calif.: C. M. in Flora 1875.

80. B. lateritia Kindb. n. sp. — B. brachyphylla var. angustifolia C. M. et Kindb. l. c.
Leaves ovate lanceolate broadly acuminate subobtuse nearly smooth, slightly reflexed or partly flat at borders, crowded, appressed when dry; cells subpellucid subquadrate; costa red thick (princ. above), percurrent. Capsules unknown. Tufts compact brick red 1—2 c. m. high. — Rocks r. Amer. Can. Brit. Col.: Macoun.

B. Leaves short gen. ovate.

81. B. brachyphylla Sullivant.
Leaves ovate obtuse recurved all around; costa percurrent. Capsule cylindric; lid long-rostrate; teeth scarcely half-twisted; calyptra short. Tufts dark brown dense high radiculose their whole length. — Amer. r. U. S.»: Lesq. et Jam.

82. B. decursivula Kindb. cat. Can. m.
Leaves recurved nearly all around, faintly papillose, loosely disposed and long-decurrent, subtorquate or loosely appressed when dry; gen. ovate acute; the uppermost of stem and some
branches broadly ovate-lanceolate; cells short small pellucid exa. the elongate alar; costa red not excurrent. Capsules unknown. Tufts 2—3 c. m. high somewhat dense; stem naked below. — Rocks r. Amer. Can. Rocky mts: Macoun.

c. Fallaciformes.

A. Peristome very much contorted. Leaves faintly papillose.

83. B. fallax Hedwig.
Leaves with ovate base and carinate not much longer acumen, reflexed at least below middle, us. curled when dry; nearly all basal cells quadrate. Capsule brown oblong-cylindric; annulus not distinct. Tufts us. dense and not low, often rufescent below. — Earth and stone. Eur. common. Sweden, Switzerland, Italy! Amer. not common. Can.: Macoun.

* B. brevifolia Smith. — Tortula Sm.; Barbula Bridel.
Leaves smaller and shorter, nearly appressed when dry. Capsule smaller; teeth shorter. Tufts us. low and rufescent. — Rocks. Eur. not r. Sweden!

84. B. subfallax C. Mueller.
> Differs from B. fallax in its pale green color, basal leaf-cells more distinctly rectangular, capsule short-pedicellate, annulus simple; perichetial leaves longer and larger. — Amer. r. U. S.»: Lesq. et Jam.
B. Peristome not or faintly contorted. Leaves distinctly papillose.

85. B. reflexa Bridel. — B. recurvifolia Schimper.

86. B. sparsidens C. M. et Kindb. l. c.
Leaves small ovate-lanceolate carinate reflexed nearly all around; lower basal cells rectangular hyaline. Capsule small reddish oblong-cylindric; teeth loosely half-twisted with spreading points when dry. Tufts loose 0,5—1 c. m. high, green above, ferruginous below. — On earth r. Amer. Can. Brit. Col.: Macoun.

87. B. semitorta Sullivant.
> Upper leaves linear-lanceolate gradually tapering from near the base, flat at borders, tufted and squarrose; costa thick percurrent. Capsule cylindric-oblong; teeth half-twisted; annu-
lus very narrow not revoluble. Plants short simple loosely cespitose. — Amer. r. U. S. *; Lesq. et Jam.

88. **B. spadicea** Mitten.


d. Vinealiformes.

A. Leaves reflexed all around; cells very pellucid. Plants small.

89. **B. virescens** Lesquereux.
Leaves small broadly ovate-lanceolate nearly smooth; cells gen. short well-distinct, the upper round-oval not confluent. Capsule small cylindric; teeth contorted. Tufts green dense about 1 c. m. high. — Rocks r. Amer. U. S. Calif. near Oakland: Bolender, com. C. Mueller.

B. Leaves partly flat at borders. Plants us. high and robust.

a. Upper leaf-cells opaque confluent very papillose.

aa. Leaf-base long ovate-lanceolate; costa not excurrent.

90. **B. cylindrica** Taylor. — Zygotrichia Tayl.; Barbula Schimp.

92. **B. elata** Durieu et Montagne.

Leaves entire nearly gradually subulate not large, faintly crisped; basal cells pellucid gen. rectangular. Pericentral leaves with narrower often sublinear channelled acumen; costa sub-excurrent or in the shorter uppermost leaves wanting. Capsule reddish subcylindric; teeth contorted. Tufts brown-green often high. — **Amer.** r. Pacif. distr. U. S.; Roell; Henderson, com. Cardot.

**bb.** Leaf-base subovate ovate-oblong; costa often excurrent.

93. **B. vinealis** Bridel.

Leaves with oblong base and not longer in upper part subulate-filiform acumen, reflexed below middle, nearly straight when moist; inner basal cells short-rectangular; costa nearly filling the upper part of acumen, in the more abruptly attenuate pericentral longer excurrent. Capsule short oblong-cylindric; teeth short pale once contorted. Tufts lower than in **B. cylindrica**, us. brown or brown-red. Not r. fruiting. — Rocks and stonewalls. **Eur.** not r. in warmer distr. Switzerland. France: Husnot m. Gall. Italy: Venturi; Roell. **Amer.** r. Can.; Macoun.

94. **B. flexifolia** Hampe.

Differs from **B. vinealis** in leaves crisped when dry, falcate when moistened, borders revolute; capsule narrower subcylindric dark red or brown; teeth much twisted reddish then white or variable in color. — On the ground r. **Amer.** U. S. Calif.; Lesq. et Jam.

95. **B. circinnatula** C. M. et Kindb. l. c.

Leaves from ovate or ovate-oblong base somewhat abruptly narrowed to the subulate much longer acumen, reflexed below, curved when moist, circinate when dry; basal cells gen. short dusky; costa well-distinct but not excurrent also in the nearly similar pericentral leaves. Capsule subcylindric; teeth pale much contorted; annulus simple by one row of large cells. Tufts greenish somewhat high, or red-brown below. — Wet earth and rocks r. **Amer.** Can. Pacif. distr.; Macoun.

96. **B. subcylindrica** Brotherus.

Leaves from subovate base abruptly narrowed to the longer and subobtuse acumen, falcate when moist; lower basal cells rectangular hyaline. Tufts dark brown. Capsules unknown. Otherwise as the last. — **Amer.** r. U. S. Pacif. distr.; Roell, com. Brotherus.
97. *B. horridifolia* C. M. et Kindb. 1. c.

Differs from the both last and *B. vinealis* in leaves faintly papillose loosely disposed long-decurrent. Leaves from ovate base narrowed to a longer and long-subulate acumen, falcate when moist, crisped or spreading when dry; basal cells pellucid short-rectangular, the inner larger; costa broader below vanishing in apex, not excurrent. Capsule cylindric; teeth red-dish scarcely more than once contorted with long in dry state spreading points. Tufts somewhat high, brown or rusty red below, greenish at tops. — Damp rocks r. Amer. Can. Pacif. distr.: Macoun.

98. *B. tortellifolia* C. M. et Kindb. 1. c.

Differs from the last: Leaves broader, less distinctly decurrent; the comal larger and crowded with short-excurrent costa. Perichetial leaves suddenly tapering to a long narrow acumen; costa slightly excurrent. Peristome whitish. Tufts often higher sometimes quite red. — Wet rocks. Amer. Pacif. distr. princi. near sea. Can. less r.: Macoun.

b. Leaves also the uppermost nearly smooth; upper cells pellucid well-distinct.


Leaves shorter and more crowded than in the last, from ovate base narrowed to the subulate acumen, reflexed nearly to middle at one side, falcate or crisped; basal cells subquadrate hyaline; costa equally broad and distinct to apex, not excurrent. Capsules unknown. Tufts dark brown or olive-green. — Rocks r. Amer. Pacif. distr. Can.: Macoun. U. S.: Roell.

110. *Ceratodon* Bridel.

A. Leaves carinate. Outer perigonial leaves long-acuminate acute.

1. *C. purpureus* L. — *Mnium* L.; *Ceratodon* Brid.

Leaves reflexed nearly all around, entire or slightly denticulate near apex, gen. not decurrent, us. broadly ovate-lanceolate attenuate not subulate at apex; cells small us. chlorophyllose; costa us. percurrent. Inner perichetial leaves (1 or 2) obtuse or short-acuminate. Capsule sometimes strumose us. curved when dry; teeth with numerous articulations, often marginate; lid elongate-conic; pedicel red. Outer perigonial leaves with scarcely excurrent costa. Tufts us. not tomentose. Dioecious. — Gravelly soil. Eur. common. Sweden etc.! Amer. Can.: Macoun.
*C. brevifolius* Milde. — *C. dimorphus* Philibert.
Leaves ovate-oblong; costa often long-excurrent. — R. Eur.

* C. xanthopus* Sullivant.
Leaves long-subulate; costa gen. excurrent. Perichetal leaves
Col.: Dawson, com. Macoun.

* C. arcticus* Kindb. n. subsp.
Leaves small subdecurrent, not much patent when moist; cells
hyaline not chlorophyllose, larger than in the common *C. pur-
pureus.* Tufts compact tomentose. Capsules unknown. — Arctic

2. *C. conicus* Hampe. — *Trichostomum* Hampe; *Ceratodon* Lindb.;
C. minor Austin.

Diffs from *C. purpureus:* Leaves shorter; costa not r. excur-
rent. Capsule straight; teeth immarginate with few articula-
Brit. Col.: Macoun.

Leaves narrowly ovate-lanceolate subulate-acuminate, reflexed
below the somewhat long serrulate acumen; costa gen. excur-
rent. Inner perichetal leaves (2 or 1) with somewhat long
linear or inlurate acumen. Capsule curved when dry; teeth
with numerous articulations, broadly margined; lid short-conic
obtuse or subconvex; pedicel red. Outer perigonal leaves with

B. Leaves concave, princ. those of the long shoots. Peri-
gonal leaves obtuse, the outer not long-acuminate.

4. *C. heterophyllus* Kindb. in Ottawa Nat. vol. V.
Leaves of the short stem very few, narrowly ovate-lanceolate
subobtuse entire reflexed; costa percurrent. Shoot-leaves small
oval obtuse not distinctly reflexed; costa scarcely percurrent.
Capsule short not curved; teeth with few articulations; lid
short-conic; pedicel pale red or yellowish, finally red or blackish.

111. *Geheebia* Schimper.

Leaves papilllose entire carinate, reflexed below, gradually
acuminate or subobtuse-lanceolate with acute or subulate apex,
subfalcate when moist, spreading or faintly crisped when dry;
lower cells sinuous, upper subquadrate; costa subpercurrent.


A. Leaves close when dry, not patent when moist. Us. synoecious.


Leaves ovate-oval very broad, cucullate above; costa not excurrent. Capsule us. cylindric with much shorter lid, r. suboblong with nearly half as long lid; teeth us. once contorted; calyptra reaching below lid; annulus broad partly revoluble.


B. Leaves incurved when dry, patent when moist. Dioecious.

a. Peristome twice contorted; annulus broad revoluble. Calyptra reaching to the half of capsule.

2. A. stellata Schreber. — Bryum Schreber 1771; Aloina Kindb. Laubm. S. u. N.; Barbula rigida Hedwig 1787.


Leaves round-ovate cucullate; costa not excurrent. Capsule oblong-ovoid; lid more than 2/3 its length; pedicel pale red or yellowish. — On earth r. Amer. Can.: Macoun.


5. A. aloides Koch. — Trichostomum Koch; Aloina Kindb.  
l. c.; Tortula Notaris; Barbula Bruch.  
Leaves shorter and narrower than in the last, incurved or  
cucullate, gen. acute with prominent subexcurrent costa. Cap-  
sule often inclined us. much longer than lid; pedicel reddish;  
calypt. not much prolonged below lid. — Clay banks.  
Orphanides.

113. Crossidium Juratzka.

A. Leaves blunt. Dioecious.

1. C. chloronotos (Bridel in part) Bruch. — Barbula (Brid.)  
Bruch; Crossidium Limpricht.  
Leaves oblong-lingulate, appressed when dry; hairpoint shorter  
nearly smooth; upper leaf-cells greenish. Capsule narrow-oblong  
at least twice longer than the rostrate lid; teeth twice contor-  
ted; tube long. Tufts dense. — Calcareous rocks and soil r.  

2. C. Heinrici Rau. — Barbula Rau; Crossidium Kindb.  
>Differs from the last: Leaves few small more arrounded  
at apex; some cells decorate; hairpoint denticate. Capsules  
unknown. — Amer. r. U. S. Kansas: Rau. C. M. in Flora  
1886.

3. C. Manniæ C. Mueller. — Barbula (Argyrobarbula) C. M.;  
Crossidium Kindb.  
>Leaves few small without hairpoint; lamellæ few. Capsule  
small; peristomial tube short. — Amer. r. U. S.»: C. M. in  
Flora 1887.

B. Leaves narrowed above to the subacute apex. Monoecious.

4. C. squamigerum Viviani. — Barbula Viv.; Crossidium Jur.;  
Tortula membranifolia Hooker; Barbula Schultz.  
Leaves subovate; hairpoint us. as long and denticate; upper  
leaf-cells hyaline. Capsule oblong, subcylindric or suboval,  
finally blackish, longer than the rostrate lid; teeth twice con-  
torted; tube long. Tufts dense. — Calcareous stones in war-  
mer distr. r.  
Eur. France: Le Jolis; Bouvet.  
Amer. »U. S.»: Lesq. et Jam.

5. C. griseum Juratzka.  
>Differs from the last: Capsule finally brown; teeth shortish;  
not or faintly twisted nearly without basal tube. Leaves with  
nearly smooth often longer hairpoint; those of shoots more  
obtuse. — Eur. r. Italy: Roell; Bottini.

A. Capsule immersed; calyptra mitriform. Leaves with long rough hairpoint.


B. Pedicel exserted; calyptra cucullate. Leaves with smooth point.


Differs from the last: Leaves papillose at back, faintly reflexed below; costa shorter excurrent. Capsule oblong-cylindric; peristome slightly twisted, loosed with difficulty; basal membrane clathrate. Stem somewhat higher. — Wet clay soil. *Eur.* France: Bescherelle. *Austria:* Berggren.


A. Leaves gen. entire; cells small at least the upper, r. (in *Stegonia*) large.

a. Leaves not reflexed, often involute. Peristome not twisted.

I. *Stegonia*. Leaves close also when moist, smooth entire very broad concave or involute; cells large. Perichetal leaves not sheathing. Stem short. Monoeocious. Spores large.

II. *Trichostomum*. Leaves not imbricate when moist, us. crisped when dry, papillose us. narrow. Spores small.


b. Leaves not involute gen. reflexed.

aa. Leaves half-sheathing, sometimes dentate above.

III. *Erythrophyllum*. Leaves reflexed papillose us. pointed by a long pellucid apical cell; basal cells long, hyaline or finally reddish. Perichetal leaves sheathing. Peristome pale straight. Tufts us. rusty red. Us. synoeocious.
bh. Leaves entire not sheathing. Tufts dense.

IV. Desmatodon. Leaves short broad gen. reflexed, crisped; basal cells long somewhat large and hyaline; costa often long-excurrent. Peristome straight. Habit of Barbula (Zygotrichia). Often monoecious.

V. Eu-Didymodon. Leaves reflexed us. short, r. twisted when dry; cells small gen. short, the inner basal us. rectangular yellowish; costa often or slightly excurrent. Peristome sometimes twisted. Habit of Barbula (Eu-Barbula). Dioecious often sterile.

VI. Leptodontium. Leaves dentate or denticulate, often not reflexed, gen. broad and obtuse, often crisped when dry; basal cells at least the lowest rectangular hyaline.

VII. Hydrogonium. Differs from subg. Leptodontium in entire leaves.

I. Stegonia Venturi revue bryol.

1. D. latifolius Schwägrichen. — Weisia Schw.; Didymodon Kindb.; Pottia C. M.

Leaves orbicular or subcochleariform gen. obtuse, sometimes apiculate or with long hairpoint; upper cells subrhombic, the lower hyaline longer; costa abbreviate or percurrent. Capsule suboval or subcylindric; teeth pale red. Spores 0.03—0.04 m. m. Tufts low green somewhat silver-like. — Earth on alp. rocks. Eur. less r. Norway, Switzerland; Austria: Breidler. Amer. r. Can.: Macoun; Drummond 70.

II. Trichostomum Hedwig, in part.

1. Pusiilli.


* D. monspeliensis Schimper. — Trichostomum Sch.; Didymodon Kindb.

Leaves concave, the perichetal with percurrent costa. Annulus simple. — Eur. r. France: Schimper.

* D. Philiberti Schimper. — Trichostomum Sch.; Didymodon Kindb.
Perichetial leaves with excurrent costa. Annulus simple. —

_Eur_. r. France: Philibert; Goulard.


Leaves plane below, the perichetial with percurrent costa.
Capsule finally striate; annulus simple; pedicel wholly pale yellow. — _Eur_. r. Germany: Geheeb.

2. Crispuliformes.


3. _D. cylindricus_ Bruch. — Weisia Bruch; Didymodon Br. eur.

Leaves long narrow acute or subobtuse, sometimes sparingly denticulate near apex; basal cells hyaline; costa not excurrent. Capsule cylindric. Tufts dark green. — Siliceous rocks. _Eur_. not common. Switzerland: Sweden; Lindberg. _Amer_. Can.: Macoun.


Differed from the last: Leaves entire acute more dilated at base; basal cells abruptly passing to the rounded green ones. Stem often very long. — Wet rocks r. _Eur_. Ireland: Stewart and Holt.

B. Leaves not carinate, sublinear or with sublinear or subulate acumen, entire.

a. Leaves channelled or involute; basal cells us. yellowish, upper very small opaque papillose.

5. _D. brachydontius_ Bruch. — Trichostomum Bruch; Didymodon Wilson; Trichostomum mutabile Notaris.

Leaves sublinear or narrowly ovate-lanceolate gen. acute, sometimes ovate-oblong short-acuminate, not channelled near apex; basal cells brownish or yellowish; costa excurrent. Capsule oval-oblong or subcylindric; teeth smooth us. short irregular; pedicel yellow. Tufts loose 1—2 c. m. high or lower. — Calcareous rocks. — _Eur_. Switzerland; Sweden; Zetterstedt; P. Larsson. Belgium: Roemer. France: Philibert; Brébisson.


Differed from the last: Leaves smooth pellucid longer-apiculate; upper cells better defined. Tufts yellowish green. Capsules unknown. — Fissures of limestone rocks r. — _Eur_. Ireland: Lindb.; Braithwaite.


Leaves from subovate base sublinear or r. suboblong, short-attenuate often subobtuse, distinctly channelled or involute;
basal cells yellowish or subhyaline; costa often excurrent to a curved point. Capsule oval-oblong; teeth papillose often deeply cleft; pedicel red. Tufts dense very low or 2—6 c. m. high. — Calcareous stones. *Eur.* Sweden, Switzerland. *Spain:* Levier. France: Roux; Berthoumieu. *Amer.* r. *«U. S.»*: Lesq. et Jam.


Leaves short from broader base nearly gradually attenuate obtuse; basal cells yellowish pellicule; costa sometimes excurrent. Capsule minute round-oval; lid as long; teeth papillose; pedicel reddish below, yellow above. Tufts dense 0.5—1.5 c. m. high. Habit of *D. crispsus*. — Limestone rocks r. *Eur.* *«Engl.»*: Braithwaite. *«Bosnia:* Sendtner»: C. M.

b. Leaves concave not involute, somewhat broad and sub-oblong-linear; basal cells hyaline.


11. *D. trachyneuron* Kindb. n. sp.


III. *Erythrophyllum* Lindberg.

A. Leaves nearly smooth and faintly reflexed, not twisted when dry. Tufts loose eradiculate. Capsules unknown.


B. Leaves distinctly papillose and reflexed, crisped. Tufts dense.

a. Leaves from broad-ovate base long-subulate; costa sometimes excurrent. Plants robust.
   Leaves long acute or subobtuse at apex, often denticulate near it. Inner perichetal leaves subfiliform-subulate smooth and not recurved; costa filling nearly the whole upper part of acumen. Capsule straight; cells of the rostellate lid in straight rows. Tufts reddish. Dioecious, very r. fruiting. — Alp. rocks r. Eur. Austria: Breidler. Switzerl. fruiting: Philibert.

b. Leaves short-acuminate or obtuse obliquely apiculate; costa not recurved. Plants not robust.

   Leaves from short ovate base sublinear-cultriform, at apex us. obtuse and entire or with few teeth. Perichetal leaves nearly as long and similar. Capsule straight or indistinctly curved; cells of lid as ~ the last. Us. synoecious. — Stone and earth. Eur. comm. Sweden etc.! Amer. not r. Can.: Macoun; Waghorne.

15. **D. alpigenus** Venturi. — D. rubellus var. dentatus Schimper.

16. **D. canadensis** Kindb. cat. can. m.

17. **D. subruber** Kindb. revue bryol. 1896.

18. **D. Baden-Powell** Kindb. in Ottawa Natur. vol. V.
   Leaves as in **D. rubellus** but smaller shorter often denticulate, less twisted when dry. Perichetal leaves as in **D. canadensis**. Capsule curved; lid short blunt very thick. Tufts very compact, pale brown below. Dioecious. — Arctic distr. r. Amer. Alaska: J. M. Macoun.

19. **D. Debati** Husnot revue bryol. 1895.
   Differs from other species of this section in leaves densely serrulate above basal part. Leaves from narrowly oblong base gradually tapering to a scarcely longer acumen, not or slightly crisped when dry. Stem about 5 c. m. long. Capsules un-

IV. Desmatodon (Bridel) Schimper, in part.


B. Leaves with long-excurrent costa.


»Diers from the last in nearly entire peristomial teeth. Monoecious. — Amer. r. U. S. Texas: Wright: Lesq. et Jam.


V. Eu-Didymodon.

A. Leaves broadly acuminate or obtuse. Tufts not high.

a. Leaves papillose; costa not excurrent. Peristome well-evolute.


Leaves ovate-oblong or ovate, obtuse or acute us. concave with thick borders, more or less crisped. Capsule ovate-oblong or subcylindric; pedicel red. Tufts olivaceous reddish-brown below us. very compact r. loose. — Rocks prin. calcareous and stonewalls. Eur. prin. in warmer districts, not r.
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b. Leaves smooth. Peristome often rudimentary.


B. Leaves narrowly acuminate.

a. Leaves gen. papillose, faintly twisted when dry. Tufts us. low and fuscescent.


Leaves from long ovate-lanceolate base tapering to the narrow nearly as long acumen, with thick reflexed borders, nearly straight when moist; the upper part of acumen nearly filled by costa; lower basal cells often long. Capsule oval-oblong or cylindric; teeth not contorted but us. faintly twisted; pedicel red. — Rocks and stonewalls. *Eur.* not r. Sweden, Norway, Switzerland! Scotl.: Fergusson. Amer. r. Can.: Macoun. U. S.: Roell.


Leaves smooth from ovate-oblong base tapering to a not long acumen, gen. with thick reflexed borders, nearly straight when moist; cells gen. short; costa thick often long-excurrent. Capsules unknown. Tufts brown loosely cohering, about 1 c. m. high (*1.5 c. m. or more*: Limpriecht). — Calcareous alp. rocks r. *Eur.* Austria: Gander.


Leaves from broad ovate-oblong base abruptly narrowed to the subulate not longer acumen, flat above, not or slightly
reflexed below, straight when moist; nearly all cells quadrate; costa short-excrescent or percurrent. Capsules unknown. Habit of the last. — Amer. r. U. S.: Roell, com. Brotherus.

b. Leaves mamillose nearly appressed when dry. Tufts us. red-brown, often high and very large.


VI. Leptodontium Hampe.

A. Leaves broadly limbate all around by pale cells, dentate nearly all around, papillose.


B. Leaves not or indistinctly limbate, entire below middle.
   a. Leaves papillose and reflexed; costa not percurrent.

Leaves oval-oblong or lingulate, obtuse acute or apiculate, dentate above middle or in upper third, reflexed at both sides, spreading when moist. Capsule cylindrical; teeth fugacious sometimes entire; pedicel pale yellow. Stem 1—3 c. m. high. — Bare gravelly and turfy places in warmer districts r. Eur. Engl.: Boswell. France: Husnot.
34. D. styriacus Juratza.

Differ from the last: Leaves narrower, sparingly dentate near apex, reflexed at one side, patent when moist; lower basal cells gen. wider. Capsules unknown. — Alp. rocks r. Eur. Austria: Breidler.

b. Leaves papillose not reflexed; costa sometimes excrescent.
35. D. gemmascens Mitten. — Leptodontium Braithwaite; »Streptopogon Mitten»: Braithw.

36. **D. Heimii** Hedwig. — Gymnostomum H.; Didymodon Kindb.; Pottia Fuernrohr.

Leaves lanceolate or sublingulate, the upper long-acuminate acute, densely serrulate above, not spreading; costa us. not excurrent. Capsule short subcylindric or oval-oblong; lid stylytic; peristome none; pedicel red. Stem 1—2 c. m. or lower. Monoecious or synoecious. — Wet soil often near sea sometimes in alps. — **Eur.** not uncommon. Sweden, Norway! Spetsbergen: Berggren. **Amer. Can.**: J. Macoun; Drummond; Waghorne. Alaska: J. M. Macoun.

* **D. Ryani** Philibert. — Pottia Phil.; Didymodon Kindb.

Leaves very small, oval or short-oblong, very obtuse and entire. Lid of capsule short and thick. — **Eur.** Norway: Ryan; Philibert revue bryol. 1896.

37. **D. helmiioides** Kindb. — Pottia Kindb. cat. Can. m.

Leaves suboblong, the lower obtuse, the upper short-acuminate acute; costa gen. excurrent. Capsule cylindric longer and narrower than in the last; peristome present but rudimentary; pedicel golden yellow. Stem only 2—3 m. m. high. Otherwise as the last. — Earth in alps r. **Amer. Can.** Rocky mts: Macoun.

c. Leaves smooth distantly dentate or denticulate.

38. **D. riparius** Austin. — Pottia Aust.; Sulliv. i-can. m.; Didymodon Kindb.; Barbula lingulata Warnstorf; Trichostomum Warnstorffii Limpricht.

Leaves oval-oblong or lingulate obtuse sometimes apiculate, sparingly denticulate near apex sometimes to 1/₄, patent when moist; only the lowest basal cells rectangular; costa not or scarcely percurrent. Capsule oblong-cylindric; peristome unknown; annulus broad. Stem to 3 c. m. high, sometimes with propagula. — Wet rocks near water r. **Eur.** Switzerl.: Weber; Culmann, com. Husnot. **Amer. U. S.**: Austin, com. Mrs Britton.


Leaves lanceolate or narrowly oblong-lingulate acute, coarsely dentate at least in upper half, spreading when moist; lower basal cells rectangular; costa percurrent or short-excurrent. Stem scarcely 1 c. m. high. Capsules and male plants unknown. — Stones in rivers r. **Amer. Can.** J. Macoun.
VII. Hydrogonium C. Mueller.

40. D. Ehrenbergii Lorentz. — Trichostomum Lor.; Didymodon Kindb.; Trichostomum (Hydrogonion) mediterraneum C. M.

Leaves sublinear or ovate-lanceolate subobtuse not (or indistinctly near base) reflexed, patent when moist; basal cells narrow hyaline, the others smooth subpellucid sparingly chlorophylllose; costa not or scarcely excurrent. Capsules unknown. Stem often 3—6 c. m. high. — Wet calcareous rocks r. Eur. France: Taxis*: Boulay (Africa, Alger: Debat; Philibert).


A. Leaves smooth with hyaline cells. Paroecious.

1. P. venusta Juratzka.

This leaf long obovate-oblong spatulate short-acuminate not reflexed; costa excurrent. Capsule oval-cylindric; teeth none; annulus double persistent. — Eur.: Schimper (*Asia island Cyprus: Unger*: Jur.).

2. P. pallida Lindberg.


B. Leaves often papillose; cells more or less chlorophylllose.

a. Paroecious. Leaves us. reflexed and papillose; costa long-excurrent.


* P. viridifolia Mitten; Braithwaite.


* P. asperula Mitten; Braithwaite.


* P. Wilsoni Hooker. — Gymnostomum Hook.; Pottia Br. eur.


4. P. cuneifolia Solms Laubach.

Lower leaves linear-oblong, the upper longer and spatulate-oblong subobtuse smooth r. reflexed. Capsule oval-oblong
small; teeth indistinct; pedicel reddish. Plants small. — Eur.
5. P. Notarisii Schimper.

*Differs from P. crinita: Leaves smaller narrower; upper cells
scarcey chlorophylllose. Capsule oblong-cylindric longer narro-
wer and longer-pedicellate. — Eur. r. Sardinia: F. Mueller»:
Schimp. syn.
b. Monoecious. Leaves often smooth and not reflexed.
Pedicel reddish.
6. P. truncatula L. — Bryum L; Pottia Lindb.; P. truncata
Fuernrohr.

Leaves subobovate acute or short-acuminate smooth not
reflexed; costa not long-excurrent. Capsule short cupuliform
or subhemispheric; teeth none. — Earth in fields and gardens.
7. P. lanceolata Hedwig. — Leersia H.; Pottia C. M.

Leaves oblong-lingulate acute obtuse or short-acuminate,
us. reflexed and more or less papillose; costa oft. a long-excur-
rent. Capsule oblong-oval; teeth often well-evolute. — On
Italy: Arcangeli.
* P. littoralis Mitten; Braithwaite.

Leaves nearly smooth; costa shorter-excurrent. Peristome
Can.: Macoun.
* P. intermedia Turner. — Gymnostomum Turn.; Pottia Fuern-
rohr.

Leaves faintly papillose sometimes slightly reflexed; costa
short-excurrent. Capsule gen. subcylindric; teeth none or rudim-
entary. — Banks and walls. Eur. not r. Sweden! France:
Brébisson. Amer. r. Can.: Macoun.
117. Dermatodon Huebener.
1. D. cernuus Huebener. — Desmatodon Br. eur.; Cynodontium
latifolium Schwägrichen.

Leaves oblong sublingulate sharply acuminate acute limbate
papillose, reflexed at least to middle, us. denticulate near apex;
Costa excurrent finally reddish. Capsule broad-ovate inclined
or horizontally patent with erect neck, finally red-brown; teeth
long us. deeply cleft; lid apiculate; pedicel straight yellow
finally red 10—16 m. m. long. Spores about 0,04 m. m.
Tufts dense to 2—3 c. m. high, often lower. Monoecious.

*D. xanthopus* Kindb. — Desmatodon Kindb. cat. Can. m.

Leaves less chlorophyllose; costa greenish. Capsule larger; teeth more united; pedicel yellow not red. — On earth r. Amer. Can.: Macoun.


Differs from *D. cernuus*: Leaves narrower and longer, sub-obtuse gen. entire, nearly smooth, reflexed only rear base; costa greenish. Capsule arcuate pale brown or pale red; teeth short cut in 2–4 partly cohering segments; lid with oblique beak; pedicel flexuous arcuate when young, reddish yellow. — Rocks near Atlantic sea r. Amer. Can.: Macoun; Waghorne.

118. *Weisia* Ehrhart.

A. Leaves long narrow, serrate at the broad base, at least the perichetial. Dioecious. Stem us. high.

I. *Eucladium*. Capsule long-exserted; lid deciduous; teeth more or less cleft; annulus persistent or indistinct. Leaves not recurved, gen. faintly crisped when dry; cells pellucid; costa excurrent.

B. Leaves broad entire crisped. Monoeious or paroecious.

II. *Pseudo-Pottia*. Capsule long-exserted; teeth often present; lid deciduous. Leaves concave often recurved; upper cells small; costa sometimes excurrent Habit of *Pottia*. Stem low.

C. Leaves entire narrow gen. sublinear.

a. Leaves often involute us. crisped; costa often excurrent. Stem low. Often monoeious.

III. *Astomum*. Capsule not emerging above upper leaves; lid persistent or loosed with difficulty; teeth none. Stem very short.

IV. *Hymenostomum*. Capsule long-exserted; lid deciduous; teeth none. Leaves crowded; costa excurrent. Monoeious.

V. *Eu-Weisia*. Capsule long-exserted; lid deciduous; teeth present at least rudimentary, us. entire. Leaves crowded; costa sometimes not excurrent.

b. Leaves not involute and not or slightly crisped; costa not excurrent. Dioecious. Stem often high.

VI. *Hymenostylium*. Capsule without peristome; lid systylic; annulus none. Leaves partly recurved; upper cells more or less pellucid.
VII. Gymnostomum. Capsule sometimes but r. with peristome; lid deciduous not systyllic; annulus often present. Leaves sublinear not recurved; cells gen. subquadrate, the upper us. opaque and very small.

1. Eucladium Br. eur.

II. Pseudo-Pottia Kindb.
A. Leaves not recurved. Peristomial teeth well-evolute more or less perforated; annulus distinct. Monoecious.
B. Leaves recurved. Peristome us. imperfect or wanting; annulus not distinct. Paroecious.

3.W. Starkei Hedwig. — Pottia C. M.

*W. Davallii Smith. — Gymnostomum Sm.; Weisia Kindb.; Pottia minutula Br. eur.

*W. mutica Venturi. — Pottia Vent.; Weisia Kindb.


**W. commutata** Limpricht. — Pottia Limpr.; Weisia Kindb.

4. **W. groenlandica** Kindb. in Hedwigia 1897 p. 65.
Leaves suboblong-linear or sublingulate very obtuse, only the uppermost recurved; cells nearly smooth; costa not percurrent. Capsule oblong; lid long-conic much shorter; teeth none; pedicel reddish. — Habit of *W. Starkei*. — Arctic distr. r. Amer. Greenl. Silch: Baur 1885, com. Roell.

III. Astomum Hampe (Syntegium Schimper).

A. Leaves channelled not involute.

a. Leaves with long-excurrent costa, crisped.

5. **W. Levieri** Limpricht. — Astomum Limpr.; Weisia Kindb.

b. Leaves with subpercurrent costa.

6. **W. multicaapsularis** Smith. — Phascum Sm.; Weisia Mitten.
Lower leaves distant; comal and perichetial longer, long-acuminate subulate, crisped; costa not or slightly excurrent. Capsule subglobose or oval-oblong, not much longer than pedicel. — Clay fields r. Eur. Engl.: Braithwaite.

7. **W. Mittenii** Bruch et Schimper. — Astomum B. S.; Weisia Mitt.
Lower leaves distant; the uppermost larger, subulate, shorter-acuminate than in the last, not or faintly crisped; costa not excurrent. Capsule subglobose; pedicel somewhat longer. — Clay fields and banks r. Eur. Engl.: Braithwaite.


B. Leaves involute gen. carinate and long-acuminate, crisped.

a. Leaves with gen. long-excurrent costa: the lower distant.

b. Leaves long-acuminate with subpercurrent costa, the lower distant. Capsule with rostellate lid.
10. W. Sullivantii Schimper. — Astomum Sch.; Sull. icon. m.; Weisia Kindb.
   *Capsule ovoid; pedicel much longer. — Amer. r. U. S.«: Sullivant icon. m.
* W. Drummondii Kindb. — Systegium cat. Can. m.
   Capsule subglobose; pedicel 3—4 times longer, nearly emerging above upper leaves. — Amer. r. Can.: Drummond, com. Macoun.
c. Leaves crowded: upper long-acuminate, lower short-acuminate; costa subpercurrent. Capsule with thick short obtuse point.
   Capsule subglobose; pedicel often somewhat longer. — Amer. r. U. S.«: Sullivant.

IV. Hymenostomum R. Brown.
13. W. squarrosa Esenbeck et Hornschuch. — Hymenostomum Es. et Horns.; Weisia C. M.
14. W. microstoma Hedwig. — Gymnostomum H.; Weisia C. M.
   Leaves us. not strongly involute above; costa pale faint. Capsule with very small mouth, often asymmetric. — Banks and barren fields. Eur. not uncommon. Sweden, Spain etc.
15. W. tortilis Schweigerchen. — Gymnostomum Schw.; Weisia C. M.

V. Eu-Weisia.
   A. Perichetial leaves obtuse short convolute. Other leaves with not distinctly excurrent costa, not involute.

Leaves sublinear-subulate. Capsule gen. narrow; beak shorter.

**B.** Perichetial leaves acute not convolute. Other leaves with excurrent costa.

17. **W. viridula** L. — Bryum L.; Weisia Hedwig.


* **W. longirostris** Kindb. in Hedwigia 1896 p. 59.

Capsule more wide-mouthed, gen. shorter than beak; teeth gen. rudimentary. — **Amer. r. U. S. Chicago:** Roell.

* **W. crispata** Esenbeck et Hornschuch; Gymnostomum Es. et Hsch.; Weisia Juratzka.

Capsule more small-mouthed, suboblong, r. longer than beak; teeth rudimentary. — Clay and calcareous soil. **Eur. Switzerl.** Sweden; J. Persson.

* **W. longiseta** Lesquereux et James.


* **W. Ganderi** Juratzka.

**W. Ganderi** differs from **W. viridula** in nearly all leaves flat at borders. Capsule oblong scarcely longer than beak. — **Eur. r. Switzerl.** France: Philibert.
VI. Hymenostylium Bridel.

20. **W. curvirostris** Ehrhart. — *Pottia* Ehrh.; *Weisia* C. M.; *Gymnostomum* Hedwig.

Leaves long narrowly ovate-lanceolate or sublinear acuminate acute carinate, more or less papillose: the upper sometimes falcate; cells often faintly yellowish or less pellucid, rectangular or subquadrate; the lower basal cells hyaline sometimes rhomboidal. Perichetial leaves costate nearly similar. Capsule red-brown subglobose or obovate; beak longer and oblique. Tufts radiculose often high, sometimes loosely cohering. — Calcareous and schistose rocks princ. in alps. *Eur.* not uncommon. Sweden, Norway, Switzerland. *Amer.* Can.: Macoun; Waghorne. U. S.: Demetrio, com. Cardot.


Leaves oblong-lanceolate obtusate obtuse nearly smooth concave or channelled, shorter and broader than in the last; cells pellucid somewhat large: the upper subquadrate, the inner basal rectangular hyaline. Perichetial leaves ovate, the inner not or indistinctly costate. Capsules unknown. Tufts not high nearly eradiculose. — Rocks r. *Amer.* Can. Brit. Col. near a waterfall: Macoun.

VII. *Gymnostomum* Hedwig.

A. Tufts compact. Stem somewhat elongate. Capsule with indistinct or narrow persistent annulus; peristome none; pedicel yellow.

22. **W. rupestris** Schleicher. — *Gymnostomum* Schl.; *Weisia* C. M.


23. **W. calcarea** Esenbeck et Hornschuch. — *Gymnostomum* Es. et Hornsch.; *Weisia* C. M.

Leaves channelled or indistinctly carinate above, obtusate or short-acuminate, acute or obtuse, not or faintly curved when moist, not long; costa not percurrent. Perichetial leaves larger and longer with long sheathing base and shorter, attenuate acumen; the inner shorter. Capsule oval-oblong yellowish; lid


B. Tufts loose very low. Capsule minute; annulus us. broad. Leaves channelled. Plants small.

a. Lower leaves not shorter than the upper; cells pellucid, the upper nearly smooth well-distinct.

25. W. Barbula Schwägrichen. — Gymnostomum Schw.; Weisia Kindb.; Hyophila Hampe; Pottia C. M.

Leaves not long, obtuse gen. obtuse, not or faintly curved when moist. Perichetal leaves nearly similar not sheathing; the innermost one from short base somewhat narrowed to a long linear obtuse at one side faintly reflexed acumen. Capsule long cylindric; beak short; teeth none; annulus broad loosed in pieces. — Rocky banks of mountain rivulets r. Amer. U. S.: Garber; Lesq. et Jam. (Cuba: Wright, herb. Sullivant, com. C. Mueller).

b. Lower leaves shorter than the upper; upper cells opaque very small. Leaves often curved when moist.

aa. All leaves short; costa not percurrent. Capsule with broad annulus.


*W. reflexa* Bridel. — Gyroweisia Schimper.


Leaves not arrounded at apex; the upper sometimes acute, not much longer than the lower. Perichetial leaves acuminate acute. Capsule suboval twice longer than beak; teeth none; annulus revoluble. — Caverns of calcareous rocks r. *Eur.* Switzerl.: Philibert.


Leaves obtusate subacute not arrounded at apex. Perichetial leaves not larger and not sheathing, the inner one subovate shorter. Capsule oblong, not longer than beak; teeth none or rudimentary; annulus not revoluble. Resembles *W. tenuis* in size. — Calcareous rocks r. *Amer.* Can. Owen Sound: Macoun.

bb. Leaves acute; the lower oval very small, the upper very much longer (about 4 m. m.); costa subexcurrent. Annu-
ulus of capsule not found.


Upper leaves somewhat broader at base, crenulate-papillose all around; costa subexcurrent. Perichetial leaves from broader base abruptly tapering to a sublinear by costa nearly filled acumen. Capsule oblong-cylindric; teeth none; lid long-rostrate; pedicel pale finally reddish. Stem with shoots at base as in *W. tenuis*. — Calcareous rocks r. *Eur.* Switzerl. in a cavern near Lugano

119. Syrrhopodon Schwägrichen.

1. *S. texanus* Sullivant icon. muscorum.

Leaves hyaline-limbate and serrulate nearly all around, subli-
near acute or obtuse; nearly all basal cells large hyaline, the others very small opaque; costa with 2 serrate lamellae near apex. Calyptra scabrous. Peristomial teeth with 2 or 3 arti-

2. *S. crispus* Austin. — Calymeres Lesq. et Jam.

»Leaves hyaline-limbate in lower part, papillose-crenulate above, narrowly panduriform or lingulate, obtuse; basal cells larger, the upper very small. Tufts compact yellowish green, brown inside. — *Amer.* r. U. S. Florida»: Lesq. et Jam.
3. S. floridanus Sullivant icon. musc.
Leaves not limbate, entire at the lower part of sheath, papillose-crenulate in its upper part, narrowly ovate-lanceolate, tapering to the subobtuse apex; upper lamina furnished with 2 serrate lamellae at each border; the most cells small dusky, only the lower basal large hyaline; costa papillose, not serrate, at back. Calyptra smooth. Peristomial teeth with 5—6 articulations. Pedicel of capsule shorter than in the last. Tufts brown-green. — Decayed logs r. Amer. r. U. S. south. st.; Fitzgerald, com. Renauld.

120. Dialytrichia (Schimper as subgenus) Limpricht.
Leaves broad somewhat long sublinear or sublingulate round-obtuse carinate with thickened borders above the hyaline slightly reflexed base; upper cells papillose subquadrate, the basal rectangular hyaline or faintly colored; costa thick short-excurrent. Capsule suboblong; lid rostellate much shorter; teeth short reddish papillose scarcely once contorted; basal tube short; pedicel yellowish red. Stem branched 2—5 c. m. high us. erect. Tufts large dark green or dirty brownish. Habit of Cinclidotus riparius.
2. D. cancellata C. M. — Barbula C. M.; Dialytrichia Kindb.
Diffeis from the last: »Leaves yellowish green; stem nearly simple. Capsule cylindric; lid scarcely shorter; teeth smooth; calyptra very rough. — Amer. r. U. S. Texas: Boll* C. M. in Flora 1873.

121. Cinclidotus Beauvois.
A. Leaves narrow long sublinear or nearly subulate, falcate when moist.
Leaves crowded entire channelled narrowed from base, faintly curved when dry; nearly all inner cells subquadrate faintly pellucid, the marginal short-rectangular; costa thick sublinear excurrent to a thick smooth point, occupying about 1/4 of lamina at base. Capsule oblong brown; lid subconic often nearly as long; teeth brittle partly loosed with difficulty; pedicel short-exserted. Tufts brown or dark green. Stem naked below and much branching, often very long to 50 c. m. — Rivulets. Eur. southern distr. somewhat r. Switzerland, Schimper. Austria: Venturi. Italy: Arcangeli. Germany: Kolb.
2. *C. falcatus* Kindb. revue bryol. 1887.

Differs from the last: Leaves less crowded and dark green, distinctly falcate also when dry; cells opaque very chlorophyllose; costa broader and gradually narrowed, occupying at least 1/3 of lamina at base, much narrower at apex and gen. not excurrent. Stem not naked below, divided in long branches. Capsules unknown. — Springs r. *Eur.* Greece: Heldreich.

1b. Leaves broad obtuse or broadly acuminate, patent when moist; lower cells short rectangular.

3. *C. riparius* Host — Gymnostomum Host; Cinclidotus Arnott.


Leaves carinate sometimes denticulate at apex, ovate-oblong or broadly ovate-lanceolate acuminate gen. acute; upper cells sometimes faintly papillose. Capsule oval nearly immersed; teeth reddish. Stems fasciculate often to 10—15 c. m. long with numerous short branchlets. Tufts olivaceous or brown. — Stones in springs and rivulets *Eur.* not r. in lower warmer districts, r. in alps. Sweden, Switzerl., Italy! *Amer.* r. *Can.: Macoun*: Lesq. et Jam.

Fam. 25. **Calymeraceae**.

122. *Calymeres* Swartz.

1a. *C. Richardi* C. Mueller.


1b. *C. disciforme* C. Mueller.


Fam. 26 **Encalyptaceae**.

123. *Encalypta* Schreber.

A. Peristome double. Pedicel red.

1. *Streptotheca*. Capsule finally twisted, r. distinctly necked,
more or less ribbed; teeth red; endostome yellow; calyptra very
long, fringed below. Leaves limbate ciliolate lingulate.

II. *Diploleps*. Capsule necked, neither twisted nor sulcate;
endostome rudimentary adhering to teeth; calyptra us. fringed
when young. Leaves not limbate.

B. Peristome simple or wanting. Monoeious.

a. Leaves not recurved. Capsule without distinct defluent
neck; pedicel red.

III. *Rhabdothea*. Capsule greenish or pale yellowish, sul-
cate when dry, often red-ribbed; peristome often present; cal-
yptra not long, r. fringed. Leaves often limbate.

IV. *Pyromitrium*. Capsule pale brown not sulcate; peri-
stome none; calyptra long, often fringed when young. Leaves
limbate.

b. Capsule more or less distinctly necked; pedicel yellow
in younger state.

V. *Xanthopus*. Capsule reddish r. sulcate, not ribbed; peri-
stome us. present. Leaves not distinctly limbate.

I. *Streptotheca* Kindb.

A. Capsule very much twisted also when unripe. Leaves
obtusate obtuse; costa hispid above at back, not excurrent.
Spores about 0,01 m. m.

1. *E. contorta* Wulfen. — Bryum Wulf.; Encalypta Lindb.; E.
streptocarpa Hedwig.

Outer perichetial leaves from broad base abruptly tapering
to a long sublinear obtuse acumen; the inner shorter with short
acute acumen. Pedicel faintly rough. Calyptra hispid at beak.
Sterile stems often with propagula. Dioecious r. fruiting. —
Rocks princ. calcareous. Eur. not uncommon. Sweden, Nor-

2. *E. cucullata* C. M. et Kindb. l. c.

Perichetial leaves gradually long-acuminate acute with long
hairpoint. Pedicel smooth. Calyptra hispid on the whole
surface. Stem without propagula. Monoeious. — Crevices of

B. Capsule faintly twisted, straight when unripe; pedicel
smooth; calyptra hispid at beak. Upper leaves acute; costa
smooth often excurrent. Spores 0,02 m. m. Monoeious.


Upper leaves gen. acute, sometimes with hairpoint; the per-
ichetial subovate short-acuminate us. with hairpoint. Capsule
without distinct neck; teeth us. shorter than endostome.

4. E. Selwyni Austin.
Leaves more recurved than in the last; the upper and perichetial longer-acuminate with long hairpoint. Capsule sometimes with distinct neck and more twisted; endostome less papillose, as long as teeth. — Alp. rocks r. Amer. Can. Pacif. distr.: Macoun. U. S.: Roell.

II. Diplolepis Kindb.

A. Capsule not or scarcely longer than neck.

5. E. longicolla Bruch; Husnøt m. Gall.
Leaves long narrow sublinear-lingulate obtuse or acute, concave not recurved; costa excurrent to a short yellowish point. Perichetial leaves long, the inner not smaller, with long whitish hairpoint. Capsule brown with red neck; teeth purplish. Spores 0,05—0,09 m. m. Calyptra long fringed nearly glabrous. — Calcareous soil in alp. region r. Eur. »Austria, Switzerland, Germany»: Schimper.

B. Capsule much longer than neck.

a. Leaves long narrow sublinear-lingulate; the perichetial ovate-oblong. Calyptra long hispid fringed when young.

Leaves more or less acuminate often acute, not or indistinctly recurved; costa short-excurrent not piliform at apex. Capsule brownish; teeth pale red. Spores about 0,02 m. m. — Alp. rocks r. Eur. Switzerland! Sweden: Aongstroem. Austria: Breidler.

Leaves gen. obtusate, distinctly recurved nearly all around; costa not excurrent. Capsule reddish brown; teeth brown-yellow. Spores about 0,03 m. m. — Clay banks in alp. region r. Amer. Can. Rocky mts 2250 metr. a. sea: Macoun; Drummond 50 c, com. C. Mueller.

b. Leaves somewhat broad and not long, oblong-lingulate or shorter; the perichetial us. subovate r. suboblong.

aa. Leaves distinctly recurved nearly all around; costa not excurrent without hairpoint.

8. E. leiocarpa Kindb. cat. Canad. m.
bb. Leaves not or indistinctly recurved; costa long-excurrent with hairpoint.

Leaves oblong-lingulate acute sometimes slightly recurved, often serrate at apex, very concave; hairpoint whitish. Capsule red; neck distinct; teeth whitish; calyptra short glabrous fringed when young. Spores about 0.03 m. m. — Schistose rocks in alp. regions in northern districts r. Eur. Norway! Sweden: E. Adlerz.

10. E. subbrevicolla Kindb. n. sp.
Leaves oblong-lingulate obtuse undulate not recurved, entire gen. obtuse; hairpoint whitish. Perichaetial leaves suboblong acuminate. Capsule brownish with very short neck; teeth whitish when moist, pale reddish when dry; calyptra somewhat long with hispid beak, fringed when young. — Amer. r. Can. northern Labrador: Macoun 1896.

11. E. labradorica Kindb. n. sp.
Leaves subovate obtuse or subacute entire not recurved; hairpoint whitish or at base yellowish. Capsule brownish with distinct neck; teeth brown-yellow; calyptra short faintly rough not fringed. — Amer. r. Can. northern Labrador: Macoun 1896.

III. Rhabdotheca C. Mueller.

A. Leaves not distinctly limbate.

12. E. extinctoria Swartz. — Mnium Sw. 1781; Eucalypta Sw. 1799; Leersia vulgaris Hedwig 1787; Eucalypta Hoffm. 1795.
Leaves short subspathulate us. obtuse sometimes apiculate; costa not or r. excurrent with short hairpoint, us. without hairpoint. Capsule red-mouthed not ribbed, finally sulcate when dry; teeth wanting or rudimentary; pedicel elongate. Calyptra pale yellow not fringed, more or less hispid. Spores about 0.03 m. m. Tufts green low, radiculose only at base.

* E. tenella Kindb. in Hedwigia 1896 p. 65.

B. Leaves limbate below.

a. Tufts dense very radiculose, brown below, often high.
   Leaves suboblong or oblong-lanceolate obtusate us. subacute; costa often excurrent sometimes pilferous. Capsule us. red-ribbed and oblong-cylindrical; teeth orange or purplish. Calyptra short bispid not fringed. Spores 0.04—0.05 m. m. — Calcareous and schistose rocks. *Eur.* common in alps. Sweden (also below alps), Norway, Switzerl. *Amer.* Can. not r.: Macoun.

*E. leiomitra* Kindb. cat. Canad. m.


b. Tufts less dense, radiculose only at base, green and not high. Costa of upper leaves long-excurrent with hairpoint.

   Leaves oblong-spathulate us. obtuse. Peristome none. Calyptra fringed nearly glabrous. Capsule more or less sulcate. Spores 0.03—0.04 m. m. — Stones and walls r. *Eur.* Sweden! Austria Transsilvania; Barth, com. C. Mueller.

15. *E. subspathulata* C. M. et Kindb. l. c.
   Leaves spathulate-lingulate obtuse. Capsule not ribbed, faintly sulcate when dry; teeth pale high or partly incomplete and membranose. Calyptra bispid above, not fringed. Spores 0.04—0.05 m. m. Tufts low not dense. — Earth r. *Amer.* Can. Brit. Col.: Macoun.

IV. Pyromitrium Wallroth.

   Leaves deeply impressed at both sides above the short erect nearly sheathing base, sublingulate acute more or less attenuate; costa often excurrent. Perichetial leaves us. piliferous. Calyptra brownish glabrous. Spores 0.03—0.04 m. m. Tufts tomentose often high and brown. — Alp. rocks. *Eur.* common in northern districts, otherwhere r. Norway! *Amer.* r. Can. Rocky mts: Drummond 49.

V. Xanthopus Kindb.

A. Capsule not sulcate.
17. E. ciliata Hedwig. — Leersia H.; Encalypta Hoffmann.
   Leaves lingulate subacute not long; costa nearly smooth at back, often excursive to a yellowish point. Capsule with short less distinct neck and pale mouth; teeth orange erect when moist, appressed to mouth when dry, faintly papillose and us. brittle. Calyptra fringed also when old, us. glabrous r. rough at beak. Spores about 0,03 m. m. — Earth and stones also in alps. Eur. common. Sweden, Norway, Switzerl.! Amer. 
   »Greenl.«: Berggren.

* E. microstoma Balsamo et Notaris.
   »Capsule with narrow mouth and distinct neck; teeth irregular us. wanting. — Earth in alps r. Eur. Austria; Switzerl.«: Limpricht.

18. E. Macounii »Austin«: Macoun. — Leersia borealis Kindb. Laubm. Schwed. u. N.
   Leaves gen. narrowly lingulate; costa longer-excurrent than in the last. Capsule with distinct often somewhat long neck and brown mouth; teeth brown-red or red, erect when dry, appressed to mouth when moist, distinctly papillose and not brittle. Calyptra as in the last. Spores about 0,04 m. m. — Rocks. Eur. in alp. regions not common. Norway! Switzerl.: Husnot m. Gall.; H. Forssell. Amer. Can. not r.: J. Macoun (also original specimen determined by Austin). Alaska: J. M. Macoun. U. S.: Roell.

B. Capsule distinctly sulcate when dry.

19. E. alaskana Kindb. cat. Canad. m.
   Leaves short subobovate subobtuse; costa nearly smooth, scarcely excursive. Capsule with very short neck and brown mouth; teeth as in the last. Spores about 0,02 m. m. Calyptra not seen. — Arctic district r. Amer. Alaska; J. M. Macoun.

124. Merceya Schimper.

1. M. ligulata Spruce. — Encalypta Spruce; Merceya Schimp.
   Leaves lanceolate-lingulate ciliate arro illustration at apex, reflexed below but not limbate, not or indistinctly papillose; upper cells small round-quadrate, the basal rectangular; costa not excursive. Capsule oblong; teeth none; pedicel long. Stem simple or bifurcate. Tufts dense, brownish below, yellow-green at the tips, 2—4 c. m. high. — Wet rocks r. Eur. France: Renaud; Jeannenay. Austria: Breidler.

2. M. latifolia Kindb. bull. Torr. club XVI.
   Leaves broadly spatulate-lingulate obtuse or subacute, slightly reflexed near base, broadly limbate by orange-

Fam. 27. Orthotrichaceae.

125. Orthotrichum Hedwig.

**A.** Stomata of capsule superficial.

a. Leaves partly or wholly involute, not carinate. Dioecious.

**I. Coelophyllum.** Leaves short concave obtuse; cells gen. short. Capsule immersed sulcate strangulate when dry; calyptra scabrous; teeth reflexed when dry, broader than the cilia.

b. Leaves gen. carinate and recurved nearly all around, not crisped. Monoecious or (*O. exiguum*) dioecious.

**II. Doreadion.** Capsule r. strangulate; calyptra us. hairy.

aa. Capsule narrow subcylindric not distinctly constricted, us. exserted.

1. *Speciosa.* Capsule nearly smooth at least when young; cilia narrow; teeth us. opake and connate in pairs. Leaves carinate gen. long.

bb. Capsule thick oval-oblong strangulate and sulcate, us. immersed; cilia narrow.

2. *Arctica.* Leaves short often subcanaliculate, us. obtuse.


cc. Capsule thick suboval not strangulate.

4. *Rupestria.* Capsule immersed or emergent, more or less sulcate; teeth erect or patent when dry, joined in pairs but us. subpartite; cilia narrow. Leaves long carinate.

5. *Leiocarpa.* Capsule wholly or partly immersed, not sulcate; cilia very broad; teeth not connate. Leaves sometimes short and nearly flat at borders.

c. Leaves faintly or not carinate, partly recurved or wholly flat at borders, us. long and crisped. Sometimes dioecious.

**III. Lyellina.** Capsule us. immersed; cilia somewhat broad. Leaves not or faintly crisped; alar cells not hyaline. Dioecious, often (in Europe) with propagula when sterile.

**IV. Ulota.** Capsule exserted; cilia narrow. Leaves more or less distinctly crisped; alar cells mostly pluriseriate and hyaline. Tufts us. pulvinate. Monoecious.
V. **Pseud-Ulota**. Capsule exerted; cilia narrow. Leaves strongly crisped; hyaline alar cells uniseriate or indistinct. Tufts pulvinate. Dioecious very r. fruiting, often with propa-
gula when sterile.

B. Stomata of capsule immersed.

VI. **Calyptoporus**. Capsule often strangulate; cilia us. subfiliform. Leaves more or less recurved, gen. not crisped. Monoecious.

a. Leaves partly flat at borders. Plants gen. small.

1. **Psilocarpa**. Capsule immersed thick neither sulcate nor strangulate. Leaves not crisped.

2. **Microcarpa**. Capsule immersed thick sulcate us. strangulate. Leaves not crisped.

3. **Pulchella**. Capsule narrow subcylindric sulcate not distinctly strangulate, us. exerted. Leaves more or less crisped.

b. Leaves recurved nearly all around, not crisped. Capsule sulcate.

aa. Leaves with hyaline hairpoint.

4. **Diaphana**. Capsule immersed not strangulate. Plants small.

bb. Leaves without hairpoint.

5. **Rivularia**. Capsule immersed. Leaves channelled short broadly obtuse; cells large thin-walled, the upper polygonal; costa abbreviate. Plants gen. large, growing in or near water, r. fruiting.

6. **Cupulata**. Leaves carinate long gen. acuminate acute; upper cells small rotundate thick-walled; costa gen. percurrent. Capsule sometimes not strangulate; teeth not appressed to it. Plants often large, growing on rocks or less often on trees.

7. **Pumila**. Leaves more or less distinctly carinate often obtuse; upper cells small rotundate thick-walled; costa gen. percurrent. Capsule us. strangulate; teeth appressed to it when dry. Plants small us. pulvinate, growing on trees or less often on rocks.

I. **Coelophyllum** Kindb.

A. Capsule with nearly as long neck; teeth orange.

1. **O. obtusifolium** Schrader.

   Leaves ovate-oblong obtuse not involute at apex, also the perichetial; costa pellucid not percurrent. — Trees and roofs. 

   *Eur.* common. Sweden, Norway, Switzerland! *Amer.* not common. 

   Can.: Macoun.

2. **O. inflexum** C. Mueller syn. — *O. brachytrichum* Shim-
pers: Lesq. et Jam.?
Leaves narrower than in the last and less obtusate or subacute subinvolute nearly all around; cells larger; costa shorter, sometimes ceasing far below apex. — Trees r. Amer. Can.: Macoun.

B. Capsule with short neck; teeth wanting.

3. O. gymnostomum Bruch.


II. Dorcadion Adanson; Lindberg.

1. Speciosa.

A. Capsule short-emergent; pedicel very short; teeth free or slightly connate at base.

4. O. Bolanderi Sullivant icon. muscor.

Leaves ovate-lanceolate short-acute subacute; nearly recurved below, flat above, faintly papillose, appressed when dry, falcate when moistened. Capsule short-necked, smooth when young; finally sulcate; teeth yellowish appressed when dry; calyptra hairy. Tufts about 3 c. m. high. — Rocks r. Amer. S. S.: Sullivant.

5. O. psilothecium C. M. et Kindb. l. c.

Differ from the last: Leaves shorter often obtuse or obtusate, recurved nearly all around, less papillose, not appressed when dry. Peristomial teeth not connate. Calyptra finally glabrous. Tufts 1—2 c. m. high. Capsule greenish as in O. affine. — Trees r. Amer. Can.; Macoun. U. S. Oregon: Roell.

B. Capsule exserted gen. long-emergent; teeth connate in pairs.

a. Capsule arrounded below, not defluent to the short neck.

6. O. lavigatum Zetterstedt. — O. rhabdophorum Venturi ?


b. Capsule defluent to the long neck.

aa. Capsule not or very faintly sulcate when old.

7. O. Kingii Lesquereux; Sullivant icon. m.

Leaves as in the last but nearly appressed when dry. Capsule longer or shorter than pedicel; teeth whitish erect when dry; calyptra hairy. Tufts as in the last, 1—2 c. m. high. — Rocks r. Amer. Can. Brit. Col.: Macoun. U. S.: Henderson, com. Cardot,
bb. Capsule us. distinctly sulcate when old.

8. **O. speciosum** Eisenbeck.

Leaves ovate-lanceolate subulate-acuminate or r. subobtuse at apex, not or r. appressed when dry, falcate when moistened. Capsule pale brown when ripe; teeth whitish or pale yellow, us. appressed to it when dry; cilia not sinuous; pedicel shorter than capsule; calyptra hairy. Tufts us. pale or yellowish green; stem us. long. — On trees or less often on stones. Eur. common, but r. in alp. regions. Sweden, Norway, Switzerland. Amer. Can.: Macoun; Wagorne.

* **O. elegans** Schweigrenchen.


9. **O. Roellii** Venturi.

Differs from **O. speciosum**: Capsule longer exserted shorter than pedicel; teeth pale yellow erect when dry. — Rocks r. Amer. U. S.: J. Roell.


* **O. Schlothaueri** Venturi.


Leaves ovate-lanceolate shorter and shorter-subulate than in **O. speciosum**, appressed when dry, not falcate when moist. Capsule faintly sulcate; teeth yellowish erect when dry; cilia sinuous; pedicel shorter than capsule; calyptra finally glabrous. Tufts brown; 1—3 c. m. high. — Alp. rocks r. Eur. Norway, Switzerland. Amer. U. S.: Roell.

2. **Arctica**.

11. **O. Pylaisii** Bridel; C. M. syn. — O. Breutelii Hampe; O. Blyttii Schimper.

Leaves ovate-oblong or broadly ovate-lanceolate more or less obtuse, narrowly or slightly reflexed, faintly open when moistened; cells gen. short. Capsule suboval; teeth not or faintly perforate; cilia short or rudimentary; calyptra hairy. Leaves short us. faintly papillose; costa subpercurrent. Capsule exserted distinctly sulcate; teeth opake; pedicel long. Tufts olive-green or brown. — Rocks near sea in northern prince.

*O. brevinerve* Lindberg.

> Leaves nearly smooth; costa abbreviate. Tufts brown. — Eur. r. Finl.: Lindb. musci scandin.

*O. sommerfeltii* Schimper.

> Leaves longer nearly smooth; costa subpercurrent. Tufts green or yellowish green. — Eur. r. Norway: W. Baur; Arnell.

*O. microblephare* Schimper.


*O. arcticum* Schimper.


*O. groenlandicum* Berggren.

> Differs in peristomial teeth separated not connate in pairs. Amer. r. Greenl.: Berggren.

12. *O. sordidum* Sullivant et Lesquereux; Sull. icon. m.

Leaves ovate-oblong or broadly ovate-lanceolate gen. acute sometimes short- acuminate, faintly papillose and broadly recurved, open when moistened; inner basal cells narrow. Capsule broad-oval or subpiriform immersed or nearly exserted; teeth obsolete perforate above; cilia long; calyptra sparingly hairy; pedicel very short. Tufts dusky green about 1 c. m. high. — Trees r. Amer. Can.: Macoun.

3. Affinia.


Leaves ovate-lanceolate us. subulate-acuminate and very papillose. Capsule oblong yellowish green defluent to the long neck; teeth pale perforate (fenestrate) above, finally appressed; pedicel very short; calyptra sparingly hairy. Tufts green us. 2—3 c. m. high. — On trees r. on stones. Eur. common. Sweden, Switzerland! Amer. r. Can.: Macoun.

*O. fastigiatum* Bruch. — O. neglectum and O. appendiculatum Schimp.

*O. acuminatum* Philibert.
Capsule more abruptly narrowed below, sometimes suboval; teeth rudimentary. — Trees *Eur.* France: Philibert. Italy: Venturi.

*O. praemorsum* Venturi.
Leaves less papillose. Capsule oval; teeth often rudimentary, deflexed when evolute; calyptra hairy. Stem 2—3 c. m. high. Rocks *Amer.* U S.: Roell.

4. Rupestria.


*O. Franzonii* Notaris.
Tufts green. Leaves less rigid. — On trees and rocks *Eur.* Switzerland.

*O. Sturmii* Hornschuch.

15. *O. texanum* Sullivant icon. muscor.

16. *O. Douglasii* Duby; Lesq. et Jam.

5. Leiocarpa.

17. *O. leiocarpum* Br. eur. — *O. striatum* (Hedw.) Bridel.
Leaves ovate-lanceolate subulate-acuminate carinate us. long. Capsule brown-yellow suboval or oval-oblong quite smooth; neck not distinct; teeth opake finally appressed, orange in
younger state; cilia yellowish narrower; calyptra not densely hairy. Tufts green or yellowish green 2—4 c. m. high. — On trees r. on rocks. Eur. not r. Sweden, Norway, Switzerl. Amer. r. Can.; Drummond 154.

*O. Shawii Wilson.

18. O. exiguum Sullivant icon. muscor.
Leaves small short gen. ovate-oblong, sometimes broadly ovate-lanceolate or sublinear, obtuse or short-acuminate gen. obtuse, often nearly wholly flat or slightly reflexed at borders; cells gen. short; costa subpercurrent or shorter. Capsule oval faintly striate when old; neck none or indistinct; cilia whitish broader than teeth; calyptra nearly glabrous; stomata? Tufts small green about 0.4 c. m. high. Dioecious. — Base of trees r. Amer. U. S. Nat. Park: Roell.

III. Lyellina Kindb.
A. Capsule immersed; pedicel indistinct. Leaves nearly appressed when dry not flexuous, with numerous propagula.

19. O. lyelli Hooker et Taylor.

B. Capsule more or less emergent; pedicel distinct. Leaves without propagula, the upper us. flexuous or crisped.

20. O. papillosum Hampe. — O. Pringlei C. M.
Leaves as in the last but longer and recurved at least at one side to the greater part, more papillose also below. Capsule longer, subcylindric brown and partly emergent. Stem us. higher. Tufts us. yellowish or bright green. — Trees and rocks. Amer. not r. Can.; Macoun. U. S. Calif.: Mrs L. C. Feely.

*O. strictum Venturi.
Leaves dark green shorter, appressed when dry: — Amer. r. Can.; Macoun.

Leaves long as in O. papillosum, nearly flat or undulate at borders, faintly papillose, not appressed when dry; the upper crisped. Capsule narrow-cylindric pale brown nearly wholly

IV. Ulota Mohr.

A. Leaves not or indistinctly crisped; hyaline alar cells gen. uniseriate or indistinct.

a. Leaves longish not twisted; nearly all cells short.

22. O. americanum Beauvois. — Ulota Hutchinsonæ (Smith) Hammar.

Leaves more or less recurved princi. at base, broadly ovate-lanceolate gen. subobtuse at apex. Capsule thick piriform; calyptra densely hairy. Tufts green or blackish. — On rocks or r. on trees. Eur. common. Sweden, Norway, Switzerl. ! Amer. Can.: Macoun; Waghorne.


b. Leaves short faintly twisted when dry; basal cells long.

24. O. Barclayi Mitten. — Ulota Mitt.; Sulliv. icon. m.; Orthotrichum Kindb.


B. Leaves long very crisped; hyaline alar cells gen. indistinct.


C. Leaves more or less crisped; hyaline alar cells in several rows.

a. Capsule gen. not wholly exserted; pedicel short. Leaves long distinctly papillose nearly opake; nearly all cells short.

26. O. connectens Kindb. in Ottawa Natur. IV, 64. — Ulota camptopoda Kindb. cat. Canad. m,
Leaves recurved below, often subulate at apex, very crisped; alar cells in straight transverse rows. Capsule small obovate not constricted; pedicel often curved or geniculate in younger state. — Trees r. Amer. Can.: Macoun.

b. Capsule long-exserted; pedicel long. Inner basal leaf-cells long

aa. Leaves not long with long cylindric papillae, faintly crisped; alar cells short-rectangular. Calyptra densely hairy.

27. O. curvifolium Wahlenberg. — Ulota Bridel.

Leaves obtuse acute or subobtuse, nearly flat at least at base, not or slightly crisped when dry, open-erect straight when moist. Capsule obovate sulcate in its whole length, finally subcylindric; neck short; teeth finally deflexed. Tufts blackish below. — Rocks princ. in northern districts gen. r. Eur. Sweden and Norway, less r. in Alps! Amer. Can.: Macoun; Waghorne.

28. O. scabridum Kindb. — Ulota Kindb. cat. Canad. m.; U. americana Mitten?

Leaves obtuse or broadly acuminate subobtuse, recurved below to middle, distinctly crisped when dry, falcate when moist. Capsule obovate or suboblong sulcate in upper half when young, finally subcylindric; neck somewhat long; teeth erect. Tufts green or brown, dark brown below. — Rocks r. Amer. Can. Rocky mts: Macoun.

bb. Leaves long with short papillae, nearly smooth at least at borders, us. not strongly crisped (at least the elder); alar cells subquadrate. Calyptra densely hairy. Stem us. decumbent. Peristome not appressed; cilia very short, us. wanting.

29 O. Ludwigii Bridel. — O. coarctatum Beauvois.


Leaves us. subulate at apex; upper cells rotundate, the outer
basal long-rectangular (often to middle of leaf) in straight rows. Capsule not deeply sulcate, not strangulate; pedicel thin very long; calyptra sparingly hairy. — Trees r. Eur. Irel.: Stewart and Holt.


Differs from the last: Leaves more or less obtuse at apex; upper and middle cells oval-oblong. Capsule narrower; pedicel longer and thinner. — Trees r. Amer. Can. Brit. Col. and Vanc. isl.: Macoun.

34. **O. ulophyllum** Ehrhart. — Bryum striatum var. ulophyllum Ehrh. 1780; Weisia ulophylla Ehrh. 1787; Orthotrichum Kindb.; O. crispum Hedwig 1788; Ulota Brid. 1819.

* **O. crispulum** Bruch. — Ulota Bruch; Orthotrichum Br. eur.
Capsule not strangulate, oval or round-oval not defluent to neck. — Eur. not uncommon. Sweden, Norway, France! Amer. Can. not r.: Macoun; Waghorne.

* **O. intermedium** Schimper. — Ulota Sch.; Orthotrichum Kindb.


V. Pseud-Ulota Kindb.

36. **O. jutlandicum** Bridel. — Ulota phyllantha Brid. in part.
Leaves sublinear above middle, short-acuminate often sub-obtuse, nearly flat at borders, faintly papillose; nearly all basal cells long; costa smooth. Capsule oblong; neck long; teeth erect; pedicel long straight thin. — On trees princ. near sea
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VI. Calyptoporus Lindberg.

1. Psilocarpa.

38. O. psilocarpum James. — Sullivant icon. musc.

Leaves broadly ovate-lanceolate obtusate subobtuse faintly papillose, recurved below, sometimes faintly crenulate at apex; cells small, the basal short. Capsule broad-oval finally suboblong; neck not distinct; lid mamillate; teeth free opake erect; cilia narrow; calyptra glabrous. Stem about 0,5 c. m. long. — Trees r. Amer. U. S.: James, com. C. Mueller. Can.: Macoun.

2. Microcarpa.

39. O. microcarpum Notaris; Husnot muscol. gall.

Leaves flat at borders at least at one side, nearly smooth, gen. obtuse suboblong or broadly ovate-lanceolate; basal cells short. Capsule suboval; neck not distinct; teeth papillose yellowish connate in pairs, appressed when dry; calyptra glabrous. — On small trees prnc. Morus r. Eur. Switzerl. near Lugano.

40. O. Hallii Sullivant et Lesquereux; Sull. icon. m.

Leaves recurved below middle, distinctly papillose, ovate-lanceolate acute or subobtuse at apex; alar cells quadrate, the inner basal short-rectangular. Capsule oval; neck not distinct; teeth smooth whitish connate in pairs, erect when dry; calyptra hairy. — Trees r. Amer. Can.: Macoun.

41. O. Jamesii Sullivant icon. muscor.

Leaves faintly reflexed, very papillose with long cylindric papillae, broadly obtuse ovate-oblong; marginal cells quadrate, the inner basal somewhat long-rectangular not hyaline. Capsule obovate-piriform often with thick neck; teeth smooth pale, wholly or nearly free, deflexed-appressed when dry; calyptra sparingly hairy. — Limestone rocks r. Amer. Can.: Macoun.

3. Pulchella.

42. O. pulchellum Brunton.

Leaves long narrow subulate at apex, recurved below, flat

*O. ulotaeforme* Renault et Cardot.

43. **O. Winteri** Schimper; Limpicht.

4. Diaphana.

44. **O. diaphanum** Gmelin. — Bryum Gm.; Orthotrichum Schrader.
Leaves broadly ovate-lanceolate nearly smooth. Capsule oblong smooth when young; neck short; calyptra nearly glabrous. Stem 1 c. m. or shorter. — On trees or r. on stones. Eur. not r. Sweden, Germany. Amer. r. U. S.: Lesq. et Jam.

*O. canum* Mitten.
Capsule emergent. Leaves with shorter hairpoint. — Amer. r. Can.: Drummond; Lesq. et Jam.

5. Rivularia.

45. **O. rivulare** Turner.

46. **O. euryphyllum** Venturi.
Differs from the last: Leaves not distinctly decurrent; alar cells short-rectangular or indistinct. Capsule broad-oval; teethless papillose. Stem about 2—3 c. m. — Stones in running water r. Amer. U. S.: Roell.

47. **O. Sprucei** Montagne.
6. Cupulata.
A. Capsule not distinctly strangulate; teeth smooth erect when dry.
   a. Capsule narrow gen. long-exserted.
   Leaves subcanaliculate and not subulate at apex, hyaline below, faintly papillose above. Capsule oblong or oblong-cylindric with brown stripes; teeth nearly free. — On stones, less often on trees and roofs. — *Eur.* common. Sweden, Norway, Switzerl.l *Amer.* r. Can.: Macoun.
   b. Capsule thick suboval, sometimes immersed.
49. *O. consimile* Mitten; Sulliv. icon. musc.
   Leaves not subulate at apex, faintly papillose above, hyaline below. Capsule us. long-exserted; teeth nearly free. Stem us. about 0,5 c. m. — Rocks *Amer.* Can. Pacif. distr.: Macoun.
   *O. anomaloides* Kindb. n. subsp.
      Capsule less exserted; cilia shorter than teeth. Stem higher.
      — *Amer.* r. Can.: Macoun.
50. *O. Watsoni* James; Sulliv. icon. musc.
   Leaves subulate at apex, strongly papillose with long cylindric papille. Capsule wholly immersed; teeth connate in pairs. Stem 1—2 c. m. high. — Alp. rocks *Amer.* *U. S.*; Lesq. et Jam.
   B. Capsule thick us. strangulate, more or less immersed; teeth nearly free often papillose, often patent when dry. Leaves carinate.
      a. Peristomial teeth entire.
51. *O. urnigerum* Myrin. — *O. perforatum* Limpricht>; Venturi.
52. *O. cupulatum* Hoffmann.
   Leaves us. faintly papillose, often hyaline below. Capsule with more or less distinct us. thick short neck; teeth gen. smooth, often patent when dry. Tufts us. dense and brown or blackish when dry. — Rocks. *Eur.* not uncommon. Sweden, Switzerl.l *Amer.* Can.: Macoun.
   *O. nudum* Dickson; Venturi.
*O.Sardagnae* Venturi.  
Capsule with long defluent neck. — Dolomitic rocks r. Eur.  
Switzerl.1 Austria: Venturi.  

*O.Venturi* Notarís.  
»Austria«: Venturi.  

b. Peristomial teeth gen. partite and papillose.  
53.0.Lescurii Austin; Sulliv. ic. m.; Kindb. rev. bryol. 1896.  

*O.Porteri* Austin.  
»Capsule nearly exserted. Amer. r. U. S.»: Lesq. et Jam.  

54.0.Baldacelii Venturi et Bottini.  

A. Capsule arrounded below when operculate, finally strangled when dry. Calyptra campanulate.  

55.0.Schimperi Hammar. — O. fallax Schimper.  

56.0.strangulatum Beauvois; Sulliv. icon. musc.  
Differs from the last: Leaves often subulate at apex; basal cells sometimes longer. Capsule finally exserted; calyptra sparingly hairy. — On trees or r. on rocks, r. Amer. Can.: Macoun.  

B. Capsule not arrounded below when operculate.  
a. Capsule not distinctly constricted when dry. Leaves subcanaliculate.  

57.0.pallens Bruch.  
Leaves not r. obtuse at apex, faintly papillose, more or less long, often decurrent; inner basal cells somewhat long. Capsule partly emergent somewhat thick with long defluent neck, us. pale yellow; stomata us. not much immersed; teeth us. orange; calyptra campanulate yellowish us. glabrous. Stem us. about 1 c. m. high. — On trees princi. in warmer districts.

*O. scopulosorum* Lindberg. — O. Arnelli and O. rufescens Greenwall; Limprecht.


*O. Rogeri* Bridel.


58. *O. ohioense* Sullivan et Lesquereux. — Sulliv. icon. m.


Leaves broadly acuminate, gen. acute or subsulubulate at apex, faintly papillose; inner basal cells somewhat long. Capsule greenish nearly or wholly exserted with long defluent neck, narrower than in *O. pallens*; stoma much immersed; teeth whitish sometimes not connate; calyptra narrowly conic whitish nearly glabrous. Stem 0.5—1 c. m. high. — Trees (princ. *Salix alba*) in southern districts r. Swizerl.; Philibert. Austria: Venturi. France: Puget.

b. Capsule finally strangulate.

aa. Capsule narrow oblong-cylindric, often exserted; neck long; calyptra narrowly conic.

60. *O. tenellum* Bruch.


bb. Capsule thick oval-oblong, us. immersed; neck short; calyptra broad.


Leaves us. long acute often carinate; inner basal cells long-rectangular. Capsule piriform more or less emergent; teeth orange papillose; calyptra straw-colored us. with few short hairs.
Tufts 2—3 c. m. high. — On trees or r. on stones. Eur. common below alp. regions. Sweden, France, Switzerland! Germany: Warnstorf.

62.0.alpestrae Hornschuch.

63.0.pumilum Swartz.
Leaves broadly ovate-lanceolate carinate us. acute; basal cells short. Capsule suboblong immersed; teeth dark yellow; calyptra glabrous pale yellow. Tufts about 1 c. m. high. — On trees and roofs. Eur. not uncommon, Sweden, Switzerland! France: Husnot. »Amer.: Venturi.

64.0.Braunii Bryol. eur.

65.0.cylindrocarpum Lesquereux; Sullivant icon. m.
Leaves broadly ovate-lanceolate obtuse subobtuse subcandicate; basal cells short. Capsule oval-oblong finally cylindric wholly exserted; calyptra hairy. Tufts 1 c. m. or lower. — Rocks and trees r. Amer. Can.: Macoun.

126. Macromitrium Bridel.
A. Leaves closely imbricate when dry. Calyptra with long hairs.

Leaves broadly ovate-lanceolate broadly acuminate subacute carinate scarcely reflexed, slightly papillose, entire, patent-erect when moist; cells round-oval; costa not percurrent. Perichaetial leaves longer and narrower. Capsule oblong-cylindric, contracted at mouth, plicate at it and below when dry; exostome wanting or imperfect; endostomial tube very low; lid rostrate-subulate; pedicel somewhat long; calyptra covering capsule. Branches reddish brown not crowded. Monoecious. — On pine trees r. Amer. »U. S.»: Sulliv.

»Differ from the last in its dark brown color; branches yellowish; capsule larger, distinctly ribbed; lid shorter, conic and blunt; pedicel shorter; leaves longer; male flowers not found. — On trees r. Amer. U. S.»: Lesq. et Jam.
B. Leaves crisped when dry. Calyptera slightly hairy.

3. Maerhabdocarpum Mitten.

Leaves linear-lanceolate acute or subobtuse and subapiculate, carinate, not recurved, crenulate, papillose above, spreading-open and slightly flexuous when moist; upper cells round, basal oblong; costa yellowish percurrent. Perichetial leaves narrower, more acute. Capsule oval gradually narrowed to pedicel and to mouth, distinctly plicate; peristome simple; teeth short pale fragile; lid subulate; calyptera covering capsule. Branches not crowded. — Amer. U. S., Florida: Lesq. et Jam.

127. Schlotheimia Bridel.


Leaves sublinear or oblong-lingulate, obtuse often subtruncate, carinate, sometimes recurved, broadly limbate at one side below, entire indistinctly papillose not rugose, patent and faintly curved when moist, slightly crisped when dry; cells very small round-oval, lower marginal narrowly linear; costa dark brown, depressed on upper side, very prominent at back, excurrent to a thick deflexed point. Perichetial leaves similar. Capsule suboblong, contracted at mouth, not sulcate; teeth wanting; lid rostrate; pedicel not long; calyptera glabrous or slightly rough above, lacinate, covering half capsule. Branches red-brown densely crowded. Monoecious. — Trunks of palms r. Amer. U. S.: Lesq. et Jam. (Cuba: Wright, herb. Sullivan; com. C. Mueller.)

2. S. Sullivantii C. Mueller; Sulliv. icon. musc.

Diffs from the last: Leaves often rugose, neither recurved nor limbate; basal cells rhomboidal; costa short-excurrent or (in perichetial leaves) subpercurrent. Capsule oblong-cylindric; teeth deflexed when dry; segments ciliiform; calyptra lobulate, rough above, covering whole capsule. — Trees r. Amer. U. S.: com. Macoun and Cardot.


II. Gymnocephalus. Leaves nearly plane or somewhat concave, bluish when moistened; cells smooth with thin hyaline walls. Monoecious.

III. Amphidium. Leaves green papillose carinate often recurved at one side; cell-walls not thickened. Perichetial leaves sheathing. Capsule piriform, long-necked; peristome none.
I. Eu-Zygodon.

A. Leaves sublinear apiculate us. not falcate; cells not opaque.
Tufts small low.

1. Z. viridissimus Dickson. — Bryum Dicks.; Zygodon R. Brown.

*Z. rupestris* Lindb.
Leaves narrower with longer pellucid terminal cell (point), often falcate, us. brown when dry. — Rocks somewhat r. Eur. Sweden!

2. Z. conoideus Dickson. — Bryum Dicks.; Zygodon Hooker et Taylor; Z. Brebissoni Br. eur.

b. Leaves with excurrent costa. Capsule round-oval; teeth none.

3. Z. Stirtoni Schimper; Braithwaite.

B. Leaves ovate-lanceolate dentate above, falcate when moist; upper cells small opaque; costa not excurrent. Tufts large; stem long.

4. Z. gracilis Wilson; Braithwaite.

5. Z. Sullivantii C. Mueller; Sullivant ic. m.

II. Gymnocephalus Schwägrichen.

Leaves flaccid entire sublingulate acute or short-acuminate; upper cells roundish, the hyaline basal rectangular; costa us. subpercurrent. Capsule piriform or oblong-cylindric with long neck; peristome double. Tufts small. — On bark of

*Z. Sendtneri* Juratka.

III. *Amphidium Limpriecht* (Amphoridium Schimp.; Lesq. et Jam.)

A. Leaves subulate-acuminate very long, often red-brown. Dioecious.

a. Capsule exserted; lid rostrate. Perichetial leaves with not excurrent costa. Other leaves recurved below at one side, entire or in upper part faintly sinuolate. Stem gen. high.

Leaves flexuose not distinctly crisped; the perichetial not much broader, short-sheathing gradually long-subulate. — Rocks. Eur. not r. Sweden, Norway, Switzerland, Spain! Amer. Can.: Waghorne.

Leaves crisped entire with longer acicular point than in the last; the perichetial broader, long-sheathing, abruptly narrowed to the subulate shorter point. — Rocks r. Amer. Pacif. distr. Can.: Macoun.

b. Capsule not exserted; lid obtuse or apiculate. Perichetial leaves with long-excurrent costa. Other leaves gen. distantly serrulate above. Stem low when fruiting, often high when sterile.

Leaves crisped more or less reflexed below at one side, with long acicular point, us. red-brown; the perichetial not broader, short-sheathing gradually long-subulate. — Rocks r. — Amer. Pacif. distr.: Macoun.


B. Leaves acute fuscescent not long. Monoecious.

Leaves crisped entire not or slightly reflexed, sublinear or nearly gradually attenuate; the perichetial very much broader, long-sheathing, abruptly narrowed to a short point; costa faint abbreviate. Capsule scarcely exserted; lid rostellate. Tufts dense gen. low. — Rocks princ. in Alps. Eur. not uncommon.
Amer. Greenl.: Berggren. Can.: Macoun; Moser.

*Z. decipiens* Kindb. n. subsp.
Perichetal leaves longer acuminate; costa long-excurrent.


129. *Anoectangium* Schwägrichien.

I. **Pleurozygodon.** Leaves small entire obtuse or short-acuminate.

II. **Molendoa.** Leaves large from short crenulate base tapering to a long subulate channelled acumen.

1. **A. compactum** Schwägrichen.

*A. brevifolium* (Juratzka as var.) Kindb. n. subsp. — Molendoa tenuinervis Limpricht?

Stem not abruptly foliate. Leaves crowded much smaller, half as long and broad, ovate-oblong subobtuse nearly all brown, faintly twisted; cells less dusky; costa brown. Tufts more compact, ferruginous when dry. — Alp. rocks r. Eur. Norway in Dovrefjeld!

2. **A. Peckii** Sullivant ic. m. — *A. pellucidum* Wilson*: Braithwaite.

3. **A. Schliephackei** Limpricht. — Pleuroveisia Limprich.
Leaves linear obtuse crowded erect when dry; costa yellow not percurrent. Capsule oval. Tufts green above, 1—2 c. m. high. — Calcareous rocks in alp. region r. Eur. *Switzerland*: Gref*: Limpricht.

II. **Molendoa Lindberg.**

4. **A. Hornschuchii** Funck.
Upper leaves green; basal cells narrow; costa sometimes excurrent. Capsule obovate with somewhat long neck; pedicel
long (as in other species), often emergent above tufts. Stem often high. — Wet calcareous alp. rocks r. Eur. Austria: Breidler.

* A. Sendtneri Bryol. eur.

Leaves brown more crisped; costa not excurrent. Pedicel not emergent above tufts. — Eur. r. Switzerl.: Schimper.

Fam. 28. **Meesaceae.**

130. **Paludella** Ehrhart.

1. **P. squarrosa** L. — Bryum L.; Paludella Bridel.


131. **Meesa** Hedwig.

A. Leaves from dilated base tapering to a gradually attenuate acumen, decurrent, not reflexed; basal cells larger than the upper. Pedicel very long.

1. **M. triquetra** L. — Bryum L.; Meesa Aongstroem; M. tristicha Br. eur.


2. **M. longiseta** Hedwig.


B. Leaves sublinear more or less reflexed; nearly all cells equal in size. Pedicel often shortish.

3. **M. trichodes** L. — Bryum L.; Meesa Spruce; M. uliginosa Hedwig.


132. Amblyodon Palisot de Beauvois.
1. A. dealbatus Dickson. — Bryum Dicks.; Amblyodon Beauv.
Leaves narrowly oblong acuminate acute not reflexed; the uppermost serrate at the not long acumen, finally pale green or whitish; the lower finally reddish; costa not percurrent. Capsule thick suboval. Stem about 1 c. m. high. Male flowers discoid. Monoecious or polygamous. Resembling Meesea trichodes in capsule. — Wet and turfy soil princ. in alps. Eur. Sweden, Norway not r.! France: Husnot. Amer. Can.: Macoun.

133. Plagiobryum Lindberg.


134. Miellchoferia Hornschuch.
A. Leaves small ovate-lanceolate, less strongly appressed; upper cells narrow. Peristomial (exostomial) teeth wanting—
1. M. nitida Hornschuch.
Leaves gradually acuminate acute, serrulate above often to middle. Perichetial leaves costate larger. Capsule us. suberect when dry; segments not split; pedicel reddish more or less flexuous; spores about 0,02 m. m. Tufts about 1 c. m. high. Habit of Bryum (Webera) but with smaller leaves. — Schistose princ. metalliferous (esp. copper) rocks in alps, r. Eur. Norway! France: Husnot.

Leaves entire short-acuminate acute or sometimes subobtuse; the perichetal smaller, the inner indistinctly costate. Capsule as in the last. Branches clavate. Tufts about 1 c. m. high.


**B.** Leaves short very small strongly imbricate; upper cells dilated. Peristome sometimes double.

a. Uppermost leaves obtuse, acute or obtuse; costa us. not percurrent.


Leaves gen. ovate-oblong, faintly serrulate near apex. Capsule us. deflexed when dry; teeth rudimentary r. present; segments distantly trabeculate, sometimes split in middle; pedicel yellow arcuate at least when young; spores somewhat larger than in *M. nitida*. Tufts us. low when fruiting, sometimes to 8—10 c. m. high. — Growing as *M. nitida* but more often on wet rocks, r. *Eur.* Norway. Austria: Schimper. France: Husnot.


Leaves as in the last. Capsule erect when dry; teeth densely trabeculate; segments rudimentary or wanting; pedicel reddish sometimes arcuate when moistened. Tufts very low. — Alp. rocks r. *Eur.* Norway Wangsfjeld in Opdal: Kaurin.

b. Leaves suddenly cuspidate; costa often percurrent.

5. *M. cuspidifera* Kindb. cat. Canad. m.

Leaves from broad-ovate base cuspidate, entire or near apex slightly crenulate. Capsules unknown. Tufts about 2 c. m. high. — Damp alp. rocks r. *Amer.* Can. Rocky mts 1500 metr. a. sea: Macoun.

135. *Orthodontium* Schwägrichen.


Leaves long very narrow sublinear or gradually subulate, flexuous nearly entire not reflexed; lower cells wider than the upper; costa not excurrent. Capsule greenish narrow suboblong cernuous when dry; neck not much narrower or shorter; pedicel pale sometimes longer than stem; teeth pale; lid rostellate. Tufts greenish about 1 c. m. or lower. Monoecious or paroe-

Fam. 29. **Cinclidiaceae** Kindb., new fam.

136. **Cinclidium** Swartz.

A. Leaves pale-limbate not recurved. Capsules unknown.

1. **C. Hymenophyllum** Br. eur. — Mnium Br. eur.; Cinclidium Lindb.

Leaves spatulate-lingulate narrowly limbate long-decurrent bright green; upper cells round-hexagonal or round-oval, the basal rectangular; costa abbreviate. Tufts high very dense tomentose to shoots. — Alp. rocks in northern districts; also in Switzerland.: Pfeffer) r. Eur. Norway! Sweden: E. Nyman. Amer. Greenl.: Berggren.

B. Leaves reddish or finally blackish limbate, more or less recurved when dry.

a. Leaves concave not decurrent; costa not excurrent. Synoecious.

2. **C. stygium** Swartz.


**C. latifolium** Lindb., hitherto not found in our district, differs in convex shoot-leaves and dioecious inflorescence.

3. **C. subrotundum** Lindb.,


b. Shoot-leaves convex somewhat long-decurrent; costa excurrent. Synoecious.

4. **C. Macounii** Kindb. revue bryol. 1896.


5. **C. arcticum** Br. eur. — Mnium Br. eur.; Cinclidium C. M.

Stem-leaves red broadly spatulate often with short-acute
point; shoot-leaves sublingulate gen. obtuse with more or less distinct point, us. pale red, sometimes decurrent; costa gen. percurrent, not excurrent. Capsule suboval; pedicel us. shorter than in other species. — Swamps in northern alps r. Eur. Norway in Dovrefjeld.

* C. virescens Kindb. n. subsp.

Leaves larger, only those of stem red. Shoots green very long; their leaves gen. not decurrent. Pedicel us. as long as in C. stygium. — Swamps in northern alps r. Eur. Norway in Dovrefjeld.

* C. polare Kindb. n. subsp.


Fam. 30. Bartramiaceae.

137. Breutelia Schimper.

1. B. arcuata Dickson. — Mnium Dicks.; Breutelia Sch.


I. Eu-Bartramia. Leaves mamillose, not or only in lower half recurved.

1. Ithyphylle. Leaves channelled not crisped, not or near base (slightly) reflexed; cells linear.

2. Crispae. Leaves carinate curling or crisped, recurved in lower half; upper cells subquadrate or sho' rectangular.

II. Plagiope. Leaves smooth, recurved all around, carinate; upper cells subquadrate.

1. Eu-Bartramia.

A. Leaves gradually narrowed, reflexed near base and not distinctly sheathing; costa excurrent outside the subula.
1. B. stricta Bridel.
   B. Leaves abruptly narrowed from the not reflexed us. hyaline sheath; costa more or less filling subula.

2. B. ithyphylla Bridel.
* B. brevifolia Lindberg.
* B. rigidula (Schimper as var.) Kindb. n. subsp.


2. Crispæ.

A. Upper leaf-cells short-rectangular. Leaves crowded very distinctly sheathing, more or less flexuous but not crisped.

4. B. norvegica Gunner. — Bryum Gunn. 1772; Bartramia Lindb.; Webera Haller Hedwig 1782; Bartramia Hedw. 1789.
   B. Upper leaf-cells subquadratæ. Leaves crisped or circinnate.
   a. Leaves crowded, not distinctly sheathing.
5. *B. pomiformis* L. — Bryum L.; Bartramia Hedwig.
Leaves nearly gradually tapering and long-subulate, not
decurrent, crisped; costa not long-excurrent. Pedicel exserted
above shoots. Monoecious or subparoecious. — On earth princ.
on rocks. *Eur.* common. Sweden, Norway, Switzerland! *Amer.*
Can.: Macoun; Warborne. U. S.: Sullivan, com. C. M.

b. Leaves sheathing, more or less distant.

Leaves nearly gradually tapering to a not long subula, not
decurrent, circinnate; costa not long-excurrent. Perichetial leaves
with very long-excurrent costa. Pedicel us. not exserted above
shoots. Tufts sparingly radiculose, green or dark green. Paroe-
cious or synoecious. — Rocks not *r.* *Eur.* Sweden! *Amer.* Can.:
Macoun.

7. *B. glaucoviridis* C. M. et Kindb. l. c.
Leaves sublinear abruptly short-subulate subcircinnate not
decurrent; costa subpercurrent or short-excurrent. Pedicel not
long. Tufts glaucous green very radiculose. Subparoecious. —
Wet rocks in alps *r.* *Amer.* Can. B. C. near Revelstoke: Macoun.

8. *B. circinnulata* C. M. et Kindb. l. c.
Leaves abruptly tapering and long-subulate circinnate decur-
rent; costa very long-excurrent. Capsule and flowers unknown.
Col.: Macoun.

II. Plagiopus Bridel.

Leaves gradually narrowed short-subulate not sheathing,
slightly curling; upper cells subquadrate; costa percurrent. Cap-
sule erect when moist, sometimes small. Tufts compact. Synoec-
Sweden, Norway, Switzerland! *Amer.* Can.: Macoun.

139. Philonotis Bridel.

I. Eu-Philonotis. Male flowers disciform with more or less
patent leaves. Dioecious.

1. Homomorphae. Leaves nearly uniform small narrow,
serrate (without double mamillae at borders), not falcate, often
distant. Perigonal leaves acuminate acute. Stem often subcapillary.

2. Dimorphae. Leaves gen. dimorphous and large, *r.* distant:
some short subovate with; us. not recurved borders, the others
gen. ovate-lanceolate or ovate-oblong, often recurved at base and
sometimes falcate; borders serrate or furnished with double
mamillae. Stem gen. long and thick with long branches.
II. Philonotula. Male flowers gemmiform with erect leaves. Monoecious or dioecious. Leaves small narrow, nearly erect when moist, not reflexed, faintly mamillate without double mammille, often nearly appressed when dry. Fruiting stem very short.

I. Eu-Philonotis.

1. Homomorphae.

A. Leaves not recurved at borders.

1. Ph. marchica Wildenow. - Leskia Willd.; Philonotis Brid.

* Ph. laxa Limprecht.
   *Leaves very distant; costa not excurrent. — Eur. r. Switzerland and Germany*: Limprecht.

2. Ph. Muchlenbergii Bridel.
   Differs from the last: Leaves smaller, more distant; costa long-excurrent; stem thinner, subcapillary; capsule smaller. — Springs in sandy rocks r. Amer. Can., Macoun. U. S.: Roell; Sullivant, com. C. Mueller.

   Leaves ovate-oblong or broadly ovate-lanceolate, long-subulate, sharply serrate prince. above, crowded, smaller and shorter than in Ph. marchica; costa long-excurrent. Perigonal leaves horizontally spreading, ovate-lanceolate acute not subulate; costa not well-defined, obsolete not excurrent. Inner perichaetial leaves reaching far above vaginula with long-excurrent costa. Stem somewhat short. — Amer. r. Can. Pacif. distr.: J. Macoun.

B. Leaves (at least some ones) recurved, ovate-lanceolate. Capsules not seen. Stem us. subcapillary.

a. Leaves nearly smooth and not sharply serrate; costa short-excurrent.

5. *Ph. subcapillaris* Kindberg n. sp. — *Ph. capillaris* Lindb. ?
Leaves nearly crowded, shorter acuminate than in the last: perigonal patent erect subovate short acuminate with not excurrent costa, the inner sometimes obtuse. — Wet earth r. *Eur*. Switzerl. near Lugano.

b. Leaves very mamilllose and sharply serrate; costa long-excurrent.

6. *Ph. vancouveriensis* Kindb. n. sp.

2. Dimorphae.

A. Leaves smooth or only at borders furnished with few double mamillae; cells very pellucid somewhat large.

7. *Ph. glabriuseula* Kindb. cat. Can. m.

B. Leaves very mamilllose also at the inner cells.

a. Perigonal leaves acute distinctly costate.

8. *Ph. calcarea* Br. eur.

*Ph. mollis* Venturi.

*Ph. easpitosa* Wilson.


differs from *Ph. calcarea*: Leaves shorter and broader, more recurved and us. appressed with patent point, either serrate or partly with double mamillae, r. falcate. Perigonal leaves us. patent-erect. — In alps r. *Eur*. Norway, Switzerl! *Amer*. Can.: Waghorne. Greenl.: Vanhoeffen.

Leaves not serrate and not falcate, recurved to or above
middle, with double mamilla, gen. appressed when dry, smaller than in Ph. calcarea. Perigonal leaves horizontally spreading. Tufts not high; fruiting stem very low. — Amer. r. Can.: Macoun. U. S.; Roell.

b. Perigonal leaves gen. all obtuse subovate, the inner not distinctly costate.

11. Ph. fontana L. — Mnium L.; Philonotis Bridel.


* Ph. seriata Mitten. — Bartramia Mitt.; Philonotis Lindb.


* Ph. gracilescens Schimper. — Ph. fontana *angustifolia Kindb. Laubm. Schw. u. Norw.

Leaves (nearly all) small and narrow, often not recurved, those of shoots gen. distant: perigonal subacute at least the outer. Stem somewhat thin. Habit of Ph. marchica. — Wet rocks princ. in alps. Eur. not common. Sweden, Norway; France: Husnot. Spetsbergen: R. Gyllencreutz.

c. Perigonal leaves not seen. Other leaves not plicate.


Leaves crowded, resembling those of Ph. fontana, but minutely serrulate above gen. with double mamilla below, not distinctly plicate, reflexed below, straight, open also when dry; costa long-excurrent. Capsule faintly plicate when dry; lid umbonate. Stem not high; pedicel as long. — Rotten logs r. Amer. U. S.: Louisana: Mohr, com. C. Mueller. Greenl.:

13. Ph. adpressa Fergusson; Braithwaite.


II. Philonotula C. Mueller.

A. Leaves serrulate all around, narrowly ovate-lanceolate.

a. Leaves subulate at apex; costa excurrent. Monoecious.

14. Ph. rigida Bridel.

Leaves faintly papillose or mamillose nearly crowded, us.


b. Leaves acute not subulate; costa percurrent. Dioecious.

16.*Ph. tenella* C. Mueller.


B. Leaves entire and nearly smooth in lower half, sublinear-subulate. Capsules and flowers unknown.

17.*Ph. pumila* Kindb. n. sp:

Leaves erect, smaller and narrower than in *Ph. rigida*; costa scarcely excurrent. Tufts about 1 c. m. high. — *Amer.* r. Can. Ontario near Belleville: Macoun.

140. **Anacolia** Schimp.

1.*A. Menziesii* Turner. — Bartramia Turn.; Sulliv. *i.c.* m.; Anacolia Kindb.

Leaves smooth from subovate base nearly gradually subulate, serrate to the plicate basal part, nearly appressed when dry; lower cells short-rectangular, upper longer; costa short-excurrent or percurrent. Capsule globose pale or reddish brown; teeth short or none; pedicel us. longer than capsule to 1 c. m. Tufts green soft and silky, tomentose. Dioecious. — Rocks r. *Amer.* Can. Pacif. distr.: Macoun. U. S.: E. Hall; Leiberg, com. Mrs Britton.

2.*A. Webbii* Montagne. — Glyphccarpus Mont.; Anacolia Sch.

Differs from the last: Leaves mamillose brittle serrate in upper third; cells gen. quadrata; middle rectangular. Capsule red-brown; pedicel shorter; teeth none. Tufts rigid brown green.

141. **Bartramidula** Bruch et Schimper.

1. **B. Wilsoni** Br. et Sch. — Philonotis Braithw.; Bartramia C. M.
   Leaves from suboblong entire base tapering to the serrulate
   acute acumen; upper cells longer-rectangular, the lower shorter;
   costa not percurrent. Capsule small globose-piriform with short
   neck; pedicel longer. Tufts scarcely 1 c. m. high. — Rocks r.

142. **Catoscopium** Bridel.

1. **C. nigritum** Hedwig. — Weisia H.; Catoscopium Brid.
   Leaves small entire ovate-oblong or broadly ovate-lanceolate
   acuminate acute; costa percurrent. Capsule red-brown finally
   blackish glossy, resembling a pinhead in size; pedicel red.
   Spores about 0,04 m. m. Dioecious. — Swamps and turfy
   soil in alps or as relics from glacial period. Eur. common
   in northern alps. Sweden, Norway, Switzerland. Spetsbergen:
   Berggren. Engl.: Manchester Crypt. society. Amer. r. Can.:
   Macoun.

143. **Conostomum** Swartz.

1. **C. boreale** Swartz.
   Leaves gradually tapering to the subulate apex, faintly serrate
   in upper part of acumen; costa not or slightly excurrent. Capsu-
   le much longer. Tufts glaucous green. — Rocks in or near alps. Eur. not r. in northern distr. Norway!
   Sweden; Wahlenberg. Amer. r. Can.: Macoun. Greenl.: Van-
   hoeffen.

Fam. 31. **Funariaceae.**

144. **Funaria** Schreber.

I. **Eu-Funaria.** Peristome double. Capsule gen. oblique often
   annulate.
   1. **Annulate.** Capsule annulate us. rugose or furrowed
      when dry; endostome short. Leaves entire. Spores mostly
      about 0,01 m. m.
   2. **Exannulate.** Capsule not annulate, slightly or not
      rugose. Leaves us. serrate. Spores about 0,02 m. m.

II. **Entosthodon.** Peristome simple or none. Capsule not
   rugose, us. symmetric; annulus none; pedicel short. Leaves
   serrate, entire or indistinctly sinulate.
   I. **Eu-Funaria.**
   1. Annulate.
   1. **F. hygrometrica** L. — Mnium L.; Funaria Sibthorp.
      Leaves us. ovate-oblong acute subconvoluted not distinctly
acuminate; costa subpercurrent. Capsule oblique; teeth red with prominent ribs also below; segments well-evolute; lid not umbonate; pedicel us. very long. Spores about 0,01 m. m. — On bare earth common. Eur. Sweden etc. Amer. Can.: J. Macoun.

*F.calvescens* Schwaeigrichen.

*F.Ravenelli* Austin.
»Comal leaves narrower, spreading; costa percurrent. — Amer. U. S.»: Lq. et Jam.


3. *F.arctica* Kindb. n. sp. — *F. hygrometrica* var. arctica Berggren.
Resembling a small state of *F. hygrometrica* with smaller leaves and capsules. Differs from it: Spores twice as large, about 0,02 m. m. Leaves ovate mostly obtuse. Peristomial teeth with prominent ribs only near apex; pedicel short. — Earth in arctic distr. r. Amer. Greenl.: Berggren.

Resembling *F. hygrometrica*. Differs from it: Capsule smaller, less rugose often pale; pedicel short; endostome very short or rudimentary; spores 0,02 m. m. Leaves smaller, more or less acuminate. — Wet sand or clay in alps r. Eur. Switzerl. Austria: Breidler. France: Bréboisso. Amer. »U. S.»: Lq. et Jam.

5. *F.flavicanus* Michaux; Lesquer, et Jam.
Leaves ovate-oblong or obovate, abruptly attenuate to a long subulate or acicular point; costa sometimes excurrent. Capsule not or slightly rugose when dry; teeth with prominent ribs only at point; endostome rudimentary; lid umbonate; pedicel not long. Spores about 0,02 m. m. or larger. — Amer. r. U. S.; Vasay, com. Macoun.

2. Exannulatae.

A. Capsule oblique; endostome nearly as high as teeth.

Leaves ovate-oblong or ovate-lanceolate, gen. short-acuminate, serrate above; costa subpercurrent. Capsule slightly rugose when
dry; teeth without prominent ribs; lid umbonate; pedicel somewhat long. — Moist clay and sand r. Amer. U. S.: Langlois, com. Cardot.

7. F. americana Lindberg; Sulliv. l.e.
Leaves ovate or ovate-oblong, obtuse or tapering to a long aciculinar point, entire or faintly serrate; costa sometimes not percurrent. Capsule not rugose; teeth sometimes with prominent ribs in lower part; lid obtusely apiculate; pedicel short. — Amer. r. U. S. Montana: Williams, herb. Demetrio, com. Roell.

B. Capsule not rugose, r. straight; endostome short.

8. F. calcrea Wahlenberg.

* F. Muehlenbergii Schwägrichen: C. M.

* F. mediterranea Lindberg.

* F. convexa Spruce.

* F. pulchella Philibert.

9. F. californica Sullivant et Lesquereux; Sull. ic. m.
Leaves oval-oblong or subobovate subobtusate or very shortly acuminate without acicular point, entire or serrate; costa not percurrent. Capsule oblique (or erect symmetric) long-necked; teeth with slightly or not prominent ribs; lid umbonate; pedicel short. — Clay soil r. Amer. U. S. Calif.: Bolender, com. Renauld. — In Sulliv. icon. muscor. capsule is straight, leaves are entire.

Capsule always straight symmetric; endostome very short; spores a little larger; lid not seen. Leaves entire. — Eur. r. Greece: Haussknecht.
II. Entosthodon Schwägrichen.

A. Leaves gen. serrate acute or short-acuminate. Peristome rudimentary or wanting.
   a. Capsule subglobose short-necked; pedicel straight longer.

11. F. fascicularis Dickson. — Bryum Dicks.; Funaria Schimp.
   b. Capsule piriform long-necked; pedicel inclined scarcely longer.
12. F. curviseta Schwägrichen. — Gymnostomum Schw.; Funaria Milde; Entosthodon Schimper.

B. Leaves entire or indistinctly sinuate. Peristome simple well-ellolute. Pedicel straight somewhat long.
13. F. attenuata Dickson. — Bryum Dicks.; Funaria Lindb.; F. Templetoni Smith; Entosthodon Schwägrichen.


145. Physcomitrium Bridel.

1. Erythrocarpa. Capsule (as pedicel) red, very dilated at mouth.
2. **Xanthocarpa.** Capsule (as pedicel) yellowish, not or very r. dilated at mouth.

II. **Pseudo-Funaria.** Capsule long-necked; teeth pale indistinctly articulate. Leaves nerveless or short-costate. (Calytra 4-lobed as in other species.)

I. Eu-Physcomitrium.

1. Erythrocarpa.

A. Capsule somewhat large; lid flat.

1. Ph. acuminatum Schleicher. — Gymnostomum Schl.; Physcomitrium Bruch et Sch.

Upper leaves long-lanceolate sharply acuminate, entire at least above, yellow-marginied below; costa percurrent or short-excurrent. Lid of capsule mamillate. — Earth princ. on walls r. Eur. Switzer.; Austria; Gander. Amer. 1 U. S. 2: Lesq. et Jam.

2. Ph. Hookeri Hampe. — Ph. hians Lindb.; Sulliv. ic. m.


B. Capsule small. Leaves suboblong.


2. Xanthocarpa.

A. Pedicel of capsule not emergent above upper leaves; lid convex.

a. Capsule immersed.

5. Ph. immersum Sullivant leon. muscar.

Leaves narrowly oblong-lingulate or lanceolate short-acuminate, sharply serrate above; costa not percurrent. Capsule globose with dilated mouth; lid mamillate. — River banks r. Amer. Can.: Macoun.


Leaves subovate obtusate or short-pointed, slightly serrate above; costa percurrent. Capsule subglobose-piriform; lid apiculate. — Amer. 1 U. S. r. 2: Mrs Britton.
b. Capsule emergent shorter than pedicel.

7. **Ph. pygmaeum** James.

Leaves oblong-lanceolate or short-acuminate, slightly serrate above; costa not percurrent. Capsule oblong-piriform; lid apiculate. — Earth in alps; **Amer.** U. S. Utah; Lq. et Jam.

B. Pedicel of capsule long-exserted.

a. Lid of capsule flat when ripe and moist.

8. **Ph. piriforme** L. — Bryum L.; Physcomitrium Bridel; Ph. Drummondii Britton.


b. Lid of capsule convex us. mamillate.

10. **Ph. megalocarpum** Kindb. bull. Torr. club XVI.


* **Ph. californicum** Britton l. c.

Leaves shorter, oblong-lanceolate sometimes not sharply acuminate; costa not percurrent. Capsule smaller, slightly strangulate. — **Amer.** U. S.: Mrs Britton.

11. **Ph. Langloisii** Renaud et Cardot. — Ph. australis Britton l. c.

Differs from **Ph. megalocarpum**: Leaves serrate all around, not or less distinctly yellow-margined; capsule not large, sometimes strangulate when dry; lid sometimes apiculate. — **Amer.** r. U. S.: Langlois, com. Cardot; C. Roell, com. J. Roell.

12. **Ph. platyphyllum** Kindb. cat. Canad. m.

Leaves broad ovate-oblong; upper sharply acuminate serrate above; costa percurrent or short-excurrent. Capsule not large, not distinctly strangulate when unripe. — **Amer.** r. Can.: Fletcher, com. Macoun.
II. Pseudo-Funaria Kindb.

Leaves from subobovate base abruptly narrowed to a short subulate acumen, nearly entire. Capsule piriform; pedicel not long; lid convex mamillate; calyptra with very long beak. — Clay soil r. Amer. »U. S. Calif.; Bolander*; Sullivant.

146. Pyramidula Bridel.

1. P. tetragona Bridel.

147. Discelium Bridel.

1. D. nudum Dickson. — Bryum Dicks.; Discelium Brid.

Fam. 32. Bryaceæ.

148. Leucolepis Lindberg.

1. L. acanthoneura Schwägrichen. — Hypnum Schw.; Leucolepis Lindh.; Bryum Menziesii Hooker; Mnium C. M.

149. Rhizogonium Bridel.

1. R. spiniforme L. — Hypnum L.; Rhizogonium Bruch.
Lowest leaves short; the others distant long sublinear short-
IMAGE EVALUATION
TEST TARGET (MT-3)

Photographic Sciences Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

150. Timmia Hedwig.

A. Sheath of leaves with finally red-brown cells; costa us. dentate at back. Dioecious.

1. T. austriaca Hedwig.

Leaves from broad sheath abruptly narrowed to the sublan-ceolate in upper half serrate gen. obtuse and faintly involute lamina, not or loosely appressed when dry. Capsule sulcate when dry; cilia not appendiculate; lid apiculate. — Shaded often dry rocks. Eur. not r. Sweden, Norway, Switzerland. Amer. r. Can.: Macoun.

2. T. arctica Kindb. in botan. notiser 1893.

Leaves above sheath tapering to the broad-lanceolate obtuse entire or to 1/5 faintly denticulate not much narrower and scarcely involute lamina, impressed at both sides above sheath, appressed when dry and not much open when moist, much smaller than in the last; costa nearly smooth. Stems not or loosely tufted, about 3—4 c. m. high. Capsules unknown. — Swamps in arctic districts r. Eur. Spetsbergen: R. Gyllencreutz 1883. Amer. »Greenl.»: Berggren.

B. Sheath of leaves with pale either hyaline or (in elder leaves) pale brown cells; costa not dentate.


3. T. norvegica Zetterstedt.


4. T. megapolitana Hedwig.

Leaves channelled serrate in whole lamina; nearly all broadly

5. **T. bavarica** Hessler.

151. **Aulacomnium** Schweinrichen.


I. **Orthopyxis** Palisot de Beauvois.
1. **A. androgynum** L. — Mnium L.; Aulacomnium Schweinrichen.


II. **Gymnocybe** Ahnfelt et Fries.

* **A. papillosum** C. M. in Flora 1875.
Leaves with longer papillae, long-decurrent; alar cells larger,


152. Mnium Linné, in part.


II. Eu-Mnium. Leaf-cells gen. round-hexagonal except the marginal and sometimes the inner near costa.

A. Leaves entire limbate; outer perichetial broad not long.


2. Punctatiformia. Leaves large not distichous; uppermost rosulate. Lid of capsule rostrate or rostellate.

B. Leaves entire or dentate us. not limbate: outer perichetal long narrow sublinear. Lid of capsule convex mamillate. Dioecious.

3. Stellariformia. Leaves bluish when moist; cells not large.

C. Leaves simply dentate, limbate by pale cells; costa excurrent. Outer perichetial leaves us. broad and not long. Stem often with decumbent stolons at base.
a. Leaves not linear.

4. **Cuspidatiformia.** Leaves gradually larger upwards not rostrate and not undulate, us. abruptly acuminate; teeth ciliiform; cells round-hexagonal us. not large. Lid of capsule submamillate. Us. synoecious.

5. **Rosulata.** Leaves us. obtuse or with short point and gen. not undulate; teeth r. ciliiform; cells large sometimes suboval. Upper leaves of fruiting stem rostrate. Lid of capsule mamillate-apiculate. Mostly dioecious.


b. Leaves linear-lingulate.

7. **Undulata.** Leaves strongly undulate, the uppermost of fruiting stem rostrate; cells small round-hexagonal. Lid of capsule submamillate. Stems not tufted; shoots deflexed or the basal ascending. Dioecious.

D. Leaves doubly dentate (r. nearly entire), limbate by finally red cells. Outer perichetial leaves oblong-lanceolate. Stem r. with decumbent stolons. Leaf-cells gen. not large.

8. **Spinosa.** Upper leaves broad; costa excurrent. Capsules us. clustered; lid rostrate or rostellate.

9. **Serrata.** Upper leaves narrow; costa us. percurrent. Capsule us. solitary; lid rostrate or apiculate.

10. **Horna.** Leaves long narrow; costa not percurrent. Capsule solitary; lid mamillate. Tufts very tomentose.

I. **Pseudo-Bryum Kindb.**

1. **M.cinclidoides** M. N. Blytt.


II. **Eu-Mnium.**

1. **Hymenophylophoidea.**

2. **M.hymenophyloides** Huebener.


2. **Punctatiformia.**

A. Leaves narrowly limbate by 1—2 pale cell-rows, short-decurrent. Capsule broad-oval less large. Synoecious or dioecious,
3. M. subglobosum Br. eur

B. Leaves broadly limbate by 3—4 often red cell-rows, not decurrent. Capsule us. large suboval. Dioecious.


*M. chlorophyllolosum Kindb. n. subsp.


6. M. stellare Reichard; Hedwig.
Leaves not or indistinctly limbate oblong-oval us. entire or the uppermost (of fruiting stem) denticulate above; shoot-leaves often distichous. — On rocks and base of trees. Eur. not uncommon. Sweden, Norway, Switzerl. Austria: C. E. Kindberg. Amer. Can.: Macoun; Moser.

Leaves (at least on fruiting stem) red-limbate often doubly dentate, us. larger than in the last, not distichous. R. fruiting. — Rocks in northern alps r. Eur. Norway! Amer. Can.: Macoun.

4. Cuspidatiformia.

A. Leaves crowded dentate all around, spreading when
moist. Capsule yellowish finally red-yellow with red mouth; neck dark red tapering to pedicel. Sterile shoots erect often clavate.

8. M. venustum Mitten; Sulliv. ic. m. — M. Neevii C. M.

B. Leaves not crowded, entire below, patent when moist. Capsule greenish finally brownish; neck not distinct.


10. M. Drummondii Bruch et Schimper; Sulliv. icon. m. — M. submarginatum Nawaschini et Zinger.

5. Rosulata.
A. Leaf-cells gen. hexagonal-oval and seriate, at least the inner near costa. Dioecious.

11. M. affinis Blandow.
Leaves oblong-oval or narrower, dentate all around (r. entire), us. short-decurrent; teeth us. long; nearly all inner cells suboval. Capsules often clustered 2—3. Tufts loose. — Wet grassy places. Eur. not r. Sweden, Norway, Switzerland! Amer. Can.: Macoun.

* M. ciliare Greville. — Bryum Grev.; Mnium Lindberg.

* M. Seligeri Juratzka et Milde.

Leaves oblong-oval or narrower, gen. entire and short-decurrent; the uppermost faintly dentate and not much larger than the lower, less distinctly rosulate; cells gen. round-hexagonal, the innermost near costa oval. Shoot-leaves nearly entire. Tufts loose. — Swamps r. Eur. Sweden, Norway! Germany: Warnstorf. Amer. Can. near Ottawa and N. Labrador: Macoun.

B. Leaf-cells round-hexagonal not seriate. Often synoecious.

Leaves dentate all around, the uppermost rosulate.

a. Leaves very narrow, oblong-lanceolate acuminate; the outer perichaetial longer acuminate. Plants robust.


Leaves not or very short-decurrent. Synoecious. Otherwise as the last. — Earth in bogs and woods r. Amer. Can. Vanc. isl.: Macoun.

b. Leaves short broad or only the uppermost narrow.


*M. boreale* Kindb. n. subsp.


Lower leaves decurrent with long ciliiform teeth, oblong obtuse; the uppermost oblong-lanceolate short-acuminate acute; outer perichetal ovate-lanceolate long-acuminate acute. Capsule solitary small (as in *M. cuspidatum*) suboval; pedicel not long. Tufts loose, about 2 c. m. high. Shoots erect. Dioecious. Habit of *M. cuspidatum*. — Arctic district r. *Amer.*


6. Rostrata.

Leaves not or slightly decurrent; lower small rotundate or broad-oval; upper oval or broadly obovate obtuse, entire below. Capsules yellowish often clustered. Tufts loose. — Rocks and stonewalls. *Eur.* not r. in lower distr. Sweden, Switzerl. *Amer.* Can. not uncommon: Macoun.

7. Undulata.


8. Spinosa.

19. *M. spinosum* Voit. — Bryum Voit; Mnium Schwægrichen.


*M. macrociliare* C. M. et Kindb. l. c.


A. Synoecious or paroecious without special male plants.

Stem us. radiculose between lower leaves.

21. *M. marginatum* Dickson. — Bryum Dicks. 1790; Mnium Beauvois; M. serratum Schrader ? (1791); Br. eur.

Leaves long-decurrent; costa scarcely percurrent. Upper
stem-leaves suboblung subobtuse short-acuminate, dentate above middle; lower leaves oval obtuse entire; shoot-leaves also entire. Capsule oval-oblong not strangulate, with not or slightly dilated mouth; lid rostellate or apiculate; teeth brownish. Tufts green or finally brownish green; us. dense, often high. — On earth. Eur. common. Sweden, Switzerl! Amer. Can.: Macoun.

22. M. Niagare Kindb. cat. Canad. m.
Leaves gen. indistinctly decurrent. Upper stem-leaves lanceolate acuminate dentate to below middle, crowded and not decurrent; costa excurrent. Lower leaves oblong acute more or less dentate. Upper shoot-leaves also dentate. Capsule cylindric-fusiform strangulate wide-mouthed; lid obliquely rostrate; teeth yellow. Tufts loose dark green. — On earth under trees near water r. Amer. Can. Niagara: Macoun.

B. Dioecious (with separate male plants). Stem gen. not radiculose between leaves. Upper leaves us. dentate all around.

a. Leaves crisped (princ. on long us. decumbent stolons); gradually larger upwards on fertile stem; costa not excurrent.


24. M. umbratilis Mitten; Sullivant icon. m.
Leaves narrowly lanceolate acuminate very distant and long-decurrent. Capsule curved suboblung large often with long neck; teeth yellow; lid apiculate; pedicel often very long. — Wet rocks r. Amer. Can. Brit. Col.: Macoun.

b. Leaves faintly curled. Stem without decumbent stolons.
aa. Leaves distant long-decurrent. Tufts loose us. high.


Lower leaves small oval-oblong; upper suddenly larger, lanceolate acute less distant; costa not excurrent. Capsule straight suboval; teeth dark yellow; lid apiculate. Stem often very
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bb. Upper leaves nearly crowded and not or shortly decurrent. Leaves gradually larger upwards. Tufts often low.

27. _M. orthorhynchum_ Bridel.


28. _M. inelinitum_ Lindberg.

Differs from the last pr. in shorter and smaller leaves; the lower rotundate or broad-ovate, the upper suboval subobtuse. Capsule curved suboblong; teeth yellow; lid apiculate. Tufts often loose. R. fruiting. — Alp. rocks r. Eur. Norway, Switz.: Amer. Can.: Drummond; Macoun. Greenl.: Vanhoeuffen.

29. _M. pseudo-lycopodioides_ C. M. et Kindb. l. c. — M. lyco-

podioïdes Lesq. et Jam.

Leaves as in _M. orthorhynchum_ but gen. obtuse and more curled; costa not dentate, often excurrent. Capsule curved with distinct neck; teeth pale; lid rostellate. Tufts loose not high. — Base of trees in swamps r. Amer. Can.: Macoun.


30. _M. hornum_ L.


153. _Roellia_ Kindb. revue bryol. 1896.


Lower leaves distant ovate acute long-decurrent entire not limbate; upper crowded not decurrent, subpathulate with short often twisted acumen, serrate in upper third, faintly reflexed below, limbate by 2 narrow cellrows; upper cells oval-oblong, lower oblong or narrower; costa abbreviate or short-excurrent. Comal leaves oblong-lingulate. Perichetial leaves erect, shorter and much narrower, long-acuminate; inner nearly entire, neither limbate nor reflexed. Capsule long subcylindric pale rufous not constricted; teeth yellow; lid high-conic short-apiculate pale; pedicel very long, irregularly curved or geniculate. Tufts green.


Nearly allied to the last but well-distinct. Differs from it: Leaves smaller, crowded and not decurrent. Comal leaves shorter, oval-spathulate. Shoot-leaves nearly similar, more numerous and not distant, nor indistinctly limbate. Capsule constricted below the wide mouth; lid obtuse. Endostome hyaline, cilia not appendiculate, spores small, as in the last. — Alp. regions r. **Amer.** Can. Brit. Col., Gold Range 2100 metr. a. s., Vane. isl. (mt Benson); Macoun.

154. **Rhodobryum** (Schimper, as subgenus) Limpricht.

1. **R. roseum** Weis. — Mnium Weis; Rhodobryum Limpricht; Bryum proliferum (L. as var.) Sibthorp; Lindb.; Braithwaite.

Comal leaves suboblong or broadly lingulate, obtusate acute or abruptly broad-apiculate, serrate above middle, revolute below it; costa gradually narrower, not excurrent. Capsule red-brown subsymmetric nearly straight; neck short not or slightly curved; lid conic or subconvex mamillate; archegonia 5—6; pedicels often clustered. — Wet places in woods in lower districts. **Eur.** nearly common. Sweden, Switzerland.


Comal leaves lingulate abruptly short-acuminate, much more numerous than in the last, dentate with large confluent often yellowish teeth; above to 1/4 or 1/3, revolute below the dentate part; costa stout excurrent. Capsule pale brown asymmetric; neck curved half as long; lid convex short-apiculate; archegonia numerous; pedicel us. solitary. Dioecious as the last. — Old logs and limestone rocks. **Amer.** not r. Can.: Macoun; Moser. U. S.: Wetherby; Roell; Marshall A. Howe.

155. **Bryum** L.; Hedwig.

A. Perichetal leaves few, not much differing from the other upper ones. — Leaves gen. entire or faintly denticate with few teeth, often limbate; upper cells us. rhomboidal; costa often excurrent.

2. Cilia of endostome mostly appendiculate. Spores small, about 0,01 m. m., r. nearly 0,02 m. m. Capsule r. oblique.

aa. Capsule thin-walled. Upper leaves setaceous; costa broad.

I. **Leptobryum.** Capsule with long downwards narrowed neck, very nitid (vernicose). Leaves not limbate; cells sublinear. Stems not julaceous.
bb. Capsule thick-walled. Leaves not setaceous; costa narrow.

II. Eu-Bryum. Capsule with distinct, already before sporosis downwards narrowed neck. Leaves often limbate; costa often excurrent. Stems r. julaceous.

III. Pachylophus. Capsule with very short and thick, before sporosis not narrowed and often indistinct neck. Leaves not limbate, gen. reddish at insertion; costa not often excurrent. Stems mostly julaceous. Us. dioecious.

b. Cilia gen. smooth, r. appendiculate. Spores gen. large, about 0.03—0.04 m. m., r. smaller (about 0.02 m. m.) Capsule not r. oblique.


B. Perichetial leaves well-defined gen. numerous. — Leaves gen. denticulate with numerous teeth, r. (in Epityerygium) limbate; costa gen. not excurrent. Capsule narrowly necked, not oblique; cilia very r. (in Webera) appendiculate; spores gen. small.

a. Endostomial segments broad; cilia us. long.

V. Webera. Leaves not limbate, us. denticulate; cells us. narrow; costa sometimes short-excurrent.

VI. Epityerygium. Leaves broadly reddish limbate, entire, the larger us. dioecious; cells dilated; costa abbreviate.

. b. Endostomial segments somewhat narrow; cilia short or rudimentary.

VII. Pohlia*. Perichetial leaves sublinear-lanceolate narrowly acuminate acute. Leaves not limbate; upper cells gen. very narrow.

Eu-Bryum.

A. Basal leaf-cells not (or very pale) red. Capsule brown.


2. Speiropylla. Leaves more or less distant, often red, not shining, sometimes reflexed or limbate; cells dilated; costa sometimes excurrent. Capsule straight or (sometimes in B. pallens) oblique. Stems not julaceous.

B. Basal leaf-cells (at insertion of elder leaves) us. deep-red.

*) This section could be related as a proper genus to fam. Mesaceae, allied to Plagiobryum and Orthodontium.
1. Capsule gen. red, r. brown. Leaves broader at base, without hairpoint, r. limbate.

3. **Erythrocarpa.** Leaves often serrulate above; costa thin excurrent. Capsule mostly red. Tufts small us. loose. Dioecious or r. monoecious.

4. **Alpiniformia.** Leaves gen. entire; costa somewhat thick. gen. not (r. shortly) excurrent. Tufts large and dense. Us. dioecious.

b. Capsule brown or red-brown. Leaves gen. with a by costa not formed hairpoint, often entire; the lower of stem or the upper of shoots often broader above middle.

5. **Trichophora.** Leaves us. limbate; costa often abbreviate. Capsule gen. subclavate. Dioecious or r. synoecious. Tufts often large and dense.

c. Capsule brown. Leaves broader at base, without hairpoint, entire or denticulate; costa us. excurrent. Dioecious or sometimes synoecious.

6. **Bimiformia.** Leaves gen. broadly limbate and large, sometimes denticulate, often distant. Stem distinct us. high.

7. **Caspiticia.** Leaves not or very narrowly limbate, gen. entire and not large, crowded. Stem distinct gen. not high.

8. **Gemniformia.** Leaves not or narrowly limbate, small entire crowded. Stem very short with gamniform shoots. Cilia of endostome sometimes not appendiculate.

**Pachylophus.**

A. Plants small with small leaves. Tufts low.

1. **Argenteiformia.** Capsule often red; neck finally narrowed. Costa of leaves subpercurrent or short-excurrent. Stems julaceous.

2. **Versicoloriformia.** Capsule us. (finally) red; neck us. not narrow. Costa of leaves long-excurrent. Stems r. julaceous.

B. Plants large with large leaves.


**Cladodium.**

A. Leaves not (or very faintly) red at insertion. Tufts mostly loose.

a. Capsule and peristomial teeth red. Leaves not limbate.


b. Capsule and peristomial teeth brownish or yellowish. Leaves gen. limbate.
2. *Arcticiformia.* Capsule gen. not longer than neck, often oblique; teeth short; endostome more or less adhering. Us. synoecious. Leaves gen. entire.


   b. Capsule brownish or yellowish. Tufts gen. dense.

   b. Capsule brownish or yellowish. Tufts gen. dense.


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Webera.

A. Perichetial leaves sublinear-lanceolate narrowly acuminate acute, longish. Other leaves r. decurrent.

1. *Crudiformia.* Capsule indistinctly necked before sporosis, finally not much longer than neck, often yellowish brown, gen. not pendent; pedicel long. Leaves often somewhat large; upper cells very narrow.

2. *Nutantiformia.* Capsule distinctly necked also before sporosis, not much longer than neck, brownish (or partly reddish) and somewhat narrow, pendent; cilia sometimes appendiculate. Leaves often distant; upper cells sometimes dilated.


B. Perichetial leaves shortish, oblong-lanceolate acute broadly acuminate or obtuse. Other leaves gen. decurrent; cells not r. dilated.


I. Leptobryum Br. eur.


II. Eu-Bryum.


A. Leaves obtusate obtuse, us. shining when dry.

2. *B. juliforme* Dickson. — Anomobryum julaceum Schimp.
   Leaves ovate or ovate-oblong, very concave, gen. entire; upper cells narrow; costa not percurrent. Capsule suboblong. Stems longish, tufted. — Sandy soil in alps r. *Eur*. Switzerland.

B. Leaves short-acuminate or apiculate (or some ones obtuse).
   a. Leaves of the short fruiting stem reflexed, sublimbate, not shining; costa percurrent.

   Leaves broad-ovate or ovate, entire; cells narrow. Capsule small oblong-piriform yellowish pendent; cilia appendiculate. Tufts loose; shoots and male plants longish. Habit of the last. — *Amer*. r. Can., Selkirk mts: Macoun 1890. »Alaska«: C. M.
   b. Leaves neither reflexed nor limbate, us. shining; costa subpercurrent or (in *B. juliforme*) abbreviate.

4. *B. juliforme* C. Solms Laubach. — Anomobryum Solms; Bryum Schimper.

   Leaves suboval entire: those of shoots often obtuse; upper cells oblong-lanceolate. Capsule suboblong; »peristome rudimentary«: Limpricht. Stem us. very low when barren, sometimes 1 c. m. high in fruiting state. — Wet rocks r. *Eur*. France: Berthoumieu; Lamy, com. Husnot.

   Leaves ovate or broadly ovate-lanceolate, gen. entire; upper cells often rhomboidal. Capsules unknown. Stems longish, often mixed in other moss-tufts, sometimes with greenish bulbili. Often silver-glosey when dry. — Rocks princ. in alps r. *Eur*. Norway, Switzerland! »Amer.»: Lq. et Jam.
1. B. Geheeii C. Mueller.

2. B. Comba Notaris.
> Leaves ovate-oblong obtusely short-acuminate; upper cells oblong-oval or rhomboidal. Capsules unknown. Tufts 1 c. m. high. — Eur. r. Sardinia island: Comba*: Limpricht.

3. Speirophylla.
A. Leaves finally rose-red, loosely disposed, gen. not limbate. Capsule not oblique, longer than neck.
a. Leaves long-decurrent; costa not excurrent.

> Leaves not reflexed, ovate-oblong acute or apiculate. Capsule brown strangulate; pedicel often very long. Stems often long and loosely tufted. Not often fruiting. — Swamps also in alps. Eur. not uncommon. Norway! Amer. Can.: Macoun; Moser.

5. B. obtusifolium Lindberg.

6. B. pygmeo-alpinum C. M. et Kindb. 1. c.
b. Leaves gen. not decurrent; costa sometimes excurrent.

7. B. erythrophyllum Kindb. cat. Can. m.

8. B. erythrophyllodes Kindb. cat. Can. m.
> Leaves diversiform, not reflexed; uppermost oblong-lanceolate somewhat long-acuminate with narrower cells and short-excurrent costa; middle leaves ovate-oblong acute with subrhombic cells and percurrent costa; the lowest ovate-oval subobtuse. Capsules unknown. Tufts loose. — By springs r. Amer. Can.: Macoun.
*B. Gaspeanum* Kindb. l. c.

Leaves not reflexed, ovate-oblong short-acuminate or apiculate; cells subrhombic; costa gen. short-excurrent. Capsules unknown. 
Tufts somewhat dense. — Rocks r. Amer. Can.: Macoun.

B. Leaves us. red, gen. not much distant, limbate; costa percurrent or short-excurrent; shoot-leaves us. decurrent. Capsule shorter than neck, not or indistinctly constricted below mouth, often oblique.

Leaves us. reflexed to above middle, ovate-oblong or subobovate, acute or acuminate, entire or nearly so, brownish or yellow limbate, somewhat twisted when dry. Capsule us. oblique with often curved neck; teeth yellow; endostome nearly orange; lid mamillate; cilia sometimes not appendiculate; spores r. large. Stem us. low (about 1 c. m.) and sparingly radulose near base. Tufts loose. Easily confounded with *B. arcticum*. — Moist earth, sometimes on stone-walls, often in alps. Eur. common. Sweden, Norway, Switzerland. Amer. r. Can.: Macoun.

* B. rufescens* Kindb. n. subsp.
Leaves very distant, entire, faintly or not reflexed, spreading when dry. Tufts dense rufescent 6—8 c. m. high. Capsules unknown. — Alp. districts r. Eur. Norway, near Kongswold!

* B. fallax* Milde.

* B. baldense* Venturi.

C. Leaves us. greenish, more or less loosely disposed. Capsule strangleate, not oblique.

a. Leaves obtuse; costa abbreviate.

15. *B. cyclophyllum* Schwegrichen. — Mnium Schw.; Bryum B. E.
Leaves not distinctly limbate, round-oval or broadly obovate, loosely disposed, not distinctly decurrent, not or scarcely reflexed. Capsule brown-yellow; neck short. Stems not or loosely

b. Leaves gen. acute (in B. Schleicheri *latifolium mostly obtuse); costa percurrent or short-excurrent. R. fruiting. Male flowers subdisciform.

16. **B. turbinatum** Hedwig.


**B. Schleicheri** Schweigrichen.


* **B. latifolium** Schleicher. — Mnium Schl.; Bryum Bridel.


18. **B. grandifolium** Kindb. n. sp.

Leaves acute not limbate, imbricate when dry, ovate or broad-ovate, not or scarcely acuminate, loosely disposed and short-decurrent; cells very large: upper subrhombic; costa percurrent. Capsules unknown. Tufts sparingly radiculose, red-brown below, yellowish green above, not high. — In alps r. Amer. Can. Brit. Col.: Macoun.

3. **Erythrocarpa.**

A. Leaves not limbate.


b. Capsule not strangulate.

20. B. Sauteri Bryol. eur.
Leaves entire narrowly ovate-oblong not reflexed; costa long-excurrent. Tufts reddish green or brownish. — Wet sand by alp. rivulets r. Eur. Austria: Gander.

bb. Capsule gen. narrow. Dioecious

21. B. erythrocarpum Schweigrichen.
Leaves narrow serratulate above, reflexed below middle, often decurrent; the uppermost with excurrent costa. Tufts yellowish green. Often with red bud-like propagula. — Sandy places princ. below alps. Eur. not uncommon. Sweden, Switzerland, Amer. »U. S. »: Lesq. et Jam.


B. Leaves limbate. Capsule not strangulate. Dioecious

a. Leaves serratulate above. Capsule narrow.

23. B. marginatum Bryol: eur.; Husoat m. gall.

24. B. Bomanssonii Lindberg.

b. Leaves nearly entire, not distinctly reflexed. Capsule sometimes thick.

25. B. rubens Mitten; Braithwaite brit. mossfl.
Leaves ovate-oval; costa excurrent. Capsule narrow; lid apiculate. Tufts somewhat loose yellowish green, or reddish below. — On ground r. Eur. »Engl.«: Braithwaite.


4. Alpiniformia.

A. Leaves distinctly limbate (at least the lower) and reflexed; costa gen. percurrent.

a. Leaves obtusate subobtuse; the lower broadly recurved and limbate; the uppermost not limbate and nearly flat. Capsules unknown.
27. **B. percurrentinerve** Kindb. bull. Torr. club XVII.

Leaves somewhat large, not distinctly decurrent, nearly appressed when dry; upper cells oblong-oval. Lower leaves sub-ovate finally red; uppermost green glomerate oval or oval-oblong. Tufts about 2 c. m. high. — Dripping rocks near a waterfall r. Amer. Can. Brit. Col.: Macoun.

b. Leaves (at least the upper) acute, all narrowly reflexed and limbate.

**aa.** Leaf-cells red also those of the limb.

28. **B. haematophyllum** Kindb. cat. Canad. m.


29. **B. anoëctangiaceum** C. M. et Kindb. l. c.

Diffs from the last: Nearly all leaves acute more distinctly acuminate, less distinctly reflexed and limbate, less crowded and spirally twisted when dry. Capsules unknown. Tufts scarcely 2 c. m. high. — Rocks by torrents r. Amer. Can. Brit. Col.: Macoun.

**bb.** Leaf-cells not red.

30. **B. haematocarpum** C. M. et Kindb. l. c.

Leaves ovate-oblong acuminate, slightly corrugate and not or loosely appressed when dry: those of branches distant decurrent. Capsule blood-red not constricted; endostome orange; segments short; cilia often indistinctly appendiculate; pedicel 2—5 c. m. long. Tufts tomentose about 5 c. m. high. — Damp rocks r. Amer. Can. Brit. Col.: Macoun.

**B.** Leaves not or indistinctly limbate.

**a.** Leaves gen. broadly recurved all around or to above middle, not decurrent; costa us. red.

**aa.** Costa of leaves gen. excurrent.

31. **B. aciculium** Kindb. n. sp.


**bb.** Costa of leaves gen. percurrent.
32. B. alpinum Hudson.
Leaves nearly appressed not twisted when dry, us. ovate-oblong or ovate-lanceolate acute and recurved to above middle; upper cells us. narrow. Capsule blood-red not or faintly constricted. Tufts often copper glossy. — Wet rocks. Eur. not uncommon. Sweden, Norway, Switzerland! Amer. r. »U. S. White mts»: James.

* B. meridionale Schimper.
Leaves narrower with narrow cells; the uppermost often with short-excurrent costa. — Eur. southern distr. r. Spain, Portugal: Levier.

* B. appressum Kindb. in Hedwigia 1896 p. 66.
Capsule brown. Leaves narrow, lanceolate short-acuminate acute or obtuse, recurved all around, more strongly appressed when dry, gen. not red at base; costa not red. Tufts sparingly radiculose not glossy. — Amer. r. U. S. Washington: Roell.

* B. gemmiparum Notaris.


34. B. Raul Austin.
Leaves very much twisted when dry, subovate broadly obtuse subobtuse, strongly recurved all around; cells subrhombic, the lowest near base deep-red numerous; costa r. but shortly excurrent. Capsule pale brown subclavate strangulate; neck longer. Tufts very tomentose, green above, not glossy. — Wet rocks r. Amer. Can. Pacif. distr.: Macoun Canad. musci n. 480.

b. Leaves not or slightly reflexed.

aa. Leaves small and green, more or less twisted when dry.

35. B. flagellosum Kindb. n. sp.
Leaves gen. ovate; cells subrhombic; costa sometimes short-excurrent. Uppermost leaves and those of flagelliform shoots

bb. Leaves not twisted, more or less strongly appressed when dry, large and mostly reddish.

36. B. mildi Juratzka.

Leaves gen. ovate-oblong acute sometimes denticulate near apex; cells oblong-rhomboidal; costa green or brown-yellow not r. short-excurrent. Capsule reddish yellow finally brown. Tufts green us. silky or golden glossy, often very large. Very r. fruiting. — Earth and stones r. Eur. Switzerl; Philibert. Belgium: Roemer.

37. B. atwateriae C. Mueller.


38. B. miniatum Lesquereux.

Differs from the last: Leaves not decurrent, often green or brown; cells suboblong; costa green or at base red. Capsule smaller. — Wet rocks r. Amer. Can. Brit. Col. 1300 metr. a. sea; N. Foundl.: Waghorne.

39. B. capitellatum C. M. et Kindb. l. c.

Uppermost leaves suboblong subacute not arrounded at apex; cells somewhat narrow; costa green percurrent. Lowest leaves small oval round-obtuse distant finally reddish; costa red not percurrent. Tufts low golden glossy above or green. Capsules unknown. — Wet rocks near Pacific sea r. Amer. Can. Vanc. isl.: Macoun.

40. B. corsicum Kindb. n. sp. in litt. ad Levier.

Leaves flacid pale red entire subobtuse, not distinctly reflexed, not densely appressed when dry; upper cells wide, the others somewhat narrow; costa pale red or yellowish not excurrent. Stem-leaves crowded ovate-oblong; branch-leaves suboblong distant decurrent. Capsules unknown. Tufts high. — Eur. r. Corsica: E. Levier.

5. Trichophora.

A. Leaves distinctly limbate.
41. B. capillare L.
Leaves. gen. broad-limbate nearly entire and crowded, twisted when dry, us. yellowish. Capsule us. red-brown.

*B. torquescens* Bruch.

*B. restitutum* Notaris.
Leaves finally brown-red, entire obtuse; limb brown. Capsule dark brown. — Eur. r. Switzerl. near Lugano »Italy near Como»: Notaris.

*B. ruraliforme* Kindb. n. subsp.

*B. erythroloina* Kindb. n. subsp.

*B. Haistii* Schimper.

42. B. speiropfaylhin Kindb. bull. soc. bot. Ital. 1895.

b. Leaves, prin. those of stem, subovate-lanceolate with not or slightly narrowed base, often acuminate, not or slightly twisted when dry; basal cells short-rectangular, upper rhomboidal. Dioecious.

43. B. Donii Greville.
Leaves nearly crowded and not decurrent, us. denticulate and broadly limbate. Upper shoot-leaves often rosulate. Capsule often very large. Tufts green or brown. — Dry stones in warmer distr. r. Eur. Italy: Levier; Arcangeli. Greece:
Heldreich, France; Corbière. Amer. Pacif. distr. Can.: Macoun.
U. S.: Marshall A. Howe; Roell.

* B. obconicum Hornschuch.
Leaves nearly entire not rosulate. Capsule less large. —
Walls and sandstone rocks r. Eur. Switzerl. Engl.: Curnow,

* B. floridanum Renaud et Cardot.
> Leaves shorter, narrower limbate not recurved. — Amer.
r. U. S.»: Cardot.

44. B. squarrosum Kindb. in Hedwigia 1896 p. 66.
Fruiting stem very short; leaves crowded denticulate, less
distinctly limbate. Leaves of sterile stems (shoots) broadly-
limbate gen. denticulate, distant recurrent spreading also when
dry. Capsule not large. Tufts reddish brown. — Amer. r.
U. S. Oregon near Astoria: Roell.
c. Leaves short narrowly limbate. Tufts low and dense.
Dioecious.

aa. Leaves imbricate somewhat large, very concave.

45. B. elegans Esenbeck.
Leaves subovate not or indistinctly recurved, only the
upper limbate denticulate; cells subrhombic. Capsule large.
Tufts green or finally reddish. — Calcareous rocks prnc. in
alps r. Eur. Switzerl. in alp. region!

b. Leaves small us. not imbricate; cells gen. oblong-rhombic.

46. B. oregonum Sullivant; Lesq. et Jam.
Leaves twisted: lower few very small; upper glomerate sub-
oveate abruptly acuminate, sometimes recurved. Tufts brown

47. B. streptophyllum Kindb. n. sp.
Differs from the last: All leaves crowded nearly uniform:
upper not larger and not recurved, very concave. Tufts green
finally brown, less low. Capsules unknown. — Amer. r. Can.
Brit. Col.: Macoun.

48. B. trichophorum Kindb. n. sp.
Leaves obtusate appressed neither recurved nor twisted: lower
distant linear-oblong acute, upper crowded suboval. Tufts green.
Capsules unknown. — Amer. r. Can. Vanc. isl. near sea: Mac-
oun 1893.

B. Leaves not distinctly limbate.

a. Leaves, princ. the lower of stem, gen. sublingulate with
long narrow base, as in B. capillare, us. twisted and crowded.
Dioecious.
Leaves not decurrent; cells large.

49. B. Hendersoni Renauld et Cardot.

50. B. Sawyeri Renauld et Cardot.

51. B. sangullentum Renauld et Cardot.

bb. Leaves decurrent; cells somewhat small.

52. B. gemmacens Kindb. n. sp.

b. Leaves, princt. those of stem, subovate-lanceolate, as in B. Donii.

53. B. provinciale Philibert.

*B. crassirameum Renauld et Cardot.

54. B. extenuatum Renauld et Cardot.

c. Leaves short as in B. elegans, not recurved; cells subrhombic. Dioecious.

aa. Leaves twisted when dry, not densely crowded. Capsules unknown.

55. B. Stirtoni Schimper; Braithwaite.
Leaves broadly subovate nearly entire subdecurrent not large. Tufts green. — Eur. r. Switzerl. »Scotl.«: Braithw.
56. *B. tomentosum* Kindb. n. sp.

Leaves subovate nearly gradually acuminate, entire decurrent small. Tufts brown and very tomentose below, green above; dense and not low. — *Amer.* r. Can. Rocky mts.; Macoun 1890.

bb. Leaves not distinctly twisted, nearly appressed when dry.

57. *B. heteroneuron* C. M. et Kindb. cat. Can. m.

Leaves suboval or subobovate often obtuse, entire or faintly denticulate, crowded and not large; awn sometimes wanting. Capsule less large than in *B. capillare*. Tufts us. reddish, not high; shoots clavate. — Rocks and roadsides r. *Amer.* Can. Brit. Col. and Vanc. isl.; Macoun.

58. *B. earinthiacum* Bryol. eu'.


* B. spelugense * Kindb. n. subsp.

Leaves larger, facecid and not cochleariform: upper subobovate, middle short-decurrent; cells larger; awn sometimes indistinct. Capsules unknown. — Rocks in higher alp. region r. *Eur.* Switzerl. near Spluegen 1500 metr. a seal


* B. suecicum* Kindb. n. subsp.

Leaves gen. distant decurrent entire; awn long flexuous. Capsules not seen. Tufts brown below, dark green above, about 4 c. m. high. — Moist places r. *Eur.* Sweden Aongermanl. on the shore of a lake; H. W. Arnell.


A. Leaves distinctly decurrent, not (or slightly near base) reflexed, gen. broadly limbate; costa gen. percurrent. Dioecious.

60. *B. neodamonse* Itzigssohn.

*B. ovatum* Juratzka.
Leaves oval-ovate more concave and large; the uppermost acuminate. Tufts green us. high. — Eur. r. Norway! Austria: Breidler. Finl.: Brotherus.

61. *B. denticulatum* Kindb. bull. Torr. club XVII.


B. Leaves decurrent, recurved nearly all around, acuminate acute.

a. Costa of leaves long-excurrent. Capsule narrow strangulate; neck us. long; teeth yellow; segments fenestrate.

63. *B. affine* Bruch. — Webera Bruch; Bryum Lindb.; B. cuspidatum Schimper.

64. *B. revelstokense* Kindb. revue bryol. 1896.

b. Costa of leaves not or shortly excurrent. Tufts us. high and tomentose, sometimes red.

65. *B. bimum* Schreber.

67. **B. ventricosum** Dickson. — B. pseudotriquetrum Schwægr.
Leaves as in *B. bimoidum*. Capsule brown sometimes slightly oblique; neck often long; teeth yellow. Dioecious. Very variable.
— Wet places common also in alps. Eur. Sweden etc! Amer.
Can.: Macoun.
r. Switzerl.: Limpricht.
*B. hyalodontium* C. M. et Kindb. l. c.

68. **B. Reyeri** Breidler.
C. Leaves not decurrent, broadly limbate and recurved gen. entire; costa excurrent.

69. **B. pallescens** Schleicher.
Leaves gen. ovate-lanceolate, twisted when dry. Capsule pale brown or yellowish us. subclavate and not pendent when young; teeth pale. Tufts us. 2—3 c. m. high, often green. Often monoecious. — Earth and rocks also in alps, prin. the northern. Eur. not uncommon. Sweden, Norway, Switzerl! Amer. Greenl.: Berggren. Can.: Macoun.
*B. contextum* Hoppe et Hornschuch.
Leaves short-acuminate smaller. Capsule thicker and more distinctly strangulate; pedicel often only 1 c. m. long. Tufts brown-green often much higher. — Rocks prin. in alps. Eur. Norway!

70. **B. cirratum** Hoppe et Hornschuch.
Leaves gen. ovate or ovate-oblung, not or slightly curled. Capsule brown somewhat thick and pendent; teeth pale. Tufts green us. about 1 c. m. high and less compact than in the last. Spores in some alpine forms somewhat large. Us. synoecious. — On earth prin. on old roads in alps. Eur. not r. Norway, Switzerl! Amer. r. Can.: Macoun.
*B. syphinctum* Limpricht.
b. Capsule small-mouthed not constricted.
71. **B. subglobosum** Schliephake.
> Leaves ovate-oblong not twisted; costa long-excurrent. Capsule subglobose-piriform; neck short; lid mamillate; teeth brown-yellow. Tufts dusky green less than 1 cm. high. Synoecious or polygamous. — Alp. rocks r. Eur. Switzerl.: Gref: Limpricht.

* **B. Bænitzii** C. Mueller.

72. **B. Lisa** Notaris.

7. **Cæspiticia.**

73. **B. Jackii** C. Mueller.
> Leaves ovate-lanceolate acuminate, denticulate near apex, strongly recurved; costa long-excurrent. Capsule oval or sub-cylindric; lid blackish red. Tufts dense 3 cm. m. high. — Alp. region r. Eur. Austria: Jack: Limpricht.

74. **B.stenotrichum** C. Mueller.

75. **B. producticolle** Kindb. n. sp.
> Leaves ovate-lanceolate reflexed; costa long-excurrent. Capsule narrow strangulate; neck long not curved; lid low short-apiculate; cilia long-appendiculate. Tufts about 1 cm. m. high. Spores scarcely 0,02 m. m. — Rocks r. Amer. Can. Vanc. isl.: Macoun 1893.

76. **B. manilligerum** Kindb. cat. Canad. m.
> Leaves narrowly ovate-oblong not distinctly reflexed; costa long-excurrent. Capsule narrow not strangulate; neck long cur-
365

— Cap-

rown-

Bcious

Lit-

sub-

Eur.

ved; lid low mamillate. Tufts 1—2 c. m. high. Fruiting stem 1—2 m. m. high. Spores larger than in the last. — Damp rocks r. Amer. Can. Rocky mts: Macoun.

77. B.fuscum Lindberg.

Leaves ovate-lanceolate reflexed, denticulate above; costa short-excurrent. Capsule narrow faintly constricted; neck as long; lid short-conic; cilia long-appendiculate. Tufts about 1 c. m. high. Spores about 0,02 m. m. — Wet sand r. Eur. Finl.: Lindberg: Limpricht.

B. Leaves not distinctly limbate.

1. Shoots juilaceous. Leaves not or near base slightly reflexed. Dioecious.

78. B.Funckii Schwäegrichen.

Leaves subovate very short-acuminate; upper cells dilated; costa short-excurrent. Capsule narrow strangulate; lid mamillate. Tufts loose very low. Spores sometimes about 0,02 m. m., often smaller. — Sand or gravel prinr. in southern distr. Eur. not r. Sweden: R. Hartman; J. Persson.

79. B.Kunzei Hornschuch.

Leaves smaller nearly pellucid: those of stem suboblong; shoot-leaves broad-ovate longer acuminate; upper cells narrow; costa long-excurrent. Capsule narrow or subpiriform strangulate; lid mamillate. Tufts compact about 2 c. m. or higher. Spores about 0,01 m. m. — Dry earth also in alps r. Eur. Norway!

80. B.occidentale Sullivant.

Leaves small oval or suboblong often decurrent; upper cells narrow; costa short-excurrent. Capsule oblong wide-mouthed; lid apiculate. Tufts tomentose about 1 c. m. high. — Amer. r. U. S. Montan: Roell.

b. Shoots not distinctly juilaceous. Spores small about 0,01 m. m. Usually dioecious. Capsule us. narrow.

81. B.caespiticium L.


*B.comense* Schimper.

* B. oligochloron* C. M. et Kindb. l. c.

* B. pseudo-Kunzei* Limprieh.
>Leaves ovate-oblong gen. not recurved; costa short-excurrent. Tufts about 1 c. m. high. Synoecious. — In alp. region r. *Eur.* Switzerl.: Culmann»: Limprieh.

82. B. microcephalum* C. M. et Kindb. l. c.

83. B. vancouveriense* Kindb. bull. Torr. club XVI.
Leaves narrowly ovate-oblong reflexed below; cells smaller than in *B. cespiticium*; costa denticulate above, sometimes short-excurrent. Capsule pale brown not constricted; lid low mamillate; pedicel about 5—6 c. m. long. Fruiting stem very short. — Wet earth in woods r. *Amer.* Can. Vanc. isl.: Macoun.
c. Shoots not julaceous. Spores about 0,02 m. m. *Us.* synoecious. Capsule us. not strangulate (exc. *B. Culmannii*). 
**aa.** Capsule narrow.

84. B. intermedium* Ludw. — Mnium Ludw.; Bryum Bridel.

85. B. clathratum* Amann; Limprieh.
> Capsule not strangulate; neck shorter often curved; lid low mamillate; cilia long-appendiculate. Leaves oval-oblong strongly recurved all around. Tufts brown-green about 1 c. m. high. — Wet places in alp. region r. *Eur.* Switzerl.: Amann»: Limprieh.

86. B. Culmannii* Limprieh.
>Capsule strangulate longer than the not curved neck; lid acute; cilia long-appendiculate. Leaves subovate, the upper recurved. Tufts bright green 2—4 c. m. high not tomentose. — In higher alp. region. *Eur.* Switzerl.: Culmann»: Limprieh.
bb. Capsule short thick gen. not distinctly constricted.

Capsule large oval or obvate pendent; neck short; lid low
mamillate; cilia appendiculate; pedicel geniculate below middle,
arcuate at apex, 5–8 c. m. long. Leaves ovate or ovate-
oblong reflexed; costa long-excurrent, often denticulate above.
Tufts about 1 c. m. high, radiculose only at base. — Gravel

88. B. lonchoeauna C. Mueller.
>Leaves small reflexed all around, ovate-lanceolate subdecur-
rent; cells pellucid. Capsule small oval; cilia appendiculate,
pedicel about 3 c. m. long. Stems subjulaceous elongate radiculose. Resembles somewhat B. bimum but more slender.
— Amer. r. U. S. Colorado: C. M. in Flora 1875.

89. B. dovrense Schimper.
>Leaves ovate suddenly short-acuminate indistinctly limbate
faintly reflexed. Capsule oval-ovate yellowish; neck short; seg-
ments hyaline adhering to the yellowish teeth; cilia rudimen-
tary; spores scarcely 0,02 m. m. Stem about 2 c. m., pedicel
1 c. m. long. Tufts tomentose yellowish green above. — Wet turfy
soil in alps r. Eur. Norway near Kongswold in Dovrefjeld:
Lorentz»: Schimper syn.

90. B. caespiticiforme Notaris.
>Leaves subovate reflexed in lower half, limbate in upper
part. Capsule subpiriform small-mouthed; neck not long; lid
low. mamillate; teeth brown-yellow; cilia not appendiculate; pe-
dicel 1 c. m. long, stem not longer. Tufts tomentose yellow-
ish green. Monoecious. — In higher alp. region r. Eur. Swit-
zerl.: Carestia»: Limprecht.

8. Gemmiformia.

A. Leaves not distinctly reflexed at borders, gen. not limbate.

91. B. subrotundum Bridel.
Leaves ovate-oblong short-acuminate acute gen. small; costa
short-excurrent. Capsule pale brown oval or subglobose, with
thick or indistinct neck; teeth yellow; segments long, gaping
or fenestrate; cilia short r. appendiculate; lid small mamillate.
Spores nearly 0,02 m. m. Us. monoecious. — Stony ground

*B. turfaceum Kindb. in Botan. notiser 1896.
Leaves larger, sometimes narrowly limbate; costa gen. sub-
percurent. Capsule larger, brown, more distinctly necked and faintly constricted when dry; cilia very short mostly wanting. Spores smaller. Stem more distinct. Dioecious. — Turfy soil! in higher subalp. region r. Eur. Norway near Kongswold!

92. B. gemmuligerum Kindb. n. sp.
Leaves subovate obtusate small; those of shoots broader, obtuse; costa long-excurrent. Capsule brown oblong or obovate with short thick neck, distinctly constricted when dry, not large; teeth yellow; segments long fenestrate; cilia long appendiculate; lid large apiculate or mamillate. Spores about 0.01 m. m. Monoecious or dioecious. — Amer. r. Can. Assa: Macoun.

93. B. subgemmuligerum Kindb. n. sp.
Leaves subovate short-acuminate acute distinctly limbate somewhat small; costa short-excurrent. Capsule pale brown suboblong strangulate not large; neck distinct longish; segments entire; cilia long and long-appendiculate; lid mamillate not small; pedicel about 2 c. m. long. Spores gen. 0.02 m. m. Dioecious. — Sandy ground in subalp. districts r. Eur. Norway in Foldal near L. Elvedal 1897!

B. Leaves distinctly reflexed and limbate.

94. B. microstegium Bryol. eur.
Leaves narrowly ovate-lanceolate long-acuminate acute, reflexed often all around, not large; costa long-excurrent. Capsule pale brown suboblong with long and distinct neck, not large; teeth pale; segments long fenestrate; cilia long appendiculate; lid small apiculate. Spores nearly 0.02 m. m. Us. synoecious.
— Dry earth in alp. regions r. Eur. Norway!

95. B. submicrostegium Kindb. in Botan. notiser 1896.
Leaves broadly ovate-lanceolate or ovate-oblong, acute gen. long-acuminate, reflexed all around and distinctly limbate (at least the upper of fruiting stem), not large; costa long-excurrent. Capsule pale brown oval-oblong short-necked gen. small; teeth yellowish; segments fenestrate shorter than basal membrane; cilia long appendiculate; lid small mamillate. Spores about 0.01 m. m. Dioecious or monoecious. — On earth in higher subalp. region r. Eur. Norway Tronfjeld and near Kongswold by Goverlivandl.

96. B. acutiusculum C. Mueller.
Leaves oblong acuminate; costa short-excurrent. Capsule oval-piriform with somewhat long curved neck, minute; teeth brownish; segments not perforated; cilia long, short-appendicu-
late above; lid small subacute. Dioecious. Habit of *B. subro- 
tundum. — Rocks in arctic districts r. *Amer. Alaska: Kraus*. 
C. M. in Flora 1887.

II. Pachylophus Kindb.

1. Argenteciformia.

A. Leaves gen. obtuse; costa (exc. *B. nitidulum*) not ex-
current.

a. Leaves sparingly chlorophyllose, silver-glossy, not reflexed, 
not r. with hairpoint. Tufts low.

97. *B. argenteum* L.

Leaves subovate often apiculate; costa subhyaline not or r. 
confluent with hairpoint. Capsule oval-oblong strangulate blood-
red or pale red. — Bare earth, stones and roofs. *Eur.* com-
mon. Sweden etc. *Amer.* not r. Can.: Macoun. U. S.: Langlois, 
com. Cardot.

b. Leaves distinctly chlorophyllose, not reflexed. Capsules 
unknown.

Laubm. S. u. N.

Leaves broad-ovate or ovate-oblong, obtuse, reddish at base; 
cells rhombic shorter than in *B. argenteum*; costa yellow abbrevi-
ate. Branches subclavate pale green. Tufts sometimes 2—3 
c. m. high. — In water on stones and sand r. *Eur.* Norway; 

c. Leaves chlorophyllose, more or less reflexed.


Leaves oval-oblong subobtuse: only uppermost (narrowly) 
reflexed. Capsule blood-red obovate; cilia sometimes not appen-
diculate. Dioecious. — Wet sand pric. by rivers, r. on rocks, 
r. *Eur.* Norway; F. Kier. France: Boulay. *Amer.* Can.: Ma-
coun.

* *B. oblongum* Lindberg.

Leaves more obtuse. Capsule sometimes suboblong. — Wet 

100. *B. teres* Lindberg.

Leaves broad-ovate obtuse: only uppermost apiculate and 
reflexed. Capsule pale brown suboblong; cilia appendiculate; 
pedicel about 1 c. m. long. Resembles somewhat *B. calophyl-
lum. — Arctic district r. *Eur.* Spetsbergen: Berggren.


Leaves ovate obtuse with deflexed point: only uppermost 
reflexed. Capsule brown-red obovate; cilia appendiculate. Stem
nearly indistinct with gemmiform shoots. Synoecious. — Arctic
102. **B.nitidulum** Lindberg.
Leaves subovate subobtuse, narrowly limbate, recurved all
around; costa sometimes short-excurrent. Capsule obovate pale
yellow or brown. Stem short; shoots subgemmaform with
somewhat loosely disposed leaves. Synoecious or monoecious.
— Northern, princ. arctic districts r. — Eur. Spetsbergen:

**B.** Leaves short-acuminate; costa, at least in uppermost
leaves, excurrent. Capsule not or indistinctly constricted below
mouth.

103. **B.atropurpureum** Wahlenberg.
Leaves subovate gradually acuminate, reflexed below; upper
shoot-leaves glomerate. Capsule blood-red suboval; teeth yellow-
ish or pale red; cilia appendiculate. Tufts small pale green
0.5—1 c. m. high, often with gemmiform propagula. Dioecious.
Sweden, Germany! Amer. r. Can.: Macoun.

* **B.californicum** Sullivant.
Leaves faintly reflexed. Capsule red oblong. Cilia not
appendiculate*: Lesq. et Jam. — Amer. r. U. S.: Bolander,
com. Cardot.

* **B.arenarium** Juratzka.
Leaves shorter, less reflexed; cells shorter. Capsule red-
brown. — Sometimes inundated places r. Eur. Austria: Juratzka»:
Limprecht.

104. **B.Garovagllii** Notaris.
Leaves subovate short-acuminate, gen. not reflexed; costa
scarceexcurrent. Capsule chestnut-brown broad-oval; teeth
brown-yellow; cilia appendiculate. Tufts small dusky green,
scarcey 1 c. m. high. Synoecious. Habit of **B. atropurpureum**.

* **B.confertum** Limprecht.
Leaves broader, those of shoots obtuse. Tufts very dense,
pale green above, 2—2.5 c. m. high. Capsules unknown. —

105. **B.microglobum** C. M. et Kindb. cat. Can. m.
Leaves ovate-oblong short-acuminate, reflexed below; upper
cells short; costa short-excurrent. Upper shoot-leaves glomerate
ovate obtusate not reflexed. Capsule small pale red subobovate or
subglobose; pedicel 3 c. m. long. Tufts green and dense, radi-
culose below, about 1 c. m. high. — Earth r. Amer. Can.
Ont.: Dearness, com. Macoun.

2. Versicoloriformia.

106. B. versicolor Al. Braun.

107. B. coronatum Schwægrichen.
Leaves as in the last but looser disposed and not reflexed; those of shoots decrent. Capsule yellowish or pale brown, oval-oblong. — Amer. r. »U. S.«: Lesq. et Jam. (Cuba: Wright, com. C. Mueller).

108. B. excurrens Lindberg.
Leaves subovate abruptly acuminate acute more or less reflexed, crowded and not decrent. Capsule small pale red oval or subobovate. Tufts reddish about 1 c. m. high. — Sandy alp. places r. Eur. Norway in Dovrefjeld!

3. Zonatiformia.

A. Tufts dense and tomentose.

109. B. zonatum Schimpf.
Leaves subovate short-acuminate apiculate, neither limbate nor reflexed, subdecerrant, large and not densely crowded; costa of the uppermost leaves often short-excurrent. Capsules and flowers unknown. Tufts very compact, zonate, brown below, often high. — Alp. rocks r. Eur. Norway in Dovrefjeld!

110. B. zonatiforme Kindb. in Botan. notiser 1896.
Leaves subcircular obtusate subobtuse, sometimes (narrowly) limbate, crowded: uppermost apiculate; costa not excurrent. Habit of the last, but tufts are lower, about 2—3 c. m. and wholly brown. Capsules and flowers unknown. — Alp. rocks r. Eur. Norway in Dovrefjeld!

111. B. Limprichtii Kaurin.
Differs from B. zonatum: Leaves broad-ovate obtusate, either subobtuse or abruptly apiculate, more crowded and less large. Tufts less tomentose often green, 2 c. m. or higher. Polygamous. Capsule pale brown suboblong or subobovate, not constricted; lid small; cilia unknown. — Higher alp. region r. Eur. Norway in Dovrefjeld 1500 m. a. s.l; Kaurin.

B. Tufts loosely cohering, not tomentose.

IV. Cladodium Schimper, in part.
1. Erythrodontia.

113. B. Marratii Wilson.

2. Arcticiformia.
A. Capsule us. abruptly narrowed to the very small mouth. Leaves not crowded.

Leaves subobl gland, more or less reflexed, broadly red-limbate, finally rose-red or purplish; costa percurrent or short-excurrent, finally red. Lower shoot-leaves decurrent. Capsule thick sub-oval often oblique, brown; teeth and endostome orange; cilia not appendiculate. Fruiting stems very short, scarcely tufted; shoots short, radiculose at base. — Earth in alp. region prnc. in northern districts r. Eur. Norway! Amer. very r. Can.: Macoun.

Leaves subobl gland scarcely reflexed us. broadly yellow-limbate, often finally brown-red, sometimes decurrent; costa short-excurrent yellowish or brown. Capsule thick subobovate oblique often curved, finally brown: teeth and endostome yellowish; cilia often appendiculate. Stems as in the last, more distinctly tufted. — Alp. rocks r. Eur. Norway near Kongsvid!

116. B. Lindbergii Kaurin.
Agreeing with the last in often appendiculate cilia. Differs from it in leaves longer, oblong-lanceolate, and green; stems higher, densely tufted. Us. monoecious or dioecious. — Moist alp. rocks r. Eur. Norway!

B. Capsule not abruptly narrowed to the less contracted mouth. Leaves yellowish green and yellowish-limbate, not red. Stem more distinct, radiculose in lower half.

a. Capsule yellowish; teeth orange; cilia not appendiculate. Leaves oblong-lanceolate, broadly limbate. Us. synoecious.

Leaves distant scarcely reflexed, decurrent; costa often long-excurrent. Capsule subclavate often oblique and curved; endostome yellow. Stems not or loosely tufted. — Moist alp. rocks r. **Eur.** Norway!; Kaurin.

118. **B. callistomum** Philibert.

Differences from the last in capsule thicker, subobovate, neither oblique nor curved, pale yellow; endostome orange. — Alp. rocks r. **Eur.** Norway.

119. **B. Kindbergii** Philibert. — *B. schisticola* Kindb. mcr.

Leaves crowded, often reflexed below middle, not decurrent, pale-yellowish limbate; costa gen. long-excurrent. Capsule not (or indistinctly) oblique nor curved, thick and subobovate, faintly constricted below the not red mouth; endostome yellow; lid mamillate. Shoot-leaves not distinctly limbate. Spores scarcely 0,03 m. m. Tufts dense. — Rocks of micaschiste in alps r. **Eur.** Norway, higher subalp. region near Kongsvold 900 mtr. a. s.l.; growing together with *Myurella tenerrima*. »Switzerl.» Philibert.

* B. helveticum Philibert.

> Leaves narrower, subdecurrent and reddish. Capsule suboblique. — **Eur.** r. Switzerl.»: Philibert.

b. Capsule brown; teeth and endostome yellowish; cilia often appendiculate. Leaves suboblong indistinctly or somewhat narrowly limbate. Monoecious.

120. **B. stenoecarpum** Limpricht.

Leaves not crowded, reflexed, sometimes decurrent; costa somewhat longly excurrent. Capsule narrowly obovate, scarcely oblique or curved. Spores large. Habit of *B. Sauterii*. Tufts low brown-green. — Alps r. **Eur.** Norway!

3. **Cerniformia.**

A. Leaves gen. somewhat twisted when dry. Tufts green or brownish, us. loose. Cilia of endostome not appendiculate. Male flowers gemmiform. Spores large.

121. **B. cernuum** Swartz. — Didymodon Sw.; Bryum Lindb.; B. uliginosum Br. eur.

Leaves not decurrent, oblong-lanceolate long-acuminate, reflexed below, broadly yellowish-limbate us. serrulate near apex; costa percurrent or short-excurrent. Capsule subobovate or clavate, oblique and curved, pale or finally reddish brown; teeth brown-yellow; lid subconic mamillate; pedicel long. Tufts olive-green.

122. B. calcareum Venturi.

Leaves decurrent, oblong-lanceolate or sublingulate, long-acuminate, scarcely reflexed, narrowly limbate; costa short-excurrent. Capsule subclavate r. curved, brown; teeth yellowish; lid subconic obtuse; pedicel somewhat long. Tufts green, radiculose at base, about 1 c. m. high. Monoecious. — Calcareous caverns in alp. region r. Eur. Austria 2100 metr. a. s.: Venturi.

123. B. luridum Ruthe.

Leaves not decurrent, oval-oblong long-acuminate, reflexed all around, broadly brown-limbate, brown at apex; costa long-excurrent. Capsule us. thick, suboval or round-oval, not oblique and scarcely curved, pale brown; teeth yellow; lid convex or subconic, obtuse or mamillate; pedicel somewhat long. Tufts low and greenish, radiculose. Synoecious. — On earth below alps r. Eur. Germany: Ruthe, com. Warnstorf.


124. B. meesoides Kindb. bull. Torr. club XVI.

Leaves not decurrent, ovate-oblong or broadly ovate-lanceolate, not distinctly reflexed, faintly denticate, brown-limbate; costa abbreviate or subpercurrent. Capsule shorter than neck, narrowly piriform or subclavate, us., prnc. unripe, arcuate (Meeea-like); teeth pale yellow; basal endostomial membrane nearly indistinct; lid mamillate; pedicel long. Stem often longish. Dioecious. — Wet rocks r. Amer. Can.: Macoun. Alaska: J. M. Macoun.

1. Purpurascenfiformia.

A. Stems not or loosely tufted. Leaves gen. narrowly limbate.

a. Spores gen. not large, about 0.02 m. m. Capsule gen. narrow; cilia not appendiculate; pedicel long. Leaves decurrent, faintly reflexed us. rose-red; costa gen. subpercurrent. Stems gen. very short and scarcely or not cohering; shoots long loosely foliate. Us. synoecious.


Leaves short-decurrent suboblong or oblong-lanceolate, more or less limbate. Capsule suboblong pale yellow or finally pale brown; teeth yellow; lid large deplanate, mamillate or subapi-

*B. opdalense* Limpricht.


126. *B.subpurpurascens* Kindb. cat. Can. m.
Leaves long-decurrent oblong-lanceolate reddish limbate rose-red; costa scarcely excurrent. Capsule very narrow, distinctly strangulate, curved when unripe; teeth orange; lid large conic obtuse. Spores smaller than in the last, fruiting stem more distinct. Dioecious. — Wet earth r. *Amer. Can.* Brit. Col. by a railway: Macoun.

b. Spores gen. very large. Capsule gen. thick; teeth orange, incurved when dry; pedicel us. very long and thick. Leaves gen. not decurrent, more or less reflexed. Cilia gen. not appendiculate (*in Californian specimens sometimes long-appendiculate*: Lesq. et Jam.). Stems and shoots short.

Leaves not crowded, gen. narrow-limbate and faintly reflexed, sometimes short-decurrent, suboval, sometimes denticate above, often finally rose-red; costa percurrent or short-excurrent. Capsule large oval-globose reddish yellow or finally reddish brown; lid convex mamillate. Spores often about 0,05 m. m. Sometimes synoecious. The *flagelliform shoots*, delineated in Br. eur., not are essential. — Wet sand, princ. near sea, r. in alps, r. *Eur. Sweden*! Germany: Warnstorff. France: Boulay. Amer. *U. S.*: Lesq. et J.

128. *B.Biddlecomiae* Austin. — *B. Edwardsianum* C. M. et Kindb. l. c.
Differ from the last in leaves narrower, longer acuminate, entire, more distinctly limbate and reflexed; costa long-excurrent. Capsule narrower, less inflated, more strangulate; lid lower. — Damp sandy soil r. *Amer. Can.*, Prince Edw. isl.: Macoun. *U. S., Colorado*: Lq. et J.

Differs from the last in leaves narrow-limbate, cells narrower; capsule longer necked, pedicel less long; stems more distinct, less loosely tufted. — Wet sand r. *Eur*. Sweden: H. W. Arnell.

B. Tufts dense. Leaves gen. broadly limbate.
a. Fruiting stem distinct with somewhat long loosely foliate shoots. Capsule gen. narrow.

Leaves green not crowded, subdecurrent and narrowed at the orange-colored base, reflexed below, ovate-oblong or narrower; costa yellowish often long-excurrent. Stem-leaves broadly limbate; shoot-leaves less distinctly limbate with short-excurrent costa. Capsule pale finally brown-yellow; cilia not appendiculate; lid apiculate; pedicel often long. Stem and shoots radiclose in lower half. Us. monoecious. — Wet rocks and swamps in alp. northern regions r. *Eur*. Norway! *Amer*. Greenl: Berggren.

132. *B. erubescens* Kindb. cat. Canad. m.

b. Fruiting stem very short with short shoots. Us. synoecious.

133. *B. Lindgrenii* Schimper. — *B. purpurascens*: Lindgren musci succ. exsicc.
Leaves crowded not decurrent, often reflexed, ovate-oblong short-acuminate, often denticulate above; costa subpercurrent. Capsule suboblong not large, pale brown; teeth brown-yellow; cilia not appendiculate; lid deplanate mamillate; pedicel somewhat long. Tufts small yellowish green or pale red. — On the shore of a lake (Wenern) r. *Eur*. Sweden near Lidköping: S. J. Lindgren.
134. **B. micans** Limpricht.
Leaves not crowded, subdecurrent, reflexed at base, oval-oblong or sublanceolate; costa, only of uppermost leaves, short-excurrent. Capsule somewhat small, thick suboval brownish; teeth orange, incurved when dry; cilia not appendiculate; lid subconvex mamillate; pedicel not long. Tufts brown-green. — Turfy soil in northern alps r. *Eur. Norway*; Kaurin. *Amer. Greenl.*: Berggren.

*B. inflatum* Philibert.

135. **B. pycnodermum** Limpricht.
Leaves not crowded, subdecurrent, reflexed at base, oblong-lanceolate long-acuminate; costa of uppermost leaves long-excurrent. Capsule suboblong dark brown, finally blackish; teeth brown-yellow; cilia appendiculate; lid deplanate mamillate; pedicel often long. Habit of *B. cirratum*.* — Wet sand by water in northern alps r. *Eur. Norway*; Kaurin.

5. Calophylloidea.

Leaves broad-ovate obtusate (obtuse or acute), often sublimbate, not reflexed, sometimes decurrent; cells large; costa not excurrent. Capsule suboval; cilia sometimes appendiculate; pedicel us. long, often 3 c. m. or more. — Swamps prin. in alps r. *Eur. Norway*; Eng.: Rogers. *Spetsbergen*: Berggren. *Amer. Greenl.*: Vanhoefken.

137. **B. acutum** Lindberg.
Leaves ovate-oblong acute more or less acuminate, often narrowly limbate and reflexed below, not decurrent; cells smaller than in the last; costa often short-excurrent. Capsule us. suboblong and long-pedicellate; cilia smooth. Stem not high. — Sandy borders of rivers r. *Eur. Finland*: Brotherus. (Asia, Sibiria: Arnell).

*B. Axel-Blyttii* Kaurin.

6. Penduliformia.

A. Leaves gen. not distinctly (or very narrowly) limbate; costa gen. not excurrent. Us. synoecious.

a. Spores large, about 0,04 m. m.

138. **B. brachyneuron** Kindb. Ottawa Naturalist V.
Leaves small broad-ovate short-acuminate reflexed narrowly
limbate, nearly crowded, sometimes short-decurrent; colom glo-
merate; upper cells subrhombic; costa often abbreviate. Cap-
sule thick round-oval or subobovate, somewhat long-necked and
constricted below mouth, reddish brown; teeth broader than in
B. pendulum; segments also orange, adhering; pedicel about 1
c. m. long, scarcely emerging above tufts. Fruiting stem dis-
inct and tomentose; shoots short. — Arctic district r. Amer.
Alaska: J. M. Macoun.

b. Spores somewhat small, about 0,02 m. m. Leaves not
decurrent.

139. B. lacustre Blandow. — »B. Barnesi Wood«: Limpricht.
Leaves ovate-oblong short-acuminate acute not or indistinctly
limbate, broadly recurved nearly all around, entire; costa gen.
subpercurrent. Capsule small suboval short-necked; lid small;
teeth pale yellow; pedicel long. Stems very short, loosely tufted;
shoots filiform. — Wet sand often near lakes, prin. balt. maps.
England: Rogers.

140. B. Knowltoni Barnes bot. gazette 1889.
Leaves ovate to obovate-lanceolate short-acuminate, us. in-
distinctly limbate, slightly revolute or plane, entire or nearly
so; costa not or shortly excurrent. Capsule oblong-piriform;
cilia rudimentary; lid small; pedicel about 1 c. m. long. Tufts
dense and tomentose, 1—2 c. m. high. Spores about 0,025
m. m. — Crevices in rocks r. Amer. Can. N. Foundl.«: Barnes.

141. B. flexuosum Austin.
Diffs from B. lacustre in leaves pale red not reflexed; cap-
sule narrower; lid large; tufts dense less low. Dioecious. —

B. Leaves broadly limbate, loosely disposed and decurrent
(at least the lower). Us. monoecious.

142. B. Moëi Schimper.
Leaves very narrow, obovate-lanceolate long-acuminate entire:
upper reflexed; apical cells suboblong; costa long-excurrent.
Capsule thick suboval not constricted; lid small flat mamillate;
teeth orange. Tufts sparingly radiculose, 2 c. m. high. —
Northern alps r. Eur. Norway; N. G. Moë«: Schimper and
Limpricht.

143. B. paludicola Schimper.
Lower leaves small, subovate short-acuminate acute, loosely
disposed: upper somewhat large, crowded, gen. broad-oval, re-
flexed all around, yellow-limbate; costa short-excurrent. Cap-
sule, subpiriform dark fuscous; lid mamillate somewhat large; teeth yellow, orange below; pedicel 3 c. m. long. Tufts dense 2–3 c. m. high. Spores about 0,03 m. m. Sometimes synoecious. — Swamps in alps r. Eur. Norway near Kongswood: Lorentz; Schimp. and Limpricht.

C. Leaves gen. narrowly limbate not decurrent us. crowded; costa excurrent. Us. synoecious.

a. Leaves not (or only at base) reflexed. Fruiting stem nearly indistinct with very short shoots. Capsule thick, smaller than in B. pendulum. Spores large. Comal shoot-leaves gen. not glomerate.

144. **Barchangelicum** Bryol. eur. — »B. Holmgrenii Lindb.«: Kaurin.


Leaves broad-ovate short-acuminate; middle cells rhomboidal, apical scarcely narrower; costa not long-excurrent. Capsule subpiriform; peristome orange; segments adhering; lid apiculate not deplanate; pedicel not long. — Alp. rocks r. Eur. Norway, Dovrefjeld!

b. Leaves reflexed, us. all around.

aa. Peristomial teeth pale; segments yellow. Capsule subglobose very small. Spores somewhat small, about 0,02 m. m.

146. **B.globosum** Lindberg.

Leaves oval acuminate acute, reflexed to above middle, entire; costa of uppermost leaves short-excurrent to a deflexed point. Capsule pale reddish-yellow; lid small; pedicel short. Stems very short; tufts dense about 0,5 c. m. high. — Arctic district r. Eur. »Spetsbergen«: Lindberg. (Asia, Sibiria: Sahlberg, com. Brotherus.)

bb. Peristomial teeth brown-yellow; segments yellow. Capsule suboval. Spores about 0,03 m. m.

147. **B.Graeffii** Schlipheracke.

Upper leaves gen. ovate-oblong, reflexed all around, entire; costa more or less excurrent. Capsule brownish not constricted; lid small; pedicel about 1,5 c. m. long. Stem very short with short shoots. Tufts about 0,8 c. m. high or lower, sometimes loose. — Schistose rocks in alps r. Eur. Norway: Hagen.
148. **B. Lorentzii** Schimper.


149. **B. Kaurinianum** Warnstorf.


150. **B. pendulum** Hornschuch. — Ptycholeptum Hsch.; Bryum Schimper.


151. **B. compactum** Hornschuch.


152. **B. Roellii** Philibert.


153. **B. angustirete** Kindb. bull. Torr. club XVI.

*Differs from B. pendulum:* Stem-leaves more distinctly limbate and strongly recurved. Capsule narrowly oblong; lid not apiculate; pedicel long; spores smaller. Shoots longer, not thicker
above; their leaves longer acuminate with narrower cells. —
*Amer.* r. Can.: Macoun.

154. *B. alaskanum* Kindb. n. sp.

Leaves broad-ovate apiculate or very short-acuminate, reflexed all around; cells wide, the upper subrhombic; costa short-excurrent. Capsule short but not thick, subclavate-piriform; lid convex mamillate; pedicel not long. Fruiting stem tomentose with shorter and longer shoots. Uppermost leaves of stem and shorter shoots glomerate; those of longer shoots not glomerate. — Arctic district r. *Amer.* Alaska: J. M. Macoun.

D. Leaves gen. broadly limbat and not (or only on shoots) decurrent, us. crowded; costa excurrent. Us. synoecious.

a. Spores very large, about 0.04—0.05 m. m.


Leaves ovate-oblong acuminatae, not reflexed above, smaller than in *B. inclinatum*: the uppermost not distinctly glomerate; upper cells narrow; costa short-excurrent. Capsule thick sub-oval short-necked; lid convex apiculate; teeth yellow; pedicel us. 5—10 c. m. long. Stems very short or nearly indistinct, not densely cohering; shoots short. — Swamps and turf-moors also below alps r. *Eur.* Norway! Germany: Holler, com. Warnstorf.

*B. labradorense* Philibert.


156. *B. murmanicum* Brotherus.

Leaves ovate acuminate, reflexed all around: the uppermost glomerate; upper cells suboblong; costa short-excurrent to an often deflexed point. Capsule broad-oval somewhat long-necked; lid flat apiculate; teeth pale; pedicel 3 c. m. long. Stem about 1 c. m. high. Tufts dense blackish about 2.5 c. m. high; shoots glossy green. — Wet sand by rivers r. *Eur.* Russian Lapland: Brotherus.

b. Spores less large, about 0.03 m. m. or smaller. Upper leaves reflexed all around.

aa. Upper leaves obtusate or short-acuminate. Capsule sub-globose scarcely longer than neck.


Upper leaves ovate-oblong acute; costa somewhat long-excurrent (in lower leaves not excurrent). Capsule pale brown not constricted below mouth; lid small apiculate or rostellate; teeth
orange; pedicel about 1 c. m. long. Tufts dense greenish about 1,5 c. m. high. — On shores of Atlantic sea r. Eur. Norway: I. Hagen.

**bb.** Upper leaves us. long-acuminate. Capsule gen. sub-oblong, longer than neck.

158. **B. inclinatum** Swartz. — Pohlia Sw.; Bryum Br. eur.

159. **B. lapponicum** Kaurin.
Differs from the last: Leaves broader, subovate not long-acuminate; pedicel of capsule 5—6 c. m. long; lid mamillate; stem distinct; tufts more dense, about 2 c. m. high; spores somewhat larger. — Eur. Norway near Tromsø: Kaurin, com. N. Bryhn.

* **B. subinclinatum** Kindb. n. subsp.
Spores smaller about 0,02 m. m. Endostome adhering to teeth; lid apiculate. Tufts very dense and tomentose. — Amer. Can. northern Labrador: Macoun 1896.

160. **B. Hagenii** Limpricht.

* **B. curvatum** Kaurin et Arneil.

161. **B. Froudei** Kindb. in Ottawa Naturalist V.
Leaves ovate-lanceolate, twisted when dry: the uppermost not glomerate; upper cells very long and narrow; costa long-excurrent. Capsule oblong-ovate; lid flat mamillate or subapiculate; pedicel about 3 c. m., not much longer than tufts. Spores scarcely 0,03 m. m. Stem distinct and tomentose with longish shoots. — Amer. r. Alaska: J. M. Macoun. Can.: J. Macoun.

7. Rutilantiformia.

162. **B. rutilans** Bridel. — B. oeneum Blytt.
Leaves ovate-lanceolate long-acuminate, broadly limbate and reflexed, gen. entire, twisted when dry, finally copper-red; costa

163. **B. campylocarpum** Limpricht. — **B. angustifolium** Kaurin (not Bridel)?

Differs from the last: Leaves denticulate above, not or indistinctly reflexed, less twisted when dry; costa subpercurrent. Capsule sometimes shorter necked; lid more deplanate. Stem lower, less radiculose. Monoecious. — Wet rocks by rivulets in northern alps r. Eur. Norway!

V. **Webera** Hedwig; Schimper.

1. **Crudiformia.**

A. Leaves serrate not reflexed us. crowded; costa not percurrent. Capsule subclavate; cilia us. long.


164. **B. crudum** L. — Mnium L.; Bryum Hudson.


b. Leaves long not opal-glossy. Capsule gen. suberect.


166. **B. longicollum** Swartz. — Webera Hedwig.

Diffs from the last: Leaves loosely disposed more patent. Capsule thicker more inclined. Tufts looser. Paroecious or dioecious. — Amer. r. Can.: Macoun.


B. Upper leaves faintly serrate reflexed nearly all around; costa subpercurrent or short-excurrent. Capsule suboblong; cilia rudimentary.


2. Nutantiformia.

A. Sterile stems us. with bud-like propagula. Leaves loosely disposed, only the uppermost glomerate; cells somewhat dilated. Dioecious r. fruiting. Stems not or loosely tufted.


Capsule broad-oval dark brown-red; teeth brown-yellow; pedicel purplish. Leaves broader than in the last, more erect when dry. Bulbilli us. greenish. — Sand or clay. Eur. probably not r. Switzerl., Sweden! Norway! S. O. Lindberg and E. Nyman.

B. Stem without bulbili. Leaves crowded, at least the upper of fertile stems; cells narrow. Tufts us. dense.

a. Upper leaves serrate. Us. paroecious. Capsule with apiculate lid,
172. B. nutans Schreber. — Webera Hedwig.

* B. cuspidulatum Kindb. n. subsp.

* B. canaliculatum C. M. et Kindb. — Webera cat. Can. m.

* B. camptotrachelum Renaud et Cardot.

* B. Macounii Kindb. n. subsp.
All leaves, also on sterile stems and shoots, distinctly serrate, not glossy, finally red, densely crowded, appressed when dry. — Rocks r. Amer. Can. Vanc. isl.: J. Macoun.

b. Leaves nearly entire. Dioecious or polygamous with sub-discoid male flowers. Capsule with mamillate lid.

173. B. Schimperi C. Mueller.


3. Pulchelliformia.
A. Capsule strangulate; teeth brown-red; annulus none. Leaves crowded; cells wide, the upper subrhombic.

175. B. carneum L. — Webera Schimper; Mniobryum Limpricht.
Leaves broadly ovate-lanceolate or ovate-oblong short-acuminate not decurrent; costa red not percurrent. Capsule broad oval

B. Capsule not strangulate; teeth yellow; annulus us. present. Leaves more or less distant; cells narrow or not much dilated.


176. B. columbicum Kindb. — Webera cat. Can. m.
Leaves sublinear-lanceolate long-acuminate serrate reflexed; cells narrow; costa red subpercurrent. Capsule red or red-yellow broad-oval or subglobose; annulus broad; cilia in pairs. — Moist banks r. Amer. Can.: Macoun.

b. Leaves not distinctly decurrent us. green. Tufts us. loose.

aa. Capsule more or less distinctly annulate.

177. B. pulchellum Hedwig. — Webera Schimper, in part.

Differs from the last: Capsule suboval paler; neck us. longish. Leaves more distinctly serrate and distant; costa red, in comal leaves sometimes excurrent. Tufts less loose. — Earth also in alps r. Eur. Norway!

179. B. Lescurii Sullivant ic. musc. — Webera Lesq. et Jam.

bb. Capsule not annulate.

Capsule sometimes larger than in B. pulchellum. Differs also from it: Leaves erect distinctly reflexed and serrate; cells wider; costa finally red below. — Earth also in alps r. Eur. »Germany»: Limpricht. Amer. Can.: Drummond n. 261, com. Macoun.


A. Leaves very distant, us. broadly long-decurrent; cells gen. very wide.
Leaves gen. ovate or suboblong obtusate, us. entire and large.
Capsule suboval. Tufts loose finally red. Dioecious. — Wet
siliceous ground princ. in alps. Eur. less r. Norway! Austria:
com. Cardot.
* B. grande Kindb. n. subsp. — Webera Ludwigii var. latifolia
Schimp.
Leaves still larger and broader, round-ovate gen. quite entire
and green, less distinctly decurrent; cells rhombic wider. Stem
182. B. Bigelowii Sullivant. — Webera Ludwigii var. micro-
phylla Kindb. cat. Canad. m.
Differs from W. Ludwigii: Leaves small; cells narrower; costa
B. Leaves crowded or not much distant, not or shortly de-
current; cells rhomboidal not much wide.
a. Paroecious. Leaves obtusate gen. obtuse, at least the
lower and the perichetal.
183. B. eucullatum Schwägerichen. — Webera Schimper.
Leaves oval-ovate not decurrent. Capsule oval-oblong yellowish
brown; lid mamillate; cilia smooth; endostomial membrane
very low. Tufts dense. — Moist alp. places. Eur. less r. Nor-
184. B. eucullatiforme Kindb. n. sp.
Differs from the last: Leaves subdecurrent smaller, appressed
when dry: upper gen. acute. Capsule smaller and more con-
stricted; cilia sometimes appendiculate. — Arctic distr. r. Amer.
Alaska: J. M. Macoun.
b. Dioecious. Leaves acute, at least the perichetal.
aa. Leaves crowded not decurrent. Endostomial membrane
very low; cilia short rudimentary; lid mamillate.
185. B. polymorphoides Kindb. — Webera cat. Canad. m.
Leaves ovate-oblong acute or subobtuse; costa not excurrent.
in the longer and narrower perichetal sometimes excurrent.
Capsule oblong yellowish brown; teeth pale; pedicel about 2
c. m. long. Tufts dense 4—5 c. m. high rufescent below. —
Higher alp. region r. Amer. Can. Brit. Col. 2250 metr. a. sea:
J. M. Macoun.
bb. Leaves more or less distant and decurrent. Endostosti-
mial membrane elevate; cilia long; lid conic.

*B. microdenticulatum* Kindb. — Webera microdenticulata C. M. et Kindb. cat. Can. m.

*B. gracile* Schleicher. — Webera Notaris.

*B. subcucullatum* C. M. et Kindb. — Webera cat. Can. m.

*B. Cardoti* Renaud. — Webera Ren.; Bryum Kindb.

*B. filum* Schimper.

*B. carinatum* Boulay. — »Webera cucullata var.«: Husnot.

*B. Payoti* Schimper. — »Bryum Blindii var.«: Husnot.

Differs from *B. commutatum*: Leaves distinctly serrate longer-decurrent, more glossy and finally reddish, patent when dry;

188. **B. canadense** Kindb. — Webera micro-apiculata C. M. et Kindb. cat. Can. m.

Leaves small suboblong or oblong-lanceolate apiculate or narrowed to a short gen. entire acumen, finally red, appressed when dry; the uppermost denticulate faintly reflexed; cells very narrow; costa faint, vanishing far below apex. Tufts dense not high, green above, reddish below. Capsules unknown. — Rocks r. Amer. Can. Brit. Col.: Macoun.

189. **B. norvegicum** Kindb. — B. micro-commutatum Kindb. botan. notiser 1890.

Leaves small oval-ovate obtuse or short-acuminate faintly denticulate nearly crowded and gen. not decurrent; cells not wide; costa not excurrent. Tufts low green. Differs from **B. commutatum**: Capsule subglobose or broad-piriform purplish or finally dark brown-red, often erect; neck very short; teeth brown-yellow; pedicel us. shortish. — In alp. region r. Eur. Norway Dovrefjeld and Tronfjeld!

5. Albicantiformia.

190. **B. albicans** Wahlenberg. — Mniobryum Linpr.


VI. Epipetricium Lindb.


Leaves pale green; the larger oval or obvate abruptly short-acuminate acute decurrent; inner cells wide rhomboidal. Smaller leaves oblong. Capsule small obvate rufescent; neck short; lid conic; annulus very broad; pedicel not long. Stems short not tufted. Dioecious. Habit of **B. carneum**. — Wet earth r.

VII. Pohlia Hedwig, in part.


192. **B. elongatum** Hedwig. — Pohlia H.; Bryum Dickson.

Upper leaves sharply acuminate more or less denticulate. Capsule not pendent, with us. curved longer neck; lid r. rostellate; pedicel long. Us. paroecious. — Earth and rocks princ. below alp. regions. Eur. not r. Norway! Sweden: E. Adlerz.


B. Capsule not large, suboblong or subobovate. Upper leaves faintly reflexed, broadly ovate-lanceolate. Tufts dense.


Capsule gen. suboblong and pendent; neck shorter, r. curved; lid not rostellate; pedicel us. short. Leaves crowded us. pressed when dry; cells very narrow. Stem us. naked below or beset with very small leaves. Tufts low. Us. paroecious. — Earth and rocks in alp. regions. Eur. not r. Norway, Switzerland! France: Husnot. Amer. r. Greenl.: Berggren; Vanhoeffen.

* **B. brachycarpum** Hoppe et Hornschuch. — Pohlia Hop. et Hsch.; Bryum Kindb.; B. nudicaule Lesquereux; Sullivant icon. m.; Webera microcaulon C. M. et Kindb. cat. Can. m.


* **B. pseud-acuminatum** Kindb. n. subsp.

Capsule larger, suboblong and gen. not pendent. Stem and pedicel longer. Us. monoecious or dioecious. — Alp. rocks r. Eur. Norway!

194. **B. subpolymorphum** Kindb. n. sp.

Capsule oblong pendent, smaller than in **B. polymorphum**;
— 391 —


156. Leptotheca Schwægrichen.

1.L.Wrightii Sullivant.


Fam. 33. Buxbaumiaceae.

157. Buxbaumia Haller; L.

1.Baphylla L.


2.B.indusiata Bridel.


158. Diphyscium Ehrhart; Mohr.


Leaves small linear-lingulate, curled when dry; upper cells rotundate, lower oval-oblong, outer basal linear pellucid; costa not percurrent. Perichetal leaves very large not chlorophylllose, from ovate-oblong base long-acuminate ciliate near apex; costa excurrent to a long rough hairpoint. Capsule large ovoid small-mouthed often curved; endostome white. Dioecious. — Earth and rocks. Eur. not r. Switzerland! Amer. r. Can.: Macoun.

Fam. 34. Andreaeeae.

159. Andreaea Ehrhart.

A. Leaves nerveless us. appressed when dry.

1. Petrophilaæ. Leaves more or less papillose. Us. monoecious.
B. Leaves costate, not appressed when dry, often falcate.
2. *Nivales*. Leaves papillose, crisped or flexuous when dry; the perichaetial costate. Dioecious, r. fruiting.

1. Petrophilae.
A. Leaves broader above base, somewhat large; perichaetial obtusate. Stem often longish.
  a. Leaves slightly crenulate at base; cells small.
  b. Leaves entire; cells somewhat large.
  2. *A. Hartmani* Schimper.
* A. Thedenii* Schimper.
    Leaves less large and more distinctly acuminate, crowded, faintly papillose, often appressed. Tufts blackish brown; stem erect not much high. — Wet rocks in norther alps r. *Eur*. Norway!
B. Leaves broader near base, gen. small and appressed when dry; perichaetial sometimes acuminate. Tufts loose; stem erect.
*A.alpestris* Thedanius.

*A.papillosa* Lindberg.
Leaves very papillose often nearly subulate-acuminate; cells somewhat large. Perichetial leaves acute short-acuminate. Tufts often high and blackish. — Princ. in arctic distr. r. *Eur.* Norway! Spetsbergen: Berggren. *Amer.* *Greenl.*: Lange;

* A.subsparsifolia* Kindb. n. subsp.
Leaves gen. long-acuminate: perichetial acute acuminate; cells not large. Tufts brown somewhat high. — *Eur.* r. Norway on rocks near Atlantic sea in Oerkedal!

* A.tenella* Kindb. n. subsp.
Leaves narrow long-acuminate often crenulate above, very small; cells small as in *A. alpestris*. Stem capillary. Tufts low blackish. — Alp. region r. *Eur.* Spain hospice de Vénasque in Pyren. mts 1800 metr. a. seal

* A.sparsifolia* Zetterstedt.

* A.sublabavis* Kindb. note on Can. bryol. 1893 (as var.).

5.*A.parvifolia* C. Mueller in Flora 1887.
Plant very small. Leaves minute from oval biventricose base narrowed to a suboblong round-obtuse acumen, very papillose: perichetial subobtusate or acuminate. Capsule minute; pedicel very short. Dioecious. — Arctic distr. r. *Amer.* Alaska!:

C. M.

2. Nivales.

A. Leaves papillose on whole lamina, not densely crowded, more or less crisped. Tufts loose and high when sterile.

6.*A.nivalis* Hooker.
Leaves ovate-lanceolate gradually narrowed to the subulate acumen, papillose princi. at borders; costa not or slightly excurrent. Tufts us. blackish or black-red when dry. — Wet sand on alp. often inundated rocks r. *Eur.* Norway! Sweden: E. Adlerz. France: Zetterstedt. Austria: Husnot m. Gall.
Leaves from short ovate or broadly ovate-lanceolate base abruptly narrowed to the sublinear acumen, papillose princ. on upper part of costa, which is purple red gen. long-excurrent but not filling whole acumen below. Tufts brown or brown-red when dry. Capsules unknown. — On inclined faces of rocks by rivulets in higher alp. region r. Amer. Can. Brit. Col. 2250 metr. a. sea: J. Macoun. U. S. Oregon: Roell.

B. Leaves smooth on lamina, papillose on the long-excurrent costa, crowded, slightly crisped. Tufts low dense.

8. A. Blyttii Schimper.

3. Rupestres.
A. Leaves with not or slightly excurrent costa; the inner perichetal with percurrent costa.


* A. falcata Schimper.

B. Leaves gen. with long-excurrent costa; inner perichetal nerveless.

a. Leaves short ovate or ovate-oblong crowded often suberect when dry: perichetal us. smooth.

10. A. crassinervis Bruch.

11. A. obtusifolia Berggren in sched.
Leaves ovate-oblong; costa faint applanate excurrent not filling whole acumen below. Nearly all perichetal leaves nerveless: inner obtusate or short-acuminate. Tufts loose blackish.

b. Leaves gen. ovate-lanceolate patent also when dry.

aa. Leaves somewhat distant; inner perichetial very papillose.

12. **A. Huntii** Limpricht.


bb. Leaves crowded; the perichetial smooth.

13. **A. frigida** Huebener.


14. **A. angustata** Lindberg.

Leaves narrowly long-acuminate subacute; perichetial nerveless. Tufts loose blackish very low. — In alp. region r. Eur. »Austria 1600 metr. a. sea: Breidler»: Limpricht.

**Fam. 35. Bruchiaceae.**

160. **Bruchia** Schwægrichen.

A. Calyptra hispid. Capsule with nearly indistinct neck.

I. **Trachymitra**. Capsule wholly immersed; pedicel very short. Upper leaves long-acuminate subovate-lanceolate; costa percurrent. Spores nearly smooth about 0,03 m. m. Monoecious.

- B. Calyptra glabrous. Capsule gen. distinctly necked.

II. **Pseudo-Trematodon**. Capsule with narrow often defluent neck; pedicel gen. long-exserted above the upper leaves. Spores about 0,02 m. m., more or less papillose. Us. monoeccious.

III. **Eu-Bruchia**. Capsule with gen. thick (not defluent) and not longer neck; pedicel short-exserted or immersed. Paroecious or (B. Drummondii) monoeccious, r. dioecious.

I. **Trachymitra** Kindb.

1. **B. Ravenelli** Wilson; Sullivant icon. musc. Upper leaves nearly gradually acuminate; costa nearly filling upper part of the serrulate acumen. — Amer. r. »U. S.: Sullivant.

2. **B. Caroline** Austin; Britton in contrib. from Columbia coll. Upper leaves gen. from subovate base abruptly acuminate; costa broadly bordered by lamina of the nearly entire acumen. — Amer. r. »U. S.: Austin»: Britton.
II. Pseudo-Trematodon Kindb.

A. Upper leaves slightly sinuolate above; costa not excurrent.
3. B. Bolenderi Lesquereux; Sullivant icon. m.
Upper leaves ovate-lanceolate nearly gradually narrowed. Capsule shorter than the not defluent neck; pedicel longer. — Amer. r. »U. S.»: Sullivant.

B. Upper leaves us. entire r. denticulate; costa excurrent.
Upper leaves ovate-lanceolate nearly gradually narrowed; costa filling upper half of acumen. Capsule shorter than the defluent neck; pedicel long-exserted. — Amer. r. »U. S.»: Eaton.

5. B. trobasiana Notaris.

Upper leaves ovate-oblong abruptly narrowed to a by costa filled acumen. Capsule not shorter than the defluent neck; pedicel long-exserted. — Eur. r. France: Boulay; Buchinger.

III. Eu-Bruchia.

A. Costa of leaves excurrent.
7. B. curviseta Lesquereux et James.
> Upper leaves subovate, denticulate above. Capsule wholly exserted, longer than the thick neck; pedicel curved or geniculate, not shorter. Spores papillose. Paroecious. — Amer. U. S.»: Lesq. et Jam.

Upper leaves entire from subovate base abruptly narrowed to the subulate by costa nearly wholly filled acumen. Capsule wholly immersed; pedicel short. Spores less papillose. Monoeious. — Amer. r. »U. S.»: Sullivant.

B. Costa of leaves not excurrent.
 a. Leaves short obtusate or short-acuminate.
9. B. brevifolia Sullivant icon. musc.
Upper leaves from longer, ovate-oblong base nearly gradually narrowed to the short acumen; costa percurrent. Capsule partly emergent; pedicel very short. Spores nearly smooth somewhat small. — Amer. r. »U. S.»: Sullivant.

10. B. fusca Britton l. c.
Upper leaves ovate or broad-ovate obtusate or very short-
acuminate, often obtuse; costa abbreviate or scarcely percurrent. Capsule exserted; pedicel nearly immersed. Spores as in the last. — **Amer. r. »U. S.»:** Mrs Britton.

11. **B. Hallii** Austin; Britton l. c.

Upper leaves subovate very short-acuminate acute; costa percurrent. Capsule wholly exserted; pedicel nearly emergent at apex. Spores large papillose. — **Amer. r. »U. S.»:** Mrs E. G. Britton.

b. Leaves long-acuminate. Spores somewhat large, us. very papillose.

12. **B. texana** Austin; Britton l. c. — **B. flexuosa** var. **nigricans** Sull. l. c.


* **B. Donnellii** Austin; Lesq. et Jam.

>Leaves sinulate above, sometimes faintly papillose. Pedicel often emergent. — **Amer. r. »U. S.»:** Lesq. et Jam.

* **B. Sullivantii** Austin; Lesq. et Jam. — **B. flexuosa** Sull. l. c. in part.

Capsule partly emergent. Spores larger, more papillose. — **Amer. r. »U. S.»:** Sullivant.

13. **B. flexuosa** Schwengrichen. — **Phascum** Schw.; **Bruchia** C. M.; **B. Beyrichiana** Sull. l. c.

Upper leaves from ovate-oblong base nearly gradually narrowed to the linear-subulate by the (not excurrent) costa nearly filled acumen. Capsule oval piriform without distinct neck, partly emergent; pedicel not shorter. — **Amer. r. »U. S.»:** Langlois, com. Cardot.

161. **Pleuridium** Bridel.

**A.** Monoecious with gemmiform male flowers.

a. Branches julaceous. Leaves obtuse or short-acuminate; upper cells small rhomboidal.

1. **P. Sullivantii** Austin. — »**P. nervosum**« Sull. icon. m., non Brid.

Leaves subovate crowded: upper with thick excurrent costa, perichetial abruptly acuminate much larger. Capsule broad-oval thick-pointed; pedicel nearly half as long. — **Amer. r. »U. S.»:** Sullivant.

b. Branches not julaceous. Leaves long-acuminate; the upper larger; cells rectangular.
2. *P. alternifolium* Dickson. — *Phascum* Dicks.; *Pleuridium* Rabenhorst.


Upper leaves gradually subulate nearly entire, shorter than in the last; costa excurrent. Capsule ovoid with oblique point. Tufts dark green. — *Amer.* r. U. S. Chicago: Roell.

B. Paroecious or synoecious.

a. Upper leaves not larger than the lower.


b. Upper leaves larger than the lower.


*P. anomalous* Kindb. in nuovo giorn. bot. ital. 1893 (as var.).

Capsule with distinct lid; pedicel arcuate emergent above leaves. — On sand at a stonewall, mixed with *P. subulatum* and *Ditrichum pallidum* (hybride form ?). *Eur.* *Switzerl.* near Lugano!

*P. astomoides* Limpricht.

>Hybride form ? Capsule without distinct lid, shorter than the straight not emergent pedicel. — Mixed with *P. subulatum* and *Ditrichum pallidum*. *Eur.* *Austria:* Breidler»: Limpricht.
7. P. Ravenelli Austin.

162. Archidium Bridel.

A. Monoecious with male flowers on separate branches.

1. A. ohioense Schimper; Sullivant icon. musc.
> Leaves distant patent sublinear-subulate serrulate above; the perichetal from ovate base abruptly acuminate; costa gen. not excurrent. - Clay soil r. Amer. Can.: Macoun.

2. A. Hallii Austin.

B. Synoecious or subparoecious (submonoecious).


> Synoecious. Leaves narrowly lanceolate-subulate; cells gen. rectangular; costa excurrent. - Amer. r. U. S.: Lesq. et Jam.

5. A. tenerrimum Mitten.

6. A. Ravenelli Austin.
> Synoecious. Lower leaves ovate, upper ovate-lanceolate or acute or obtuse entire; cells round-oval or rhomboidal; costa sometimes excurrent. - Amer. r. U. S.: Lesq. et Jam.

163. Ephemeron Hampe.

1. Ecostata. Leaves nerveless (r. faintly costate in upper half).


1. Ecostata.
pillose 0,05—0,07 m. m. — Eur. not r. Sweden: Hamnström. 
et Jam.
*E. præcox* Walther et Molendo. — E. intermedium Mitten. 
Leaves faintly costate in upper half. — Eur. r. »Engl.«: 
Braithwaite.
Leaves narrowly lanceolate long-acuminate. Spores nearly 
smooth smaller than in the last. — Eur. r. »Engl.«: Braithwaite. 
Amer. Can.: Macoun; Drummond n. 10.
B. Leaves nearly entire; upper cells narrow.
Leaves from subovate base abruptly narrowed to a long subu-
late acumen. Spores 0,04—0,05 m. m. — Eur. r. France: Philibert.
2. Costata.
A. Leaves from broader base gradually subulate.
a. Leaves nearly entire. Calyptra campanulate.
E. stenophyllum Schimper; Braithwaite.
Leaves with long-excurrent costa; cells somewhat narrow 
uniformly. Capsule sessile; columnella rudimentary. Spores 
0,06—0,08 m. m. — Eur. r. France: Camus; Philibert. Amer. 
»U. S.«: Lesq. et Jam.
b. Leaves serrulate nearly all around. Calyptra subcocl-
ulate split at one side.
5. *E. crassinerve* Schwägrichen.
Leaves with smooth not excurrent costa; cells rectangular 
nearly uniform. Capsule very short-pedicellate; columnella com-
plete. — Described to figures in icones muscorum by Sullivant; 
his own description not is agreeing. — Moist clay ground. 
Amer. »U. S. common«: Lesq. et Jam.
»Differ from the last in leaves narrower; costa excurrent 
into a long hyaline spinulose arista. — Amer. Same locality 
as the preceeding«: Lesq. et Jam.
B. Leaves from long base abruptly narrowed to a shorter 
often deflexed acumen, more or less serrate above middle.
7. *E. recurvifolium* Dickson. — Phascum Dicks.; Ephemerum 
Boulay; Ephemerella Schimper; E. pachycarpa C. M.
Leaves sublinear-lanceolate often somewhat long-acuminate,
sometimes falcate when moist; cells subrectangular or the upper shorter. Spores about 0.04 m. m. — Eur. r. France: Brebiisson.

Leaves suboblong short-acuminate; cells irregular; upper rhombic. Spores 0.05—0.07 m. m. — Eur. r. Austria: Breidler. Amer. r. U. S. common: Lesq. et Jum.

*E. Flotowii* Funck. — Phaseum Funck; Ephemerum Limpr.

9. **E. Ruthel** Schimper; Husnot m. Gall.
Leaves sublinear-lanceolate long-acuminate; cells nearly uniform. Spores about 0.05 m. m. — Eur. r. Germany: Schimper.

164. **Nanomitrium** Lindberg.

1. **N. tenerum** Bruch. — Phaseum Bruch; Nanomitrium Lindb.; Micromitrium megalosporum Austin; Sulliv. icon. m.; Ephemerum longifoliium Philibert.
Leaves narrowly ovate-lanceolate faintly serrulate nearly all around, suberect when moist. Capsule with hyaline walls and very short subacute point, sometimes transversely splitting when pressed. Spores faintly papillose about 0.03 m. m. — Eur. r. France: Thériot; Philibert. Amer. r. U. S.: Sullivant.

2. **N. Austin** Sullivant. — Ephemerum Sulliv.; Nanomitrium Ren. et Card.; Kindb. revue bryol. 1895; Micromitrium Austin; Sull. icon. musc.
Leaves longer-acuminate, more subulate, entire below middle, spreading or deflexed when moist; cells of capsule larger, not hyaline; spores smaller scarcely 0.03 m. m. nearly smooth. — Amer. r. U. S.: Sullivant.

Leaves narrowly ovate lanceolate long-acuminate subulate entire, suberect when moist. Capsule neither apiculate nor regularly splitting; cells as in the last. Spores about 0.02 m. m., distinctly papillose. — Amer. r. U. S.: Sullivant.

165. **Ephemeridium** Kindb. revue bryol. 1895.

1. **E. papillosum** Austin. — Ephemerum Aust.; Sullivant icon. musc.; Ephemeridium Kindb. l. c.
Leaves long narrowly ovate-lanceolate, tapering above middle to the subulate acumen, sharply serrate nearly all around, suberect when moist; cells rectangular nearly uniform; costa per-
current serrate at back. Capsule subapiculate; cells small; calyptra covering half capsule, lacinate. Spores about 0.02 m. m. nearly smooth. Confounded with *Ephemerum crassinerve.* — On thin soil and rocks r. *Amer. *U. S.*: Sulliv.

2. *E. hystrix* Lindberg. — *Ephemerum* Lindb. manip. muscor. 2 (Societ. pro flora et fauna fenn. 1874); Lesq. et Jam.; *Ephemeridium* Kindb. (Ephemerum spinulosum Bruch et Sch. ?).

leaves narrowly lanceolate-subulate, long-spinulose at margins, open-erect or subsecund, not much passing capsule; costa percurrent nearly filling the subulate point, spinulose at back. Capsule large very shortly conic-rostellate. Spores minutely tuberculate very large. — *Amer.* r. *U. S.: Louisiana*; Lindb. l. c.

Fam. 36. *Voitiacæ.*

166. *Voitia* Hornschuch.

1. *V. nivalis* Hornschuch.

Leaves distant long-acuminate not recurved; cells oblong-hexagonal or subrectangular; costa gen. long-excurrent, in uppermost leaves sometimes not excurrent. Capsule subovate-oblong; pedicel thick 2—3 c. m. long. Perichetal leaves obtuse; costa long-excurrent. Spores small. Tufts tomentose 3—8 c. m. high. — On animal dung in alp. region r. *Eur.*

Austria: Breidler.

2. *V. hyperborea* Greville et Arnott.

Diffs from the last: Leaves broad-ovate obtuse gen. apiculate; costa percurrent or short-excurrent. Shoot-leaves small obovate; costa vanishing; far below the short point. Capsule subglobose smaller, sometimes shorter rostrate; pedicel thin less long. Stems us. not tufted. Perichetal leaves not seen. — Arctic distr. r. *Eur.* Spetsbergen: R. Gyllencreutz.

Fam. 37. *Physcomitrellaceæ.*


1. *P. patens* Hedw. — Phasium H.; *Physcomitrella* B. S.


168. *Aphanorhegma* Sullivant.

1. *A. serratum* Hooker et Wilson. — Schistidium H. W.; Aphanorhegma Sull. icon. m.

Leaves linear-lanceolate gen. with long subulate acumen; costa
cells small; caryomele, crassinervæ.


Calyptora as the last. Capsule oval with short conic point, pedicel not much shorter. Leaves as in Physcomitrella. — Eur. r. »Germany«: Limpricht.

Fam. 38. Phascaceaæ.

169. Phascum L.

A. Leaves close to an head-like bud, us. smooth and serrulate.

I. Acaulon. Capsule immersed globose not or indistinctly mamillate; calyptora very short mitriform. Leaves us. serrulate at the mostly recurved borders; costa r. long-excurrent. Monoecious with distinct male flowers. Plants minute.

B. Leaves not densely close, us. papillose and entire (or faintly sinuolate).

a. Capsule not rostrate.

II. Aschisma. Capsule immersed subglobose apiculate; calyptora broad short submittiriform, often cleft at one side. Leaves papillose involute; costa subpercurrent. Monoecious with distinct male flowers. Plants minute.

III. Eu-Phascum. Capsule often exserted, oval-globose apiculate or r. mamillate; calyptora us. broad subcucullate or r. mitriform. Leaves us. papillose often reflexed; costa excurrent. Paroecious. Stem often distinct.

b. Capsule obliquely rostrate.

IV. Mildeella. Capsule sometimes exserted, suboval or r. globose; calyptora narrow cucullate. Leaves mostly papillose; costa gen. long-excurrent. Monoecious with distinct male flowers, or dioecious. Stem distinct.

I. Acaulon C. Mueller.

A. Leaves smooth; costa complete.

a. Leaves concave; costa subpercurrent.

1. Phaciumticum Schreber. — Acaulon C. M.; Sphærangium Schimper.

Upper leaves subovate acute or short-acuminate; borders recurved (sinuolate or serrulate) above; costa short-excurrent or percurrent. Inner perichetal leaves of same length, not wholly convolute, us. serrulate and much longer than the short-pedi-

* Ph. minus (Hooker et Taylor, as variety) Jäger. — Ph. muticum var. minus H. T.; Acaulon Jäger; Phascum Kindb.

'Smaller in all parts. Perichetial leaves entire scarcely reaching above capsule. — Eur. r. »France and Engl.»: Limpricht.

* Ph. rufescens Jäger. — Acaulon Jäger; Phascum Kindb.; Sphœrangium Lesq. et Jam.

»Leaves mostly not revolute. Pedicel of capsule sometimes curved. — Amer. U. S. very common in eastern and central states»: Lesq. et Jam.

2. Ph. mediterraneum Limpricht. — Acaulon Limpr.; Braithwaite; Phascum Kindb.; Acaulon Holtii Lindb. in litt.

Leaves smaller and narrower than in Ph. muticum, entire, gen. not recurved; cells smaller. Perichetial leaves unequal in length; the upper one much longer, wholly convolute and nearly entire. Capsule mamillate; pedicel indistinct. — Eur. r. England: G. A. Holt.

b. Leaves carinate; costa excurrent.

3. Ph. triquetrum Spruce. — Acaulon C. M.; Sphœrangium Schimper.


* Ph. piligerum Notaris. — Acaulon Limpr.

Leaves with long-excurrent costa. — Eur. »Italy»: Notaris.

B. Leaves papillose on both sides; costa not evolute in lower part, long-excurrent.


Upper leaves concave, serrulate and recurved above, subovate with narrow subulate patent or deflexed point. Perichetial leaves subobovate not convolute. Capsule mamillate; pedicel curved. — Amer. »U. S. r.»: Sull.

V. Aschiisma Lindberg.

5. Ph. carnolicum Weber et Mohr.

Upper leaves concave oblong-lanceolate subobtuse, not close when moist; upper cells green round-quadrate, lower hyaline short-rectangular. Capsule subglobose; pedicel very short. Plants
minute cespitulose. — On sand and earth r. Eur. »Mediterr. 
distr.»:Husnot. Amer. »U. S.»: Lesq. et Jam.
III. Eu-Phacum.
A. Capsule with distinct lid; calyptra very papillose.
6.Ph.rectum Withering. — Pottia Mitten; Braithwaite.
Leaves entire papillose suboblong or subobovate. Capsule 
ovo-globose exerted; pedicel straight; calyptra cucullate. Stem 
Italy: Arcangeli.
B. Lid not distinct. Calyptra smooth or faintly rough.
A. Stem and pedicel indistinct. Plant subgemmiform.
Upper leaves papillose us. oval-ovate acuminate gen., entire, 
erect or patulous; their point reflexed when dry. Capsule sub-
globose immersed; calyptra short us. mitriform. — Eur. r. 
b. Stem distinct often divided. Pedicel distinct.
8.Ph.acaulon L. 1753. — Ph. cuspidatum Schreber 1770.
Upper leaves entire erect oblong-lanceolate often nearly smooth. 
Capsule oval-globose not or scarcely exerted above perichetal 
leaves; pedicel sometimes curved. Calyptra gen. broad sub-
cucullate, r. short mitriform. — Eur. common in plains on 
P.piliferum Schreber.
Leaves narrower, piliferous by costa; upper cells smaller more 
9.Ph.curvicollum Ehrhart.
Diffs from Ph. acaulon: Upper leaves longer acuminate 
slightly sinuate near apex. Capsule wholly exerted; pedicel 
curved longer; calyptra narrow cucullate. — Eur. r. Sweden: 
IV. Mildeella Limpricht.
Upper leaves oval-lanceolate or r. acuminate, entire; costa 
us. long-excurrent. Capsule suboval; lid distinct with subulate 
beak; pedicel red. Stem 2—10 m. m. high. — Peristome 
rudimentary. Limpricht. — Eur. not r. Germany: Ahnfeldt; 
Roell. Austria: Schmidt. Amer. »U. S.»: Lesq. et Jam
11.Ph.subexsertum Hooker; C. M. syn.
Diffs from the last: Upper leaves crenulate-papillose above, 
sparingly chlorophylllose. Capsule globose; lid not distinct; beak 
thick; pedicel reddish yellow. Stem 5—8 m. m. high. — 
Glossary.

Alar (cells) special group at basal angles.
Alate (stem) bordered by leaf-substance.
Angular (cells) those of basal angles.
Apiculate with short point.
Apophysis basal enlargement of capsule.
Appendiculate with small spurs.
Areolation tissue of cells.
Arista awn.
Attenuate tapering.
Aureoled with ear-like angles.
Barren sterile.
Beak tip of lid (of capsule).
Bifarious placed on two sides.
Bifid cleft to middle.
Cancellate latticed.
Cernuous drooping.
Cespitose forming matted tufts.
Cilia hair-like appendages of inner peristome.
Circinulate rolled into a circle.
Comal (leaves) the uppermost.
Cochleariform concave as a spoon.
Complanate flattened.
Complicate folded together.
Connate united.
Costa rib of a leaf.
Cribrrose sieve-like.
Crisped strongly curled.
Cuneulate (calyptra) cleft at one side; (leaf) involute at apex.
Cultriform like a blade of a knife.
Cuspidate tapering to an acute point.
Decurrent (leaf) prolonged downward upon the stem.
Deflexed bent downward.
Defluent running downward.
Deeperciliate without lid.
Dimorphous of two forms.
Distichous in two opposite rows.
Emarginate notched at summit.
Entire without incisions.
Eradiculose rootless (without rhizoides).
Exannulate without annulus.
Excurrent ending beyond apex.
Fasciculate collected in small bundles.
Fenestrate with dilated apertures.
Filliform thread-like.
Fimbriate fringed.
Flagellate like a thong of a whip.
Flexuous bending inward and outward.
Fusiform spindle-shaped.
Gemmiform bud-like.
Glabrous hairless.
Habit general aspect.
Heteromorphous of different forms.
Homomorphous of like form.
Hyaline clear as glass.
Imbricate disposed like tiles.
Immarginate without special border.
Immersed not emergent.
Julaceous like a roller (by appressed leaves).
Lamellæ small thin narrow plates.
Lamina part of leaf (above a sheath).
Lateral placed at the side.
Limbate with a list (border).
Lingulate tongue-shaped.
Mamilla small nipple on lid or at apex of a leaf-cell.
Muticus without hairpoint.
Nodose nobbed.
Oblong 3 times as long as broad.
Obsolete indistinct.
Obtusate not acuminate.
Oval twice as long as broad and broader near middle.
Ovate egg-shaped.
Papilla small rounded prominence.
Paraphylla leaf-like appendages.
Pedicel stalk of capsule.
Percurrent reaching to apex.
Pinnae branching on two sides.
Plicate folded lengthwise.
Pulvinate cushioned.
Pliciform pear-shaped.
Ramose branching.
Recurved, revolute, reflexed bent back on the border.
Rimose with narrow apertures.
Rostellate (lid) with short beak.
Rostrate with long beak.
Rugose wrinkled.
Seesaw turned to one side.
Serrate with teeth as a saw.
Serrulate with smaller teeth.
Setaceous bristle-like.
Sinuolate not wholly entire.
Sinuous crenulate at walls.
Squamuliform like a scale.
Strangulate strongly constricted
below mouth.
Striate with fine furrows.
Strumose with a swelling below.
Sub-; nearly (subovate nearly ovate).
Subulate awl-shaped.

Synonyms of pleurocarpous genera or species.

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Salicate grooved.
Terminal placed at top.
Tomentose with soft matted hairs.
Truncate transversely cut above.
Tumid, turgid swollen.
Umbraculiform as an umbrella.
Wing: border of leaf-base, prolonged on stem; (in Polytrichaceae)
characteristic part of lamina; (in Fissidentaceae) stipular appendage.
Index of families.

A. Pleurocarpous.


B. Acrocarpous.

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