THE ANNALS
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MAGAZINE OF NATURAL HISTORY,
INCLUDING
ZOOLOGY, BOTANY, AND GEOLOGY.

(Being a continuation of the 'Annals' combined with Loudon and Charlesworth’s ‘Magazine of Natural History.’)

CONDUCTED BY

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1851.
patent. Joints about twice as long as broad, but the lower ones frequently shorter. Capsules orbicular, numerous, lateral, arising from all parts of the plant and usually on short stalks.

*Chantransia compacta* differs from *C. chalybea* in its compact, firm habit, more crowded branches, shorter joints and more scattered capsules.

I am unacquainted with *C. violacea*, Kütz., and am consequently unable to decide with certainty that this plant is not a variety of that species; but its difference in colour has induced me to propose it as a distinct species.

Kützing in his 'Species Algarum' mentions two other British species: as I am unacquainted with them, I subjoin his descriptions:


In Scotia legit cl. Kützing.


In fluviis et rivulis montanis Germaniae et Scotiae ad Lemaniam fluviatilém.

XXV.—A List of all the Mosses and Hepaticæ hitherto observed in Sussex. By WILLIAM MITTEN, A.L.S.

Besides the species not before described as British, this list will be found to contain localities for others of rare occurrence or but little known, and will show the comparative rarity of the more common species.

With very few exceptions all the species enumerated have been gathered by the author himself; most of the previously known rarer species having been shown to him in their respective localities by Mr. Borrer, with whom he has examined many of the most productive parts of the county, and to access to whose collections he attributes chiefly whatever small amount of critical knowledge he may possess of these beautiful plants.

Tribe I. ANDREWACEAE.

Genus 1. Andreaea, Ehrh.

*A. rupestris*, Hedw.

"On the High Rocks;" Forster, Fl. Tonbridgensis.

Nothing further is known respecting this moss, but it has been supposed that a small blackened state of *Jungermannia emarginata*, found on some of the High Rocks, might have been mistaken for it by Forster.

**Tribe II. Dicranaceae.**

**Genus 1. Archidium, Brid.**

1. *A. phascoides*, Brid.
   *Phaseum alternifolium*, Eng. Fl., not of Dickson.
   Not common. In wet places on Henfield Common, on Tilgate Forest, and by roadsides near Hurstpierpoint.

**Genus 2. Angstromia, B. et S.**

2. *A. subulata* (Linn.), Mitten.
   *Phaseum subulatum*, Linn. Eng. Fl.
   Frequent on banks by roadsides; found more rarely on the Downs.

3. *A. alternifolia* (Linn.), Mitten.
   *Phaseum alternifolium*, Dicks.
   Far less common than the preceding species, and almost confined to clayey soils; it occurs at Hurstpierpoint in several places, at Henfield, and on Tilgate Forest.

   On this species Bridel founded his genus *Pleuridium*, "ob thecam lateralem aut talem visam," but he seems to have been not well satisfied about it, for he takes care to follow his assertions on that point with "aut talem visam," or "aut talis videtur." The authors of the 'Bryologia Europaea' in their last review of these species have adopted Bridel's name *Pleuridium*, which appears to be neither founded on a true idea of their mode of fruiting nor applicable to the species.

4. *A. nitida* (Hedw.), Mitten.
   *Phaseum axillare*, Dicks. Eng. Fl.
   Frequent in ditches and places where water is dried up in summer.

5. *A. cerviculata* (Hedw.), C. Müller.
   *Dicranum cerviculatum*, Hedw. Eng. Fl.
   Not rare on peat, and sometimes on wet sandy banks; at Hurstpierpoint, Albourne, Henfield, Tilgate Forest, and Tunbridge Wells.

   *Dicranum heteromallum*, Hedw. Eng. Fl.
   Frequent, particularly on sandy soils.

   *A. Hedwigii*, Mitten, *Dicranum subulatum*, Hedw., is stated to grow near Littlehampton in the Appendix to Horsfield's 'History of Sussex,' but nothing further seems known respecting it.
7. *A. varia* (Hedw.), C. Müller.
   *Dicranum varium*, Hedw. Eng. Fl.
   Frequent on all kinds of soils.

8. *A. rufescens* (Turn.), C. Müller.
   *Dicranum varium, β. rufescens*, Eng. Fl.
   Not rare on moist sandy or clayey banks.

   *Dicranum Schreberi*, Hedw., not *D. Schreberianum*, Eng. Fl.
   In very small quantity and rarely fruiting in many places about Hurstpierpoint and Henfield.

    *Dicranum crispatum*, Hedw. Eng. Fl.
    In small quantity at the High Rocks, Tunbridge Wells.

11. *A. cylindrica* (Hedw.), C. Müller.
    In stubbles on St. Leonard’s and Tilgate Forests, and on hedge-banks in several places about Hurstpierpoint, but always without fruit.
    On the forests this species is very short and inconspicuous, but it grows much more luxuriantly on a shaded bank near Hurstpierpoint.

12. *A. pellucida* (Hedw.), C. Müller.
    *Dicranum pellucidum*, Hedw. Eng. Fl.
    Common about the sand rocks, and less frequent on wet ditch banks; very seldom in fruit.
    The variety of this species, *Dicranum flavescens*, Smith, Eng. Fl., is found on the Hunghershall Rocks near Tunbridge Wells, but it has not been observed in Sussex.


    On stones at Henley Hill, at Blackdown, and in the stone-pit at Henfield, the place where it was first observed in Britain by Mr. Borrer.

Genus 4. *Campylostelium*, B. et S.

14. *C. saxicola* (Web. et Mohr), B. et S.
    On stones at Blackdown, where it was first observed by Mr. Borrer; on rocks and stones at Henley Hill, on a stone wall at Tillingdon, on blocks of stone in a rivulet near Wych Cross, and in the same situation on Tilgate Forest near Balcombe.
Genus 5. Seligeria, B. et S.

15. S. pusilla (Hedw.), B. et S.
   Weissia pusilla, Hedw. Eng. Fl.
   Not uncommon on chalk-stones about the Downs; on stones at
   Henley Hill near Midhurst.

16. S. calcarea (Hedw.), B. et S.
   Weissia calcarea, Hedw. Eng. Fl.
   On chalk about Lewes.
   The preceding species is very commonly mistaken for this, which
   happens the more easily, as the form of $S. \text{pusilla}$ which grows on
   the chalk is shorter-leaved than usual.


17. L. flexicaule (Schw.), Hampe.
   Didymodon longirostris '?, Eng. Fl.
   Abundant on the Downs, and rarely by roadsides; always sterile.

18. L. homomallum (Hedw.), Hampe.
   Rare; it occurs at Blackdown, on Tilgate Forest, at the High
   Rocks, and in some other places about Tunbridge Wells.

19. L. tortile (Schrad.), Hampe.
   Didymodon pusillus, Hedw. Eng. Fl.
   In the stone-pit at Henfield in very small quantity, and on a sandy
   bank near Hurstpierpoint, where it was very plentiful for one season,
   1847, but has scarcely been seen since.


   On Waterdown and Broadwater Forests near Tunbridge Wells, but
   without fruit.

   Frequent in woods, and varying greatly; the leaves sometimes all
   straight, more commonly secund, and rarely, about the sand rocks,
   all falcate-secund.

22. D. majus, Turn.
   D. scoparium, $\beta$. majus, Eng. Fl.
   Not common; confined chiefly to the neighbourhood of the sand
   rocks, and St. Leonard’s Forest.

23. D. Bonjeani, De Notaris; ‘‘dense caespitosum fragile erec-
tum vel ascendens fastigiatum breviter ramosum robustum dense foliosum, apice substricto vel subeuidato; folia caulina paulisper secunda vel erecto-patentia, e basi lata plana lanceolata latusculo-acuminata dentibus acuta, apice subplano loriciformi, superne argute serrata et leviter transversim undulata, nervo angustissimo evanido, omnino e cellulis longis robustis parietibus crassissime valde interruptis flavidis praeitis areolata, cellulis alaribus planisculis paucis robustis brunneis dein marcescentibus; perichaetialia in cylindrum convoluta late vaginantia superne sinuato-rotundata subito acuminata integra obsoletinervia; theca oblongo-cylindracea erecto-curvata subapophysata levis exannulata fuscescens, operculo longi-subulato; perist. dentes angusti pallide purpurei bifidi."—C. Müller, Synops. p. 369.


Frequent in bogs, but always barren.

This species has no doubt commonly been passed over as a state of D. undulatum or of D. scoparium, to which last in habit and appearance it has great resemblance, but it differs in having the upper part of its leaves broader and more strap-shaped and not subulate; the nerve vanishes below the point, in D. scoparium it is excurrent; the areolation of the leaves is much more lax than in D. scoparium or D. Schraderi; the capsules without opercula, sent by Mr. Spruce and Mr. Gardiner, resemble those of D. scoparium. As in D. undulatum, the leaves of this moss are prettily undulated, especially when dry.

24. D. Scottianum, Turn.

D. flagellare, β. Eng. Fl.

On all the sand rocks.

25. D. Funkii, C. Müller; "pulvinato-caespitosum humile pallide viride fragile subsimplex strictum, inferne fuscidulo-tomentosum tenuius, superne crassius foliosum, parce fructificans; folia caulina erecto-patentia stricta e basi longa tenera laxissime et pellucide areolata lanceolato-acuminata latinervia, dorso scabra, apice denticate, cellulis alaribus raro conspicuis, paucissimis tantum marginalibus hyalinis; folia ramorum stellatum apicis angustissime lanceolata linearia late quadrate et amene pellucide areolata valde canaliculata strictissima lacinia nervia crassa; perichaetialia vaginantia basi laxius sed superne ut in caulinis minute et incrasato-areolata; thece parce solitaria in pedunculis valde cyagneis ovales subpyriformes leviter sulcatæ olivaceæ, operculis conico-subulatis rubentibus obliquis; calyptra parce fimbriata; peristomium D. turfaci."—C. Müller, Synops. p. 393.


On all the sand rocks, but seldom in fruit.
This pretty moss forms small dense tufts in cracks in the sand rocks. The upper parts are of a fresh or yellowish green colour, the lower pale brown; the leaves are all erecto-patent and subulate from a more elliptic pale base than in _D. flexuosum_; the large cells found at the base of the leaves of all _Dicranum_ are scarcely visible in this species, being reduced to a single row of cells. In _D. flexuosum_ this part is more developed and coloured of a deep red-brown, and the areolation of the leaves is closer and more dense, and the leaves are much longer and often falcate. The capsules resemble those of _D. turfaceum_.

In the male plant the flowers are collected into capituli of four or five flowers each, at the summit of every innovation.

_D. densum_, Schleich., differs from the present species principally in its straighter and more appressed leaves; but whether it is not a form produced by growing "ad margines fossarum in paludosis prope Roche," as stated on the label of Mr. Borrer's authentic specimen, is questionable.

_D. Funkii_ never grows on the ground in Sussex.

26. _D. turfaceum_, C. Müller; "dense caspitum humile inferne interdum divisum erectum haud tomentosum viride substrictum, inferne nudiusculum, superne longe comosum, haud falcatum; folia caulina erecto-patentia apice paulisper falcata, lanceolato-subulata longius capillacea canaliculata latinearv, dorso scabra, summo apice denticulata, cellulis alaribus minus conspicuis parvis laxis tenerrisimis paucis planis praedita, e cellulis inferne quadratis pellucidis parvis superne minutissimis areolata; perichaetialia intima cylindraceae-convoluta, e basi longe vaginante magis sensim subulata, inferne laxe pellucide superne minute areolata, longiora, apice denticulata; theca plerumque solitaria in pedunculo valde arcuato ovalis basi vix apophysata glabra sulcata pallida, operculo conico subulato obliquo longiori rubente; perist. dentes ad medium fissi, cruribus tenuisimis hyalinis rugulosis haud nodosis; calyptra ciliis albis inaequalibus flaccidis fimbriata."—C. Müller, *Synops.* p. 399.

*Camptothamus turfaceus*, Bryol. Europ. *Camptothamus*, p. 4. t. 3.  
_Dicranum flexuosum_, Eng. Fl. in part.

Not rare in moist sandy places.

The most slender of all the British species, with longer and more subulate capillary leaves, which are often broken and strewed in abundance over the patches of the plant. As in _D. Funkii_, the enlarged cells at the base of the leaf are reduced to three or four in number, and not perceptible unless expressly looked for; but it appears distinct from that moss in its longer, more flexuose and loosely placed leaves.

27. _D. flexuosum_, Hedw.

About the sand rocks, and by the bog on Chailey North Common.
Tribe III. POTTIACEAE.

Genus 1. Schistidium, Brid.
28. S. Floerkeanum (Web. et Mohr), Mitten.
   Acacolum Floerkeanum, C. Müller, Synops. p. 21.
   Frequent in stubbles on chalky or clayey soils.
29. S. muticum (Schreb.), Mitten.
   Acacolum muticum, C. Müller, Synops. p. 22.
   Phascum muticum, Schreb. Eng. Fl.
   On banks and in stubbles, not very common.
30. S. triquetrum (Spruce), Mitten.
   Acacolum triquetrum, C. Müller, Synops. p. 22.
   On the cliffs between Brighton and Newhaven.

Genus 2. Pottia, Ehrh., C. Müller.
31. P. cuspidata (Schreb.), Mitten.
   Phascum cuspidatum, Schreb. Eng. Fl.
   Common in stubbles and on banks.
32. P. curvicolla (Hedw.), Mitten.
   Phascum curvicollum, Hedw. Eng. Fl.
   Not unfrequent about the Downs.
33. P. recta (With.), Mitten.
   Phascum rectum, With. Eng. Fl.
   More frequent than the preceding, and often growing with it, but seldom seen off the chalk.
34. P. bryoides (Dicks.), Mitten.
   Phascum bryoides, Dicks. Eng. Fl.
   On the coast at Aldrington near Brighton, and on the cliffs between Brighton and Newhaven; it has also been met with by Mr. Borrer on the Downs at Plecombe and near Lewes, and near the Devil’s Dyke.
35. P. cavifolia, Ehrh.
   Gymnostomum ovatum, Hedw. Eng. Fl.
   Cliffs and walls between Brighton and Newhaven, and about Hove, also at Hurstpierpoint, but almost confined to the coast.
   Rare; growing intermixed with P. Heimi amongst the shingle at Aldrington.
37. P. Wilsoni, B. et S.
   On a sandy bank at Barrow Hill, Henfield, where it has been known to Mr. Borrer for many years.
   C. Müller refers hither with doubt the Gymnostomum truncatum,
38. *P. eustoma*, Ehrh.
   Common on banks and in stubbles.

39. *P. Heimii*, Furn.
   On the coast at Newhaven, Hove, Shoreham and Lancing.

40. *P. minutula* (Schw.), Hampe.
   Very common in stubbles and waste places.

41. *P. Starkeana* (Hedw.), C. Müller.
   At Hove, and on the cliffs between Brighton and Newhaven; not rare in stubbles, but most frequent near the coast.

42. *P. caspitsa* (Bruch), C. Müller.
   "Cespitulosa, parvula; caule subramoso vel ramoso; foliis patentibus, ovato- et oblongo-lanceolatis, concavis, margine paulo revolutis, costa in mucronem brevem excedente, perichaetialibus vaginatis; capsula ovata, operculo longirostro, annulo unam cellularum seriem sistente, peristomii dentibus plus minus perfectis, in linea divisurali obsoleta fissis vel pertusi."—Bryol. Europ. l. c.
   Rare: on Woolsonbury Hill near Hurstpierpoint.
   Intermediate between *P. Starkeana* and *P. lanceolata*, but agreeing more nearly with the first; it differs however in the form and never reflexed margins of its leaves; the three perichaetial leaves are much widened and embrace the base of the yellow seta; the capsule is of a fine orange-brown when mature, ovate and not at all tapering downwards into the seta; just below the mouth it is a little constricted; the peristome is similar to that of *P. lanceolata* and equally variable; the calyptra is smooth and not scabrous as in *P. Starkeana*.

43. *P. lanceolata* (Hedw.), C. Müller.
   Not uncommon, particularly about the Downs.


44. *T. cylindricum* (Bruch), C. Müller.
   On all the sand rocks, but always sterile.


Common on the Downs; and at Shoreham, growing plentifully on the scanty humus between the shingle, exposed to immersion at very high tides; always sterile.


Nearly as common as the last, but like it confined to the chalk and the sandy sea-shore, and barren.

47. *T. rubellum* (Hoffm.), Rabenh.


Frequent on walls and roofs, and on the ground about the roots of trees.

48. *T. rigidulum*, Sm.

*Didymodon rigidulum*, Hedw. Eng. Fl.

Rare: in small quantity at Henley Hill and about Hurstpierpoint.

49. *T. trifatium*, Sm.

*Didymodon trifatius*, Sw. Eng. Fl.

Frequent on the Downs; growing on the earth in tufts about the roots of trees; it is also common on sandstone and on mortar in walls built of sandstone, but rarely fertile.

50. *T. tophaceum*, Brid.

On a wet sandy bank near Hurstpierpoint; at Hastings on and above the cliffs near the Dripping Well, and on walls at Midhurst.

51. *T. convolutum*, Brid.

*Didymodon nervosus*, Hook. and Tayl.

On the cliffs between Brighton and Beachy Head, and at Hastings.


52. *B. aloides*, B. et S.

*Tortula rigida*, Eng. Fl.

Common about the Downs, and less frequently on clayey banks. This is the *T. rigida* of the Flora of Tunbridge Wells.

53. *B. ambiguus*, B. et S.

On a sandy bank near Hurstpierpoint, where it grew very sparingly in 1849.


*Tortula enorvis*, Eng. Fl.

In small quantity about a chalk-pit at Newtimber near Hurstpierpoint.
55. B. revoluta, Schw.
Tortula revoluta, Eng. Fl.

Not unfrequent on walls.

56. B. Hornschuchiana, Schultz; "dioica; laxet et late caespitosa flavescens fragilis gracillima erecta parce breviter dichotoma; folia caulina sicca, incumbentia, madeacta patentia, perfecte late lanceolata acutissima, nervo crasso excurrente vel in superioribus excedente, integerrima, inferiora minute sed dense areolata sub-lavia margine minus revoluta, superiora vel perichesialia parum majus areolata, margine erecto; theca oblongo-cylindrica, basia parva subcurvula, anguste annulata, operculo oblique subulato; perist. praecinentis." [B. revoluta] C. Müller, Synops. p. 608.

Probably not uncommon. At Aldrington near Brighton, growing on the sandy soil between the road and the sea; at Clayon on the chalk; on the Forest near Balcombe Tunnel; and Mr. Borrer has gathered it on Tunbridge Wells Common.

Similar as this species is to B. revoluta in size and appearance, yet when carefully compared, it presents many points of difference. The stems are about half an inch high, green, or more frequently dirty yellowish; leaves patent, when dry appressed to the stem, and slightly twisted, lanceolate, acute; the nerve excurrent into a sharp point; the margins revolute; the perichetal leaves are broader below and more subulate above, of a thinner and looser texture, and the margins are not reflexed; the capsules are subcylindrical; the peristome resembles that of B. revoluta. The plant does not form compact tufts like B. revoluta, but grows in loose patches on the ground; the leaves taper gradually to the point even when the margins are spread out. In B. revoluta the leaves are obtuse mucronate, and when the margins are spread out the point of the leaf is found to be broad and rounded. The perichesial leaves are six in both species; those of B. Hornschuchiana are subulate from an ovate base, but those of B. revoluta are broadly lanceolate and somewhat obtuse.

The description of B. revoluta in 'Eng. Fl.' corresponds better with B. Hornschuchiana than with the species intended, and it is possible that the B. gracilis of English authors may belong in part to B. Hornschuchiana.

57. B. convoluta, Hedw.
Tortula convoluta, Sw. Eng. Fl.

Frequent on chalky, gravelly, or sandy soils.
A variety with longer leaves, but always sterile, occurs on walls at Hurstpierpoint.

58. B. unguiculata, Hedw.

Common everywhere.

59. B. fallax, Hedw.
Tortula fallax, Sw. Eng. Fl.

Frequent, but not so ubiquitous as B. unguiculata.
60. *B. vinealis*, Brid.

Common on walls, growing on the sides rather than on the tops; not often in fruit. The form *B. flaccida* is very common on hedgebanks, but always sterile.

61. *B. squarrosa*, Brid.


Beeding chalk-pit, Mr. Borrer. In small quantity on Woolsonbury Hill, and elsewhere on the Downs, but it is not rare on the cliffs between Brighton and Newhaven, and between Shoreham Harbour and the sea; always sterile.


Tottington Mount, Mr. Borrer; Slindon, Mr. Jenner.

63. *B. marginata*, B. et S.


Frequent on sandstone walls, and less commonly on bricks; it occurs also on the sand rocks.

64. *B. muralis*, Hedw.

*Tortula muralis*, Hedw. Eng. Fl.

 Everywhere on walls and stones.


Cliffs near the Lovers’ Seat, Hastings, Mr. Jenner, 1844; it has since been gathered in the same place by Mr. Borrer.

Closely resembling *B. muralis*, but rather less in all its parts. The stems are short and almost buried in the fine loose sandy earth of the locality; the leaves in the lower parts of the stem are oblong or oblong-ovate, the upper ones are oval oblong and a little acuminate, concave, with the margins reflexed; the nerve is very stout for the size of the leaves, and excurrent into a diaphanous hairy-like point, which in the lower leaves often equals the length of the whole leaf, in the upper it scarcely exceeds one-fifth; the sets are yellow, and the oblong capsules orange-brown; the peristome is about half as long as the capsule, and tubular about half its own length; the operculum is conical, and the calyptra covers about half the capsule.

This moss may at all times be known from *B. muralis* by the long tubular base of the peristome, which corresponds with that of *B. cuneatifolia*, *B. muralis*, and *B. subulata*; besides this difference the leaves are broader, the upper ones rather acuminate, and all of a less firm and close texture than in *B. muralis*, and its habit is to grow on the earth, where *B. muralis* is rarely seen.
66. B. cuneifolia (Dicks.).

*Tortula cuneifolia*, Turn. Eng. Fl.

Tunbridge Wells, "on sandy banks and elsewhere," Forster. Bo- peep, near Hastings, Mr. Jenner; also between Hastings and Win-
chelsea under the low cliffs; and on a moist sandy bank at Skeims Hill.

67. B. subulata, Hedw.


Common on banks.

68. B. latifolia, B. et S.

Frequent on trees and posts subject to inundation; not often pro-
ducing fruit.

69. B. papillosa, Wils.


Frequent on trees and fences, rarely on tiles.

The leaves of this species are not always gemmiferous, and its habit is altogether that of the *Syntrichia*; no trace of inflorescence
has been seen.

70. B. leavipila, Schw.

*Tortula ruralis*, β. leavipila, Eng. Fl.

Abundant on trees.

71. B. ruralis, Hedw.

*Tortula ruralis*, Sw. Eng. Fl.

Very common on roofs; on the ground; rarely on trees. When growing on roofs this moss is usually of a brown colour, but when on the earth in sandy or chalky places it becomes of a fine yellow, and the lower portions ferruginous: this state is rarely fertile.

Genus 5. Ceratodon, Brid.

72. C. purpureus (L.), Brid.


73. W. crispa (Hedw.), Mitten.

*Phascum crispm*, Hedw. Eng. Fl.

*Astromum crispm*, Bryol. Europ.

Common on the Downs.

When growing in tufts, as is most usual with this species, the leaves on the lower parts of the stems are not divergent; but when the plants grow singly, as sometimes they may be found amongst grass, the leaves are all divergent, and the plants have a very different look, and resemble very closely, except in colour, the next species.
74. W. Mittenii (Schimper), Mitten.

Astomum Mittenii, Bryol. Europ.

"Cespitulosum; caule elatiore flexuoso erecto simplici et ramulo; foliis inferioribus late lanceolatis, superioribus sensim majoribus utrisque solidis, sordide viridibus, costa crassa rufa cum apice evanido, perichaetialibus tenuioribus, pallidioribus, costa tenuiore viridi, capsula in pedicello longiore subemersa ovata, rostello obtuso subobliquo; flore mascolo terminali, perigoniaibus ovato-lanceolatis."—Bryol. Europ. l.c.

On clayey soil in a stubble near Little-ease, and by a roadside near Hurstpierpoint; very rare in both situations, and growing intermixed with W. mucronata, W. squarrosa, and W. multicapsularis.

More robust than W. crispa, and with its capsules on longer setae; the inflorescence is also somewhat different, being monoicous and polygamous; the flowers are terminal and sometimes hermaphrodite; the whole plant is brownish.

75. W. multicapsularis (Sm.), Mitten.

Astomum multicapsulare, Bryol. Europ.

"Cespitulosum; caule procumbente, flexuoso-erecto, dichotome ramoso et ramulo, unciali et longiore; foliis caulinis patulis, recurvis, flexuosis, flaccidis, perichaetio polypylallo, foliis perichaetialibus erectis, linearis-lanceolatis; capsula in pedicello perbrevi, ovato-oblonga in rostellum subobliquum producta; calyptra ad medium capsulam producta, longius persistente."—Bryol. Europ. l.c.

In very small quantity in several spots by a roadside on a clayey soil near Hurstpierpoint. A much larger moss than W. crispa, with broader and longer leaves, and with more stoutly rostrate capsules; the male flowers have not yet been observed.

[It corresponds very closely with the following, which may be noticed here, although it has no claims to be considered a Sussex moss.

W. convolutacea, Mitten; dioica? caulis breviusculus infra perichaetium innovans, monocarpus; foliis inferioribus late lanceolatae nervo excurrente omissidato, marginibus inflexis, et basi cauli adpresso patenti-divergentia; perichaetialia et basi subelliptica convolutaceae subulato-attenuata, acuta, superne marginibus incurvus; theca in pedunculo brevissimo elliptica, operculo brevi apiculato.

Phacocur crispa, Mougeot et Nestler, no. 703.

Bedfordshire, Mr. Turner in H.B. Borrer.

As in W. multicapsularis, the male flowers have not been seen in this moss; it also resembles that species in colour and appearance, but differs in the very convolute bases of the perichaetial leaves, which quite cover the capsule, and have their margins incurved towards their apices.]

76. W. longifolia, Mitten; monoica; caulis breviusculus po-
Ilycarpus; folia inferiora lanceolata nervo excurrente mucronata, marginibus erectis, e basi cauli adpresso patentia; perichaetialia longissima e basi lata convolutacea subulato-acuminata acuta apicibus arcuato incurvis; theca in pedunculo brevi, elliptica, operculo brevi apiculato; flos masculus in medio fertilium; folia perigonialia ovata acuta.

Gathered in 1836 by Mr. Borrer, near Goldstone Barn near Brighton, growing on a fence bank with W. viridula.

In appearance this moss differs greatly from all its allies; the perichaetia are crowded together around the central male flower, and their leaves are remarkably long for the small size of the plant. The capsules appear to be slightly coloured, but are too young in all the specimens to ascertain if they may be coloured when mature like those of the Phascum crispa of Drummond's 'Musci Americani,' No. 9, which nearly resembles the present moss, and may belong to the same species.

77. W. aciculata, Mitten; monoica; caulis elongatus, ramulis fastigiatis polycarpis; folia inferiora e basi latiora crecta lanceolata divergentia nervo excurrente mucronata; marginibus erectis vel parum incurvis; perichaetialia e basi lata sensim subulata angusta acutissima nervo excurrente; marginibus erectis; theca in pedunculo brevissimo vel fere sessilis, elliptica, operculo brevi apiculato; flos masculus ut in W. crispa.

On clayey soil by a roadside near Hurstpierpoint.

Nearly resembling W. crispa, but much more slender, with more attenuated and very acute perichaetial leaves, which have the margins erect and not rolled in. The capsules are almost sessile and covered by the perichaetial leaves, and the operculum and calyptra are shorter than those of W. crispa.

This and the last species present differences from each other, and from the other preceding species, amounting to the same value as those which distinguish W. squarrosa, W. phascoides, W. rostellata, and W. microstoma; and in all these mosses there is great difficulty in seizing upon any distinctive character which can be readily defined; yet they cannot well be considered varieties of a single species. W. crispa and W. longifolia are both found on the chalk, where as yet no intermediate state has been seen. W. multicapsularis, W. Mittenii, and W. aciculata are found on clay, and have but little the appearance of being varieties of each other: still it is possible that some of these at least may be only states of W. crispa modified by soil and situation. In all the species the leaves are patent-divergent from an erect base appressed to the stem, and the apices are slightly hooded; the perichaetial leaves have the margins more or less involute, and, like the cauline, are very papillose. The inflorescence in W. multicapsularis and W. convolutacea appears to be dioicous, but the male flowers are yet wanting to both species. The flowers of W. Mittenii, although sometimes hermaphrodite, do not essentially differ otherwise from those of W. crispa, which has the male flower sometimes terminal. In W. longifolia the male flower remains at the extremity of
the axis, apparently from the simultaneous growth of innovations on all sides of the stem beneath it.

78. *W. phaseoides* (Wils.), C. Müller.


By the margin of the larger pond at Pondleigh near Hurstpierpoint.

With the usual form of this species there sometimes occur stems which are hardly to be distinguished from *W. rostellata*.

79. *W. squarrosa* (Bruch), C. Müller; “monoica; laxae cespitulose, caule annosiore decumbente inaequaliter ramoso; folia squarrosa latiora, margine erecto, haudd involuto; theca erecta ovata et elliptica equalis, operculo angusta conico rostellato.”—C. Müller, *Synops.* p. 663.

On clayey soil by a roadside near Hurstpierpoint, and in a stubble at Little-ease.

Very similar to *W. microstoma*, but more slender, with longer stems and shorter and broader squarrose leaves; its fruit too is ripened in November, whereas that of *W. microstoma* is scarcely mature before March or April.

80. *W. microstoma* (Hedw.), C. Müller.

*Gymnostomum microstomum*, Hedw. Eng. Fl.

Common on banks, by roadsides, and on the Downs.

81. *W. tortilis* (Schw.), C. Müller; “monoica; pulvinate cespitosa dichotome et fastigiate ramosa fasciculata foliosa, viridissima inferne ferruginea parce radiculosa, robusta; folia caulinia conferta, sicca valde incumbenti-tortilis, madefacta erecto-patula, inferiora minuta ovata, superiora late oblongo-lanceolata, nervo excurrente breviter mucronata, margine integerrima incurva, carinata, subundulata, ubique e cellulis quadratis minutis firmis diaphanis apice folii opacis tenuissime papillosis arcolata; perichaetialia longiora, basi tenerius longius angustiuspellucidius arcolata; theca in ped. medio flavido turgide ovalis raro cylindraceae equalis vel gibba firma orificio majori rubro post operculo lapsum medio apertum, fuscescens simpliciter annulata, operculo longirostrato obliquo.”—C. Müller, *Synops.* p. 661.

On the cliffs at Gin Gap near Newhaven.

Plants growing together in small patches amongst the short starved herbage on the edge of the cliff, exposed to the full influences of the sea breezes. The stems are from one to three-fourths of an inch high, fastigiat branches; the leaves are green or yellowish green in the upper parts, below ferruginous; the capsules are pale yellowish brown, erect or gibbous, the mouth red and the sete yellow. It is readily known from *W. mucronata*, to which it is nearest allied, by its much greater size, thicker leaves, and coloured mouth of its capsules, which are ripened in March.
82. *W. mucronata*, Bruch.
*Gymnostomum rutilans*, Hedw. Sp. Muse. t. 3. f. 8–11.
Not very common on clayey banks about Hurstpierpoint.
Doubtfully distinct from the following species.

83. *W. viridula* (Linn.), Brid.
Very common and variable in appearance.

84. *W. cirrhata*, Hedw.
Frequent on wooden fences; sometimes on thatch, on trees, and on
the sand rocks.

85. *W. crispula*, Hedw.
Harrison’s Rocks, Mr. Borrer, 1810, from whose specimens gathered
there, the ‘Eng. Bot.’ figure was drawn.

86. *W. verticillata*, Brid.
On mortar between bricks round a spring near Hurstpierpoint; and
about the Dripping Well at Hastings.

87. *W. tenuis* (Schrad.), C. Müller.
In the stone-pit at Henfield, but barren.


88. *G. apocarpa*, Hedw.
Not uncommon on walls and roofs; on exposed flints on the Downs,
and on the sand rocks at Tunbridge Wells.

89. *G. pulvinata*, Hook. and Tayl.
Very common on walls and roofs.

Rare: it has been gathered in small quantity by Mr. Borrer on
some Druidical stones near Brighton, and on a roof at Henfield; it is
also found on a stone wall at Henley Hill, and on rocks at Tunbridge
Wells.

91. *G. acicularis* (Hedw.), C. Müller.
On rocks about Tunbridge Wells, and on a wall at Henley Hill.

92. *G. lanuginosa* (Hedw.), C. Müller.
*Trichostomum lanuginosum*, Hedw. Eng. Fl.
On a rock at Henley Hill. It was formerly found on heaps of
flints on the Downs near Patcham, by Mr. Borrer.

93. *G. canescens* (Hedw.), C. Müller.
In very small quantity on Woolsonbury Hill, and about Tunbridge
Wells; more abundant above Heyshot, and in several other places on
the ridge of the Downs; on a tiled roof near Henfield, Mr. Borrer.

94. G. heterosticha (Hedw.), C. Müller.
Trichostomum heterostichum, Hedw. Eng. Fl.
On all the sand rocks, but fertile only at Tunbridge Wells.

95. G. fascicularis (Schrad.), C. Müller.
Trichostomum fasciculare, Hedw. Eng. Fl.
In very small quantity on a rock at Henley Hill.


96. Z. viridissimus, Brid.
Very common on trees, more rare on walls; not rare in fruit, particu-
larly on trunks of trees near the ground.

97. Z. conicoides (Dicks.), Hook. and Tayl. Eng. Fl. in part.
Bryum conicoides, Dicks.

Rare: on a beech-tree on Newtimber Hill, and more plentifully on
Sallows by the Mill Pond at Arundel. Mr. Borrer has gathered it
in Charlton Forest, and Mr. Jenner in the Forest near Handcross.

Great as the confusion has been in the names of this and the next
species, still it appears that the name conicoides is the proper one for
this moss, it being the Bryum conicoides of Dickson; but if the name
given to it by its discoverer is to be suppressed, it ought to take that
of Z. Dicksoni rather than any other.

The peristome of this species is double, as described by Hooker and
Taylor; not simple, as it is described and figured in "Bryol. Europ."

98. Z. Forsteri (Dicks.), Mitten; "monoicus; pulvinatus hu-
milis breviter ramosus, inferne tomentosus viridissimus; folia
caulina dense conferta, madefacta patula, e basi angustiore am-
pliuscule hexagono reticulata sensim late ovato-lanceolata s. sub-
spatulato-acuminata, planiuscula nervo ante apicem evanido
crassiusculo, integerrima, e cellulis ubique magnis perfecte hex-
agonis chlorophyllosis firmis areolata; perichaetialia basi mutio
laxius reticulata; theca in ped. brevi flavido crassiuscolo erecta,
pyriformi-ovalis, fuscescens 8-striata, ore coarctata, operculo co-
nico subulato obliquo; perist. dentes externi 8 bigeminati lati-
usculi subrugulosi pallide lutentescentes sicci reflexi apice liberi,
interni: cilia 8 cum dent. alternantia breviore anguste subulata
hyalina subrecta."—C. Müller, Synops. p. 667.

Z. conicoides, Brid. i. p. 590; Bryol. Europ. p. 8. t. 2; C.
Müller, Synops. p. 667.
Gymnostomum viridissimum, in part Eng. Fl.
Bryum Forsteri, Dicks. 1

Near Hastings, Mr. Jenner.
Ann. & Mag. N. Hist. Ser. 2. Vol. viii. 21
No precise locality is known for this moss, but one small tuft was found amongst mosses collected by Mr. Jenner in the neighbourhood of Hastings.

Stems scarcely half an inch high, growing in dense tufts, the upper portions dark green, the lower pale and covered with whitish rootlets; the leaves are patent, subspathulate or widely lanceolate, shortly acuminate carinate; the nerve vanishes just below the apex; the texture of the leaves is composed of perfectly hexagonal cells in the upper part, and in the lower part they are elongated and colourless; the perichaetal leaves are rather longer, but of the same shape as the cauline: the setae are about a quarter of an inch long and yellowish; the capsules are erect pyriform-ovate, when dry ovate pyriform and eight- striate; the operculum conical subulate, oblique; the external peristome consists of eight bigeminate minutely rugose whitish teeth, the internal of eight-subulate colourless cilia, alternating with the external teeth; the calyptra resembles that of Z. viridissimus, and covers about one-third of the capsule.

Although the confusion has been very great respecting the present species and Z. conoides, still there seems no just reason why Dickson, who was the first to observe and describe these two mosses, should have his names set aside because others have confounded them and imposed names of their own.

In Mr. Borrer's herbarium is preserved a small portion of an original specimen gathered by Mr. Forster on a felled tree at Chapel-end, Walthamstow, and this being the source of Dickson's species places beyond doubt the fact that his Bryum Forsteri, "capsulis erectis denticulatis, setis ascendentibus rufulis subacaulibus, foliis ovatis," is the same as the Z. conoides of Bridel and continental authors, who have been altogether misled by the "Muscologia Britannica." This moss is still in want of a precise locality, Mr. Forster's specimens being from a felled tree in a timber-yard, and Mr. Jenner's gathered somewhere near Hastings.


99. O. anomalum, Hedw.
Not unfrequent on roofs and walls.

100. O. diaphanum, Schrad.
Common on trees and fences, rarely on roofs.

101. O. stramineum, Hsch.
Not very common, chiefly on beech-trees.

102. O. rivulare, Turn.
Rare: it occurs on bushes and roots by the stream at Little-ease near Hurstpierpoint, and on posts at Shermanbury. Mr. Borrer has found it at Henfield, and Mr. Jenner at Lugershall.

103. O. Sprucei, Mont.
Frequent on trees and fences by rivulets, always within the reach of occasional inundations.
104. *O. cupulatum*, Hoffm.
Rare: on tiles at Balcombe. Mr. Borrer has gathered it at Storrington, and Mr. Jenner at Lewes.

Plentiful on trees about Hurstpierpoint and Henfield, but perhaps not generally common.

Abundant on trees, more rarely on tiles.

107. *O. speciosum*, Nees ab E.
Very rare: one patch was gathered by Mr. Spruce in an orchard at Henfield; it has since been carefully sought for in the same place without success.


In very small quantity on an ash-tree by a rivulet near New Close, near Hurstpierpoint.


*O. leiocarpum*, B. et S.
Frequent on trees.
Following C. Müller, the old name has been used for this moss, which, if it is the species so named by Hedwig, ought to retain his name, bad as it may be.

Common on trees: unfrequent in fruit, which is mostly found in woods.

111. *O. pulchellum*, Smith.
Rare: in several places near Hurstpierpoint and in Tilgate Forest. On hazel at Midhurst, and on bushes on the beach near Shoreham, Mr. Borrer.

112. *O. crispsum*, Hedw.
Not unfrequent, especially on beech-trees, in woods near the Downs. A somewhat smaller state than usual is sometimes met with, and has been referred to *O. crispsum*, Bruch, but it does not quite correspond with continental specimens.

113. *O. Bruchii*, Hsch.

*O. coarctatum*, B. et S.
Common on trees in woods, particularly in the forests, where it abounds.

Very rare: on beech-trees on the north side of Woolsonbury Hill. Only three small tufts have been seen.
115. *O. jutlandicum*, Brid. i. p. 296.
*O. phyllanthum*, B. et S.
Common on trees.

**Genus 10. Enalypta, Schreb.**

On the Downs at Halmaker near Chichester, and on the north wall of St. Nicholas Church, Brighton, Mr. Borrer. On a wall at Storrington, and on a wall between Cocking and Midhurst.

117. *E. streptocarpa*, Hedw.
In many places on the Downs: at Newtimber; Arundel Park; Offham near Lewes; and on tiles near Hurstpierpoint: always barren.

[To be continued.]

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**XXVI.—On the Development of the Cirripedia.**

By C. SPENCE BATE.

[With three Plates.]

Few animals belonging to the European fauna, so very abundant on our shores as the Cirripedia, have had their nature so misunderstood, and so long veiled in mystery. The happy discovery of Mr. J. V. Thomson, so far back as 1826, approximated somewhat to a revelation of their real history; and the later researches of Burmeister, in his Beiträge zur Naturgeschichte der Rankenfüsser, together with those of Prof. Goodric, in the Edinburgh New Phil. Journal, July 1843, have further elucidated this interesting inquiry. Although as yet the chain of development between the ovum and the perfect animal has not been successfully observed, the hiatus is not so great but that naturalists are enabled to identify the position of these creatures in the animal kingdom.

Feeling a little curiosity in relation to the subject, and wishing to verify for myself the observations of Mr. Thomson, I took advantage of my residing near the shore where two or three distinct species are common, and have occupied myself a little this summer in endeavouring to observe the animal, as well as the changes through which the larva passes until it assumes the form and characters of the parent. Being desirous to obtain the young, so as to identify it with the species which are the parent of each, I adopted the mode of breaking off the *Balanus* from the rocks and obtaining the embryo in a mature state before it had left the ovum, and of then hatching it; which was readily accomplished upon its being plunged into sea-water,—a mode which I found