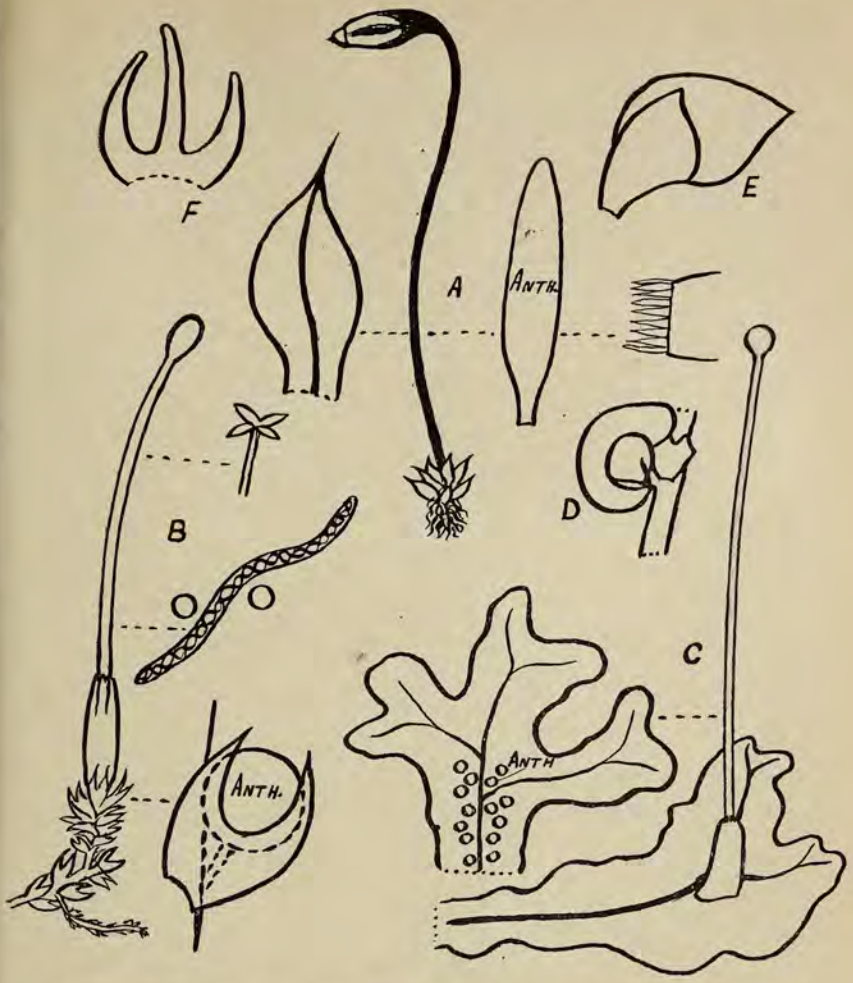
The Liverworts of Somerset.

BY W. WATSON, D.SC.

THE romantic story how the Forget-me-not got its name is familiar to most people, and the origin of many other plant-names can be readily traced. Many of our early botanists were interested in plants for their medicinal properties, and believed that the likeness of a plant to some organ of the body showed its power in curing diseases of that organ. One of the commonest liverworts is a plant with leafy lobes bearing some likeness to those of the liver, and it is owing to this resemblance that the common name is derived. Linked with this resemblance, there was probably some idea in the minds of our ancestors that the plant was a liver-wort or liver-herb, useful in curing diseases of the liver. The scientific appellation of hepatic also is derived from the liver or hepatic organ.

Though some liverworts have liver-like lobes, this is not true of the majority of plants now grouped under this name. Many of them have stems and small leaves, and would have been called mosses by our earlier naturalists. At the present time the reproductive bodies are considered to show the most important differences between the two groups. In mosses the bodies (capsules), which contain the reproductive cells (spores), are much stronger and longer-lived. A moss-capsule usually opens by means of a lid and its opening is guarded by teeth (fig. A), which prevent the spores from escaping till the conditions are favourable for dispersion or germination. Its central part is filled with a column of sterile tissue (fig. A), and its stalk (seta) is strengthened by the thickening of the cell-



A. *Bryum capillare*, L. Complete moss with capsule (in optical section so as to show the column of sterile tissue), x 4. A single leaf, x 20. An antheridium, x 65. Mouth of capsule with peristome teeth, x 12.

B. *Cephalozia bicuspidata* (L.), Dum. A foliose liverwort showing a capsule, x 4. A capsule spilt into its four valves, x 4 One elater and two spores, x 130. An antheridium in the axil of a leaf, x 130.

C. *Pellia epiphylla* (L.), Corda. A thalloid liverwort. Plant with capsule. Plant with antheridia, x 4.

D. *Frullania dilatata* (L.), Dum. Portion of plant showing stem, two-lobed leaf (the under lobe forming a bell-shaped water-reservoir), and under-leaf, x 20.

E. *Scapania curta* (Mart.), Dum. Two-lobed leaf, x 30.

F. *Lepidozia setacea* (Web.), Mitt. Leaf with 3 lobes, x 130.

walls. The capsule of the liverwort (figs. B and C) is a more ephemeral organ ; its stalk (seta) is very frail, and its mouth usually opens by four valves (fig. B). There is no central sterile tissue, but some cells, instead of forming spores, develop into hygroscopic threads (elaters), which assist in the dissemination of the spores (fig. B). Though the capsule is the most critical character in distinguishing a moss from a liverwort, its absence causes little difficulty in assigning a plant to its proper group. The chief aids to discrimination between mosses and liverworts are the following :—Mosses have stems and leaves ; some liverworts (thalloid) have not (fig. C). In mosses the leaves usually radiate from all sides of the stem ; in leafy liverworts they usually come from two sides only, this character being correlated with the general creeping habit. Smaller leaves (under-leaves) are present on the under-surface of the stem in many liverworts (fig. D). The leaf of the liverwort is more variable in shape, is often lobed, and is sometimes much divided (figs. B, D, E and F). In mosses the leaves are usually much longer than broad, and are rarely divided. In many mosses the leaf has a midrib of thick-walled or longer cells (fig. A), whereas in liverworts a midrib, or any structure approaching it, is of very rare occurrence. Many mosses have also a core of longer and stronger cells in their stems. The cells of a moss-leaf are usually either smaller or much longer and narrower than those of a liverwort-leaf. When thickening of the cell-wall occurs in the liverwort, the thickening material is usually deposited at the corners of the cells. The spore at first develops into a filament (protonema), which is much longer lived in a moss than in a liverwort. The antheridia of a liverwort are usually globose (fig. B), and occur in the axils of the leaves, or, in a thalloid liverwort, in pits in the thallus (fig. C). In mosses they are usually much longer than broad (fig. A), and occur in clusters at the apices of the stems or branches. The archegonia of a liverwort are relatively shorter than those of a moss, and the surrounding leaves are usually much altered so as to form a protective covering. In a moss the leaves surrounding the archegonia are seldom much different to the ordinary leaves. Generally speaking, liverworts are plants

of wetter habitats than mosses, and consequently have a more delicate structure.

The distribution of liverworts in the county was little investigated until recent years. No doubt some of our early botanists found and recorded some liverworts, but most of their collections or records have been lost. The Rev. C. Parfitt, whilst a curate at West Hatch, near Taunton (about 1845), collected a few liverworts, which are now preserved in Taunton Museum, but very few of them are from Somerset. He appears to have been friendly with the well-known bryologists, Mitten and Borrer, who aided him in the determinations of the mosses and liverworts in his collection. Dr. H. F. Parsons, whilst practising at Beckington, near Frome (about 1867), was also interested in the liverworts. The records given in the *Victoria County History, Somerset*, were due to him, and some liverworts collected by him are in the herbarium at Taunton Museum. Sir Edward Fry (about 1880–90) of Failand, and Messrs. Green (about 1870–80) and Read (about 1890) of Bristol, collected and recorded some liverworts from the Bristol district. In the Hepatic Census Catalogue, published for the Moss Exchange Club in 1905, the two botanical vice-counties of Somerset were each credited with two hepatics. *Lophocolea cuspidata* and *Diplophyllum albicans* were given for V.C. 5, whilst the northern and more eastern portion of the county (V.C. 6) was credited with *Lophozia turbinata* and *Chiloscyphus pallescens*. In the *Victoria County History, Somerset* (1906), localities were given for 21 liverworts. The Hepatic Census Catalogue of 1913 gives 40 hepatics for V.C. 5 and 52 for V.C. 6, and for many of these the author was responsible. Since then the numbers have been increased to 140 for V.C. 5 and 94 for V.C. 6, the list for the county now including 148 hepatics.

Other sources of records for the county, together with the literature dealing with Somerset hepatics, and explanations of any abbreviations used in the text are given in the following list.

Explanations and Abbreviations.

(*) An asterisk indicates that the liverwort is not given for the vice-county in the Hepatic Census Catalogue of 1913.

(!) A note of exclamation after a locality, given by someone else, indicates that a specimen from the locality has been seen by the author.

Bry. Zon. (*See* Watson).

C.C. = Hepatic Census Catalogue of 1913. C.C. 1905 = That of 1905.

c. fr. = *cum fructus* (with sporogonia or capsules).

Com. = Common and well distributed in the county.

C.P. = Rev. C. Parfitt.

F. = Miss A. Fry, Failand, near Bristol.

G. = Herbarium and records, Green.

J. of Bot. = *Journal of Botany.* (*See* Watson).

K. = Mr. H. H. Knight, M.A., Cheltenham.

M.E.R. = Moss Exchange Club Reports, Sect. 1 (yearly).

P. = Dr. H. F. Parsons.

R. = Rev. P. G. M. Rhodes, M.A., Birmingham.

S. = Dr. E. J. Salisbury, Radlett, Herts.

sec. = according to.

teste = tested by.

V.C. The county of Somerset is divided botanically into two vice-counties, numbers 5 and 6 of Topographical Botany. V.C. 5 (South Somerset) extends from the western border, and is separated from V.C. 6 (North Somerset) by a line along the R. Parrett from Bridgwater to Ilchester, thence curving round to the northern extremity of Dorset.

V.C.H. = *Victoria County History, Somerset,* 1906.

Watson, Dr. W., Taunton School, Taunton. *The Distribution of Bryophytes in the Woodlands of Somersetshire,* "New Phytologist," 1909; *Bryophytes of Somerset* (with W. Ingham, B.A.), "Journal of Botany," 1909; *A Somerset Heath and its Bryophtic Zonation,* "New Phytologist," 1915; *Cryptogamic Vegetation of the Sand-dunes of the West Coast of England,* "Journal of Ecology," 1918; *The Bryophytes and Lichens of Calcareous Soil,* "J. of E.," 1918; *The Bryophytes and Lichens of Fresh Water,* "J. of E.," 1919.

Some records by Miss Armitage (Ross) and Messrs. Boswell (herbarium at Oxford), Downes (Ilminster), Hamlin (Bridgwater), Hurst (Bedwyn) and Wilson (Sedbergh).

Some specimens examined by Messrs. Macvicar, Pearson, Knight, Nicholson, Lett, Jones, Ingham and Dixon.

All records without any authority given are due to the author, and generally have been collected since 1910.

Specimens of most Somerset hepatics are included in the herbarium at Taunton Museum.

ORDER I. SPHÆROCARPALES.

FAMILY SPHÆROCARPACEÆ.

Neither of the two British species of Sphærocarpus have been recorded for the county. *S. michelii* has been found in Devonshire and Gloucestershire, the latter county also yielding *S. texanus*. Both plants may occur in Somerset, but have not been noticed on account of their minuteness.

ORDER II. MARCHANTIALES.

FAMILY RICCIACEÆ.

Riccia glauca, L. On moist clayey soil of banks, little-used lanes and other bare places. Rare.

5.* Combe Sydenham, near Monksilver (1916). Kingston (and var. *minor*, 1920).

6. Failand ! (F., 1910).

Var. *subinermis* (Lindb.), Warnst. Very rare.

5.* Combe Sydenham (1916).

R. sorocarpa, Bisch. Habitat similar to that of *R. glauca*. Rather frequent.

5.* Combe Sydenham, near Monksilver (1916, M.E.R. 1917). Some specimens had a few short cilia at the margin of the thallus. Cornfields near Taunton and Buckland St. Mary. Nimmer, near Chard.

6. Ploughed field at Failand ! (F., *teste* Macvicar, 1907). Moist ground under spruces, Harptree Combe (1920).

R. fluitans, L. Floating in ponds or ditches, or rooting in the mud at the margin or bottom. Rare.

5.* In a pond at Ashill ! (Downes, 1917).

6. Nailsea !, Tickenham, Cheddar and Draycott (Read, 1906).

Ricciocarpus natans (L.), Corda. Floating in ditches or growing on the mud at the margins. In the terrestrial form, the violet scales on the under-surface are less evident. Rare.

6.* Othery (1913). Middlezoy.

FAMILY MARCHANTIACEÆ.

Targionia hypophylla, L. On flat limestone rocks in drier situations than any other British thalloid liverwort. Rare.

6.* Cheddar Gorge ! (R. 1915, M.E.R. 1917).

Reboulia hemisphaerica (L.), Raddi. In damp places amongst rocks and soil. It usually grows in drier places than the other members of this family except Targionia. Infrequent, except on the Mendip.

5.* Here and there on the Blackdowns about Otterford (1916, M.E.R. 1917), Buckland St. Mary, Wambrook and Combe St. Nicholas. Chaffcombe. Kingscliffe, near N. Petherton (Hamlin).

6. Wells (P., 1868). Ebbor Gorge, etc. (Read, 1900). Com. on Mendip, near Cheddar, Wells and Harptree. Penselwood (1920). Kewstoke.

Conocephalum conicum (L.), Dum. On wet shady rocks or soil, usually just above the level of the water. Com. Recorded for 6 from Frome (P., 1868), and for 5 from Taunton (*J. of Bot.*, 1909).

Lunularia cruciata (L.), Dum. On moist soil and rocks ; often on flower-pots, and noticeable owing to the lunar cups which contain gemmae. Plants with archegonia are frequently seen, but antheridial plants are rarer. Sporogonia are very rare, but have been found in the county. Com., especially near habitations. Recorded for 6 from near Bristol (G., 1875), Frome (P., 1905) and for 5 from Taunton (*J. of Bot.* and M.E.R., 1909).

Preissia quadrata (Scop.), Nees. On moist soil among rocks or on wet rocks, chiefly on limestone and in upland districts. Rare, except on Mendip.

6. Black Down, Mendip (Read, 1905). Cheddar and Blackrock Valley. Wookey (Hamlin).

Marchantia polymorpha, L. Moist wall-tops, rocks near streams, damp or moist ground. A favourite habitat is on the tops of boulders in streams and just above the level of the water. Infrequent. It is much less common than *Conocephalum* and *Lunularia*, which have often been confused with it.

5. Norton Fitzwarren (*J. of Bot.*, 1909). Taunton. Ilminster (Downes). Herridge and Bicknoller Combes, Quantocks. Bishops Lydeard. Combe Sydenham. Ley Hill, Porlock (900ft.). Oareford (*J. of Bot.*, 1909). Barle Valley. Haddeo Valley.
6. Frome! (P., 1869). Near Bristol (G.). Failand (F.). Shapwick.

Var. *aquatica*, Nees. In marshy or boggy places, where it is often submerged. Rare.

5.* Cocker Combe, Quantocks (1913, M.E.R. 1914).

ORDER III. JUNGERMANNIALES.

FAMILY PELLIACEÆ.

Aneura pinguis (L.), Dum. In wet places, stream-sides, wet heaths, bogs, springs, and in moist places on sand-dunes. Frequent.

5.* Blackdowns! (C.P., 1847). Quantocks. Orchard Portman. Chard Common. Exmoor.
6. Failand! (F., 1905). Berrow (1912).

Form *pellioides*, mihi. A form like a small Pellia in general appearance. Occurs in bogs on Exmoor, Quantocks, Blackdowns and Chard Common in V.C. 5, and near Failand in V.C. 6.

A. incurvata (Lindb.), Steph. On moist sandy ground. Very rare.

5.* Combe Sydenham (1916). Halsway Combe, Quantocks.
6. Berrow (1912).

A. multifida (L.), Dum. Frequent in wet places, chiefly on the sides of running water.

5.* Blackdowns! (C.P., 1847). Quantocks. Brendons. Com. in Exmoor Combes! (Armitage, 1891). Chard Common and Chilworthy.

6.* Black Down (Read, *teste* Boswell, 1880).

Form *ambrosioides* (Pears). On wet rock near Wambrook in V.C. 5 (1920).

Form *congesta*, mihi. A form with crowded and overlapping thalloid lobes occurs on Chard Common (V.C. 5), and is figured in Bry. Zon.

A. sinuata (Dicks.), Limpr. On stones in or near streams, usually completely submerged. Frequent in the hilly regions of the west of the county.

5. Quantock and Exmoor Combes. Croydon Hill combes. Castle Neroche.

6. Black Down (Read, *teste* H. Boswell, 1880).

A. major (Lindb.), K. Müll. On moist soil, ditch sides, etc. Infrequent.

5.* Merridge, near Bridgwater (fallow field, 1913). Aisholt. In boggy spring with *Hypnum stellatum*, Halsway Combe, Quantocks. In oatfield, Buckland St. Mary.

6.* Berrow (C. P. Hurst, 1917); a form from sand-dunes.

A. latifrons, Lindb.. On peaty soil and on decaying stumps.

5. This record was based probably on the Berrow sand-dune plant, and therefore ought to have been given for 6. The sand-dune plant, which was formerly referred to this species, is now given as a form of *A major*.

Metzgeria furcata (L.), Dum. On trees and sometimes on rocks, in rather dry situations for a liverwort. Com. from sea-level to over 1000 feet.

Recorded from Chilcompton! in 6 (P., 1868), and from Norton Fitzwarren in 5 (*J. of Bot.*, 1909).

Var. *fruticulosa* (Dicks.), Lindb. On trees. The aeruginose form has not been noticed. It has been recorded for Gloucestershire (K.).

5.* Haddeo Valley (1915). Barle Valley. Near Raleigh's Cross. Combes of Croydon Hill.

6.* Near Gare Hill, at 500 ft. (1915). Long Wood, near Cheddar.

M. conjugata, Lindb. On moist rocks. Rare.

5.* At an altitude of 800 ft., Hodder's Combe, Quantocks (1915, M.E.R. 1916).

6.* On moist rock, 800 ft., Harptree Combe (1920).

Pallavicinia lyellii (Hook.), Gray. "What I believe to be this plant was formerly to be found in one spot on Black Down. Have not found it there of late years." E. H. Read *in litt.* to Miss A. Fry, 1907.

Pellia epiphylla (L.), Corda. In wet places. Com., except in districts which are strictly calcareous. Collected in 5 on the Blackdowns! (C.P., 1847), and in 6 on Mendip! (P., 1868), probably on the Old Red Sandstone.

Many of our Somerset specimens do not show the strengthening fibres characteristic of the species. Miss Agnes Fry sent some specimens to Prof. Schimper and he referred them to a new variety *efasciata* (*in litt.*). This seems to be the common form on drier ground, such as damp shady nooks of banks and rocks, and is found in both vice-counties.

Specimens obtained from a stream near Exton (1915), a boggy spring, Herridge Combe, Quantocks, and a wet bank near Leigh waterfall, Brendons (1919), I should refer to the var. *undulata* Nees, the Exton plant being a broad-leaved form.

Pellia neesiana (Gotts.), Limpr. A plant near Brendon Hill (1919) in 5 may be this species. As it has not been observed with reproductive organs, the determination is doubtful. Recorded for Gloucestershire (K.).

P. fabbroniana, Raddi. In wet places, on rocks and at spring-sides, especially in limestone districts. Com. in the calcareous districts; less frequent in the parts of the county west of Taunton. Collected from W. Hatch!, V.C. 5 (C.P., 1847), and from Failand!, V.C. 6 (F., 1903). In autumn and winter the forked branching of the thallus gives it a different appearance. To this common winter form of the plant, Hooker gave the name of var. *furcigera* (under *P. epiphylla*).

Var. *lorea*, Nees. In wet places, especially on dripping rocks, often near water-spouts. Rare.

5.* Near Monksilver (1915). Halsway and Triscombe, Quantocks. Between Exton and Dulverton. Cheddon.

6. Batcombe, near Bruton (1912).

Blasia pusilla, L. In the Somerset stations in swampy ground. Rare.

5.* Holford Combe, Quantocks (1913). Ley Hill and Porlock (900—1000 ft.). Pond Wood, near Monksilver (with long gemmae-cups, 1915).

Petalophyllum ralfsii (Wils.), Gotts. Very rare.

6. On the margin of a dune-pool, Berrow (1913).

Fossombronia pusilla (L.), Dum. On bare damp soil on banks, old paths, sides of ditches. Some of the following records possibly belong to *F. wondraczeki*, but all fertile plants examined were *F. pusilla*. Frequent.

5. Aisholt (1912). Wiveliscombe. Combe Sydenham (c. fr). Nimmer, Whitestaunton, Chaffcombe and Winsham near Chard (c. fr.). Withycombe (700 ft.). Haddeo Valley (c. fr.). Minehead (K., 1920). In cornfield, Angersleigh (c. fr.).

6. Gare Hill! (P., 1868). Failand (F., *teste* Lett, 1905). Blackrock Valley, Cheddar (1919).

F. wondraczeki (Corda.), Dum. A plant from a cornfield at Buckland St. Mary (V.C. 5) is probably this species, but no spores were seen (1920).

FAMILY JUNGERMANNIACEÆ.

Marsupella emarginata (Ehrh.), Dum. On moist rocks and soil on the hills. Common on the higher parts of Exmoor; rare elsewhere.

5.* Holford Combe (1913). Treborough. Croydon Hill. Exmoor (M.E.R., 1919). The small form (var. *minor* Carr.) has been noted in quantity at Treborough, Exford and Croydon Hill (1916) in V.C. 5. Forms approaching *M. funckii* and *M. pearsonii* occur on Exmoor.

6.* Recorded by Green from near Bristol (about 1880).

Alicularia scalaris (Schrad.), Corda. Com. on pathsides and banks in the hilly regions (0—1600 ft.) on heathy, arenaceous or greensand substratum.

Recorded from near Bristol for 6 (G., about 1875) and from Minehead for 5 (*J. of Bot.*, 1909).

Var. *procerior*, Schiff. In wetter places than the type and often on wet rocks. Rare.

5.* Hawkridge and Halsway, Quantocks (1915, M.E.R. 1916). Staple Hill and Bishopswood, Blackdowns.

A. geoscyphus, De Not. In sandier places than the preceding species. Rare.

5.* Near Fourches Corner, Blackdowns (1917, M.E.R. 1919). Near Dulverton. Near Wambrook.

Var. *suberecta*, Lindb.

5.* On rocks in a quarry between Haddeo Bridge and Kents, 1918.

Eucalyx hyalinus (Lyell.), Breidl. On moist rocks or ground, and sometimes in boggy springs. Infrequent.

5.* Hawkridge (M.E.R., 1916), Halsway and Herridge Combe, Quantocks. North Hill. Oareford. Withypool.

6.* Top of Harptree Combe (1920).

Aplozia crenulata (Sm.), Dum. On moist soil, damp banks of oak woods, etc., chiefly on siliceous formation. Com. in the hilly districts.

5. Buckland St. Mary! (C.P. 1847), etc., on the Blackdowns. Quantocks. Exmoor and its spurs. Brendons. A large, pale-green form occurs in a boggy spring, Halsway, Quantocks (700 ft.).

6.* Near Bristol (G., 1880). Longleat. Black Down, Mendip.

Var. *gracillima* (Sm.), Heeg. Frequent on damp banks and bare ground in the hilly districts (1909).

5. Combes of the Quantock (1909), Brendon and Exmoor hills (com.). Castle Neroche.

6.* Leigh Wood (Read, 1900). Black Down, Mendip (c. fr., 1000 ft., 1915).

Form *tuberculata*, Schiffn.

5.* At the base of a bank near Stogumber (1916).

A. sphaerocarpa (Hook.), Dum. On stream-sides. Rare.

5. Combes of the Quantocks (1912). Dunkery. Bradley, Barle Valley. Horner Combe.

A. pumila (With.), Dum. On moist rocks. Infrequent.

5.* Ley Hill, Porlock (1915). Treborough and Leigh waterfall, Brendons. Couple Cross, Exford, Withypool and Simonsbath (1300 ft.), Exmoor (M.E.R., 1919).

A. riparia (Tayl.), Dum. On wet rocks. Infrequent.

5.* Horner Wood (1915). Buncombe.

6. Kingsettle Hill (1907, *J. of Bot.*, 1909). Harptree Combe (1920).

Form *potamophila*, Bern. Stream-sides. Rare.

5.* Holford Combe, Quantocks (1914, M.E.R. 1916).

Gymnocolea inflata (Huds.), Dum. The most common form is *subaggregata* Nees. On damp heathy ground.

5.* Common on Exmoor ascending to nearly the summit of Dunkery (1915). Blackdowns. Bewley Down. Chipstable. Haddon Down. Holford.

6.* Shapwick Heath ! (C.P., 1849). Black Down, Mendip (1915).

Form *natans*, Schiffn. Floating in pools. Rare.

5.* Dunkery at 1600 ft. (1915). Ley Hill, Porlock (1000 ft.).

6.* Shapwick Heath ! (C.P., 1849).

Form *laxa*, Nees. Wet heaths, ditches and pools.

5.* Dunkery (1915, M.E.R. 1916) and Ley Hill, Exmoor.

6.* Shapwick ! (C.P., 1849).

Form *nigricans*, Nees. On moist heaths.

5.* On Calluna heath, Culmhead (1915, M.E.R. 1919). Withypool.

Form *compacta*, Nees. On drier heaths than the other forms.

5.* Haddon Down (1916).

Lophozia turbinata (Raddi.), Steph. On moist soil, frequent in the calcareous districts of the county.

5. Taunton district (1908). West Sedgemoor. West Hatch. Cothelstone, Aisholt and Merridge. Bishops Lydeard. Curland. Williton. Milverton. Treborough. Watchet.

6. Norton St. Philip (P., 1868). Bruton ! and Chatley Hill (P., 1868-9). Portishead and Flax Bourton ! (F., 1909). Cleeve. Shapwick. Frome.

L. badensis (Gott.), Schiff. Moist calcareous soil. Apparently rare, but probably some of the earlier records of the preceding species belong to this.

5.* Damp base of limestone wall, Pitminster (1917). Watchet.

L. ventricosa (Dicks.), Dum. On heaths, sides of paths, etc. Frequent.

5. Minehead (*J. of Bot.*, 1909). Com. on the Quantocks, Blackdowns, Brendons and Exmoor. Croydon Hill. Haddon Down.

6.* Brean Down (1913). Goblin Combe. Black Down.

L. bicrenata (Schm.), Dum. On dryish banks on heaths. Rare.

5.* Dunkery (1915). Gupworthy, above Dunster! (K., 1920).

6.* Near Bristol (G., 1880).

L. excisa (Dicks.), Dum. On somewhat shaded soil on the hills. Rare.

5.* Treborough (1915, M.E.R. 1916). Staple Hill (1000 ft.). Gupworthy, near Dunster! (K.). Bewley Down, with form *cylindracea* (1920).

L. incisa (Schr.), Dum. In moist peaty places. Rare.

5.* Treborough (1915). Near top of Horner Wood (K., 1920).

L. quinquedentata (Huds.), Cogn. On moist rocks. Rare.

5.* Treborough (1915, M.E.R. 1916). Minehead (K., 1920).

6.* Blackrock Valley, Cheddar (1920).

L. floerkii (W. and M.), Schiff. On heaths. Very rare.

5.* Near Landacre Bridge, Withypool (1918, M.E.R. 1919).

L. attenuata (Mart.), Dum. Very rare.

5.* On a heap of stones, Bewley Down, with form *eflagellis* (1920).

L. atlantica (Kaal.), Schiffn. A plant growing with the preceding had gemmae which were red, both in mass and when examined singly under the microscope; otherwise I should have been inclined to refer it to a form of the preceding species.

Sphenolobus exsectiformis (Breid.), Steph. On peaty banks. Rare.

5.* Near Dunster! (K., 1920). Minehead (K.). Linnington, near Chard. Recorded for Gloucestershire (K.).

Plagiochila asplenioides (L.), Dum. Com. on shady banks and in woods. Collected in 6 near Frome! (P., 1868), and in 5 at Bagborough! (C.P., 1872).

Var. *major*, Nees. The common plant of shaded banks. First records as in the type. The form *subintegerrima* Schiff. is frequent in both vice-counties. In 5 I have noticed it at Bury, Haddeo Valley (1915), Dulverton (M.E.R., 1919), Brendon Hill (M.E.R., 1917), Birchwood and Milverton ; in 6 at Bruton (1907), Ebbor, Harptree Combe, Leigh Wood and Penselwood.

Var. *minor*, Lind. On less shaded banks and rocks.

5.* Horner (1914. Form *laxa* Mat. also occurs). Merridge (M.E.R., 1915). Broomfield. Treborough. Brompton Ralph. Clatworthy.

6.* Rowberrow (1920). Harptree Combe (and form *laxa*, 1920). Wells.

Var. *humilis*, Lind. On shady sandy banks and in limestone scrub.

5.* Buckland St. Mary (1920). Wellington. Form *laxa* Schiffn. at Winsham and Horner (1914).

6.* In limestone scrub, Cleeve Hill and Goblin Combe (1917). On soil cap of dolomitic conglomerate, Shipham.

P. spinulosa (L.), Dum. On moist shaded rocky banks. Infrequent.

5.* Holford Combe (1914). Clammer, Haddeo Valley. Combe below Raleigh's Cross. Several places between Haddeo Bridge and Exton (1918, M.E.R. 1919). Horner (K.).

6. Near Bruton (1913). Recorded for Gloucestershire (K.)

Lophocolea bidentata (L.), Dum. Com. on moist banks, rocks and walls. Recorded for 5 from Cothelstone (*J. of Bot.*, 1909), and for 6 from Beckington ! (P., 1867).

Form *latifolia*, Nees. In wetter places. Frequent.

5.* Stream side, Merridge (600 ft., 1913). Wet place, Blagdon Hill (800 ft.). Orchard Portman. Castle Neroche. Treborough (1000 ft.). Near Leigh waterfall, Brendons. Near Haddeo Bridge.

6.* Edge of bog on Black Down, Mendip (1915). Harptree Combe.

L. cuspidata, Limpr. On banks, walls and decaying stumps. One of the most common and widely distributed liverworts in the county, and one of the few liverworts common

in lowland districts, where the agriculturist has rendered the conditions less favourable to their development.

First records :—C.C. 1905 for 5. Failand (F., 1907) and Bruton (M.E.R., 1909) for 6.

L. alata, Mitt. On moist banks and rocks. Rare.

5.* Linnington, near Chard (*teste* K., 1921).

6. Failand (F., *teste* Macvicar, 1909). Bruton.

L. heterophylla (Schrad.), Dum. More commonly occurs on decaying logs and stumps and on tree bases than the other species of this genus, but it is also found on sandy banks and rocks. Com. Forms *laxior* Nees, and *multiformis* Nees, are co-extensive or almost so. Recorded for 6 from Gare Hill! (P., 1868), and for 5 from Cothelstone (*J. of Bot.*, 1909).

Chiloscyphus polyanthus (L.), Corda. Well-sides, stream-sides, wet ground and rock. Com. in the hilly districts.

First records :—For 5, C.C. For 6, Berkley! (P., 1868).

Var. *rivularis* (Schrad), Nees. In quickly running water. Rare.

5. Cocker Combe (1912, M.E.R. 1913). Halsway Combe. Oareford. In a tributary to the Barle, above Dulverton.

Var. *fragilis* (Roth.), Müll. In wetter places than the type. A common habitat is on stones in streams, near the average level of the water. It is common in the combes of hilly parts in the west of the county (first noticed on the Quantocks, 1912), but has hitherto not been recorded for 6, though it probably occurs on the siliceous rocks of Mendip. Recorded for Gloucestershire (K.).

C. pallescens (Ehrh.), Dum. Moist banks. Infrequent.

5. Aisholt (1912), Holford Combe and Halsway, Quantocks. Elworthy. Bury. Haddeo Valley. Selworthy. Exmoor.

6. C.C., 1905. Black Down! (K., 1912). Yatton. Leigh Wood. Wells (on wood near water).

Saccogyna viticulosa (Sm.), Dum. Amongst mosses on wet rocks. 0—1700 ft.

5.* Porlock! (C.P., 1846). Horner. Mineral Railway Incline and above Leigh waterfall, Brendons. Wet bank near Dunkery Beacon (S.).

6. Near Bruton (1912). Longleat (1915).

Cephalozia bicuspidata (L.), Dum. On moist soil and rocks, from sea-level to near summit of Dunkery; occasionally on rotting stumps (c. fr., Holford C.). Com. and often fertile. Gare Hill! (P., 1869) for 6, and Taunton (*J. of Bot.*, 1909) for 5. Often with gemmiferous heads at Shapwick.

Var. *conferta*, Hub. usually on sandier and rather drier ground.

5.* Hawkcombe Head, above Porlock (1915). Hodder's Combe (M.E.R., 1916).

6.* On Greensand bank, Stourhead (1920).

C. lammersiana (Hub.), Spr. In wetter places than the preceding species. Rare.

5.* On dripping bank, Blagdon Hill (1915). Croydon Hill (1000 ft.).

C. media, Lindb. Damp banks in oak (*Q. sessiliflora*) woods. Rare.

5.* Abundant and often fertile in oak woods at Luxborough and Croydon Hill combes (1913). Holford Combe. Horner Wood. Minehead! (K., 1920).

C. connivens (Dicks.), Lindb. On moist peaty ground, often amongst Sphagnum. Often fertile. Infrequent.

5.* Chard Common (1914, Bry. Zon.). Staple Hill, Widcombe Moor and Bewley Down, Blackdowns. Hodder's Combe. Horner Combe. Ley Hill (900 ft., with rhizoids much swollen at apices) and Simonsbath (1400 ft.), Exmoor. Croydon Hill, above Dunster! (K., 1920). Near Dunkery Beacon! (S.)

Cephaloziella byssacea (Roth.), Warnst. On peaty ground, occasionally on rocks and decaying roots of heather. On drier ground its colour is usually reddish-brown or purplish, on wet ground green. Frequent in the peaty districts. Often sterile.

5.* Minehead (1913). Horner (*teste* Macvicar). Exmoor. Quantocks. Blackdowns. Croydon Hill! (K.).

6.* Near Bristol (G., 1880). Leigh Wood! (Read, 1904). Black Down (1915). Harptree Combe. Cleeve Hill. Brean Down. Wells. Frome.

Some of the plants, *e.g.* those from Bewley Down, 5

(1920), and Harptree Combe, 6 (1920), may be referable to *C. douini* Schiff. They are not *C. byssacea* var. *asperifolia* (Jens.) Macv., which is given by Müller as a synonym.

C. bifida (Schr.), Schiff. This is probably not rare in both vice-counties, but has only been noticed on Haddon Down, 5 (1915). It has been recently recorded for Gloucestershire (K.).

Odontoschisma sphagni (Dicks.), Dum. Bogs and wet heaths amongst Sphagnum.

5.* Widcombe Moor (1914) and Bewley Down, Blackdowns. Winsford Hill. Exton (M.E.R., 1916).

Calypogeia trichomanis (L.), Corda. Usually in damp places on heaths and moors, but occasionally in wet places amongst Sphagnum. Com. from sea-level to the highest parts of Exmoor. Collected in 6 at Shapwick (C.P., 1849), and in 5 from near Taunton (1909). Aquatic forms from a ditch at Shapwick, 6 (C.P., 1849), and from a Sphagnum bog at Cocker Combe, 5 (1913), may be referable to the var. *aquatica* Ingh.

C. fissa (L.), Raddi. Commoner than the last and usually in moister or shadier places. The Calypogeia by streamsides in our woods and combes usually belongs to this species. Recorded for 5 from Timberscombe and for 6 from Bruton (*J. of Bot.*, 1909). An aquatic form with long stems and decurrent leaves is common amongst Sphagnum (Bry. Zon.).

C. neesiana (C. and M.), Mass. On sandy bank. Very rare.

5.* Hodder's Combe, Quantocks (1913).

C. arguta, N. and M. Com. in shady nooks, especially those of peaty moist banks and on banks where shaded by other bryophytes. Collected in 6 at Frome! (P., 1868), and in 5 near Taunton (1909). The specimen of *Jungermannia divaricata*, collected in 1876 from Leigh Wood, near Bristol, by the Rev. A. Ley, is this plant (*sec* K.).

Bazzania trilobata (L.), Gray. On moist shaded banks and rocks. Rare.

5.* Tarr Steps (*leg.* Miss A. Miller of Cheddon, 1915). Bewley Down and Whitestaunton (1920). Porlock (K., 1920).

Lepidozia reptans (L.), Dum. Com. on peaty banks. Collected in 5 at Minehead! (Boswell, 1867), and in 6 at Gare Hill! (P., 1868). A form agreeing with *L. intermedia* Schiff. *ad interim*, is found on the Quantocks.

L. trichoclados, K. Müll. Recorded from a wet bank near Dunkery Beacon (S., 1918).

L. setacea (Web.), Mitt. On moist peaty soil and amongst Sphagnum. Rare.

5.* Staple Hill (1916) and Bewley Down, Blackdowns. Dunkery.

6. Downhead Common (P., 1881).

A form occurring amongst Sphagnum (Bewley Down, 5) may possibly go under var. *sertularioides* (Hub.) Cooke. Some of our plants may be the closely-allied *L. sylvatica* Evans, but, in the absence of perianths, such a determination is doubtful.

Ptilidium ciliare (L.), Hampe. Heaths, on moist banks and rocks. Infrequent.

5.* Simonsbath! (C.P., 1850). Minehead (1914). On rock, Treborough. On peat, Will's Neck and near Bagborough Plantation.

P. pulcherrimum (Web.), Hampe. Very rare.

5. On sandstone, Selworthy, 1912 (*teste* Ingham).

Trichocolea tomentella (Ehrh.), Dum. Wet banks. Infrequent.

5. C.C. Horner combes (1913). Holford Combe (abundant), Leigh Wood and Waterfall, and combe below Raleigh's Cross, Brendons.

6. Berkley Wood (P., 1869). Failand (Sir Edward Fry, 1885; "now extinct," F.). Cogley Wood and King's Warren, near Bruton.

Diplophyllum albicans (L.), Dum. Com. on heathy banks and on rocks. This is the most abundant hepatic in the county; it is extremely common in oak woods, but it is not so widely distributed as *Lophocolea cuspidata* and seldom occurs in well-cultivated districts. It probably owes its great frequency to the conducting line of cells in its leaves. Recorded for 6 from Gare Hill! (P., 1868), and for 5 from Exmoor! (Armitage, 1891).

Scapania compacta (Roth.), Dum. On rocks and rocky banks. Often fertile. Frequent in 5 and probably so in 6, though not hitherto recorded. It has been found in Gloucestershire (K.).

First record for 5, Minehead (*J. of Bot.*, 1909).

S. aequiloba (Schw.), Dum. On calcareous rocks and soil. Rare.

6. C.C. Cheddar Gorge (R. 1915, M.E.R. Sect. II, 1920). Harptree Combe, Mendip (*sec.* D. A. Jones).

S. gracilis (Lindb.), Kaal. Among rocks and on rocky banks. Infrequent. Chiefly on upland siliceous rocks, but sometimes on limestone.

5. Exmoor! (Armitage, 1891). Castle Neroche (1912). Horner. Badgworthy. Simonsbath. Bewley Down.
6. C.C. Ebbor Gorge, Burrington Combe, and Blackrock Valley, Mendip.

Var. *minor*, Pears.

5.* Bewley Down (1920).

S. aspera, Bern. On calcareous rocks and soil. Rare, except on Mendip.

6. C.C. Cheddar! (K., 1913). Burrington Combe. Blackrock Valley. Goblin and Brockley Combes. Cleeve. Yatton. Harptree Combe.

S. nemorosa (L.), Dum. On moist rocks and banks in shady places. Infrequent.

5.* Oareford (1913). Winsford (M.E.R., 1919). Horner (K.). Bewley Down and Whitestaunton.
6. Near Bristol (G., about 1880). Frome. Longleat.

S. dentata, Dum. In springs on peat, sometimes on wet soil or wet rocks in siliceous and upland districts. Infrequent, except in the hilly parts of the west.

5.* Badgworthy (1913). Frequent on Exmoor, Quantocks and Brendons. Croydon Hill. Wellington. Castle Neroche.
6.* Black Down, Mendip (1915). Longleat.

Var. *ambigua*, De Not. In moist places.

5.* Frequent on Exmoor (1913), Quantocks (M.E.R., 1916), and Brendons. Wellington Hill.
6.* Black Down at 1000 ft. (1915). Longleat (M.E.R., 1916).

S. intermedia (Hus.), Pears. In rather drier places than *S. dentata*. Rare.

5.* Horner (1913, *teste* Macvicar). Quantocks. Croydon Hill. Near Leigh waterfall, Brendons. Castle Neroche.

S. undulata (L.), Dum. In springs and marshes, and on rocks in streams. Frequent on the hills of the west, but rare elsewhere.

5. Blackdowns (C.P., 1847). Frequent on Exmoor (M.E.R., 1916), Quantocks and Brendons. Croydon Hill.

6. C.C. 1913. Near Shipham. Longleat.

S. irrigua (Nees), Dum. Rare.

6.* On moist grassy ground near a wall at Longbottom Farm, Shipham (1920).

S. curta (Mart.), Dum. Usually on moist banks, sometimes on grassy drives in woods and occasionally on wet rocks. It occurs almost at sea-level at Shapwick, but is more frequent on the lower parts of the hills, ascending to 1200 ft. on Winsford Hill. Infrequent.

5.* Cocker (1915, M.E.R. 1916), Halsway and Holford Combes, Quantocks. Bury, Haddeo Valley. North Hill. Treborough and Leigh Wood. Staple Hill. Elworthy. Winsford Hill. Horner (K.). Bewley Down.

6.* Shapwick (1913). Longleat.

S. umbrosa (Schr.), Dum. On peaty banks, etc., in hilly districts.

5.* Horner (K., 1920).

6.* Recorded from near Bristol by Green (about 1880). It has been found in Gloucestershire (K.).

Radula complanata (L.), Dum. On trees and shrubs, but occasionally on shady moist rocks. Com., especially in the lowlands. Commonly fertile. Gemmae are frequently produced, and are sometimes very abundant on specimens which undoubtedly belong to this species owing to their paroicous character.

Recorded for 6 from Laverton ! (P., 1868), and for 5 from Taunton (*J. of Bot.*, 1909).

Madotheca laevigata (Schr.), Dum. On damp shady rocks. Rare.

6. Nettlebridge ! (P., 1881). Cheddar Wood (1920). Harptree Combe.

M. thuja (Dicks.), Dum. On rocks near the coast. Rare.
5.* Horner (1913).

M. platyphylla (L.), Dum. On rocks, walls and at the bases of trees. Com. Most abundant in limestone districts. In siliceous districts it usually occurs on the soil-caps of mortared walls. Collected in 6 at Lullington ! (P., 1868), and in 5 from Exmoor ! (Armitage, 1891).

M. rivularis, Nees. In similar places to *M. platyphylla*, but under moister conditions. Rare.
5.* Birchwood, Blackdowns (1920).

M. porella (Dicks.), Nees. On stones submerged in streams. Very rare.
5.* On rocks in the R. Barle below Tarr Steps (1918, M.E.R. 1919).

FAMILY JUBULACEÆ.

Lejeunea cavifolia (Ehrh.), Lindb. On rocks and trees, and sometimes on banks in moist shady places. Com. from near sea-level to over 1000 ft. and often fertile. Collected in 6 near Bristol (G., 1880) and Goblin Combe (*J. of Bot.*, 1909), and in 5 at Dunster (1911).
Var. *planiuscula*, Lindb. On moist rocks. Apparently rare.
5.* Oareford, Exmoor (1913).
6.* Ebbor Gorge (1920).
Var. *heterophylla*, Carr. A plant of wetter ground or rocks. I have some recollection of gathering it in Horner Wood, but have no specimens to verify the record. Many plants of dripping rocks belong to type.

Microlejeunea ulicina (Tayl.), Evans. On trees (birch, beech, ash, oak, etc.) and on gorse, usually in shady places. Rather frequent, but often overlooked owing to its minuteness.
5.* Clammer, Haddeo Valley (1915). On oak at 900 ft., Staple Hill. Whitestaunton. Linnington.
6. C.C. King's Warren and Longleat, on oak and ash (1915). Long Wood, Cheddar.

Marchesinia mackaii (Hook.), Gray. Usually on more or less shaded and vertical faces of limestone rocks.

6. Near Bruton (*J. of Bot.*, 1909). Cheddar ! (K., 1913). Ebbor Gorge ! (A. Wilson).

Jubula hutchinsiae (Hook.), Dum. Rare.

5.* On wet rock at the top of Leigh waterfall, near Treborough, at 700 ft. (1916).

Frullania tamarisci (L.), Dum. On rocks, trees and shrubs, occasionally on old heather, rarely on ground in woods (Longleat, V.C. 6, at 400 ft.). Com. from sea-level to the high parts of Exmoor. On rocks near the sea it is often almost black. On oak it is often of a peculiar reddish-brown colour (*e.g.* Exton, M.E.R. 1916). On oak and other trees it often stands out in lax green tufts, whilst *F. dilatata* on the same tree is appressed and brownish, but it is more constantly reddish than *F. dilatata*. First record for 5, Porlock ! (C.P., 1846) ; for 6, Mells ! (P., 1868).

Var. *robusta*, Lindb. Usually on damp rocks. Rare.

5.* Treborough (1916, M.E.R. 1917).

6.* Blackrock Valley and Ebbor Gorge, Mendip (1920).

F. dilatata (L.), Dum. Usually on trees, but occasionally on rocks. On coast shingle it often becomes almost black. Com. from sea-level to the high parts of Exmoor and often fertile. First records :—Frome district ! (P., 1868) for 6, and Exmoor ! (Armitage, 1891) for 5.

Var. *microphylla*, Nees. Some of our plants are probably referable to this variety.

ORDER IV. ANTHOCEROTALES.

FAMILY ANTHOCEROTACEÆ.

Anthoceros punctatus, L. Very rare. On shaded gravelly bank at 900 ft.

5.* In old quarry, Porlock (c. fr., June 1913, M.E.R. 1914).

A. crispulus (Mont.), Douin. Rare. Damp parts of an oat-field at 900 ft.

5.* Buckland St. Mary (c. fr., Sept. 1920).

A. husnoti, Steph. On moist stony soil by stream-sides, or on damp shaded stony banks. Rare.

5.* Horner Wood (c. fr., Dec. 1914, M.E.R. 1915) at 500 ft. Hodder's Combe (c. fr., Mar. 1920), at 800 ft. Combe from Croydon Hill to Dunster (c. fr., May 1920), at 400 ft. West Porlock (c. fr., Oct. 1920).

A. stableri, Steph. Rare.

5.* On a bare hedge-bank of Lower Permian Marl, near Monksilver, at 400 ft. (c. fr., Oct. 1916, M.E.R. 1917). On damp shaded crumbling Lynton Slate in quarry, Porlock, at 900 ft. (c. fr., 1918).

A. laevis, L. Damp or moist soil on banks and ditch-sides. Sometimes forms patches over 10 cms. in diameter.

5.* Near Crewkerne (1913). Hinton St. George (Downes, 1916). Aisholt. Cocker Combe. Washford. Orchard Wyndham. Leighland. Treborough. Combe Sydenham. Ley Hill, Porlock (a somewhat crisped form by stream-sides) at 900 ft. West Porlock. Combe St. Nicholas, Nimmer and Chaffcombe, near Chard.

Var. *aquatica*, mihi. In bog-springs or in running water, with such aquatic plants as *Montia fontana*, *Myosotis repens*, *Philonotis fontana*, *Chiloscyphus polyanthus* vars. *fragilis* and *rivularis*. Differs from the type in its lighter green colour, greater brittleness, more branched and crispate lobing, more compact habit and in the aquatic habitat.

5.* Halsway (1915), Bicknoller and Herridge Combes, Quantocks.

The neighbouring counties of Devonshire and Gloucestershire were credited in the Census Catalogue of 1913 with 122 (those given as doubtful not included in the number) and 82 hepatics respectively. A few additional records for Devon have been made by the author, and the number for Gloucestershire has been augmented to 96 by Mr. Knight.

Devon is probably richer in bryophytes than Somerset. Not only is there a greater diversity of surface and a more humid climate, but more alpine plants find suitable habitats

on the heights of Dartmoor. Wiltshire and Dorsetshire has been little investigated for hepatics, only being credited with 27 and 10 respectively.

The following are not recorded for Somerset but are recorded for both Devon and Gloucestershire, and are therefore likely to be found in the intervening county :—*Sphaerocarpus michelii*, *Prionolobus turneri*, *Lepidozia pinnata*, *Blepharostoma trichophyllum* and *Cololejeunea calcarea* (probably occurs on Mendip). *C. minutissima* is recorded for both Devon and Wiltshire. Its minuteness renders it very liable to be overlooked.

The following are recorded for Devon only :—*Riccia ciliata*, *R. crystallina*, *Dumortiera hirsuta*, *Metzgeria pubescens*, *Moerckia flotowiana* (found by the author on Braunton Burrows in 1914 ; this and *Riccia crystallina* have been sought for in vain on the Somerset sand-dunes), *Fossombronia mittenii*, *Haplomitrium hookeri*, *Gymnomitrium crenulatum*, *Marsupella pearsoni*, *M. aquatica*, *Alicularia compressa*, *Aplozia sphaerocarpa* v. *nana*, *A. lanceolata*, *Lophozia bantriensis*, *L. excisa* form *limprichtii*, *L. barbata*, *Sphenolobus ovatus*, *Plagiochila punctata*, *Leptoscyphus anomalus*, *Adelanthus decipiens*, *Diplophyllum obtusifolium*, *Scapania subalpina*, *S. uliginosa*, *Lejeunea patens*, *Frullania microphylla*, and *F. fragilifolia*.

Marsupella aquatica, *M. pearsoni*, *Alicularia compressa*, *Lophozia bantriensis* and *Plagiochila punctata* may occur on the higher parts of Exmoor, but, if they do, are rare, as they are conspicuous for liverworts and easily noticed in their habitats. For the fairly common *Leptoscyphus anomalus* and *Lophozia barbata*, many likely Somerset localities have been searched in vain. *Diplophyllum obtusifolium* and *Frullania fragilifolia* have probably been overlooked.

The following are recorded for Gloucestershire only :—*Sphaerocarpus texanus*, *Riccia warnstorfii*, *R. commutata*, *Fossombronia caespitiformis*, *Aplozia caespititia* (K.), *Jamesoniella subapicalis* (K.), *Lophozia mülleri*, *Cephalozia francisci*, *Cephaloziella stellulifera*, *C. limprichtii*, *C. myriantha* (K.), *C. baumgartneri* (K.), *Scapania nemorosa* v. *uliginosa*, and *Cololejeunea rossettiana*. Any of them are likely to occur in Somerset. *Lophozia mülleri* and *Cololejeunea rossettiana* prob-

ably occur on Mendip, which has been incompletely explored for hepatics. *Leptoscyphus taylori* is recorded for Wiltshire only. It is a conspicuous liverwort and, if it occurs on Exmoor, is rare.

In conclusion, I must express my indebtedness to many correspondents (and particularly to Mr. Knight) for kind help in tracing and verifying the records.