BRITISH BRYOLOGICAL SOCIETY

PRESIDENT: Dr M.O. HILL

BULLETIN

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SUBSCRIPTIONS 1991

Members are reminded that subscriptions, which are now £15 for full members, £7.50 for junior members and £1 for family members, are due on 1 January each year. All members were circulated with a notification and reminder in November. However, some Standing Order mandates were not amended and a number of subscriptions were still outstanding at the end of January. Members are asked to send the Membership Secretary any outstanding amounts, as soon as possible.
A.V. Smith, 1 Carr Meadow Cottages, Glossop Road, Little Hayfield, via Stockport, Cheshire, SK12 5NR.

THE SPRING FIELD MEETING, 1990, MORECAMBE

Though small in area, Lancashire north of the river Ribble encompasses a remarkably diverse range of habitats. This reflects its varied geology and topography. Most of the Bowland uplands are within its borders, and land rises to over 2000ft on the Pennine massif. Substantial limestone exposures, partly wooded, occur in the northern part of the county, notably in the Arnside, Hutton Roof and Leck Beck areas. These contain important bryophyte sites. The Bowland uplands are composed mainly of sandstones and shales, ranging from strongly acidic to base-enriched, much of which is overlain by peat above the upland fence. The richest bryophyte habitats in this area include the upland mires, and the ravine woodlands on the northern slopes. It was in order to survey these and other habitats that the members of the Society foregathered in April 1990.

The headquarters for the week was the Belle Vue Hotel on the Morecambe sea front, and this proved to be good value. It was comfortable and warm, the food good, and the proprietors willingly accommodated our particular requirements. A total of 40 people attended the meeting for at least some of the time, and all but three came on field excursions. We were especially pleased to welcome an overseas contingent - Barbara Murray from Alaska, and Lillian Franck, Heike Hofmann and Johannes Vogel from Germany. The weather was generally kind. Apart from rain on the Thursday and the following Monday, the week was mostly warm and bright with much sunshine.

4 April. Clougha Pike. Three stalwarts attended the short afternoon excursion on the first day. We met at the car park below Clougha Pike. Though only three miles from Lancaster City centre, the area has much of interest. A rather small range of typical bryophytes was found in the stunted oak woodland which covered blocky gritstone talus at the base of the hillslope, though these were often in abundance. *Dicranum fuscescens* was notably common on boulders and as an epiphyte. *Dicranum majus*, *Leucobryum glaucum*, *Campylopus flexuosus*, *Lepidozia reptans*, *Barbilophozia floerkei* and *Scapania gracilis* were prominent members of the community. On open block talus screes above, bryophytes were often luxuriant. Most notable was the frequent occurrence of *Lepidozia cupressina*, which in Lancashire is most common on Clougha Pike. Other species noted included *Sphagnum quinquefarium*, *Mylia taylorii*, *Kurzia trichoclados*, *Barbilophozia atlantica*, *Racomitrium lanuginosum* and *Calypogeia integristipula*.

5 April. Dalton Crags and Leck Beck. Two separate venues were planned for the first full day. Nineteen members assembled at Dalton Crags, an area of partly wooded limestone pavement, which rises to the limestone plateau of Hutton Roof. Torrential rain with hail engulfed us soon after entering the site, but fortunately lasted only a short time, and eventually the sun appeared. The bryophyte flora was rich and interesting. Common species such as *Ctenidium molluscum*, *Isothecium myurum*, *Porella platyphylla*, *Thamnobryum alopecurum*, *Anomodon viticulosus*, *Tortella tortuosa* and *Fissidens cristatus* covered boulders, and the clints and grikes. Rather more local taxa included *Funaria muhlenbergii*, *Bryum elegans*, *Rhytidium rugosum*, *Barbilophozia barbata* and *Marchesinia mackaii*. Peter Martin found *Tortella densa**, new to v.c.60. *Cololejeunea calcarea*, *C. rossettiana* and *Seligeria pusilla* were found in small quantity on vertical rock faces, and thin peat over limestone supported such calcifuges as *Leucobryum glaucum*, *Pleurozium schreberi* and *Racomitrium lanuginosum*. Epiphytes on a few Elders included *Ulota crispa* var. *norvegica*, *U. phyllantha*, *Orthotrichum pulchellum*, *Zygodon conoideus* and *Metzgeria fruticulosa*.

In the afternoon, we made our way westwards to survey Springs Wood and part of the Leck Beck above Leck village. A good range of species typical of bouldery streams included *Brachythecium plumosum*, *Hygrohypnum luridum*, *Schistidium alpicola*, *Amblystegium tenax*, *Cinclidotus fontinaloides* and *Thamnobryum alopecurum*. The more interesting species of the wooded banks and rocks above were *Plagiochila britannica*, *Thuidium delicatulum*, *Scapania*

aspera, *Tritomaria quinquedentata*, *Taxiphyllum wissgrillii* and *Breutelia chrysocoma*. Chris Preston detected *Cryphaea heteromalla** new to v.c.60, and also on Elders were *Orthotrichum lyellii*, *O. stramineum* and *Ulota phyllantha*. On the west side of the Leck Beck, Springs Wood itself was, however, disappointingly poor. One or two members of the party ventured further up the valley and, *inter alia*, added the Lancashire rarities *Bartramia ithyphylla*, *Fissidens osmundoides* and *Racomitrium ericoides* to the day's list.

6 April. Ease Gill and Greygareth Fell. We spent the whole of this sunny day in the extreme north-west of the county, where Lancashire attains its highest elevation. Mark Hill and a few others headed for the highest ground, and, having expressed a wish to survey the most species-poor tetrad in the area, spent the day exploring acidic habitats up to 2000ft on Greygareth Fell. In a small tally of species, there were, however, some interesting finds including *Andreaea rupestris*, *Splachnum sphaericum*, *S. ampullaceum*, and *Calypogeia azurea*, all rare in Lancashire. The rest of the party spent the day examining the bryophyte flora of the limestone scars, grassland and flushes bordering East Gill, and the adjacent heather moorland. This area is the richest bryologically in the county, and has a splendid array of species in abundance. Notable species seen today included *Hylocomium brevirostre*, *Orthothecium intricatum*, *Plagiopus oederi*, *Seligeria acutifolia*, *Apometzgeria pubescens*, *Lejeunea patens*, *Plagiochila spinulosa*, and *Porella arboris-vitae*. Jeremy Roberts and Nick Hodgetts rediscovered *Bazzania tricrenata*, which had not been seen since 1905. Nick and the local secretary independently found *Pedinophyllum interruptum**, Cliff Townsend collected *Tortula subulata* var. *graeffii** and also confirmed for v.c.60 was *Mnium thomsonii**. *Zygodon baumgartneri** was found on the base of an Ash tree growing from the limestone scar. Of particular note was the abundance of *Cololejeunea calcarea* in dry shaded crevices or under overhangs, as was the abundance of fruiting *Neckera crispa* above. The only disappointment on an otherwise most successful day (over 200 species recorded) was the failure to locate the small calciphilous mire in which *Cinclidium stygium* was found in 1906, and to confirm its presence.

7 April. Littledale, Foxdale and Wardstone. Saturday was the best attended day, the sun shone, and 32 members and friends assembled at Littledale Hall above Caton. The objective was to survey Foxdale Beck and the surrounding woods and upland habitats. Most people did not venture far up the valley, being content to examine the fairly rich flora of the boundary stream and adjacent woodland in the first quarter mile. Species here included *Seligeria pusilla*, *Brachydontium trichodes*, *Bazzania trilobata*, *Nowellia curvifolia* on rotting logs, *Hookeria lucens* on a seepage bank, and an abundance of *Lejeunea ulicina* and *Metzgeria temperata* on tree trunks.

Others went further up Foxdale Beck, and recorded a hundred or so species on rock, heathery slopes, and in base-enriched seepages. Of particular note along the beck were *Amphidium mougeotii*, *Blindia acuta*, *Fissidens taxifolius* var. *pallidicaulis*, *Bartramia ithyphylla*, *Gyroweisia tenuis* and *Oligotrichum hercynicum*. The *Calluna-Vaccinium* covered hillslopes, supported the characteristic association of *Dicranum majus*, *Rhytidiadelphus loreus*, *Bazzania trilobata*, *Barbilophozia floerkei*, *Lepidozia reptans* and *Plagiothecium undulatum*. Here were recorded *Calypogeia neesiana*, *Polytrichum alpinum*, and *Kurzia trichoclados* in abundance. Several people remarked on the very fine show of typical *Rhynchostegium alopecuroides* which occurred locally in abundance in Foxdale Beck: one member said he was now "happy to believe in the species".

The Presidential Party as usual headed for high ground, i.e. the summit of Wardstone, and provided lists for several tetrads. The acidic ground was poor in species and nothing of special note was found. Eleven species of *Sphagnum* included *S. quinquefarium*, *S. russowii* and *S. tenellum*. *Nardia compressa* was abundant in some rocky streams, and *Tetrodontium brownianum* was found in one or two deep crevices.

At the end of the day a few members visited the nearby Cragg Wood, and recorded *Fontinalis squamosa* in its stream.

8 April. Whitendale and Dunsop Bridge. Twenty-seven members attended today's field meeting. We travelled south-west over the Trough of Bowland to Dunsop Bridge, and thence north along private estate roads into Whitendale. This was unknown territory bryologically, and it proved to be poor for a number of contributory reasons. The Whitendale river was strongly eutrophicated as evidenced by abundant algal growths, and bryophytes were few and sparse. The hillsides were heavily grazed, and bare peat locally exposed. The valley was south-facing, and almost all the ground was strongly acidic. However, after the riches of the previous days, the relative paucity of the flora did at least provide an opportunity for the common upland species to be studied at leisure. And it was good to take things easy on this cloudless and warm day. Roy Perry and Barbara Murray discovered a small quantity of *Anastrepta orcadensis* and new finds in the lower valley included *Dicranella cerviculata* and *Sphagnum girgensohnii*.

The more energetic made the long walk to the head of the valley and the plateau above. Despite the unpromising terrain, small basic areas were found, and the more interesting species included *Anomobryum filiforme*, *Fissidens osmundoides*, *Philonotis calcarea*, *Sphagnum teres* and *Scapania umbrosa*. David Long found *Bryum riparium** new to v.c.64 on a wet rock by the Whitendale River. Extensive rock scars on the upper slopes of the Bowland Fells look promising from a distance, but those of the party who examined them above Whitendale were inevitably disappointed. Aerial pollution has made them bryologically bald. The member for Twickenham, on examining the Great Bull Stones and finding nothing, professed "This is the worst place I've ever been!"

A survey of epiphytic species near Dunsop Bridge provided valuable records of *Cryphaea heteromalla*, *Ulota phyllantha*, *U. crispa* and *Orthotrichum pulchellum*.

9 April. Warton Crag and Gait Burrows. Limestone country was on the menu for today. The morning was spent at Warton Crag, a limestone hill overlooking Morecambe Bay. This hill has a series of scars and terraces, wooded below, which rise to areas of *Sesleria* grassland and limestone pavement above. A characteristic flora of the wooded scars included such species as *Cirriphyllum crassinervium*, *Brachythecium populeum* and *Mnium stellare* in abundance, and *Eurhynchium striatulum* was in huge quantity on shaded boulders and scars. Also recorded were *Reboulia hemisphaerica*, *Metzgeria conjugata* and *Cololejeunea rossettiana*. On the scars and pavements above, *Funaria muhlenbergii* was frequent, but *F. pulchella*, which was recorded here in 1902, was not refound. There were fine patches of *Riccia beyrichiana* in peaty hollows - sadly some was unnecessarily collected. Chris Preston discovered *Bryum canariense*, and Harold Whitehouse found *Pottia lanceolata*, which had not been recorded in Lancashire for 80 years.

For lunch and the afternoon session we moved to Gait Barrows National Nature Reserve, which contains the best single example of limestone pavement in Britain. The warden, Tony Aldridge, gave a much appreciated introductory talk on the reserve. Though extensive areas of pavement were removed for ornamental stone before the NNR was established (the huge quantity lining the Morecambe sea front, for example, bears testimony to the scale of past exploitation), large areas remain undamaged. Those of the party who had not hitherto seen limestone pavement, marvelled at the large area of massive, flat tubular limestone with "bonzai" Ash, Oak, Yew, Juniper and many other shrubs growing from its grikes. Of the large number of limestone bryophytes recorded, the most notable included *Platydictya confervoides*, *Barbula reflexa* in abundance, *Ditrichum flexicaule*, *Pleurochaete squarrosa*, *Rhytidium rugosum*, *Thuidium recognitum*, *Riccia beyrichiana*, and a second county record for *Tortella densa*. Of particular interest were the thin peat lenses which had developed on the flat limestone surface, which supported an intimate mixture of both calcicole and calcifuge species. Among the latter were *Calluna vulgaris*, *Hypericum pulchrum*, *Potentilla erecta*, *Hypnum jutlandicum*, *Pleurozium schreberi*, and *Plagiothecium undulatum*. Epiphytes included *Orthotrichum stramineum* on Elder, and *Cololejeunea calcarea* on a tree trunk. Hawes Water, a marl lake, was visited briefly, and *Campylium elodes* and *Eurhynchium speciosum* noted on its margins.

A cold wind with persistent light rain rather dampened enthusiasm at the end of the afternoon, and we were not unhappy to retreat to the warmth of the hotel.

10 April. Roeburndale. The last full day dawned overcast and remained so all day. A depleted party of 12 set out for Roeburndale to survey part of the valley upstream of the area visited by the Society in 1981. The morning was spent in Winder Wood, which is situated on a steep hillside bordering the river. Bryophytes were abundant on shaded and moist slopes by the woodland beck. Notable among them were *Seligeria recurvata* abundant on vertical sandstone faces, and the several square feet of *Ptilidium pulcherrimum* on a fallen tree. Cliff Townsend came across *Campylostelium saxicola*, and *Bryum capillare* var. *rufifolium** new to v.c.60. *Tetrodontium brownianum* occurred in dark places.

Further up the wooded valley at Haylotts, species characteristic of alluvial banks included *Atrichum crispum*, *Pogonatum urnigerum*, *Dicranella rufescens* and *Pohlia camptotrachela*. Shale scars had a typical flora including *Fissidens pusillus*, *Jungermannia pumila*, and *Heterocladium heteropterum*. Other species seen today were *Philonotis caespitosa*, *Hookeria lucens*, and *Ctendium molluscum* woodland taxon in both sites.

11 April. The Greeta gorge. Just three of us remained for the final morning's excursion. The first stop was a site by Morecambe Bay where the author found *Bryum donianum* in 1978, but we discovered that subsequent building operations had obliterated the site. A brief exploration was then made of part of the Keer banks at Carnforth, hoping to confirm historical records of one or two coastal species - but a complete blank, and not even *Pottia heimii* seen. Gressingham Bridge was the next stop, where we admired *Orthotrichum sprucei* which was common on silty tree-bases and branches in the flood zone of the river Lune.

However, the main objective of the morning was to re-find *Campylostelium saxicola* in the gorge of the River Greeta where Albert Wilson recorded it in 1905. We were lucky enough to find it fruiting well on two pieces of calcareous sandstone on the floor of a hazel coppice area close to the river. The bryophyte flora is well-developed in this beautiful wooded gorge. It included abundant *Anomodon viticulosus*, *Porella platyphylla* and *Homalia trichomanoides* on tree bases, *Heterocladium heteropterum* var. *flaccidum*, *Mnium marginatum*, *Lejeunea cavifolia* and *Fissidens crassipes* on rocks, and *Cryphaea heteromalla* and *Dicranum montanum* on tree trunks.

During the week 23 tetrads were visited and a total of 368 taxa recorded. This total represents some 68% of the taxa recorded since 1950 in Lancashire north of the river Ribble. Despite there having been intensive survey in this area since 1979 in preparation for a Flora, 8 new county records and a substantial number of 10km square records were made. Thanks are due to all owners and occupiers for allowing us access to their land, to staff of the Nature Conservancy Council for help in planning the meeting, and to Tony Aldridge for welcoming us to Gait Barrows. Our grateful thanks also to the proprietors of the Belle Vue Hotel for their hospitality in many ways: for altering their normal mealtimes to suit us, for keeping the television off and the bar open, and allowing a comprehensive rearrangement of the dining room for the Council meeting. Finally, I should like to thank all participants of field excursions who made this such an enjoyable and successful meeting.

M.J. WIGGINTON

THE SUMMER MEETING, 1990, IRELAND

The 1990 Irish field meeting was held in the province of Ulster from 1st to 15th August. The first week was spent in Northern Ireland in counties Antrim and Londonderry and the second week in Donegal. It is interesting to note that the first ever Irish BBS meeting was held in Northern Ireland in August 1928 with Belfast as the centre. Since then the six counties have not been formally visited by the Society but they are, nevertheless, relatively

'well-worked', having been fertile hunting ground over many years for the late J.W. and R.D. Fitzgerald, both of whom hailed from this corner of Ireland.

Membership attendance was disappointingly low. Six members were present during the first week: Mr D. Synnott, Dr D. Kelly, Mr P. Hackney, Dr R. Weyl, Dr K. Lewis and Mr P. Martin, the latter being the only member from the British mainland. Dr P. Lightowlers and Mr T. Blockeel attended the second week in Co. Donegal. Some local naturalists with a special interest in bryophytes joined the excursions during the first week and we are indebted to the NI Countryside and Wildlife Branch for supplying useful details on the sites visited. A special tribute must be paid to Donal Synnott for his unfailing inspiration throughout the meeting. Despite an early setback which resulted in a temporary loss of voice and a subsequent dental mishap, he struggled on valiantly, effectively communicating his expertise with a finger in the book, a nod of the head and a wink of the eye.

Participants convened on the evening of 1 August at the Londonderry Arms, Carnlough. In addition to the members mentioned above, Miss M.D.B. Allen and Miss J. Shipp of the Belfast Naturalists' Field Club were present. County Antrim that evening was basking in beautiful sunshine; it was experiencing one of the hottest heat-waves of the century and no rain had fallen for almost a month. Poor bryophytes, we thought! We retired that evening pledging ourselves to pray for a drop of rain. Alas, within a couple of days, our folly was regretted.

THE FIRST WEEK IN COUNTIES ANTRIM AND LONDONDERRY

2 August, Glenarriff (VC H39; D 2120). Some 12 participants gathered in the car-park at the foot of the Glen on a sweltering hot morning. Glenarriff is the best known of the nine glens of Antrim; it is a deep, wooded gorge of mixed oak woodland through which the river tumbles in a series of cascades over hard basalt rock. The deep shade and wet basic conditions result in a luxuriant growth of bryophytes comparable to the woods of Kerry. A team of experts would doubtless have recorded an impressive list but as it was, the attention of the experts (mostly D. Synnott) was largely devoted to pointing out and identifying specimens for the benefit of less-experienced members. Abundant *Jubula hutchinsiae* was seen on wet rocks beside the river and we also recorded *Blindia acuta*, *Mnium marginatum*, *Isopterygium pulchellum*, *Plagiochila spinulosa*, *Scapania nemorea*, *Riccardia multifida*, *R. chamedryfolia* and *Metzgeria temperata*. *Leiocolea heterocolpos*, seen here by Jean Paton in 1969, the only known Irish location, was not spotted.

3 August, Garron Plateau (VC H39; D 2620). By the second day a sudden change of weather had occurred and a soft Irish drizzle was falling as the party climbed the steep track to the Garron Plateau. The Garron is a vast expanse of peatland and lakes, sharply delimited on its eastern side by the basalt cliffs of the Antrim coast and commanding uninterrupted views across the North Channel to the western coast of Scotland. It is a remote, inaccessible area of considerable botanical interest with rare vascular plants such as *Carex pauciflora* (its only Irish station), *C. dioica*, *Spiranthes romanzoffiana*, *Hammarbya paludosa*, *Groenlandia densa* and a few scattered growths of *Cryptogramma crispa*, so rare in Ireland. We were expertly guided over this difficult terrain by David Ledsham, a local naturalist and Carexologist with a special interest in the area.

The more noteworthy bryophytes seen were *Metzgeria temperata*, *Splachnum sphaericum*, *Tetraplodon mnioides*, *Calliergon sarmentosum*, *C. giganteum*, *Thuidium delicatulum*, *Pleurozia purpurea*, *Sphagnum compactum*, *S. contortum*, *S. cuspidatum*, *S. girgensohnii*, *S. magellanicum*, *S. palustre*, *S. papillosum*, *S. subnitens* ssp. *ferruginea*, *S. capillifolium*, *S. russowii*, *S. auriculatum* var. *auriculatum* and *S. tenellum*.

4 August, Murlough Bay (VC H39; D 1942) and Fair Head (VC H39; D 1743). Murlough Bay and Fair Head are well-known for their botanical and geological interest. Murlough Bay faces north-east and is enclosed on three sides by steep calcareous cliffs. Fair Head, two miles further north, rises to over 600 feet above sea level; on its coastal side huge

columns of dolerite form a vertical precipice, below which a massive boulder scree has developed stretching down to the sea.

The morning was spent exploring the mixed deciduous woodland on the scree slope overlooking Murlough Bay. The more interesting finds here were: *Dicranum fuscescens*, *Grimmia trichophylla* var. *stirtonii*(?), *Glyphomitrium daviesii*, *Barbilophozia floerkei*, *Bazzania trilobata*, *Lepidozia cupressina*, *Plagiochila spinulosa*, *Riccardia chamedryfolia*, *Scapania nemorea*, *S. umbrosa* and *S. gracilis*.

After lunch we took the cliff-top path to Fair Head crossing open moorland with exposed outcrops of glaciated rocks. We were delighted to find *Hedwigia integrifolia* growing in quantity intermixed with *H. ciliata* on a rocky outctop close to the cliff edge. Several species of *Sphagnum* were seen including *S. palustre*, *S. subnitens*, *S. recurvum* var. *mucronatum*, *S. capillifolium*, *S. tenellum* and *S. teres*. Three members scrambled down the Grey Man's Path to explore the block scree at the base of the cliff, known to harbour subalpine species such as *Herbertus aduncus* ssp. *hutchinsiae*, *Bazzania tricrenata*, *Lepidozia pearsonii*, *Marsupella sprucei* and *Gymnomitrion concinnatum*. Disappointingly, none of these was found but *Pohlia muyldermansii** was found on detritus beside the path and abundant *Glyphomitrium daviesii* was seen on the shaded rock surfaces.

5 August, Craigagh Wood (VC H39; D 2232), Loughareema (VC H39; D 2035), Breen Wood (VC H39; D 1233). Sunday 5 August, was a cold, wet, blustery day and only six participants turned out. The morning was spent in Craigagh Wood, a mixed oak woodland on a steep, rocky slope with a southern aspect overlooking Cushendun. Both species of *Hymenophyllum* occur here and the bryophyte flora was abundant but lacking in variety. Apart from the usual woodland species the more interesting finds were *Bazzania trilobata*, *Plagiochila spinulosa* and a small patch of *Lophocolea fragrans*.

After lunch we proceeded to Breen Wood stopping *en route* at Loughareema to examine the muddy bed of the transient body of water, known locally as the 'vanishing' lake. *Barbula hornschuchiana*, *Hygrohypnum luridum*, *Hypnum lindbergii* and *Philonotis rigida* were soon added to our list. On arrival at Breen the weather had deteriorated sharply. Breen is one of a small number of native oak-woods still extant in the north of Ireland and well worthy of bryological investigation. But a scramble through wet undergrowth and a deluge from above curtailed enthusiasm and we did not tarry long. The following species were noted: *Pohlia muyldermansii*, *Sphagnum quinquefarium*, *Lejeunea ulicina*, *Lophocolea fragrans* and *Metzgeria temperata*.

6 August, Magilligan dunes (VC H40; C 6936). No excursion was planned for the morning to allow for moving headquarters from Carnlough to Castelrock in County Londonderry. A brief non-bryological stop was permitted *en route* at Bushmills on the north Antrim coast to witness the art of fine whiskey distilling. The party re-convened at 1.00 pm and proceeded to Ballymaclary Nature Reserve. Ballymaclary contains the most varied and unspoilt area of the extensive Magilligan Dunes and is not normally accessible to the public. In addition to the usual dune species *Thuidium philibertii* was seen and the less common *T. recognitum* and *T. abietinum* ssp. *abietinum* as well as ssp. *hystricosum*. Of special interest, however, was *Rhytidium rugosum*, unknown from elsewhere in Ireland, but growing in profusion here and covering extensive areas of the dry stabilized dunes. Some of the wetter regions of the extensive dune slacks yielded *Drepanocladus sendtneri* and contained an abundance of *Calliergon giganteum*.

7 August, Binevenagh (VC H40; C 6831). Binevenagh is a north-east facing cliff of basalt, 1200 ft high, overlooking Magilligan Strand, Lough Foyle and the Inishowen Peninsula of Donegal. It is a protected area with an arctic-alpine flora containing *Saxifraga oppositifolia* and *Silene acaulis*. The party explored the block scree at the base, parts of the cliff face and a deep crevice which extended to the top of the cliffs. Here Donal Synnott found *Eremonotus myriocarpus**. It also yielded *Drepanolejeunea hamatifolia*, *Harpalejeunea ovata*, *Lejeunea lamacerina*, *Frullania microphylla* and *F. fragilifolia*. The most noteworthy species seen

was *Rhytidium rugosum* of which a few scattered stems were found on the grassy slopes below the cliff. David Riley proposed a theory to account for its spread from this point to colonise the dunes of Magilligan Strand. Other species of interest were *Antitrichia curtipendula* and *Plagiochila spinulosa.*

8 August, Ness Wood (VC H40; C 5211) and Banagher Glen (VC H40; C 6704). The Ness is a deep gorge of mixed, semi-natural, oak woodland with a prominent waterfall and encroaching *Rhododendron* thicket. The most interesting area was in the vicinity of the waterfall where Peter Martin found a bank of *Fissidens celticus**. Also seen were *Rhynchostegiella teesdalei, Tetrodontium brownianum, Blasia pusilla, Lophocolea fragrans, Marchesinia mackaii* and *Nowellia curvifolia.*

Banagher Wood near Dungiven is some 12 miles west of the Ness. Banagher is a large native woodland composed of oak, birch and ash with several rivers running through it. It was late afternoon by the time the party reached here and the time available was mainly spent searching the paths and clearings. An abundance of *Jungermannia gracillima* was seen with quantities of *Oligotrichum hercynicum, Phaeoceros laevis, Riccia sorocarpa* and *Scapania irrigua* growing through it.

Thursday 9 August was set aside for moving headquarters to Co. Donegal. Some members paid a visit to the National Trust property at Downhill a little beyond Castlerock. Here they encountered Miss Eccles, eminent plantswoman, gardener and custodian of the domain of the late Earl-Bishop of Derry, and a veritable institution herself. She delighted them with tales of 'Belching Magilligan' and showed them *Phaeoceros laevis* ssp. *laevis* growing on her doorstep! Others made their way to Derry City to walk the walls, change money and buy provisions before crossing the border. The party re-convened that evening for dinner at Arnold's Hotel, Dunfanaghy, where we were joined by Philip Lightowlers and Tom Blockeel.

KEITH LEWIS

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THE SECOND WEEK IN COUNTY DONEGAL

The Summer Meeting in Ireland ended with five days based in the village of Dunfanaghy in north Donegal. The county was previously visited by the Society in 1962, and Dunfanaghy was also the base on that occasion. That meeting occupied a full fortnight, and it achieved a good coverage of West Donegal, so that we did not expect to make many surprising discoveries. We were well accommodated at Arnolds Hotel, and we specially looked forward at the end of each day to the excellent and wholesome dinners to be had there. The hotel grounds even obliged with two new vice-county records, *Orthotrichum diaphanum* on the car park wall, and *Dicranella staphylina* on bare soil under trees.

Unfortunately, the meeting was not well attended. Only six members were present (Paul Hackney, Keith Lewis, Philip Lightowlers, Peter Martin, Donal Synnott and myself), but we had guidance and support from two local naturalists, Dr. Ralph Forbes from Belfast, who guided us in Glenbheagh, and Ralphe Sheppard from Raphoe.

10 August. This day was devoted to Glenbheagh. Although this valley was visited during the 1962 meeting, a return trip seemed justified because the area is now a National Park, and it contains interesting fragments of Oak and Birch woodland. Unfortunately it is also infested with *Rhododendron,* and the intractable nature of this problem was obvious to us both in the woodlands and on otherwise bare hillsides covered with extensive and impenetrable thickets. We hoped that *Telaranea* might turn up by way of compensation but we were not so lucky. In the morning we explored Glenlack near the head of Lough Bheagh. This side valley contains some of the best of the Oak woodland, though none of the lower part that we visited was free of the *Rhododendron.* At the foot of the valley the trees were covered with the

commoner western hepatics, principally *Scapania gracilis*, *Plagiochila spinulosa* and *P. punctata*. Rotting stumps and peaty banks produced *Tritomaria exsectiformis*, *Odontoschisma denudatum*, *Kurzia trichoclados* and *Cephalozia catenulata*. The rocky stream had plentiful *Jubula hutchinsiae* and smaller amounts of *Hygrobiella laxifolia*, *Radula aquilegia* and *Aphanolejeunea microscopica*. Also recorded in the vicinity of the stream were *Dicranum scottianum* and *Harpanthus scutatus* on boulders, *Lepidozia cupressina* on rocks and logs, *Drepanolejeunea hamatifolia* on hazel, and *Eurhynchium praelongum* var. *stokesii* on the ground.

Later, we looked at the area of bog at the head of Lough Bheagh, but this proved unproductive. There were occasional patches of *Pleurozia purpurea*, but other species were sparse. *Hedwigia ciliata* and *Ulota hutchinsiae* were on boulders at the edge of the bog, and Donal climbed high enough to find *Anthelia julacea* and *Herbertus aduncus* ssp. *hutchinsiae*.

Glenbheagh Castle occupies a spectacular location on the shores of the Lough, and late in the afternoon we returned to look at the woodland above the gardens. Much of our interest, however, was held by the walls and man-made structures. These produced *Gyroweisia tenuis*, *Plagiochila britannica* and, on paths and flower beds, *Phaeoceros laevis* ssp. *laevis*. A fine flight of stone steps leading up through the woods had been colonised by numerous species, including *Drepanolejeunea hamatifolia*. In the woodland there were some particularly good patches of *Harpanthus scutatus* on boulders, and *Leptoscyphus cuneifolius* on trees. *Metzgeria temperata* was on ornamental trees near the lough side.

11 August. We decided to devote this day to the Horn Head peninsula immediately to the north of Dunfanaghy. The area held promise of base-rich rock, and there are extensive sand dunes and slacks adjacent. We parked the cars at Claggan, on the south-west of the peninsula and made our way across the ridge of Anloge Hill. Initial indications were good. *Funaria obtusa*, *F. attenuata*, *Haplomitrium hookeri* and *Riccia beyrichiana* were found at the side of the track leading towards the hill, and *Leiocolea* cf. *bantriensis* (sterile) was in a wet flush. *Neckera crispa* on the rocks held out a promise of rich pickings, but the promise was not really fulfilled. The rocks proved fairly unproductive, though small amounts of *Gymnostomum calcareum*, *Orthotrichum rupestre*, *Pterogonium gracile*, *Lophozia excisa* and *Plagiochila britannica* were seen.

After lunch in a field occupied by inquisitive donkeys, we continued south towards the dunes. The route took us across some marshy ground with *Plagiomnium ellipticum* and *Brachythecium mildeanum*, to the higher dunes some distance still above sea level. At the edge of the marsh was the most interesting ground of the day, a small but very productive patch of damp sand. Close scrutiny on hands and knees revealed the presence of *Distichium inclinatum*, *Amblyodon dealbatus*, *Catoscopium nigritum*, *Thuidium abietinum*, *Leiocolea badensis* and *Moerckia hibernica*. Though reluctant to leave this excellent place, we felt we had to explore the extensive wet slack at the foot of the dunes. In descending the sandhills, we found *Barbula reflexa*, *Entodon concinnus* and *Gymnostomum viridulum*, the latter forming crusts on stony ground blown clear of sand. The large slack, which contained some standing water, proved to be densely vegetated, with much *Scorpidium scorpioides* and *Calliergon giganteum*, but we could not find any more of the damp sand community that we had seen on the higher dunes.

12 August. We decided it was time for a day in the hills. The weather for the next three days was to be changeable, and we feared it might deteriorate. In the event, this was the worst day we could have chosen for the high ground. Persistent dense mist covered the ground above about 300 m. and frustrated our plans. The hills we hoped to climb were Aghla More and Aghla Beg, positioned between the better known Errigal and Muckish, and a little lower than either. Nevertheless there was promise of the northern hepatic mat, and *Adelanthus lindenbergianus*. Our approach was via the northern end of Altan Lough. We parked the cars near a trout farm, and made for the stream running down from L. Feeane. The boggy ground had much *Pleurozia purpurea*, and as we ascended the stream we began to encounter small quantities of *Herbertus aduncus* ssp. *hutchinsiae*, *Bazzania tricrenata*,

Lepidozia cupressina and *Mylia taylorii*. Other species included *Kurzia trichoclados*, *Sphenolobus minutus* and *Tetraplodon mnioides*. Eventually we reached the scree below and to the north-west of L. Feeane. The *Herbertus* and *Bazzania* were abundant here, but at scarcely 400 m. we were not high enough for the rarer hepatics. The mist was thick, and we thought it unwise to attempt the steep summit slopes, which were covered with sharp, broken quartzite scree. The afternoon proved a bit miserable, partly because of the mist and the disappointment of not reaching the high ground, and partly because of the dreary acid terrain which occupies the middle slopes of these hills. We would have been more cheerful had we known, as it turned out, that we had collected *Grimmia atrata* new to Ireland, both on the shore of L. Feeane and on the ridge between Aghla More and Aghla Beg, and nearby on the ridge *Anthelia juratzkana*. Other finds in the same area included *Dicranum scottianum*, *Campylopus schwarzii*, *Pohlia bulbifera*, *Ulota hutchinsiae*, *Racomitrium sudeticum*, *Jungermannia subelliptica* and *Hygrobiella laxifolia*.

We arrived back at Dunfanaghy relatively early, and Donal and I were keen to make something more of the day by visiting the well-wooded Ards Peninsula. Although much of the forest consists of planted conifers, the trees are mature and attractively interspersed with native species. We stopped at the main car park and walked to the dunes nearby, on the north side of the peninsula. These were much overgrown with course grass, but we found *Distichum inclinatum*, *Gymnostomum calcareum* and *Brachythecium glareosum* on a rocky bank with blown sand, and *Ulota phyllantha* with sporophytes on a scrubby Sycamore. We returned by a track through the woods. *Riccardia incurvata* was on a piece of disturbed ground by the track, and epiphytes included *Harpaleleunea ovata* and *Cololejeunea minutissima*. The lichens were quite spectacular, too.

13 August. Even before the frustrating day on the two Aghlas, there had been talk of an ascent of Muckish, where *Adelanthus lindenbergianus* and other oceanic-montane hepatics are known to occur. However, Donal was due to leave us at mid-day, and although the cloud cover was higher than it had been, the summit plateau of Muckish was still enshrouded and there did not seem much prospect of the cloud lifting. The morning was therefore spent in coastal habitats on the Rosguill peninsula. No especially rich sites were found, but the list of species seen included *Distichium inclinatum*, *Tortella flavovirens*, *Barbula reflexa*, *Thuidium delicatulum*, *Entodon concinnus* and *Blepharostoma trichophyllum*.

Ballyarr Reserve, east of Kilmacrenan, had been identified as a site with bryological potential, and we moved on to there in the early afternoon. The Reserve is a fine piece of old Oak and Birch wood set in undulating pasture land and it was known to harbour the ferns *Hymenophyllum tunbrigense* and *Dryopteris aemula*. We parked in a narrow lane on the north side. Soil by the roadside here produced *Dicranella staphylina*, *Bryum klinggraeffii*, *B. sauteri* and *Riccia sorocarpa*. To gain entry to the wood, we had to cross a field with much *Juncus*, where *Pseudephemerum nitidum*, *Pohlia camptotrachela* and *Fossombronia wondraczekii* were growing on damp peaty soil. Bryophytes were luxuriant in the wood, but there were surprisingly few Atlantic species, the most plentiful of these being *Plagiochila spinulosa*. Not a lot of rock is exposed, but there are several low vertical faces where the *Hymenophyllum* grows. This habitat produced *Lepidozia cupressina* and *Kurzia sylvatica*. Other records included *Plagiochila punctata* and *Metzgeria temperata* on Birch trees, *Hylocomium brevirostre* very fine in the ground flora, and *Sphagnum girgensohnii* in damp hollows.

14 August. This was the last day of the meeting and most of the party were heading home in the evening. This gave us the opportunity to take in areas in the south of Donegal which involve a very long return journey from Dunfanaghy. Two coastal sites had been identified where ultrabasic rocks outcrop. The first of these was west of Lettermacaward on Gweebarra Bay. The rock here certainly did not advertise its basicity in the composition of the flora, but there was a nice piece of wet ground in one of the pastures with plentiful *Anthoceros punctatus*, together with *Ephemerum serratum* var. *serratum* and *Pohlia camptotrachela*. The next site was at Sheskinmore Lough, a Reserve on the Rossbeg peninsula noted for its birdlife. As we walked down from the road to the north of the lough, it soon became obvious

that this was a better kind of rock. *Orthotrichum rupestre*, *Pterogonium gracile*, *Reboulia hemispherica*, *Frullania microphylla* and *F. teneriffae* turned up before we reached the reserve boundary. Additions by the lough included *Fissidens pusillus*, *Marchesinia mackaii* and, in the marsh, *Scorpidium scorpioides* and *Calliergon giganteum*. This was a beautiful place and the far side of the lough, backed by sandhills, was enticing. By now, however, it was mid afternoon and we were anxious to visit L. Eske - nearly an hour's drive away - to see what we were assured was the best Oak wood in Donegal. Our records would assist in ensuring protection of this very important wood.

We were not disappointed. We entered the wood by the lane on the west side of the lough. There is a rocky stream here, with abundant *Jubula hutchinsiae*. There must be traces of base in the rock, since other records on the stream bank included *Neckera crispa* forming ruffs about the bases of small trees, *Rhynchostegiella teesdalei*, *Blepharostoma trichophyllum*, *Cololejeunea calcarea* and, on damp ground, *Trichocolea tomentella*. The epiphytic flora was very attractive, and included *Leptoscyphus cuneifolius*, *Plagiochila spinulosa*, *P. punctata*, *P. exigua* (very fine male plants), *Frullania fragilifolia*, *Drepanolejeunea hamatifolia*, *Harpalejeunea ovata* and a little *Aphanolejeunea microscopica*. We certainly had no time to do justice to this habitat and only penetrated a little way into it. Further investigation would certainly be rewarding both here and in the ravine to the north of the lough at the base of the Blue Stack mountains.

In his report on the 1962 meeting, Ted Wallace remarked that most of the species likely to be encountered in the north-west of Ireland had now been recorded, and our own experiences confirmed this view. Certainly there are still unexpected finds to be made, and many details of distributions to be filled in. Be that as it may, the landscapes of Donegal are a real pleasure, and for me the biggest joy of all in the torrid summer of 1990 was the moist Atlantic climate!

T.L. BLOCKEEL

THE PAPER-READING MEETING, 1990, CAMBRIDGE

From the outset the Cambridge meeting was intended to be a special memorial event to celebrate two of the Society's most active and long-standing members, Professor Paul Richards and Dr Eustace Jones (Jonah). Between them they had clocked up 127 productive years as members of the Society, as a result of which the bryological world has become the richer.

In recognition of this achievement, all of the papers read on Saturday 22 September had some connection with the bryological interests of either Paul or Jonah. In practice this meant a special emphasis on tropical bryology, a passion they hold in common, and we were pleased to welcome two of our overseas members, Dr Tamás Pócs and Dr Rob Gradstein as guest speakers. The Tropical Bryology Group were able to capitalise on this concentration of tropical talent by calling a special workshop meeting in Cambridge on the Friday preceding the AGM.

After short autobiographical talks from Paul and Jonah the meeting heard about the bryological exploration of Africa and the taxonomy and ecology of tropical hepatics. In the afternoon, an ecological investigation of *Campylopus introflexus* and studies in the changing flora of southern Britain completed the day. Summaries of the papers, written by their authors, are presented below.

The surroundings of Downing College were distinguished and refined, as one would expect of Cambridge, and the weather provided us with a silver mist, for which the city is famed. The meeting was a memorable one, and the arrangements went very smoothly, thanks in no small part to the excellent organisation of the local secretary, Dr Phil Stanley.

▪ **Prof P.W. RICHARDS** (Cambridge): "My first steps in tropical bryology."

My first step in tropical bryology was when I set foot on Barbados, 1 August, 1929, on my way to British Guiana (now Guyana) as a member of the Oxford Exploration Club's expedition. In Welshman's Hall Gully I saw some epiphyllous liverworts, but it was not as good a place for bryophytes as Grenada where the ship called the next day.

The expedition set up camp at Moraballi Creek, a small tributary of the Essequibo about 80 km from the coast, on 11 August. With two other botanists, T.A.W. Davis and N.Y. Sandwith, I remained at Moraballi Creek until the end of November, collecting bryophytes, ferns and other cryptogamic plants, as well as working with Davis on the ecology of the rain forest.

My first impressions of the bryophytes were set out in a short paper which Mr H.N. Dixon invited me to give to a small informal meeting of bryologists in London in January 1930. I identified the mosses as well as I could with some help from Mr R.S. Williams of the New York Botanical Garden and published a list of them in the *Kew Bulletin* **8**, 317-337 (1934). My collection of hepatics was sent to Professor A.W. Evans (Yale University, U.S.A.). He identified about half of it and promised to send a list of the rest. He never did so and the specimens must be presumed lost. In 1953 I published 'Notes on the bryophyte communities of lowland tropical rain forest, with special reference to Moraballi Creek, British Guiana' (*Vegetatio* **5-6**, 319-328).

▪ **Dr E.W. JONES** (Kirtlington, Oxfordshire): 'What am I - Botanist, Forester, Physiologist, Ecology or Taxonomist?'

A few personal details which may help to answer the question are recorded in *BBS Bulletin* **42** (1983). I will add a few more here. I learned to recognise *Schistostega pennata* in a cave as a very small boy, but made no further progress bryologically until I became a student at Cambridge. Here I became most interested in what grows where and why (i.e. ecology) and as I walked the hills and moors and bogs of the north and west of Britain, where bryophytes are important members of the plant communities, it seemed to me that they had valuable information to give to the student who knew them. With vascular plants help in identification was readily available; with bryophytes one had to be one's own authority.

I chose for my doctoral studies a physiological subject because I believed (and still believe) that physiology should be the basis of ecology and provides a more rigorous discipline than does e.g. 'plant sociology'. I look upon bryophytes as members of living plant communities - **not** as twigs or branches of some hypothetical phylogenetic tree, and the primary job of the taxonomist as the production of classifications that aid identification of taxa and the prediction of behaviour; he should not upset well-tried practical classifications in order to make them conform with his own phylogenetic theories.

If I have specialised in the taxonomy of African hepatics it is simply because ecological work has taken me to Africa; I found there a gap which was plugged by disordered and often erroneous information which I was in a better position than most bryologists in 1948 to tidy up.

▪ **Dr A.J. HARRINGTON** (Natural History Museum, London): 'The bryological exploration of West Africa.'

Three discrete periods can be recognised in the bryological exploration of West Africa. The first of these - the heroic - extended from the end of the eighteenth century to the middle of the nineteenth. Plant collecting at this time was closely associated with exploration, the expansion of commerce and the suppression of the slave trade. The early botanists were beset by difficulties and illness, and it surprising that they managed to collect as many specimens as they did. Of those who included bryophytes amongst their collections, the following deserve special mention: Palisot de Beauvois (southern Nigeria, 1786-8), Adam

Afzelius (Sierra Leone, 1792-6), Mungo Park (?Mali, 1795-7), Theodor Vogel (southern Nigeria and Fernando Póo, 1841) and Charles Barter (mostly Nigeria and Fernando Póo, 1857-9).

The German botanist Gustav Mann, who made extensive collections in Cameroon and the islands of the Gulf of Guinea between 1860 and 1863, acts as a link with the second phase of exploration, the period of the resident collector. This extended from *c.* 1880 to the First World War, and thus coincides with the major period of colonial expansion. Collecting was concentrated in three areas:

1. Guinea and Senegal, where many specimens were gathered, mostly in the early years of the century, by French army officers and colonial administrators, notably Henri Pobéguin.
2. Western Cameroon. German and Swedish botanists collected extensively in the area of Cameroons Mountain in the 1890s, prominent amongst them the Swede Per Dusén who, unusually for the time, described several new moss species from his own material.
3. The islands of the Gulf of Guinea. The Portuguese botanists Moller, Newton and Quintas were active, especially on Sao Tomé and Príncipe, during the 1880s, while the German bryologist Wilhelm Mönkemeyer made a small but significant collection on Fernando Póo in 1885.

Collecting continued in the 30 or so years between the second and third periods of exploration, but the collections are mostly small and incidental; important exceptions are those of Auguste Chevalier from various parts of French West Africa, Paul Richards from south-west Nigeria and A.P.D. Jones from Nigeria.

The third period of exploration - the age of the specialist - commenced with the Cambridge Botanical Expedition of 1947-8 and continues to the present day. It is characterised by two features: the leading role played by trained bryologists in fieldwork, and the wealth of taxonomic studies produced. Many of these studies have benefited greatly from the key specimens collected on the Cambridge Expedition, and, more recently, by Eustace Jones and Paul Richards. The period has also witnessed the participation of indigenous botanists in collecting and research, a development vital for the future of bryology in the region.

In spite of more than 200 years of exploration our knowledge of the bryophyte flora of West Africa is still fragmentary and generally poor; some countries remain virtually unexplored (e.g. The Gambia, Guinea-Bissau), while even in comparatively well-worked states such as Nigeria large areas are scarcely known or have not been investigated. Many more field observations and collections are needed before a clear picture of the distribution and ecology of even the common species can be obtained.

▪ **Dr T. POCS** (Hungarian Academy of Sciences): 'The genus *Colura* in East Africa.

[Dr Pócs' paper appears on pages 33-39 of this *Bulletin*.]

▪ **Dr S.R. GRADSTEIN** (Institute of Systematic Botany, Utrecht): 'A view at the liverwort flora of tropical America.'

One of the earliest contributions on neotropical hepatics was by Olof Swartz, a Swedish doctor and pupil of Linnaeus, who collected in the West Indies in the late 18th century. Swartz published a comprehensive *Flora of the West Indies* in which he described about 30 species of liverworts. They are among the earliest names in tropical hepatics.

The first important collector who penetrated into the vast jungles of the Amazon, around 1820, was the German botanist Karl Friedrich Philipp von Martius, a director of the Botanical Garden of Munich. After his travels, Martius devoted the rest of his life to work up his collections and publish *Flora Brasiliensis*, probably the largest tropical Flora ever written. His Brazilian liverwort collections were studied by Nees von Esenbeck, who described about 70 species, virtually all of them new to science. No doubt the most

important 19th century collector of neotropical hepatics was Richard Spruce. Spruce was a Yorkshire man and an amateur botanist who, at the age of 32, decided to travel to South America. He remained there for about 15 years and brought back a huge collection of plants, most of which were studied by others except for the liverworts which Spruce decided to work up himself. Out of this came his *Hepaticae of the Amazon and the Andes*, which is the most important work that has ever been written on neotropical liverworts. Spruce treated about 600 species, many of which were new to science.

After Spruce many people worked on the liverworts of Tropical America. Probably the most notable contributions were made be Alexander W. Evans from Yale University, who wrote numerous important taxonomic papers on neotropical liverworts in the beginning of this century, and by his student, Margaret H. Fulford from the University of Cincinnati, who is author of the *Manual of the Leafy Hepaticae of Latin America.*

The neotropical liverwort flora counts about 180 genera and each year about one new genus is being added. The flora has about twice as many genera as Europe and, more significantly, generic endemism is about 25 times higher in the Neotropics! Schuster (1990) believes that the very high rate of liverwort endemism in the area - the highest in the world - is due to the eventful geological history of the region coupled with an extraordinary ecological complexity. I would like to comment, however, that the tropical flora is still very incompletely known and endemic taxa might in fact be more widespread. Examples of neotropical genera recently shown to be more widespread are *Arachniopsis* (also in Africa), *Gymnocoleopsis* (also in Africa) and *Cladomastigum* (=*Iwatsukia* from Asia).

The number of species in the neotropics can be only roughly estimated. Stephani in his *Species Hepaticarum* listed about 3000 species but my figures from monographs for FLORA NEOTROPICA indicate that there are probably no more than 1200 species. Most parts of Tropical America are still under-explored but some areas are certainly more poorly known than others. Whilst the West Indies have received considerable attention, large parts of the Amazon basin, the table mountains of Guayana and the Pacific coast of northern South America virtually remain *terra incognita.*

As to habitats, cultivated land, road sides and riverbeds are places of interest for liverworts which have been neglected. For example, the genus *Riccia* was unknown in the Guianas - one of the relatively better-explored regions in tropical America - until it was recently found to be relatively common in gardens. On bare soil in an oil palm plantation in coastal Ecuador, where vegetation had been removed with herbicides, we found masses of *Cyathodium* new to the country. Riverbeds contain interesting rheophytic forms such as *Myriocolea*, *Myriocoleopsis*, *Potamolejeunea* and *Stenorrhipis* which have only rarely been collected.

The habitat most urgently needing more study is the canopy of the tropical lowland rain forest. Dr Schuster has recently repeatedly called attention to the supposed poverty in liverworts of the lowland forest: "students are doomed to terrible disappointment, when first exposed to lowland tropical rainforest. They will miss the innumerable genera...of Hepaticae they have become familiar with in temperate and boreal climate (Schuster, 1988: 241). Over a distance of about 1000 km along the Amazon he could find no more than 50-60 hepatics and a square kilometre yielded no more than 5-10 species on average.

It should be realised, however, that most collecting in the tropical rain forest has been done at ground level, from tree trunks and fallen branches. Using mountaineering techniques my students have recently inventoried the bryophyte flora of the rain forest canopy in the Guianas, an area where Professor Richards did his classical work on tropical rain forest ecology (Richards, 1952, 1954). The results indicate that a single tree may on average harbour 50 species of bryophytes, the majority of them liverworts (Gradstein *et al.*, 1990). In humid forest almost 100 species of liverworts were found on only 28 trees. The sampling in the tree tops yielded many species new to the region, including taxa that had previously been collected only large distances away. *Verdoornianthus griffinii* (Lejeuneaceae), for

instance, was first described from a tree near Manaus (Brazil) in 1974 and has since been found in forest near Iquitos (Peru) and in French Guiana. The three localities are thousands of miles apart. I would expect that careful sampling of forest canopies in intermediate Amazonian lowland areas will yield many more collections of this and other "rare" species. The liverwort flora of the lowland rain forest certainly cannot be considered poor in species and is in urgent need of study in view of the continuing destruction of the forest.

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▪ **Dr M. EQUIHUA** (University of York): '*Campylopus introflexus* on the North York Moors National Park.'

Campylopus introflexus was first reported to be spreading in the British Isles by Professor P.W. Richards in 1963. He indicated that the first time this moss had been found in Britain was 1941. He also pointed out that from 1949 onwards it had been reported with increasing frequency from new localities in the British Isles. Professor Richards and Dr A.J.E. Smith in 1975 reported that by then *C. introflexus* had been found in 440 localities contrasting with the 120 known in 1963. It is now also known in Europe from France, Belgium, Denmark, Germany, Holland, Norway, Spain and Sweden and is thought to have originated from the temperate regions of the southern hemisphere.

The aim of the present research project on this species in the North York Moors is to explore the effects this moss could have on the moorland vegetation of the National Park. Two main issues were considered: first, how is its distribution related to the vegetation and other environmental factors, and second, what are the effects this moss could have on the recovery of *Calluna vulgaris* after being burnt or cut.

It was found that *C. introflexus* is most frequent on loamy stagnopodzols and open *Calluna* moor where the vegetation is around 18cm tall. It is possible to have a potentially active *Calluna* seed bank in carpets of *C. introflexus*; however, the activation of this seed bank can be severely limited by the hydrological balance. The presence of *C. introflexus* together with a limitation in water supply markedly reduces the germination rate of *Calluna* seeds. There was no evidence that *C.introflexus* has an allelopathic effect on the germination of *Calluna* seeds.

There are a number of management considerations. The moss seems to be promoted by the current management practice. Considering its potential effect on delaying recovery of the moor after heather burning, would it not be sensible to consider possible alternative management procedures? Because *Calluna* management is dependent on a quick recovery of the mature moor, *C. introflexus* should be considered a potentially important invasive species, with a potential impact on the local economy. What is the potential economic importance of the species?

▪ **Dr E.W. JONES** (Kirtlington, Oxfordshire): 'Two hundred years of Oxfordshire bryophytes.'

The first bryophyte flora of Oxfordshire, by John Sibthorp, was published in 1794. Subsequent important accounts of the flora appeared in 1886 (Henry Boswell), 1922 (G.C.

Druce) and 1952-5 (E.W. Jones). The number of taxa recorded from the county has increased from 108 in 1794 to 362 in 1990 - an increase due chiefly to the increasing discrimination and facility with which species have been recognised, but dependent on the presence of skilled observers.

The records are much less efficient for indicating losses than gains, but suggest that about 20 species may have become extinct; experience suggests that many more species have declined greatly in abundance and comparison of lists made during the period 1940-50 with lists made from 1970 onwards confirm some of these impressions. Drainage, changing agricultural practices (especially the increased use of fertilizers), changing silvicultural practices and a decline in grazing, especially by rabbits, have all contributed. The decline in frequency of many corticolous bryophytes has long been recognised as a widespread phenomenon and attributed to atmospheric pollution. Some terricolous species may also have declined for this reason.

There have, however, also been gains which are due to increasing frequency of the plants, not to increasing facility of recognition. Two or maybe three of these are riverside plants and may have been favoured either by eutrophication of the water or by regulation of water levels. The remaining species, at least 16 in number, for which an increase can be either proved or suspected, are all acidophile; most grow on wood or bark, but a few grow on earth.

Sibthorp's records suggest that fruit, especially of dioecious species, was produced more freely in the 18th century than it is now. In this, as also in the decline of some corticolous species and the increase of acidophile species, we seem to be seeing the effects of slight but prolonged atmospheric pollution, resulting in the slow but steady acidification of the substrata.

A much more detailed account is being prepared for publication.

▪ **Dr J. BATES** (Imperial College, Ascot): 'Studies of Berkshire's mosses and hepatics.

A progress report was given eight years into a ten-year flora project in Berkshire (v.-c. 22). Major environmental patterns are imposed by geology, rainfall variations and atmospheric pollution and their effects are seen in the distribution patterns of many species. Dot maps plotted using 5 x 5 km recording units showed the distribution of characteristic riparian, calcifuge, calcicole and epiphytic bryophytes. In the latter group a sequence of examples demonstrated putative differential sensitivities to atmospheric pollution and the importance of rainfall variation (*Metzgeria temperata* only occurs in the highest rainfall district). Some evidence was presented for an increase in the abundance of epiphytes, notably *Orthotrichum stramineum* and *Ulota phyllantha*, with falling SO_2 levels. Some bryophytes of arable fields, especially *Riccia* species, are much rarer than formerly while increases have continued, or are becoming apparent, for *Campylopus introflexus*, *Plagiothecium curvifolium*, *P. latebricola*, *Dicranum tauricum*, *D. montanum*, *Platygyrium repens* and *Zygodon conoideus*. Lastly, the warm dry climate of Berkshire is emphasised by recent discoveries of *Cololejeunea minutissima* and *Scorpiurium circinatum* and the persistence of a sizable population of *Pallavicinia lyellii* at Silwood Park for at least 20 years.

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Following the Annual General Meeting (Minutes in *Bulletin* **58**), there was an evening conversazione at which several demonstrations were staged.

PHILIP LIGHTOWLERS

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FIELD MEETING, 23 SEPTEMBER, 1990

After the dry summer of 1990 it was impossible to find suitable sites in Cambridgeshire for

an excursion, so members travelled to West Norfolk to visit Ringmere. This is one of the 'Breckland meres' and consists of a basin with a fluctuating water level, being full when the water-table of the underlying chalk is high. The water in the mere gradually fell during the summer of 1990 and the mere dried out (for the first time since 1977) shortly before the BBS excursion. *Riccia cavernosa* proved to be the first species to appear on newly exposed mud, and was locally abundant at higher levels. The rare *Physcomitrium eurystomum* was seen with the commoner *P. pyriforme* on the dried bed of the mere. The only other bryophyte which grew in quantity at this level was *Leptobryum pyriforme*.

A reduced party travelled to Grimes Graves for lunch. The grassland was too dry for serious bryologising, but we paid our respects to *Rhytidium rugosum*. Vegetation stripes reflecting soil patterns of periglacial origin were clearly visible at the fringes of the site.

CHRIS PRESTON

BRYOPHYTE PHOTOGRAPHY WORKSHOP, 9-11 November 1990, MANCHESTER

Eighteen people (twenty-one registered with three apologies for absence) attended the weekend course on bryophyte photography. Even with three tutors, these numbers were the maximum possible for the practical session.

Despite guidance sent out in advance, it was anticipated that some people might turn up with equipment problems; therefore an informal introductory session was held on Friday evening, and the Saturday sessions started at 10 a.m. to allow an early dash to town to rectify the odd vital omission, or to replace some unsuitable item. The main problems were unsuitable tripods, or problems (both physical and electrical) of connecting the flash to the camera when used out of the camera shoe.

Undoubtedly a major attraction of the course was the chance to see Harold Whitehouse's superb stereophotographs of bryophytes. This was nearly not to be. Harold was first of all plagued by the rail strike, and arrived at the wrong station at the wrong time on Friday night; a misunderstood message via security staff meant that he waited to be collected for over two hours in bad weather with all his equipment, whilst we were still waiting to hear from him. And then on Saturday, just as the stereo slide show started, his projector dropped its transformer onto the cooling fan with an awful noise. However, resourceful students (mainly Ken Adams) soon repaired the machine, and were rewarded with a fitting grand finale to Saturday's lectures.

Earlier that afternoon, Harold had fascinated us with an account of the camera he now used, made from the body of an old Agfa Isola and two lenses from a Nimslo, plus a lot of ingenuity from his late wife Pat. He also explained how lesser mortals could take and view stereo photographs of bryophytes, using their more ordinary equipment.

The remaining three forty-five minute illustrated lectures (two in the morning and one in mid afternoon) dealt with the subjects: general bryophyte photography, close-up and high magnification photography, and microscope and SEM photography. Each of these was shared between Michael Proctor and myself, who had earlier attempted to coordinate their contributions over the telephone. Perhaps inevitably, this resulted in more than sufficient material, with the result that both morning and afternoon teabreak got lost in the wash, and a rather generous one-and-a-half hour lunchbreak became seriously less. It seems that all the students were either very pleased with the value-added course, or alternatively were very polite. One student was heard to remark that "Saturday had been a most interesting week".

On Saturday evening, almost all the students turned up for an informal and cheerful social evening with wine at the organiser's house, where they could quiz the tutors on individual

problems. Harold was persuaded to put out stereo viewers so that students could look at his photographs at leisure.

Sunday morning was spent at Marie Louise Gardens in Didsbury, putting theory into practice. The aim was to leave everyone with a working setup that would at least enable them to take reasonable life-size photographs of bryophytes in the field, without too much trouble. The key seemed to be the little close-up flash calculator dial, which most students requested, and which is being published (with instructions) in *J. Bryol.* **16**(3), June 1991. Sunday afternoon was spent back in the University laboratory, to discuss high-magnification work and much else as well, before the course dispersed.

Much more time was needed, and perhaps an extended course might be considered for the future.

Tutors: Dr Harold L.K. Whitehouse, Dr Michael C.F. Proctor, and Dr Sean R. Edwards (local organiser).

SEAN EDWARDS

FUTURE MEETINGS OF THE SOCIETY

Members are reminded to read the BBS Safety Code, published in *Bulletin* **43** and available from local secretaries for inspection during BBS meetings.

SPRING FIELD MEETING, 1991, Clevedon, 3-10 April.
Local Secretary: Mr Peter Martin, 37 Hughenden Road, Horfield, Bristol BS7 8SF. Tel.: 0272 240355

This meeting will be based at Clevedon which will give access to a variety of habitats in North Somerset (VC 6). Places to be visited include sites in the Mendips on limestone where such species as *Gymnostomum viridulum*, *Grimmia orbicularis*, *Phascum curvicolle*, *Bryum canariense* and *Pleurochaete squarrosa* occur. Other sites include old lead workings where *Ditrichum plumbicola* and *Grimmia donniana* are recorded. The Somerset levels and coastal habitats will be included where *Pallavicinia lyellii* and *Cololejeunea minutissima* are possible finds.

A programme and details of accommodation are available from the local secretary.

IAB/BBS INTERNATIONAL SYMPOSIUM ON THE BIOLOGY OF *SPHAGNUM*, Exeter, 12-18 July, 1991.
Organisers: Dr R.E. Daniels, Institute of Terrestrial Ecology, Furzebrook Research Station, Wareham, Dorset BH20 5AS. Tel.: 0929 551518/9. Dr R.E. Longton, Department of Botany, Plant Science Laboratories, The University, Whiteknights, Reading RG6 2AS.

This meeting will begin with a five-day field excursion (12-16 July) starting in Glasgow and terminating in Exeter, where the symposium meeting will be held. The excursion will concentrate on *Sphagnum* and visit a range of peatland types, including many classic sites. The approximate cost will be around £220, including transport, accommodation and food.

The International Symposium on the Biology of *Sphagnum* will be held at the University of Exeter from 17-18 July, and will bring together diverse aspects of the biology of this economically important group. There will be eight sessions, each with an invited speaker(s):

Taxonomy and systematics: R.E. Andrus. **Biogeography:** A. Eddy, D. Lane. **Population genetics:** R.E. Daniels, C.P. McQueen. **Physiology:** H. Rudolph. **Ecophysiology:** J.M. Glime, J.A. Lee. **Ecology:** K. Dierssen, H. Rydin. **Peat-forming systems:** J.A.P. Janssens, N. Malmer. ***Sphagnum* and man:** P. Pakarinen. There will also be special contributions from R.S. Clymo and H. Sjörs.

For details of accommodation and registration, see below under the IAB biennial experimental bryology meeting.

IAB BIENNIAL MEETING - EXPERIMENTAL BRYOLOGY, organised jointly with the BBS, Exeter, 19-24 July, 1991

Organisers: Dr M.C.F. Proctor, Hatherly Laboratories, The University, Prince of Wales Road, Exeter EX4 4PS. Dr R.E. Longton, Department of Botany, Plant Science Laboratories, The University, Whiteknights, Reading RG6 2AS.

This meeting will cover the major advances achieved in recent years in many areas of experimental bryology, and attempt to explore the interrelationships between results from many areas of study. The topics, each of which have an invited keynote speaker, are as follows:

Biochemistry and metabolism, fine structure, reproduction and control of development, environmental physiology and experimental ecology, pollution and conservation and **biosystematics and populations.**

There will also be two one-day field excursions to sites of bryological interest in the area.

Accommodation, registration and booking: Accommodation for this meeting and the *Sphagnum* symposium will be provided in residence halls at the University of Exeter. The cost of dinner, bed and breakfast will be approximately £27.50 per day.

Registration fees are:- *Sphagnum* symposium £15; Experimental bryology meeting £25; both meetings £35.

Anyone wishing to attend either of these meetings, or who wishes to submit a paper, is asked to contact Dr Royce Longton as soon as possible.

SUMMER FIELD MEETING, 1991, Massif Central, France, August.

Local Secretary: Mr Roy Perry, Department of Botany, National Museum of Wales, Cardiff CF1 3NP. Tel.: (work) 0222 397951, ext 267/ (home) 0222 515531.

Problems have arisen in trying to arrange this meeting of one week's duration in mid August. When more information becomes available it will be sent to those who have shown an interest in attending. Please register your interest by writing to Roy Perry.

ANNUAL GENERAL MEETING AND SYMPOSIUM MEETING, 1991, Sheffield, 14-15 September.

Local Secretary: Mr Tom Blockeel, 9 Ashfurlong Close, Dore, Sheffield S17 3NN. Tel.: 0742 366861.

Both lectures and accommodation are being arranged in the University of Sheffield's Tapton Hall, adjacent to the Department of Animal and Plant Sciences' Experimental Garden. The Hall's prices are as follows: Bed & Breakfast £15.10, Lunch £6.00, Dinner £6.50.

BRYOPHYTE WORKSHOP, 1991, Rogate, West Sussex, 11-13 October.

Local Secretary: Dr June Chatfield, 44 Ashdell Road, Alton, Hampshire GU34 2TA. Tel.: 0420 82214.

Tutors: Alan Crundwell, Francis Rose and Rod Stern.

This weekend workshop, which is designed for beginners and intermediates, will be held at Rogate Field Centre, near Petersfield. The Centre belongs to King's College, University of London, and is set in good downland countryside. Full microscope facilities, a well-equipped laboratory and comfortable accommodation will all be arranged at a very reasonable cost.

SPRING FIELD MEETING, 1992, Northern Shropshire.
Local Secretary: Mr Ron Shoubridge, 8 Mary Elizabeth Road, Ludlow, Shropshire SY8 1LW. Tel.: 0584 872480

SUMMER FIELD MEETING, 1992, Scotland.
Local Secretaries: Peter Pitken and Gordon Rothero. One week of the two-week meeting is likely to be based in the Outer Hebrides. More details in a later *Bulletin*.

FURTHER MEETINGS

Your suggestions on our future programme are greatly welcomed, and will help provide the Society with the kind of varied and successful meetings we have enjoyed in the past. For 1992 we are planning to return to Scotland for our main summer meeting, which we last visited in 1988. New ideas for the spring, AGM and Workshop meetings are particularly welcome, and - remember that there is always room in the programme for local field meetings. Don't delay - write or phone with your ideas:

Philip Lightowlers, 8 Almack Road, London E5 0RL (Tel.: 081-533 0052).

LOCAL MEETINGS

Many members find it difficult to attend the Society's regular meetings but would be interested in short local excursions with other bryologists. Informal local groups have thrived for many years in some cases - in the Cambridge area, for example. Naturally, the Society is keen to encourage these groups, which help to fulfill its aims at a local level.

The Society is promoting its own Regional Secretaries' Scheme to encourage members to organise excursions in their area. If you are interested please contact me at the address below.

Bryological meetings organised by or in conjunction with other societies, as many local excursions are, may of course be included here. But since most group's programmes do not allow sufficient advance notice to be included in the *Bulletin*, the emphasis will be on providing contact details for groups which hold regular meetings. Please get in touch with me if you know of any other groups that should be included here.

Cambridge Area Group
The long-established BBS local group. A programme of meetings is planned for Spring 1991. Contact: Harold Whitehouse, tel. 0223-333900 or 0223-352417.

Leicestershire Bryological Survey
A regular season of meetings is held by the survey which is mapping the county's bryophyte flora. Contact: Dennis Ballard, 84 Leicester Road, Groby, Leicester LE6 0DN. Tel. 0533-873263.

Forthcoming meetings (11 am with packed lunch):
March 10: Misterton Marshes SSSI. Park at 140/SP 554847.
April 14: Granitethorpe Quarry, and later Stoney Stanton Cove. Park at 140/SP 495936.

North West Area Group
Newly formed group which meets with the NW Naturalists' Union (see elsewhere in this *Bulletin*). Would those hoping to attend please contact Tony (A.V.) Smith beforehand in order that numbers may be determined - these may have to be limited in some case.

Contact: Tony Smith, 1 Carr Meadow Cottages, Glossop Road, Little Hayfield, via Stockport, Cheshire SK12 5NR. Tel. 0663-744499.

Forthcoming meetings:

March 23: Deep Dale. Meet Earl Sterndale Church SK 094717, 11.00 am.
April 20: Dingle/Appleton/Thelwall Eyes. Meet SJ 626846, 11.00 am.
May 18: Warton Crags. Meet car park, SD 498724, 11.30 am.
August 10: Priddock Wood & Ladybower Wood. Meet SK 203861, 11.00 am.
August 31: Long Clough. Meet roadside, SK 033930, 11.00 am.
October 5: Dick Clough. Meet SE 006044, 11.00 am.
November 9: Etherow Lodge. Meet Printer's Close, SK 008964, 11.00 am.

South East Area Group

Newly formed group which has had several meetings over the last few months and more are planned. Contact: Roy Hurr, 6 The Woodlands, Chelsfield, Orpington, Kent BR6 6HL. Tel. 0689-852966.

Philip Lightowlers, 8 Almack Road, London E5 0RL. Tel. 081-533 0052.

OTHER BRYOLOGICAL MEETINGS 1991

Saturdays throughout the year: Northwestern Naturalists' Union Bryophyte & Lichen Section. BBS members are invited to attend these field excursions, which are normally held in Lancashire, Cheshire and Derbyshire.
Details from the Secretary, Mr O. McCann, 2 Mayfield Avenue, Sale, Cheshire M33 2JN.

April 19-21: Introduction to Mosses and Liverworts. Dr Martha Newton, Rhyd-y-Creuau, Draper's Field Centre, Betws-y-coed, Gwynedd LL24 0HB.
Details from the Warden, Mr Tony Schärer.

April 26-29: Beginning Mosses and Liverworts. A short course for all who would like to start getting to know these fascinating plants. Highland Field Studies, Borelick, Trochry, Dunkeld, Perthshire PH8 0BX.
Details from the Warden, Mr Brian S. Brookes (sae appreciated).

April 27 and 11 May: The World of Mosses. Dr M.E. Newton & Dr A. Gunn. To be held at the Liverpool Museum, William Brown Street, Liverpool L3 8EN, followed by a day in the field.
Further details from Dr Newton at this address.

May 3-5: Bryophytes. Dr Paddy Coker, Rogate Study Centre, The Red House, Rogate, nr.Petersfield GU31 5HN.
Details from the Adminstrator of Rogate Study Centre, Anne Finlay.

July 20-27: Mosses and Liverworts. Dr M.E. Newton, Kindrogan Field Centre, Enochdu, Blairgowrie, Perthshire PH10 7PG.
Details from the Warden, Dr A. Lavery.

July 29 - 2 August: Woodland Mosses and Liverworts. Dr M.E. Newton, Draper's Field Centre, Rhyd-y-creuau, Betws-y-coed, Gwynedd LL24 0HB.
Details from the Warden, Mr Tony Schärer.

August 23-30: Mosses and Liverworts. Dr M.E. Newton, Malham Tarn Field Centre, Settle, North Yorkshire BD24 9PU.
Details from the Warden, Mr K. Iball.

August 24-31: Bryophytes. A course on mosses and liverworts for beginners and for those with some experience. Highland Field Studies, Borelick, Trochry, Dunkeld, Perthshire PH8 0BX.
Details from the Warden, Mr Brian S. Brookes (sae appreciated).

August 30 - 6 September: Mosses and Liverworts. Dr M.E. Newton, Preston Montford Field Centre, Montford Bridge, Shrewsbury SY4 1DX.
Details from the Warden, Mr J.A. Bayley.

COUNCIL NEWSLETTER NUMBER 7

It is hoped that every BBS member will read this newsletter with a view to making his/her opinions known. Only in that way can Council gear its efforts to the wishes of the entire membership and, at the same time, make effective use of the vast reservoir of skills there must be within the Society. Therefore, please let me know of your comments and advice on any of the following; they would be very warmly welcomed.

Committees
Much of the work of Council is done by small groups of people set up by Council. A full list of those that are current is published elsewhere in this *Bulletin* in order to facilitate communication. Please make full use of this opportunity to contribute to the work of the committee and working groups by contacting their convenors to discuss your suggestions and ideas.

Bryophyte Distribution Atlas
As I write, publication of the first volume, on liverworts, is expected any day. The second is ready to go to the publisher, and work on compiling the third has now begun. Council is particularly pleased that preparation of data accumulated over the past 30 or so years is going ahead swiftly and smoothly. It is also good to be able to report success in obtaining subsidies from the Royal Society (£1,000) and the Natural Environment Research Council through the Linnean Society (£1,500). These, together with £1,000 from the BBS itself, will have the effect of keeping the purchase price as low as possible.

Subscriptions
It has been clear for some time that an increased annual subscription would have to be recommended to members and, at the recent AGM, a sum of £15 for ordinary membership (£7.50 for junior members; £1 for family members) was approved unanimously. In the last two years, expenditure has exceeded income from all sources and has been met from reserves, but the Treasurer was supported in his view that capital ought to be reserved for promoting the aims of the Society. Indeed, the Society is now in a stronger position to do this for other reasons, too, having recently received substantial bequests from the estates of Mr J.C. Gardiner and, particularly, Mrs A.G. Side.

Wallace Memorial Reserve
Arrangements have been made with the Hampshire and Isle of Wight Naturalists' Trust to designate part of the Greywell Fen Reserve as the Wallace Memorial Reserve. It was a site much loved by Ted Wallace and is considered to be of significant bryological interest. The Wallace Memorial Fund, set up be personal donations from BBS and BSBI members, in addition to a sum set aside by the BBS itself, will be invested by the Hampshire and Isle of Wight Naturalists' Trust for the purpose of financing the management of the site from the interest accruing. A memorial plaque will be erected, and BBS members will be granted access to the site by permit.

Local Meetings
In response to continuing requests for a network of local bryological meetings, a pilot scheme has been set up in south-east England and in the east Midlands. Organizers in each

of these areas, as well as those already active in the Cambridge area and in north-west England, are attempting to coordinate arrangements for field excursions. Details are available elsewhere in this *Bulletin* and, whatever your interests, your participation is encouraged, for this is an excellent opportunity to get to know others sharing a common interest and to establish a worthwhile programme of meetings.

Future recording activities
In anticipation of a surge of interest in bryophyte recording following publication of the *Bryophyte Atlas*, a new post of Recording Secretary has been created. Initial plans are impressive, as you will have seen in *Bulletin* **56**, and it is hoped they will serve to bind the Society together in the way the original mapping scheme did. It is obvious that support given to these activities will help to provide not only the Society, but bryologists in general, with the kind of basis they need to make well-informed contributions in all fields of research and conservation.

Archives
There has been concern for some time that archival material needed to be drawn together. Arrangements for this to be done have now been made, and details are to be found elsewhere in this *Bulletin*. If you know of the whereabouts of any photographs or documents relating to the Society, it would be greatly appreciated if you would kindly get in touch with Prof. M.R.D. Seaward (photographs) or Mr A.R. Perry (other bryological documentation).

M.E. NEWTON

BBS COMMITTEES AND WORKING GROUPS

Council would like to encourage greater interaction between the BBS membership in general and those who act on its behalf. For that reason, details of existing committees and working groups are set out below in the hope that everyone wishing to discuss the work of Council will know whom to contact.

Executive Committee
Present composition (ex officio): Dr M.O. Hill (President), Prof J.G. Duckett (Vice-President), Dr M.E. Newton (General Secretary & Chief Executive Officer), Dr G.C.S. Clarke (Treasurer).
Terms of reference: To decide on matters of immediate importance.
Convenor: Dr M.E. Newton, Botany Department, Liverpool Museum, William Brown Street, Liverpool L3 8EN.

Honorary Membership Committee
Present composition (ex officio): Dr M.O. Hill (President), Dr M.E. Newton (General Secretary), Mr G. Bloom & Mr P.J. Wanstall (Past Presidents).
Terms of reference: To advise Council on the nomination of Honorary Members.
Convenor: Dr M.E. Newton (address as above).

Steering Committee for Mapping
Present composition : Dr M.O. Hill, Mr C.D. Preston, Dr A.J.E. Smith, Dr R.E. Longton, Dr M.E. Newton, 1 representative each from Nature Conservancy Council and Biological Records Centre.
Terms of reference: As stated in the title.
Convenor: Dr M.O. Hill, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, PE17 2LS.

Editorial Board
Present compostion: Dr A.J.E. Smith (Editor of *J. Bryol.*), Dr H.J.B. Birks, Dr D.H. Brown, Mr A.C. Crundwell, Dr J.H. Dickson, Prof J.G. Duckett, Prof D.H.

Lewis, Dr M.E. Newton, Dr M.C.F. Proctor, Dr H.L.K. Whitehouse.
Terms of reference: Nominated by the Editor of the *Journal of Bryology* subject to five-yearly confirmation by Council.
Convenor: Dr A.J.E. Smith, School of Biological Sciences, Brambell Building, University College of North Wales, Bangor, Gwynedd, LL57 2UW.

Publications Committee
Present composition: Dr R.E. Longton, Miss J.M. Ide, Dr A.J. Harrington.
Terms of reference: a) To look into the suitability of the Society producing its own illustrated, annotated keys to the genera and species of British bryophytes with appropriate links to the Society's refereeing system to facilitate identification and confirmation of specimens. (b) To look into the feasibility of producing a series of field guides and practical handbooks with particular attention being paid to the financial aspects. (c) To locate suitable authors and publishers for field guides and to present a definitive proposal concerning publication of handbooks.
Convenor: Miss J.M. Ide, Roehampton Institute of Higher Education, Whitelands College, West Hill, Putney, SW15 3SN.

Conservation Committee
Present composition: Mr R.C. Stern (Conservation Officer), Mr P.J. Wanstall, Dr P.H. Pitkin, Mr D.G. Long, Mr N.G. Hodgetts.
Terms of reference: As set out in *Bulletin* **52**:56.
Convenor: Mr R.C. Stern, Botany Bay, Main Road, Fishbourne, Chichester, West Sussex, PO18 8AX.

Recording Committee
Present composition: Dr J.W. Bates (Recording Secretary), Dr K.J. Adams, Mr C.D. Preston, Mr R.C. Stern, Dr M.O. Hill.
Terms of reference: As set out in *Bulletin* **56**:20.
Convenor: Dr J.W. Bates, Imperial College Field Station, Silwood Park, Ascot, Berkshire, SL5 7PY.

Working Group on Wallace Memorial
Present composition: Mr R.C. Stern, Mr A.C. Crundwell, Dr R.E. Longton, Dr F. Rose.
Terms of reference: To collaborate with the BSBI in the establishment of a suitable memorial to the late Mr E.C. Wallace.
Convenor: Mr R.C. Stern (address as above).

Tropical Bryology Group
Present composition of Executive Committee: Mr B.J. O'Shea, Mr D.G. Long, Dr R.E. Longton, Dr A.J. Harrington, Mr R. Stevenson.
Terms of reference: a) To promote the study of tropical bryophytes. (b) To involve as many members of the BBS as possible in this activity. (c) To support bryologists working in the tropics.
Convenor: Mr B.J. O'Shea, 131 Norwood Road, London, SE24 9AF.

MEMBERSHIP LIST 1991

An up-to-date membership list has been produced and, thanks to the expertise of Dr Philip Stanley, this has been processed into a format suitable for printing in sufficient numbers to distribute in the near future to all members of the Society.

It is then hoped to print an annual up-date in the *Bulletin* and to reissue the List in full at approximately 5-year intervals.

RECORDING MATTERS 1

Publication of this first list of BBS Regional Recorders initiates the new scheme for recording of bryophytes in Britain and Ireland.

In future, members should send completed record cards to **the regional recorder in whose area the records were made.** If there is no regional recorder you should send completed cards directly to me (Dr Jeff Bates, Imperial College at Silwood Park, Ascot, Berks., SL5 7PY).

The regional recorders have the responsibility to check record cards before forwarding them to me for eventual inclusion in the data bank maintained by the Biological Records Centre. Please continue to use the old style cards (obtainable from BRC, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, PE17 2LS) until new ones become available in 1991. Many regional recorders will also want to keep facsimiles of your records for dissemination to conservation bodies, for use in compiling a flora, or for a local natural history data bank. It is to be hoped, therefore, that the maximum possible benefit will result from the information you gather.

I am indebted to the many busy people who have agreed to become regional recorders. Most of England and Wales is covered although there are still some surprising gaps like Surrey (17). Donal Synnott has bravely offered to cover the whole of Ireland but I am sure he would appreciate offers (through me, please) of help with individual counties, and what of Ulster? Unfortunately, much of southern and eastern Scotland is 'un-recordered' as well as the Isle of Man, Orkney and Shetland. If you regularly bryologise in any of the vacant vice-counties please consider offering your services as a regional recorder. Currently the vacant ones outside Ireland are: 7,17,38,39,56,58,59,67,68,71-78,85-88,90-95,106-109,111,112. Additions and amendments to the list of regional recorders will be noted in future "Recording Matters".

The list is organised in a similar way to those naming the referees for mosses and hepatics. However, the numbers commencing each entry refer to the vice-counties superintended by each regional recorder. The names and locations of the vice-counties are shown in *Distribution of Bryophytes in the British Isles* by M.F.V. Corley & M.O. Hill (1981) and also in *The Liverworts of Britain and Ireland* by A.J.E. Smith (1990).

REGIONAL RECORDERS:

1,2: Miss R.J. Murphy, Shang-ri-la, Reskadinnick, Camborne, Cornwall
3,4: Mr M. Pool, 91 Warbro Road, Babbacombe, Torquay, Devon, TQ1 3PS
5: Mr R.D. Porley, Nature Conservancy Council, Roughmoor, Bishops Hull, Taunton, Somerset, TA1 5AA
6,34: Mr P. Martin, 37 Hughenden Road, Horfield, Bristol, BS7 8SF
8,11: Mr R.C. Stern, Botany Bay, Main Road, Fishbourne, Chichester, West Sussex, PO18 8AX
9: Dr M.O. Hill, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, PE17 2LS
10: Mrs L. Snow, Ein Shemer, Upper Hyde Farm Road, Shanklin, Isle of Wight, PO37 7PS
12: Mr A.C. Crundwell, Acorn Cottage, 12 Kay Crescent, Headley Down, Hampshire, GU35 8AH
13,14: Mr H.W. Matcham 21 Temple Bar, Strettington, nr Chichester, West Sussex, PO18 0LB
15,16: Dr F. Rose, Rotherhurst, 36 St Mary's Road, Liss, Petersfield, Hampshire, GU33 7AH
18-21: Dr K.J. Adams, 63 Wroths Path, Baldwins Hill, Loughton, Essex, IG10 1SH
22,46: Dr J.W. Bates (address above)
23: Mr G. Bloom, 15 Tatham Road, Abingdon, Oxon., OX14 1QB

24: Dr S.V. O'Leary, J.J. Thomson Physical Laboratory, P.O. Box 220, Whiteknights, Reading, RG6 2AF
25,26: Mr R.J. Fisk, 1 Paradise Row, Ringsfield, Beccles, Suffolk, NR34 8LQ
27,28: Mr R. Stevenson, 111 Wootton Road, Kings Lynn, Norfolk, PE30 4DJ
29: Dr H.L.K. Whitehouse, Botany School, Downing Street, Cambridge, CB2 3EA
30: Mr A.R. Outen, 15 Manor Close, Clifton, Shefford, Beds., SG17 5EJ
31,99: Mr N.G. Hodgetts, Nature Conservancy Council, Northminster House, Peterborough, PE1 1UA
32,60: Mr M.J. Wigginton, 36 Big Green, Warmington, Oundle, PE8 6TU
33,101-104,110: M.F.V. Corley, Pucketty Farm Cottage, Faringdon, Oxfordshire, SN7 8JP
35,41,44: A.R. Perry, Department of Botany, National Museum of Wales, Cardiff, CF1 3NP
36,37: P.J. Port, Hollybush Cottage, Newton Lane, Kington, Hereford, HR5 3NG
40: Mr R.F. Shoubridge, 8 Mary Elizabeth Road, Ludlow, Shropshire, SY8 1LW
42,43,47: R.G. Woods, Nature Conservancy Council, 3rd Floor, The Gwalia, Ithon Road, Llandridod Wells, Powys, LD1 6AA
45: Dr P.M. Rhind, Field Studies Council Research Centre, Fort Popton, Angle, Pembroke, Dyfed, SA71 5AD
48-52: T.H. Blackstock, Nature Conservancy Council, Ffordd Penrhos, Bangor, Gwynedd, LL57 2LQ
53-54: Professor M.R.D. Seaward, School of Environmental Science, The University, Bradford, BD7 1DP
55: D.W. Ballard, 84 Leicester Road, Groby, Leicester, LE6 0DN
57,61-65: T.L. Blockeel, 9 Ashfurlong Close, Dore, Sheffield, S17 3NN
66: Rev. G.G. Graham, 3 The Willows, Bishop Auckland, Co. Durham, DL14 7HH
69,70: F.J. Roberts, Eden Croft, Wetheral Pasture, Carlisle, Cumbria, CA4 8HU
79-80: R.W.M. Corner, Hawthorn Hill, 36 Wordsworth Street, Penrith, Cumbria, CA11 7QZ
81: D.G. Long, Royal Botanic Garden, Edinburgh, EH3 5LR
82-84: Dr D.F. Chamberlain, Department of Botany, Royal Botanic Garden, Edinburgh, EH3 5LR.
89: M.C. Robinson, Balrobbie Farm, Killiecrankie, Pitlochry, PH16 5LJ
96: A.G. Payne, Nature Conservancy Council, Fraser Darling House, 9 Culduthel Road, Inverness, IV2 4AG
97,98,105: G.P. Rothero, Stronlonag, Glenmassan, By Dunoon, Argyll, PA23 8RA
100: Mrs K.M. Cocking, 4 Ashwood Crescent, Marple, Stockport, Cheshire, SK6 6LS
Ireland: D.M. Synnott, National Botanic Gardens, Glasnevin, Dublin 9, Ireland
Channel Islands: C.D. Preston, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, PE17 2LS

TROPICAL BRYOLOGY GROUP - PROGRESS IN 1990

The last year has seen the TBG quite active, but perhaps not yet involving a wide enough range of people. The major activities were as follows:

- A Tropical Bryology Workshop was organised for 21 September in Cambridge, the day before the BBS Paper-reading Meeting. Fewer people attended this than we had hoped (14 including the speakers), but the workshop proved very successful. The speakers were Tamás Pócs, Rob Gradstein and Paul Richards. Most of us managed to identify some of the unnamed material from Malawi supplied by David Long, and besides the speakers, other experts such as Eustace Jones and Cliff Townsend were able to confirm identifications. A short (3 page) account of the meeting has been produced, and at the request of workshop participants, Tamás Pócs has produced a "Quick Reference Guide of Basic Literature to Identify Tropical African Bryophytes".

- 15 members attended the AGM of the TBG held on 22 September, and a set of objectives was agreed. These are: 1) to promote the study of tropical bryophytes, 2) to

involve as many members of the BBS as possible in this activity and 3) to support bryologists working in the tropics. In addition, four more specific aims were agreed, as was the description of how the group will operate. A committee was elected: Alan Harrington, David Long, Royce Longton, Brian O'Shea (coordinator) and Robin Stevenson. Any correspondence should be via the coordinator (address below).

- The TBG first trip is now being organised, to Mt Mulanje in Malawi, from 12 June to 3 July. Following a note in the *Bulletin*, five UK members are now committed to this trip, along with 3 from Africa, including the leader (Shaun Russell). Members of the expedition will be: Shaun Russell (leader), Royce Longton, Nick Hodgetts, Liz Kungu (Kenya), Z.L.K. Magombo (Malawi), Brian O'Shea, Ron Porley and Martin Wigginton. A first planning meeting has been held, and funding is now being actively sought following agreement to a proposal document which includes objectives, costs, etc. A preliminary list of Malawi mosses has now been produced by Brian O'Shea, and a hepatics list is being worked on.

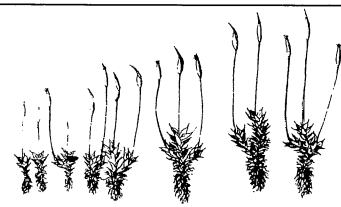
- An area of importance that we identified early on - the processing of existing tropical collections - is still the one that has received least attention, but David Long has now produced 'Guidelines for processing old bryological collections', which should help get people started. We would welcome any offers of help in this area. We are still trying to produce a full list of which herbaria have unprocessed tropical material, but there is now enough information to get people started.

TBG is open to any BBS member who is interested, who should send me their name. Membership is currently 26. The documents produced by the TBG (including those mentioned above) are also available from me. The list is as follows:

No.	Document name	Issue	Pages	Date of Issue
1	TBG - Discussion paper	1	10	14.04.1988
2	List of tropical countries	1	3	15.04.1988
3	TBG working party minutes (1) (13.05.88)	1	6	30.06.1988
4	UK herbaria with tropical bryophyte collections	2	2	15.02.1990
5	Bibliography of tropical bryology	1	5	30.12.1989
6	TBG working group minutes (2) (15.02.90)	1	6	19.02.1990
7	Guidelines for processing old tropical collections	2	2	26.03.1990
8	Objectives	1	1	01.10.1990
9	Membership list	1	1	01.10.1990
10	Annual General Meeting (1) (22.09.90)	1	1	01.10.1990
11	List of available documents	1	1	08.01.1991
12	Tropical Bryology Workshop (21.09.90)	1	3	18.11.1990
13	Provisional List of Malawi Mosses	1	11	14.09.1990
14	Literature for identifying tropical African bryos.	1	18	24.10.1990
15	Newsletter 1	1	2	08.01.1991

TBG members are kept in touch by a periodic newsletter, the first of which has now been circulated.

TBG Coordinator: *Brian O'Shea, 131 Norwood Road, London SE24 9AF (Tel.: 081-674 6093 (home); 071-728 4976 (work))*



BBS EXPEDITION TO MT MULANJE, MALAWI, JUNE/JULY 1991

Mt Mulanje - a unique ecosystem under threat

Plans are now well advanced for the BBS Expedition to Mt Mulanje. The Mulanje massif is the most impressive mountain region in south-central Africa, rising abruptly from plains at about 600-700m to high plateaux and basins at around 1800-1900m, which are in turn surmounted by rocky peaks reaching almost 3000m. It forms a biotically isolated 'island', a member of the Afro-Montane archipelago that extends from Ethiopia to the Cape.

The natural vegetation of the lower slopes comprises mid-altitude evergreen forests supporting a great diversity of vascular plants. Bryophytes are locally abundant, particularly as epiphylls and in moist ravines. The dissected plateaux are largely covered by rolling grassland, with forests in sheltered hollows protected from fire. Much of the higher altitude montane forest is dominated by Mulanje Cedar, an endemic form of *Widdringtonia cupressoides*. Epiphytic mosses and hepatics are a conspicuous feature and both are also abundant in high-altitude boulder fields. The vascular flora is reasonably well known and it is clear that isolation has resulted in diversification as around 30 endemic species have been recorded. The fauna is known to be similarly diverse and distinctive. In contrast, Mt Mulanje is bryologically one of the most poorly documented members of the Afro-Montane archipelago.

The forest vegetation has been sadly diminished by a rapidly expanding human population. This is manifest both in encroachment of lowland agriculture into the mid-altitude forests and in exploitation of the timber resource, particularly in the montane *Widdringtonia* stands. Forest destruction threatens not only the indigenous biota but also water supplies vital to agricultural communities in the lowlands. The epiphytic bryoflora of the natural forests, with its remarkablly high water-holding capacity, may play an important and highly beneficial rôle in regulating water supplies. The area has been managed as a forest reserve since 1927, but this has not afforded adequate protection against forest destruction, much of it illegal, that continues apace. There is thus a move to place the conservation of the Mt Mulanje ecosystem on a more secure footing, perhaps by designating the area as an IUCN Biosphere Reserve.

It is against this background that the Expedition, organized by the Tropical Bryology Group of the BBS, has been invited to work on Mt Mulanje by Dr J.H. Seyani, Keeper of the National Herbarium & Botanic Gardens of Malawi at Zomba. It will aim both to document the flora as insurance against the possibility of continuing forest destruction and, more optimistically, to strengthen the impetus for conservation of the biota as a whole.

The BBS Expedition

An eight-man expedition will operate from Zomba, located 70km from Mt Mulanje, from approximately 12 June to 3 July, 1991, when cool, dry weather may be anticipated. Four periods of three to four days will be spent in the field, based at mountain huts in different parts of the Mulanje massif. These periods will be separated by single days at the base huts for processing specimens. Field work by parties of two or three will cover as wide a diversity as possible of sites, as regards altitude, aspect and vegetation type, and of habitats at each site. Transport will be in a land rover brought from the University of Namibia by Mr S. Russell, the leader of the expedition, and in a second vehicle available locally. Mr Russell will visit Zomba in April 1991 to coordinate local arrangements with Dr Seyani.

The members of the expedition, listed below, combine considerable bryological expertise with extensive experience in conservation-orientated survey work and related research. Four of the eight members have tropical experience, and three are currently based in Africa.

Shaun Russell, leader, University of Namibia.
Royce Longton, UK coordinator, University of Reading.

Nick Hodgetts, Nature Conservancy Council.
Liz Kungu, University of Nairobi, Kenya.
Z.L.K. Magombo, National Herbarium & Botanic Gardens of Malawi.
Brian O'Shea, British Telecom.
Ron Porley, Nature Conservany Council.
Martin Wigginton, Nature Conservancy Council.

The specific objectives of the expedition are:

1. To make a comprehensive collection of bryophytes from Mt Mulanje.
2. To arrange for the identification of the specimens and the distribution of duplicate sets to appropriate national herbaria, including that at Zomba.
3. To identify sites of special bryological significance.
4. To make observations on the biology of ecologically important, and of rare or threatened species and communities.
5. To assist in training local botanists in the collection and systematic study of bryophytes.
6. To publish information on the bryoflora of Mt Mulanje in the local and international literature and to contribute to the Bryologia Africana project.
7. In these and in every other possible way, to promote the conservation of the bryoflora of Mt Mulanje, and of the ecosystem of which it forms part.

Contributions are at present being sought from government, commercial and conservation organizations towards the costs of the expedition, estimated at around £8,000.

R.E. LONGTON

BBS ARCHIVES

An attempt is being made to draw together and preserve documents relating to the history of the Society and of bryology in general. There are of course a considerable number in the safe-keeping of Officers; these papers are mainly in the form of official correspondence, minute books and other records. It is thought likely, however, that members may know of other material, which they and the Society would like to safeguard with the ultimate aim of making them available for study at some time in the future.

The amount of material involved is not known, nor is its exact nature. In order to make some assessment, Mr A.R. Perry has therefore kindly made space available at the National Museum of Wales for the accumulation of archival material. It will be examined and sorted with a view to deciding what kind of arrangements need to be made to ensure its continued safety and availability.

If you are aware of such material, it would be very much appreciated if you would let Mr Perry know. Arrangements could then be made, either to incorporate it in the official archives, or simply to include details of it in a central file of material located elsewhere. The address for correspondence is: Mr A.R. Perry, Department of Botany, National Museum of Wales, Cardiff CF1 3NP.

BRYOLOGISTS WITH CURRENCY DIFFICULTIES

We have recently become aware that there are many potential members of the British Bryological Society in countries with currency exchange problems, We know that several members are very kindly helping out some of these less fortunate bryologists and either have 'exchange' agreements or have sponsored their membership of this Society.

If any member feels that he or she would like to help in this way then a line to the membership secretary would be much appreciated.

B.B.S. LIBRARY SALES AND SERVICE 1991

FOR LOAN:
Members wishing to borrow books or papers are advised to consider whether a xerox copy of the appropriate pages would suffice instead of the original in those cases where copyright has expired. Charge 10p per exposure. Limit 50.

(a) Approximately 250 bryological books and journals and several thousand off-prints of individual papers. A catalogue of the books and journals is available from the Librarian, price £1.00.

(b) Transparency collection, list available (s.a.e.). 630 slides in the collection. Loan charge (to cover breakage of mounts) 50p plus return postage. Only 50 slides may be borrowed at a time to minimise possible loss or damage.

(c) Microscope stage-micrometer slide for calibration of eyepiece graticules. 10μm divisions. Loan deposit £15.

FOR SALE:
British Bryological Society Bulletins: Back numbers from no. 23 @ £1.00 each.
Transactions of the British Bryological Society/Journal of Bryology:

Vol. 1	parts 1-5 (£2.40 each) £12.00
Vol. 2	part 1 (£3.00), parts 2-4 out of print
Vols. 3 & 4	parts 1-5 (2.40 each) £12.00 per vol.
Vol. 5	parts 1-4 (£3.00 each) £12.00
Vol. 6	parts 1-2 (£6.00 each) £12.00 - ends the series of *Transactions*
Vols. 7-9	parts 1-4 (£5.00 each) £20.00 per vol. - renamed *Journal of Bryology*
Vol. 10	parts 1-4 (£8.00 each) £32.00
Vol. 11	parts 1-4 (£10.00 each) £40.00
Vol. 12	parts 1-4 (£11.50 each) £46.00
Vol. 13	parts 1-4 (£15.50 each) £62.00
Vol. 14	parts 1-4 (£18.00 each) £72.00
Vol. 15	parts 1-4 (£22.50 each) £90.00
Vol. 16	parts 1-2 (£27.50 each) £55.00

Census Catalogues:

Duncan, J.B., Census Catalogue of British Mosses, 2nd ed.	1926 (20p)
Sherrin, W.R., Census Catalogue of British Sphagna	1946 (20p)
Paton, J.A., Census Catalogue of British Hepatics, 4th edition	1966 (20p)
Warburg, E.F., Census Catalogue of British Mosses, 3rd edition	1963 (20p)

Corley, M.F.V. & M.O. Hill, Distribution of Bryophytes in the British Isles: a census catalogue of their occurrence in vice-counties. 1981.
Price incl. P.& P. Members (£5.00), Non-members (£6.00), Trade (£4.00)

Other items:

Evans, D.E. & A.R. Perry, Moss Wall Chart. Prince incl. P.& P.	1987 (£2.80)
Grolle, R., Hepatics of Europe and the Azores: an annotated list of species with synonyms. Price incl. P.& P.	1983 (£2.50)
Longton, R.E. & A.R. Perry, Proceedings of Jubilee Meeting, 1983.	1985 (£6.00)
Pearman, M.A., A short German-English bryological glossary.	1979 (£0.50)
Newton, M.E. *et al.*, Bryology: modern research and the ways forward.	1988 (£5.50)
Newton, M.E., A Practical Guide to Bryophyte Chromosomes.	1989 (£2.50)
O'Shea, B.J., A Guide to Collecting Bryophytes in the Tropics.	1989 (£3.50)

BBS Tie, claret with single BBS logo	(£4.95)
Swift x20 handlens and leather case	(£9.50)
Idealteck no.3 stainless steel forceps	(£5.50)

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PLEASE DO NOT INCLUDE CASH WITH UK ORDERS. Customers will be invoiced for the correct amount including p.& p. (postage & packing is extra unless stated). Address label legibly printed would be appreciated. All the above are available form BBS Librarian: *Kenneth J. Adams, 63 Wroths Path, Baldwins Hill, Loughton, Essex, IG10 1SH, U.K.*

BBS MOSS POSTCARDS

THE BBS ANNOUNCES A COMPETITION for members to submit mossy (including liverworts and hornworts, of course) pictures, for the Society to use to produce our own postcards.

We expect most entries to be colour slides of anything bryophytic; colour prints are less likely to be successful since printers prefer to work from slides. Artwork (or anything else for that matter) can be submitted, but it is likely that the pictures would form a uniform series of five or ten cards and so colour photographs are a good bet.

All entries (unless we are totally submerged) will be printed to postcard size for judging by a panel of non-photographers who will not know who took what. Submit entries that you think will sell as postcards. Think of pattern or impact, etc., rather than of personal associations that will not be known to the buyer. A striking *Bryum argenteum* will beat a boring *Scopelophila cataractae* any day. Anything from a general mossy scene to close-ups, or even microscope shots, will do, but remember that fine detail is likely to get lost on postcard size.

PRIZES will be seeing your own pictures produced as postcards, acknowledged on the back as taken by A. Mosser, and possibly (if we can convince the treasurer) even your own free set!

IF you do not want your original slide away for any time, please say so and we can have a print done as soon as possible and return the slide; better still, submit the slide with a postcard size print you have had done yourself, and we will return the slide straight away (after checking that the quality of the original is all right for reproduction).

PLEASE DO include the name of the moss, liverwort, hornwort, or other title such as location if a general shot. Also add an interesting supplementary explanatory sentence such as is usual on the back of postcards.

PLEASE DO mark your entry clearly with your unambiguous name, and include a stamped-addressed return envelope.

PLEASE DO NOT send slides in glass mounts through the post; breakage may cut the slide itself.

SEND entries to: Dr Sean Edwards, Manchester Museum, Manchester University, Oxford Road, Manchester M13 9PL. Do write (or 'phone: 061-275-2671, or 061-442-9346 evenings) if any further information is required.

CLOSING DATE is one year from now, the Spring Field Meeting 1992, so you have a whole year to hunt for postcard pictures.

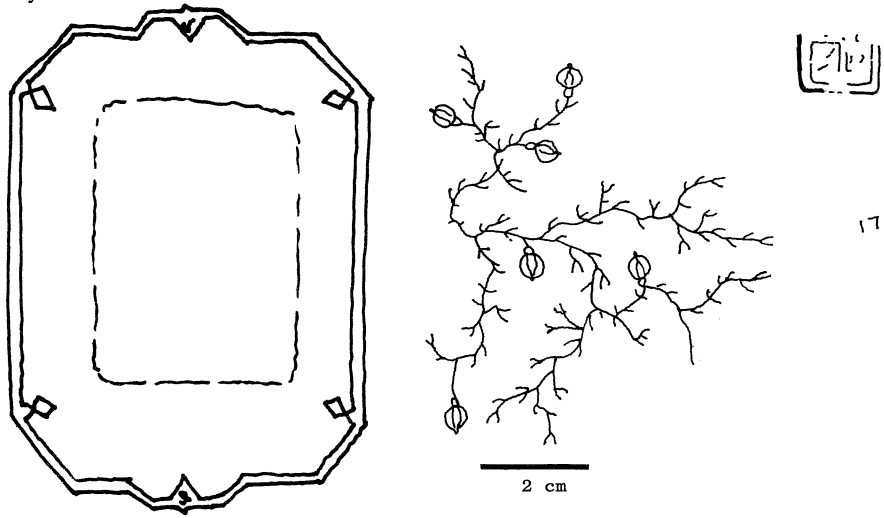
POTTIA SPECIES WANTED

I am working on the genus *Pottia* in the Iberian Peninsula and for cultivation purposes I need specimens with mature capsules of *Pottia intermedia, P. lanceolata* and *P. starckeana*, from wet places (preferably from Europe) in order to compare them with others from dry places. I would be very grateful if anyone were to able to send me some material.

Dr Rosa M. Ros, Departamento de Biologia Vegetal (Botanica), Facultad de Biologia, Universidad de Murcia, 30100-Murcia, Spain.

A MOSSY DINNER PLATE

Just before last Christmas I was browsing through a junk/antique shop with my wife when my attention was grabbed by a plate, 27 x 23 cm, bearing a pattern resembling some sort of pleurocarpous moss. Given that it is probably fairly stylised, can anybody suggest the genus represented? The ware (manufacturer's mark below, right) has been identified by the National Museum of Wales as conceivably Mason's Ironstone, 1840-60. Can anyone supply any further information?



I think the BBS ought to make a determined effort to collect a full dinner service bearing this pattern, to be eaten off by the President on formal occasions.

ROBIN STEVENSON

POLYVINYL-LACTOPHENOL MOUNTANT

In *Bryological Times* **53** an article by Jan-Peter Frahm on water-soluble microscopical mountants recommended Polyvinyl-lactophenol as probably the best. Readers of the *Bulletin* might be interested to know that this preparation is available in the UK.

I came across a reference to it in a manual of microscopical data by G.T. Gurr (1957 edition). G.T. Gurr is no longer in business but the compound is listed in the BDH catalogue under the 'Gurr' label. The stock reference number is 36116 2A and the current price is £6.70 + VAT for 100 ml. BDH has a number of distributors and depots covering the UK. Their headquarters is BDH Chemicals Ltd., Broom Road, Poole, BH12 4NN (tel. 0202 745520) where enquiries can be made. I got my sample from their London & South-east depot at Freshwater Road, Dagenham, Essex RM18 1RZ. The South-west and South Wales area is covered by Ferris & Co. Ltd., Kenn Road, Hillside Road, Bristol BS5 7PE.

The mountant does set, which Hoyer's Medium does not do. An excess needs to be left around the cover-slip to allow for evaporation and avoid air bubbles. Its R.I. is 1.4105, a fact not mentioned by Frahm, and is thus similar to glycerine jelly with an R.I. of 1.44.

RICHARD FISK

Bull.brit.Bryol.Soc. **57**, 33-39 (1991)

THE GENUS *COLURA* IN EAST AFRICA

by T. Pócs

Institute of Ecology and Botany, Hungarian Academy of Sciences, Vácrátót, H-2163

Until the early 50s only *Colura digitalis* and *C. dusenii* were reported from continental tropical Africa and *C. tenuicornis* from St Helena under the name of *C. pungens*. The publication of the worldwide revision of the genus (Jovet-Ast, 1953, 1954) made a breakthrough but since then a number of new species have been described or reported as new to Africa (Jovet-Ast, 1956, 1958, 1976, 1980; Jones and Pócs, 1987; Bizot & Pócs, 1979; Pócs, 1985, 1990).

The reason for this late increase in the number of known species is probably connected with their small size and often specialised habitat (epiphyllous or inhabiting tiny live or dead, mostly Ericaceous twigs, cf. Pócs, 1990), that are often neglected by collectors.

Now 10 species are known from the continent and a further five from the Indian Ocean islands. All the ten continental species occur in Tropical East Africa as well. In the following I wish to give an account of their distribution and ecology after my identification and revision of many recently collected specimens.

Distribution of East African Species

Section Lingua S.Jov.-Ast

Colura saroltae Pócs 1987, in Jones & Pócs, *J.Bryol.* **14**:497 (see Fig.1).

Tanzania: Kilimanjaro Mts. Machame Route, 3200m, on Ericaceae bark - Pócs 6978/O (Type, VBI), 2800-3300m, on *Erica* bark - Pócs 87172/C, 88173/K (EGR); Mweka Route, above Mweka Base Hut, 3015m, on *Erica* twigs and bark - Pócs 90130/AL (EGR); **Mt Rungwe** in the southern Highlands, N slopes, 2400m, on Ericaceae bark - Pócs *et al.* 89130/H (EGR).

Colura usambarica E.W. Jones 1987, in Jones & Pócs, *J.Bryol.* **14**:495 (see Fig.2).

Malawi: Mlanje Mts., 1830m - Lupton, F.G.H. s.n., (Hb.Jones, Paratype). **Tanzania: West Usambara Mts.** above Kambi Falls near Mazumbai, 1800m, on Ericaceae twigs - Pócs 8528/C (BM, Holotype; VBI, Isotype); Ndelmai For.Res. 1840m, on decaying twigs - Pócs *et al.* 8430/U (VBI); Sagara ridge, 1930m, on Ericaceous bark - Pócs *et al.* 88080/G, 89262/AH (EGR); Kwagoroto Summit 1900m, on *Erica* twigs - Pócs 89258/A (EGR); Kwekulunge summit in Ndelmai For.Res. 1840m, on dead *Philippia* (Ericaceae) twigs -Pócs *et al.* 8430/U (EGR); Mlomboza summit, 2200-2300m, on Ericaceous twigs - 8448/BS (EGR): **Kilimanjaro Mts.** Marangu Route near Mandara Hut, 2750m, on *Erica* bark - Pócs & Orbán 89145/AA,AB,AM (EGR); Mweka Route, near Mweka Base Hut, 3000m, on *Erica* twigs - Pócs 90130/AN (EGR): **North Pare Mts.** Kindoroko Summit, 1900m, on *Erica* bark - Pócs 90018/K (EGR): **South Pare Mts.** Chuva forest, 1750m, on *Aguaria* bark - Pócs *et al.* 89249/G; Ranji Plateau, 2000m, on *Erica* bark - Pócs *et al.* 89250/P: **Nguru Mts.** Mafulumula summit ridge, 2280m, on twigs of broadleaved bushes - Pócs & Orbán 89173/D: **Uluguru Mts.** Lupanga NW ridge, 1880m, on Ericaceous twigs - Pócs & van Zanten 86113/BC (EGR); Lupanga crest, 2090-2140m, on twigs of broadleaved shrubs - Pócs & van Zanten 86108/AU.

Sect. Oidocorys S.Jov.-Ast

Colura kilimanjarica Pócs & S.Jov.-Ast 1980, in Jovet-Ast, S., *Cryptogamie, Bryol.Lichénol.* **1**:281 (See Fig.3).

Tanzania: Kilimanjaro Mts. Umbwe Route, 2900m, on dead *Erica* twigs near 1st

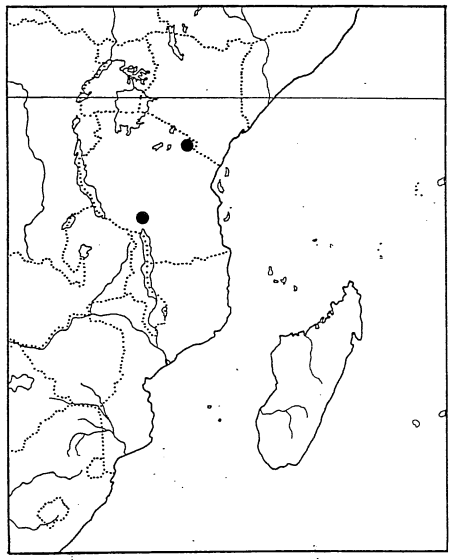


Fig.1: Colura saroltae.

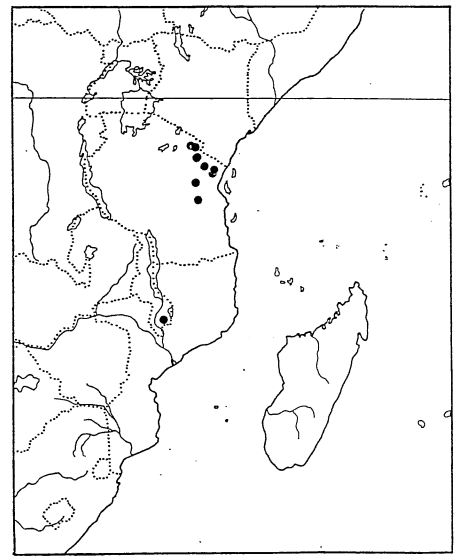


Fig.2: Colura usambarica.

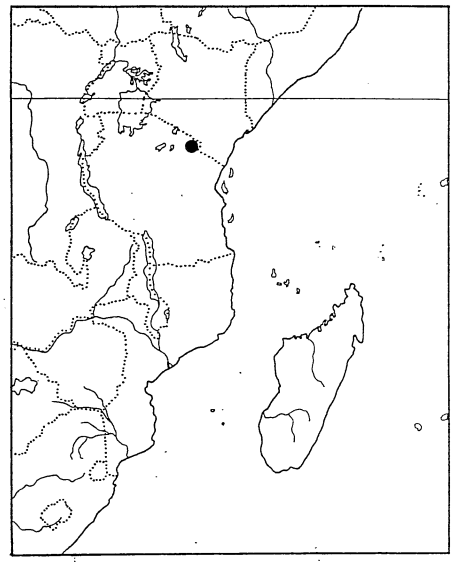


Fig.3: Colura kilimanjarica.

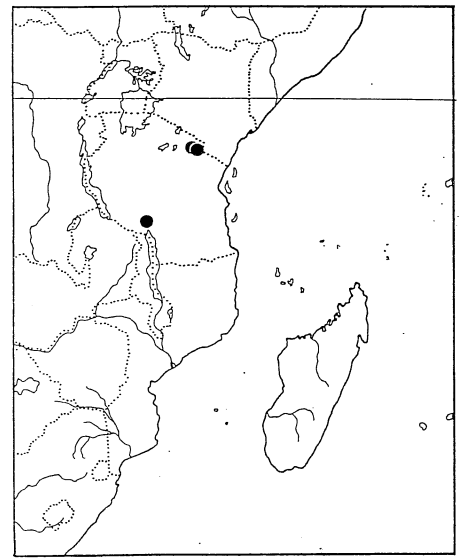


Fig.4: Colura berghenii.

bivouac - Pócs 6929/ND (Holotype EGR; Isotypes PC, JE). Known only from the type collection.

Sect. Macrorhampus S.Jov.-Ast

Colura berghenii S.Jov.-Ast 1953, *Rev.Bryol.Lichénol.* **22**:245 (See Fig.4).
Kilimanjaro Mts. below Horombo Hut, 3225m, on Ericaceous twigs - Hedberg 1373 (Holotype, S); Umbwe Route, 2900m, on dead *Erica* twigs - Pócs 6929/NC (EGR); **Rungwe Mts.** in the Southern Highlands, N slope, 2400m, on Ericaceae bark and twigs - Pócs 89130/G (EGR).

Colura calyptrifolia (Hook.) Dum. 1835, Rec. d'Obs. Jung.:12.
Worldwide distribution discussed in Gradstein *et al.* (1983:159) (See Fig.5). Tropical East African distribution (Fig.6): **Rwanda:** Kuwasenkoko, 2400m (Vanden Berghen, 1960: 132); **Tanzania: Mt. Meru** SW slope, Engare Narok gorge, 2320m, on dead Ericaceous twigs - Pócs 89265/C (EGR); **Kilimanjaro Mts.** Mweka Route, near Mandara Hut, 2700-2800m, on *Erica arborea* bark and twigs - Pócs & Orbán 89145/D,Z and AD (EGR); NE slope of Mawenzi above Tarakea village, 2620m, on *Erica* bark - Pócs 90022/C (EGR); **West Usambara Mts.** Mazumbai, Sagara ridge, 1980m, on *Philippia* (Ericaceae) bark - Pócs *et al.* 6960/E (VBI); **Poroto Mts.** in the Southern Highlands, Mt Ngozi SW of Isongole, 2000m, on twigs of broadleaved trees - Pócs *et al.* 89128/U (EGR).

Colura hedbergiana Pócs 1987, in Jones & Pócs, *J.Bryol.* **14**:449 (See Fig.7).
Tanzania: Kilimanjaro Mts. Machame Route. 3400m, on *Philippia* (Ericaceae) twigs - Pócs 8678/AG (Holotype, VBI); Umbwe Route, 2900m, on dead *Erica* twigs - Pócs 89235/D (EGR); **Mt. Meru** SW ridge between Engare Narok headwaters, 3050m, on *Erica* bark - Pócs 89186/AW (EGR); W ridge above Laikinoi, 3200m - Pócs 89194/AJ (EGR).

Colura tenuicornis (Evans) Steph. 1916, Spec.Hepat. **V**:942.
Very widespread Pantropical species (See Fig.8). East African distribution: **Rwanda and Burundi** 1500-1750m (Vanden Berghen, 1972:465); **Kenya: Taita Hills** Mbolol Hill, 1440-1680m, epiphyll - Evans *et al.* s.n. 1970 (EGR); **Kilimanjaro Mts.** Umbwe Route, 2450m, epiphyllous - Pócs 6931/E (EGR); **Uluguru Mts.** Mwere v. 1500-1600m, epiphyllous - Pócs 6176/H (EGR); Lupanga 1900-2000m, epiphyllous - Pócs 6287/P (EGR); Bondwa top, 2100m, epiphyllous - Pócs 6233/A (EGR).

Sect. Eucolura S.Jov.-Ast

Colura cylindrica Herz. 1952, *Svensk.Bot.Tid.* **46/1**:106-107.
(See Fig.9. This American species was recently found in tropical Africa and probably occurs in other lowland rainforest areas, too; American distribution: Galápagos, Ecuador, Guyana. A closely related species, *C. mosenii* is present in Java.) In Africa: **Tanzania: Nguru Mts.** Dikurura valley near Mhonda, 900m - Pócs 89058/H, 89117/A, 89218/F (EGR); Divue valley near Mlaguzi village, 1060m - Pócs & Orbán 89160/F (EGR). Ramicolous.

Colura digitalis (Mitt.) Steph. 1916, Spec.Hepat. **V**:931.
(See Fig.10. The species is known only from one locality in Latin America: Southern Brazil - Ule in Stephani Spec.Hepat. **V**:933 under the name *C. obtusa* Steph. It is very widespread in the equatorial belt of Tropical Africa.) East African distribution: **Tanzania: Usagara Mts.** (Steph. Spec.Hepat. **V**:931, Type of *C. obtusa* Steph. seen by Vanden Berghen (1963) and by Jovet-Ast (1953). Both authors confirmed its identity with *C. digitalis*); **Kilimanjaro Mts.** Kibosho, 1930m, epiphyllous and ramicolous - Pócs 90066/C (EGR); **West Usambara Mts.** 1750-1930m, Sagara ridge above Mazumbai, epiphyllous and ramicolous - Jones & Pócs 6371/BK, 6372/CE, Pócs *et al.* 89262/H (EGR); Baga I. For. Res. 1800m, corticolous - Pócs *et al.* 8419/BT (VBI); Kwagoroto Summit, 1900m, ramicolous - 89258/B (EGR); Shagayu Forest Res. 1850-2050m, corticolous - Pócs *et al.* 86205/K (VBI); Mt. Kwashemhambu, 1930m, epiphyllous - Pócs & Farkas 86202/F

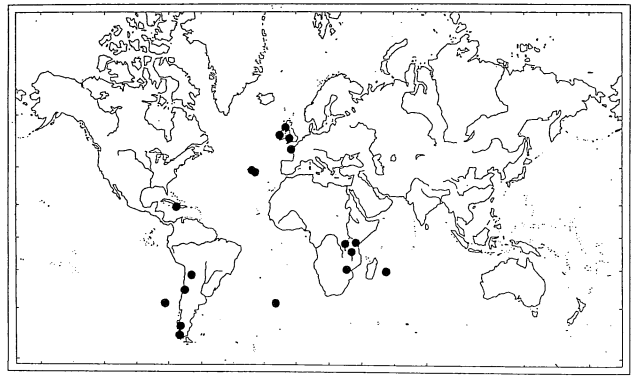


Fig.5: Colura calyptrifolia, based on Gradstein et al. (1984).

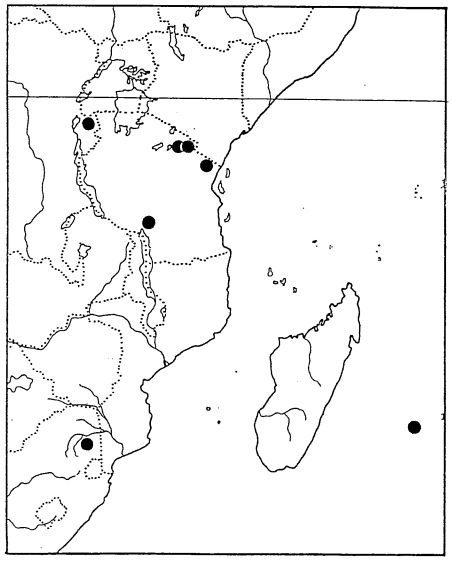


Fig.6: Colura calyptrifolia in Tropical Africa.

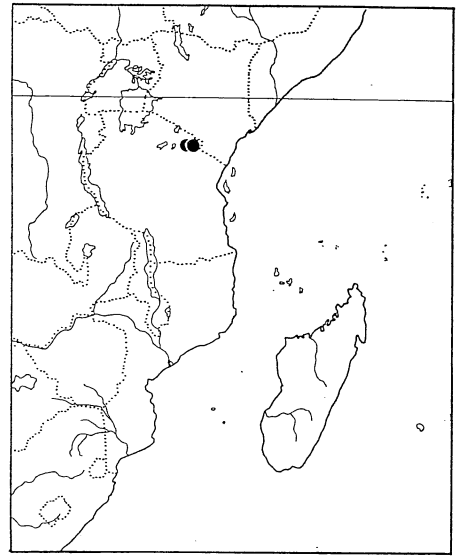


Fig.7: Colura hedbergiana.

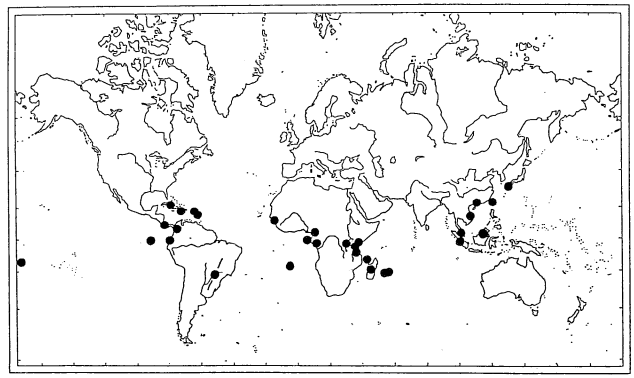


Fig.8: Colura tenuicornis.

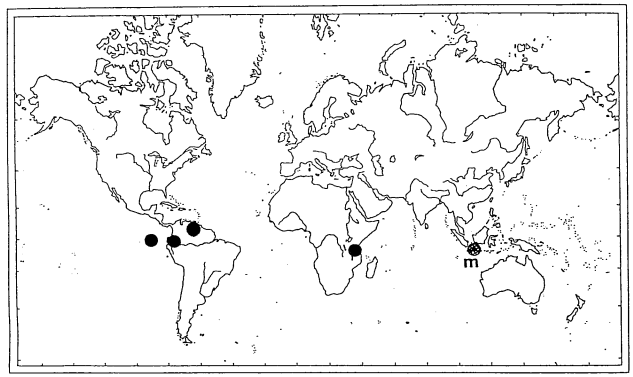


Fig.9: Colura cylindrica and (m) C. mosenii.

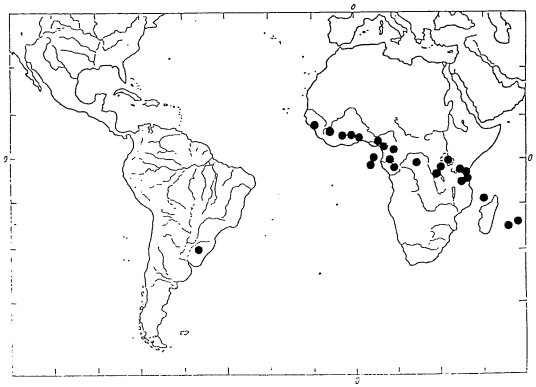


Fig.10: Colura digitalis.

(VBI); **East Uambara Mts.** near Amani, 900-1000m, epiphyllous - Pócs *et al.* 6088/K, L, 6105/AV (EGR), 6945/AE, 6947/BG (VBI); **Nguru Mts.** S Divue Valley, 900m, ramicolous - Pócs & Orbán 89224/AM (EGR); **Uluguru Mts.** Mwere V. 1500-1600m, epiphyllous - Pócs *et al.* 6181/B, 6966/AX (EGR, VBI); Palata 1600-1900m, epiphyllous - Pócs *et al.* 6967/AC, 6968/H (VBI); Bondwa 1600-2100m, epiphyllous - Pócs 6181/E, 6233/B (EGR); Lupanga 1850-2000m, epiphyllous - Pócs 6287/B (EGR); Lukwangule Plateau, 2115m, on wet granitic rocks near Mgeta Falls - Pócs *et al.* 6829/T (EGR).

Colura dusenii (Steph.) Steph. 1916, Spec.Hepat. **V**:931 (See Fig.11).

Although Vanden Berghen (1972) synonymized this species with the previous one, Jones (1979) confirmed their separation. The species is much rarer than *Colura digitalis*, therefore it seems justifiable to enumerate all known localities. As all known collections (including my own) were revised, identified and recorded by Jovet-Ast (1953, 1976), by Jones (1979), and finally by Jones & Harrington (1983), I list only the major geographical units where it occurs: **Cameroun** (Type); **Sierra Leone; Ghana: West (Ankasa); Nigeria: West (Benin)** and **East (Calabar); Kenya: Taita** and **Kasigau Hills; Tanzania: West Usambara, Nguru (Kanga)** and **Uluguru Mountains.** It is in all cases epiphyllous and occurs from sea leavel to 2140m altitude.

Ecology and Phytogeography of East African species

Ecologically the species enumerated above belong to two major groups. *Colura cylindrica*, *C.dusenii*, *C. digitalis* and *C. tenuicornis* are rainforest elements, occurring in the tropical lowland, submontane and montane forest belts, from sea level up to 2200m altitude (see Fig. 12). While *C. cylindrica* in the few known African localities occurs exclusively on tiny twigs of streamside trees, the three other species of this group are mostly epiphyllous and occur only ocasionally on twigs, bark or on wet rocks.

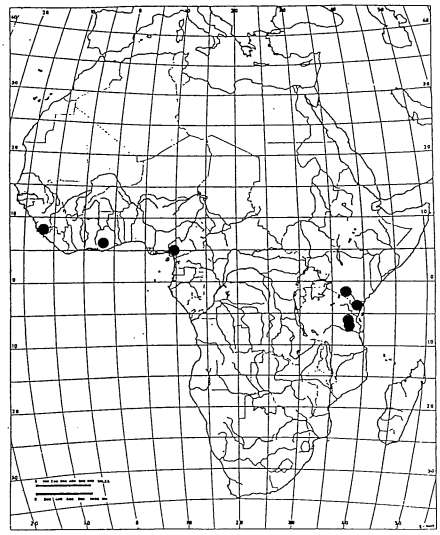


Fig.11: Colura dusenii.

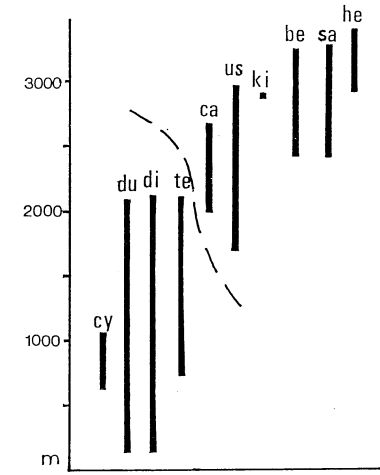


Fig.12: Altitudinal distribution of the African Colura species: be = C. berghenii, ca = C. calyptrifolia; cy = C. cylindrica; di = C. digitalis; du = C. dusenii; he = C.hedbergiana; ki = C. kilimanjarica; sa = C. saroltae; te = C. tenuicornis; us = C. usambarica.

The rest of the species are altimontane-subalpine. In fact, all but one (*C. calyptrifolia*) are endemic to the Afroalpine flora region. Species belonging to this second group occur in most cases on live or dead Ericaceae (*Erica arborea* or *Philippia* spp.) stems or twigs, in *Erica arborea* forest just below, or in subalpine *Philippia* bushes above, the forest lines, between 1980 and 3225 metres.

While members of the first group belong mostly to the Eucolura section, the second group is divided among four sections. These are all very interesting from an evolutionary point of view. Jovet-Ast (1980) discussed the evolutionary and phytogeographical significance of the members of the Oidocorys section. The Oidocorys species (including the very rare *C. kilimanjarica*) are all distributed on the dissected memers of the former Gondwanaland, all quite isolated and disjunct. The East African members of the Lingua section are closely related to each other and to the Madagascan *C. inornata*, and probably are of common origin. The members of the Macrorhamphus section probably all evolved from the closely related *C. calyptrifolia* through isolation on the high East African volcanoes. Both *C. berghenii* and *C. hedbergiana* are very limited in their distribution (Kilimanjaro - Meru: Kilimanjaro - Rungwe, respectively) and their distribution never overlaps that of *C. cylindrica*.

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THE IDENTIFICATION OF *ENCALYPTA BREVICOLLIS* (B.& S.) Ångstr.

by A.J.E. Smith

In a recent paper Horton (1980) reported the occurrence of *Encalypta brevicollis* in Scotland based upon an herbarium specimen in NY ('Reeky Linn, Aug. 1871, W.M.' - i.e. Reekie Linn, Den of Airlie, Angus). She does not give a description although she gives references for distinguishing *E. brevicollis* from *E. ciliata* to which it is most closlely related. Detailed descriptions are to be found in Horton (1983).

As both species possess fringed calyptras, a feature not found in other British species, it is quite possible that there may be other gatherings of *E. brevicollis* lurking in herbaria under the label *E. ciliata*. The differences between the two species are tabulated below.

Encalypta brevicollis	*Encalypta ciliata*
Leaf margins plane	Leaf margins narrowly recurved at middle part of leaf
Midrib papillose-denticulate at back towards apex	Midrib smooth at back
Upper part of calyptra papillose	Upper part of calyptra smooth
Capsule not or hardly contracted below mouth when dry and empty	Capsule contracted below mouth when dry and empty
Peristome teeth whitish	Peristome teeth if present dark orange
Spores papillose	Spores smooth or ridged

If the calyptras are old with the fringe missing or have fallen off, the smooth capsules will distinguish the two species from *E. rhaptocarpa*. *E. vulgaris* differs from *E. brevicollis* in the midrib smooth at back and from *E. ciliata* in the leaf margins plane.

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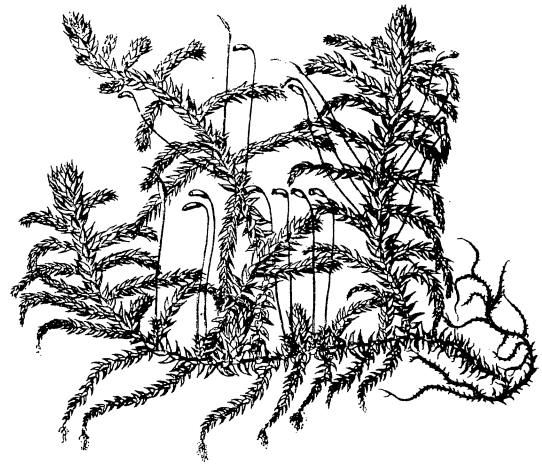

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ARTIFICIAL KEY TO THE GENERA OF BRITISH AND IRISH MOSSES

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This is a revision of the key to genera in my *Moss Flora of Britain and Ireland* (Smith, 1978), hopefully removing at least some of the difficulties encountered in that key but doubtless introducing others. Comments on the use of this key are the same as those on p.9 of the *Moss Flora*. I would be pleased (or perhaps grateful would be a better term) to hear of any problems encountered by users of this key and suggestions for improvements will be particularly welcome.

The concept of genera follows Corley *et al.* (1981) apart from four changes. *Conardia* is separated from *Amblystegium* (Hedenäs, 1989), *Tomenthypnum* from *Homalothecium* (Hedenäs, 1987), *Paraleptodontium* from *Leptodontium* (Long, 1982) and *Hennediella* from *Tortula* (Blockeel, 1990). In addition *Pictus* (Townsend, 1982) is included in the key as also are *Leptobarbula* (Appleyard *et al.*, 1985) and *Scopelophila* (Corley & Perry, 1985) not known to occur in Britain at the time of publication of Smith (1978).

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1	Leaves without midrib, composed of network of narrow green cells surrounding hyaline cells with spiral or annular thickenings	**Sphagnum**
	Leaves not as above	2
2	Capsules dehiscing by 4(-8) slits, plants saxicolous, red to brown or blackish, fragile when dry, leaf cell walls incrassate, reddish to brownish	**Andreaea**
	Capsules dehiscing by lid or cleistocarpous, plants not as above	3
3	Plants acrocarpous	4
	Plants pleurocarpous	26

4	Plants with capsules	5
	Capsules lacking	11
5	Capsules oblique, perichaetial leaves ciliate above and capsules immersed or leaves decayed at maturity of capsule borne on coarsely papillose seta	**33**
	Plants not as above	6
6	Peristome teeth 4	**34**
	Peristome teeth more than 4 or absent or capsules cleistocarpous	7
7	Capsules cleistocarpous and/or immersed	**35**
	Capsules dehiscent, emergent to longly exserted	8
8	Capsules globose or subglobose	**46**
	Capsules ovoid to cylindrical	9
9	Capsules cernuous to pendulous	**49**
	Capsules erect to horizontal	10
10	Apophysis conspicuous, about half total length of capsule, often as wide as or wider than urn	**159**
	Apophysis shorter or not distinct from urn	11
11	Leaves in two ranks	**52**
	Leaves not in two ranks	12
12	Leaves with filaments or lamellae on adaxial face of midrib at least above	**55**
	Leaves lacking filaments or lamellae on adaxial face of midrib	13
13	Leaves with border of narrow elongated cells or margin thick and several-stratose	**60**
	Leaves without border, margin 1-2-stratose	14
14	Some stems terminating in gemma-cups containing discoid gemmae, or plants minute (to 2 mm) with protonemal leaves	**34**
	Gemma-cups lacking or if plants minute then protonemal leaves lacking	15
15	Basal cells of leaves elongated, walls sinuose-nodulose, upper cells with strongly sinuose walls	**Racomitrium**
	Areolation not as above	16
16	Leaves lacking midrib	**70**
	Leaves with midrib	17
17	Midrib 1/3 or more width of leaf near base	**71**
	Midrib narrower	18
18	Alar cells differentiated from other basal cells, inflated or not, hyaline or coloured	**76**
	Alar cells not differentiated	19
19	Leaf apex hyaline, whitish when dry	**83**
	Leaf apex not hyaline	20
20	Cells in mid-leaf ± isodiametric	21
	Cells in mid-leaf longer than wide	23
21	Leaf margins dentate or denticulate at least towards apex	**87**

Margins entire, crenulate or papillose-crenulate but not dentate or denticulate 22

22 Midrib excurrent **105**

Midrib ending in or below apex **123**

23 Leaf cells lax, thin-walled **159**

Cells firm, thin-walled or not 24

24 Leaves tapering to longly acuminate or subulate apex consisting largely or entirely of midrib, cells smooth (except *Ditrichum zonatum* var.) **167**

Leaf apex rounded to acuminate or if longly acuminate then cells papillose 25

25 Leaf cells distinctly papillose and/or margins serrate or dentate from middle or below, or leaves longitudinally plicate **176**

Cells smooth, margins entire or denticulate towards apex, leaves not plicate **184**

26 Leaves with border of narrow elongated cells **197**

Leaves not bordered 27

27 Leaves complanate **199**

Leaves not complanate 28

28 Leaf cells to twice as long as wide, at least towards margin at widest part of leaf **207**

Cells more than twice as long as wide 29

29 Leaves squarrose or falcato-secund **221**

Leaves not squarrose or falcato-secund 30

30 Leaf apex obtuse or rounded, apiculate or not, or abruptly narrowed to long apiculus **230**

Leaf apex subacute to longly acuminate 31

31 Leaves longitudinally plicate **243**

Leaves not longitudinally plicate 32

32 Leaves with single midrib, forked or not above, extending halfway or more up leaf **253**

Midrib shorter or double or lacking **266**

.....

33 Capsules immersed, stem leaves and perichaetial leaves persisting **Diphyscium**

Capsules exserted on coarsely papillose seta, leaves decayed by time capsules are mature **Buxbaumia**

.....

34 Plants to 1.5(-3.5) cm, some stems terminating in gemma-cups containing discoid gemmae, leaf cells ± isodiametric, protonemal leaves lacking **Tetraphis**

Plants minute, to 2 mm, gemma-cups lacking, leaf cells longer than wide, protonemal leaves present **Tetrodontium**

.....

35 Leaves narrowly lanceolate or linear-lanceolate strongly incurved when dry, margin plane or incurved, cells ± isodiametric **Weissia**

Leaves not strongly incurved when dry, wider or if not then margin plane and cells

longer than wide 36

36 Capsules cleistocarpous, immersed, emergent or exserted 37

Capsules dehiscent, immersed 45

37 Capsules exserted, seta straight **Pottia**

Capsules immersed or laterally emergent on curved seta 38

38 Plants 1-2 mm high arising from persistent protonemata, capsules not concealed by perichaetial leaves 39

Plants larger, protonemata not persisting, capsules ± concealed by perichaetial leaves or protruding laterally 40

39 Leaves without midrib, margin entire or obscurely toothed, capsules without apiculus except when fresh **Micromitrium**

Midrib present or if absent then margin coarsely toothed, capsules with apiculus **Ephemerum**

40 Spores *ca* 16 per capsule, 100-120 μm diameter **Archidium**

Spores numerous, 15-40(-50) μm diameter 41

41 Leaves narrowly lanceolate to linear-lanceolate and subulate 42

Leaves ovate to lanceolate 43

42 Perichaetial leaves longer than stem leaves, midrib ending in apex or excurrent **Pleuridium**

Perichaetial and stem leaves of ± similar length, midrib ceasing below apex **Pseudephemerum**

43 Leaf margins entire, cells papillose or plants reddish brown **Phascum**

Margins toothed above, cells smooth 44

44 Leaves concave, midrib excurrent in reflexed apiculus **Acaulon**

Leaves not concave, midrib ending below apex **Aphanorhegma**

45 Leaves without midrib **Hedwigia**

Leaves with midrib 84

.....

46 Plants bud-like, leaves lacking midrib **Discelium**

Plants not bud-like, leaves with midrib 47

47 Capsules black, scarcely 1 mm diameter, seta straight **Catoscopium**

Capsules green to brown, more than 1 mm diameter or seta arcuate 48

48 Leaves closely imbricate when moist, in 5 ranks, margin plane, denticulate above **Conostomum**

Leaves erecto-patent to patent when moist, not in 5 ranks, margin plane or recurved, dentate 180

.....

49 Leaves imbricate when moist 194

Leaves erecto-patent to spreading 50

50 Leaf margins dentate at least above **Mnium**
Leaf margins entire or denticulate near apex 51
51 Leaf apex rounded, cells in rows radiating from midrib **Pseudobryum**
Leaf apex obtuse to acuminate or if rounded then cells not in radiating rows 196

.....

52 Leaves abruptly narrowed from broad sheathing base to long subulate apex consisting almost entirely of midrib **Distichium**
Leaves not as above 53
53 Lower part of leaf lacking conduplicate portion, midrib absent **Schistostega**
Lower part of leaf with conduplicate portion, midrib present 54
54 Conduplicate portion about 1/2 total leaf length, seta long **Fissidens**
Conduplicate portion about 1/3 total leaf length, capsule barely emergent from perichaetial leaves **Octodiceras**

.....

55 Leaves with branched filaments on adaxial surface of midrib **Aloina**
Leaves with longitudinal lamellae on adaxial surface of midrib at least above 56
56 Midrib narrow, with 2-4 lamellae on upper part, leaves entire, unbordered, capsules without epiphragm **Pterygoneurum**
Midrib occupying more than 1/2 width of leaf blade or leaves bordered and spinosely toothed, capsules with epiphragm 57
57 Leaves bordered, midrib narrow **Atrichum**
Leaves unbordered, midrib more than 1/2 width of leaf blade 58
58 Lamellae sinuose, 2-4 also present on abaxial side of midrib **Oligotrichum**
Lamellae ± straight, absent from abaxial side of midrib 59
59 Capsules at least obscurely angled, apophysis and stomata present, leaves linear-lanceolate, acuminate or with margins strongly inflexed, not glaucous green **Polytrichum**
Capsules not angled, apophysis and stomata lacking, leaves shortly oblong or oblong-lanceolate, apex acute to obtuse or if leaves narrower then glaucous green **Pogonatum**

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60 Leaf cells ± isodiametric 61
Cells longer than wide 65
61 Marginal cells 3-5-stratose, forming thick marginal band, not elongated **Cinclidotus**
Marginal cells elongated, forming distinct border 62
62 Leaf cells papillose and/or margins recurved at least below 63
Cells smooth, margins plane 64
63 Leaf border bistratose below, capsules cernuous or horizontal, peristome straight **Desmatodon**

Leaf border unistratose, capsules erect, peristome spirally coiled or lacking 63a

63a Leaf margin entire or denticulate above, rhizoidal gemmae lacking, peristome present **Tortula**

Leaf margin irregularly toothed towards apex, rhizoidal gemmae present, peristome lacking **Hennediella**

64 Midrib with lamellae on adaxial face in upper part, capsules with epiphragm **Atrichum**

Midrib without lamellae, capsules without epiphragm **Mnium**

65 Leaf cells thin-walled, lax, rectangular to rhomboidal, capsules erect, peristome rudimentary or absent **Entosthodon**

Cells firm, thin-walled or not, elongate-hexagonal, capsules horizontal to pendulous, peristome well developed 66

66 Leaf margin toothed, sometimes spinosely so, or if entire then sterile shoots arcuate to prostrate and/or leaf cells in rows radiating from midrib **Plagiomnium**

Margins entire or denticulate above, sterile shoots erect, cells not in radiating rows 67

67 Midrib only extending about 3/4 way up leaf, leaves often of two distinct sizes on same stem **Epipterygium**

Midrib extending nearly to apex to excurrent, leaves not of two distinct sizes 68

68 Leaves ovate to ovate-lanceolate, acute to acuminate, rarely obtuse, margin entire or denticulate above **Bryum**

Leaves elliptical to orbicular or obovate, apex rounded, margin entire 69

69 Mid-leaf cells 15-35 μm wide **Cinclidium**

Cells 35-50 μm wide **Rhizomnium**

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70 Plants bud-like, capsules long-exserted **Discelium**

Plants forming tufts or patches, capsules immersed **Hedwigia**

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71 Plants glaucous green to whitish, often forming large $\pm$ hemispherical cushions, midrib constituting almost whole of leaf, the very narrow lamina cells lacking chloroplasts, alar cells not differentiated **Leucobryum**

Plants and leaves not as above, alar cells differentiated or not 72

72 Leaves ligulate to linear-lanceolate, apex rounded **Meesia**

Leaves tapering to longly acuminate apex 73

73 Alar cells not forming auricles, margins not inflexed except sometimes towards apex, seta straight 74

Alar cells inflated, forming hyaline to brownish auricles and/or margins inflexed from near base to apex, seta straight or variously curved 75

74 Basal cells of leaves rectangular or narrowly rectangular, capsules ovoid or ellipsoid, gibbous **Dicranella**

Basal cells linear-rhomboidal, capsule pyriform, $\pm$ symmetrical **Leptobryum**

75 Lamina cells extending only short distance up leaf, midrib in section with green cells and lacking stereids **Paraleucobryum**

Lamina cells extending part or all way up leaf, midrib in section without green cells and with stereids 77

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76 Midrib 1/4 or more width of leaf base 77

Midrib less than 1/4 width of leaf base 78

77 Midrib in section with stereids in a band on both sides of guide cells, peristome teeth divided ± to base **Dicranodontium**

Midrib in section without stereids or stereids on abaxial side only or if on both sides then few on adaxial side and in small groups on abaxial side, peristome teeth divided ± half-way **Campylopus**

78 Angular cells enlarged, hyaline **Oncophorus**

Angular cells orange or brown at least in older leaves, enlarged or not 79

79 Cells in upper part of leaf ± linear, midrib excurrent in subulate point, capsules erect **Blindia**

Cells in upper part of leaf quadrate to rectangular, midrib if excurrent not forming subulate point, capsules erect, inclined or horizontal 80

80 Leaves crisped when dry, margins entire, bistratose above **Dicranoweisia**

Leaves not or only slightly crisped when dry or if strongly crisped then margins denticulate and unistratose above 81

81 Seta short (3-6 mm), stout, capsule ovoid, wide-mouthed when dry, leaves abruptly narrowed above basal part, midrib longly excurrent **Arctoa**

Sporophytes not as above, leaves gradually tapering from near base, midrib if excurrent not longly so 82

82 Plants autoecious, capsules strumose, leaves not brittle, midrib in section without stereids or with a few on abaxial side only, alpine plants **Kiaeria**

Plants dioecious, capsules not strumose, midrib in section with abaxial and adaxial stereids or if stereids lacking then leaves brittle, plants lowland or alpine **Dicranum**

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83 Mid-leaf cells longer than wide, narrowly hexagonal, capsules longly exserted, pendulous **Bryum**

Cells ± isodiametric, capsules immersed to longly exserted, erect or inclined 84

84 Leaf cell lumens rounded or if hexagonal then cells 10-16 μm wide, walls not sinuose, capsules immersed to shortly exserted, peristome double, outer teeth whitish, in pairs **Orthotrichum**

Mid-leaf cells 6-12 μm wide, lumens irregularly quadrate, walls ± sinuose, capsules longly exserted or if immersed then peristome teeth reddish, teeth not in pairs 85

85 Leaves longitudinally plicate, plicae often bistratose, margins plane, capsules immersed,

plants dioecious **Coscinodon**

Leaves not plicate, margins plane, incurved or recurved on one or both sides, capsules exserted or immersed 86

86 Capsules immersed, erect, basal cells of leaves quadrate or shortly rectangular, incrassate, plants synoecious **Schistidium**

Capsules exserted or if immersed then inclined, basal cells rectangular to linear, thin-walled to strongly incrassate, plants synoecious or dioecious **Grimmia**

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87 Leaves squarrose when moist 88

Leaves erecto-patent to spreading but not squarrose when moist 89

88 Leaf margins plane, hyaline basal cells ascending up margin **Pleurochaete**

Margins recurved, hyaline basal cells not ascending up margin **Paludella**

89 Leaf cells obscure with papillae 90

Cells pellucid, papillose or not 92

90 Basal cells of leaves narrowly rectangular, marginal cells not pellucid **Dichodontium**

Basal cells rectangular, marginal cells pellucid 91

91 Leaves ± erect, flexuose when dry, not undulate when moist, marginal cells not elongated **Leptodontium**

Leaves strongly crisped when dry, ± undulate when moist, 1-2 rows marginal cells elongated **Paraleptodontium**

92 Mid-leaf cells 20-34 μm wide **Mnium**

Cells narrower 93

93 Leaves obovate or oblong-lanceolate 94

Leaves lingulate to lanceolate or linear-lanceolate 95

94 Plants bud-like, leaf apex rounded or obtuse, capsules with peristome **Stegonia**

Plants not bud-like, leaf apex acute, capsules gymnostomous **Pottia**

95 Stems matted with dense brown tomentum and/or some terminating in gemma-bearing pseudopodium **Aulacomnium**

Stems neither matted with dense tomentum nor producing pseudopodia 96

96 Leaves linear-lanceolate, fragile, margins undulate, sinuose, irregularly toothed towards apex **Didymodon**

Leaves not as above 97

97 Leaves ligulate or narrowly lingulate, ± abruptly or gradually tapering to apex **Rhabdoweisia**

Leaves ovate to linear-lanceolate, gradually tapering to apex 98

98 Leaf margins plane 99

Leaf margins recurved 101

99 Leaves plicate below, longitudinal walls of basal cells more heavily thickened than transverse walls, upper cells smooth **Ptychomitrium**

Leaves not plicate below, walls of basal cells of ± equal thickness, upper cells papillose or smooth 100

100 Basal cells of leaves narrowly rectangular, midrib toothed or papillose on abaxial side above **Timmia**

Basal cells rectangular, midrib smooth on abaxial side **Zygodon**

101 Leaves crisped when dry 102

Leaves flexuose or ± curled when dry 104

102 Plants pale glaucous green, midrib toothed on abaxial side above **Bartramia**

Plants not pale glaucous green, midrib smooth on abaxial side 103

103 Leaf base not sheathing, cells papillose or not, capsules striate or if smooth not strumose **Cynodontium**

Leaf base ± sheathing, cells smooth, capsules smooth, strumose **Oncophorus**

104 Leaf margins not papillose-crenulate, cells smooth, capsules inclined at least when dry, strumose **Ceratodon**

Leaf margins crenulate-papillose, cells papillose, capsules erect, not strumose **Bryoerythrophyllum**

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105 Leaf cells sinuose, opaque and bistratose above, not markedly papillose, capsule immersed **Schistidium**

Leaf cells not sinuose, pellucid or if opaque or obscure then strongly papillose, capsule exserted 106

106 Leaf cells obscure, bistratose, strongly papillose with hollow papillae **Cheilothela**

Cells unistratose except sometimes at margin, pellucid or obscure with papillae, papillae solid 107

107 Tips of uppermost leaves with clusters of gemmae **Ulota**

Gemmae if present not in clusters on tips of young leaves 108

108 Leaf cell lumens rounded, stem gemmae present **Zygodon**

Lumen shape various, if rounded then stem gemmae lacking 109

109 Leaves lingulate to broadly spathulate, apex acute to rounded, midrib excurrent in hair-point or not or widened in upper part of leaf, cells smooth to densely papillose, pellucid to very obscure, capsules cylindrical 110

Leaves lacking any combination of above characters, capsules ovoid to cylindrical 111

110 Leaf cells very obscure with dense multifid papillae, calyptra cylindrical, covering capsule **Encalypta**

Leaf cells pellucid to obscure, smooth to papillose, papillae simple, calyptra cucullate, only covering lid **Tortula**

111 Leaf cells smooth, margins entire 112

Leaf cells papillose, margins entire or papillose-crenulate 113

112 Leaf margins plane, peristome absent **Pottia**

Margins recurved, peristome of erect or spirally coiled filiform segments or absent 145

113 Stems with dense reddish brown tomentum, apical cell of leaves translucent, remaining cells densely papillose **Anoectangium**

Stems without reddish brown tomentum, apical cell of leaves not markedly differentiated from neighbouring cells 114

114 Leaf margins recurved on one or both sides at least below 115

Margins plane or incurved 119

115 Leaf margins revolute ± from base to apex 116

Margins variously recurved but not revolute 117

116 Midrib excurrent in short or long hair-point, marginal cells less strongly papillose than inner cells, forming a pale band **Desmatodon**

Midrib excurrent in stout mucro, marginal cells similar to inner cells **Pseudocrossidium**

117 Leaf margins papillose-crenulate 158

Margins smooth 118

118 Leaves ovate-lanceolate or oblong-lanceolate **Pottia**

Leaves linear-lanceolate **Didymodon**

119 Basal hyaline cells ascending up margin of leaf, transition from basal to upper cells abrupt **Tortella**

Basal cells not ascending up margin, transition to upper cells not abrupt 120

120 Leaf margin denticulate near base, leaves linear-lanceolate, margins plane **Eucladium**

Margins entire near base, or if denticulate then leaves wider or margins incurved above 121

121 Leaves crisped or curled when dry, margins plane, stems without central strand **Oxystegus**

Leaves ± tightly incurved when dry, stems with central strand, margins plane or incurved above 122

122 Leaf margins plane or incurved above, apex not cucullate, hairs in leaf axils 3-5 cells long, plants autoecious **Weissia**

Leaf margins plane, apex flat or if margin inflexed then apex cucullate, axillary hairs 8-15 cells long, plants dioecious **Trichostomum**

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123 Leaves longly lingulate, midrib poorly defined, cells papillose, 2-3- stratose in upper part of leaf, perichaetial leaves ciliate, capsules immersed, oblique **Diphyscium**

Plants not as above 124

124 Basal cells of leaves swollen, 2-3-stratose, cells above with stellate lumens, papillose, pellucid, stems with dense brown tomentum or not **Aulacomnium**

Basal cells unistratose, lumens of cells above not stellate, tomentum absent or if present then cells obscure with papillae 125

125 Leaf apex obtuse or rounded or if acute then stems with dense reddish brown tomentum

below 126
Leaf apex acute to acuminate, dense tomentum lacking 132
126 Leaves ovate-spathulate to lingulate, mostly widest above middle **Tortula**
Leaves ovate to lanceolate, widest at or below middle 127
127 Leaf cells papillose 128
Cells smooth or only slightly papillose 130
128 Leaf margins recurved, incurved or plane, cell lumens ± rounded 129
Leaf margins plane, cell lumens irregularly quadrate 152
129 Leaf margins plane or recurved below, cells obscure with papillae, capsules exserted, gymnostomous **Anoectangium**
Leaf margins recurved ± from base to apex or incurved, cells not obscure, capsules immersed to emergent, peristomate **Orthotrichum**
130 Cells in upper part of leaf 3-4-stratose and very opaque or walls very sinuose **Grimmia**
Cells neither 3-4-stratose and obscure nor with sinuose walls 131
131 Capsules immersed, leaf cells ± quadrate, usually bistratose at margin and above, plants of rocks in and by streams **Schistidium**
Capsules longly exserted or absent, leaf cells ± hexagonal, unistratose throughout, habitat various 147
132 Leaf margins recurved on one or both sides at least below 133
Leaf margins plane or inflexed above 148
133 Midrib 2-winged on abaxial side above, basal cells of leaf with sinuose walls **Dryptodon**
Midrib not winged on abaxial side, walls of basal cells not sinuose 134
134 Leaf cells with ± rounded lumens 135
Lumens ± quadrate or hexagonal 139
135 Leaves linear-lanceolate or narrowly lanceolate, not much widened above base, capsules exserted 136
Leaves lanceolate, widened above base or not, capsule exserted or not 137
136 Plants to 1 cm, basal cells of leaves thin-walled, calyptra concealing capsule **Glyphomitrium**
Plants to 8 cm, basal cells incrassate, calyptra small **Amphidium**
137 Leaves spreading-recurved when moist, stem gemmae usually present **Zygodon**
Leaves erecto-patent to spreading, gemmae if present borne on leaves 138
138 Capsules immersed to slightly exserted, calyptra naked or sparsely hairy, basal part of leaf not widened or concave or plicate, basal cells near margin not differentiated **Orthotrichum**
Capsules exserted, calyptra hairy, basal part of leaf widened, concave and sometimes plicate, marginal cells near base widened, hyaline **Ulota**
139 Plants much branched or not, capsules immersed, leaf cells bistratose at least towards

apex, walls sinuose but sometimes only slightly so **Schistidium**

Plants not or sparsely branched, capsules exserted, leaf cells unistratose except sometimes at margin, walls not sinuose 140

140 Leaf cells papillose, margins crenulate-papillose or not 141

Leaf cells and margins smooth 144

141 Leaves lanceolate to narrowly lanceolate, basal cells thick-walled, capsules gymnostomous **Hymenostylium**

Leaves oblong-lanceolate to narrowly lanceolate or lingulate, basal cells thin-walled, capsules peristomate 142

142 Plants reddish-brown, at least below, abaxial surface of midrib and both surfaces of lamina cells with C-shaped papillae **Bryoerythrophyllum**

Plants red-tinged or not, midrib and cells smooth or with blunt or conical, not C-shaped papillae 143

143 All cells of hairs in leaf axils hyaline, abaxial cells of midrib elongated, lamina cells obscure **Barbula**

Basal cell of axillary hairs brown, abaxial cells of midrib shortly rectangular, lamina cells pellucid **Didymodon**

144 Leaves crisped when dry, narrowly linear-lanceolate, gemmae usually present on leaves **Dicranoweisia**

Leaves not crisped when dry, linear-lanceolate to ovate, leaf gemmae lacking 145

145 Margins recurved ± from base to near apex, capsule sulcate and inclined when dry, strumose **Ceratodon**

Margins recurved below, capsule smooth, erect, not strumose 146

146 Leaves linear-lanceolate, basal cells incrassate, capsules gymnostomous **Hymenostylium**

Leaves lingulate to ovate-lanceolate, peristome present or not 147

147 Leaves broadly ovate to narrowly or linear-lanceolate, gradually tapering to acute to obtuse or rounded apex, peristome present **Didymodon**

Leaves ovate-spathulate to narrowly lingulate, ± abruptly narrowed to acute apex, peristome lacking **Scopelophila**

148 Plants 1-2 mm, upper leaves linear, margins and cells smooth, seta cygneous **Campylostelium**

Plants larger or if not then leaves wider, cells papillose, margins papillose-crenulate or not, seta straight 149

149 Leaf cells pellucid, lumens rounded, margins smooth, stem gemmae usually present **Zygodon**

Leaf cell lumens ± quadrate or if rounded then obscure with papillae, margins papillose-crenulate at least above, stem gemmae lacking 150

150 Hyaline basal cells ascending up leaf margin, transition between basal and upper cells

abrupt **Tortella**

Hyaline basal cells not ascending up margin, transition between basal and upper cells not abrupt 151

151 Margins of basal part of leaf denticulate **Eucladium**

Leaf margins entire towards base 152

152 Plants minute, 2-3 mm, leaves narrowly linear-lanceolate, abruptly or gradually tapering from ± expanded basal portion, peristome perfect 153

Plants larger or if minute then leaves ligulate to ligulate-lanceolate or narrowly lanceolate and peristome absent 154

153 Leaf margins unistratose, apex obtuse **Leptobarbula**

Leaf margins bistratose at middle of leaf, apex acute to acuminate **Trichostomopsis**

154 At least lower leaves bluntly pointed, apex flat, not apiculate 155

Leaf apex acute to acuminate or apiculate, or if bluntly pointed then cucullate 156

155 Plants to 2.5 mm tall, basal cells of leaves narrowly rectangular, upper cells pellucid, capsules very common **Gyroweisia**

Plants larger or if not then basal cells rectangular, upper cells obscure with papillae and capsules rare **Gymnostomum**

156 Leaves ligulate to linear, basal cells incrassate, cells above with ± rounded lumens **Amphidium**

Leaf shape various, basal cells thin-walled, cells above ± quadrate or hexagonal 157

157 Leaves 3-5 mm long; translucent when moist **Oxystegus**

Leaves shorter, opaque when moist 158

158 Leaf cells 8-14 μm wide, peristome long **Barbula**

Leaf cells 6-8 μm wide, peristome short **Trichostomum**

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159 Leaves abruptly narrowed from oblong or oblong-lanceolate base to long subula, margin entire, cells firm, seta straight, capsule curved, peristome single **Trematodon**

Leaves not as above, cells lax, seta straight or arcuate, capsule straight, asymmetrical or not 160

160 Leaves ovate-spathulate to ± orbicular, ciliate at base, apex rounded, mid-leaf cells 50-100 μm wide **Oedipodium**

Leaf shape various, apex acuminate to obtuse, base not ciliate, cells smaller 161

161 Plants occurring on soil of various types, apophysis less than half length of capsule and narrower than urn 162

Plants on dung or animal remains, apophysis *ca* 1/2 total length of capsule and of similar diameter to or much wider than urn 165

162 Seta arcuate and/or capsule inclined, capsule asymmetrical with oblique mouth, peristome double **Funaria**

Seta straight, capsule erect, symmetrical, peristome single, rudimentary or absent 163

163 Leaves spathulate and acute or lingulate and obtuse, caspules ellipsoid or sub-cylindrical, peristome perfect **Tayloria**

Leaf shape various but not lingulate and obtuse, capsules pyriform or turbinate, peristome rudimentary or absent 164

164 Capsules pyriform, peristome rudimentary or absent, lid convex, calyptra cucullate, oblique **Entosthodon**

Capsules pyriform or turbinate, peristome absent, lid apiculate or rostellate, calyptra mitriform, symmetrical **Physcomitrium**

165 Leaves broadly ovate or obovate, apex obtuse, apical cell 1-2(-3) times as long as wide, antheridia on slender lateral branches, apophysis ± as wide as urn **Aplodon**

Leaf apex acuminate, apical cell 3 or more times as long as wide or leaves ovate-orbicular, male branches not slender or plants dioecious, apophysis much enlarged or not 166

166 Leaves narrowing to long subulate acumen, apophysis *ca* as wide as urn and of similar colour when ripe, plants on animal remains and dung **Tetraplodon**

Acumen shorter, apophysis of similar width to urn but of different colour or much wider, plants of dung **Splachnum**

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167 Midrib 1/4 or more width of leaf base, capsules pyriform **Leptobryum**

Midrib narrower, capsule shape various 168

168 Capsules narrowly pyriform or clavate, seta arcuate, cells in mid-leaf linear, midrib ending in or below apex **Orthodontium**

Capsule shape various, seta straight or if arcuate then capsules ovoid, mid-leaf cells ± rectangular or if linear then midrib excurrent 169

169 Plants minute, to 2.5 mm or if more then leaves trifarous and/or ending in stout obtuse subula, peristome teeth entire or lacking 170

Plants more than 2.5 mm, leaves not trifarious or ending in stout subula, peristome teeth divided into filiform segments 172

170 Capsule longitudinally striate, peristome teeth papillose, leaf subula acute **Brachydontium**

Capsule smooth, peristome teeth where present smooth, leaf subula acute or obtuse 171

171 Seta stout relative to size of capsule, leaves secund with subula several times length of sheathing base **Trochobryum**

Seta relatively slender or if stout then leaves with short obtuse subula, leaves not secund **Seligeria**

172 Basal cells of leaves rectangular, capsules erect, straight **Ditrichum**

Basal cells narrowly rectangular to linear, capsules erect or inclined, straight or curved 173

173 Leaves squarrose from sheathing base 174

Leaves not squarrose 175

174 Leaf subula denticulate all round, capsules erect, cylindrical **Ditrichum**

Leaf subula entire or denticulate at margins only, capsules ovoid, erect or inclined **Dicranella**

175 Midrib longly excurrent, capsules erect **Ditrichum**

Midrib ending below apex to excurrent but not longly so, capsules inclined **Dicranella**

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176 Leaf cells smooth 177

Cells papillose 182

177 Leaves squarrose from erect sheathing base, margins toothed ± from base to apex **Meesia**

Leaves not as above 178

178 Plants glaucous bluish green, cells in mid-leaf with ± flat ends, capsules erect, narrowly ellipsoid, peristome single **Saelania**

Plants not as above, peristome double 179

179 Leaves spathulate, capsules pendulous, ellipsoid, seta straight **Rhodobryum**

Leaves not spathulate, capsules ± spherical, erect or inclined, seta straight or arcuate 180

180 Leaves longitudinally plicate, seta arcuate, plants robust **Breutelia**

Leaves plane or if plicate then near apex only, seta straight or if arcuate then plants minute 181

181 Plants synoecious, minute, 2-5 mm, leaf margins plane **Bartramidula**

Plants dioecious or synoecious, larger, leaf margins plane or recurved, seta straight 182

182 Leaves ovate or ovate-lanceolate **Philonotis**

Leaves narrowly lanceolate to linear-lanceolate 183

183 Plants synoecious, cells very finely papillose **Plagiopus**

Dioecious, cells coarsely papillose **Bartramia**

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184 Cells in mid-leaf with ± flat or rounded ends (i.e. cells ± rectangular or narrowly rectangular) 185

Cells in mid-leaf with pointed ends (i.e. cells narrowly hexagonal, rhomboidal or linear) 191

185 Leaf apex obtuse or rounded 186

Leaf apex acute to acuminate, rarely bluntly pointed 187

186 Plants 1-10(-15) cms, leaves squarrose when moist **Dicranella**

Plants to *ca* 1 cm, leaves imbricate **Aongstroemia**

187 Leaves closely imbricate when moist, 5-ranked, apex acuminate, midrib excurrent **Conostomum**

Leaves erecto-patent to flexuose-spreading or if imbricate then not 5-ranked and apex

bluntly pointed, midrib ending below apex or excurrent 188

188 Leaves ± appressed when moist, bluntly pointed **Ditrichum**

Leaves erecto-patent to flexuose-spreading when moist, acute to acuminate 189

189 Vegetative shoots slender with small distant leaves, fertile shoots with longer more crowded leaves, capsules cleistocarpous, immersed **Archidium**

Leaves on vegetative and fertile shoots similar, not distant, capsules dehiscent, longly exserted 190

190 Plants to *ca* 1 cm, cells in mid-leaf rectangular to linear, not incrassate, capsules ovoid **Dicranella**

Plants to 4(-7) cm, cells in mid-leaf quadrate-rectangular, incrassate, capsules ± spherical **Catoscopium**

191 Plants 3-10(-15) cm, leaf apex rounded, cells in rows radiating from midrib **Pseudobryum**

Leaf apex acuminate, acute or obtuse or if rounded then plants smaller and cells not in radiating rows 192

192 Midrib very stout below, occupying 1/4-1/3 extreme base of leaf, capsule ± erect, curved, inner peristome teeth longer than outer **Amblyodon**

Midrib narrower, capsule inclined to pendulous, outer peristome teeth as long as or longer than inner or teeth absent 193

193 Leaves imbricate when moist, apex if rounded not apiculate 194

Leaves erecto-patent to spreading or if imbricate then apex rounded and apiculate 196

194 Leaves denticulate towards apex, plants of heavy metal-containing substrates, capsules pyriform, borne on short lateral branches **Mielichhoferia**

Leaves entire or obscurely denticulate towards apex, substrate with or without heavy metals, capsules narrowly pyriform, terminal on main axis 195

195 Mid-leaf cells narrowly hexagonal, 14-24 μm wide **Plagiobryum**

Mid-leaf cells linear-vermicular, 9-16 μm wide **Anomobryum**

196 Mid-leaf cells narrowly hexagonal to linear, midrib usually ending below apex **Pohlia**

Mid-leaf cells hexagonal, narrowly hexagonal or rhomboid-hexagonal, midrib ending below apex to excurrent, if cells linear then plants usually purplish-red **Bryum**

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197 Midrib single, extending *ca* 3/4 way up leaf **Daltonia**

Midrib very short and single or long and double 198

198 Midrib very short, single or forked, mid-leaf cells 25-40 μm wide **Calyptrochaete**

Midrib double, extending *ca* 3/4 way up leaf, cells 15-30 μm wide **Cyclodictyon**

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199 Leaf cells very large, 60-100 μm wide in mid-leaf **Hookeria**

Cells narrower, 4-30 μm wide 200

200 Midrib single, extending halfway or more up leaf 201

Midrib very short, forked or absent 202

201 Leaves ovate-oblong, apex rounded, apiculate or not **Homalia**

Leaves lanceolate or ovate-lanceolate, apex acuminate **Amblystegium**

202 Leaves often subfalcate and transversely undulate, not whitish green, base not decurrent, cells linear, incrassate, capsules erect **Neckera**

Leaves not falcate, if transversely undulate then plants whitish green, cells linear to narrowly hexagonal, not incrassate, capsules erect to horizontal 203

203 Leaf base decurrent*, alar cells hyaline or greenish 204

Leaf base not decurrent, alar cells greenish 205

204 Leaf margins entire or denticulate towards apex only **Plagiothecium**

Margins denticulate ± from base to apex **Herzogiella**

205 Leaf margins denticulate ± from middle or below, apex short, acute, mid-leaf cells 6-10 μm wide, filiform branches absent **Taxiphyllum**

Margin entire or denticulate towards apex, apex ± filiform, mid-leaf cells 4-7 μm wide, filiform branches present or not 206

206 Epidermal cells of stem thick-walled, 6-10 μm wide, filiform branches often present, leaf margin denticulate towards apex **Isopterygium**

Epidermal cells thin-walled, 16-20 μm wide, filiform branches lacking, leaf margin entire **Isopterygiopsis**

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207 Midrib single, extending halfway or more up leaf 208

Midrib shorter or double or lacking 216

208 Stems pinnately or bipinnately branched, abundant paraphyllia present, stem leaves acute to acuminate, margins denticulate **Thuidium**

Stems irregularly branched or if pinnate or bipinnate then leaf margins entire or apex rounded, paraphyllia few or lacking 209

209 Midrib occupying 1/4(-1/2) base of coarsely toothed branch leaves, shoots often dendroid with scale leaves on main axis **Thamnobryum**

Plants not as above 210

210 Leaf apex rounded, cells smooth **Leptodon**

Apices obtuse to acuminate or if rounded then cells papillose 211

211 Leaves longitudinally plicate **Lescuraea**

Leaves not longitudinally plicate 212

212 Leaf cells papillose with papillae central on both faces of cell 213

Cells smooth or if papillose only slightly so with papillae on end walls of cells 214

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*Decurrent portions will remain on stem when leaf is removed.

213 Primary stems not stoloniform, leaf margins entire, cells unipapillose **Leskea**
Primary stems stoloniform, leaf margins papillose-crenulate, cells 2-3- papillose **Anomodon**

214 Plants medium-sized, leaves mostly more than 1 mm long, capsules immersed **Cryphaea**
Plants slender, leaves less than 1 mm long, capsules exserted 215

215 Mid-leaf cells 8-12 μm wide, 1-2 times as long as wide **Pseudoleskeella**
Mid-leaf cells 12-16 μm wide, 2-3 times as long as wide 220

216 Leaves longitudinally plicate **Leucodon**
Leaves not longitudinally plicate 217

217 Cells papillose 218
Cells smooth 220

218 Stems with numerous short secund branches, leaves mostly more than 1 mm long, dentate above **Pterogonium**
Branching not as above, leaves less than 1 mm long, entire or denticulate above 219

219 Leaves strongly concave, apex obtuse or rounded, apiculate or not **Myurella**
Leaves not or hardly concave, apex acute to acuminate **Heterocladium**

220 Leaves obtuse to acute, midrib single, extending 1/3(-2/3) way up leaf, mid-leaf cells 12-16 μm wide **Myrinia**
Leaves acuminate, midrib lacking, mid-leaf cells *ca* 10 μm wide **Habrodon**

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221 Leaves squarrose 222
Leaves falcate or falcato-secund 223

222 Leaf margin entire towards apex or plants very slender **Campylium**
Leaf margin denticulate towards apex, plants robust **Rhytidiadelphus**

223 Leaves rugose when moist, midrib single, extending $\pm$ halfway up leaf, cells papillose on abaxial side **Rhytidium**
Leaves not rugose or midrib very short and double, cells smooth 224

224 Leaves tapering to acuminate apex, alar cells not opaque 225
Leaves shortly pointed or apex obtuse to rounded or if longly pointed then alar cells opaque with granular contents 242

225 Midrib single, extending halfway or more up leaf 226
Midrib short or double or lacking 227

226 Leaves with broad cordate base, midrib stout, paraphyllia present or not **Cratoneuron**
Leaf base not cordate, midrib not stout, paraphyllia lacking **Drepanocladus**

227 Leaves not plicate, base not cordate **Hypnum**
Leaves plicate and/or base cordate 228

228 Shoots arcuate, stem and branch leaves of $\pm$ similar shape, plants robust **Rhytidiadelphus**

Shoots not arcuate, branch leaves narrower than stem leaves, plants small to medium-sized 229

229 Stems closely pinnately branched, branches complanate, stem leaves ovate to ovate-lanceolate, longly tapering, with small distinct auricles **Ptilium**

Branching various, branches not complanate, stem leaves rapidly narrowed to long acumen from broad base, alar cells not differentiated into auricles **Ctenidium**

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230 Leaf apex abruptly narrowed into long apiculus 231

Apiculus if present short 232

231 Midrib absent, apiculus not piliferous **Myurium**

Midrib present, apiculus piliferous **Cirriphyllum**

232 Leaf apex rounded 233

Leaf apex obtuse 236

233 Midrib present, single or if double or absent then stems irregularly branched 234

Midrib absent or very short and double, stems regularly pinnately branched 235

234 Alar cells inflated, hyaline, forming distinct auricles, leaf apex not apiculate **Calliergon**

Alar cells not inflated, apex apiculate or not 237

235 Stems green to reddish brown, stem and branch tips cuspidate, leaves widest near base **Calliergonella**

Stems reddish, tips not cuspidate but branch tips often attenuated, leaves widest *ca* 1/3 from base **Pleurozium**

236 Midrib single, forked or not above, extending halfway or more up leaf 237

Midrib absent or short and double 240

237 Alar cells small and opaque, forming a distinct group **Isothecium**

Alar cells neither opaque nor forming a distinct group 238

238 Stems regularly pinnately branched, branches short, spreading or ± ascending, seta smooth or papillose **Scleropodium**

Stems irregularly branched, branches neither short nor ascending, seta smooth 239

239 Leaf margins entire **Hygrohypnum**

Leaf margins denticulate at least towards apex **Rhynchostegium**

240 Alar cells inflated, longly decurrent* **Plagiothecium**

Alar cells not inflated or if so then not longly decurrent 241

241 Stems pinnately branched, branches numerous, leaf margin recurved near base, plant of dry ground **Entodon**

Stems sparsely or irregularly branched, leaf margins plane, plants of moist or aquatic habitats 242

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*Decurrent portions will remain on stem when leaf is removed.

242 Plants small to medium-sized, shoots not tumid, leaf apex not apiculate, alar cells various and if hyaline forming decurrent auricles **Hygrohypnum**

Plants robust or very robust, shoots tumid, alar cells forming small non-decurrent auricles or leaf apex apiculate **Scorpidium**

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243 Leaves with midrib short and double or absent 244

Midrib single, extending halfway or more up leaf, forked or not above 246

244 Plants greenish red to vinous red, leaf margins entire **Orthothecium**

Plants not red (but stems reddish), leaf margin dentate 245

245 Stems without paraphyllia **Rhytidiadelphus**

Stems with abundant paraphyllia **Hylocomium**

246 Stems erect, dendroid, arising from underground rhizomatous stem **Climacium**

Stems neither dendroid nor arising from underground rhizomatous stems 247

247 Leaves with reflexed marginal teeth at apex **Antitrichia**

Leaves entire or teeth not reflexed 248

248 Leaf cells papillose, stems with abundant paraphyllia **Helodium**

Leaf cells smooth or if papillose then paraphyllia sparse 249

249 Mid-leaf cells 4-8 times as long as wide, stem leaves lanceolate to broadly ovate **Lescuraea**

Cells longer or stem leaves cordate-triangular 250

250 Leaves tapering ± from base to long acuminate or filiform apex, cells of ± uniform shape throughout leaf except for alar cells 251

Leaves tapering ± from base or not, cells near base shorter and wider than cells above 252

251 Stems with tomentum of brown rhizoids, seta smooth **Tomenthypnum**

Stems without tomentum, seta papillose **Homalothecium**

252 Midrib not ending in projection on abaxial side of branch leaves, capsule lid conical-rostellate **Brachythecium**

Midrib ending in projection on abaxial side of branch leaves, lid with subulate beak **Eurhynchium**

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253 Leaves with long channelled acumen or midrib very stout, alar cells enlarged, forming distinct hyaline auricles 254

Leaves with neither channelled acumen nor stout midrib, or if with either then auricles lacking 255

254 Leaves without channelled acumen, midrib stout **Cratoneuron**

Leaves with long channelled acumen, midrib slender **Campylium**

255 Mid-leaf cells 2-6 times as long as wide or if longer then leaves spreading and sub-complanate, apex acuminate 256

Cells longer or if not then leaves shortly pointed, acute to subobtuse, leaves not spreading or subcomplanate 258

256 Leaf cells incrassate **Pseudoleskeella**

Cells not incrassate 257

257 Leaf margins entire or denticulate towards apex **Amblystegium**

Leaf margins strongly denticulate especially at widest part of leaf **Conardia**

258 Alar cells differentiated, either large and hyaline or small, incrassate and opaque, not decurrent 259

Alar cells not differentiated or if forming auricles then decurrent 261

259 Leaves longly tapering to acuminate apex **Drepanocladus**

Leaves shortly pointed, apex acute to obtuse or ± abruptly narrowed to acumen 260

260 Leaf margins entire **Hygrohypnum**

Leaf margins denticulate above **Isothecium**

261 Branches numerous, crowded, ascending, curved, stem leaves smaller than branch leaves **Scorpiurium**

Branches not as above, stem leaves larger than branch leaves 262

262 Leaf base with decurrent auricles, mid-leaf cells 5-8 times as long as wide **Cirriphyllum**

Decurrent auricles absent or if present then cells 9-20 times as long as wide 263

263 Midrib of branch leaves ending in projection on abaxial side, branch leaves not tapering to longly acuminate apex, capsule lid with subulate beak **Eurhynchium**

Midrib of branch leaves not ending in projection or if so then leaves longly tapering to long acuminate apex, lid with or without subulate beak 264

264 Leaves ovate or broadly ovate, apex acute, seta smooth, capsule lid with subulate beak, plants medium-sized or robust **Rhynchostegium**

Leaf shape various, apex acuminate or if not plants very slender, seta smooth or papillose 265

265 Lid conical-rostellate, plants slender to robust, if slender then leaves lanceolate-triangular or wider, tapering to acuminate apex **Brachythecium**

Lid subulate, plants very slender, leaves linear-lanceolate or oblong-lanceolate and acute **Rhynchostegiella**

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266 Plants slender, leaf cells with large papillae on abaxial surface **Pterigynandrum**

Plants very slender to robust, cells smooth 267

267 Plants slender or very slender, leaf cells mostly 2-4 times as long as wide **Amblystegium**

Plants slender to robust, cells more than 4 times as long as wide 268

268 Leaves spreading to subsquarrose, from ± ovate-cordate base narrowed to fine channelled acumen **Campylium**

Leaves erect to patent when moist, shape not as above, acumen if present not channelled 269

269 Stem leaves cordate-triangular, rapidly narrowed to apex, margin sharply dentate, seta papillose **Hyocomium**

Stem leaves not as above, entire or denticulate, seta smooth 270

270 Alar cells quadrate or inflated, forming group distinct from neighbouring cells 271

Alar cells neither differentiated nor forming distinct group 278

271 Alar cells inflated, forming distinct auricles, decurrent or not 272

Alar cells ± quadrate, not inflated or decurrent 274

272 Plants slender or very slender, mid-leaf cells 5-8 μm wide **Sematophyllum**

Plants medium-sized or robust, cells 10-20 μm wide 273

273 Capsules immersed, leaves keeled or not, midrib absent, plants aquatic, green to dark green or golden brown **Fontinalis**

Capsules longly exserted, leaves not keeled, short double midrib present, plants terrestrial, yellowish green **Plagiothecium**

274 Midrib single and forked above or double, extending 1/4-1/2 way up leaf, alar cells forming concave orange-brown group **Pictus**

Midrib very short or absent, alar cells not forming concave orange-brown group 275

275 Plants autoecious, fertile branches numerous and crowded, capsule lid conical, some basal cells of leaf with flat end walls **Pylaisia**

Plants autoecious or dioecious, fertile branches not crowded, lid rostrate or conical, all basal cells with pointed ends 276

276 Leaf margins recurved on one or both sides below, gemmae often present on stem and branch tips **Platygyrium**

Margins plane, gemmae lacking 277

277 Autoecious, alar cells not incrassate, forming group *ca* 1.5 times as long as wide, capsule inclined to horizontal, lid conical **Homomallium**

Dioecious, alar cells incrassate, forming group *ca* twice as long as wide, capsule erect, lid with subulate beak **Hypnum**

278 Plants often reddish, leaf margins entire, apex acuminate **Orthothecium**

Plants yellowish green, leaf margins denticulate or not, apex ± filiform 279

279 Leaf margins denticulate ± from base to apex **Herzogiella**

Leaf margins entire **Isopterygium**

COMMON NAMES FOR MOSSES

Should or do mosses and liverworts have common names, and does it matter anyway? This is a thorny issue which arises from time to time, and strong views are often expressed. I should be most interested in the response from the BBS membership, and in order to get a few backs up and pens going, here are some suggestions that have already been expressed on the subject:

> > An invented common name is not a common name;
> > Mosses don't have common names because "ordinary" people can't distinguish between them;
> > Of course all mosses have a common name -- it's "Moss";
> > Common names may do for genera, e.g. "Hair (Cap) Moss" for any *Polytrichum*;
> > Scientific names do quite well as common names; gardeners use them, e.g. Chrysanthemum, or Nasturtium (ex-scientific), and so do bryologists, e.g. Hypnum;
> > Common and scientific names can be mixed anyway, e.g. "Heath Hypnum" for what was *Hypnum ericetorum*;
> > If they're going to get used, they should never be more than two (or three) words long, otherwise what's the point?
> > Common names should refer to something visible, not to some obscure peristome character as in "Fork Moss";
> > Translations of scientific names are ridiculous; the following have all been published: Mouse-tail Hypnum with stooping heads; Pointed Bog Feather-moss; Depressed Feather-moss; Triple Large Moss; Mueller's Large Membrane Moss (in the Ruined Tooth Moss family); Hairy Nipple Moss; Uncovered Nipple Moss; Dubious Bladder Moss; Profusely Fertile Moss; Eastern Pott Moss; Thick-nerved Split Tooth Moss; Hairy Horizontal Tooth Moss, and the Two-row Axe Moss;
> > Small things don't have common names;
> > Irrelevant;
> > You can do what you like -- nobody will use them anyway;
> > We shall have to investigate the profitability of such proposal;
> > You can tell when common names are really fake, because they always end in the sort of organism it is; it's always a "This Moss" or a "That Moss", whereas moths or butterflies are usually just a "Footman" or "Fritillary", and birds are usually a "Robin" or "Crow" etc., and not a "Robin Bird";
> > Even fungi have surprisingly few genuine common names -- what can you expect for mosses?
> > A decent guide to common names of mosses would make them a lot more digestible, so to speak;
> > What we (don't) need is a BSBI-type approved list;
> > It's the same sort of academic snobbery (against common names), that puts ordinary people off an interest in mosses;
> > A breath of fresh air (admitting common names) up a stuffy society;
> > We are a serious society, and this sort of thing can only damage our image.

Do you agree or disagree with any of the above comments? How about some suggestions, either about whether mosses need or should have common names, or a list of suggested common names? Do you know of any list of common names, or old (or new) books that give them? Please give any source, with as full a reference as possible. Have you heard any names used, by non-bryologists or by bryologists? Have you ever thought of any moss by a "pet" name, or have you ever thought that a common name would be especially appropriate for any particular species or genus? Are there any common names that you particularly dislike, or like? Below is a mixture of some already published names, plus a few thrown in:

Atrichum (undulatum): Catherine's Moss
Bartramia pomiformis: Apple Moss
Breutelia chrysocoma: Golden-head
Bryum argenteum: Silver Bryum (Dillenius)

Bryum capillare: Twist Moss
Buxbaumia aphylla: Bug-on-a-Stick
Campylopus introflexus: Heath Star Moss
Ceratodon purpureus: Redshank (Dillenius)
Ctenidium molluscum: Little Shell Moss
Fissidens: Flat Moss
Funaria hygrometrica: Cord Moss; Little Goldilocks (Dillenius)
Homalothecium sericeum: Jekyll-and-Hyde Moss (Megaw)
Oligotrichum: Balding Moss
Pogonatum aloides: Little Aloe
Polytrichum commune: Great Goldilocks (Dillenius); Great Golden Maiden-hair or Silk-wood (Gilbert White)
Polytrichum piliferum: Bristly Hair Moss
Schistostega pennata: Luminous Moss; Goblin Gold
Sphagnum: Spagnum (most gardeners); Bog Moss
Tortula papillosa: Marble Moss (ref. marble-like gemmae)

PLEASE SEND ALL CONTRIBUTIONS to: Dr Sean R. Edwards (BBS Publicity Officer), Manchester Museum, Manchester University, Manchester M13 9PL.

NORTH WESTERN NATURALISTS' UNION

The main object of the North Western Naturalists' Union is to encourage interest in Natural History throughout the north-western region. It is a federation of Local Natural History Societies and similar organisations in the north west of England. It caters for individual members, too. Founded in 1929, the Union is administered by an Executive Council which reports to an annual general meeting at which the Presidential address is given.

The British Bryological Society has joined the NWNU with a view to liasing with its Bryophyte and Lichen Section in arranging members' outings. Several BBS members are already individual members of the NWNU and others have expressed interest in attending meetings arranged in the north west. We have had one joint meeting in Monk's Dale in the White Peak and will be holding a meeting in January to arrange a programme for 1991. This will be published in the next *Bulletin*.

If any member who has not already notified me of his/her interest would like to be kept informed of any future activity, would he/she please contact me.

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