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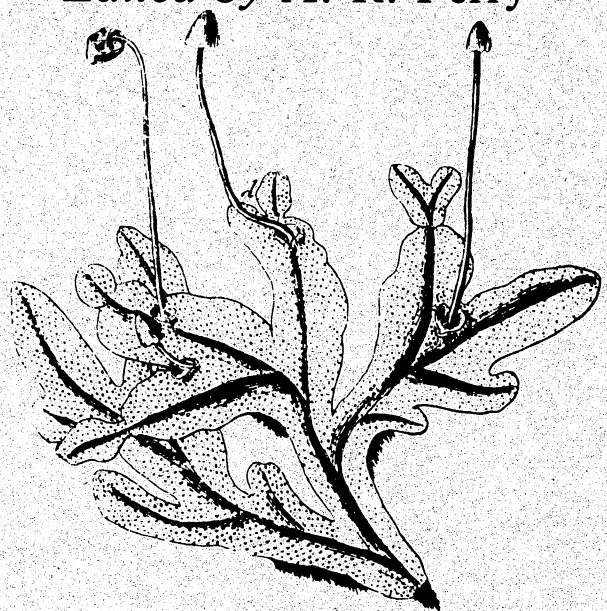
# BULLETIN

## OF THE

# BRITISH BRYOLOGICAL SOCIETY

*Edited by* A. R. Perry



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# BRITISH BRYOLOGICAL SOCIETY

# BULLETIN

Number 59 February 1992

*Editor:* A.R. Perry, National Museum of Wales, Cardiff, CF1 3NP, U.K.

CONTENTS



## SUBSCRIPTIONS

Subscriptions were increased in January 1991 and they now are £15 for full members, £7.50 for junior members and £1.00 for family members. They are due on 1 January. Some standing order mandates have not yet been altered and some 1992 subscriptions are still outstanding. Members should send any outstanding amounts to the Membership Secretary as soon as possible.

*A.V. Smith, 1 Carr Meadow Cottages, Glossop Road, Little Hayfield, via Stockport, Cheshire SK12 5NR*

## BRITISH BRYOLOGICAL SOCIETY

## INCOME AND EXPENDITURE ACCOUNT, YEAR ENDED 31st DECEMBER 1990

### Income

| (1989) £ | | (1990) £ |
|---|---|---|
| | **Publications** | |
| 10,648.71 | Blackwell's - subs to J. Bryol. | 13,088.35 |
| 747.05 | - sales of J.Bryol. back issues | 343.23 |
| 999.55 | - sales of offprints | 763.65 |
| 12,395.31 | | 14,195.23 |
| 170.80 | TBBS/J. Bryol. back issues | 519.40 |
| 343.30 | Other publications | 431.55 |
| 12,909.11 | | 15,146.18 |
| | **General** | |
| 5,214.15 | Subscriptions from members | 6,480.44 |
| 43.00 | Reading circle subscriptions | 15.00 |
| 41.77 | Postage | 102.55 |
| 581.00 | Sale of Microscopes | - |
| 280.00 | Sale of lenses etc | 98.00 |
| 30.00 | Legacies and donations | 711.00 |
| 75.80 | Miscellaneous | - |
| - | Grants for publishing 'Atlas' | 2,500.00 |
| - | Sale of A.G. Side's books | 550.00 |
| - | Members payments to Cambridge AGM | 1,934.00 |
| 3,499.00 | Interest from Nat. Savings Bank | 3,591.99 |
| 47.62 | Interest from Nat. West deposit a/c | 48.61 |
| 9,812.34 | | 16,031.59 |
| 22,721.45 | | 31,177.77 |

## BRITISH BRYOLOGICAL SOCIETY

### Expenditure

| (1989) £ | | (1990) £ |
|---|---|---|
| | **Publications** | |
| 11,095.95 | Blackwell's - J. Bryol. productions costs | 12,960.24 |
| 470.88 | - general costs (reprints etc.) | 602.12 |
| 4,259.48 | - 40% of subscription income | 5,235.34 |
| 186.76 | - 25% of sales of back issues | 85.81 |
| 349.84 | - 35% of sales of offprints | 267.28 |
| 1,635.00 | - servicing membership | 2,184.00 |
| 17,997.91 | | 21,334.79 |
| 580.44 | Production of Bulletin (2 issues) | 672.33 |
| - | Production of Atlas (contribution) | 3,500.00 |
| 1,238.00 | Production of Special Volumes | 329.00 |
| 19,816.35 | | 25,836.12 |
| - | Expenses - Cambridge AGM | 2,537.08 |
| 125.00 | - Other meetings | 145.15 |
| 603.78 | Officers' expenses | 594.03 |
| 232.00 | Library purchases | - |
| 48.00 | Reading circle | 46.24 |
| 150.00 | Insurance | 87.50 |
| 352.00 | Atlas compilation | 950.00 |
| 1,000.00 | CABS Conservation Officer's salary | - |
| 318.00 | Steere Memorial Fund donation | - |
| - | Stationery | 166.14 |
| 279.45 | Miscellaneous | 78.50 |
| 3,108.53 (st) | | 4,605.24 (st) |
| 22,924.88 | | 30,440.76 |
| (203.43) | Balance of income over expenditure | 737.01 |
| 22,721,45 | | 31,177.77 |

## BRITISH BRYOLOGICAL SOCIETY

## STATEMENT OF AFFAIRS AS AT 31st DECEMBER 1990

| Current Assets | £ | £ |
|---|---|---|
| Nat. West - current a/c | | 4,021.48 |
| - deposit a/c | | 878.09 |
| National Savings Bank | | 30,685.09 |
| Girobank | | 784.60 |
| Wallace Memorial Fund | | 1,611.25 |
| | | 37,980.51 |

| Current Liabilities | | |
|---|---|---|
| Blackwell's 1990 a/c outstanding | 7,139.56 | |
| Subscriptions in advance | 444.26 | |
| Members' credit | 54.00 | |
| | 7,637.82 | 7,637.82 |
| | | 30,342.69 |

Represented by:

| | |
|---|---|
| Capital account b/fwd | 27,994.43 |
| Adjustment - Wallace Memorial Fund | 1,611.25 |
| | 29,605.68 |
| Plus excess of income over expenditure | 737.01 |
| £ | 30,342.69 |

G C S CLARKE
Treasurer

## THE SPRING MEETING, CLEVEDON, 1991

This meeting was based in the area of North Somerset (v.-c. 6), which the society last visited for a field meeting over 30 years ago. It was attended by a total of 36 people, with a maximum of 25 people on Saturday. The headquarters hotel was the Walton Park which proved an excellent last minute substitute for the previous selection which became bankrupt only weeks before the meeting.

**3 April.** The morning was spent at Draycott Sleights, situated on a steep south-west facing slope of the Mendip Hills. The geology consists of various strata of the Carboniferous Limestone and a significant part of the soils is made up of windblown silt (loess). The weather was pleasantly sunny with views of heavy showers passing below. Plentiful *Gymnostomum viridulum* was found along with *Phascum curvicolle*, *Pottia recta*, *Weissia longifolia* var. *angustifolia*, and the hepatics included *Reboulia hemisphaerica* and *Riccia sorocarpa*. Cliff Townsend found a short leaved form of *Tortella tortuosa* and Alan Crundwell found *Bryum caespiticium* var. *imbricatum*. Other species included *Orthotrichum cupulatum* and *Scorpiurium circinatum*.

In the afternoon we were shown around the Somerset Trust for Nature Conservation reserve at Ubley Warren by the warden and BBS member Valerie Cornell. The ground here is dissected by old workings providing rock faces and boulders. The rock faces supported *Scapania aspera*, *Gymnostomum aeruginosum* and *Gyroweisia tenuis*. *Climacium dendroides* was plentiful on the tops of boulders, and in the turf *Rhytidium rugosum* was found. Cliff Townsend found *Acaulon muticum*. The nearby old lead workings at Charterhouse proved disappointing though the locally uncommon *Grimmia donniana* and *Racomitrium lanuginosum* were seen.

A brief visit to Cheddar church *en route* back to Clevedon produced *Barbula revoluta*, *Gyroweisia tenuis* and *Orthotrichum cupulatum* on the church walls. On the chippings around the church it was interesting to find *Scorpiurium circinatum* thriving.

In the evening Harold Whitehouse showed some excellent stereo photographs of New Zealand bryophytes.

**4 April.** The Stockhill forestry commission plantation near Priddy was visited in the morning but we failed to find *Ditrichum plumbicola* previously recorded here. Old Elders in the rides of the plantation provided good epiphytes, and on them Rod Stern found *Orthotrichum pulchellum* and *O. striatum*. Also seen were *Cryphaea heteromalla*, *Metzgeria fruticulosa* and *Zygodon conoideus* c.fr.

In the afternoon Harridge wood near Shepton Mallet was visited. The bryophytes were luxuriant and near the entrance to the wood Cliff Townsend and Mark Hill found *Pylaisia polyantha* on Ash. The epiphytes proved interesting, due perhaps to the influence of dust carried from the adjacent quarry. The following epiphytes were seen: *Tortula subulata* var. *graeffii*, *Barbula rigidula*, *Encalypta streptocarpa*, *Leskea polycarpa* and *Tortula latifolia* - the last two far from water. Rock faces had *Cirriphyllum crassinervium*, *Seligeria pusilla*, *Marchesinia mackaii*, *Porella arboris-vitae* var. *arboris-vitae* and *Zygodon viridissimus* var. *stirtonii*. Further species seen include *Orthotrichum pulchellum*, *Neckera pumila*, *Metzgeria temperata* and fine fruiting *Thamnobryum alopecurum*.

**5 April.** In the morning we visited Westhay Moor reserve, where the Somerset Trust for Nature Conservation are trying to preserve a raised bog from drying out. Drying is caused by adjacent peat extraction mainly by the company Fisons. Eight species of *Sphagnum* were recorded but in poor quantity. Other species seen included *Calliergon cordifolium*, *Aulacomnium androgynum*, *A. palustre*, *Ulota phyllantha*, *Cephalozia connivens* and *Cephaloziella hampeana*.

In the afternoon we visited Withial Coombe near Glastonbury. This steep sided wooded valley which lies over the Lower and Middle Lias made access difficult in places. *Epipterygium tozeri* and *Fissidens incurvus* grew on the steep clay banks. Alan Crundwell found *Eurhynchium schleicheri*, and epiphytes included *Neckera pumila*, *Orthotrichum pulchellum*, *Metzgeria fruticulosa* and *M. temperata*.

Finally, Harold Whitehouse took us to a bridge near Butcombe where *Leptobarbula berica* had been recorded. Fruiting *Gyroweisia tenuis* caused us some confusion but turned out not to be the second British record for fruiting *Leptobarbula*.

**6 April.** The morning was spent on the old Iron Age fort site of Dolebury Warren. In this steep sided hill in the Mendips 25 members saw a fine range of species on the Carboniferous Limestone. Nine species of *Barbula* were seen including *B. vinealis* which is uncommon in N. Somerset. Vanessa Stern found *Acaulon muticum* on an anthill where *Ephemerum serratum* var. *serratum* was also recorded. *Grimmia orbicularis* was detected amongst large quantities of *G. pulvinata*. On the thin soiled slopes *Eurhynchium swartzii* var. *rigidum* and 5 species of *Pottia* were seen including *P. bryoides* by Alan Crundwell and *P. intermedia* by Eustace Jones. Chris Preston found *Platydictya confervoides* on a rock face, and George Bloom found *Bryum radiculosum*. Other species seen included *Brachythecium glareosum*, *Funaria muhlenbergii*, *Zygodon baumgartneri*, *Rhodobryum roseum* and *Tortella nitida*. David Long found *Tritomaria quinquedentata* in the third locality for N. Somerset.

The afternoon in Cheddar wood was in fairly heavy rain which dulled the enthusiasm, though a few interesting records included *Eurhynchium schleicheri*, *Taxiphyllum wissgrillii*, *Porella arboris-vitae* var. *arboris-vitae*, *Cirriphyllum crassinervium* and *Isothecium striatulum* c.fr. Ron Porley found *Orthotrichum stramineum*.

In the evening a council meeting was held in the Walton Park Hotel, Clevedon.

**7 April.** A fine but windy morning was spent on the slopes of Crook Peak in the southern edge of the Mendips. Harold Whitehouse found and photographed *Barbula hornschuchiana* c.fr. *Bryum caespiticium* var. *imbricatum* was again found, this time by David Long who also found *Campylopus fragilis* and *Rhodobryum roseum*. The south facing slopes support *Pleurochaete squarrosa*, *Phascum curvicolle*, *Pottia lanceolata* and *P. recta* and Mark Hill found *Pottia starkeana* ssp. *starkeana* var. *brachyodus*. Nick Hodgetts found *Metzgeria conjugata* and Eustace Jones found *Cephaloziella stellulifera* which he also recorded in Burrington Coombe and Ebbor Gorge in the 1959 BBS meeting. Other species seen included *Bryum canariense* c.fr., *Entodon concinnus*, *Lophozia excisa* and *Tritomaria quinquedentata* c.gemmae. The best find of the day was *Porella obtusata* by Nick Hodgetts which was new to v.-c. 6.

In the afternoon the Avon Wildlife Trust reserve at Goblin Coombe was visited. The site consists of mixed woodland with short turf in open areas below cliffs. *Marchesinia mackaii* was found growing over the rock face and extending onto the trunk of a Yew tree which was growing out of a crack in the cliff face. *Bryum canariense* and *Dicranum bonjeanii* were found in the openings on the cliffs and in the woodland *Fissidens exilis* and *F. incurvus* were found. Small amounts of *Hylocomium brevirostre* were seen and David Long found *Orthotrichum tenellum* and *Phascum curvicolle*. Other species seem were *Isothecium striatulum*, *Plagiothecium latebricola* and a mixed patch of *Lejeunea cavifolia* and *L. lamacerina*.

**8 April.** The Black rock area of the Cheddar Gorge showed a range of habitats - rock faces, quarry floor, walls, woodland and grassy slopes. Boulders in the woodland had *Platydictya confervoides*, *Hylocomium brevirostre*, *Isothecium striatulum*, *Scapania aspera* and *Neckera crispa* c.fr. *Hygrohypnum luridum* was found growing on a wall. On the quarry floor David Long found *Barbula reflexa* and *Entodon concinnus*. On the slopes leading up to the top of the gorge were *Bryum caespiticium* var. *imbricatum* and *Funaria muhlenbergii*. Alan Crundwell found *Riccia subbifurca* here growing with *R. sorocarpa*.

In the afternoon Kings Castle wood near Wells was visited. It proved a little dry and the most interesting plants we found were *Platydictya confervoides*, *Hylocomium brevirostre*, *Taxiphyllum wissgrillii* and *Porella arboris-vitae* var. *arboris-vitae*.

Michael Fletcher failed to find us after visiting Wells *en route* from Cheddar Gorge but did manage to see extensive *Tortula papillosa* on lime trees in the city.

**9 April.** In the morning Berrow dunes was disappointing in that the few wet areas in the dunes did not have the *Riccia cavernosa* and *Petalophyllum ralfsii* we tried to refind. In the dunes *Tortula ruraliformis* and *Rhynchostegium megapolitanum* were found. Frank Lammiman found *Tortella flavovirens* and Nick Hodgetts found *Cololejeunea minutissima* epiphytic in scrub in the dunes in only the second record for N. Somerset.

A pleasant final sunny afternoon was spent on Brean Down where no great surprises were seen on this well worked site. Amongst the bryophytes were *Grimmia trichophylla*, *Pleurochaete squarrosa*, *Pottia starkeana* ssp. *conica*, *Scleropodium tourettii*, *Reboulia hemisphaerica*, *Trichostomum brachydontium*, *Funaria pulchella* and *Weissia levieri*.

During the week more than 200 species of moss and 40 species of liverwort were seen and hopefully everyone enjoyed the North Somerset countryside. We managed to find only one new v.-c. record, though perhaps not unexpectedly, in a well-worked area. This is largely due to the previous thorough field work of the late Joan Appleyard.

I am grateful to the various bodies who gave permission to visit the sites and to participants in forwarding records to me.

PETER MARTIN

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## IAB/BBS INTERNATIONAL SYMPOSIUM ON THE BIOLOGY OF *SPHAGNUM*, EXETER, 1991

The first International Symposium on the Biology of Sphagnum was sponsored jointly by the BBS and the International Association of Bryologists (IAB) and was held at the University of Exeter on 17-18 July, 1991. It was preceded by a field excursion starting in Glasgow on 12 July.

The field excursion, with 36 participants, visited a number of sites where different habitat conditions and species of *Sphagnum* were seen. After an inauspicious start which meant that a planned visit to the Silver Flowe NNR could not be undertaken because the Cooran Lane was in spate and could not be crossed to reach the site, an alternative site was found on the Cairnsmore of Fleet. Standing high above Loch Grannoch, this provided an exhilarating, if fleeting, glimpse of Scotland before the journey south. Late afternoon provided a contrast at the lowland raised bog, Glasson Moss.

The following day provided an opportunity to see rarities in the British *Sphagnum* flora, with visits to Muckle Moss and Moor House, again two contrasting sites. A measure of the interest in these peatlands and their *Sphagna* can be gauged by the fact that we were too late for our evening meal in Lancaster. We were undeterred, and the following day saw equally intensive visits to the fen at Malham Tarn and degraded blanket bog on Featherbed top.

Chartley Moss was the main attraction of the following day before we pressed southwards ready to take in the valley mires of the New Forest and Dorset on the final day. This part of the meeting produced interesting finds to add to the *Sphagnum* flora of Britain (including the North American *S. bartlettianum* and *S. andersonianum*) and showed the value of bringing together in the field bryologists with different taxonomic cultures and with different experiences and conceptions of the same species.

The two days of papers in Exeter were attended by some 75 people. The intention was that the

meeting should be wide-ranging and provide an up-to-date picture of current work on this important genus, but forcing eight crowded sessions into two days was something of a test of stamina. The participants stood up very well. Sessions covered were: taxonomy, biogeography, population genetics, physiology, physiological ecology, ecology, peat-forming systems and the interactions between *Sphagnum* and man. An opening survey on the history of *Sphagnum* studies by Hugo Sjörs and a closing session of crystal ball gazing by Dicky Clymo were especially appreciated.

The most gratifying thing about the meeting was that the high attendance brought together not only workers from different geographical areas, but also from different disciplines to provide a stimulating atmosphere for exchange of ideas and information. I look forward to the second *Sphagnum* symposium.

R.E.DANIELS

## IAB BIENNIAL MEETING: EXPERIMENTAL BRYOLOGY, EXETER

A joint IAB/BBS meeting on this topic was held in the Hatherly Laboratories, University of Exeter from 19-24 July 1991, immediately following that on the Biology of *Sphagnum*. The programme was organised by Dr M.C.F. Proctor in consultation with Dr R.E. Longton, and Dr Proctor was also responsible for the excellent local arrangements. These included a most enjoyable Symposium dinner attended by all participants at both the Experimental Bryology and *Sphagnum* meeting, an exhibition of morris dancing, and field excursions to Wistman's wood and Fingle Bridge (21 July), and to Bicton Common and the Axmouth-Lyme Regis landslip (24 July). Approximately 50 bryologists attended the meeting. Invited and contributed papers were presented on three days and posters were on display throughout the meeting. The papers were arranged under six themes:

1. *Physiology and metabolism.* J.A. Lee (Manchester) gave the keynote address on the effects of airborne pollutants on growth and nitrate metabolism in *Racomitrium lanuginosum*. He was supported by S. Morgan (Manchester) who discussed responses of bryophytes to desiccation. The session also included papers by the home team on physiological and ecological implications arising from measurement of stable carbon isotope discrimination (M.C.F Proctor), and on biochemical aspects of desiccation tolerance (N. Smirnoff), and by S. Gagnon (Houghton, Michigan) on effects of ozone on photosynthesis and growth in *Sphagnum*.

2. *Cell biology and fine structure.* Rather surprisingly there were only two papers under this heading, by J.G. Duckett *et al.* (London) on protonemal morphogenesis in *Sphagnum* and by N.W. Ashton (Regina, Canada) on applications of polymerase chain reactions in bryophyte research.

3. *Reproduction and control of development.* After a stimulating review on the action of place-dependent growth suppression in liverwort morphogenesis (D. Basile, New York) papers were presented on experimental studies of variation in life-history traits in *Polytrichum* species (T.A. Hedderson and R.E. Longton, Reading) and on the life-history of *Archidium alternifolium* at a reservoir in northern England (C.J. Miles and R.E. Longton, Reading).

4. *Ecophysiology and experimental ecology.* Studies on boreal and polar bryophytes figured prominently in this session, which included papers by D.H. Vitt and L.D. Gignac (Edmonton, Canada) on the response of bryophyte species and their potential in simulating the response of vegetation to climatic change, by R.I.L. Smith (British Antarctic Survey, Cambridge) on bryophyte colonisation of a recently deglaciated site in the Antarctic, and by H. Adamson *et al.* (Australia) on *in situ* levels of $CO_2$ in colonies of *Grimmia antarctici*. Other papers were by J.W. Bates (Imperial College) on nutrient uptake and retention, and by J. Glime (Houghton, Michigan) on stresses of bryophytes at geothermal sites.

5. *Biosystematics and population ecology.* Martha Newton opened this session by gazing into her crystal ball and attempting to predict the state of bryophyte cytology in the year 2001. She was followed by three papers discussing variation in specific bryophytes, i.e. the polyploid,

dioecious hepatic *Marchantia globosa* (H. Bischler-Causse, Paris), *Meesia triquetra* along a gradient from boreal to arctic regions of Canada (D.H. Vitt and J. Montagnes, Edmonton), and *Sphagnum centrale* in Poland (M. Krzakowa and I. Melasik, Poznan). Finally H.J. During *et al.* (Utrecht, Netherlands) described an experimental approach to the study of chalk grassland bryophytes.

6. *Pollution and conservation.* The final session began with a review by D.H. Brown and M. Sidhu (Bristol) on the effects of heavy metals on bryophytes. This was followed by papers by H. Adamson *et al.* (Australia) on the effects of cement-dust on the bryophytes at Casey Station, Antarctica, and by K. Satake (Tsukuba, Japan) on the ecology of the copper moss *Scopelophila cataractae* in Japan. The meeting was closed on an optimistic note by P.J. Beckett (Sudbury, Canada) who described the recovery of some bryophytes following a reduction in air-pollution around Sudbury.

A selection of the papers delivered at the meeting will be published in the *Journal of Bryology*.

R.E.LONGTON

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## AGM AND SYMPOSIUM MEETING, SHEFFIELD, 1991

The Sheffield meeting was a return to our traditional format of AGM weekend meetings - with no special anniversaries or topics to consider in the symposium session. For all that it was a very successful meeting, due in no small part to the impeccable arrangements made by Tom Blockeel. The venue, Tapton Hall, was pleasant enough and - as one member noted - offered no nonsense service at no nonsense Yorkshire prices.

There are many interesting bryological sites of interest within striking distance of the city. Tom's local expertise and superb field knowledge showed through here. Surprisingly he took the meeting not west towards the Peak District but east, towards intensively farmed land. What initially appeared to be an unpromising and disturbed woodland turned out to be a marvellous site, holding many rarities.

I am also grateful to the speakers who provided an interesting day of talks covering tropical, temperate and laboratory bryophytes. As usual, accounts of the lectures follow, written by the speakers.

PHILIP LIGHTOWLERS

▪ **Mr J. GOODE** (Royal Holloway and Bedford New College, Egham, Surrey): 'Caulonema, chloronema, rhizoids and plates in the moss protonema.'

Moss protonemata represent an ideal model system with which to answer fundamental questions in plant cell biology. They are small, grow rapidly, are relatively simple and can be easily cultivated under axenic conditions in the laboratory.

The moss protonema is the juvenile stage of growth of mosses, from spore germination until the production of the mature gametophyte shoot. Protonema are also produced by regeneration of either specialised vegetative reproductive propagules (gemmae), or of virtually any part of the moss plant. In the majority of protonemata, the spore germinates to produce a tip-growing filament which divides and branches, and eventually produces a gametophore shoot as a modified side-branch. This progression can be summarised as 1-D to 3-D.

*Tetraphis pellucida* and *Sphagnum fimbriatum* are different in that the protonema has an intermediary two-dimensional plate phase, produced from the filamentous phase and from which the shoot is formed; a 1-D to 2-D to 3-D progression. These mosses differ from each other in the mechanism of plate formation: in *Sphagnum* plates are formed at the tips of chlorophyllose filaments, and in *Tetraphis* they are formed as modified side branches.

There is a wide array of types of filaments in the protonema. Although in some cases the distinction between different types is clear-cut, absolute distinctions between filamentous types is ill-advised owing to the developmental plasticity shown by the protonema.

Although widely regarded as a simple phase of growth, some protonema exhibit quite complex structures. *Dicranoweisia cirrata* produces specialised protonemal gemmae by means of an abscission cell, and *Bryum tenuisetum* produces abscission cells which produce gemmae by fragmenting the chloronemal filaments. Other protonema, including *Rhytidiadelphus loreus* and *Bryum flaccidum* produce unspecialised gemmae by sub-apical cell divisions and the subsequent rounding off of cells to form short fragments of 'brood cells'. If these are then transplanted to fresh media they regenerate in a manner similar to the regeneration of gemmae.

▪ **Dr T.A. HEDDERSON** (University of Reading): 'Influences of size, phylogeny and water relations on life history variation in mosses.'

Life histories (the combination of age-specific fecundities and survival probabilities which organisms display in some particular environmental context) are of great interest to evolutionists since they define the operation of the joint processes of natural selection and adaptation. Physiological and energetic realities mean that life history traits will be involved in trade-offs (e.g. Schaffer, 1974; Stearns, 1976) and should thus co-evolve to yield adaptive 'tactics' in specific ecological contexts (e.g. Stearns, 1976; Brown, 1983).

Comparative approaches have been widely used to identify such tactics, generally emphasising the importance of age-specific mortality or spatio-temporal patterns of resource availability to selection on life histories (Harper, 1967; Southwood, 1977; Stearns, 1976). However, other ecological factors may be important, and traits may be constrained allometrically, or by peculiarities of physiology or development in some organisms (see review in Stearns, 1980). Furthermore, phylogenetic effects seem to be pervasive, suggesting that microevolutionary forces acting on life-histories are constrained within larger phylogenetic lines.

The existence of such a suite of interacting factors has important implications for comparative approaches to the study of life histories, and raises a number of questions relating to the existence of life history tactics and our perception of them. This analysis addresses five of these questions for a group of mosses: 1) Does taxonomic level significantly affect life history variation? 2) Does covariation of life history traits depend on taxonomic level or phylogenetic affinity? 3) What are the relationships of life history traits and their patterns of covariation with gametophyte size? 4) Is there a relationship between life history variation and morphological variation associated with water relations? 5) Are phylogenetic effects mediated by difference in size or water relations among taxonomic groups?

The analysis included a total of 336 species from the Pottiales, Funariales and Polytrichales, representing nine families and 52 genera, for which data were available on five life history traits (i. sexuality, ii. presence or absence of specialised asexual reproductive diaspores, iii. longevity, iv. median spore diameter, v. number of spores per capsule (estimated as the ratio of capsule volume to spore volume minus 35% for interspore space)), size (the only readily available measure is maximum length of the female gametophyte), and five water relations traits (i. growth form, ii. stem structure, iii. leaf papillosity, iv. nature of the leaf margin, v. nature of the leaf apex).

Univariate and Multivariate Nested Analysis of Variance revealed strong taxonomic effects on individual life history traits and the ways in which traits covary. Principal Components Analyses within orders and families also show that the ways in which life history traits covary differs among higher taxonomic levels. Size has only a small effect on variation in individual life history traits, and regression analyses yielded either non-significant or low $R^2$ values.

A Canonical Correlations Analysis was used to examine joint variation among life history and water relations traits. This analysis revealed a clear relationship between life history variation and variation in morphological design associated with differing water relations. The first Canonical Variate from the water relations set ranks species from those with poorly developed

water uptake and/or retention mechanisms. The life history Variate associated with it ranks species from those that are small, short lived, and produce few large spores to those with the opposite suite of traits. Variation on the water relations Variate accounted for 70% of variation on the life history Variate. Plots of species on the first pair of Canonical Variates revealed again the influence of phylogeny, with each family occupying a unique region of the reduced space. The relationship between water relations and life history seen across all species is sometimes weakened when examined across species within families.

After statistically removing the effects of size and water relations by Analyses of Covariance and Regression procedures, all phylogenetic effects noted earlier still persist.

Patterns of life history variation seen across species may result from a number of co-acting factors including phylogenetic inertia, ecological forces and allometrically forced relations with size. The influence of phylogeny is particularly great and phylogenetic information needs to be included explicitly as part of comparative analyses.

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▪ **Dr S. RUSSELL** (British Antarctic Survey, Cambridge): 'Bryofloristic relationships within southern African forests.'

The degree of uniformity shown by the vascular flora of the inland forests of southern and eastern Africa has led to the inclusion of this vegetation in a single 'Afromontane' phytochorion. Recent improvements in knowledge of the bryoflora of the region - particularly in Tanzania and South Africa - permit a more detailed understanding of biogeographic relationships among the 'islands' of forest vegetation that occur in the Afromontane 'archipelago, viz.:

1. A far larger proportion of southern Africa's bryoflora occurs in the forest biome than is the case for the vascular flora.

2. The drop in forest species numbers from the Equator to the Cape is not as evident among bryophytes as it is for vascular plants.

3. Many bryological examples can be cited to support the diminution in numbers of tropical species southwards, and temperate species northwards along the Afromontane chain. However, the trend is not as marked among mosses and liverworts as it is with the vascular plants.

4. Adjacent forest regions show an average 50% greater similarity when compared on the basis of their bryofloras rather than the flowering plants alone. Concomitant lower levels of endemicity are displayed by the forest regions, when their total flora is considered.

A low apparent degree of affinity between the forests of Malawi and those of neighbouring Zimbabwe and Tanzania may at present be explained by the poor knowledge of the Malawian bryoflora. This situation will be remedied as results become available from several collecting expeditions to the Malawi-Zimbabwe region that are taking place during the early 1990s.

▪ **Mr B.J. O'SHEA** (London): 'Beginner's guide to tropical bryology - the BBS Tropical Bryology Group trip to Mount Mulanje, Malawi.'

The BBS TBG stated some time ago its wish to organise a tropical collecting trip, and the activity on *Bryologia Africana* (the new African flora) and the current gap in our knowledge of African bryophytes - the 'Malawi gap'- served to make Mount Mulanje in Malawi the target.

The expedition numbered nine botanists - three academics, two herbarium staff, three conservationists and one amateur. Three of the party were from Africa, and the leader, Shaun Russell, moved from Africa to England during the course of organising the trip.

The trip took place from 12 June to 4 July 1991, and was based at the National Herbarium and Botanic Garden, Zomba, which also provided logistic help. We were on the mountain for 12 days, with 3 more days around the base.

The base of Mount Mulanje is at about 800 m, and at this height it is about 26 x 22 km in size. The plateau area of rolling grassy uplands, intersected by deep forested ravines and gullies, is at about 1800 m to 2100 m. Above the plateau are deeply fissured boulder-strewn rock slabs and walls, and there are 20 peaks that exceed 2500 m. The highest peak is Sapitwa at 3002 m.

It is a popular walking area and there are well-marked paths, and huts to stay in (the paths and huts being maintained by forestry staff). The rock is largely granitic, giving landscapes reminiscent of Scotland, but particularly to the south of the mountain there are areas of rain forest in the ravines and on the south-facing cliffs.

Bryophyte collecting in Malawi was until recently very limited, and Mount Mulanje is probably the richest area. Before the expedition, there were only 205 mosses and 97 hepatics recorded from Malawi, of which 98 and 59 respectively were from Mount Mulanje.

The expedition covered a large area of the mountain, and collected about 4500 packets from a wide variety of habitats. Some of the areas of the mountain damaged by agriculture and forestry were visited, with the aim of providing evidence of the reduction in bryophyte numbers in such areas. The disturbed areas were clearly less rich, and this underlined the concern of the authorities about deforestation on the mountain - several hundreds of lives were lost earlier this year on the NE of the mountain owing to landslides, widely blamed on deforestation, and the water supply of much of southern Malawi depends on water captured by Mount Mulanje.

Our collections are now being catalogued at Reading University Herbarium, and the task of identification is now about to begin. We hope that out results will add to the pressure for making Mount Mulanje a National Park and a Biosphere Reserve.

▪ **Ms A.J. RUSSELL and Prof D.J. COVE (University of Leeds):** 'Studying protonemal development using time-lapse video recording.'

*Physcomitrella patens* is being used for studies of development in Leeds because, as in other Funariales, the pattern of development from newly regenerated protonema to the formation of gametophores is marked by clearly defined transitions from one cell type to another. The apical protonemal cells respond to environmental stimuli in a similar manner to higher plants. The techniques of genetic analysis, including the isolation of developmental and physiological mutants, are being used to study the role of plant hormones in development and the molecular basis of tropic responses.

Time-lapse microscopy has previously been used to study the gravitropic response of moss filaments grown in the dark. We have now developed a method of filming protonema in the light to enable more detailed observation of light-mediated steps in development and to obtain data on their timing. To avoid the problems of unnatural growth of filaments caused by their confinement on a microscope slide and/or the continual perfusion of liquid medium, cultures

are grown on a thin layer of agar surrounded by deep agar, and filmed using an inverted microscope.

Using this technique we have been able to obtain data on the comparative growth rates and cell cycle times of chloronema and caulonema and film the transition from one cell type to another. The hypothesis that the timing of the cell cycle is related to cell volume can be tested.

Spore germination and the regenerative effect of light on dark-grown filaments have been compared. The increase in mitotic activity and lack of a polar direction of side-branch initiation has lead to the hypothesis that spore germination and cell regeneration represent a preferred starting point for development.

The plant hormone cytokinin, which at certain concentrations causes a massive increase in budding in the moss, is known to have a promotive effect on cell division. It has been possible, using time-lapse, to compare the first cell divisions of natural buds with those of cytokinin-induced buds. We found no increase in the timing of cell division in response to cytokinin. While the initial steps in bud formation such as the movement of chloroplasts into the apex of an initial and the formation of the vacuole in the stalk area appear to be the same in both cases, the subsequent pattern of cell division in natural bud formation is disrupted by the addition of cytokinin. Particularly noticeable is the inhibition of the early development of rhizoids.

We are planning to use this technique to film the effects of specific inhibitors on growth. From observations of these and normal cellular events we hope to gain more insight into developmental mechanisms.

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▪ **Mr G. ROTHERO** (Dunoon, Argyll): 'The bryophyte dominated snow-beds of the Scottish Highlands.'

As a result of ideas mooted by the conservation committee of the BBS and taken up (and paid for!) by the NCC in Scotland, I spent the summers of 1989 and 1990 visiting a substantial proportion of the hills in the Highlands where the snow lies into mid-summer or later. The first year concentrated on the Cairngorm area and the second covered as much as was possible of the rest. A bryophyte species list with an assessment of relative abundance was compiled for each site and a series of quadrat samples recorded for community analysis.

Broadly speaking, the major division of sites is between the deep coire sites with a high amplitude of relief, crags and block scree and the 'nivation hollow' type of site with rounded features, low relief and large areas of fine substrate. The former occurs widely but the latter is concentrated on the Cairngorm plateau with outliers in the Ben Alder Forest and on Creag Meagaidh. The 'coire type' site, with its great variety of habitat, often has the most impressive species lists, but the best examples of the snow-bed bryophyte communities come from the finer, more uniform substrates of the 'nivation hollow' sites.

Where the substrate is fine and is subject to frost-heave then the vegetation is likely to be some form of *Marsupella brevissima - Anthelia juratzkana* snow-bed, often in the form of a wrinkled crust of small hepatics. Within forms of this community some very rare plants occur. *Marsupella condensata* can be abundant on some Cairngorm sites, and on Creag Meagaidh and Ben Lawers both male plants and sporophytes occur occasionally. Other rarities which seem to have a more sporadic occurrence are *Marsupella arctica*, *M. sparsifolia* and *Gymnomitrion apiculatum* - though the last two are exceedingly difficult to pick out in the field.

Where the substrate is more stable but still relatively fine, large stands of the *Polytrichum sexangulare - Kiaeria starkei* snow-bed occur, particularly in melt-water channels. These may be dominated by one or the other of the mosses, the largest pure stands being of *Kiaeria starkei*, sometimes covering over 100 $m^2$. Often associated with this community are stands of *Moerckia blyttii* and *Pleurocladula albescens*, as well as large cushions of more cosmopolitan species like *Cephalozia bicuspidata*, *Nardia scalaris* and *Barbilophozia floerkei*. Where the substrate is permanently irrigated there can be large areas dominated by *Pohlia ludwigii* snow-bed, visible from a distance as a bright green carpet, often bordering burns.

In spring communities associated with melt-water, spectacular and very visible stands of *Pohlia wahlenbergii* var. *glacialis* may occur, often at some distance from the snow-beds themselves. *Scapania paludosa* occurs as cushions in springs at the base of block scree (where it may grow with *Rhizomnium magnifolium*). Rather more remote from the late snow but irrigated by melt-water, a small number of mires contain substantial populations of *Sphagnum lindbergii*.

On rocks associated with the areas of late snow-lie a number of interesting *Andreaea* species occur. *Andreaea nivalis* can be abundant on rocks in burns, on crags with permanent irrigation and on irrigated gravel. This level of abundance is limited to the Cairngorms and the Ben Nevis-Aonachs massif. In one or two of the larger melt-water burns in the Cairngorms *Andreaea frigida* is common, occurring with *Andreaea nivalis*. On flat rock surfaces in the areas of latest snow-lie, *Andreaea blyttii* can be abundant and is certainly widespread. This species is easily picked out and it is a puzzle as to how it has been overlooked in the past.

On the crags and screes in the coires a few more interesting species occur. *Marsupella boeckei* var. *boeckei* forms green wefts on irrigated steep rock faces and bears little resemblance to the var. *stableri* which is common. *Brachythecium glaciale*, *B. reflexum* and, more rarely, *Lescuraea patens* can be found, usually associated with the litter of the fern *Athyrium distentifolium* in the block scree. Irrigated rocks in one or two coires have *Hygrohypnum molle*, *H. smithii* and in one case *Hygrohypnum styriacum*, a surprising addition to the British flora.

All of these sites are wonderful places, most are remote and, in their snowy garb for most of the year, seem inviolate. The tiny total area involved (some 160 to 200 hectares seems a reasonable estimate) makes the snow beds vulnerable. The major threat is amply demonstrated by a visit to the Cairngorm plateau on a good day in the summer; today it is possible to count hundreds of walkers where only ten years ago there would only have been a handful. A similar situation has already arisen on Aonach Mor and Aonach Beag in the Nevis range. The increase is due to the ease of access provided by the skiing facilities which depend on summer income for their existence. A pro-active management policy for the high hills is an urgent issue.

▪ **Mr N. HODGETTS** (Joint Nature Conservancy Council, Peterborough): 'Bryophytes in the new conservation agencies.'

In the Environmental Protection Act 1990, the Nature Conservancy Council was reorganised into four separate bodies; English Nature, the Nature Conservancy Council for Scotland (soon to become Scottish Natural Heritage), the Countryside Council for Wales and the Joint Nature Conservation Committee (JNCC). The lower plant specialist post went to the Species Conservation Branch of the JNCC. The JNCC was set up to deal with Great Britain-wide issues that could not be dealt with effectively on a country-by-country basis. For example, legislative matters, setting standards for survey, monitoring and site selection, advice to government, liaison with national voluntary organisations (such as the BBS), coordinating conservation initiatives and international matters.

Within the JNCC, the Species Conservation Branch has special responsibility for legally protected species, reviewing the schedules of the Wildlife and Countryside Act 1981, Red Data Books, the National Vegetation Classification, the Invertebrate Site Register and lower plant conservation.

Current bryophyte work in the JNCC includes selection of rare species to recommend for addition to the schedule of fully protected species in the Wildlife and Countryside Act: 31 species have been submitted. The Red Data Book (RDB) project is well under way, and a RDB for bryophytes should be produced in 1993-4. Other proposed publications currently being worked on include SSSI selection guidelines for lower plants (in use but not yet published), field guides to selected groups, popular pamphlets to promote lower plants and management guidelines. Monitoring rare and threatened species is another aspect of the JNCC's work. International groups with JNCC involvement such as the IUCN bryophyte specialist group and the European Committee for the Conservation of Bryophytes also have a number of initiatives under way.

The JNCC research programme has yet to be finalized but proposals include grazing experiments, climate change monitoring, ecological studies on oceanic bryophytes, the development of work on lower plant community types and ensuring adequate representation for bryophytes in the Nature Conservation Review.

Recent work in the country agencies has included bryophyte surveys in western oceanic woodlands and snow patch vegetation in Scotland. Proposed work includes further woodland surveys, monitoring projects and pollution studies. Initiatives such as the BBS Recorders Scheme and the activities of Plantlife are also likely to give bryophyte conservation a boost.

In conclusion, bryophyte conservation does not seem to have suffered significantly from the reorganisation of the NCC, and may actually benefit in the long run. In particular, the international scene is developing well, sites are being afforded protection specifically for their bryophytes and professional conservationists are coming to terms with the idea of conserving bryophytes, even embracing it enthusiastically.

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## FIELD EXCURSION, 15 SEPTEMBER 1991

The meeting visited two sites on the Magnesian Limestone east of Sheffield. Although the countryside here is less attractive than in the Peak District to the west, the limestone is relatively little known to bryologists and it supports some very interesting communities. The naturally dry climate was exacerbated on this occasion by two months of almost unbroken drought, and conditions were not good for field work.

The first site was at Anston Stones Wood between South Anston and Worksop. This important wood occupies a small steep-sided valley along the busy A57 road, and it is traversed by a railway line and a rather polluted stream! Nevertheless, the wooded banks, with low crags and limestone boulders, continue to support rich bryophyte communities.

Some species which are more characteristic of the wetter uplands manage to survive here, though not very luxuriantly. These include *Scapania aspera*, *Apometzgeria pubescens*, *Distichium capillaceum*, *Tortella tortuosa* and *Neckera crispa*. On the other hand there are also species present which have a broadly Mediterranean or Mediterranean-Atlantic distribution. *Tortula marginata* is one of these: it is a rarity in northern England, but it is a characteristic species of Magnesian Limestone woods. More surprising is the occurrence of *Marchesinia mackaii*. The station here is one of four recently discovered in the area where Yorkshire, Derbyshire and Nottinghamshire meet. The known population was seen and a new one located on the northern side of the wood. In both places it is accompanied by *Cololejeunea rossettiana*. Perhaps even more remarkable, in view of its great rarity in Britain, is the occurrence of *Anomodon longifolius*. This was relocated on the boulder where it was found a few years ago. There is just a single patch of it, associated with *A. viticulosus*, but it appears to be holding its ground.

Other locally rare species which were seen in the wood included *Leiocolea badensis*, *Fissidens cristatus*, *Eucladium verticillatum*, *Gymnostomum calcareum*, *Homalia trichomanoides* and *Isothecium myurum*. *Amblystegium compactum*, growing as it so often does on dark damp

ledges at the bottom of an overhanging crag, attracted a lot of attention. A new record for the wood was *Ephemerum serratum* var. *minutissimum*, collected by Jeff Duckett on a damp path by the stream. Some members commented on the species which were not present. There was no *Lejeunea* (though this is known in small quantity on Magnesian Limestone over the Derbyshire border) and there was no *Porella platyphylla*. Epiphytes, in this dry and polluted district, were almost non-existent.

In the mid afternoon, a reduced party moved on to the Don valley at Sprotborough near Doncaster, to pay respects to *Desmatodon cernuus* at its best (and perhaps the only reliable) British site. A large quantity of the species was demonstrated on a railway embankment, the setae so dense in some of the patches as to colour the ground. Many of the capsules, however, had been lost, presumably grazed by invertebrates. This population is restricted to a small area covered with highly calcareous matter, about which there was much speculation. Further plants occur a little distance away on the bank of the riverside track. The locality is in a derelict area of old quarries, which are soon to be used for tipping, but the site on the railway embankment is presumably safe from destruction. Other species seen included *Leiocolea badensis* and *Aloina aloides*.

T.L. BLOCKEEL

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## BEGINNER'S AND INTERMEDIATE'S WORKSHOP, ROGATE, WEST SUSSEX, 1991

A taxonomic workshop - bryophytes for beginners and intermediates - was held at the Rogate Study Centre over the weekend of 11-13 October, and led by June Chatfield, Alan Crundwell, Francis Rose and Rod Stern and attended by 22 participants.

The first morning, led by Francis Rose, was spent at Rondle Wood, north east of Rogate, investigating a sweet chestnut coppice, oak wood and sunken lane on acid sandy soil. The usual common mosses of acid woodland were found - *Atrichum undulatum*, *Dicranella heteromalla*, *Dicranum scoparium*, *D. majus*, *Hypnum cupressiforme*, *H. jutlandicum*, *Mnium hornum*, *Orthodontium lineare*, *Pleurozium schreberi*, *Polytrichum formosum* and *Tetraphis pellucida*. One of the more unusual finds was *Leucobryum juniperoideum*, occurring with the more common and somewhat larger *L. glaucum* on and around chestnut stools of the coppice. On more open ground by the path near the top of the scarp, heathland species occurred - *Campylopus introflexus*, *Ceratodon purpureus*, *Pohlia nutans* and *Polytrichum juniperinum*. The north grassy bank of the track running west had much *Barbilophozia attenuata*, *Cephalozia connivens* and *C.lunulifolia*.

A sandy sunken lane under beeches through Common Wood to the road at Harting Combe (41/815257) proved particularly rich in liverworts - *Calypogeia muelleriana*, *Cephalozia bicuspidata*, *Diplophyllum albicans*, *Lepidozia reptans*, *Lophocolea bidentata* and *L. heterophylla*. Francis Rose showed us an extensive patch of *Bazzania trilobata*, a liverwort rarely found in lowland England. It often associates with the moss *Dicranum majus*, and such was the case at Combe Wood. *Plagiothecium undulatum* was also found on this bank.

A late afternoon foray into the churchyard at Rogate yielded a different range of species including many of the smaller calcicole acrocarps - *Barbula convoluta*, *B. revoluta*, *B. tophacea*, *B. trifaria*, *B. unguiculata*, *B. vinealis*, *Grimmia pulvinata* and *Tortula muralis*. Hypnobryales on walls and in turf were: *Brachythecium rutabulum*, *Eurhynchium praelongum*, *Homalothecium sericeum*, *Rhytidiadelphus squarrosus* and *Lunularia cruciata*. The pteridophyte *Selaginella kraussiana*, a non-native species which looks like a moss, was present in turf.

On the sandy bank at the entrance gate to the Rogate Study Centre were some patches of the local *Reboulia hemisphaerica*, indicating a less acid soil here.

Sunday morning, led by Rod Stern, was spent on Iping Common seen in a mist, scenic with

webs of spiders. The heathland had been severely affected by fire in 1976 and its bryophyte flora was still limited, but a rich flora remained intact in the bog in the valley below (41/850218). *Sphagnum* was particularly well represented at this site with eight species of different colour and growth form - *S. compactum*, *S. papillosum*, *S. magellanicum*, *S. tenellum*, *S. recurvum* var. *mucronatum*, *S. cuspidatum*, *S. auriculatum* and *S. capillifolium* with two other typical bog mosses - *Aulacomnium palustre* and *Polytrichum commune*. The *Sphagnum* cushions in the bog provided a good habitat for leafy liverworts - *Kurzia pauciflora*, *Cladopodiella fluitans*, *Cephalozia macrostachya* and *Mylia anomala*.

A final visit was made to Tullecombe Wood descending to wet woodland in Harting Combe. Woodland species of *Sphagnum* were found in an alder swamp - *S. palustre*, *S. auriculatum* and *S. recurvum* var. *amblyphyllum*. There were also lush growths of *Plagiomnium undulatum* and of the horsetail *Equisetum sylvaticum* in this habitat.

Within a short distance of the Study Centre, a good range of bryophyte habitats was found which kept up the variety in the species at each site. The Centre is owned by Kings College, London, and provides residence and excellent laboratory facilities: it is available for hire by parties and also runs its own programme of weekend field courses. For details contact The Rogate Study Centre, The Red House, Rogate, Nr Petersfield, GU31 5HN. Tel. 0730 821621.

JUNE CHATFIELD

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## THE WALLACE MEMORIAL RESERVE

A ceremony took place on 24 September 1991 to mark the establishment of the Wallace Memorial Reserve at Greywell Moors near Odiham in Hampshire. This was organised by the Hampshire Wildlife Trust (HWT) in conjunction with the BBS. The proceedings consisted of speeches by Dr Francis Rose, Dr Mark Hill (President of the BBS) and Mr Graham Darrah (Chairman of HWT). Francis Rose spoke of his long friendship with Ted Wallace, extending over 45 years, and of the many people who had appreciated Ted's great botanical knowledge and his wonderful patience in helping beginners; he was always an inspiring companion in the field. Greywell Moors was a fitting Memorial to Ted because it had been one of his favourite places.

Mark Hill spoke of Ted's enormous contribution to the BBS, which he served as Secretary for 22 years, subsequently becoming President. Mark mentioned the importance of calcareous fens such as Greywell for bryophytes and the essential need to conserve this habitat which had suffered such a disastrous decline in recent years. The BBS had entered into an agreement with HWT concerning the name of the Reserve and the future management, and he was pleased to hand over a cheque for £5,000 to the Trust.

In accepting the cheque, Graham Darrah thanked the BBS very much for its generous support and said he believed that this occasion marked the start of a very fruitful partnership. The essential need for this Reserve was the maintenance for which funding was always difficult, and the BBS' contribution would be especially valuable in this respect.

The ceremony took place by a newly installed memorial, made of Purbeck stone, with an angled face inscribed as follows:

The Wallace Memorial Reserve
Dedicated to the memory of E.C. Wallace
1909 - 1986
Eminent Botanist who loved this place

A number of invited guests were present including representatives from Hampshire botanical and conservation organisations, and the following members of the BBS who had special associations with Ted over many years: Professor Paul Richards, Dr Eric Watson, Mr Alan Crundwell and Mr Rod Stern. The Press was also present.

Following the formalities Francis Rose conducted a tour of the Reserve, pointing out the richness of the site for vascular plants and bryophytes and explaining the management requirements. Much scrub clearance had been carried out, and this in conjunction with grazing had already resulted in a significant improvement from its very overgrown condition. Much more, however, needs to be done.

The donation from the BBS to the Trust included many contributions which had come in as a result of the Appeal. BBS members may like to visit the Reserve and to see the memorial stone. The entrance is opposite the pumping station on the south side of the village of Greywell near Odiham, at which there is an entrance board headed 'Wallace Memorial Reserve'. If members wish to explore the reserve 'in depth' they should obtain a permit from the Hampshire Wildlife Trust, 71 The Hundred, Romsey, Hampshire, SO51 8BZ (Tel. 0794 513786).

R.C. STERN

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## REPORTS OF LOCAL MEETINGS

**North West Group**

Deep Dale, 23 March, 1991, Leader Dr M.E. Newton
This proved to be a popular outing and was attended by 10 BBS members and 7 others including members of our associated North Western Naturalists' Union. An excellent species list was obtained which was reported to the Joint Nature Conservation Committee who are trying to improve their knowledge of bryophytes in Derbyshire.

Dingle/Appleton, 20 April, 1991, Leader Mr W. Hay
Two very interesting sites were visited but the meeting was attended by only three BBS members.

Wharton Crag, 18 May, 1991, Leader Mr M. Gosling
This was a venue promoted by the lichenologists of the NWNU and was a revisit for the five BBS members who attended. Despite an abortive attempt to turn *Grimmia pulvinata* into *G. orbicularis* no new records were made.

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# FUTURE MEETINGS OF THE SOCIETY

## SPRING FIELD MEETING, 1992, Oswestry, 8-15 April.

Local Secretary: Ron Shoubridge, 8 Mary Elizabeth Road, Ludlow, Shropshire, SY8 1LW.
Tel. 0584 872480
Headquarters: Ellesmere College, Ellesmere, Shropshire (8 miles north-east of Oswestry).

This area in the Welsh border country offers a good variety of habitats, and outings have been arranged to the Ironbridge Gorge, limestone quarries, river and canal banks, Shropshire mosses and meres and upland sites in the Berwyn mountains.

Accommodation will be in one of the residential blocks of Ellesmere College, mostly in single rooms and will include the use of a lounge with tea and coffee making facilities. Classrooms will be available for meetings and laboratory work. The cost for bed, breakfast and evening meal and a lunch pack will be £26 per member per night, inclusive of VAT. Booking is required by 29 February please.

## SUMMER FIELD MEETING, 1992, Lochinver/the Uists, 29 July - 12 August.

### Lochinver, 29 July - 5 August

Local Secretary: Gordon Rothero, Stronlonag, Glenmassan, By Dunoon, Argyll, PA23 8RA. Tel. 0369 6281
Headquarters: yet to be finalized.

The first week of this year's summer meeting will be based on Lochinver on the north-west coast of Scotland, some 37 miles north of Ullapool. The village has a spectacular backdrop provided by the abrupt Torridonian sandstone crenellations of Stac Polly and Suilven, and an interesting coastline with wide views to the Outer Isles. Close to Lochinver there are a number of interesting rocky woodlands with many oceanic species here nearing their northern limit in Britain. The coastline provides both small areas of blown sand and miles of low crags that are relatively unexplored bryologically.

A few minutes drive inland are the well-known Durness limestone exposures at Inchnadamph with a long list of rarities but which no doubt will repay further scrutiny. The higher mountains, Ben More Assynt, Conival, Quinag and Cul Mor have had little attention from bryologists but will certainly produce most of the 'oceanic-montane' hepatics and much else besides. This is the most beautiful part of the Scottish Highlands and the variety of habitat plus the week of fine, breezy weather already booked (!) should make this a meeting not to be missed.

For those going on to the second week on the Uists, it is a comfortable drive down via Kyle of Lochalsh to Uig on Skye (170 miles) for the Wednesday evening ferry (dep. 18.20) to Lochmaddy on North Uist (arr. 20.05). For those without transport, it should be possible to find 'lifts' either to Uig or 'civilisation'.

### The Uists, 5-12 August

Local Secretary: Dr Peter Pitkin, Nature Conservancy Council for Scotland, 2/5 Anderson Place, Edinburgh, EH6 5NP, Tel. 031 554 9797.
Headquarters: Craegorny Hotel, Benbecula.

The second week of the meeting will be based in Benbecula. Benbecula is less attractive than either North or South Uist, but it is central, and there is a reasonable range of accommodation. The ferry timetable allows for the transfer from Ullapool to the Uists via Uig, Skye, in a single day (5 August).

The bryological attractions include:

Machair: A vast area of sand-dunes, slacks and associated habitats. Rich bryophyte communities of slack-like areas (*Amblyodon dealbatus*, *Meesia uliginosa*, *Distichium inclinatum*, *Catoscopium nigritum*, *Moerckia hibernica*) and fen (*Drepanocladus*, *Calliergon* and *Campylium* spp.)

Mountains: There are two mountains on S. Uist, Beinn Mhor 620 m, and Hecla 606 m. Beinn Mhor, at least, has several of the larger oceanic hepatics.

Other Islands: There is a small car ferry to Berneray, which has one of the best expanses of machair. It may be possible to arrange a visit to St Kilda. If not, Pabay, on the Sound of Harris, can be visited relatively easily and is interesting for its 'climbing' dunes.

The east coast: Rocky and inaccessible, but worth looking at the one scrap of scrub woodland. *Myurium* is locally frequent.

## ANNUAL GENERAL MEETING AND SYMPOSIUM MEETING, 1992, East Sussex, 26-27 September.

Local Secretary: Dr David Streeter, Sussex House, Falmer, Brighton, Sussex, BN1 9RH. Tel. 0273 678212

The meeting will be held at the Isle of Thorns Training Centre, Chelwood Gate, near Haywards Heath. The centre is purpose built for conferences and meetings in a quiet rural setting, and is managed by the University of Sussex.

All facilities are provided for our autumn meeting at a cost of around £44 for a day's full board. The centre is conveniently close to Ashdown forest and other sites of bryological interest.

### BRYOPHYTE WORKSHOP, 1992, London, 31 October - 1 November

Local Secretary: Dr Ken Adams, 63 Wroths Path, Loughton, Essex, IG10 1SH. Tel. 081 508 7863.

The meeting - which will be the first specialist taxonomic meeting for some years - will be held at the Polytechnic of East London, Stratford, and will concentrate on the genera *Fissidens* and *Tortula*. There will also be a field trip to chalk pits at Greys near Tilbury, which have produced a number of rarities in the past, such as *Lophozia pearsonii*.

### SPRING FIELD MEETING, 1993, Brittany.

Local Secretary: Dr Jeff Bates, Imperial College Field Station, Silwood Park, Ascot, Berkshire, SL5 7PY. Tel. 0344 23911.

Jeff Bates writes:

I have been asked to look into the possibility of organising the 1993 Spring Field Meeting in N.W. France, possibly in Brittany. At this stage it would be useful to have some indication of the level of interest in such a meeting. If you think that you might attend I would be grateful if you could drop me a line indicating the likely number of persons in your party, preferred type of accommodation (hotel, self-catering, camping, etc.) and whether you would bring a car. The bryophyte flora of Brittany is not dissimilar to that of S.W. England. Calcicoles are uncommon and mainly associated with dunes while some Mediterranean species (bryophytes and flowering plants) are locally frequent, e.g. *Gongylanthus ericetorum*. A handful of bryophyte species are unknown from Britain, e.g. *Sphagnum pylaisii* and *Riccia ciliifera*, but most will be familiar. The richest *Département* for oceanic species is Finistère and a base in or near Quimper would probably be most convenient. A foretaste of what there is to see can be obtained from the account of the British Lichen Society's 'Field Meeting in Brittany' (B.J. Coppins, 1971, *Lichenologist* 5: 149-169). A number of interesting bryophytes are mentioned. Key references to the bryophyte flora of Brittany are listed in my recent paper on Belle-Ile bryophytes (J.W. Bates, 1991, *Cryptogamie, Bryol. Lichénol.* 12: 111-148). Reprints of the latter are available to those with a *bona fide* interest. I do not know Brittany well so suggestions for an alternative base and for sites to visit would be gladly received.

*Jeff Bates, Imperial College at Silwood Park, Ascot, Berkshire SL5 7PY*

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## LOCAL MEETINGS PROGRAMME

### Cambridge Group

The group continues to hold well attended meetings. A programme is currently being finalised for February and March 1992. Interested members should 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.

### North West Group/North West Naturalists' Union

Some 12 BBS members have attended 8 outings of the NW Group during the year (see page 18) and we are grateful to all those who have led outings, to the organisations and landowners who have allowed access and to the Secretary of the NWNU - Owen McCann - who has worked hard to organise the meetings.

We look forward to our meetings next year and will be deciding on the programme at the joint group meeting in January. We hope Dr Peter Bullard will take us to reserves in south Cumbria and Dr Newton will again give us the benefit of her expertise as she has kindly done for several years now. We also plan to visit sites in Derbyshire and Cheshire.

It is intended to circulate the details to all members on the NW list as soon as they are available - this should be in early February. Experience this year has shown that it is wise to check that there have been no changes in times or venues before joining outings and those expecting to join us should contact either to Mr A.V. Smith (tel. 0663 744499), or Mr O. McCann (tel. 061 962 1226).

### South East Group

The south east group continues to thrive under the leadership of Roy Hurr, and has a full programme of meetings for 1991-2. With the advent of the Southern Group, with which there is some geographical overlap, it has been necessary to coordinate meeting dates to avoid a clash. Meetings from the current programme include:

February 29, 1992: Scadbury Park, Bromley, Kent, led by Jeff Duckett.
April 4, 1992: Holly Hill, near Snodland, Kent, led by Roy Hurr.

For further details contact Roy Hurr, 6 The Woodlands, Chelsfield, Orpington, Kent, BR6 6HL. Tel. 0689 852966.

### Southern Group

A new group is being established to cover Hampshire, Berkshire, Sussex, Surrey and south London. There is some overlap with the South East group, but meetings are being coordinated to ensure that there is no clash of dates.

The regional secretary of the group will be Howard Matcham, and Alan Crundwell, Francis Rose and Rod Stern will also be helping to arrange meetings. Members who wish to be included on the group's mailing list should write to Howard at 21 Temple Bar, Strettington, Chichester, PO18 0LB.

March 14, 1992: The group has organised three meetings over the 91/92 season, the last of which will be of particular interest to all BBS members - a visit to the Wallace Memorial Reserve, Greywell Fen, Odiham, to view the Wallace memorial and record the reserve. Park by road at pumping station at 10.30 a.m. The entrance to the reserve is at Grid Ref. SU 722512.

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## OTHER BRYOLOGICAL MEETINGS 1992

Saturdays throughout the year: Northwestern Naturalists' Union Bryophyte and Lichen Section. BBS members are welcome to attend these meetings - see under local meetings for further details.

April 5: INTRODUCING MOSSES. Tutor: Dr June Chatfield, Woodland Study Centre, Countryside Education Trust, Beaulieu, Hampshire. Bookings should be made to Department of Adult Education, The University, Southampton, SO9 5NH (T el. 0703-593469)

April 24-26: INTRODUCTION TO MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Rhyd-y-creuau, Drapers' Field Centre, Betws-y-coed, Gwynedd, LL24 0HB. Details from the warden, Mr A. Shärer.

April 24-27: BEGINNING MOSSES AND LIVERWORTS. A course especially suitable for beginners. Highland Field Studies, Borelick, Trochry, Dunkeld, Perthshire, PH8 0BX. Details from the Warden, Mr Brian S. Brookes (s.a.e. appreciated).

August 8: JOINT FIELD MEETING WITH BSBI, TREGARON BOG, WEST WALES. A special meeting with the Botanical Society of the British Isles which is being organised by Arthur Chater, a BBS and BSBI member and a retired chief of the herbaria at the Natural History Museum. The meeting is likely to be well attended by members looking at bryophytes and other plants. *Sphagnum* specialists are particularly encouraged to attend! Tregaron Bog, in the Cors Caron NNR, was visited during the BBS summer field meeting to Aberystwyth in 1989. Members can get some insight into the quality of the bryophytes to be found there from the account of the meeting in *Bulletin* **55**: 6. There will be no danger of covering the same ground, however, as the meeting will concentrate on different areas of the site! The meeting will start at 11.00 a.m. at the car park 200 m along the road north of Maeslyn Lake, NE Tregaron, Grid ref. SN 694630 (bring packed lunch). Organiser: Mr A.O. Chater, Windover, Penyrangor, Aberystwyth, Dyfed, SY23 1BJ. Tel. 0970 617409.

August 8-15: MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Kindrogan Field Centre, Enochdu, Blairgowrie, Perthshire, PH10 7PG. Details from the Warden, Dr A. Lavery.

August 17-21: MOSSES AND LIVERWORTS OF GRASSLAND AND ROCKY OUTCROPS. Tutor: Dr Martha Newton, Rhyd-y-creuau, Drapers' Field Centre, Betws-y-coed, Gwynedd, LL24 0HB. Details from the Warden, Mr A. Shärer.

August 21-28: MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Malham Tarn Field Centre, Settle, North Yorkshire, BD24 9PU. Details from the warden, Mr K. Iball.

August 22-29: BRYOPHYTES. A course suitable 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 (s.a.e. appreciated).

August 28 - 4 September: MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Preston Montford Field Centre, Montford Bridge, Shrewsbury, SY4 1DX. Details from the Warden, Mr J.A. Bayley.

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# RECORDING MATTERS 3

## Regional Recorders

Lists of Regional Recorders appear in *Bulletins* **57** & **58**. Recorders are still sought for the following vice-counties: 7, 17, 39, 56, 59, 67, 68, 71-75, 77, 78, 85, 90-95, 106, 111, 112. No offers of help have yet been received for individual vice-counties in Ireland or Ulster.

## Regional Recorders' Workshop

This will take place on Friday 10 April 1992 during the Spring Field Meeting at Oswestry. The workshop will begin at 8.00 p.m. and include a discussion of the 'protocol' to be adopted by Regional Recorders and demonstration (probably by Dr Alan Morton) of the use of a personal computer for storing bryophyte records in a database and producing distribution maps.

## New Recording Cards

You should receive with this *Bulletin* examples of the new recording cards which have been prepared by Chris Preston at the Biological Records Centre (BRC). Batches of cards can be obtained from either Chris or myself (addresses below). To encourage dissemination and use of the new cards all reasonable requests will be met as long as the cards are for use in the BBS recording scheme (i.e. completed cards should be sent to a Regional Recorder). Also note that the requirement for a stamped, addressed envelope no longer applies. Chris's instructions for use of the cards follow.

## Notes on the New Bryophyte Recording Cards

Two cards have been produced, one suitable for general use in Britain and Ireland (BRC card RP22) and the other designed for use in south-east England (BRC card RP23). The general card lists all species which have been recorded in at least 100 10-km squares in Great Britain. The SE card includes most species recorded in at least 15 10-km squares south-east of a line between Spurn Head and Portland Bill. However, the SE card will probably be useful in some areas north of this line, e.g. Cheshire, S. Lancashire, E. Yorkshire and many parts of E. Ireland. Conversely, recorders in bryologically rich areas in the south-east, such as the New Forest, may find the national card more satisfactory. The cards have the same general design and the following notes apply to both of them.

***Species list*** Each species on the card is represented by its BRC code number and an abbreviated name. Nomenclature of mosses and liverworts follows A.J.E. Smith (1978) *The Moss Flora of Britain and Ireland* and A.J.E. Smith (1990) *The Liverworts of Britain and Ireland*, respectively. Departures from Smith's nomenclature have been made for the *Racomitrium canescens* and *R. heterostichum* complexes to bring this into line with the current taxonomic treatment. An asterisk (*) indicates an aggregate. Subspecies and varieties are italicized and indented under the species to which they belong.

***Recording species on the card*** To record a species, cross through the name on the card

| | | | | | |
|---|---|---|---|---|---|
| e.g. | 72 ~~Brac albi~~ | | | 920 | Scap aspe |
| | 75 glar | | or | 922 | comp |
| | 76 ~~mild~~ | | | 929 | ~~irri~~ |
| | 77 ~~plum~~ | | | 930 | ~~nemo~~ |
| | 78 popu | | | 939 | undu |

Note that the line should be extended to the left so that it nearly reaches the code number.

To delete a species which has been crossed off in error, place an 'X' on each side of the line through the species name

| | | |
|---|---|---|
| e.g. | 72 ~~Brac albi~~ | |
| | 75 glar | |
| | 76 ~~mild~~ | |
| X | 77 ~~plum~~ X | deletes erroneous record for |
| | 78 popu | *Brachythecium plumosum* |

To record the presence of sporophytes, add 'f' after the specific name.

e.g. 72 ~~Brac albi~~ f

If information on the presence of sporophytes is to be of any use it must be recorded systematically. *Please record all species which have sporophytes and not just those where the presence of sporophytes surprises you.*

Details of the locality where the species have been seen are recorded on the other side of the card. Spaces are provided for:

***Grid ref.*** The O.S. grid reference. The 100-km square should precede the detailed grid reference. It doesn't matter whether the 100-km square is given in its alphabetical or numerical form - TL450594 and 52450594 are equally acceptable. Record a 1-km square as TL (or 52) 45-59- **not** 450590, and record a 10-km square as TL (or 52) 4--5-- **not** 400500.

***Tetrad*** Included for those who are recording on a tetrad (2x2 km square) basis. Even if you are not recording systematically in tetrads, it is sometimes useful to note the tetrad for sites which occupy more than one 1-km square but fall within a single tetrad. Use the standard BSBI letter nomenclature for tetrads within a 10-km square:

| | | | | |
|---|---|---|---|---|
| E | J | P | U | Z |
| D | I | N | T | Y |
| C | H | M | S | X |
| B | G | L | R | W |
| A | F | K | Q | V |

***Vice-county*** Give the vice-county number here.

***Date*** Record day, month and year, e.g. 24021991 or -3-91991.

***Recorder(s)*** Insert the name(s) of the recorder(s) here. The code number will be added to the card at BRC. Please be sure to include all the initials of each recorder so that the correct recorder number can be inserted.

***Locality*** Give the locality details in words. If you are recording in a site which is not named on the 1:50,000 O.S. map (Britain) or 1:126,720 map (Ireland), make sure that this is related to a site named on the map, e.g. not just 'Crundwell's Gulch' but 'Crundwell's Gulch 3km SE of Farnham'.

***Altitude*** Give the altitude in feet (ft) or metres (m). If recording over a narrow range of altitude state the range. If records came from a wide altitudinal range it isn't worth giving the altitude.

***Habitat*** Describe the habitat(s) in words.

***Rare, notable, critical and other taxa not included over*** This is the space to add the details of species which are not on the printed list. Please give full details of grid reference, locality and habitat for extra species if the records listed on the card are for, say, a large site or a whole 10-km square. Species which have to be added to the card are likely to be notable and it is therefore worth recording their whereabouts exactly. There is no need to repeat details on this part of the card if those already given on the main part of the card apply.

C.D. Preston, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, PE17 2LS

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## Local Floras

The following projects are currently under way in the south of England.

### Isle of Wight (v.-c. 10)

The Isle of Wight Natural History & Archaeological Society is bringing up to date all the records of flora and fauna on the Island, as not a great deal has been published since Morey's 'Guide to the Natural History of the Isle of Wight' in 1909. Bryophytes were updated slightly in 1926, but since then very little has been done.

All local recording on the Island is done on the 2 km TETRAD basis, and I have been collecting bryophyte records for some years now. A 'Provisional Atlas of the Bryophytes of The Isle of Wight: Liverworts' was published in 1989 (L. Snow, *Proc. Isle Wight nat. Hist. archaeol. Soc.* **9**: 121-133) and I hope to publish the moss maps soon. I should be glad to

receive any records for the area, where possible localised to a tetrad, if members would make them available under the BBS Regional Recording scheme.

Mrs Lorna Snow, Ein Shemer, Upper Hyde Farm Road, Shanklin, Isle of Wight, PO37 7PS.

**North Hampshire Flora (v.-c. 12)**
The bryology of North Hampshire has been rather neglected. It lacks the unique sand-rocks and dominating South Downs of Sussex. The New Forest is in South Hampshire and Surrey is more easily worked by Londoners. With very few resident bryologists and few others being tempted to visit there were many quite common species not recorded until after the war. Yet though North Hampshire does not flaunt its riches it contains many fine sites: chalk escarpments, steep wooded slopes (or 'hangers' as they are known locally), bogs and calcareous fens (one of which is now the Wallace Memorial Reserve). In the post-war period Ted Wallace did a great deal of work in the vice-county and so too has Francis Rose. I have been resident in it since 1983 and have been collecting data for a flora, working on a 5 km square system and aiming to produce something comparable with Jack Gardiner's Surrey flora. I now have an average of about 130 species and varieties recorded for each of the better south-eastern squares but only half as many for some of the poorer (and more distant) south-western ones. I hope to finish the fieldwork and start writing in a couple of years, but meanwhile if anyone has records or specimens likely to be of interest I should be glad to know of them.

A.C. Crundwell, Acorn Cottage, 12 Kay Crescent, Headley Down, Hampshire, GU35 8AH.

We would like to publicise other bryophyte recording ventures happening or planned in Britain or Ireland so if you are quietly working on a local flora or similar project why not confess here?

*Jeff Bates, Imperial College at Silwood Park, Ascot, Berkshire, SL5 7PY*

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## EUROPEAN LEGISLATION FOR ENDANGERED BRYOPHYTES

Bryophytes have been included on the protected species lists of two international conventions over the last 18 months. A list of 25 species has been added to Appendix I of the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention). This lists species for which strict protection is recommended. The same list has been included on Annex II of the EC Habitats and Species Directive, adopted at the Maastricht Summit in December. This Annex lists species for which protected areas should be designated.

There are four British species on the lists: *Marsupella profunda*, *Petalophyllum ralfsii*, *Buxbaumia viridis* and *Drepanocladus vernicosus* (!). *M. profunda* is designated a 'priority species' in the EC directive. In addition the EC Directive lists all *Sphagnum* species and *Leucobryum glaucum* on Annex V, the list of species whose exploitation should be subject to management.

Although bryophyte representation on these two conventions is less than one might have hoped for, it is certainly a step forward to have them represented at all, and the lists can be built on in the future. For the present the lists have, in particular, highlighted Britain's responsibility to protect the threatened coastal sites where *P. ralfsii* is found and the declining wetland habitats of *D. vernicosus*. They should also encourage bryologists to try to rediscover *M. profunda* in Cornwall. It will be interesting to see whether or not the inclusion of *Sphagnum* on Annex V has a beneficial effect on our over-exploited peatlands.

Meanwhile, the European Committee for Endangered Bryophytes is drafting a bryophyte Red List for Europe, and is working towards a book on endangered bryophytes and key bryophyte habitats and sites in Europe.

N.G. Hodgetts,
Joint Nature Conservancy Committee Lower Plant Specialist

# COUNCIL NEWSLETTER NUMBER 8

To keep you in touch with the Society's news, I am pleased to be able to tell you of significant achievements in several directions but, first, I must report the sad loss of one of our Honorary Members. Prof Per Størmer had been a member of the BBS for 56 years and a full obituary will be published in the *Journal*. The death has also occurred of Miss E.H. du Feu, whose ill health in later years prevented her from maintaining her membership, but who had greatly benefited the Society by her earlier work in Jersey.

**Publication of *Journal of Bryology***
Council is currently dealing with one of the most important events to have affected the Society in recent years. Financial considerations have induced our publisher, Blackwell Scientific Publications Ltd., to notify us of its intention not to renew our contract which expires at the end of 1992. This has had repercussions in that Dr Smith feels unable, in view of the time commitment, to participate in the search for a new publisher, and has signified his wish to relinquish the post of Editor concomitantly. We are therefore fortunate to have the enthusiastic agreement of Dr J.W. Bates to become the acting Editor until he can be elected at the next A.G.M. He and a small Committee are now trying to establish the best means of publishing volume 17, part 3, and subsequent issues of the *Journal*.

**Bryophyte Distribution Atlas**
The first volume, published early in 1991, has received a warm welcome among bryologists. Its editors are to be congratulated on having produced such an attractive, informative and readable book from copious amounts of data supplied by BBS members over the past 30 or so years. This is the sort of effort that serves to draw the Society together, for we were all able to contribute in different ways to its preparation, and we all, no doubt, look forward to the publication of the two remaining volumes over the next two years. Thereafter, there are opportunities for us all to consolidate this unique record by participating in the BBS Recording Scheme.

**Tropical Bryology Group**
Through the efforts of this group, the BBS is helping to promote studies in tropical bryology. The group has recently undertaken its first expedition, to Mt Mulanje, Malawi, and members attending the paper-reading meeting in Sheffield were able to hear at first hand of its achievements.

**Wallace Memorial Reserve**
Council is pleased that prolonged negotiations to establish a fitting memorial to the late Mr E.C. Wallace have now been completed. An agreement with the Hampshire and Isle of Wight Wildlife Trust was signed in September, 1991, and Greywell Moors Nature Reserve was officially opened by the Chairman of the Trust and Dr M.O. Hill, as BBS President. BBS members wishing to visit the Reserve may apply for a permit to do so. The address for correspondence is; 71 The Hundred, Romsey, Hampshire, SO51 8BZ.

**Reading Circle**
For some time the Society has been unable to offer members access to the *Bryologist*. Many, particularly those in the Reading Circle, which brought it to the attention of Council, will be pleased to hear that this has now been rectified. A subscription will be taken out, and as many back-numbers as possible within a fixed budget will be purchased.

**Sweatshirts**
Mention must also be made of a very recent innovation in BBS sartorial matters. In the interest of publicity, sweatshirts bearing a neat representation of the logo in green and brown were offered for sale during the A.G.M. in Sheffield. They are available in a choice of two colours, burgundy and light grey, and the evidence is that many members see them as a welcome addition to their wardrobe. Our Publicity Officer would, I am sure, be delighted to sell you one.

Finally may I say that, in its efforts to run the Society, Council is heavily dependent on comments and advice from members. I and other Officers would be glad to hear your views, as would the conveners of committees, of which details were set out in *Bulletin* 57: 23-24.

M.E. NEWTON

## TRUDY SIDE'S BEQUEST TO THE SOCIETY

As you know, Trudy Side left an extremely generous bequest of £24,500 to the Society in her will. Council is keen that this should be used to its greatest effect for the benefits of bryology. We feel that it should be *used* rather than stored away against a rainy day, and that the use we put it to should achieve some purpose that we could not otherwise achieve.

How do you feel this could best be done? Should we hold on to the capital and use the interest over a period of years? Should we fund some major bryological project that could play a part in furthering the progress of the science? Should we consider using the money for conservation purposes, perhaps by buying and managing a reserve? Should we mount a publicity campaign to make the public more aware of bryophytes and their importance? There are many different ways we could use the money and Council would like to feel that in taking its decision, it is aware of members' views.

If you have an opinion on how you would like to see us proceed, I would be glad to hear from you. Council proposes to discuss the matter at its meeting next Easter.

*Giles Clarke, The Natural History Museum, Cromwell Road, London, SW7 5BD*

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## WARBURG MEMORIAL FUND

The British Bryological Society and the Botanical Society of the British Isles are able to offer small awards under the terms of the Warburg Memorial Fund. Whenever funds are available, the awards will take the form of travel grants of up to £75 for botanists under the age of 25. Preference will be given to candidates who intend to undertake a project involving fieldwork in the British Isles or elsewhere.

Applications should include the following:

1) Curriculum vitae.
2) Brief details of the proposed project, with an estimate of costs, and information relating to the candidate's relevant experience and other qualifications.
3) Names and addresses of two referees.

Applications should be sent to Dr M.E. Newton, Department of Botany, Liverpool Museum, William Brown Street, Liverpool, L3 8EN, in an envelope marked PRIVATE. Successful candidates will be expected to submit a report on completion of the study.

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## TRANSLOCATION AND REINSTATEMENT OF RARE PLANTS

There is a renewed interest in the translocation and reinstatement of rare vascular plants with the aim of establishing self-sustaining populations of endangered species, and this interest is beginning to extend to cryptogams. A Rare Plants Translocation Panel has been set up to (a) record such undertakings for future information, (b) to provide advice (the Panel has produced a set of guidelines) and (c) to put interested people in touch with one another for their mutual benefit. The Panel consists of Frank Brightman (South London Botanical Institute), Duncan Donald (Botanical Society of the British Isles), Lynne Farrell (English Nature), Sue Minter (Chelsea Physic Garden), Franklyn Perring (Botanical Society of the British Isles) and Joyce Stewart (Royal Botanic Gardens, Kew). The Panel would like to hear from anyone who is or wishes to be involved in translocation projects, and asks them to write to Sue Minter, Chelsea Physic Garden, 66 Royal Hospital Road, Chelsea, London, SU13 4HS, who can also supply copies of the Guidelines for Translocation. Any translocation proposal involving bryophytes would, of course, be referred to the BBS Conservation Committee before any action is taken.

# B.B.S. LIBRARY SALES AND SERVICE 1992

**FOR LOAN (U.K. Members Only):**

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 offprints of individual papers. A catalogue of the books and journals is available 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. 10$\mu$m 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 per volume |
| Vol. 2 | part 1 (£3.00), parts 2-3 out of print |
| Vols 3 & 4 | parts 1-5 (£2.40 each) £12.00 per volume |
| 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 1-4 (£29.75 each) £119.00 |

Census Catalogues:

| | |
|---|---|
| Duncan, J.B., Census Catalogue of British Mosses, 2nd edition | 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. Price 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, Proceeding of Jubilee Meeting, 1983 (Special volume 1) | 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 (Special vol. 2) | 1989 (£2.50) |
| O'Shea, B.J., A Guide to Collecting Bryophytes in the Tropics (Special vol. 3) | 1989 (£3.50) |

| | |
|---|---|
| BBS Tie, claret with single BBS logo | (£4.95) |
| Swift x20 handlens and leather case | (£9.50) |
| Idealtek 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 and packing is extra unless stated). Address label legibly printed would be appreciated. All the above are available from BBS Librarian: *Kenneth J. Adams, 63 Wroths Path, Baldwins Hill, Loughton, Essex, IG10 1SH, U.K.*

# BBS MOSS POSTCARDS, URGENT NOTICE

This time last year, in *Bulletin* **57**: 31, members were invited to submit mossy (including liverworts and hornworts) pictures, for the Society to use to produce our own postcards.

**UNFORTUNATELY,** I have so far (15.i.1992) received only one slide! I know that many members have excellent colour photographs of bryophytes that would be ideal for BBS postcards. If you thought yours wouldn't be needed, or wouldn't be good enough, then please think again. Therefore the CLOSING DATE has been put off one year to the **SPRING MEETING, 1993**

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. 35mm colour slides are ideal, but prints are also acceptable.

We will print all submissions to postcard size for selection by a panel of non-photographers, who will not know who took what. Please send pictures 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 (at Boots or any High Street photoshop), and we will return the slide straight away (after checking that the original is all right for reproduction).

**PLEASE DO** include the name of the plant(s), 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 photographs 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** photographs 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 the SPRING MEETING, 1993, so you have a whole extra year to hunt for postcard pictures. But please send your pictures sooner if you can (or let me know that you intend to), or we may end up in the same situation this time next year, not knowing if there will be any last minute contributions.

# BBS TBG EXPEDITION TO MOUNT MULANJE, MALAWI

**Progress to February 1992**

The BBS Tropical Bryology Group Expedition to Mount Mulanje, Malawi, took place from 12 June to 4 July 1991. The specimens were oven-dried in Malawi prior to transit, and were all sent via air freight to London. Although one parcel has still not arrived, the UK-based members of the expedition have made a good start on working through the 4500 collections.

Each member was allocated a collection number range; specimens were first sorted at RBG then returned to the collectors for identification. (First, each collector is identifying their own collections, to genus where possible. Later we expect to allocate genera or families to individuals.) Collection details are also being computerised at Reading, and most are now entered and are either checked or ready for checking.

Specimens were sent back to the collectors in mid-September so we have had about 4.5 months to look at them. About 500 packets have been examined. Present progress shows we have some years' work ahead of us, but there are several reasons why progress has been slower than it might have been - for instance all the initial identification work is being done in the UK because of the difficulty of getting hold of the necessary literature in Africa.

Initial results are quite encouraging. Although most identifications are only down to family or genus, we are all finding some of our species have not been recorded for Malawi before, even at the family and genus level. The 4 species of *Andreaea* we found represented a family not previously recorded for the country. The intention is to confirm all identifications with experts, which we will do before the new records are published.

Our identified collections are pledged to certain recipients, including Malawi National Herbarium at Zomba and the Missouri Botanical Garden who gave us financial support. The main problem will come with small liverworts: some collections comprise only a few stems growing on a leaf, which will be difficult to split. Not all grow in sufficient quantity to allow several specimens to be prepared from one collection.

We have had some other problems:

- Unavailability of literature. Also, though most of it is not in English, and although we can struggle through French and German, the subtleties are easy to miss. But we are improving with practice. It is difficult to find any literature at all for some taxa, and there is a serious lack of generic revisions. *Bryologia Africana* will be a tremendous boost.
- Unfamiliarity. We had little experience of tropical bryophytes within the expedition, so even common plants can take some time to identify. Some families cause problems, e.g. Sematophyllaceae, for which the literature is sparse and generic differences difficult, and the Lejeuneaceae, where literature is available, but many of the characters are difficult for the beginner.
- Lack of equipment. Hepatics in particular need a reasonable quality dissection microscope, and some of us only have standard light microscopes.
- Lack of technique. Many small hepatics have critical characters difficult to see.

We hope to meet again during February or March in Reading, to hold a workshop to look at common problems, and hope to invite an expert in African bryophytes. We will also discuss the publications we expect to produce (see below). Royce Longton is arranging this meeting.

A number of publications are planned. The first will be an introduction, covering the area visited, plant geography, geology, sites visited, previous collectors, etc.; the second will be about the bryophytes known there before our trip; others will cover particular plants or plant groups. We expect to cover the most clearly defined groups first, e.g. *Andreaea*, *Sphagnum* and *Campylopus*. We envisage joint papers with taxonomists, so that we cover both ecology and distribution on Mount Mulanje as well as taxonomic issues. Conservation, a key issue, may be covered separately: deforestation on Mount Mulanje is causing serious economic and physical problems, including over 200 deaths from landslides a few months before our trip.

*Brian O'Shea, 131 Norwood Road, London SE24 9AF*

# CUMULATIVE INDEX TO B.B.S. PUBLICATIONS

The Moss Exchange Club was formed in 1896 and its activities were recorded in the *Moss Exchange Club Reports*. In 1923 it became the British Bryological Society and since then its publications have been the *Reports of the British Bryological Society* (1923-1945), *Transactions of the British Bryological Society* (1947-1971), *Journal of Bryology* (1972-present), *Bulletin of the British Bryological Society* (1963-present) together with a few occasional volumes.

Indexes have appeared at the end of each volume of the *Transactions* and the *Journal* but to date there have not been indexes for publications prior to 1947 or for the *Bulletin*. Members who have tried to locate an item in these publications know that this is not an easy task especially when one has but a faint recollection of the salient details. Was it in the *Bulletin* or the *Journal*, .... and was it 1981 or 1982 or even 1983? When were those Summer Meetings at Wooler (there have been two!) and are the associated Meetings reports in the *Bulletin*, the *Transactions* or the *Journal*?

Several years ago Prof Paul Richards and Dr Eustace Jones suggested to me that a cumulative index for all BBS publications was very much needed. I consented to prepare the index providing that I got backing from the Society. A submission was therefore made to Council which assented to the project and the decision was ratified at an AGM. It was agreed that funds would be made available to produce the volume from camera-ready copy. In addition each current member of the B.B.S. will get a copy free of charge. More recently it has been suggested that the index should also be accessible as a simple ASCII file on IBM disk(s) which would be suitable for searching using word processors such as Word Perfect, Word or WordStar. It is hoped that this format will be available at a modest charge.

The index is now at an advanced stage of preparation and it is hoped that it will be ready for printing in the 2nd or 3rd quarter of 1992 and will include publications to the end of 1991. It is expected that it will be the same size, style and format as the *Journal* and look very similar. Thus it will be a companion to previous parts/volumes of the *Transactions* and the *Journal*.

In preparing the index it has been necessary to set down some rules for entry and entering. Thus, in consultation with Tony Smith and Roy Perry, the editors of the *Journal* and the *Bulletin* respectively, and together with some other members, a set of guide lines was established. However, it has not always been easy to keep to these and sometimes as the task progressed these guide lines have required some revision.

I have aimed to cite full papers at least by title and author, or the first author where there are two or more with the other authors cross-referenced. Some papers are cited several times depending on the title and keywords they contain. Items of specific interest appearing in papers have also been cited but this has proved to be the area where it has been most difficult to decide whether or not a particular item warrants inclusion. It has also proved difficult to decide whether or not to include certain items appearing in the *Bulletin*. Administrative details of most forthcoming meetings, have, for example been excluded.

In order to keep the size (and hence cost) reasonable it was decided that certain sorts of entries would appear under specific major headings thereby minimising the need for cross-references. Thus reports of all meetings appear *only* under a Meetings heading where they are listed both chronologically and also alphabetically by place. Thus the two Wooler Meetings will appear on four occasions under this heading, two by locality and the other two by dates, 1963 and 1984. Obituaries have a heading with the deceased named alphabetically (with the writer cited) but there is not a separate entry for the writer of the obituary. BBS Accounts have a separate heading and there is one encompassing floras, checklists, and additional records for particular localities. A separate heading for Keys will include keys appearing in the depths of a paper or separately as in the *Bulletin*. As the Officers' reports for any one year appear juxtaposed they have been consolidated under the heading Officers' Reports and cited with the relevant years. Thus to find the Meetings Secretary's report for 1987 one would look for Officers' Reports for 1987. Particular or special matters within those reports may appear as a

separate entry as I am currently indexing the *Bulletins*. There are also sections for Book Reviews, lists of new v.-c. records, Membership lists, Species new to the British Isles and a number of others. Descriptions of new genera, species and varieties are preceded by an asterisk following the convention used in the current annual indexes of the *Journal*.

To distinguish the various sources, each citation is followed by an M (*Moss Exchange Club Reports*) or an R (*Reports of the B.B.S.*) or a T (*Transactions of the B.B.S.*) or a J (*Journal of Bryology*) or a B (*Bulletin*) together with the volume and a page number. Some members have also requested that full papers (T and J only) would also be cited with first and last page numbers (useful for getting photocopies from libraries) whilst others have suggested that the year of publication is 'essential'.

Many members have enquired about cross-referencing of synonyms. The guide line used has been to include the name as given in the paper and not to cross-reference with synonyms. This has been dictated not only by spatial constraints but also the recognition of the extra and substantial taxonomic exercise required to ensure that the task was completed to the proper degree. However, where major generic synonyms occur, e.g. *Rhacomitrium* and *Racomitrium*, there are cross-references between these genera. It has not been possible to include citations of all species mentioned. This is completely impossible for floras, checklists and new v.-c. records. Even where a short paragraph about a species is concerned its inclusion has not been automatic. Where it concerns taxonomy, in general it has been included.

Although the index is at an advanced stage of preparation I would be pleased to hear from any member should they wish to put forward any suggestion for improvement. I should hasten to add that no index can cover all the needs of all the members!

In Spring 1992 I will be seeking members who would agree to proof-read parts of the draft index and to test its adequacy. Should any members wish to volunteer I would be most grateful to hear from them as soon as possible at 48 Glisson Road, Cambridge, CB1 2HF (Tel. 0223-460888: Fax. 0223-461777)

PHILIP E. STANLEY

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## THINGS MOSS IS USED FOR.....3. HANGING BASKETS

It has been suggested that the BBS should discourage the use of mosses in hanging baskets, particularly as there are satisfactory alternative materials such as coconut fibre (for those who may be interested this is obtainable in the form of liners for hanging baskets from Pacific Scene, 38 Gully Hill Road, Church Crookham, Hampshire GU13 0QE). The use of mosses for this purpose and other 'floral' applications has been going on for many years. Large quantities have been collected from the forests of central Wales, for example. It seems likely, however, that the mosses gathered are all common species, and that where collection takes place, the moss vegetation rapidly recovers, certainly in high rainfall areas in the hills.

Nevertheless, there is a nagging worry that there might be a rare species collected among the common ones. This could apply in upland areas but is more likely to be a risk in lowland areas where at least locally rare species could be lost as a result of such activity.

This matter has been discussed in the BBS Conservation Committee and also in Council. One of the difficulties is that we do not know what is the scale of this activity and it would be helpful if we had an indication of the problem (if indeed there is one) before we issue guidance to members. If any member has useful knowledge to contribute on this subject, would she or he please write to me at Botany Bay, Main Road, Fishbourne, Chichester, West Sussex PO18 8AX.

ROD STERN
Conservation Officer

*Bull.brit.Bryol.Soc.* 59: 32-33 (1992)

# COLLECTING *SPHAGNUM* FOR SURGICAL DRESSINGS

by R.J. Fisk

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Field meetings of the BBS are usually leisurely and relaxed affairs. In contrast, during the First World War, organised parties descended upon the moors and bogs of Scotland and gathered *Sphagnum* moss with great determination, for the lives of wounded soldiers depended on their efforts.

The use of *Sphagnum* moss in field dressings is well documented. I recently came across a reference which gave an insight into how it was collected and on what scale. This was in the autobiography of Denis Forman, *Son of Adam*.

The collection of *Sphagnum* was regarded as 'essential war work' and was overseen by the Directorate of Voluntary Aid Organisations. It was a large-scale operation and collecting took place over a wide area of Scotland. In 1918, due to 'the enormous demand', a Sphagnum moss joint committee was established in Scotland under the chairmanship of Sir George Beatson, chairman of the Scottish Branch of the British Red Cross Society (BRCS). Its aim was to 'gather, collect, treat, supply and distribute Sphagnum moss to all Army hospitals at home and abroad'. The tenth annual report of the Scottish Branch of the BRCS records that in 1918 1,866,966 Sphagnum-filled dressings were supplied to military hospitals. Nichols (1920) estimates that production by the end of the war had reached 1,000,000 dressings per month!

To collect such volumes of moss required determination and good organisation. One of the main organisers in the Lowlands was Rev. Adam Forman who based his operations on the family estate, Craigielands, at Beattock in Dumfriesshire. He put a great deal of effort into his Sphagnum operation and took photographs of all aspects of the process, from collecting to drying. From these photographs the process seems to have been to collect the moss by whatever mean possible, by hand, garden fork or rake. One photograph shows a lady carrying a shopping basket. The moss was then squeezed by hand, to remove excess water, and then transferred to sacks which were carried by horse and cart to the nearest rail-head for shipment to Craigielands. There it was sorted to remove grass, heather stalks and other extraneous vegetation before being spread out on trays which were stacked up on the tennis courts to dry in the wind and sun. To help with moving wet sacks of moss on boggy moorland Adam Forman invented a 'moss mover'. This was a wooden device resembling a child's scooter but much larger. It had wheels with concave rims that ran on logs laid out on the bog. At Craigielands he used two of these moss movers joined side-by-side which ran on log 'tracks' to carry the wet sacks from delivery lorries (supplied by the War Department) to the processing area.

The following are extracts from a memo concerning Moss Gathering by Adam Forman offering advice to other organisations:

'The ideal method is to camp the workers on, or near, the moor, with transport stationed near at hand. Where this is impossible workers must be conveyed to and from the moors, and much valuable time and transport is expended on the journey.

'The work should be concentrated on a definite area, and no scattered working should be permitted. — Workers should start in line, work forwards, and keep in line.

'When gathering is in very wet places, over say 14 or 18 inches deep in water and mud, a good plan is to fill the sacks only about three-quarters full, drag then to the nearest hard ground and then dance on them to extract the larger percentage of water.

'All gatherers should be provided with 'weed forks'. The flat blade of the prongs

should be vertical, and not horizontal to the ground. — These forks to-day cost about 1/- each, and can be obtained from any ironmonger, but it is necessary to get a permit from the Ministry of Munitions.

'Workers should not bring their own food. It should be provided for all, and be made as simple as possible. Meal-times should be set, and the food made ready for the workers. — A large fish kettle is useful and beyond this, and cups, no utensils are necessary.

'All gatherers should understand that they are doing 'essential war work' and should undertake to carry out instructions. Where civilian and military workers are mixed, the civilians must obey orders on a par with the military workers.

'Owing to the present congested condition of railways, waggons must be loaded to *full* capacity, and must be loaded and unloaded quickly. — Waggons must be ordered ahead, and due consideration must be paid to the present over-worked condition of railway staff.'

The emphasis throughout this memo is on efficiency and the need to avoid wasting time and effort on the collecting sites. This time was valuable, for collecting could only take place in good weather and in summer. Other processes could be done under cover and dressings made up at any time of the year.

For his work with Sphagnum Adam Forman was awarded a CBE; perhaps other organisers were similarly honoured but it must surely be the only time that an honour has been bestowed on anyone for collecting moss.

I would like to thank Sir Denis Forman for loan of material from his family archive, and to Mrs J. Comrie of the British Red Cross and Mr P. Cornish of the Imperial War Museum for additional information.

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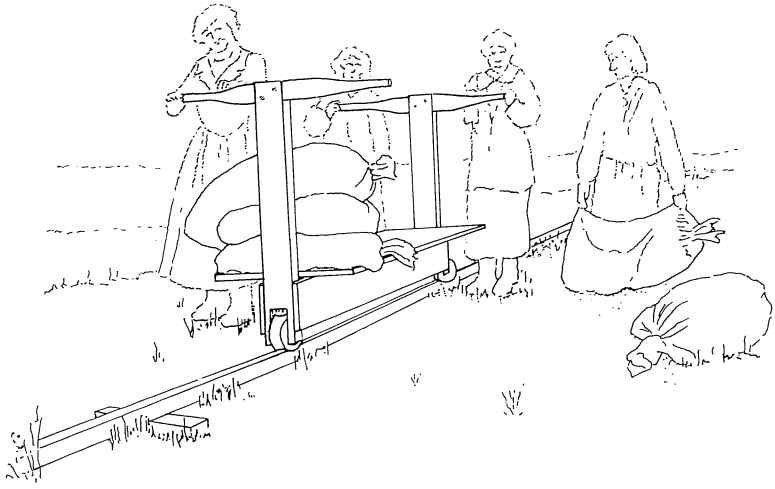

*Women's Auxiliary Corps pushing a trolley of sphagnum moss on the wooden railway devised by Rev. Adam Forman.* (Drawn from a photograph and reproduced by kind permission of Sir Denis Forman.)

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# *GYMNOSTOMUM CALCAREUM* Nees & Hornsch. AND *G. VIRIDULUM* Brid. IN EUROPE, NORTH AFRICA AND THE MIDDLE EAST

by H.L.K. WHITEHOUSE and A.C. CRUNDWELL

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The following specimens were examined and confirmed by us during the course of our work on these species (Whitehouse & Crundwell, 1991). This paper should be consulted for the distinctions between the two species. It should be noted that following the transfer of the cryptogamic collections in BRIST to NMW in 1991, all specimens listed below for BRIST are now in NMW.

## *GYMNOSTOMUM CALCAREUM*

*Grown in pure culture on agar.

AFRICA

ALGERIA
Constantine, ad rupes calcareas madidas montis 'Sidi Mecid' dicti, juxta scaturiginem thermalem prope Constantinum, leg. Maj. Paris, 2.1869 (left-hand specimen only), c.fr. (BM); Chemin des Touristes, Constantine, Miss H.W. Dixon, 12.4.1904 (BM); calcareous tufa on wet cliffs by stream, Cascades of El Ourit, Tiemcen, leg. E.W. Jones, no. 80, 4.1953, c.fr. (E.W.J.).

EGYPT
Cairo: in the suburb of El Maadi S. of the city, in shadow at the base of a stone wall, leg. G. Een, 21.12.1961 (NMW).

ETHIOPIA
Abyssinia, 7000', Saurca Serr. leg. Schimper, 1117, 1.9.1861, c.fr. (BM).

SOUTH AFRICA
Port Elizabeth, Sharks River, leg. T.R. Sim, 9057, 1.1922, c.fr. (BM).

AMERICA

CHILE
Poppig, 47, Andes chilenses, 1828, H1581 & N47, c.fr., (BM); Poppig, 47, 5, H1581, c.fr. (BM); Poppig, 15, H1581, c.fr. (BM); Chile australis ad Corral portum in muris, leg. P. Dusén, 29.11.1896, c.fr. (BM).

U.S.A.
California
Calcareous rocks, San Gabriel Mts, leg. C.C. Kingman, 1035, 13.12.1910, c.fr. (BM); Monterey County, Frances Simes Hastings Memorial Reservation, leg. J.M. Linsdale, 343, 28.2.1951, c.fr. (NMW) & 367, 2.3.51 (LANC, OXF): under dripping rock, waterfalls several miles above mouth of Kern River Canyon off highway, Kern County, leg. F.A. MacFadden, 9.7.1954 (NMW, QFA); Trinity County, 40° 53' N., 123° 32' W., left side slopes of Trinity River deep gorge in about northern exposure 3 miles E. of Salyer, near N.W. Hawkins Bar, primitive rocks, ca. 150-220 m s.m., on wet rock, leg. R. & I. Düll, 26.4.1981, c.fr. (NMW).

ASIA

Far East

CHINA
Prov. Setschwan austro-occid., prope urbem Ningyüen, in regione subtropica ad rupes, substr. arenaceo, alt. ca. 1650 m, leg. H.F.v. Handel-Mazzetti, no. 323, 11.4.1914, c.fr. (BM, E).

HIMALAYA
India, near Mussoorie, N.W. Himalaya, 6-7000 ft, leg. J.F. Duthie, 8.1895, c.fr. (BM); Kumaon, Malpa Gadh, Kali River, leg. Kabir Khan, 10934p, 15.9.1900, c.fr. (BM); India, Mussoorie, N.W. Himalaya, below Charleville Hotel, earthy banks, 5800 ft, W. Gollan, no. 4794, 18.11.1900, c.fr. (BM); India, Dharmsala, Punjab, N.W. Himalaya, 7000 ft or above, leg. R.R. Stewart, 7773W, 6.1929, c.fr. (BM).

INDIA: see HIMALAYA

TIBET
Rondi, Tibet, leg. T. Thomson (Hb. Hooker 1867), c.fr. (BM); limestone rocks, walls, etc., West Thibet, leg. Mitten, c.fr. (E).

Near East

CAUCASUS
Tmeritia, Atacharia, ad rupis calcar., leg. V.F. Brotherus, 12.6.1877 (BM); Plantae Caucasicae, Mekuenn pr. fl. Rion ad rupes calcar., leg. A.H. & V.F. Brotherus, 4.11.1877, c.fr. (BM).

CYPRUS
Among limestone rocks above Peyia, leg. E.C. Wallace, 19.3.1982 (NMW).

IRAN
Persia borealis (Gilan), Enseli, in collibus arenosis ad mare, leg. J. & A. Bornmüller, 5888, 24.4.1902, c.fr. (BM); Prov. Mazanderan, in valle fluvii Talar inter Abbasabad et Cahi, ca. 300 m, leg. K.H. Rechinger, no. 2265, 4.8.1937, c.fr. (BM); Mazanderan, Haraz valley, Kareh sang, 36° 18' N., 52° 20' E., alt. ca. 100 m, leg. P. Wendelbo, nos. 2322 & 2323, 16.4.1959, c.fr. (BG); Fars, S. of Shiraz, Sabz Puchon, in N.-faced rocks, limestone, partly in crevices and small caves, 29° 23' N., 52° 32' E., alt. ca. 1800 m, leg. P. Wendelbo, no. 2439, 26.5.1959 (BG); mixed with *Eucladium verticillatum* on wet calc. rocks by stream in wood above Shahi, Caspian coast, leg. S. Agnew, P35, 18.7.1959, c.fr. (BM).

IRAQ
Rock crevices on cliffs, Sersang, leg. S. Agnew, BUH412, 25.7.1961, c.fr. (BM).

ISRAEL
Dry rocks near Jerusalem, leg. F. Bilewsky, 1953 (NMW).

LEBANON
Libani in parietibus umbrosis humidis ad Brummana, 800 m s.m., leg. J. Bornmüller, 10.6.1897, c.fr. (E).

SYRIA
Naplouse, Lamaria, Levant, leg. W. Barbey, 1086, 13.4.1880, c.fr. (BM); Nahi et Helb prope Berythum, Syria littoralis, Levant, leg. W. Barbey, 1102, 24.4.1880, c.fr. (BM).

TURKEY
Olymp. Bithynica ad saxa riparia, leg. Grisebach, no. 194 (hb. Hampe, 1881) c.fr. (BM); Prov. Mugla, Marmaris, shady banks in Pinetum brutiae, on serpentine, 30 m, leg. Davis 25,385c, 386a, 387b & O. Polunin, 26.3.1956, c.fr. (BM, E); Prov. Urfa, Urfa-Gaziantep ca. 1 km from Urfa, calcareous rock under overhang, 600 m, leg. McNeill, 11.9.1956 (E); on the walls of damp shady stone chambers under the rows of 'seats' in the theatre, Aspendus, leg. C.C. Townsend, 19.5.1963 (C.C.T.); in small quantity in chinks in limestone rocks between the ruins and the Acropolis, Perge, leg. C.C. Townsend, 19.5.1963 (C.C.T.); on shallow soil over rock in shade, ravine above 'St Peter's Grotto', Antakya (Antioch), leg. C.C. Townsend, 27.4.1967, c.fr. (C.C.T.); on earthy rocks in vertical roadside bank in pine forest near Ackarpina, Mugla province, alt. 30 m, leg. E. Nyholm & A.C. Crundwell, 1.4.1971, c.fr. (GL, NMW); Izmir province, on damp vertical stony/earthy bank by unmade road ca. 2 km from the rear entrance to the ruins of ancient Ephesus, leg. C.C. Townsend, 4.5.1982, c.fr. (C.C.T.).

YEMEN ARAB REPUBLIC
Rocky slopes above Jibla, damp shady gully, alt. ca. 2300 m, leg. A.G. Miller, no. 683, 17.10.1978, c.fr. * (E).

ATLANTIC ISLANDS

AZORES
St Heichall, leg. F.D. Godman, 1865, c.fr. (BM); on soil by hot springs, Furnas San Miguel, leg. E.C. Wallace, 29.5.1981 (NMW).

CANARY ISLES
Tenerife
On damp rocks by the road to Bailadero just outside San Andres, 7 km N.E. of Santa Cruz, alt. ca. 50 m, leg. C.C. Townsend, 78/187, 27.3.1978 (C.C.T.); on bare rather dry soil by path up hillside just S. of the Barranco del Agua, Guimar, alt. ca. 500 m, leg. C.C. Townsend, 78/324, 2.4.1978 (C.C.T.); Santa Cruz, on bank by track up Barranco de Benijo, ca. 3 km E. of Taganana, alt. ca. 180 m, leg. C.C. Townsend, 78/344, 3.4.1978 (C.C.T.); N.-facing retaining wall in banana plantation below Los Realejas, alt. 110 m, leg. A.C. Crundwell, no. 1201, 15.12.1982 (GL).

AUSTRALASIA

AUSTRALIA
South Australia
Adelaide Hills, leg. W.P. Cormack, 2309, 1928 (BM); Mt Gambier, on slopes down to Brown Lake, leg. D.E. Symon, 1.10.1964 (hb. C.C.Townsend).
Victoria
On limestone, Portland, leg. R. Melville, 12.10.1952, c.fr. (BM).
Western Australia
Swan River, leg. J. Drummond, 287 & 300 (hb. Hooker 1867), c.fr. (BM).

NEW ZEALAND
Early Collections, poorly documented
Antarct. Exp. 1839-1843, leg. J.D.H[ooker], no. 307, c.fr. (BM, E); Bay of Isl[an]ds, dry earth, leg. J.D.H[ooker], no. 307, 8.1841, c.fr. (BM); 812, 816, 2938, 3112, leg. Colenso, c.fr. (BM); Colenso, 408, 16.7.1846, c.fr. (BM); Colenso, 4635 (BM); walls of Colenso's house, no. 308, c.fr. (BM); Col[enso], 5312 (BM); Middle Isl[an]d, Canterbury Settlement, Rev A. Bloxam, no. 8 (BM); Bloxam (CGE); Nelson, leg. J. Oldham, 6.1862, c.fr. (BM); creeks, Otaio, leg. Hector, no. 31, 1863, c.fr. (BM); Mr Mantell, 1863, c.fr. (BM); Mt Wellington, leg. T. Kirk, 27.11.1868, c.fr. (BM); Kirk, c.fr. (BM); Mount Wellington, Auckland, leg. T.K[irk], no date, c.fr. (BM); leg. Reader, no date, c.fr. (BM); Hawkes Bay, North Id, no collector's name or date, c.fr. (BM); Hokianga, Ins. boreal. leg. S. Berggren, 1874 (BM); Oamaru, leg. R. Brown ter., no date, ('original of *Trichostomum theriotii* R.Br.ter.' H.N. Dixon) (BM); South I., leg. R. Brown ter., no date (BM); at a waterfall on one of the upper branches of R. Conway, Province of Marlborough, leg. R. Brown ter., no date (BM); on rocks, Kaikoura, leg. R. Brown ter., no date (BM).

Collections 1898-1958
Oxford, North Canterbury, leg. T.W.N. Beckett, 837, 1.1898, c.fr. (BM); limestone rock, Mauriceville, leg. W. Gray, 8.10.1909 & 10.1910, c.fr. (BM); on very wet face of limestone rock at 'Limestone Hill', Mauriceville, leg. W. Gray, 10.10.1910 & 11.1910, c.fr. (BM); near Mauriceville, Wairarapa, and among grass near Mauriceville, leg. W. Gray, 17.11.1910, c.fr. (BM); small quarry at side of Dreyer's Rock Rd, Mauriceville, leg. W. Gray, 11.1910, c.fr. (BM); ad declivitatem saxeam humidulam collis, prope Wairoa, Insula septentrionalis, leg. E.A. Hodgson, 9.1931, c.fr. (BM); Broken River Basin, Canterbury, leg. L. Visch, 29.8.1958 (BM).

J. Child's Collections, 1970-79 (BM)
Troklers Gorge, seepage path in cliff, alt. 200 ft, no. 1744, 8.7.1970 (BM); the Crater, Middlemarch, gully to W. of crater, under shaded rock face, alt. 1500 ft, no. 2187, and under overhanging damp rock, alt.1000 ft, no. 2188, 10.10.1970; calcareous soil, limestone quarry, Blue Mts, Horse Ra., alt. 500 ft, no. 2501, no date; Penril Creek Falls Dam, on shaded rock face, alt. 2000 ft, no. 3309, 7.1.1972; Pigroot, 3 km from Kyeburn, on shaded rock face by stream, alt. 1500 ft, no. 3885, 23.2.1973; Castle Hill, Canterbury, alt. 2000 ft, 23.4.1973, wall of limestone cave, nos. 4047, 4048, 4052 (c.fr.) and limestone rock ledge beside creek, no. 4051; Weston, N. Otago, on roof or walls of shaded ledges or 'caves', alt. 300 ft, no. 4514, 23.5.1976, c.fr.; Castle Hill Rock, Canterbury, in cave, alt. ca. 1000 ft, no. 4738, 1.1.1977, c.fr.; near Kaikoura, on shaded rock cutting beside main road, alt. sea level, no. 4845, 20.8.1978; Takaka, on limestone rock near Golden Bay Cement works, alt. sea level, no. 4894, 21.8.1979, c.fr.

TASMANIA
On rocks, N.W. Bay, leg. Oldfield, 313 (Hb. Hooker 1867 & Hb. W. Wilson 1874) c.fr. (BM); Mt Wellington, leg. Lodden, 884 (BM); on wall of old reservoir, Hobart Waterworks, alt. 500 ft, leg. W.A. Weymouth, 1582, 19.12.1891, c.fr. (BM); Macquarie Harbour, on limestone rocks, 250 ft, leg. W.A. Weymouth, 2001, 3.1896 (BM); on external wall of reservoir, Hobart Waterworks, alt. 600 ft, leg. W.A. Weymouth, 2856, 21.4.1914, c.fr. (BM); Sandy Bay Rivulet, leg. W.A. Weymouth, no date, c.fr. (E).

EUROPE, except Britain and Ireland

AUSTRIA
Salzburg, 1824-Hornschuch, Greville Herb. ('Almost certainly ISOTYPE: probably collected 1823 or earlier and sent to Greville by Hornschuch in 1824' D.G. Long, Nov. 1982) c.fr. (E); Carinthian Alps, 1824-Kunze, Greville Herb., c.fr. (E); *Gymnost. gracillim.* Alpib. Salisburg (Hornschuch), Arnott Collection (GL); *G. gracilissimum* (sic) Alpibus Tyrol, no. 1805 (BM); Salzburg, Müller, no. 1812 (BM); ad saxa calc. pr. Salisb., no collector's name, 6.1830 (hb. Martii) c.fr. (E); Carinthia, ad saxa micaceo-schistosa supra Lieserbrücken inter Spital et Gmünd, ca. 580 m s.m., leg. G. de Niessl., 486, no date, c.fr. (BM).

BALEARIC ISLANDS
Ibiza
Moist soil at foot of wall, side of lane on outskirts of Ibiza town, leg. T.L. Blockeel, 24.11.1984 (T.L.B.); moist soil in stoney ground, hillside below Corpmari, leg. T.L. Blockeel, 24.11.84 (T.L.B.).
Mallorca
Limestone rocks near the Gorch Blau, Lluch, leg. W.E. Nicholson, 6.1905 (BM); by a small stream, Pollensa, leg. W.E. Nicholson, 9.6.1905, c.fr. (BM, NMW); shaded limestone wall, Calla san Vicente, leg. A.J.E. Smith, 21.12.1977 (A.J.E.S.); rocks in stream-bed in barranco, Soller, alt. 550 ft, leg. A.C. Crundwell, no. 90, 17.3.1982 * (GL).

BELGIUM
Rocher entre Hastière-Lavaux et Outheé, Namur, leg. H. Vandenbroech & G. Dens, 13.6.1885 (BR); rocher calcaire humide au Colébi, leg. A. Mansion, 8.1903 (BR); Juslenville, rochers calcaires, leg. M. Halin, 9.4.1905 (PC).

CRETE
C.C. Townsend's Collections (C.C.T.)
On bare dry calcareous earth among the ruins of the Palace of Minos, Knossos, 18.5.1963, c.fr.; on bare stony ground in the shade of a wall amid the Minoan ruins of Gournia, 16.5.1966; on limestone rocks in deep shade in the ravine of the River Kharchis just above the aqueduct, Knossos, 2.5.1970, c.fr.

T. Laflin's Collections (CGE)
Nomos Chanion
Bank of little gorge near Kalidonia, 18615, 10.4.1971; damp calcareous face, Gorge of Samarias, 18075, 11.4.1971, c.fr.; bank of river, White Mountains above Laki, 18205, 11.4.1971; banks in sparse maquis, mountains N. of Askyfou Plateau, 18628 (c.fr.) & 18630, 12.4.1971; shaded soft limestone rock face near Vrysos, 13.4.1971; limestone rock faces in mountains between Chora Sfakion and Askyfou, 18644, 13.4.1971, c.fr.
Nomos Irakliou
Calcareous bank by roadside between Tylisos and Gonies, 18281, 8.4.1971; soft wall, ruins at Phaistos, 18398, 16.4.1971; rubbly bank, Minoan ruins, Knossos, 18559, 17.4.1971; wet rocks in bank by roadside near Panagia, 18463, 20.4.1971.
Nomos Lasithiou
Banks of stream halfway between Neapolis and Agios Nikolaos, 18707, 18.4.1971.
Nomos Rethimnis
Wall of cave, maquis on hill slopes near Anogia, 18488, 8.4.1971; limestone bridge over river near Doxaron, 18258, 9.4.1971; silted calcareous

bank of stream below the Lower Monastery of Preveli, 18000, 15.4.1971; bank of runnel near Spili, 18299, 15.4.1971.

CZECHOSLOVAKIA
Bohemia, Beroun, in saxis calcareis humidis et umbrosis vallis Cisarska rokle prope pag. Srbsko, ca. 290 m, leg. Z. Pilous, 4.1949 (BM).

FRANCE
*G. gracillimum*, in calcareis, Galliae meridionalis, no collector's name (hb. W. Wilson, 1874) c.fr. (BM).
Alpes-Maritimes
Nizza, hb. H. Boswell, no date, c.fr. (OXF); wall, Gorbio Valley, Menton, leg. H.N. Dixon, 27.12.1900, c.fr. (BM); sandstone rock, Menton, leg. H.N. Dixon, 4.1.1901, c.fr. (BM); Rocher de l'Annonciade, Menton, leg. J. Hennen 37, 31.3.1914, c.fr. (BM); Riviera, leg. W.E. Nicholson, 3.4.1929, c.fr. (CGE); Nice, Valon obscure, leg. H. Buch, 15.12.1930 (hb. A.R. Perry); Val Sant Andriei, Nice, leg. Davies (Pres. Soc. Jersaise), 1965, c.fr. (BM).
Charente-Maritime
Saint-Vaize, rochers calcaires ombragés, leg. R.B. Pierrot, 14.6.1951 (NMW); Saint-Porchaire, bloc calcaire humide, leg. R.B. Pierrot, 26.2.1959, c.fr. (NMW, hb. A.R. Perry, hb. A.J.E. Smith).
Côte d'Or
On calcareous rock, Val Luzon nr Dijon, leg. E.C. Wallace, 4.9.1923 (NMW); Autheuil, excavation dans les tufs au-dessous de la Grotte, leg. E. Bonnot, 30.8.1959, c.fr. (NMW).
Gard
In bryophyte crust on rocks and damp earth around flushes at bottom of slopes, with *Southbya*, *Lophozia muelleri*, etc., Gorges du Gardon, Nimes, leg. E.W. Jones, 3.4.1949, c.fr.(E.W.J.).
Haute-Garonne
Roadside near St Aventin, Luchon, Pyrenees, leg. Nicholson & Dixon, 2.8.1902 (BM); Lac d'Or, Luchon, with *Eucladium verticillatum*, leg. W.E. Nicholson, 2.8.1902 (NMW).
Haute-Savoie
Rochers humides, Publier, leg. Puget (Husnot, Musci Galliae, 206) no date, c.fr. (BM, CGE, OXF).
Jura
Gorges de l'Ain, près Ney, vieux mur sous bois, alt. 550 m, leg. P. Cuynet, 12.4.1952 (NMW).
Var
Hyères, ad declivia argilloso-calcarea rivuli La Lugette, no collector's name, 10.4.1861 (hb. A. de Mercey) c.fr. (BM); Hyère, no collector's name (hb. W. Wilson, 1874) c.fr. (BM); walls, Les Arcs, leg. E.V. Watson, 10.4.1974 (E.V.W.).

GERMANY
Prope Monachium, leg. Schimper, no date, c.fr. (BM); in rupibus calcareis in subalpinis Bavariae (Schimper MS) no date, c.fr. (BM); pr. München, leg. A. Braun, 5.1824, c.fr. (BM); Monachis, in breccia calcarea (Nagelfluh) ad ripas, A. Braun, no date, c.fr. (BM); auf Sandstein felsen in Knauchthal, leg. C. Beria, 7.5.1838, c.fr. (BM); ad muros prope Bernam e. a. l. Aestate, Schimper Musc. Eur., no date, c.fr. (BM); Mauern bei Gell am See, leg. Sauter, 1.1840, c.fr. (BM); bei München, Menderschweig, leg. W. Gümbel, 6.1844, c.fr. (OXF); München, leg. Arnold, 1854, c.fr. (BM); an beschatteten Nagelfluhfelsen, Grunwald oberhalb München, leg. P. Reinsch, no date, c.fr. (BM); dans les fentes et excavations des rochers de la poudingue calcaire des côtes sur le bord de l'Isar dessus de Munich, no collector's name, 1.7.1850, c.fr. (CGE); leg. F. Schultz & F. Winter, 20.6.1852, c.fr. (BM, CGE, OXF); & F. Schultz, 7.8.1852, c.fr. (BM); am Isarconglomerat des Isar Ufers unterhalb der Menderschweig, München, no collector's name, 4.9.1856 (BM); an beschatteten Dolomit-Felsen neben der Chaussee zwischen Muggendorf und Loos in Oberfranken, leg. F. Arnold, 7.1860, c.fr. (DBN); Bavaria superior, ad rupes conglomerat. secus fl. Salzach pr. Laufen, no collector's name or date, c.fr.(BM); Oberbaiern, Nagelfluhfelsen an den Abhängen an der Salzach bei Laufen, leg. Progel, 7.1869, c.fr. (BM); Memisgen, Vordergsäng an Nagelfluh, 750 m, leg. Holler, 27.5.1882, c.fr. (E); Westfalen, bei Canstein, pfalligs übersängund Kalkfelsen im Limsunnsald, leg. Grebe, 5.1889 (E); Stockach, Bodensee, östl. Bodman, in der Marienschlucht, ca. 400-500 m s.m., leg. Düll, 6.3.1966, c.fr. (NMW); on rocks above river, below cliff, Islar-Uberstein, Aimsruch, leg. E.C. Wallace, 25.4.1977 (NMW).

GREECE
Kalamata, ravin dit Kalamitsi, leg. R. Maire, 4.1908, c.fr. (BM); Peloponnese, on shaded walls and on dry soil on the walls of the ruins of ancient Olympia, leg. C.C. Townsend, 27.5.1963, c.fr. (C.C.T.).

GREEK ISLANDS
Cephalonia
Moist friable limestone and lime-rich soil of vertical face of cutting, above Argostoli, S. of town, leg. E.V. Watson, 10.5.1985, c.fr. (E.V.W.).
Samothrace
On tufaceous, but dry, rock in streamlet which runs into main river in valley above Xiropotamos, alt. 300 m, leg. A.E. Newton & C.D. Preston 998, 20.4.1983, c.fr. (C.D.P.).
Rhodos
On wall tops amid the ruins, Kamiros, leg. C.C. Townsend, 21.5.1963, c.fr. (C.C.T.); side of large boulder in gully, Efta Pighes, leg. T.L. Blockeel, 5.1986, c.fr. * (T.L.B.).
Zante
In monte Skopó, leg. G.D.E. Weise, 1867, c.fr. (BM).

ITALY except Sardinia and Sicily
*G. gracillimum*, sui fianchi e ni crapacci della rupi presso Serravalle alla Scrivia, leg. Ferrari, no date, c.fr. (BM); Hort. San Donate, prope

Florentium, leg. E. Levier, 2.1874, c.fr. (E); Salzago, près Como, leg. F.A. Artaria, 5.4.1896, c.fr. (BM); Torriggia, Lac de Como, rochers calcaire, avec le *G. tenue*, leg. F.A. Artaria, 10.7.1896, c.fr. (E); Blevio, leg. F.A. Artaria, 20.7.1896 (E); Sirinione, Lago di Garda, leg. W.E. Nicholson & H.N. Dixon, 4.8.1904, c.fr. (BM, NMW); Pisa, leg. G. Gresino, 8.11.1911, c.fr. (BM); Nesso am Lago die Como auf feuchten verwitterten Kalkfelsen, um 250 m s.m., leg. F.A. Artaria, 5.1923, c.fr. (BM, NMW); Capo Panaggi, Arenzano, leg. C. Sbarbaro, 5.1925 (BM); irrigation channel between Pallerone and Rometta, Prov. di Massa-Carrara, leg. T. Laflin, 8741, 3.8.1960 (CGE); Valle d'Aosta, bank by stream nr La Thuile, below Little St Bernard Pass, leg. M.O. Hill, 7.1978 (M.O.H.).

LUXEMBOURG
Breidweiler Pont, between Larochette and Consdorf, on rock along the road, leg. T. Arts, 10.10.1987 (T.A.).

NETHERLANDS
Op Aufkrijt te Geulten, leg. v.d. Sande Lacoste, 1873 (BR); Z.Limburg, op zijkant, beschaduwd, van kalkmuurtje langs de gracht bij de ingang links kasteel Chaloen bij Valkenburg, leg. S.R. Gradstein, no. 2350a, 4.1974 (BR).

PORTUGAL
In viis cavis de Serra de Hualidas, leg. Welwitsch, no date, c.fr. (BM); ad terram argillaceam in viis cavis in montopi Prov. Transtajana, leg. Welw., 4.1846, c.fr. (BM); in fissuris cavernarum Piorni Estremadura non longi ab Oceano, leg. Welw., 2.1849, c.fr. (BM); Lisboa verdeer, Tajo, Ja Saisia 66, c.fr. (BM); Flora lusitanica algarve, Monchique, leg. H.G.V. Solms, 1866, c.fr. (BM); Catalogus Plantarum in Lusitania Lectarum, Burchell, no. 301 (hb. Hooker 1867) c.fr. (BM); Monchique, Algarve, leg. Nicholson & Dixon, 12.5.1911, c.fr. (BM).

SARDINIA
Prope Laconi Sardiniae, leg. Muller, 1827, unio itineraria, c.fr. (CGE, E).

SICILY
Bei Taormina an Kalkfelsen, leg. M. Fleischer, 5.4.1896, c.fr. (BM, E); Taormina, leg. Lord Justice Fry, 1897, c.fr. (BM).

SPAIN including Gibraltar
Asturias
Crevice in limestone rock face in gorge of Rio Cares between Camarmena and Cain, leg. C.D. Preston, 25.4.1987 (C.D.P.).
Barcelona
Torreletes nr Begues, buntsandst. rocks in rivulet, leg. F. Lloret & H.J. During 862200, 12.2.1986, c.fr. (H.J.D.).
Cadiz, including Gibraltar
Gibraltar, leg. A. Gillham, 5.1961 (NMW); Targinta de la Saucida nr Sierra del Algibe, leg. E.C. Wallace, 16.4.1970, c.fr. (NMW); roadside between Bornos and Espera, leg. E.C. Wallace, 17.4.1970, c.fr. (NMW); on wall of bridge over stream, N. of Algar, leg. E.C. Wallace, 20.4.1970, c.fr. (NMW); cliffs above Grazalema W. of Ronda, on mossy limestone cliffs, alt. ca. 880 m, leg. D.G. Long, no. 9013, 22.4.1980 (NMW): concrete wall, W. side of rock, Gibraltar, leg. R.C. Stern, 19.2.1985 (R.C.S.); on rock near Highest Point, W. side, Gibraltar, 22.2.1985 (R.C.S.); wall of cave, Mediterranean Steps, Gibraltar, leg. R.C. Stern, 22.2.1985 (R.C.S.).
Cordoba
Sierra de Cordoba, bei Cordoba auf alten Mauern, leg. M. Fleischer, 23.4.1908, c.fr. (BM).
Huelva
On soil by a drain, roadside between Aroche and Cortegana, leg. E.C. Wallace, 3.4.1974 (NMW).
Jaen
Sierra de Cazorla, slope below Parador, on limestone rock face in pine forest, alt. ca. 1250 m, leg. D.G. Long, no. 8935, 15.4.1980 (E).
Malaga
On rock, Sierra Bermeja, near Ronda, alt. 1100 m, leg. B.O. van Zanten (hb. C.C. Townsend); by stream in valley near Canillas de Alboida, leg. E.C. Wallace, 24.5.1976, c.fr. (NMW); Guadalhorce valley above Alora, shady crevice of limestone cliff, alt. ca. 390 m, leg. D.G. Long, no. 8985, 19.4.1980 (E).
Pontevedra
El Grove, aufractuosite terreuse à la base de blois granitiques (substrat non calcaire!), leg. R.B. Pierrot, 60289, 14.8.1960 (GL).
Santander
Picos de Europa Mts nr Potes, 4500 ft, on dry limestone, S.W. exposure, leg. D.M. Henderson, 14.8.1956 (E).

SWITZERLAND
Montreux, no collector's name, 8.1850 (Hb. Schimper) c.fr. (BM); in rupibus calcareis Bavariae, Helvetiae, leg. Schimper, 1864-65 (BM, CGE, DBN, E); Berner, Jura, leg. J. Reinsch, no date, c.fr. (E); Sagtobel prope Zurich, leg. P. Culmann, 17.6.1880, c.fr. (E); Brühlbaheald, Kanton Zurich, 530 m, leg. P. Culmann, 20.6.1894, c.fr. (E); walls above Territet, Canton Vaud, leg. P.G.M. Rhodes, 5.1911 (BM); Kanton Tessin, in einer Grotte oberhalb Viganello, 370 m s.m., leg. P. Culmann, 8.4.1914, c.fr. (BM, NMW); molasse, Mont Vuilly, Fribourg, ca. 560 m, leg. P.G.M. Rhodes, 1272, 2.1920 (BM); earthy calcareous crevice in wood above Mörel, Canton Valais, alt. ca. 3000 ft, leg. J.P.M. Brenan, M2008, 1.9.1963 (BM).

YUGOSLAVIA
Bosnia, Gravnik, leg. Sendtner, 17.6.1847, c.fr. (BM); Bosnia, Rup. Americin, leg. Sendtner, 12.1847, c.fr. (BM).

**British and Irish Records of *Gymnostomum calcareum***

For English and Welsh records, the sex of the gathering, where known, is indicated by f or m. All Scottish and Irish records, where the sex is known, are female. For male plants, see records for 10 km squares 20/27 (v.-c. 2), 31/59 (v.-c. 35), 32/01 (v.-c. 42), 32/51 (v.-c.'s 34 & 35), 33/24 (v.-c. 50), 43/07 & 17 (v.-c. 57), 43/58 (v.-c. 63) and 44/08 (v.-c. 65). For fruiting plants, see records for 10 km squares 32/51 (v.-c.'s 34-36), 43/17 (Chee Dale and Monsal Dale) and 43/25 (both v.-c. 57). Derbyshire and Gloucestershire localities are underlined in order to clarify the repeated gatherings from some of them.

* Grown in pure culture on agar.

BRITAIN

ENGLAND and WALES

East Cornwall (vice-county 2)

20/27 On mortar of shaded walls of derelict mine buildings, Phoenix United mine, Minions, m, leg. R.D. Porley, 20.5.1989 (BBSUK).

South Devon (v.-c. 3)

30/39 In pocket on rock in rough woodland by sea, Pinhay, near Lyme Regis, leg. B.J. O'Shea, 10.4.1969 (B.J.O.).

West Gloucestershire (v.-c. 34)

32/51 Limestone, The Slaughter, near Symonds Yat, leg. E. Armitage & C.H. Binstead, 2.1902 (BRIST); H.N. Dixon, 20.7.1903 (BM); c.fr., A. Ley & E. Armitage, 2.1905 (BRIST); c.fr., A. Ley, 6.11.1905 (BIRM); c.fr., E. Armitage, 5.1906 (BBSUK, BM, BRIST, NMW); c.fr., H.H. Knight, 1.9.1910 (E, NMW); W.G. Travis, 8.1925 (LIV); H.H. Knight, 26.3.1928 (NMW); sheltered niches and crevices of limestone cliffs, often where rocks are slightly moist, with soft weathered surface, c.fr., leg. E.W. Jones, 16.3.1940 (E.W.J.); limestone rock face, f, L.B.C. Trotter & A.E. Wade, 15.12.1953 (NMW); f, R.D. Fitzgerald, A.J. Pettifer, C.C. Townsend, L.B.C. Trotter, 15.4.1954 (C.C.T., NMW); c.fr., G.W. Garlick & L.B.C. Trotter, 30.4.1955 (NMW); c.fr., C.C. Townsend, 27.7.1955 (C.C.T.); J.G. Duckett, A.J.E. Smith, 6.4.1968 (J.G.D., A.J.E.S.); F.J. Rumsey, 13.2.1983 (F.J.R.); f, H.L.K. Whitehouse, 18.4.1984 * (H.L.K.W.).

32/72 On rocks by R. Leadon near Newent, f, leg. H.H. Knight, 5.11.1908 (NMW),22 & 27.3.1911 (BRIST, NMW); Keuper sandstone by R. Leadon, Redmarley, f, leg. H.H. Knight & J.B. Duncan, 24.4.1916 (E); crevices in N.-facing Keuper sandstone cliff by R. Leadon, Poolhill, N. of Newent, f, leg. H.L.K. Whitehouse, 22.5.1984 * (H.L.K.W.).

Monmouthshire (v.-c. 35)

31/59 On limestone, Wyndcliff, leg. A. Ley, 9.4.1891 (BIRM); on top of limestone boulder in woods below road, Tintern, leg. E.W. Jones, 3.1936 (BBSUK); foot of bare rock face, Piercefield Cliff, near Wyndcliff, m, leg. E.W. Jones & L.B.C. Trotter, 3.1.1955 (NMW); shaded limestone boulder below Black Cliff, S. of Tintern, leg. M.C.F. Proctor, 9.1956 (DBN, NMW).

32/51 On vertical face of soft moist limestone in sheltered position, N. aspect, near R. Wye at Staunton, m, leg. E.W. Jones, 3.1940 (hb. A.R. Perry, BBSUK, E); rock crevices, Lady Park Wood, by R. Wye near Staunton, f, leg. J. Appleyard, J.H.G. Peterken, E.F. Warburg, 15.4.1954 (BBSUK, NMW, OXF); shaded limestone rock face, near vertical, by riverside path, edge of Lady Park Wood, c.fr., leg. E.V. Watson, 15.4.1954 (RNG); damp limestone face near path along R. Wye under cliffs by Lady Park Wood, m, F.J. Rumsey et al., 13.2.1983 (RNG).

Herefordshire (v.-c. 36)

32/51 (a) On tufa, Dropping Well, Great Doward Hill, f, leg. A. Ley, 6.1890 (BM); c.fr., A. Ley, 16.5.1892 (BIRM); c.fr., E. Armitage, 3.1893 (BIRM, BRIST, CGE); E. Armitage,3.1899 (BM, E, NMW ); W.R. Linton, 2.9.1899 (LIV); H.H. Knight & A. Sutton, F. Rilstone, 15.8.1925 (BBSUK, BM, NMW); E.W. Jones, 3.1940 (E.W.J.).
(b) Limestone rocks, The Doward, f, leg. A. Ley & C.H. Binstead, 8.4.1891 (BM); f, E. Armitage, 2.1897 (BM, DBN, E, LIV, NMW ); limestone boulder, Lord's Wood, leg. H.N. Dixon, 17 & 20.7.1903 (BM, NMW); rock face opposite Slaughter, f, leg. L.B.C. Trotter, 15.8.1925 (NMW); on thin soil over limestone rocks, f, leg. H.J.B. Birks, 8.4.1968 (H.J.B.B.).
(c) Large cave by mine working, E. face of Great Doward Hill, leg. A. Ley, 21.5.1902 (BIRM).

Worcestershire (v.-c. 37)

32/72 By R. Leadon, Redmarley D'Abitot, f, leg. H.H. Knight, 26.3.1909 (E, NMW).

Glamorgan (v.-c. 41)

21/58 (a) Oxwich, f, leg. H.H. Knight, 2.4.1907 (BM, NMW); earthy crevices on Carboniferous limestone outcrop, N.E.-facing coastline, Oxwich, Gower, leg. A.R. Perry, 9.4.1967 (A.R.P.).
(b) Rock, Bishopston Valley, f, leg. C.H. Binstead, 1929 (NMW).

31/18 (a) Limestone rocks, old quarry between Pen-y-garn and Garth Wood, f, leg. A.E. Wade, 3.11.1951 (NMW).
(b) Calcareous soil on exposed bank, woodland, Coed y Bedw, Gwaelod y Garth, f, leg. A.R. Perry, 25.5.1976 (NMW).

Breconshire (v.-c. 42)

22/92 Rocks, Craig Cerig Gleisiad, leg. W.R. Sherrin, 16.8.1927 (BBSUK, BM, NMW).

32/01 (a) With *Eucladium verticillatum*, caverns in limestone at Falls of Taf Fechan, Pontsarn, leg. A. Ley, 8.6.1894 (BIRM).
(b) Dry tufa in shaded limestone gorge by Ogof Rhyd-sych, Nant-y-glais, W. of

Vaynor church, f & m, leg. A.R. Perry, 5.4.1976 (NMW).

Pembrokeshire (v.-c. 45)

12/91 Crevice in wall, Manners Hotel, Haverfordwest, leg. G. Bloom, 4.1980 (BBSUK).

Denbighshire (v.-c. 50)

33/24 Holyhead Road, W. of Llangollen, m, leg. T. Barker, 23.8.1900 (MANCH).

33/25 Minera, Bwlchgwyn, near Wrexham, f, leg. J.C. Wilson & D.A. Jones, 8.1914 (BM, NMW).

Nottinghamshire (v.-c. 56)

43/56 On Magnesian Limestone boulders on N-facing wooded bank, Pleasley Vale, leg. T.L. Blockeel, 1988 (BBSUK) (*Bull.brit. bryol.Soc.* 54:27).

Derbyshire (v.-c. 57)

43/07 (a) Ashwood Dale. Packets labelled 'Buxton', 'Near Buxton' or 'Ashwood Dale, Buxton'. No collector's name, f, 7.1878 (MANCH); C. Wild, 8.1879 (BM); R. Braithwaite, G.A. Holt, 4.1880 (BM); W. West, 7.6.1881 (CMM); f, J. Whitehead, 11.1881 (BM, BRIST, CGE, DBN, MANCH, NMW); C. Wild, 3.1882 (BM); f, J. Cash, 10.1882 (BRIST, E, MANCH); G.A. Holt, 5.1883 (MANCH); m, W. West, 7.6.1884 (BM); Dale End, f, A. Ley, 17.11.1886 (BIRM, BM); f, T. Barker, 13.9.1900 (BM, CMM, MANCH, NMW); W.R. Linton, 14.3.1901 (LIV); f, T. Barker 14.3.1901 (BIRM, BM, E, MANCH, NMW, UCNW); f, T. Barker & J. Stirling, 28.5.1901 (BM, BRIST, MANCH, NMW); f, T. Barker, 22.5.1903 (MANCH); with *Leiocolea badensis*, f, H.H. Knight, 20.5.1924 (NMW).

(b) Grin Plantation above Burbage, Buxton, leg. W.R. Linton, 28.3.1905 (LIV).

43/15 Dovedale, f, leg. L.H. Pegler, no date (BM).

43/17 (a) Miller's Dale (43/1373 to 1673): leg. E.M. Holmes, 8.1874, new to Britain (CGE) & 1876 (NMW); f, G.A. Holt, 4.2.1880 (BM, MANCH) & 13.4.1880 (MANCH); m, G.A. Holt, 9.1880 (MANCH); f, G.A. Holt, 2.1881 (MANCH); f, C. Wild, 10.1881 (BM); f, G.A. Holt, 12.1881 (MANCH); limestone rocks, f, J. Whitehead, 2.1882 (MANCH); f, J. Cash, 10.1882 (NMW); wet limestone rocks, m, G.A. Holt, 1.1884 (BM); f, T. Barker, 10.1890, 7.1894 & 6.1897 (MANCH); E.C. Horrell, 4.1899 (BIRM); limestone rocks, f, A.R. Horwood, 6.1906 (NMW); f & m, S.J. Owen & D.A. Jones, 8.1907 (NMW); L.H. Pegler, 24.8.1913 (NMW); f, J.B. Duncan & E. Armitage, 8.8.1923 (BRIST, E); roadside, m, W.N. Tetley, 8.8.1923 (BBSUK, E, NMW); shady limestone rock, m, W.G. Travis, 8.1923 (LIV); C.A. Cooper, 8.8.1923 (NMW): forming tufa by limestone cliff, m, H.J.B. Birks, 13.8.1965 (H.J.B.B.); wet calcareous rock by road, m, A.J. Pettifer, 6.4.1972 (NMW); on wet limestone cliffs by road, m, M.E. Newton, 14.5.1988 (M.E.N.).

(b) Wye Dale (43/1072): f, J. Cash, 10.1882 (MANCH); near Topley Pike, C.J. Wild, 1877 (BM).

(c) Chee Dale (43/1272 to 1273): on a wall about 3 miles from Buxton, c.fr., W. West, 7.1879, first British record with sporophytes (BM, CMM, MANCH, NMW, OXF); W. West, 5.1880 (CMM, LDS); on vertical limestone rocks 2.5 miles from Buxton on the left-hand side of the road when approaching Buxton, f, W. West, (BIRM, BM,,BRIST, CGE, E, LDS, MANCH, OXF); f, W. West, 7.1881 (MANCH); T. Barker, 28.5.1901 (MANCH); on damp limestone rocks by the stepping stones along the river, C.C. Townsend, no. 81/56, 15.5.1981 (C.C.T.).

(d) Cressbrook Dale (including Ravensdale) (43/1772 to 1774): f, G.A. Holt, 11.1881 (MANCH); Ravensdale, f, G.A. Holt, 6.1882 (NMW) & 5.1883 (MANCH); T. Barker, 11.8.1899 (MANCH); by calcareous spring, T. Barker & J. Stirling, 29.5.1901 (BM); limestone rock ledges, river gorge between Ravensdale and wool mill, J.A. Paton & A.J.E. Smith, 3.9.1959 (J.A.P., A.J.E.S.); crevices in shaded limestone cliffs, J.G. Duckett, 3.3.1967 (J.G.D.); calcareous gorge below Ravensdale Cottages, J.C. Gardiner, 25.10.1970 (BM) and H.L.K.W., 9.91.

(e) Monsal Dale (43/1771): all collections c.fr. and by G.A. Holt, 6.1882 (NMW); 10.1882 (MANCH); 7.1883 (BIRM, BM, BRIST, MANCH); 5.1884 (BM); 8.1884 (MANCH); 8.1885 (MANCH).

(f) Monk's Dale (43/1373 to 1375): m, T. Barker, 6.1883 (MANCH); m, G.A. Holt, 3.1886 (MANCH); m, T. Barker, 28.9.1888, 3.1902 & 4.1902 (MANCH); wet limestone tufa by spring, m, U. Duncan, 5.4.1948 (E); limestone rocks, m, J.H.G. Peterken, 5.4.1948 (BBSUK); on tufa, m, L.B.C. Trotter & R.H. Hall, 5.4.1948 (NMW); moist cliff of limestone tufa, m, C.D. Pigott, 1.1957 (LANC); on calcareous rocks, E.C. Wallace, 24.10.1965 (NMW); on shaded tufaceous cliff, m, H.J.B. Birks, 4.9.1966 (H.J.B.B.).

43/25 Matlock Bath, on wet limestone tufa, Via Gellia, c.fr., leg. T.L. Blockeel, 10.1988 (T.L.B.).

43/56 Pleasley Park, on shaded Magnesian limestone, f, leg. T.L. Blockeel, 2.1988 (T.L.B.).

43/57 Markland Grips, f, leg. W.R. Linton, 18.2.1897 (LIV).

Scarcliffe Park, near Nether Langwith, on Magnesian limestone at edge of wood, f, leg. T.L. Blockeel, 6.1989 (T.L.B.).

West Lancashire (v.-c. 60)

34/67 Gorge of the Greta above Wrayton, f, leg. A. Wilson & J.A. Wheldon, 7.1904 (NMW).

South-west Yorkshire (v.-c. 63)

43/58 (a) Anston Stones Wood: Magnesian limestone rock face, f & m, leg. J. Brown, 14.4.1951 (BBSUK); T.L. Blockeel, 9.1978 (T.L.B.).
(b) Roche Abbey near Maltby: loose blocks of Magnesian limestone by the pond above the abbey, f, leg. C.D. Pigott, 2.1952 (LANC); shaded Magnesian limestone, King's Wood, f, leg. T.L. Blockeel, 31.10.1976 & 22.3.1981 * (T.L.B.).
(c) Magnesian limestone outcrop, Thorpe Salvin, f, leg. T.L. Blockeel, 4.1981 (T.L.B.).

43/59 Norwood, Maltby, leg. T.L.Blockeel, 11.1979 (T.L.B.).

44/00 Face of base-rich grit rock in rocky hollow on moorland, Seal Bark Rocks, Saddleworth, alt. 400 m, m, leg. T.L. Blockeel, 6.1990 (T.L.B.).

44/41 Magnesian limestone, Went Valley near Pontefract, leg. T.L. Blockeel, 6.1979 (T.L.B.).

44/50 Sprotbrough, near Doncaster, leg. T.L. Blockeel, 6.1980 (T.L.B.).

44/51 Shaded Magnesian limestone boulders, Brockadale, Wentbridge, leg. T.L. Blockeel, 15.2.1975 (T.L.B.).

Mid-west Yorkshire (v.-c. 64)

34/77 Damp limestone rock face by Clapham Beck near caves above Clapham, Ingleborough, f, leg. D.G. Long, 9.10.1974 (E).

44/26 Magnesian limestone boulder, Mackershaw Woods, near Ripon, leg. T.L. Blockeel, 3.1982 & 4.1983 (T.L.B.).

44/35 Knaresborough: Magnesian limestone rocks near Dropping Well, f, leg. L.J. Cocks, 4.1897 (BM, MANCH); Dropping Well, R. Barnes, 4.1897 (BM); F. Haxby, 1.1912 (CMM); J. Appleyard, 2.4.1955 (NMW); on soft moist Magnesian limestone on bank of R. Nidd (a) near the railway viaduct, f, (b) opposite the Castle, f, and (c) near the Dropping Well, T.L. Blockeel, 7.1984 (T.L.B.).

44/44 Boston Spa: limestone crevices, f, leg. L.J. Cocks, 27.2.1897 (BM); Magnesian limestone rocks, woods by R. Wharfe, f, T.L. Blockeel, 4 & 7.1983 * (T.L.B.).

North-west Yorkshire (v.-c. 65)

44/08 On moist tufa on Yoredale limestone by R. Ure, Aysgarth, Wensleydale, m, leg. T.L. Blockeel, 9.1985 (T.L.B.).

Westmorland with Furness (v.-c. 69)

35/61 Wet sandstone rock face heavily charged with lime, near viaduct S. of Appleby, f, leg. L.B.C. Trotter, 17.4.1946 (hb. E.W. Jones, NMW).

SCOTLAND

Kirkudbrightshire (v.-c. 73)

25/97 On Permian sandstone cliffs by Cluden Water, leg. H. Milne-Redhead, 20.11.1955 (BBSUK, NMW) & 1.3.1964 (hb. A.J.E. Smith).

Mid Perthshire (v.-c. 88)

27/53 Clefts in low-altitude limestone about 2 miles E. of Killin near Loch Tay, leg. A.G. Kenneth, 1980 (E).

Angus (v.-c. 90)

37/76 Wall of lime kiln near Dubton station by Montrose, leg. U. Duncan, 11.1964 (E).

Westerness (v.-c. 97)

27/06 Calcareous rocks in wood on hillside above Onich, leg. E.C. Wallace, 14.7.1950 (BBSUK, NMW).

27/17 Damp limestone exposure above Glengour, Fort William, alt. 250 m, leg. D.G. Long, 26.7.1986 (E); with *Leiocolea muelleri* on base-rich soil below limestone crags, Beinn Riabhach, S. of Fort William, leg. J.A. Paton, 26.7.1986 (J.A.P.).

Main Argyll (v.-c. 98)

16/98 Limestone in gorge, Largiemore burn, just upstream from bridge, Otter Ferry, leg. H. McAllister, 13.4.1966 (LIV).

17/81 On limestone rocks and on soil amongst them, Creag Aoil, Loch Melfort, leg. M.F.V. Corley, 28.8.1967 (M.F.V.C.).

17/83 N. end of Isle of Kerrera, near Oban, leg. A.G. Kenneth, 9.1966 (hb. A.McG. Stirling); limestone crevice in woodland, Kilcheran Loch, Isle of Lismore, leg. A.G. Kenneth & B. Thompson, 7.8.1984 (E).

17/84 On damp shaded limestone ledges under sea cliffs near Achnacroish, Isle of Lismore, leg. J. Appleyard, D.F. Chamberlain, C.C. Townsend (no. 72/238), 5.9.1972 (C.C.T., E, NMW).

17/94 Foot of roadside stone wall and on rocks by road, Appin House, Appin, leg. E.C. Wallace, 24 & 25.7.1949 (BBSUK, NMW); limestone rocks in beechwood, Dalnasheen, Port Appin, leg. A.McG. Stirling, 9.1964 (A.McG.S.); crevices of limestone rocks near Port Appin, leg. E.C. Wallace, 7.9.1972 (NMW); crevices in calcareous mica schist, Glen Stockdale, Appin, leg. J.G. Duckett, E.R.B. Little & J.A. Paton, 30.7.1967 (J.G.D., J.A.P.).

17/95 Shady limestone rocks, Salachan Glen, Appin, leg. F.A. Sowter, 6.1950 (BBSUK).

26/09 Soft schist rock beside Strathlachlan River, E. side of Loch Fyne, leg. J.A. Paton, no. 2468, 1.6.1981 (J.A.P.).

27/02 Crevices of limestone rocks near Kilchrenan, leg. E.C. Wallace, 24.5.1952 (NMW).

27/05 Shaded crevice in calcareous mica schist, Tigh Phuirt, wood E. of Ballachulish, leg. J.G. Duckett, E.R.B. Little & J.A. Paton, 29.7.1967 (J.G.D.); limestone rocks by Kinlochleven road near Glen Coe, leg. J.C. Gardiner, 6.7.1969 (BM).

27/15 Calcareous rocks by road near Glencoe House, Loch Leven, leg. E.C. Wallace, 5.8.1949 & 6.7.1959 (NMW, QFA).

Kintyre (v.-c. 101)

16/61 Earthy crevices of cornstone rocks near Tirfergus Hill, Campbeltown, leg. A.G. Kenneth & A.McG. Stirling, 19.3.1966 (BBSUK).

16/67 (a) Island of Danna: crevice of limestone

rock near Ferry House, leg. A.G. Kenneth, 29.3.1966 (A.McG.S.); in old quarry, leg. J.C. Gardiner, 27.8.1972 (BM); on limestone, leg. E.C. Wallace, 27.8.1972 (NMW).
(b) Crevices of limestone rock near Point of Knap, Knapdale, leg. E.C. Wallace, 8.8.1966 (NMW).

16/77 (a) Ellary, Loch Caolisport: earthy crevices of basic schist rocks, leg. A.G. Kenneth & A.McG. Stirling, 20.3.1966 (herb. J.G. Duckett, A.McG.S., C.C. Townsend); on soil, leg. E.C. Wallace, 12.8.1972 (NMW).
(b) Limestone near Loch na Craige, Clachbreck, leg. A.G. Kenneth, 1973 (E).

16/78 On earth on limestone, Druim Buidhe, Keills, Knapdale, leg. E.C. Wallace, 8.8.1972 (NMW); rocky ledges in old quarry, Barrahormid, leg. J.C. Gardiner, 27.8.1972 (BM); low-altitude limestone outcrop S. of Carsaig, Knapdale, leg. A.G. Kenneth, no date (E).

16/79 Cnoc Reamhar, Knapdale, leg. A.G. Kenneth, 1969 (E).

16/87 S.-facing limestone, ca. 200 m (700 ft) alt., W. of Loch Arail, leg. A.G. Kenneth, 1984, * (E).

South Ebudes (v.-c. 102)

16/37 Calcareous rocks near Mala Bholsa, N.E. Islay, leg. A.McG. Stirling, 6.1964 (BBSUK).

17/61 On damp soil in limestone crevice near Bealach an Tarabairt, Garbh Eilach, Garvellach Isles, Firth of Lorn, leg. A.McG. Stirling & E.C. Wallace, 6.8.1966 (BBSUK, NMW).

North Ebudes (v.-c. 104)

18/51 On shaded limestone rocks, Allt nan Leac, S. of Torrin, Skye, leg. H.J.B. Birks, 14.8.1968 (H.J.B.B.).

18/61 Limestone rocks, Ord, Skye, leg. A.C. Crundwell, 2.6.1961 (BBSUK).

West Ross (v.-c. 105)

18/84 With *Leiocolea muelleri* on base-rich soil, flush above road, Loch Kishorn, leg. J.A. Paton, 3.8.1986 (J.A.P.).

West Sutherland (v.-c. 108)

29/21 Crevices in limestone cliffs near Stronechrubie, leg. D.G. Long, no. 3945, 4.9.1974 (E).

29/22 Inchnadamph: limestone rocks, Glen Dubh, leg. H.N. Dixon, E.S. Salmon & W.E. Nicholson, 16 & 18.7.1899, new for Scotland (BIRM, BM, CGE, LDS, MANCH, NMW) & leg. W.E. Nicholson, 4.7.1921 (NMW); overhanging bank by R. Traligill, leg. E.F. Warburg, 3.7.1952 (BBSUK); among limestone rocks, leg. R.B. Cooke & E.M. Lobley, 6.1956 (hb. C.C. Townsend).

29/36 (a) On limestone, Allt Ach a Chorrain, Kyle of Durness, leg. D.F. Chamberlain & D.G. Long, 26.6.1974 (E).
(b) Crevices of low limestone cliff near Loch Croispal, Durness, leg. D.G. Long, no. 5080, 14.7.1986 (E).

29/45 On shaded limestone blocks, Kempie, E. of Loch Eriboll, leg. D.F. Chamberlain & D.G. Long, 23.6.1974 (E).

29/46 Shaded limestone, wood N.W. of Loch Ach-an-Lochaidh, leg. D.F. Chamberlain & D.G. Long, 27.6.1974 (E).

IRELAND

North Kerry (v.-c. H2)

00/98 On mortar of wall, foot of Torc Cascade, Killarney, leg. P.R. Bell & E.W. Jones, 6.9.1951 (E.W.J.).

Clare (v.-c. H9)

12/11 Damp crevice of limestone rock, Black Head, leg. A.McG. Stirling, 29.6.1965 (NMW).

12/30 Slieve Carran, leg. J. Appleyard, 22.8.1957 (NMW).

South-east Galway (v.-c. H15)

12/40 Shaded river bank, the Punchbowl near Gort, leg. J.A. Paton, 29.5.1968 (BBSUK).

West Galway (v.-c. H16)

02/75 (a) Retaining wall, Tullywee Bridge, Kylemore, Connemara, leg. A.C. Crundwell, 25.8.1957 (BBSUK).
(b) Rocks at 200 m (700 ft) alt., above Glencorbet, Twelve Pins, Connemara, leg. A.C. Crundwell, 28.8.1957 (NMW).

East Mayo (v.-c. H26)

12/17 Crevice under overhanging limestone rock on W.-facing slope W. of Partry, leg. H.L.K. Whitehouse, 13.8.1987 (BBSUK, H.L.K.W.).

West Mayo (v.-c. H27)

03/50 Large gully at western end of Croghaun, Achill Island, leg. T.L. Blockeel, 8.1987 (BBSUK).

02/98 Croagh Patrick, head of N. corrie, alt. ca. 550 m, leg. D.G. Long, no. 14468, 13.8.1987 (E).

Sligo (v.-c. H28)

13/63 Knocknarea, leg. D. Synnott, 3.9.1970 (DBN).

13/64 Shady crevices in moist rocks, Ben Bulben, leg. D. Moore, 5.1871, new to Ireland (DBN); summit of Ben Bulben (west end), leg. H.N. Dixon, 24.6.1937 (BBSUK, BM).

Leitrim (H29)

13/74 Wooded glen, N.E. end of Glencar Lough, leg. J.B. Duncan, 9.1938 (E); on limestone rocks, ca. 250 m (800 ft) alt., at track side above Glencar Waterfall, leg. R.D. Fitzgerald & A.R. Perry, 22.7.1963 (A.R.P., NMW).

13/83 Limestone outcrop, alt. 300 m (950 ft), Boggaun, Manorhamilton, leg. A.R. Perry, 21.7.1963 (A.R.P.).

13/84 Wet shaded limestone, alt. 250 m (800 ft), Peakadaw, Glenade, leg. A.R. Perry, 24.7.1963 (A.R.P.); Glenade, leg. D. Synnott, 7.9.1970 (DBN).

Fermanagh (v.-c. H33)

23/14 Limestone rocks on E. side of Belmore Mountain, leg. A.C. Crundwell, 4.9.1957 (BBSUK).

East Donegal (v.-c. H34)
13/86 On red sandstone, Finner Camp, Bundoran, leg. W.N. Tetley, 22.4.1911 (BBSUK).
24/34 On limestone, Ballyliffin, leg. J. Hunter, 7.1907 (E).
West Donegal (v.-c. H35)
13/69 On soil in crevices of limestone rocks W. of Portnoo, N. of Ardara, leg. M.F.V. Corley, 8.8.1970 (M.F.V.C.).
24/03 (a) Limestone near Dunfanaghy, leg. J. Hunter, 4.1909 (LIV, NMW) & 4.1910 (BM).
(b) Rocks between L. Naboll and L. Agher, below Muckish, leg. E.F. Warburg et al., 2.9.1962 (BBSUK); basic rocks, old railway track below Muckish Mountain, leg. E.C. Wallace, 2.9.1962 (NMW).
(c) Sides of ravine leading to the sea, Ards Peninsula, leg. J. Appleyard, 8.9.1962 (NMW).
Tyrone (v.-c. H36)
23/49 On soft limestone, Butterlope Glen near Plumbridge, leg. R.D. Fitzgerald, 8.10.1957 (DBN, hb. A.R. Perry).
24/40 Rock crevice, Burn Dennet, leg. R.D. Fitzgerald, 6.1957 (BBSUK).

## *GYMNOSTOMUM VIRIDULUM*

The 50 km square of the UTM grid is indicated for each record, except for those from Afghanistan and Somalia, where latitude and longitude are given. The sex of British and Irish gatherings is indicated by f or m, if known.
* Grown in pure culture on agar.

AFRICA

EGYPT
Aegypten, leg. P.Ascherson, no date, c. ge., type of *Weissia rohlfsiana* C.M. (S), see Müller (1874); Aegyptia, Nilbrucken, UU2, leg. G. Schweinfurth, 10.3.1876, c.ge., as. *W. rohlfsiana* (S); Cairo, Böschungen eines Bewissenungsgrabins, UU2, leg. P.Ascherson, 4.1.1880, c.ge., as *W. rohlfsiana* (E); western desert, Burg el Arab S.W. of Alexandria, on rather moist vertical rocks of limestone in Bramleys cave, QQ2, leg. G. Een, 17.12.1961, c.ge. (GL, NMW); Burg-el-Arab W. of Alexandria on soil in cave near village, alt. 10 m, QQ2, leg. H.J. During, 850112, 17.1.1985, c.ge. (H.J.D.).

EGYPT, SINAI: see under ASIA.

MOROCCO
GA, below Imouzzer-des-Ida-Outanane near the cascade, alt. 900 m, shady limestone rocks and walls, MP3, leg. P.& J. Davis, D.48,502d, 20.3.1969, c.fr. (BM, E); Anti-Atlas, Strasse Tinherer-Tafilat zwischen Touroug und Achouria, ca. 830 m, tiefe schattige felsschlucht mit episodischem Wasserfall, UV1, leg. J.-P. Frahm, 865186, 21.3.1986, c.ge. (J.-P.F.); Suedrand des Hohen Atlas, Strasse Taroudant-Quarzazate einige km S Roulouz, Bachschluchtin Argania-Bestand mit *Nerium*, *Lavendula*, etc., ca. 600 m, PP1, leg. J.-P. Frahm, 865190, 27.3.1986, c.ge. (J.-P.F.); Anti-Atlas S. of Agadir along road S509 2-3 km S. of Ait Baha, ca. 300 m elev., on calcareous rock in Argania-woodland, MP3, leg. J.-P. Frahm, 865182, 27.3.1986, c.fr. * (J.-P.F.); Anti-Atlas, Tafraoute, on soil in fissures of granitic rocks, MN3, leg. J.-P. Frahm, 865183, 28.3.1986 * (J.-P.F.).

SOMALIA
Las Elan, alt. 1520 m, ca. 10° 14' N., 47° 12' E., leg. W.A. Macfadyen, 8a, 30.4.1930 (BM); on rock, Mait Pass, ca. 10° 50' N., 47° 04' E., leg. G.E. Wickens, 1983 * (C.C.T.).

TUNISIA
5 km N.W. Ksar Haddada, N.W. von Tatahouine, ca. 470 m s.m., an N.-expon. Felsraenken, PB1, leg. J.-P. Frahm, 813377, 11.4.1981 * (J.-P.F.); ca. 8 km W. Foum Tatahouine in Richtung Chenini, Sandsteinbergkuppe ca. 350 m s.m., an erdigen Felsabsaetzen, N.W.-exponiert, *Barbula tophacea* vorherrschend, PB2, leg. J.-P. Frahm, 813426, 11.4.1981 * (J.-P.F.).

ASIA

AFGHANISTAN
Prov. Miamana, Darreh Zang, near Belchiragh, steep rocky slopes near waterfall, alt. ca. 1400 m, ca. 35° 50' N., 65°11' E., leg. I. Hedge & P. Wendelbo, W3760D, 29.5.1962 (BG, E); Prov. Mazar-i-Sharif, Ag. Küprük, gorges, alt. ca. 750 m, ca. 36°30' N., 67°00' E., leg. I. Hedge & P. Wendelbo, W3938B, 8.6.1962, c.ge. (BG, E).

CYPRUS
On a bare, sunny slope facing N.E. near the ruins of the palace, Vouni, with *Crossidium* spp., *Valezia rigida*, etc., VD3, leg. C.C. Townsend, 20.5.1963, c.ge. (C.C.T.); on bare, very dry soil at the site of the theatre, Soli, with *Crossidium* spp., *Timmiella barbuloides*, etc., VD3, leg. C.C.Townsend, 20.5.1963, c.ge. & c.setae (C.C.T.); calcareous ground in acacia scrub near Four Mile Point, near Famagusta, locally frequent, WD3, leg. T. Laflin, 19165, 2.4.1972 (CGE); around springs on face of sea cliff, St Therissos, Karpas, occasional, XE2, leg. T. Laflin, 19270, 5.4.1972 (CGE); bank of stream W. of Rizokarpaso, Karpas, frequent, XE2, leg. T. Laflin, 19406 & 19411, 6.4.1972, c.fr. (CGE); limestone rocks and banks, deep ravine, Trypa Vouni, Kyrenia Mountains, occasional, WE2, leg. T. Laflin, 19416, 7.4.1972, c.fr. (CGE); on soil near Ayios Pholios, leg. E.C. Wallace, 17.5.1982 (NMW); on roadside waste, Episcopi, VD4, leg. E.C. Wallace, 24.3.1982, c.ge. (NMW).

IRAN
Pers. austr., Schahpur, ad rupes 3000', WN3,

leg. C. Haussknecht, Iter. orientale, 1868, c.ge. & c.fr. (BM, W); Fars, S. of Shiraz, Sabz Puchon, crevices of N.-faced calcareous rocks, ca. 1800 m alt., 29°23' N., 52°32' E., XN1, leg. P. Wendelbo, 2453, 26.5.1959 (BG).

IRAQ
Diyala
Jebel Hamrin, damp rock, MD4, leg. W.E. Evans, 49, 29.11.1918 (E); Jebel Hamrin, N.-facing sandy slopes, MD4, leg. S. Agnew, BUH222, 17.1.1958 (BM, S.A.); Diyala weir, by Jebel Hamrin, under sandstone overhang, MC3, leg. S. Agnew, BUH559, 7.12.1962, c.ge. (S.A.).
Erbil
Shirzawa below Helgurd, with *G. calcareum*, MF2, leg. E. Hadac, HCB239, 6.1960 (S.A.).
Kirkuk
Ain Dibbis, rocks, ME2, leg. S. Agnew, BUH586, 26.12.1962 (S.A.); Derbendikhan, dry rocks, leg. S. Agnew, BUH608, 28.2.1963 (S.A.).
Kut
Hashimi, near Badra, Persian border, N.-facing sandstone, NB3, leg. S. Agnew, BUH548, 2.12.1962 (S.A.).
Mosul
Gorge between Dohuk and Zakho, KG2, leg. E. Hadac, HCB412, 21.3.1961 (S.A.); Hatra-Sharqat, steppe, LE2, leg. E. Hadac, HCB241, 24.3.1961 (S.A.).

ISRAEL
Poterietum, Wadi Nigra, Negev, YU1, leg. S. Nachmony, 432, 13.3.1954, c.ge. (GL); limestone cave, Bet Govrin (Beyt Guvrin), Judaean Hills, XV3, leg. F. Bilewsky, 263, 2.1956, c.ge. & c.fr. (GL); Netiv Halamed He, XA4, leg. I. Herrnstadt, 8.3.1980, c.ge. (I.H.); 3 km N. of Latrun junction, XA4, leg. I. Herrnstadt, 83-293-5, 16.3.1983 (I.H.).

JORDAN
Prov. Al-Karak, Wadi Mujib, 650 m, calcareous rocks, YV3, leg. W. Frey & H. Kürschner, 80-452, 1-3424, 9.4.1980, c.ge. * (W.F.).

LEBANON
Shady hard limestone boulder, Antelias, YC4, leg. P.H. Davis, 5245, 7.2.1943, c.fr. (BM, E); shady sandstone outcrop in Pinetum near Ein Anub, with *Barbula trifaria*, leg. P.H.Davis, 5265, 10.2.1943, c.fr. (BM, E); on marshy bank facing N., Choueifat, YC2, leg. P.H. Davis, 5281, 22.2.1943 (BM); on calcareous boulders, Choueifat, YC2, leg. P.H. Davis, winter 1943, c.fr. (BM, E); with *G. calcareum* on damp, tightly packed limestone soil, rather glutinous, on roadside bank not far from the palace of Beit ed Din, ca. 28 miles S. of Beirut, YC2, leg. C.C. Townsend, 71/211, 22.4.1971, c.ge. & c.fr. (C.C.T.).

SINAI
On compacted sand over slabby rock and on sandy tuff below, lower slopes of Jebel Musa ca. 1 km below St Catherine's Monastery, WS3, leg. C.C. Townsend, 86/46 * & 86/50 *, 12.3.1986 (C.C.T.).

TURKEY
Antalya
Earthy stream-bank in woodland 10 km N. of Tasagil, ca. 30 m alt., UG2, leg. E.Nyholm & A.C. Crundwell, 1328, 7.4.1972, c.ge. & c.fr. (GL).
Burdur
Rock crevice, hillside 3 km S.W. of Burdur, alt. 880 m, QB3, leg. E. Nyholm & A.C. Crundwell, 1017, 30.3.1972, c.ge. (GL).
Denizli
On soil on lime-encrusted rocks, Pamukkale, alt. 380 m, PB3, leg. E. Nyholm & A.C. Crundwell, 944, 28.3.1972, c.ge. (GL); in rock crevice on mountain slope 10 km N.E. of Tavas, alt. 1160 m, PB3, leg. E. Nyholm & A.C. Crundwell, 1007, 29.3.1972 (GL).
Izmir
On rocks among *Poterium spinosum* on soil by stream on N.W. side of Yamanlar, 5 km S. of Menemen, Izmir province, alt. 15 m, NC1, leg. E. Nyholm & A.C. Crundwell, 73, 22.3.1971 (GL); on limestone rock in *Quercus* scrub on N. side of hill, Pinarbasi, near Bornova, alt. 280 m, NC1, leg. E. Nyholm & A.C. Crundwell, 837, 23.3.1972, c.ge. (GL); on rocks at edge of pine forest 55 km W. of Izmir, alt. 180 m, MC3, leg. E. Nyholm & A.C. Crundwell, 918, 25.3.1972, c.ge. (GL).
Mugla
Fethiye, 30 m, limestone rocks facing N.W., PA3, leg. Davis 25430a & O. Polunin, 27.3.1956 (E); on limestone rocks in pine forest 21 km E. of Milas, alt. 660 m, NB4, leg. E. Nyholm & A.C. Crundwell, 543, 3.4.1971, c.ge. & c.fr. (GL, NMW); on damp bank at roadside ca. 3 km E. of Gulluk, Mugla province, alt. 50 m, NB4, leg. E. Nyholm & A.C. Crundwell, 560, 4.4.1971, c.ge. & c.fr. (GL).

ATLANTIC ISLANDS

CANARY ISLANDS
Fuerteventura
Rocky side of gully 3 km S.W. of La Oliva, alt. 320 m, FS1, leg. A.C. Crundwell, 1136, 29.3.1981, c.ge. (GL); N.-facing bank, Betancuria, alt. 400 m, ES2, leg. A.C. Crundwell, 1144, 30.3.1981, c.ge. (GL).
Lanzarote
Soil between rocks on N. slope, Famara cliffs, alt. 100 m, FT2, leg. H.J. During, 77.1021, 13.10.1977, c.ge. (GL); N.E.-exposed slope, Famara cliffs, alt. 600 m, FT2, leg. H.J. During, 77.1054, 10.1977, c.ge. (GL).
La Palma
Mirador Cumbrecita, La Caldera, soil on steep N.-facing rocky slope in *Pinus canariensis* forest, alt. ca. 1250 m, BS1, leg. D.G. Long, 7529, 9.12.1978 (E); Lomo de Las Chozas, La Caldera, damp soil on bank in *Pinus canariensis forest*, alt. ca. 1250 m, BS1, leg. D.G. Long, 7540, 9.12.1978, c.setae (E).

**Tenerife**
Below El Tizen, Orotava valley, dense patches on shaded wall, alt. ca. 800 m, CS2, leg. D.G. Long, 5947, 8.4.1977, c.ge. (E); on hard rock, Montana de las Cuentas, by road to Los Cristianos, CS2, leg. E.C. Wallace, 15.4.1978, c.ge. (NMW).

MADEIRA
On a wall at Santo Antonio, near Funchal, alt. ca. 240 m (800 ft), CB2, leg. E. Armitage, 37, 4.3.1909, c.ge. & c.fr. (BM, DBN, GL).

EUROPE, except Britain and Ireland

BALEARIC ISLANDS
**Ibiza**
Side of wall in moist depression by roadside near Puig Coques, grid ref. 6415, CD4, leg. T.L. Blockeel, 26.11.1984, c.ge. (T.L.B.).
**Mallorca**
Puig Mayor, DE4, leg. W.E. Nicholson, 6.1905 (BM); retaining wall on N. side of Galazo, alt. 800 ft, DD3, leg. A.C. Crundwell, 31, 14.3.1982, c.ge. (GL); on earth, side of retaining wall, Son Marroig, near Dea, DE4, leg. A.C. Crundwell, 74, 16.3.1982, c.ge. (GL).

BELGIUM
Sur les rochers calcaires, Bouvignes, Namur, FR1, leg. F. Gravet, Bryotheca Belgica 254, 6.1875, c.ge. (BM); sur le mortier, vieux murs à Limbourg (Dolhain), FS4, leg. A. Mansion, 75997, 4.4.1904 (BR); Prov. Namur, Malonne, fente du vieux mur au-delà de la maison de Mt Saint-Martin, 76067, 4.3.1962, ex Herb. G. Thiry, c.ge. (BR) et dans les joints d'un vieux mur on calcaire, Malonne, alt. 100 m, FR1, leg. M. Onraedt, 2.1.1966 (BR); Ardennen, Mortehan, O. van Bouillon, alt. 270 m, op leisteenwand, tussen rotsspleten, FR2, leg. KNNV-kamp, 3.7.1976, c.ge. (H.J.D.).

CRETE
Prov. Chania, ostexpon., von Phrygana bedeckter Hang südl. Perivolia am Gebirgerand bei ca. 100 m.s.m. auf Erde u. Felsen, Kalk, GE4, leg. Düll, 5, 5.4.1964, c.ge. (C.C.T.); Prov. Chania, schattige Mauern b.d. Kapelle im Gebirgerand ht. Perifolia ca. 100 m.s.m., kalkreich, GE4, leg. Düll, 6d, 5.4.1964, c.ge. & c.fr. (NMW); on a limestone rock above the Bottomless Pool, W. of Heraklion, LV1, leg. C.C. Townsend, 69/317, 5.4.1969 (C.C.T.); very soft vertical rock face near Platanias, Nomos Chanion, frequent, GE4, leg. T. Laflin, 18369, 10.4.1971, c.fr. (CGE); between rocks, coastal garigue W. of Kastelli, Nomos Chanion, occasional, GE4, leg. T. Laflin, 18513, 10.4.1971 (CGE); blown sand, old coastal flat just W. of Chania, occasional, GE4, leg. T. Laflin, 18625, 10.4.1971 (CGE); rock block in bank at edge of orange orchard, Agia, Nomos Chanion, occasional, GE4, leg. T. Laflin, 18321, 11.4.1971, c.ge. (CGE); wet bank, Exo Potami, Nomos Lasithiou, frequent, LU3, leg. T. Laflin, 18518, 18.4.1971 (CGE).

CZECHOSLOVAKIA
Auf Kohlensandstein bei Kralup, 200 m.s.d.adr.M., VR3, leg. E. Bauer, Bryotheca Bohemica 205, 13.11.1898, c.ge. (BM,E,GL,NMW); Böhmen, Kralup an der Moldau, auf Kohlensandstein, VR3, leg. E. Bauer, Musci europaei exsiccati 1036, 29.9.1912, c.ge. (BM, NMW).

FRANCE
**Alpes Maritimes**
Nizza, LP4, leg. Metzler (Schimper recd. 5.1869), c.ge & c.fr. (BM); Rochers calcaires, Nice, LP4, leg. Husnot, Musci Galliae 552, c.fr. (BM); wall, Gorbio valley, Menton, LP4, leg. H.N. Dixon, 27.12.1900, c.fr. (CGE); on soft weathered calcareous rocks in shaded recesses, Vence, LP4, leg. C.H. Binstead, 4.1925, c.fr. (BM); old wall, Annunciata Ridge, Menton, LP4, leg. C.H. Binstead, 23.4.1928, c.ge. & c.fr. (BBSUK, RNG).
**Basses-Pyrénées**
Hab. in muris ad pedem Pyren. occidentalium, Pau, Rontignon, YN1, leg. R. Spruce, Musci Pyrenaici 1845-46, 1847, c.ge. & c.fr. (BM, CGE, E, OXF, TCD); Pyrenees, leg. Spruce 239 (Hb. W. Wilson 1874), c.fr. (BM); Pyrenees, H1814, leg. De Candolle (Hb. W. Wilson 1874), c.fr. (BM).
**Bouches-du-Rhône**
Dans une carrière, Cassis s/m, GH1, leg. J. Hennen, 36, 14.3.1914, c.ge. & c.fr. (BM); environs du Chateau de Ners, sur R.N. 8 bis, GJ2, leg. R.B. Pierrot, 81.031, 15.4.1981, c.ge. (GL).
**Charente**
Chateauneuf-sur-Charente, ancienne carrière, paroi ombragée, YR1, leg. R.B. Pierrot, 75.090, 6.4.1975, c.ge. & c.fr. (GL); Foret de la Braconne, Rond Point de la Grand Combe, talus sur calcaire, BL3, leg. M.A. Rogeon & R.B. Pierrot, 76.200, 17.10.1976, c.ge. (GL).
**Charente Maritime**
Dompièrre, sur mur, talus calcaire humide du ravin du canal, XS2, leg. R.B. Pierrot, 235, 18.2.1953, c.ge. (NMW); Agonnay, chaumes de Séchebec, sur le sol rocailleux, XR3, leg. R.B. Pierrot, 55.074, 27.3.1955, c.fr. (GL) & 78.039, 18.3.1978, c.ge. (GL).
**Finistère**
Sea cliff, Morgat, Crozon, UU4, leg. E.C. Wallace, 5.4.1970, c.ge. (NMW).
**Gard**
On mortar of wall, N. aspect, outskirts of the town, Nimes, FJ1, leg. E.W. Jones, 2.4.1949, c.ge. (E.W.J.); on steep vertical bank of friable earth by road, ca. 100 m alt., with *Funaria calcarea*, Gorges du Gardon, Nimes, FJ1, leg. E.W. Jones, 3.4.1949 (E.W.J.).
**Hérault**
Montpellier, EJ4, leg. Salzmann, c.fr. (BM); bei Montpellier, EJ4, leg. Salzmann, c.fr. (BM); bei Montpellier, EJ4, leg. A. Scheele (hb. Hampe, 1881), c.fr. (BM).
**Loire Atlantique**
Machecoul, carrières, VT4, leg. J. Charrier, 29.5.1937, c.ge. (NMW).

Lot
Sur rochers calcaires, St Denis près Martel, CK3, leg. G. Lachenaud, 19.9.1900 (BM).
Var
Sainte Baume, rochers calcaires, GH1 or GJ2, leg. R.B. Pierrot, 81.113, 18.4.1981, c.ge. (GL).
Vendée
Sérigné, vieux mur, XS3, leg. J. Charrier, 2.3.1928, c.ge. (NMW).
Vienne
Brux, paroi calcaire, BM4, leg. M.A. Rogeon & R.B. Pierrot, 74/202, 12.9.1974, c.ge. (GL).

GREECE
Epirus
In declivibus australibus montis Mitsikeli prope Joannina, substr. calc., ca. 600-700 m, DJ3, leg. K.H. Rechinger, 11.5.1961, c.ge., type of *Anoectangium crustatum* Froehl. (S), see Fröhlich (1963).
Fokis
Delphes, enceinte du stade, FH2, leg. R.B. Pierrot, 73.088, 20.5.1973, c.ge. (GL).
Peloponnese
On sandy path side in small wood behind the ruined theatre at Megapolis, FG1, leg. C.C. Townsend, 70/127, 1.5.1970, c.ge. (C.C.T.); Tyrins, mursterreux, FG3, leg. R.B. Pierrot, 73.094, 27.5.1973 (GL); Nauplion, mur de la citadelle, FG3, leg. R.B. Pierrot, 73.103, 29.5.1973, c.ge. & c.fr. (GL).
Thessalia
Grevena, rochers de poudingue près du pont de l'Aliakmon, alt. 500 m, EK2, leg. R.B. Pierrot, 73.083 bis, 17.5.1973, c.ge. (GL).
Voiotia
On damp roadside bank not far from the monastery, Osios Loukas, FH4, leg. C.C. Townsend, 82/400, 9.5.1982, c.fr. (C.C.T.).

GREEK ISLANDS
Cephalonia
Calcareous stone retaining wall ca. 2 km S. of Argostoli, DH4, leg. E.V. Watson, 6.5.1985, c.ge. & c.fr. (E.V.W.)
Corfu
DJ1, leg. E (hb. W. Wilson 1874), c.fr. (BM).
Kos
On damp soft limestone of wall outside the front of the Asklepeion, NA1, leg. C.C. Townsend, 85/47, 25.3.1985, c.fr. (C.C.T.).
Samothrace
Over thin layer of clayey soil on calcareous conglomerate cliff, with *Lunularia cruciata*, *Gyroweisia reflexa* and *Southbya nigrella*, W. bank of Xiropotomos valley (dry now), Makrilies, alt. 20 m, LE3, leg. A.E. Newton & C.D. Preston, 924a, 20.4.1983 (C.D.P.); on somewhat shaded damp soil on cliff, with *Southbya*, in vicinity of waterfall in river valley above Xiropotomos, alt. 250 m, LE3, leg. A.E. Newton & C.D. Preston, 986a, 20.4.1983 * (C.D.P.); damp shaded soil under overhanging tree root on S.W.-facing hillside with *Southbya nigrella*, N.W. side of Phengari, at end of track from Alonia, alt. 700 m, LE3, leg. A.E. Newton & C.D. Preston, 1179, 25.4.1983 (C.D.P.).
Santorini
Bei Thira, LA4, leg. V. Schiffner, 4.1911, c.ge. (W).

ITALY
Calabria
Ad muros prope pagum Reggio in Calabria alba jam, WC4, leg. Ariangeli, 21.6.1877, c.fr.(E).
Campania
Pompei, murs de la cité antique, VF4, leg. R.B. Pierrot, 74.107, 7.5.1974 (GL).
Liguria
Golfo di Spezzia, NP3, leg. Müller, c.fr. (BM).
Lombardy
Shady plastered wall beyond San Giorgio, Bogliaco, Lago di Garda, PR1, leg. F. Savery, 3.1912, c.ge. & c.fr. (BM, BRIST, CGE).
Tuscany
Villa Quarto ac septentr. Florentiae (rarissim!) auf Kunstlichen Tuffgrotten, PP4, leg. E. Levier, 11.3.1879, c.ge. & c.fr. (E).

PORTUGAL
Algarve
Tavira Algarvica, PB2, leg. H.G.Z. Solms, vere 1866, c.fr. (BM); Bartolome Algarvica, NB4, leg. H.G.Z. Solms, vere 1866, c.fr. (BM); bridge, Caldas de Monchique, NB2, leg. W.E. Nicholson & H.N. Dixon, 5.5.1911, c.fr. (BM, OXF); at base of limestone rock 4.5 km E. of Sao Bras de Alportel, PB2, leg. H.L.K. Whitehouse, 28.3.1989, c.fr. (H.L.K.W.); with *Southbya nigrella* on earth bank in lay-by 0.5 km E. of Marco and 8 km W. of Tavira, PB2, leg. H.L.K. Whitehouse, 28.3.1989, c.fr. (H.L.K.W.); with *Southbya nigrella* on plaster near base of inside wall of roofless building near bridge over stream 1.5 km S. of Montes Novos, NB4, leg. H.L.K. Whitehouse, 28.3.1989, c.ge. & c.fr. (H.L.K.W.).
Beira Alta
Entre Barro et Lamega, talus, NF3, leg. R.B. Pierrot, 72.108, 16.7.1972, c.ge. (GL).
Minho
Ad murum super conglomerato calcareo petrus graniticis adjunto in Ophir pr. pagum vulgo dictum 'Esposende', NF1, leg. C. Sérgio, 1175, 24.3.1970, c.ge. & 1319, 31.5.1971, type of *Gyroweisia luisieri* Sérgio (COI), see Sérgio (1972).

SARDINIA
Ad rupes calcareas prope Cagliari, NJ2, leg. Müller, Unio Iter. 1827, c.ge. & c.fr. (BM, E, GL); Sardininu au Gaflwasgau, leg. Müller, 1828, c.fr. (BM).

SICILY
Patti auf den Vorbergen, 800 m, in lückiger Macchie, VC4, leg. H. Muhle, Ostern 1965, c.fr. (NMW).

SPAIN
Almeria
With *Ophrys lutea*, *Fossombronia caespitiformis* and *Southbya nigrella*, on calcareous ground at

roadside 2.5 km S.W. of Alcolea, WF1, leg. L. Rochefort & H.L.K. Whitehouse, 4.4.1989, c.ge. (H.L.K.W.).

Barcelona

(a) Mountainous area of Sant Llorens just N. of Terrassa, DG2: (1) Can Robert on W.-exposed slope, earth below rocks along road, alt. 700 m, leg. F. Lloret & H.J. During, 862115, 7.2.1986, c.ge. & c.fr. (H.J.D.); (2) Coll d'Estenalles, rocky earth on N. slope, alt. 860 m, leg.. F. Lloret & H.J. During, 862147, 7.2.1986, c.ge. & c.fr. (H.J.D.); (3) Canal de les Teixoneres, steep N.W.-exposed roadside, alt. 800 m, leg. H.J. During & R.M. Cros, 11.3.1986, c.ge. & c.fr. (H.J.D.).

(b) District of Baix Llobregat, DF1: (1) shaded buntsandstone, Sta Maria S. of Cervello, alt. 180 m, leg. F. Lloret & H.J. During, 862169, 12.2.1986 (H.J.D.); (2) Torreletes near Begues, shaded buntsandstone on N. slope, alt. 230 m, leg. F. Lloret & H.J. During, 862199, 12.2.1986, c.ge. (H.J.D.).

(c) Further inland: Castelfollit de Riubregos near Calaf, gypsum slope exp. N., alt. 480 m, CG4, leg. M. Brugues & H.J. During, 862245, 20.2.1986, c.ge. (H.J.D.).

Cadiz, including Gibraltar

Concrete wall and shaded bank, W. side of rock, Gibraltar, TF2, leg. R.C. Stern, 19.2.85, c.ge. (R.C.S.).

Granada

Alhambra, VG2, leg. G. Lovin, 4.1876, c.fr. (BM); on rock in crevices on hillside by road above Cacin gorge, Alhama de Granada, VF1, leg. E.C. Wallace, 26.5.1977, c.ge. (GL, NMW); with *Fossombronia caespitiformis* at base of limestone rock at roadside, Puerto Jubiley, ca. 5 km W. of Torvizcón, alt. 560 m, VF3, leg. L. Rochefort & H.L.K. Whitehouse, 5.4.1989, c.ge. (H.L.K.W.).

Huelva

Floor of pine wood, road (N431) near Pozo del Camino, PB4, leg. E.C. Wallace, 11.4.1974, c.fr. (NMW).

Malaga

Guadalhorce valley, small valley between Carratraca and Garganta del Chorro, on shaded bank (8993) and on silt-covered boulder (8995) in small ravine, alt. ca. 280 m, UF3, leg. D.G. Long, 8993 & 8995, 20.4.1980 (E).

Valencia

On damp calcareous earth on N.-facing hillside, La Font d'Encarròs, S. of Gandia, YJ2, leg. H.L.K. Whitehouse, 21.4.1988, c.fr. (H.L.K.W.).

SWITZERLAND

Flora of the Jura, Lausanne, alt. 500 m, LS1, leg. J. Amann, 158, 3.1919, c.ge. (BM).

YUGOSLAVIA

On limestone rocks, Ragusa, Dalmatia, BN4, leg. F. Savery, 3.1909 (BM); Istra (Istria), in muris ad Lovran, alt. ca. 20 m, VL1, leg. A. Boros, 2963, 29.9.1968, c.ge. (NMW).

## British and Irish records of *Gymnostomum viridulum* and records from the Channel Isles

BRITAIN

SOUTH-WEST ENGLAND

West Cornwall (vice-county 1)

10/43 Wall of old mine buildings above Porthmoina Cove, W. of Zennor, UA1, leg. D.G. Long & J.A. Paton, 31.3.1979, c.ge. (E) and on rather decayed mortar of granite wall at same locality, leg. C.D. Preston, 4.4.1987, c.ge., m (C.D.P.).

10/73 On calcareous mortar between granite blocks, old wall, Buller Downs, S. of Redruth, UA3, leg. J.A. Paton, 4.2.1964, c.ge., m (OXF).

10/75 On damp sand around old mining refuse in dune flats, Wheal Vlow, Gear Sands, UA3, leg. E.W. Jones, J.A. Paton et al., 8.4.1962, c.ge., f (E.W.J., NMW, OXF, UCNW) and leg. J.A. Paton, 2.1965 (J.A.P.); rocks in quarry, Treamble, UA3, leg. J.A. Paton, 2.1965 (J.A.P.).

10/76 Sandy cliffs, Crantock, Newquay, UA3, leg. J.A. Paton, 27.2.1964, c.ge. (CMM).

East Cornwall (v.-c. 2)

10/97 Vertical sandy sides of old mine, Cassock Hill, Rock, near Wadebridge, UB4, leg. J.A. Paton, 25.4.1963, f (BBSUK, OXF).

20/26 Mortar of old wall, derelict mine, South Caradon, Darite, Liskeard, UA3, leg. J.A. Paton, 28.11.1964, c.ge. (OXF).

20/27 Calcareous mortar of crumbling wall, derelict mine, Minions, E. of Stowes Hill, Liskeard, UA3, leg. J.A. Paton, 1.3.1964, c.ge., m (J.A.P.) and at same locality, Phoenix Mine, 2 km N.E. of Minions, Bodmin Moor, alt. ca. 270 m, leg. D.G. Long & J.A. Paton, 1.4.1979, m (E) and leg. R.D. Porley, 20.5.1989, c.ge. (R.D.P.).

South Devon (v.-c. 3)

20/45 Limestone wall top near Devil's Point, Plymouth, VA1, leg. U.K. Duncan, E.C. Wallace et al., 3.4.1966, c.ge., m (CMM, E, NMW).

20/86 Crevices in W.-facing limestone cliff in disused quarry, Orley Common, Torbryan, VA3, leg. H.L.K. Whitehouse, 12.10.1984, c.ge., f (H.L.K.W.).

20/87 Banks and rock crevices in Devonian limestone quarry in wood near Wood, Kingsteignton, VA3, leg. E.F. Warburg, 10.4.1949, c.ge., f (BBSUK, OXF); moist soil in crevices of Devonian limestone in disused quarry, Broadridge Wood, Newton Abbot, VA3, leg. M.C.F. Proctor, 11.4.1983 (M.C.F.P.) and M.C.F.P. & H.L.K.W., 12.10.1984.

20/95 On soil in scree, above sea, Berry Head, Brixham, VA3, leg. M.F.V. Corley, 19.3.1965 (M.F.V.C.).

20/96 On limestone wall near entrance to Anstey's Cove, Torquay, VA3, leg. W.E. Nicholson, 3.1913 (BM, CGE) and 22.3.1916, c.ge. (BBSUK, BM, CGE);

abundant on earth and banks on lower slopes of limestone cliffs, Babbacombe, Torquay, VA3, leg. E.W. Jones & A.C. Crundwell, 16.4.1950, c.ge. (E.W.J., GL).

30/39 Pinhay, WB2, leg. W.E. Nicholson, 19.11.1925, c.ge. (CGE).

North Devon (v.-c. 4)

31/01 Old quarry, Holcombe Rogus, VB4, leg. J. Appleyard, 12.2.1971, c.ge., f (BBSUK); earth on side of boulder in disused Carboniferous limestone quarry W. of Westleigh, VB4, leg. J. Appleyard, 30.9.1984 (H.L.K.W., NMW) and crevices in S.E.-facing limestone cliff at same locality, leg. J. Appleyard & H.L.K. Whitehouse, 13.10.1984 (NMW).

North Somerset (v.-c. 6)

31/35 On S.-facing hillside, Crook Peak, near Compton Bishop, WB1, leg. R.D. Porley, 16.4.1989 (R.D.P.).

31/45 Carboniferous limestone rock, Burrington Combe, WB1, leg. E.F. Warburg, 13.10.1963, f (OXF) and on silt/detritus within crevices of Carboniferous limestone, Burrington Combe, leg. J. Woodman, 11.1987, and rarely on loose clayey soil nearby, leg. R.D. Porley & J.W., 14.2.1988 (R.D.P.); on S.-facing hillside, Fry's Hill, near Axbridge, WB1, leg. C.D. Preston, 5.3.1989 (C.D.P.); on S.-facing hillside, Draycott Sleights, WB1, leg. P. Martin, 4.2.1990, c.ge.(P.M.).

31/57 Quarry, Avon Gorge, WC2, leg. J. Appleyard, 30.10.1966, f (NMW) and in soil pocket on damp shaded vertical W.S.W.-facing limestone rock-face at same locality, leg. J. Appleyard, 26.3.1981 *, c.ge., f (NMW).

Dorset (v.-c. 9)

30/67 Stone quarry, Portland, WB2,leg. W.E. Nicholson & H.H. Knight, 15.4.1922, c.ge., f (CGE, NMW); quarry, Easton, WB2, leg. F.E. Milsom, 6.1936, c.ge. (BBSUK); damp limestone rocks, West Weare, Portland, WB2, leg. C.D. Pigott & M.C.F. Proctor, 17.4.1952, c.ge., female (BBSUK); on soil in limestone quarry with *Aloina aloides*, Verne Yeats, Portland, WB2, leg. M.F.V. Corley, 13.4.1969 (M.F.V.C.); wet clay in floor of crevices in stone pits, West Weare, Portland, WB2, leg. E.W. Jones, 4.1977 (E.W.J.).

West Gloucestershire (v.-c. 34)

31/57 St Vincent's Rocks, Bristol, WC2, leg. W.B. Waterfall & H.H. Knight, 24.3.1911, c.ge. (LDS, NMW); The Gully, Avon Gorge, below Durdham Down, Bristol, WC2, leg. H.H. Knight, 9.4.1913, c.ge., f (BM, BRIST, E, LANC) and 19.11.1913 (BM, CGE, DBN, LDS, NMW); rocks by Valley Bridge Road, Avon Gorge, WC2, leg. E. Armitage, 11.1915, c.ge., f (BM, BRIST, LDS, NMW); crevice in rock, St Vincent's Rocks, WC2, leg. P. Martin, 1.5.1988 (P.M.).

Herefordshire (v.-c. 36)

32/51 Great Doward, WC2: red soil on limestone bank to wood, c.ge., f, leg. J.A. Paton, 8.4.1968 (J.A.P.) and limestone rocks in disused pit under beech trees, c.ge., leg. M.O. Hill, 8.1968 (M.O.H.) and c.ge., f * H.L.K. Whitehouse, 4.1984 (H.L.K.W.).

WALES

Glamorgan (v.-c. 41)

21/97 Old limestone quarry W. of R. Alun opposite Ewenny Down, VC4, leg. E.W. Jones & A.R. Perry, 26.5.1976, f (NMW).

31/18 Gelli Quarry, N. of Rhiwbina, VC4, leg. A.E. Wade, 5.1933, c.ge., f (NMW) and in crevices of limestone rock shaded by young birches at top of spur of rock on W. side of the quarry, leg. H.L.K. Whitehouse, 24.5.1987, c.ge., f (H.L.K.W.); limestone rocks, roadside near the Black Cock Inn, near Thornhill, VC4, leg. A.E. Wade, 21.12.1950, c.ge., f (NMW).

Carmarthenshire (v.-c. 44)

22/41 Banks in old limestone quarry, Crwbin, S. of Carmarthen, VC2, leg. J.A. Paton & A.C. Crundwell, 6.4.1978, c.ge., f (BBSUK, GL, J.A.P.).

Pembrokeshire (v.-c. 45)

12/80 Near Rickeson, Pembroke, UC4, leg. A. Brinkman & J.B. Duncan, 8.1905, (BM, E) and leg. A. Brinkman, 6.1906 (BM, BRIST, E, LDS, NMW) and 5.1907 (BM, DBN), all c.ge., m; with *Aloina aloides*, Angle, UC4, leg. R. Jackett, 2.3.1927, c.ge. (BBSUK, E).

The 'Rickeson' specimens are the first from Wales. We think they came from a lime-kiln, as they have a white substrate containing small black charred particles. A specimen of *Gyroweisia tenuis* from old lime-kilns, St Ishmael's, leg. A. Brinkman, 10.1906 (NMW), has a similar substrate. We think Rickeson is a mistake for Rickeston and to refer to a farm of that name 4 km N.E. of St Ishmael's. George (1964) maps six lime-kilns in the St Ishmael's and Rickeston area on the shores of Sandyhaven Pill, the creek that extends N. for 2 km from Milford Haven to near Rickeston.

22/00 Steep banks of earth in old limestone pits on the coast, West Williamston, Carew, UC4, leg. E.W. Jones, 15.4.1980 (E.W.J., GL).

Caernarvonshire (v.-c.49)

23/78 Soil among sheltered limestone rocks, Gogarth, Orme peninsula, VE3, leg. M.O. Hill, 1.1976, f (BBSUK).

NORTH ENGLAND

South-west Yorkshire (v.-c. 63)

44/51 Soil on slabs or in crevices of Magnesian limestone, open dry bank in Brockadale Woods, Wentbridge, XE2, leg. T.L. Blockeel, 8.3.1981 *, c.ge., f (T.L.B.).

Mid-west Yorkshire (v.-c. 64)

44/42 Soft face of Magnesian limestone outcrop in wood near Fairburn, XE1, leg. T.L. Blockeel, 3.1981 * (T.L.B.).

44/44 Jackdaw Crag Quarry, Tadcaster, XE1, leg. W. Ingham, 16.3.1900 (BM, LDS) and 4.2.1905, c.ge., f (BM, CGE, LDS, NMW) and 6.12.1913 (BM, LDS); friable earth on bank of Magnesian limestone, wooded banks of R. Wharfe, Boston Spa, XE1, leg. T.L. Blockeel, 3.7.1983 * (T.L.B.).

The Tadcaster specimen dating from 1900 is the first record from England. The Boston Spa locality is the most northerly known in Britain.

IRELAND

South Kerry (v.-c. H1)

00/97 On old mortar in wall of Roughty Bridge, near Kenmare, MT2, leg. G. Bloom, E.W. Jones & E.C. Wallace, 30.8.1979 *, c.ge., m (G.B., E.W.J.).

North Kerry (v.-c. H2)

01/81 On wall by railway station, Tralee, MT1, leg. A.C. Crundwell, 9.1951 (GL) and 25.8.1979 *, both gatherings c.ge. & c.fr. (G.B., GL, NMW).

These are the only Irish records with sporophytes. They have never been found in Britain.

West Cork (v.-c. H3)

00/54 On stonework of ruined mine building, copper mines above Allihies, MT2, leg. D.G. Long, 26.4.1984 * (E).

Mid-Cork (v.-c. H4)

10/57 Mortar of wall of bridge over Shournagh River near Blarney, NT1, leg. R.D. Fitzgerald, 4.9.1967, c.ge., f (NMW).

East Cork (v.-c. H5)

10/59 Mortar of walls and wall top, Mallow, NT1, leg. E.W. Jones & E.F. Warburg, 15.9.1951, c.ge. (E.W.J., OXF).

10/77 Lota, near Cork, NT1, leg. I. Carroll, 2.1850 (DBN) and wall, Lota, Cork, abundant, leg. I. Carroll, 1.1876, c.ge., m (BM, CRK, DBN).

The 1850 Lota specimen is the first record from Ireland. It antedates the first English record by 50 years. The BM specimen is dated 1.1873, but this may be a transcription error as the labelling is not in Carroll's handwriting.

11/80 Wall by roadside N. of Kilworth, NT1, leg. D. Synnott, 31.8.1966, c.ge., f (DBN) and cracks between stones on underside of bridge over R. Douglas, Kilworth, alt. 300 feet, leg. J.G. Duckett, 31.8.1966, c.ge., f (J.G.D.)

Waterford (v.-c. H6)

20/29 On old walls, Dungarvan Harbour, NT3, leg. E.C. Wallace, 15.5.1956, c.ge. (BBSUK, NMW, RNG)

South Tipperary (v.-c. H7)

21/04 On mortar of old wall, Rock of Cashel, alt. ca. 120 m. NU4, leg. D.G. Long, 15445, 30.12.1988, c.ge., f (E).

Kilkenny (v.-c. H11)

21/54 Shaded rock ledge, limestone quarry, N. of Thomastown, PU3, leg. J.A. Paton, 12.6.1968, c.ge., f (BBSUK, NMW).

Laois (v.-c. H14)

21/39 Roundwood Bridge over Mountrath River, NU3, leg. A.A. Cridland, 9.1956, c.ge., f (BBSUK) and mortar on underside of same bridge, leg. H.L.K. Whitehouse, 15.8.1987, c.ge., f (H.L.K.W.); mortar on underside of Cathole Bridge over Owenass River, 5 km S.W. of Rosenallis, NU3, leg. H.L.K. Whitehouse, 17.8.1987, c.ge., f (H.L.K.W.)

West Donegal (v.-c. H35)

14/93 On stony ground among sand-hills S. of Anloge Hill, Horn Head, near Dunfanaghy, NB4, leg. T.L. Blockeel, 8.1990 (BBSUK).

CHANNEL ISLES

Alderney

90/48 On soil in old sandstone quarry, Berry's Quarry, WV3, leg. J.W. Bates, 15.4.1976, c.ge. (J.W.B.); loam on top of tall, mortared stone wall, Route le Braye, St Anne, WV3, leg. J.W. Bates & D.H. Brown, 15.4.1988, f (J.W.B.).


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