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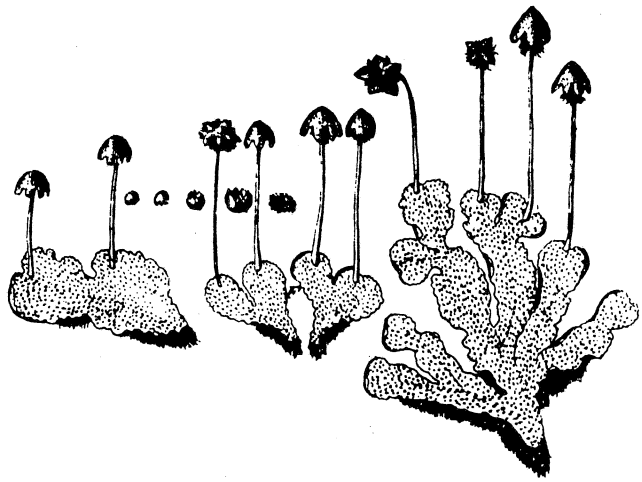
BRITISH BRYOLOGICAL SOCIETY

Edited by A. R. Perry



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BRITISH BRYOLOGICAL SOCIETY

PRESIDENT: P.J. WANSTALL, Esq.

BULLETIN

No. 52. July, 1988

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National Museum of Wales

C O N T E N T S

PAYMENTS FROM ABROAD

Recently the BBS has not been receiving adequate payment for invoices from members abroad. All invoices sent are for the exact amount the BBS wishes to receive: all payments must be in sterling with all charges prepaid. Cheques must be drawn (in sterling) on a UK account - a cheque in sterling drawn on a non-UK account will incur charges of about £5, and will not be handled by UK banks at all unless the value exceeds £10. Cheques not in sterling incur charges at a much higher level. Over the last year I have had to return a number of cheques that were unacceptable for one of these reasons, which incurs extra postage, extra time and effort, and extra bother for the sender. If you are sending money to the BBS do it in one of the following ways:

1. Get sterling cheque from your bank, drawn on a UK bank.
2. Send the money via giro transfer to our giro account (33 799 9805).
3. Pay using a Eurocheque, stating sterling (£) as the currency.
4. Pay using sterling travellers cheques.
5. Pay in US$ to Prof. Ronald Pursell at the following address:
   Prof. R.A. Pursell, Buckhout Laboratory, Department of Biology,
   Pennsylvania State University, University Park,Pennsylvania 16802, USA

(Please state the purpose of the payment, any giving the invoice number.)

Brian O'Shea, Hon. Treasurer, 131 Norwood Road, London SE24 9AF

PROCEEDINGS OF THE BRITISH BRYOLOGICAL SOCIETY

JOINT MEETING WITH THE LINNEAN SOCIETY, 7 MAY, 1987, LONDON

A special Joint Meeting of the British Bryological Society and the Linnean Society was held in the rooms of the Linnean Society, Burlington House, on 7 May 1987. This meeting, which was part of the bi-centenary programme of the Linnean Society, took the form of a symposium under the general title: "Bryology: Modern Research and the Ways Forward". This left the organisers a very wide choice in the matter of whom to invite as speakers, the implication being that the subject matter might span the whole field of modern bryological research.

In the event the eight contributions were divided by subject matter into three sessions: "Biochemistry and cytology", "Geographical distribution of Bryophytes" (each with three papers), and finally (after tea) a session on "Bryophyte interrelationships", with two papers. The Chairmen for the three sessions were, respectively, Mr G. Bloom, President of the BBS, Professor R.M. Schuster and Professor W.G. Chaloner, President of the Linnean Society. The symposium was attended by some sixty members of the BBS, a sprinkling of Fellows of the Linnean Society and a few visitors.

The session on Biochemistry and Cytology gave members an insight into three distinct subjects in which research is being actively pursued at the present time. Professor D.H. Lewis, of Sheffield University, took as his title "Whence and whither the bryophytes?". Through such a title he was admitting that, whilst his research lay in the field of phytochemistry, he was interested in gaining answers to evolutionary questions. Thus, on the broad question of the links between the Hepaticae and 'lower' groups of organisms, Professor Lewis was able to provide phytochemical evidence for a link with the Phaeophyceae. While there were many differences, phytochemically, between brown and green algae, brown algae and liverworts had important features in common.

Turning to evolution within the Jungermanniales, Professor Lewis alluded in some detail to the work of Dr Alison Christie (on sugar alcohols) and explained how chemotaxonomic findings fitted in well with conclusions reached by taxonomists on the basis of morphological evidence. The Geocalycaceae, for example, did not comprise a natural group on the basis of their phytochemistry.

Professor Lewis also touched on the role of boron in vascular plant nutrition and evolution. It was not known to what extent bryophytes needed this element. Bryophytes did not appear to be on the direct route to the vascular plants. Throughout his paper, which drew upon a considerable body of recent research in phytochemistry, Professor Lewis's main concern was with the value of phytochemical discoveries as an ancillary tool in evolutionary enquiry.

Professor D.J. Cove, of Leeds University, spoke next under the title "An insight into growth regulation and development of bryophytes". He spoke on behalf of himself and Dr N.W. Ashton and reported recent and current work with which they were both involved. He explained that what he had to say would be concerned mainly with knowledge derived from studies of a single moss species, *Physcomitrella patens*.

He considered normal development of the germinating spore, through chloronema and caulonema stages, and the establishment of the roles of auxin and cytokinin through the study of mutants. He went on to deal with the role of light. The importance of auxin in effecting the onset of caulonema was emphasised.

Professor Cove concluded by reporting some recent attempts to look into the molecular basis of the developmental controls he had described. A way ahead

could be seen clearly, involving the identification of DNA sequences and specific gene isolation. It was thus possible to look forward to an era in which "molecular bryology" would be firmly established.

Dr Martha Newton's paper, third and last in this morning session, was entitled "Chromosomes as indicators of bryophyte reproductive performance". It gave the views of the experienced cytologist who is in close touch with the huge volume of recent and contemporary work in bryophyte cytology.

Dr Newton reminded her audience of the value for the cytogeneticist of the 56 per cent of mosses which showed $\underline{n} = 2x = 10$ to 14, ie. the gametophyte generation already carried a double chromosome complement. She thought the 87 per cent of liverworts which showed $\underline{n} = 8$, 9 or 10 may well be 'basic diploids' too.

While stressing that polyploidy afforded the only cytological means of exploring the way in which genetic variation may become established, Dr Newton also drew attention to cases in which morphological similarity was accompanied by cytological diversity (as in Pellia) and the equally baffling examples (eg. Mylia) where the reverse was true.

For studies that would provide clear evidence of outcrossing, the importance of the provision of cytological markers (for example, by means of Giemsa C - banding) was emphasised. Illustrative examples came from the genera Pellia and Plagiochila. In this and other ways cytological findings impinged on the conclusions of taxonomists.

'Spreading' techniques, for the extraction of synaptonemal complexes, were seen as holding high promise for the future further elucidation of chiasmata. Only just beginning in bryophytes, but full of promise, was the molecular probing of DNA. With such techniques as these available, Dr Newton looked forward to a bright future for those researching in the cytology of bryophytes.

The early afternoon session began with a paper by Professor W.B. Schofield, of the University of British Columbia, entitled "Bryophyte disjunction in the Northern Hemisphere". Approximately 70 per cent of the European bryophyte flora, Professor Schofield pointed out, occurred also in North America, but among these could be found groups of species which displayed two well known types of disjunction. (1) the amphi-atlantic species and (2) those species found in Western Europe and turning up again only in Western North America. Once established, both these disjunctive distribution patterns are maintained through the operation of topographical and climatic factors.

Professor Schofield split the first type of disjunction into four subdivisions, to include, respectively, those species that were predominantly northern or arctic, oceanic, southern or widespread generally. He cited numerous examples of each. In the Western Europe - Western North American disjunction he again recognised four subdivisions. These were climatically based, and consisted of species referable to arctic or subalpine, oceanic, Mediterranean and steppe climatic groups. While he could cite ample examples of all four, Professor Schofield's longest list comprised those of oceanic climates. The lecture was illustrated with a profusion of distribution maps.

By way of explanation, it was necessary to postulate inter-connections in the distant past between areas now widely separated. Both principal groups of disjuncts contained a high proportion of species which appeared to be relicts from Tertiary times. Long-distance dispersal was not thought to have occurred on any considerable scale. The interesting point was made that, whereas many Eastern North American species had a neo-tropical affinity, the link for a fair number of Western North American species lay with the Old World tropics.

Puzzling disjunctions between Western Europe and Western North America of the oceanic type might have to be explained by referring back to a "Laurasian" continent which antedated the formation of the Atlantic Ocean. While the fossil bryophyte record was too scanty to help much, there was evidence that many present-day genera of Jungermanniales have existed at least since Tertiary times.

On the whole, Professor Schofield showed himself to be well aware of the difficulty of finding fully satisfactory explanations for both major types of disjunction. He was, however, able to end on a fairly optimistic note, with his reference to improved techniques for the exploration and documentation of distribution patterns. The use of computers cannot be over-estimated, he said, and we could look forward to international co-operation on an ever-increasing scale.

Dr G.A.M. Scott, of the University of Melbourne, presented a paper entitled "Australasian bryogeography, fact, fiction and fantasy". He began by adopting a strongly sceptical attitude towards the findings of phytogeographers. The actual history of past events was simply too incompletely known. He indicated how present-day disjunct distribution patterns could be explicable by disruptive phenomena, or long range dispersal, or a combination of the two.

Dr Scott stressed how incomplete and how rapidly changing is our picture of present-day distribution patterns. Numerous striking illustrations were taken from the Australasian bryophyte flora. He underlined the great length of time which bryophytes had had to change and modify their distributions.

The problem posed by bryophytes showing a bipolar distribution was considered, as were the exceptionally baffling distributions of Echinodium and Gigaspermum. Contraction from a previous wider distribution seemed the only explanation of today's distribution of Takakia.

It was emphasised how easily overlooked very minute bryophytes can be. A memorable example given by Dr Scott was that of some 30 species of Fossombronia, all new to science and supposedly endemic in the Australian semi-arid, often known from just one locality and even then irregular in their appearances.

Two most interesting points were made regarding the differences, phytogeographically, between bryophytes and angiosperms. Thus, whereas the bryophyte floras of cool-temperate rain forest in Victoria and Tasmania were closely similar to those of comparable habitats in New Zealand, the angiosperm floras were widely different. Secondly, because bryophytes had existed on earth for so much longer than angiosperms (with many present-day genera and some species having been in existence in Permian times), there was vastly more time for their distributions to become modified, either by growth alone, or through distribution by propagules or from other causes.

Dr Scott summed up by saying, with reference to his chosen title, that the "facts" were the recorded presence of species in specific areas, together with the firm information we had regarding Continental Drift and the various glaciations with their associated climatic changes. The "fictions" were the recorded absences, some of which were significant, others meaningless. The "fantasy" of his title alluded to some kinds of quantitative information, especially that referring to the incidence of endemism. This he expanded to show how the term endemism had been used in a confusing manner to include four quite different phenomena.

Dr R.E. Longton, of Reading University, adopted a very different approach. He spoke on the "Adaptations and Strategies of Polar bryophytes". He saw an

important 'way forward' as lying in the synthesis of data from many different areas of enquiry. Dr Longton's principal concern in this paper was with the physiological adaptations of those bryophytes which had come to live successfully in the Arctic or the Antarctic. However, he indicated that the special features of the physiology of these plants differed only in degree from those found in bryophytes generally.

He distinguished between (a) species that were widespread also in temperate and subarctic lands and (b) a much smaller group of genuinely endemic Arctic species suspected of relatively recent, possibly Pleistocene origin. Most of the more restricted element of the Antarctic bryophyte flora was thought to be composed of post-glacial immigrants from the Magellanic region.

Field experimental work has shown that mosses are capable of responding positively to favourable environmental conditions wherever these occur. The effects of freeze-thaw cycles, desiccation and continuous illumination, as potential threats to bryophyte survival, were rigorously examined.

Dr Longton pointed out that sporophyte production occurs in less than 30 per cent of the species of cool-Arctic sites in Northern Ellesmere Island, in some 10 per cent of species in the cold-Antarctic and none at all in the frigid-Antarctic.

Arctic endemics, thought to be of recent origin, tended to be monoecious and highly fertile, examples among mosses being found in the family Splachnaceae, in the genus Funaria and among the high-polyploid species of Bryum.

Drawing on his own wide experience, in both the Arctic and Antarctic, and on the research of others, Dr Longton was concerned to stress the value of physiological studies, carried out both in the field and in the laboratory, for a better understanding of the facts of bryophyte distribution.

The two papers of the third session came under the 'umbrella' heading of 'Bryophyte Interrelationships'. The first was given by Professor R.M. Schuster, of the University of Massachusetts. It was entitled "The aims and achievements of bryophyte taxonomists". In this highly stimulating address a taxonomic and evolutionary hepaticologist of unrivalled experience was concerned to draw attention to some of the salient difficulties that currently beset his subject. A big problem sprang from the application of a priority rule that inadvertently shielded the activities in 'species making' of past workers such as Colenso, Stephani, Kindberg and others. Out of 32 "new species" of Schistochila described by Colenso from New Zealand 31 were synonyms and of the approximately 1450 taxa currently listed under Lejeunea probably not more than 145 are valid species. A second difficulty, in the opinion of Professor Schuster, lay in the overemphasis of what are in reality comparatively trivial nomenclatural problems.

Great stress was laid on adopting a biological approach to problems of genera and species and on the importance of field studies, especially in the bryologically underworked parts of the world. Working in the tropics or the Antipodes "broadened the mind of a bryologist wonderfully"!. Thus, some of Buch's genera of hepatics were valid for Finland, but not when South American and New Zealand species were taken into account.

Professor Schuster's views on important questions of present-day taxonomic procedure were underpinned by detailed reference to a series of relevant examples. These consisted of well known genera (eg. Anthelia, Frullania, Pellia, Marchantia) in which exceptional difficulty was being experienced in species delimitation. In striving after a solution to such problems, the taxonomist would have to take into account cytology, tectonics, plant

geography, phytochemistry and so on. For "total reliance on herbarium specimens" was "the road to disaster".

Dealing briefly with the delineation of 'higher categories', Professor Schuster cited the case of the Order Metzgeriales. Here some 26 to 28 genera had been grouped quite arbitrarily in four families. In reality the order was ancient and heterogeneous and there was a great need for clarification.

Ranging widely over his subject, Professor Schuster certainly did not minimise the problems confronting us today. Yet he was able to be reasonably optimistic about the future. He foresaw ever larger contributions coming from biochemistry, cytogenetics and other disciplines far removed from classical taxonomy.

Lastly, the paper on "Cell and molecular biology of bryophytes: ultimate limits to the resolution of phylogenetic problems" (by Duckett and K.S. Renzaglia) was presented by Professor J.G. Duckett of Queen Mary College.

Professor Duckett saw the elucidation of bryophyte interrelationships as a jigsaw in which one is always finding new pieces. There had been a decline of interest in the phylogeny of land plants because of a lack of new data. The application of cladistics to old information was futile. His own concern was with the impact of cell biology. We might, however, very well be witnessing the epitaph of this, since the future would lie more and more with nucleic acid sequencing.

The exploratory phase in ultrastructural work had shown that there was no simplicity in bryophytes at the ultrastructural level; for the bryophytes lacked no major organelles.

The comparative phase had embraced a wide range of studies of ultrastructural features in the three big groups of bryophytes. The results (of studies of blepharoplasts, thylakoid architecture etc.) had been to accentuate the lack of direct relationship between hornworts, liverworts and mosses. Professor Duckett saw "some future mileage" in the study of oil bodies, which hitherto had presented considerable technical difficulties.

Thirdly, the developmental phase in cell biology took account of such matters as the differentiation of spore mother cells and the maturation of male gametes. Again there were significant differences between the three groups.

These various studies threw some light on bryophyte ancestry and suggested a possible link with Charalean green algae, but a direct ancestral lineage from this group of algae appeared unlikely. Ultrastructural investigations tended to place the bryophytes near the algae but remote from vascular plants.

Professor Duckett considered cytoskeletal proteins such as actin and tubulin, EM studies of gametophyte-sporophyte junctions and other topics, emphasising that the brightest future lay with the elucidation of DNA sequences. He thought ultrastructural attributes should be more widely used in bryophyte systematics, but did not see their use overturning current schemes of classification or phylogeny.

If one attempts to review, or indeed to summarise, the eight contributions collectively, one arrives at a few general conclusions. The 'umbrella' title was "Bryology: modern research and the ways forward", yet it is difficult to avoid the conclusion that many people interested in observing and recording bryophytes would have found much of what was said quite outside their experience and, in places, beyond their comprehension. This stricture would not have applied to those speakers who were primarily concerned with

phytogeography and classical taxonomy. These were the papers of Schofield, Scott, Longton and Schuster, where to a great extent each speaker was in turn concerned to throw new light on old concepts.

Very different was the content of the other four contributions. It could be said that they shared an interest in the excessively minute. The attention of these four speakers was focused, increasingly, on what could be seen under the highest power of the light microscope, down through the size categories revealed by electron microscopy, to the molecular level. They were thus dealing with objects and structures that were quite outside the experience of ordinary people; and these 'ordinary people' would include a high proportion of British field bryologists. What these investigators (Lewis, Cove, Newton, Duckett) had to say was of so specialised a character as to be fully meaningful only to others working in the speaker's own field. All tended to reflect very strongly the prevailing influences that have been at work in shaping bryological research over the past thirty to forty years, namely the advent and subsequent advance of electron microscopy and wholly new techniques in the broad field of biochemistry. The result has been a veritable explosion of papers, in the last twenty years, on both the ultrastructure and the phytochemistry of bryophytes.

It would have been clear to anyone attending this symposium that "modern research" in bryology carried considerable emphasis on the very minute; and "the ways forward", for several speakers, implied peering into a future when ideas would come to be dominated by our knowledge of events at the molecular level. In these circumstances it would seem to have been of the utmost importance to allow adequate time for questions, explanations and a discussion of the implications of what had been said. No such discussion time was in fact forthcoming. An opportunity to insert it just before the tea break was unaccountably lost. Questions from the Chairman (Professor Chaloner) and Dr S.W. Greene were put to R.M. Schuster at the end of his address (allowing Professor Schuster to interpose the memorable comment that "taxonomy was a Stone Age Science") but, after all eight papers had been delivered, no time for general discussion proved practicable. This omission, which nowadays tends to be the rule rather than the exception, is a serious one. It can lead so easily to the impression that each speaker has been operating very much within the confines of his or her own 'compartment', or research area, in a highly technical language fully comprehensible only to those at work in the same field, so that there is altogether too little 'overspill' of these important advances on to the 'bryological public' at large. Only generous amounts of discussion time could have provided this.

While a fair sprinkling of BBS members had come to London for this special occasion, attendance by Fellows of the Linnean Society who were not themselves bryologists appeared to be very thin. In view of the highly technical content of most of the contributions this was perhaps not altogether surprising. For unless one is familiar in a general way with most of the organisms discussed then new knowledge about them can convey little meaning; and only practising bryologists would have this familiarity. In a sense it could be said, of the symposium as a whole, that it was strong on the analytical side but - with certain notable exceptions - weak on synthesis.

"The ways forward" for ordinary field bryologists at work in Britain, or for that matter elsewhere, may not be so very different from the paths they have followed over the past quarter of a century. In brief, they are likely to remain enmeshed in problems of distribution; and inevitably, hand in hand with these will go problems relating to the definition of taxa. In this latter concern they are likely to find themselves calling upon new knowledge gained by geneticists, biochemists and electron microscopists at the ultrastructural level, but only to a limited extent. Their primary concern, in their

day-to-day bryological work, will remain with what can be seen with the naked eye, hand lens and light microscope.

Several of the speakers on this occasion saw an application of their findings in the solution of problems of interrelationships at the broadest possible level - bryophyte origins, putative links with algal ancestors, connections, close or distant, between major groups of mosses or liverworts, and so on. Yet sometimes these questions were only hinted at, or touched on very lightly; and in no case was a body of evidence derived from new knowledge in the fields of ultrastructure and phytochemistry weighed in the balance against the evidence that has been gleaned from comparative morphology over a period of more than a hundred years. Where reference was made at all to such knowledge it was mainly of a vaguely disparaging nature. The implication was that it had little validity today. In brief, bryologists had to a great extent lost interest in it.

Whether or not one agrees with this attitude - with its inference that only the newly acquired nuggets of information are of genuine interest - it is instructive to look back, for a moment, and enquire what would have been the nature and content of a symposium such as this had it been held 60 years ago. True, bryogeography could easily have been well to the fore (Herzog having published his Geographie der Moose in 1926) and ecology of bryophytes, with the papers of W. Watson and others, was starting to attract serious attention. Bryophyte cytology was definitely beginning to appear 'on the map' (cf. early contributions by von Wettstein, M. Wilson, Heitz et al.). The big emphasis, however, would have been on morphological evidence of interrelationships and the conflicting claims of the antithetic and homologous theories of the alternation of generations as seen in the bryophytes.

It seems likely that, 60 years ago, at least half the papers offered would have been concerned with this and related topics, and the bulk of the illustrations would have taken the form of slides made from photomicrographs giving details of the development of gametangia and young sporophytes; for herein, it was felt at the time, lay the secrets that could lead to the solution of such problems. It was an approach that chimed in well with the work of the immensely influential F.O. Bower on the pteridophytes. Francis Cavers had not practised bryology actively for nearly twenty years, but his "Interrelationships of the Bryophyta" still exerted a big influence. D.H. Campbell's strictly morphological comparative treatment carried weight and his "Mosses and Ferns", by then in its third edition, would have been the textbook of the day.

Now, 60 years on, quite different branches of bryology make first claim on our attention, a situation made abundantly clear by the choice of topics on the present occasion. Such morphology as is discussed consists of 'micromorphology', ie. the structural peculiarities shown by chromosomes and a range of organelles in different groups of bryophytes. But is it fitting that the characters provided by the 'old morphology' should be brushed aside so completely as they commonly tend to be nowadays?. Novel findings are always exciting but, perhaps, in the choice of criteria on which to base one's views on interrelationships, the pendulum has swung too far. Some, at least, among older bryologists must feel this to be so.

E.V. WATSON

REPORTS OF OFFICERS FOR 1987

a) GENERAL SECRETARY'S REPORT

The following reports document another successful year in the affairs of the Society. Membership has remained at about 535 but we were saddened by the deaths of Mr George Geyman, who served as an ever-conscientious and efficient Membership Secretary for a number of years, of Mr Richard Libbey, a member of Council and of Mrs Pat Whitehouse, wife of our former President, Dr H.L.K. Whitehouse and herself an enthusiastic and highly skilled photographer of bryophytes. Mr Tim Pyner has been co-opted by Council to fill the remainder of Richard Libbey's term as an elected member.

The Society continues to operate at a profit but a major increase in the cost of publication of Journal of Bryology and other anticipated expenditure suggest that we may soon find ourselves in a position where expenditure exceeds income. The indications currently are that it may be necessary to raise subscriptions in 1989, for the first time since 1982. In addition to the normal cycle of meetings, a highlight of our activities during 1987 was an international symposium on "Bryology: Modern Research and the Ways Forward", held as part of the bicentenary of the Linnean Society. The eight papers presented will shortly be published in Botanical Journal of the Linnean Society. Other achievements during 1987 included the publication, in conjunction with the National Museum of Wales, of a highly acclaimed moss wall chart and completion of a travelling exhibit aimed to stimulate public awareness in the interest and importance of mosses and liverworts, produced in collaboration with the Yorkshire & Humberside Museums Council and Bradford Art Galleries and Museums. Our thanks are due to Mr George Bloom, who relinquished the Presidency at the end of 1987, for his care and concern in ensuring the efficient operation of the Society during his period in office.

R.E. Longton
March 1988

b) TREASURER'S REPORT

In my 1986 report, I predicted a deficit for 1987, but as indicated in the Budget statement at the 1987 AGM this has not happened - mainly because various expenditures were postponed until 1988, but also because Blackwell's sales were better than predicted.

The increasing level of activity in the society has fortunately been reflected in an increasing membership, and good sales of the Journal outside of the BBS, but increasing costs, particularly of the Journal, are soon going to start eating into our reserves. It is Council's view that we should subsidise any annual deficit for a period from our reserves (which although they add to our funds through interest, are probably a good deal too high); the money would better be used directly in financing the Society's activities, rather than gathering interest in the bank.

Nevertheless, Blackwell's have already indicated that they will need to raise their charges substantially - probably by over £2 per member per year. We are thus reviewing the position each year, and a subscription increase cannot be too far away: 1990 seems to be the earliest this is likely to happen. In addition we are committed to various expenses, particularly in 1988, which are detailed in the budget statement.

Other items which have occurred during the year:

Covenanted subscriptions The advantages to UK charities of having membership subscriptions paid via a deed of covenant can be quite significant - it means for instance that the BBS would receive £13.34 (at the new 25% tax rate) instead of £10 for each standard subscription. This facility is available to all UK tax payers. We have now received written confirmation from the Inland Revenue that membership of the BBS can be paid by such a deed. We hope to introduce the scheme during 1988, provided a volunteer can be found to manage the scheme.

Payments from abroad There have been a number of problems during the year in getting payment for invoices and subscriptions from abroad. This consumes a lot of time, and also additional expense in postage and delay in receiving income, so another note has been produced for the Bulletin outlining the best method of paying money to the BBS from outside the UK.

BBS BUDGET - 1988

Income

	1984	1985	1986	1987	Est. 1988	Notes
Publications						
Sales - Librarian	543	(709)	985	60	500	*1
- mapping/atlas	7	30	9	-	-	*2
- Census catalogue	211	123	130	139	100	
Royalties (Exp. Biol. Bry.)			144	-	-	
General						
Subscriptions from members	4902	4675	5201	5141	5200	*3
Legacies/Donations		5	3677	5	-	
Grants/misc.	16		5	(37)	-	
Interest from NSB & Nat West	1703	2337	2465	3143	3000	
Ties			390	(127)	50	

Expenditure

Publications						
Blackwell's (net)	2931	1601	1570	2175	6273	*4
Bulletin	702	699	759	874	900	*5
Other printing		341	56	-	1450	*6
Jubilee Publn (Sp Vol 1)			826	(131)	-	

General						
Publicity		408	-	-	1600	*7
Cost of meetings	112	56	37	1586	1050	*8
Grants given	7	245	125	294	2643	*9
Stationery/typing/telephone/ post/copying	163	265	97	254	650	*10
Wallace memorial					2200	*11
Library purchases	264	63	-	78	225	*12
Insurance	50	61	75	100	100	
Sub. to Biological Council		30	-	-	-	
Total	3153	2692	9461	3094	(8241)	
Number of members	508	529	544	550	550	

Major 'one off' expenses expected

	1988	1989	1990	1991
Bryohistory project				
Publication of Bryol. refs	200			
Work to complete Br. & Ir. Bryols	1210			
	1303			
Publication of Br. & Ir. Bryols		200		
Cumulative index of Transactions and Journal	250	250	2500	
J. Bryol.				
North Wales bryophyte flora	1900			
Andreaea	1000			
Display boards	1600			
BES meeting	1000			
Atlas (Details not yet known)			2000	
IAB Experimental Bryology mtg.				2000
Wallace Memorial	2200			
Thermal binding machine (Details to be submitted to Council 4/88)	1000			
	11663	450	4500	2000

Notes

*1. The amount reflects the total sales, (unless already covered elsewhere, eg ties, or special publications) less expenses of buying items for sale (lenses, forceps, microscopes); it does not include expenses on postage etc, which are included in the general overall totals of such expenses. Because stock may be purchased in one year and sold in the next, this figure is likely to fluctuate from year to year.

*2. With a new atlas due, no sales of the provisional atlas are assumed. At present no cost to the BBS for the new Atlas has been assumed.

*3. A stable membership has been assumed.

*4. This is the net cost of Journal production (= income from Blackwell's sales, less expenses, and cost of printing.) This is the amount by which we subsidise the Journal, as estimated by Blackwell's, but including an extra allowance of £2900 in 1988 for two larger than normal parts, to include a N. Wales flora and a revision of Andreaea. Blackwell's costs are likely to rise again in 1989.

*5. The Bulletin size for 1988 is assumed to be similar to 1987.

*6. Publication of the first results of bryohistory project has been assumed to cost £200, and £250 has been allowed for the production of a cumulative index of the Transactions and Journal. (Further publications arising from the bryohistory project are expected in 1989.) A thermal binding machine has been assumed to cost £1000.

*7. £1500 for display boards (together with an extra £100 for smaller boards and posters) is assumed for 1988.

*8. Our contribution to the expenses of the BBS/BES Symposium is £1000. £50 has been assumed to cover other meeting expenses.

*9. £5 is assumed for the reproductive biology project, and £125 for the bryohistory project. In addition, two additional sums of £1210 and £1303 (=£2513) have been budgeted for in 1988, for completing work on the list of British and Irish Bryologists.

*10. Much of our 'stationery' cost does not fall to the BBS budget, and this figure is thus artificially low. Most of the cost is postage. An increase has been assumed, and in addition an extra £300 has been added in expectation that postage for the Bulletin may need to be found in future.

*11. This is the amount required to supplement the existing £800 in the Wallace Memorial Fund to the £3000 required for the purchase of the Wallace Memorial Reserve. This ignores the result of any appeal for the amount.

*12. Library purchases are currently set at a maximum of £225 per year, but are dependent on the availability of second-hand books, and the publication of new books, and are thus erratic, and unaligned with financial years. A flexible policy of expenditure is thus assumed: under-expenditure one year to be compensated for by over-expenditure the next, and vice versa.

B.J. O'Shea
March 1988

c) JOURNAL EDITOR'S REPORT

At the end of 1987 Blackwell Scientific Publications moved the place of publication of Journal of Bryology from their offices in Oxford to Edinburgh, thus introducing a new sub-editor with the resultant difficulties in attempting to maintain a constant Journal style. We had one sub-editor for the whole of volume 14 - the longest such period since I became Editor in 1978 - which made editing a much easier task. We received more manuscripts in 1987 than we could accept and the trend looks set to continue. This may be due, in part at least, to financial constraints on other journals.

A.J.E. Smith
March 1988

d) BULLETIN EDITOR'S REPORT

The new Moss Wallchart painted under my supervision by Miss Dale Evans in the National Museum of Wales, was published early in 1987 and is now on sale. It has been widely praised in Britain and abroad; our North American colleagues have welcomed it and speak highly of it. Before long work will start in the National Museum of Wales on a companion chart of liverworts.

Bulletins 49 and 50 were published in March and July respectively. I wish again to thank Mrs Jean McKenzie for so readily doing the typing, often under great stress from other work. Because occasionally there are contributors who fail to meet the December deadline for the February issue (and these things are accepted and forgiven) intentions for speedy publication sometimes go by the wayside and delays occur. So I apologize, this time publicly, for "the January issue that doesn't appear until March". That's life! I thank Stephen Jury for producing address labels for posting purposes.

A.R. Perry
February 1988

e) REPORT OF THE RECORDER FOR MOSSES

There has been a further increase in the number of new vice-county records but this is largely attributable to the Summer Meeting in Ireland which proved very productive. Otherwise the level of recording has been fairly constant in England and Wales but reduced in Scotland. A more detailed analysis is given below.

	New records Collected 1986-7	New records Collected pre-1986	Deletions
England	68	5	-
Wales	25	3	2
Scotland	25	3	1
Ireland	107	3	-
Totals	225	14	3

Notable among the year's records are a second British locality for Amblystegium saxatile, which is also new to Wales, and the addition of three species to the Irish flora, namely Barbula tomaculosa, Leptobarbula berica and Ptilium crista-castrensis. There has also been a considerable northward extension of the range of Trichostomopsis umbrosa in England, and new localities for Sphagnum platyphyllum, Weissia rostellata, Bartramidula wilsonii and Daltonia splachnoides in Ireland.

I am again grateful to Martin Corley, Alan Crundwell, Mark Hill, Tony Smith and Harold Whitehouse for offering their advice and assistance with a number of difficult specimens.

T.L. Blockeel
February 1988

f) REPORT OF RECORDER FOR HEPATICS

1987 saw a welcome increase in new records of Hepaticae, largely as a result of the highly successful BBS summer meeting in western Ireland. Just over half (46) of the new records were from Ireland. Eighteen new records were from Scotland, 17 from England and 10 from Wales. Eleven records were deleted from the list, largely due to the researches of J.A. Paton and M.O. Hill.

The Irish meeting produced three species new to the Irish Hepatic Flora, Riccia crozalsii, Leiocolea gillmanii and Scapania curta. During the year, significant extensions of range were reported for Fossombronia fimbriata, Marsupella adusta, M. sprucei, Geocalyx graveolens, Scapania gymnostomophila, S. lingulata, Cephalozia hibernica, Lejeunea hibernica, and L. flava in Ireland, Anastrophyllum joergensenii and Jungermannia polaris in Scotland, Lophozia perssonii in England and Scapania paludicola in Wales.

I am grateful to T. Blackstock, M.F.V. Corley and especially J.A. Paton for help with critical taxa.

D.G. Long
January 1988

g) LIBRARIAN'S REPORT

Sales:	J. Bryology (parts)	1
	TBBS (parts)	17
	Distribution of Bryophytes	45
	Census Cats. (old)	3
	Mosses of Europe & Azores	8
	Hepatics of Europe & Azores	2
	BBS Bulletins	37
	Jubilee Proceedings	20
	Library Cats.	9
	Moss Wall Charts	91
	x20 lenses	45
	Stainless-steel forceps	17
	BBS ties	3
Loans:	35mm slide loans	4
	Micrometer slide loan	2

Sales have again been high, 298 items having been ordered during 1987. The main task for the librarian has been the dispatching of the new wall charts.

Kenneth J. Adams
February 1988

h) BIBLIOGRAPHER'S REPORT - 1987

This year has been uneventful as far as production of the lists of recent literature is concerned. Two lists have been produced, one in each part of the Journal to appear in 1987.

The quantity of literature relevant to bryology remains remarkably constant from year to year with an average annual output of some nine hundred references. Oddly enough, this figure seems to be independent of the 'bandwaggon' effect whereby one aspect of bryology is prominent in the literature for a few seasons and returns to obscurity when another topic comes to the fore. A classic example of this phenomenon occurred in pollution studies which were sufficiently prominent to warrant the introduction of a new category in the listings some years ago, but have now returned to a very much smaller annual total.

G.C.S. Clarke
February 1988

i) CURATOR'S REPORT

Fewer voucher specimens were incorporated than in 1986, namely 192 mosses and 82 liverworts. There were 15 loans, of 113 specimens. It is good to report that there are no horrendous outstanding loans, though there are always a very few workers who keep borrowed material beyond the allotted time and need reminding that their time is up!. I thank my colleague, Miss Ellen Roberts, for curation duties such as incorporation of specimens in BBSUK and loans outward, splendidly managed since I became curator.

It may be of interest to hear that I have inaugurated in the Cryptogamic Section of NMW a routine cyclic freezing of the specimens. This is to kill any entomological invaders. The specimens in BBSUK are included in this cycle. Put simply, 5 drawers containing bryophyte packets are deep frozen for about 4 days then are replaced by the next 5 drawers: and so on. It's a bit like painting the Forth Bridge!. Unfortunately, it is almost certain that this process kills all gemmae and tubers. But it does protect against herbarium beetle, booklice and silver-fish all of which may attack the specimens or the packets.

A.R. Perry
February 1988

j) MAPPING SECRETARY'S REPORT

After an unexpected delay work on the production of distribution maps of British and Irish bryophytes began at the Biological Records Centre in October 1987. At a meeting held at the British Museum (Natural History) on 20 November 1987 it was agreed that the atlas would be in three volumes with leading authorities being asked to contribute relevant sections. Full details are given in Bulletin **50**, p. 28.

At present money is available only for the production of a final copy of an atlas and it will be necessary to seek sources of finance and/or a commercial publisher to publish the work.

It is anticipated that a draft text for Volume 1 will be completed by the end of 1988, with successive parts being ready at intervals of one year. Each map will be accompanied by a legend, the legends being edited by Dr M.O. Hill.

Various BBS members have agreed to write legends for about 500 of the 1000 species to be mapped. Volunteers are urgently required for the remaining 500 species.

The response to my request for field records in Bull. B.B.S. **50** was very disappointing, apart from an avalanche of records from the BBS summer meeting in Ireland, and all available records are still needed.

A.J.E. Smith
March 1988

k) MEETINGS SECRETARY'S REPORT

Four members, willing to act as local secretaries, enabled the customary programme of meetings to go ahead; their innovative ideas ensured that it did so with impressive results. For this, we are very grateful to Mrs J.A. Paton, Mr D.M. Synnott, Dr M.A.S. Burton and Dr S.R. Edwards, as well as to Dr H.L.K. Whitehouse for kindly providing invaluable tuition during the taxonomic workshop. In addition, the Society accepted an invitation to mark the bicentenary of the Linnean Society by holding a symposium in the Linnean Society's rooms at Burlington House, London. With the generous support of the Tansley Fund of the New Phytologist Trust, which made it possible for three overseas speakers to join five from Britain, the meeting was seized upon as an opportunity to review modern research with a view to identifying promising lines of further investigation.

Plans for 1988 and 1989 include the usual annual programme of meetings, but punctuated by others that are additonal and of a quite different nature. Thus, there is to be an internatonal ecology symposium next year sponsored jointly with the British Ecological Society and, in the following year, a field meeting in the Algarve. The programme also reflects elsewhere the wishes and helpful suggestions of a number of members, whose assistance in this respect is greatly appreciated. Indeed, I hope that everyone will continue to think about the kind of BBS meetings they would like and will let me know their ideas.

M.E. Newton
December 1987

l) MEMBERSHIP SECRETARY'S REPORT

The membership stood at 535 for 1987, with 33 new members enrolled. However, this was balanced by the loss of 42 members through death, resignation and default of payment.

Members are asked to advise me of any change of address in good time so Bulletins and Journals can be sent to the correct addresses.

Blackwell's have recently installed a new computer system which has caused considerable problems, but it is hoped that these have now all been sorted out. They have also appointed a new members' clerk. This has resulted in a new system of membership numbers being issued. These are now all-figure and represent a single series for all their journal subscribers, based on the alphabetical order of surname, rather than country and town as previous usage. This has simplified the system for us, since only one card index in the same alphabetical order needs now be kept. However, it has resulted in all new membership cards being made. Fortunately, these can be generated by computer.

Computerization of membership records allows us to produce updated membership records at regular intervals. Copies can be obtained for £2 post paid from the membership secretary, Dr S.L. Jury, Department of Botany, Plant Science

Laboratories, University of Reading, Whiteknights, Reading, Berkshire RG6 2AS. Cheques should be made payable to the University of Reading.

S.L. Jury
March 1988

m) CONSERVATION OFFICER'S REPORT

Increasing commitments to work on vascular plants in the last year or two have left me little time to carry out the duties of Conservation Officer. I therefore resigned at the AGM, and R. C. Stern was elected in my place.

I feel that in the last few years there has been an increasing awareness of the need to consider the conservation of all cryptogamic plant groups. However, I have felt handicapped by the absence of anyone in NCC with special responsibility for these groups. Conservation Officers in other societies have expressed similar sentiments. We all hope that this gap will soon be filled.

I wish Rod Stern a happy and successful term of office.

C.D. Preston
April 1988

n) PUBLICITY OFFICER'S REPORT

For the second year, the Travelling Exhibition has been the major concern of the Publicity Officer. It opened at last to the public on 5 December 1987, at Cliffe Castle Museum, Keighley (under City of Bradford Metropolitan Council), and is titled "A Secret Garden: the Hidden World of Mosses and Liverworts".

The aim of the exhibition is to interest non-bryologists, non-botanists, and even those with no previous interest in natural history. The idea is to attract people by the beauty hidden in the commonplace. Only then is it possible to preach, and with caution, what we as bryologists think is important.

The exhibition is in the form of eight 2 x 1m panels, as originally planned, these being: Introduction, "Where to Find Mosses" (two panels), "What is a Moss?", "What's in a Name?", "Conservation", "Bryology", "What Use are Mosses?". Supplementary material, such as a moss garden, or bags of horticultural peat, or moss poles, may be provided by the hiring institution. A master copy of an eight-page illustrated booklet "Mosses and Liverworts of Town and Garden" is available for duplication and sale. Cliffe Castle Museum's supplementary exhibition includes over forty large wall-mounted colour photographs and a floor case of bryological books.

The Schistostega-cave was excluded for reasons of cost, feasibility, and problems of flat-pack travelling. Many other valuable contributions also had to be left out, and I apologise to all those members who were pestered for contibutions which were not used. The final choice was taken by the designers Hall Redman Associates, Margaret Hartley (Cliffe Castle Museum), and myself. However, the compiled contributions of bryologia are not lost, and are available on 5¼" floppy disc.

The BBS contribution has been increased from £1,000 to £1,500 which has been matched by Area Service grants, so is worth £3,000. Bradford Council's contribution of £1,000 was also matched by the Area Service. The total cost of the exhibition now comes to £5,000 (whereas before it would have been £4,000).

Bookings are slow (at a reasonable £50/month), which indicates that the subject

matter is not one of immediate public appeal. We are fortunate to have achieved such an exhibition at all, let alone in such difficult times. I believe that the BBS has got excellent value for money, both because of funding from other sources, and also as value for the overall budget. We are particularly indebted to both Barbara Woroncow (Museums and Art Galleries Service for Yorkshire and Humberside) and Margaret Hartley, whose personal belief in the exhibition was essential.

The exhibition will be at Manchester Museum during July, August and September 1988. Anybody else wishing to book the exhibition should contact Margaret Hartley (Bradford 758235).

S.R. Edwards
March 1988

o) READING CIRCLE REPORT FOR 1987

Membership of the reading circle now stands at 31, of whom 6 are outside the United Kingdom. Two new members joined and three have been lost from the circulation list during 1987. There have again been some problems with J. Hattori Botanical Laboratory, but this should now be available on a regular basis. During the year 322 contents lists were distributed and copies of 40 articles consisting of 540 pages were supplied to 11 members.

INCOME

Members' credit at 1.1.87	£101.01
Income (cheques, cash)	£ 73.00
Total	£174.01

EXPENDITURE

Photocopies supplied	£ 32.02
Postage	£ 26.98
Administration	£ 2.94
Total	£ 61.94

Excess of income over expenditure	£112.07
Less members' credit	£111.42
Balance of income over expenditure	£ 0.65

Agneta Burton

MINUTES OF THE ANNUAL GENERAL MEETING, KENT, 1987

Minutes of the Annual General Meeting held at Wye College, Kent, at 4.40pm on 26 September 1987.

PRESENT: Mr G. Bloom (President, in the chair) and 35 other members.

The meeting began with one minute's silence as a mark of respect to the late Mr Richard Libbey.

(1) APOLOGIES FOR ABSENCE: Apologies were received from Mr R. Carpenter, Mr R.J. Fisk, Dr S.W. Greene, Dr M.O. Hill, Mr N.G. Hodgetts, Dr. S.L. Jury, Mrs J.A. Paton, Mr A.R. Perry and Mr A. Smith.

(2) MINUTES: The minutes of the AGM held at Leeds, 1986 were approved with minor corrections.

(3) MATTERS ARISING:

(a) It was reported that the moss wallchart had been published and was available from the Librarian at £2.00.

(b) Mr Bloom reported that he had chaired a working group on conservation. At the request of the group he had written to Mr William Wilkinson, Chairman of the Nature Conservancy Council, advocating the appointment by NCC of a specialist in lower plants. He had received support in this initiative from other societies, notably the British Mycological Society. The response from NCC had been sympathetic, with assurance that such an appointment would be a matter of priority in future appointments. Mr Bloom also referred to a site register scheme for lower plants currently being conducted through the Conservation Association of Botanical Societies. He noted that the feasibility of a more comprehensive project in this area would be considered by a Conservation Committee established under Mr R.C. Stern.

(c) Mr Stern reported that the Committee appointed to consider a suitable memorial to the late Mr E.C. Wallace had recommended purchase of a sand-rock area in Sussex as a nature reserve. The Sussex Trust for Nature Conservation was about to purchase a 150-acre area of woodland, a grade 1 SSSI, that contained 3-4 acres of sand rock. This site, at Saxonbury Hill near Tunbridge Wells, was considered suitable. Council had agreed that £3,000 from the Wallace Memorial appeal should be made available to the Sussex Trust for purchase of the sand-rock area as part of a larger nature reserve. The sand rock area would be designated as The Ted Wallace Reserve, and a suitable sign erected. The Trust would undertake the proper management of the reserve through a committee with BBS representation. It was not feasible to refer to the whole woodland area as the Wallace Reserve because funds for its purchase were being raised from a variety of sources. There was general support for this proposel. The view was expressed that the Wallace Reserve should be demarcated in paper documentation, but that its boundary should not be marked on the ground. It was noted that the appeal fund had so far raised considerably less than £3,000, so that a renewed appeal, for this specific project, would be necessary. The Treasurer agreed to investigate the feasibility of donations being made on a covenanted basis.

(d) Mr Stern asked what had been done with the archival material from Mr Wallace's estate. It was reported that notebooks were at present held by Mr Perry, but some appeared to be missing. Most letters were with Dr Adams. Professor Richards observed that the archival material should be maintained as a single entity as it constitues a unique historical record. The President recommended that Dr Adams put a note in the Bulletin outlining how the material was to be curated and catalogued, and outlining procedures for loans: some restriction should be imposed on consultation of letters from living people.

(4) OFFICERS' REPORTS FOR 1986:

(a) GENERAL SECRETARY: Dr Longton noted that Mr Wigginton of NCC had agreed to attempt to establish a Tropical Bryology Group, and that NCC had appointed two people for two years from 1 October 1987 to work on the Mapping Scheme.

(b) TREASURER: Mr O'Shea reported a balance of income over expenditure of £9,481 for 1986. This included a significant contribution from Mr Wallace's estate. An excess of some £2,000 was anticipated for 1987. No subscription increase would be necessary in the near future, but it was noted that Council

had approved several major expenditures in the next few years.

(e) RECORDER FOR MOSSES: Mr Blockeel emphasised the necessity for data on voucher specimens to be typed, or clearly written with at least the locality in block capitals.

(g) LIBRARIAN: Dr Adams apologised for delays in sending out some sales items: this had resulted from illness. He noted that bulk orders of lenses intended for resale were not acceptable.

(j) MAPPING SECRETARY: Dr Smith requested that all records for the Atlas be submitted by December 1987 at the latest. Revised recording cards would soon be available.

(l) MEMBERSHIP SECRETARY: Dr Longton noted that an updated membership list, indicating the dates when members had joined, was now available from the Membership Secretary, or the Librarian, at £2.

(n) PUBLICITY OFFICER: Dr Edwards reported that the travelling exhibit would be completed by the end of 1987.

There were no comments on the other Reports. Acceptance of the Reports was moved by the President and carried unanimously.

(5) REPORT FROM COUNCIL:

(a) The President announced that the Honorary Membership Committee had recommended that Mrs J.A. Paton and Dr R.M. Schuster should be elected Honorary Members of the Society. Council had endorsed this recommendation. Mr Bloom spoke briefly about Mrs Paton's major contribution to British hepaticology and about her devoted efforts on behalf of the Society sustained over many years. He noted that Dr Schuster, who had spoken at the joint meeting with the Linnean Society in May 1987 and at other BBS meetings, had an outstanding international reputation for his work on hepatics, and fully merited this honour. Election of Mrs Paton and Dr Schuster as Honorary Members was approved unanimously.

(b) The President reported that Mr Stevenson had suggested that the Society should produce and market reprinted herbarium packets in order to promote greater standardization in the size of Herbarium packets and the quality of collecting data. On a show of hands, six members indicated that they might purchase such packets if sold at 1p or 2p each, unfolded.

(c) Dr Stanley reported that Council had authorized the expenditure necessary to enable him to prepare the manuscript of a cumulative index of the Society's publications, including the Journal, Bulletin and Reports of the BBS and Moss Exchange Club. He estimated that it would contain some 10,000 entries on 100 pages, and take two years to complete. He was prepared to undertake this work on the understanding that the Index would be published and distributed as part of Journal of Bryology. Professor Richards and Dr Jones welcomed this news and noted that several other journals had published cumulative indices as part of a journal.

(6) ELECTION OF OFFICERS: The President noted that the terms of all officers expire on 31 December 1987. He would then be succeeded as President by Mr Wanstall. The other officers were willing to continue, and had been nominated by Council, with the exception of the Conservation Officer, Mr Preston, and the Reading Circle Secretary, Mr Fisk. Mr Preston wished to resign at the end of 1987, and Mr Fisk had resigned earlier in the year. Council had co-opted Dr Burton as Reading Circle Secretary for the remainder of 1987. It was reported that Council had nominated Dr M.O. Hill for election as Vice President, Dr

M.A.S. Burton as Reading Circle Secretary, and Mr R.C. Stern as Conservation Officer. No other nominations had been received. Council's nominees were therefore declared elected for two-year terms from 1 January 1988.

(7) ELECTION OF ELECTED MEMBERS OF COUNCIL: The President reported that Council had nominated Mrs Vanessa Williams, Dr P.H. Pitkin and Dr C.J. Miles for election as elected members of Council to serve for two years from 1 January 1988, replacing Dr Stanley, Mr Ellis and Mr Roberts whose terms would then expire. No other nominations had been received and Council's nominees were therefore declared elected.

The President noted that an additional elected member was required to serve until the end of 1988 in place of the late Mr Richard Libby. It was agreed that Council should co-opt a suitable person.

(8) DATE AND PLACE OF THE NEXT AGM: Dr Newton announced that the next AGM would be held at Liverpool Museum on 17 September 1988.

(9) OTHER FUTURE MEETINGS: Dr Newton confirmed that meetings up to the Paper-Reading Meeting 1988 would be as announced in Bulletin No. 50.

Bryological Workshop 1988. Bristol, Castleton and Juniper Hall were suggested as possibilities. Bristol was the choice of most of those present.

Portuguese Meeting, 1989. Dr Newton reported that Mr Perry had agreed to lead a meeting in the Algarve in the Spring of 1989. March would be the most favourable month botanically, but at least part of the meeting would then be during school and university term. On a show of hands, 12 people expressed a serious interest in attending such a meeting.

Spring Meeting 1989. It was agreed that a normal Spring Meeting (with Council Meeting) should be held in 1989 in addition to any meeting in the Algarve, and that Salisbury would be a suitable venue.

Summer Meeting 1989. A one-week meeting in Aberystwyth was approved.

AGM 1989. Lincoln was suggested and this idea received support.

Dr Longton gave details of the programme for an International Symposium on Bryophyte Ecology, organized jointly with the British Ecological Society, that would form part of the Summer meeting in 1988, and reported that Council was considering the feasibility of inviting the International Association of Bryologists to collaborate in organising a Symposium on Experimental Bryology at Exeter in 1991.

(10) ANY OTHER BUSINESS: Mr Bloom thanked officers and Council members for their hard work and support during his presidency, paying particular tribute to the work of Mr Fisk and Mr Preston over a number of years. He also thanked Dr Burton and the Administrative Officers at Wye College for their hard work and hospitality.

Dr Jones commented on the origin of the Presidential gavel. It had been fashioned from a piece of bog-oak found in an Irish bog by Mr Bob Fitzgerald when Treasurer of the Society. It had been presented to the Society by Mr Fitzgerald, and had been used by a succession of Presidents beginning with Mr J.H. Peterken (1968-69).

There being no other business the meeting adjourned at 6.08 p.m.

FUTURE MEETINGS OF THE SOCIETY

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

ANNUAL GENERAL MEETING AND PAPER-READING MEETING, 1988. Liverpool, 17-18 September.

Local Secretary: Dr J. Edmondson, Merseyside County Museums, William Brown Street, Liverpool, L3 8EN.

Accommodation has been reserved in one of the University halls of residence and lectures will be held in rooms of the Museum, where lunch will be available for those booking in advance. Convenient transport between the two sites will be arranged if necessary, although car-parking in the vicinity of the Museum is also feasible. It is hoped that British Rail conference rates will offer a saving for members travelling to Liverpool by train.

Costs of accommodation and meals have been itemized for the convenience of members wishing to attend only part of the meeting and bookings, on a form obtainable from the local secretary, should be returned **not later than 31 July**. The local secretary will also be pleased to forward full details of the programme, to which the following speakers have kindly agreed to contribute:

Dr J.W. Bates (Imperial College at Silwood Park): The use of fertilizer experiments for studying nutrient uptake and utilization by bryophytes.

Mr R. Baxter (University of Manchester): The responses of Sphagnum to atmospheric pollutants, particularly SO_2.

Dr M.A.S. Burton (Monitoring and Assessment Research Centre): Monitoring environmental contamination with bryophytes in natural habitats.

Prof. J.G. Duckett & Dr K.S. Renzaglia (Queen Mary College, London, & East Tennessee State University): The biology of underground organs in the Jungermanniales.

Dr J.R. Edmondson (Merseyside County Museums): Bryophyte collections made during the voyage of the Aiga.

Dr S.R. Edwards (Manchester Museum): What they wouldn't let us put in the exhibition.

Mr R.G. Woods (N.C.C., Llandrindod Wells): Towards conserving bryophytes: a Welsh case-study.

The ANNUAL GENERAL MEETING will follow the paper-reading session at 4.30 p.m. on Saturday 17 September.

During the evening conversazione, there will be an opportunity for the display of posters and demonstrations, offers of which would be most welcome.

A field excursion on Sunday 18 September will be led by Mr M.J. Wigginton of the N.C.C. It will take advantage of the proximity of the Delamere Forest area of Cheshire, where there are fine examples of meres and mosses in various stages of development. Full particulars will be available from the local secretary.

BRYOLOGICAL WORKSHOP, 1988, University of Bristol, 18-20 November.

Local Secretary: Dr D.H. Brown, Department of Botany, The University, Bristol, BS8 1UG. Programmer Organizer: Mr B.J. O'Shea, 131 Norwood Road, London SE24 9AF

The workshop will be held in the Department of Botany, Bristol University. A Common Room will be available in the evening. Participants make their own

accommodation arrangements but Dennis Brown will supply an annotated list of local Guest Houses/Hotels (prices from £10, with an average of £15-20), travel details and a map.

The programme will be devoted to the use of computer facilities in bryology. It is hoped that participants will have some prior basic knowledge of the use of micro-computers, but the tyro is not excluded. We will try to cover, with a strong practical bias, such topics as word-processing, data bases, statistics, spreadsheets and graphics, and specific bryological applications such as herbarium management, bibliographies, taxonomy, ecology and mapping. The content is likely to be flexible, and will be geared as far as possible to those attending. It will be based on IBM-compatible micro-computers. Participants with their own IBM-compatible micro (preferable with 5.25" diskettes) are urged to bring it along, as the number we are able to make available may be limited. Well over 100 disks from the IAB Software library will be available for demonstration and use (and may be freely copied if you supply your own 5.25" diskettes), as well as commercially available products.

Please contact Dennis Brown as soon as possible if you are thinking of coming, especially if planning to bring your own computer. Contact Brian O'Shea if you want more details of the likely programme. Full details of arrangements and programme will be mailed in September.

SPECIAL OVERSEAS SPRING MEETING, 1989, Algarve, Portugal, 23-30 March.
Organizer & Local Secretary: Mr A.R. Perry, Department of Botany, National Museum of Wales, Cardiff, CF1 3NP (tel.: 0222-397951, ext.267).

Unfortunately Easter 1989 conflicts with the proposed date for the Algarve field meeting, but the dates chosen, 23-30 March, allow participants to come during the school holiday period. People will fly to Faro where they will be met and where hired cars will be collected, and then drive to Loule (approx. 25 minutes) near where accommodation has been reserved in a guest house. The weekly charge for bed and breakfast will be approximately £70 per person. Eating out in Algarve is very cheap.

Excursions will take place on 24-29 March inclusive and will include trips to Serra de Monchique (Riccia gougetiana); Caldas de Monchique (Claopodium whippleanum, Fabronia pusilla); Lagoa de Nave (several Riccia spp., Ephemerum spp.); Alte, Cascata do Pego do Vigario (Plagiochasma rupestre, Riccia atromarginata, R. bicarinata, Scorpiurium deflexifolium); Quinta do Freixo (Riella cf. notarisii); Ribeira de Algibre (Scorpiurium sendtneri, Targionia lorbeeriana); Serra de Monte Figo, Sao Miguel (Cheilothela chloropus, bee-eaters); etc. Visits to Cork oak forest with Arbutus unedo, hopefully to chestnut forest and also to Eucalyptus forest, will also be made.

The following bryophytes are relatively common: Scleropodium touretii, Bartramia stricta, Dicranella howei, Gymnostomum luisieri, Funaria pulchella, Leptobarbula berica, Timmiella barbuloides, Tortula marginata, Leptodon smithii, Leucodon sciuroides, Rhynchostegium megapolitanum, Scorpiurium circinatum, Fossombronia spp. and Southbya spp. Other, non-British species that will probably be seen are : Corsinia coriandrina, Oxymitra paleacea, Mannia androgyna, Weissia triumphans and Homalothecium philippeanum.

At this time of the year the Algarve is (usually) warm/hot, and very floriferous. In flower will be the citrus bushes, Acacia, Eucalyptus, Cistus spp., Lavandula spp., Erica arborea, E. australis, Scilla peruviana, Paeonia broteroi, Ophrys spp., Orchis italica, Serapias spp., etc. An excursion will be made for all those interested to Cabo de Sao Vicente, the most south-westerly point of Europe, where bryophytes are not much in evidence, but where the vascular plants are spectacular. They include Cistus palhinae, C.

salvifolius, C. albidus, Halimium commutatum, Viola arborescens, Chamaerops humilis, Astragalus lusitanicus, A. massiliensis, Antirrhinum majus ssp. cirrhigerum, Corema album, Phillyrea angustifolia, Rosmarinus officianlis, Lithospermum diffusum, Ruta angustifolia, etc.

Flights and car hire firms are being investigated at present, in order to secure good bargains. But it is essential that all those intending to come on this meeting inform Roy Perry AS SOON AS POSSIBLE - preferably now - so that he can make final accommodation arrangements. This is especially important in view of the fact that the meeting will take place during the Easter week. Later on he will provide all intending participants with full details of the field meeting.

SPRING FIELD MEETING, 1989, Salisbury, 5-12 April.
Organizers & Local Secretaries: Mrs V. Williams (to whom enquiries should be addressed), Two Bridges, Lyburn Road, Hamptworth, Salisbury. Wilts., SP5 2DB; and Mr R.C. Stern.
Headquarters: The Clovelly Hotel, Mill Road, Salisbury, Wilts., SP2 7RT.

Since hotel accommodation in Salisbury is in great demand around Easter each year, early booking is recommended. 1988 prices at the headquarters hotel are £13.50 for B. & B. and £4.60 - £6.00 for dinner. Nearer the time, however, the local secretary will be pleased to supply details of other accommodation in the area, as well as detailed information about the programme of field excursions. Full particulars will appear in the next issue of the Bulletin.

SUMMER FIELD MEETING, 1989, Aberystwyth, July/August.
Organizer & Local Secretary: Mr A. Orange, Department of Botany, National Museum of Wales, Cardiff, CF1 3NP.

Combining an opportunity to visit sites of well-known bryological interest with one to examine and record in less well-known but potentially rich localities, this meeting promises to be one of exceptional interest. Full details will be available from the local secretary and be published in the next Bulletin.

ANNUAL GENERAL MEETING AND PAPER-READING MEETING, 1989, Louth, Lincolnshire.
Local Secretary: Dr M.R.D. Seaward, Postgraduate School of Studies in Environmental Science, The University, Bradford, BD7 1DP.

Details will appear in a later issue of the Bulletin.

BRYOPHYTE WORKSHOP, 1989.
Suggestions for the topic and venue would be welcomed by the Meetings Secretary. According to the established practice of alternating these meetings between the north and south of England, our choice for 1989 should ideally be somewhere in the northern half of England.

SUMMER FIELD MEETING, 1990.
In thinking about possible centres for this, the next Irish meeting, two proposals have been made. One is for a meeting in Antrim and Down and the other for Galway. Your views on these and possible alternatives would be appreciated by the Meetings Secretary as a means of assessing the level of support each might expect.

OTHER BRYOLOGICAL MEETINGS

29 July – 5 August, 1988: Mosses and Liverworts. Dr M.E. Newton, Preston Montford Field Centre, Montford Bridge, Shrewsbury, SY4 1DX.

Details from the Warden, Mr J.A. Bayley, at the above address.

20–27 August, 1988: Mosses and Liverworts. Dr M.E. Newton, Kindrogan Field Centre, Enochdu, Blairgowrie, Perthshire, PH10 7PG.

Details from the Warden, Dr A. Lavery, at the above address.

27 August – 3 September 1988: Bryophytes. A course on mosses and liverworts for beginners and for those with some experience. Based in country cottage accommodation at Snaigow, Dunkeld, Perthshire, PH8 ORD. Cost £185 for 7 days. Write to Brian S. Brookes for details (sae, please).

9–16 September, 1988: Mosses and Liverworts. Dr M.E. Newton, Malham Tarn Field Centre, Settle, North Yorkshire, BD24 9PU.

Details from the Warden, Mr K. Iball, at the above address.

14–16 October. 1988: Introduction to Mosses and Liverworts. Mr P.J. Wanstall, Flatford Mill Field Centre, East Bergholt, Colchester, Essex, CO7 6UL.

Details from the Warden, Mr E. Jackson, at the above address.

BBS BOOK and REPRINT AUCTION
BBS AUTUMN MEETING LIVERPOOL 1988

It is proposed to hold a bryological book and reprint auction at the autumn paper-reading meeting this year. It would take place during the Conversazione on the evening of Saturday 17 September 1988.

For the first auction this year we are looking to members to donate spare books and reprints to raise money for the E.C. Wallace Memorial Fund, to contribute to the cost of purchasing the Wallace Memorial Reserve. Depending on the success of this year's trial run, future auctions could be expanded to allow members to sell books to each other with an agreed percentage donated to the BBS or some worthy cause.

The auction is an informal event and Roy Perry has kindly offered to act as auctioneer. Please bring your books and reprints along to the meeting. I would appreciate advance warning of any large donations.

David Long, Royal Botanic Garden, Edinburgh EH3 5LR

BBS CONSERVATION COMMITTEE

The Conservation Committee has been re-established consisting of R.C. Stern (as Conservation Officer), P.J. Wanstall, P.H. Pitkin and D.G. Long, with powers to co-opt other members if appropriate for particular issues. Its terms of reference are as follows:

1. To ensure that bryophytes and in particular their habitats are given proper consideration by conservation organizations.
2. To advise on the preparation of a Red Data book of bryophyte species.
3. To assist in the preparation of a Site Register to locate key sites of bryological importance.
4. To identify and disseminate information on habitats important to bryophytes.
5. To encourage a positive contribution to bryophyte conservation.
6. To promote the Code of Conduct (revising it as necessary).

Matters considered during the last six months have included:

(i) The future of CABS (Conservation Association of Botanical Societies) and the possibility of the establishment of a Plant Conservation Society. R.C. Stern represents BBS on the Management Committee of CABS, which meets once a month.

(ii) The preparation of a Red Data Book for bryophytes. This will be made much easier by the appointment of a Research Officer for Conservation Requirements of Threatened Lower Plants. This is a NCC funded project to be controlled by CABS and Nick Stewart (previously Conservation Officer for CABS) has been appointed to this post; the project initially is for 2½ years concentrating on lichens, bryophytes and charophytes. R.C. Stern will be his normal contact in respect of bryophytes and will consult members as appropriate for their views.

(iii) Revision of the 1978 Code of Conduct, which will include a list of threatened species when these have been decided.

(iv) Friends of the Earth report on mosses and their conclusions that the decline in numbers of species is a result of atmospheric pollution (the Committee is not convinced by the FOE's reasoning in this respect but is pleased that they are showing interest in bryophytes).

(v) Possibility of a booklet on bryophyte conservation.

(vi) List of Ancient Woodland bryophytes of Lowland Southern England.

R.C. STERN

THE BIOLOGY OF POLAR BRYOPHYTES AND LICHENS

A book entitled The Biology of Polar Bryophytes and Lichens, by R.E. Longton, is due to be published by Cambridge University Press, in association with the British Bryological Society, in October 1988. It will be available at a discount price to members of the BBS. Full details of this offer are available from Dr Longton at Reading and will be circulated with the next issue of the Bulletin.

TROPICAL GROUP

1st Meeting of the Working Party - abbreviated Minutes

David Long, Royce Longton, Brian O'Shea and Martin Wigginton met on the 13th May 1988 at the Natural History Museum, South Kensington to discuss aims and objectives and to make firm proposals for action.
The proposal to establish a Tropical Group has been generally well-received, and there had been an encouraging response to an earlier Discussion Paper which sought to synthesise initial ideas and suggestions from members.

As a short-term aim it was agreed we could undertake valuable preparatory work on unworked herbaria. It is thought probable that many collections containing tropical bryophytes are held privately or by local institutions, such as museums, but are generally not known about or documented. Ideally such collections should be publicised and made available for study. Preparatory work could involve sorting, packeting, labelling and/or documentation of vouchers. It was agreed that, as a start, the Group would coordinate the processing of those unworked collections which are held at the Royal Botanic Gardens, Edinburgh. In order to make collections more selectively available to specialists, such preparatory work should ideally be followed by sorting vouchers into broad taxonomic groups, preferably families, or if possible, genera. This is something the Group should be able to achieve, at least imperfectly and in part.

It was agreed that detailed taxonomic/monographic work could not be undertaken in the short-term, but should be considered as a longer-term aim of the Group. Individual members may, in due course, wish to carry out research or specialise in a taxonomic group. This latter could be particularly valuable.

A priority task for the Group was recognised to be the production of a Guide to Collecting in the Tropics. This would include advice on collecting, preservation and documentation, and ecological, phytogeographical and related topics. A primary aim of the document would be to provide advice to collectors who are not bryologists but who may participate, for instance, in student expeditions. The Guide should also be of use to BBS members travelling overseas. The writing of a draft Guide is currently underway.

There was considerable discussion on the need for continued collecting and study in the tropics, not only for primary taxonomic research and to assist in the recognition of areas of bryological importance, but also to gather material from areas destined for inevitable destruction. It was agreed we should investigate the possibility of a survey and collecting trip to the tropics as an early priority. No firm proposals as to localities and habitats were made, this being also a matter for wider discussion. It was felt, however, that a visit to Africa may be most appropriate since 1) the bryophyte flora is inherently less rich and complex than that of the Americas and S.E. Asia where research effort has been considerable in recent years, and 2) many areas (countries) are extremely poorly-known bryologically and such a visit could be correspondingly valuable. The Working Party would like the opinions of members on these proposals. Possible sources of funding were briefly discussed, but no firm proposals for action were made.

Consideration was given to the problem of the availability of literature particularly for those members who do not have the benefit of a University Library or Inter-Library loans. The possible need to supplement the BBS Library with more tropical literature was discussed, and the Group could advise on additional purchases.

A proposal was made to hold a 1-day meeting of the Group in 1989 for the

presentation of short papers on tropical bryology which could include, for instance, collecting in the tropics, problems of tropical taxonomic work, writing a monograph, literature and data-bases.

Request for information on herbaria
We would be most grateful to know of any herbarium containing tropical bryophytes which is held privately or in a local institution which 1) has been hitherto unpublicised, and 2) the owner agrees can be publicised and made available for study.

Request for help in preparatory work on unworked herbaria
Help from members in the routine preparatory work would be very greatly appreciated. Each unworked collection is likely to have somewhat different requirements, but would not involve special taxonomic knowledge. Full guidance on requirements would be given. A separate issue is the problem of taxonomic sorting which some members may feel able to undertake. We would aim to process small collections in the initial stages.

Proposal to arrange a study and collecting trip to the Tropics
As outlined above, this is seen to be a worthwhile short-term objective of the Group, and we would like to know what degree of support this proposal might have.

Please send responses to the requests and proposal to M.J. Wigginton or any other member of the Working Party.

M.J. WIGGINTON

ELECTION OF OFFICERS AND ELECTED MEMBERS OF COUNCIL

Nominations are invited of members to replace Dr R.R. Longton and Mr B.J. O'Shea who have resigned as General Secretary and Treasurer respectively from the end of 1988. It is possible that a replacement will also be required to succeed Dr M.E. Newton as Meetings Secretary, and nominations are therefore invited for this post, and for three Elected Members of Council to serve two-year terms from 1 January 1989. if elections are necessary they will be held at the Annual General Meeting at Liverpool on 17 September 1988. Nominations, which should not be without the consent of the member concerned, should be sent to Dr R.E. Longton, Department of Botany, The University, Reading RG6 2AS, to arrive at least four weeks before the AGM.

PHILONOTIS CALCAREA - CONTINUOUS PRODUCTION OF SHOOTLET PROPAGULA IN THE GREENHOUSE

In October 1982 I collected a propaguliferous sample of Philonotis calcarea from Bracebridge bog, Sutton Park, Warwickshire. This was described in Bulletin 41, p 22.
Subsequent to 1982 I have noted the continuous production of shootlet propagula by this material, which has been kept in simulated bog conditions (saturated garden soil in an open plastic trough) in an unheated greenhouse since the collection date. My most recent examination of the material was in May 1988. In view of the apparent rarity of the propagula of Philonotis calcarea I think that this culture result is worth placing on record.

J.H. FIELD

REFEREES (July, 1988)

Specimens sent to the referees should have a 4- or 6- figure grid reference in addition to the locality description. THEY SHOULD ALWAYS BE ACCOMPANIED BY A STAMPED, ADDRESSED ENVELOPE, EVEN IF MATERIAL IS SENT FROM UNIVERSITIES OR INSTITUTIONS. If anyone has difficulty in getting a specimen named they should send it to the appropriate Recorder - Mr David Long for hepatics (The Herbarium, Royal Botanic Garden, Edinburgh, EH3 5LR) or Mr Tom Blockeel for mosses (9 Ashfurlong Close, Dore, Sheffield, S17 3NN).

The general referee will help beginners who are having difficulty in placing their material in a genus. The numbers refer to genera in Distribution of Bryophytes in the British Isles by M.F.V. Corley and M.O. Hill (1981).

GENERAL REFEREE: Mrs A.G. Side, 82 Poplicans Road, Cuxton, Rochester, Kent, ME2 1EJ.

HEPATIC REFEREES:

1,2,11,12,58: Mrs J.A. Paton, Fair Rising, Wagg Lane, Probus, Truro, Cornwall, TR2 4JU

3-10,18-24: Dr M.E. Newton, Dept. of Cell & Structural Biology, Williamson Building, University of Manchester, Manchester M13 9PL

13-17, 36,37,39-44: G.P. Rothero, Benmore Centre, by Dunoon, Argyll

25-35,45-47: M.F.V. Corley, Pucketty Farm Cottage, Faringdon, Oxfordshire, SN7 8JP

38,53-55,64-67,69: D.G. Long, Royal Botanic Garden, Edinburgh EH3 5LR

48-52, 78-86: M.J. Wigginton, Nature Conservancy Council, Northminster House, Peterborough, PE1 1UA

56,57,59-63,68,70-74: T.L. Blackstock, Nature Conservancy Council, Ffordd Penrhos, Bangor, LL57 2LQ

75-77: G. Bloom, 15 Tatham Road, Abingdon, Oxfordshire, OX14 1QB

MOSS REFEREES:

1: Dr M.O. Hill, Monk's Wood Experimental Station, Abbots Ripton, Huntingdon, PE17 2LS; A. Eddy, Department of Botany, British Museum (Natural History), Cromwell Road, London, SW7 5BD

2-10,143: Dr M.O. Hill (address above)

11-36: M.F.V. Corley (address above)

37,38,62-66: Dr A.J.E. Smith, School of Plant Biology, University College of North Wales, Bangor, Gwynedd, LL57 2UW

39,67-81,96-104: M. Yeo, 49 Arlesey Road, Ickleford, Hitchin, Herts., SG5 3TG

40-61: Dr D.F. Chamberlain, Department of Botany, Royal Botanic Garden, Edinburgh, EH3 5LR

82-90,105: Dr E.V. Watson, Little Court, Cleeve, Goring on Thames, Reading, Berkshire, RG8 ODG

91-95: A. Orange, Department of Botany, National Museum of Wales, Cardiff, CF1 3NP

106-138: M.J. Wigginton (address above)

139-142,144-175: (Vacant)

REFEREES

Would members please note that Mrs Joan Appleyard is now no longer able to referee material of the Hypnaceae as previously. A replacement for Mrs Appleyard will be sought and noted in the next Bulletin.

NEW VICE-COUNTY RECORDS AND AMENDMENTS TO THE CENSUS CATALOGUES

All undated records are based on specimens collected in 1987. Numbers and nomenclature follow Corley & Hill (1981), Distribution of bryophytes in the British Isles: a census catalogue of their occurrence in vice-counties.

HEPATICAE

D.G. LONG

12.7 Riccia glauca, Maidenbower Crags, Dumfries (72), Paton 1961 (BBSUK, det. Paton); on mud under Salix by river, E bank of Cloon River near Partry (H26), Long, conf. Paton.

12.8 R. warnstorfii, delete 72, specimen (BBSUK) is R. glauca, comm. Paton; track below wood, below Lough Greney, near Knappagh, S of Westport (H27), Paton.

12.9 R. crozalsii, on damp gravelly roadside, lane below Slievemore, Achill Island (H27) Long & Paton, det. Paton, new to Ireland.

12.11 R. beyrichiana, beside track below Slievemore, N of Slievemore Hotel, Dugort, Achill Island (H27), Paton.

13.1 Metzgeria fruticulosa, on elders, southern end of Wee Cumbrae (100), Cocking: on flaky bark of Fuchsia in hedge, lane below Slievemore, Dugort, Achill Island (H27), Long.

13.2 M. temperata, branch of Crataegus in scrub, N side of Wych Brook, Lower Wych near Malpas (58), Fisk; on sycamore trunk, N of Slievemore Hotel, Dugort, Achill Island (H27), Paton.

14.1 Apometzgeria pubescens, Llanymynech (47), Duckett 1974, comm. Bloom.

18.2 Pellia neesiana, on soil in open woodland near Cloon River near Partry (H26), Burton.

22.1 Fossombronia foveolata, amongst Leiocolea alpestris, NE shore of Lough Mask, Ballygarry Pier, S of Partry (H26), Paton.

22.5b F. pusilla var. maritima, flat sandy area behind strand, Trawmore Sand near Dookinelly, Achill Island (H27), Paton.

22.6 F. wondraczekii, on clayey margin of small pool with Pseudephemerum nitidum, Brampton Wood (31), Porley 1986; in tractor rut on woodland path, E side of Cloon River between Srah and Partry (H26), Synnott.

22.8 F. incurva, damp hollow on bank of flooded gravel pit, Newchurch Common near Sandiway (58), Fisk.

22.9 F. fimbriata, on damp sandy ground by sea, Trawmore Sand near Dookinelly, Achill Island (H27), Long.

26.4 Barbilophozia atlantica, on peaty soil on moorland slope, Oyster Clough, Woodlands Valley, High Peak (57), Blockeel 1986; damp slightly basic rock crevice at 900m, Garbh Choire, Ben Alder (97), Corley.

28.1 Lophozia ventricosa a. var. ventricosa, shaded siliceous rocks in roadside wall by Trelleck Bog, 1.5km SE of Trelleck (35), Perry; on rocks of raised beach, Wee Cumbrae, Strathclyde (100), Cocking; on peaty tussock on open slope, woodland E of Cloon River near Partry (H26), Long & Paton; amongst Sphagnum on damp peaty slope, lower E slope of Slievemore, Achill Island (H27), Long. b var. silvicola, on Sphagnum in raised bog, East Bog, Flanders Moss (87), Rose; on W-facing scree slope, W slope of Meall Glasail Mor, N of Braemar (92), Long; on peat in clearing in woodland, E bank of Cloon River near Partry (H26), Long; on wet peaty NE-facing slope, E corrie of Slievemore, Achill Island (H27), Long.

28.5 L. perssonii, in small depressions of chalk bank, Lydden (15), Porley.

28.9 L. opacifolia, mossy slope on exposed ridge, 730m, near middle summit of Mweelrea (H27), Rothero & Long.

28.12 L. obtusa, on sheltered N-facing side of Tweeden Burn gorge, 500ft., Newastleton (80), Corner; creeping over Hypnum callichroum in block

scree, 350m, below Kindrogan Crag, Enochdu (89), Rothero.

29.1 Leiocolea turbinata, amongst Fossombronia angulosa on steep sandy bank above stream, Trawmore Sand near Dookinelly, Achill Island (H27), Paton.

29.2 L. badensis, on solid chalk trackway with Dicranella varia etc., Lowbury Hill, Aston Upthorpe Downs (22), Bates; on patches of chalky soil in grass on floor of disused chalk pit near Upper Sundon (30), Yeo.

29.4 L. alpestris, NE shore of Lough Mask, Ballygarry Pier, S of Partry (H26), Paton.

29.6 L. gillmanii, in wet sandy fenny pasture, N end of Lough Doo, near Valley, Achill Island (H27), Perry & Murray, new to Ireland.

34.3 Anastrophyllum joergensenii, in bryophyte turf below crag by burn, c750m, steep N-facing slope above Loch an Sgoir, Geal Charn (97), Rothero.

35.2 Tritomaria exsecta, on decorticated log in NW-facing deciduous wood below Bwlch Ehediad, Nantgwynant (49), Yeo.

38.3 Jungermannia pumila, E bank of Cloon River between Srah and Partry (H26), Synnott.

38.4 J. polaris, on gravelly soil among limestone rocks at 900m, Coire Cheap, Aonach Beag, Ben Alder Range (97), Corley.

38.6 J. exsertifolia ssp. cordifolia, in stream, east slopes of N corrie of Mweelrea (H27), Burton.

38.9 J. gracillima, woodland track on E side of Cloon River W of Partry (H26), Paton.

38.10 J. caespiticia, on moist soil above steep shaley bank by stream, near Snake Inn, Woodlands Valley, High Peak (57), Blockeel & C. Wall.

38.11 J. hyalina, delete 50, specimen (BBSUK) is sterile and indeterminable.

38.12 J. paroica, sandy side of stream in the floor of the North Corrie, Mweelrea (H27), Synnott.

38.14 J. subelliptica, replace existing record for 42 by: on soil in gully, Craig Cerrig Gleisiad, Fforest Fawr (42), Corley 1984, det. Paton, previous record (BBSUK) is J. obovata, comm. & det. Paton; delete 71, 78 and 83, specimens (BBSUK) are J. obovata, comm. & det. Paton; delete 105, specimen (herb. Paton) is J. obovata, comm. & det. Paton.

40.3 Marsupella funckii, bank of old mine, West Okement Valley, Sourton Common, N of Tavistock (4), Paton 1966; with M. emarginata on soil on ledge on rocky slope, Craig Berwyn (50), Paton 1972.

40.4 M. sprucei, on thin soil on rock, 300m, NE-facing Coire, Slievemore, Achill Island (H27), Rothero.

40.9 M. adusta, on small bits of sandstone in scree, N corrie, Croagh Patrick (H27), Paton.

46.3 Plagiochila asplenioides, pathside bank on edge of wood, near Rose Cottage NW of Westport House (H27), Paton.

46.4 P. britannica, on shaded calcareous sandstone rocks by track in woodland, Chase Wood, Ross-on-Wye (36), Orange: among mosses on ground in deciduous woodland, near Rievaulx, Helmsley (62), Blockeel; on soil by burn in wooded valley, Fairy Glen, Rosemarkie, Black Isle (106), Long & Lightowlers; stone on woodland floor, E bank of Cloon River between Srah and Partry (H26), Synnott, det. Paton; on boulder in woodland in grounds of Westport House (H27), Burton.

46.7 P. killarniensis, on scree slope, Great Cumbrae (100), Rhind, comm. Cocking.

46.9 P. corniculata, delete 65, specimen (BBSUK) is Leiocolea alpestris, comm. Blockeel, conf. Long.

48.6 Lophocolea fragrans, on rotting log in woodland by river, Bridge over Cloon River W of Partry (H26), Rothero.

49.1 Chiloscyphus polyanthos, tree roots, E bank of Cloon River, W of Patry (H26), Paton.

50.1 Geocalyx graveolens, on peaty soil in declivity on damp rocky slope, N

coast of Achill Island (H27), Long.

51.2 Harpanthus scutatus, on near-vertical lightly shaded rocks in woodland, Brynberian, Tycanol National Nature Reserve (45), Orange.

53.1 Douinia ovata, delete 50, locality is in 49, comm. Benoit & Hill.

54.2 Diplophyllum taxifolium, place 49 in ( ), not seen since 1844, (Glyders, W. Wilson 1844, BM) conf. Paton, comm. Hill.

55.1 Scapania gymnostomophila, in mossy hollow on limestone pavement, Keel Bridge, Lough Carra (H26), Long.

55.4 S. scandica, with Tritomaria exsectiformis on peat on rocky slope, Carn Galver, Penwith, Land's End peninsula (1), Paton; soil below cliffs, NE corrie, Slievemore, Achill Island (H27), Paton.

55.5 Scapania curta, by path in Doles Wood, Hurstbourne Tarrant (12), Wallace 1951 (herb. Crundwell); on sandy soil in old quarry, roadside 4 km E of Keel, Achill Island (H27), Long (E), new to Ireland.

55.6 S. lingulata, on calcareous boulder on slope of deep ravine W of Croaghaun, Achill Island (H27), Long.

55.10 S. nemorosa, on boulder on wooded river bank, E bank of Cloon River near Partry (H26), Long.

55.13 S. paludicola, amongst Sphagna in acid mire at c.270m, NW of Cerrigydrudion (50), Blackstock.

55.20 Scapania aspera, near base of limestone wall, Hall Dale, Stanshope near Alstonefield (39), Blockeel.

57.3 Odontoschisma elongatum, in peaty flush, outflow burn from Loch an Sgoir, Ben Alder Forest (97), Long.

59.3 Cephalozia hibernica, on peat in deep shade of Rhododendron thicket by Sraheens Lough, ENE of Achill Sound, Achill Island (H27), Perry & Murray.

59.4 Cephalozia loitlesbergeri, delete 48, specimens (NMW) are probably C. macrostachya, det. Paton, comm. Hill.

59.5 C. pleniceps, moorland S of lane west from Partry to Cloon River (H26), Paton; in wet boggy ground near Keel Harbour, Achill Island (H27), Blockeel & Paton.

59.9 C. leucantha, moorland S of lane west from Partry to Cloon River (H26), Paton.

61.1 Cladopodiella francisci, on peaty soil, Carman Muir, near Cardross (99), J.A.B. Smith, comm. A.C. Smith.

63.1 Hygrobiella laxifolia, on wet grit rock by stream in moorland clough, Fairbrook, Woodlands Valley, High Peak (57), Blockeel.

64.2 Anthelia juratzkana, earthy bank above stream at c.500 feet, W of Keem Strand, Achill Island (H27), Paton.

66.3 Kurzia sylvatica, on burned, sandy peat, Carman Muir, near Cardross (99), J.A.B. Smith, comm. A.C. Smith; moorland S of lane west from Partry to Cloon River (H26), Paton.

69.1 Calypogeia neesiana, moorland S of lane west from Partry to Cloon River (H26), Paton; peat on boulder, SW side of Lough Nakeeroge (east), NE of Croaghaun, Achill Island (H27), Paton.

69.6 Calypogeia sphagnicola, creeping among Sphagnum papillosum in acid bog, Cors Bodgynydd, NW of Betws y Coed (49), Yeo.

74.1 Herbertus stramineus, on ledge of crag on basic rocks, c.950m, Glas Coire Beag, Glas Tulaichan (89), Rothero.

77.3 Porella platyphylla, on limestone rocks facing south-east, Eileach a Naoimh, Garvellach Islands (102), Corley.

77.4 Porella cordaeana a var. cordaeana, on roots of ash tree by seasonal stream, Manifold Valley, near Wetton (39), Blockeel; top of boulder beside river, Cadnant Dingle, Menai Bridge (52), Yeo.

78.4 Frullania fragilifolia, on old Quercus trees, Savenake Forest (7), Rose; on Quercus in old oakwood, E side Caban-Coch Reservoir, Moel Fryn, Elan Valley (42), Rose & Woods.

83.1 Lejeunea cavifolia, delete 52, specimen (BBSUK) is indeterminable without oil-bodies.

83.4 L. hibernica, creeping over Fissidens in subterranean burn in large block scree, 250m, E-facing slope of coire of Mweelrea, above Doo Lough (H27), Rothero.

83.5 L. flava, vertical wet rocks in ravine, 50m, small ravine on S side of Ben Gorm above Killary Harbour (H27), Rothero.

85.3 Cololejeunea minutissima, amongst Frullania dilatata on detaching bark of moribund, coppiced field maple, Chapel Wood, Peasemore near Newbury (22), Bates.

Contributors of Records 1987

J.W. Bates, P. Benoit, T. Blackstock, T.L. Blockeel, G. Bloom, M.A.S. Burton, K.M. Cocking, M.F.V. Corley, R.W.M. Corner, A.C. Crundwell, J.G. Duckett,, R.J. Fisk, M.O. Hill. P.J. Lightowlers, D.G. Long, B.M. Murray, A. Orange, J.A. Paton, A.R. Perry, R. Porley, P. Rhind, F. Rose, G.P. Rothero, A.C. Smith, J.A.B. Smith, D.M. Synnott, C. Wall, E.C. Wallace, R.G. Woods, M. Yeo.

MUSCI

T.L. BLOCKEEL

1.7 Sphagnum fimbriatum, on grassy bank in coastal gully, Trawmore Sand, eastern end of Keel Bay, Achill Island (H27), Blockeel.

1.15 S. molle, damp depression in Molinia - Trichophorum dominated heath, between Glasfryn and Rhydlydan (50), Yeo.

1.18 S. platyphyllum, flushed slopes, Glenlaur Valley just above Sheeffry Bridge (H27), Synnott.

1.20 S. subsecundum, Carex lasiocarpa flush on blanket bog, east of Orrid Lough, Maam Cross (H16), Grogan & C. Douglas; flush on blanket bog, Derrakillew (H27), Grogan et al.

1.27 S. recurvum a var. amblyphyllum, swampy area, Keywards Wood, Crowborough (14), Stern; shaded site in Sphagnum rich Salix cinerea carr, Hatch Mere, near Kelshall (58), Wigginton: b var tenue, Juncus subnodulosus flush, boggy field, Upper Nantserth, ca. 2 km. N of Rhayader (43), Yeo; slightly base-rich Juncus acutiflorus flush in marshy field, E. of Rhosgoch, ca. 1.5 km. S of Mydroilyn (46), Yeo & T. Blackstock; slightly base-enriched Carex rostrata-dominated swamp, nr. Glasfryn (50), Yeo; Betula flush on raised bog, Ardagh (H2), Grogan & C. Douglas; small flush on blanket bog, East of Orrid Lake, adjacent to road, Maam Cross (H16), Grogan & C. Douglas; swallow hole area on blanket bog, 3 km. east of Glenkeen Bridge, south of Loursburg (H27), Grogan & E. McGee.

11.1 Archidium alternifolium, NE shore of L. Mask, Ballygarry Pier, S of Partry (H26), Paton.

12.1 Pleuridium acuminatum, steep bank in wood, below L. Greney, nr. Knappagh, S of Westport (H27), Paton.

12.2 P. subulatum, on disturbed ground in Dormer's Wood, Thornham Magna, near Eye (25), A.C. Smith; reinstate 51, record (J. Bryol. 7: 136) accidentally omitted from Census Catalogue.

14.6 Ditrichum pusillum, on soil among limestone rocks at 900 m., Coire Cheap, Ben Alder range (97), Corley.

18.1 Seligeria donniana, on stonework of ruin in wooded valley, lower Moniack Glen, south of Kirkhill (96), Long & Lightowlers.

18.6 S. calcarea, limestone wall (?Portland stone), Torquay (3), Pool.

27.1 Aongstroemia longipes, damp ground in old gravel pit, R. Conon opposite Scatwell House (106), Long & Lightowlers.

28.2 Dicranella schreberana, barley stubble, Derrybrat, 5 km north-west of Kilcormac (H18), Whitehouse; on shaded clay bank at edge of woodland near a moist ditch running into nearby lake, Westport House, Westport

(H27), Newman.

28.6 D. rufescens, tractor rut on woodland path, E side of Cloon River, between Srah and Partry (H26), Synnott.

28.8 D. staphylina, stubble field, Newton-on-Trent (54), Blockeel; barley field, 2 km south-west of Ballinderry (H10), Whitehouse; barley field, 2 km west of Mountmellick (H14), Whitehouse; barley stubble, Derrybrat, 5 km north-west of Kilcormac (H18), Whitehouse; barley field, 2.5 km east of Rathangan (H19), Whitehouse; in tractor ruts in woodland, E bank of Cloon River near Partry (H26), Long; on peaty soil by track, Dooega, Achill Island (H27), Blockeel.

28.9 D. cerviculata, side of drain, Salia, Achill Island (H27), E. Rosen & Synnott

31.2 Kiaeria blyttii, on soil in the crevices of the summit cairn, Cader Idris (48), Hall, 1986; top of boulder in scree on E slope of N corrie, Mweelrea (H27), Paton.

32.12 Dicranum montanum, on trunk of ancient pollarded/coppiced oak, The Great Wood, Swanton Novers, nr. Melton Constable (28), Libbey, 1986, comm. Stevenson.

34.1 Campylopus subulatus, gravelly ground in old quarry, roadside 4 km. E of Keel, Achill Island (H27), Long.

34.5 C. pyriformis b var. azoricus, Molinia tussock in boggy ground, S of Tynllidiart, above Carreg-ddu Reservoir, nr. Rhayader (43), Yeo & P. Jackson.

34.12 C. brevipilus, Egton Moor (62), Usher.

36.2 Leucobryum juniperoideum, on bank under Quercus, Afon Clettwr Valley, near Taliesin (46), Long.

37.2 Fissidens viridulus, E bank of Cloon River between Srah and Partry (H26), Synnott.

37.2A F. pusillus a var. pusillus, flushed flints in lake outfall, Queen's Mere, Wokingham (22), Bates, 1985; rock in stream, Llangefni Dingle, Anglesey (52), Yeo & S. Shea, 1986; on stone in ditch in dense shade from conifer trees and hedge by old ruined animal stalls in field ca. 1/4 mile up small road off N6 between Athlone and Moate (H23), Newman; boulder in scrub by limestone pavement, W of Keel Bridge (H26), Synnott: b var. tenuifolius, on vertical face of limestone boulder in woodland, Wilsford (53), Wigginton.

37/2B F. limbatus, soil in crevice on limestone cutting by road, Manifold Valley, near Wetton (39), Blockeel; on soil in gully facing north-west on sea cliff, Eileach a Naoimh, Garvellach Islands (102), Corley; on bank of path in shady woodland, near Rose Cottage, NW of Westport (H27), Long.

37.5 F. curnovii, dripping rock outcrops by Nant Iechyd, Cwm Dimbath (41), Perry, 1974 (NMW).

37.12 F. celticus, on shaded soil bank by stream, Ely River, near Ynysmaerdy (41), Orange.

37.15 F. cristatus, Holybourne Down, Alton (12), E.C. Wallace & Crundwell, 1956.

38.1 Octodiceras fontanum, overspill by lock on Llangollen branch of Shropshire Union Canal, Grindley, nr Whitchurch (40), Fisk.

40.1 Tortula ruralis b ssp. ruraliformis, slab of limestone in floor of old carboniferous limestone quarry by Ifton, Great Wood, Rogiet (35), Perry.

40.3 T. intermedia, on cottage wall, Murrisk (H27), Martin.

40.6 T. laevipila a var. laevipila, on Fraxinus in open parkland, near Rose Cottage, NW of Westport (H27), Long.

40.8 T. muralis b var. aestiva, on shaded vertical chalk in sunken lane, Quidhampton Wood, near Wroughton (7), Corley.

40.9 T. marginata, shaded base of limestone wall of Stoke Rochford church, near Grantham (53), Wigginton; on stone on wall top sheltered by bushes, east side of L. Carra opposite Otter Point (H26), Whitehouse;

on decaying plaster of ruined cottage, Keem, Achill Island (H27), Whitehouse.

40.11 T. papillosa, on tarmac chipped road surface, Sandrock Road, St. Catherine's Point, Isle of Wight (10), Matcham.

45.2 Pottia starkeana b ssp. starkeana var. brachyodus, on soil in gully facing north-west on sea cliff, Eileach a Naoimh, Garvellach Islands (102), Corley.

45.3 P. commutata, reinstate 2, record (Trans. Brit. Bryol. Soc. **4**: 725) accidentally omitted from Census Catalogue.

45.5 P. crinita, delete 47, no record traced, comm. Hill.

45.7 P. intermedia, walled garden, Luska (H10), Whitehouse.

46.1 Phascum cuspidatum a var. cuspidatum, walled garden, Luska (H10), Whitehouse; barley field, 2.5 km east of Rathangan (H19), Whitehouse.

46.3 P. floerkeanum, on moist calcareous clay, flood zone of ditch by gravel pit, Langtoft (53), Wigginton; on clay soil in stubble field, Eaton Wood, SE of East Retford (56), Blockeel.

49.1 Barbula convoluta b var. commutata, on sandy soil, roadside verge, Stoke Rochford (53), Wigginton.

49.4 B. revoluta, mortared walls, Portumna Abbey (H15), Whitehouse.

49.5 B. acuta, chalk grassland by roadside, south eastern corner of Coldeaton Park (12), Crundwell.

49.16 B. trifaria, on oolitic limestone, Parish churchyard, Ramsey (31), Stevenson et al.

49.20 B. cylindrica, mortared walls, Portumna Abbey (H15), Whitehouse.

49.20A B. tomaculosa, barley stubble, Derrybrat, 5 km. north-west of Kilcormac (H18), Whitehouse; barley field, 2.5 km. east of Rathangan (H19), Whitehouse, new to Ireland.

49.22 B. ferruginascens, on soil among south-east facing rocks, Eileach a Naoimh, Garvellach Islands (102), Corley.

50.1 Gynmostomum calcareum, crevice under overhanging limestone rock, on west-facing slope west of Partry (H26), Whitehouse; on sides of large base-rich boulders, large gully at western foot of Croghaun, Achill Island (H27), Blockeel.

51.1 Gyroweisia tenuis, derelict China Clay works, Georgia, Penzance (1), Paton, 1966 (replaces previous record in Trans. Brit. bryol. Soc. **4**: 370, which is Leptobarbula berica); on damp wall of steps leading to basement, on limestone blocks and mortar, growing with Seligeria calcarea, Hutton Church (18), Pyner; on mortar of brick wall of old herb garden, Thornham Magna, near Eye (25), A.C. Smith (replaces previous record in Bulletin BBS **40**: 26, which is Leptobarbula berica); base of church wall, King's Ripton (31), Yeo, 1986; NE face at ground level of 1 m. high mortared wall at entrance to drive, near Leserragh House, NW of Coolbawn (H10), Whitehouse; with Rhynchostegiella tenella and Barbula cylindrica at base of mortared wall under trees (H14), Whitehouse; crumbling mortar near base of WSW facing wall, shaded by yew, stable block, Portumna Abbey (H15), Whitehouse; near base of mortared SW-facing wall, shaded by trees, of mill on River Liffey at Victoria Bridge, west of Naas (H19), Whitehouse; on soft limestone boulder on lake shore, NE side of Cooley Lough, near Ballyhean (H26), Long; on mortar of gatepost, lane below Slievemore, Dugort, Achill island (H27), Long.

51A.1 Leptobarbula berica, on moist wall of the house, Letterdyfe House, Roundstone (H16), Arts, 1986, comm. Whitehouse, new to Ireland.

54.1 Weissia controversa b var. crispata, soil at foot of limestone wall, near Bank Head, Kendal (69), Cocking.

54.8 W. rostellata, on damp soil on wooded river bank, E bank of Cloon River, near Partry (H26), Long.

55.1 Oxystegus sinuosus, stone on stream bank in limestone woodland, Manifold Valley, near Wetton (39), Blockeel; mortar at base of wall of old graveyard with Rhynchostegiella tenella, SW of Coolbawn (H10),

Whitehouse; on tree roots on wooded lake shore, by lake, Westport House (H27), Long.

57.7 Tortella inflexa, on chalk in deep shade, Grim's Ditch, Streatley (22), Bowen, comm. Bates.

59.1 Trichostomopsis umbrosa, base of brick wall, Rufford, near Ollerton (56), Blockeel; on shaded steps in churchyard, Ledsham, north of Castleford (64), Blockeel.

63.5 Schistidium atrofuscum, on limestone cliffs, Craig Mhor, Glen Tilt (89), Long, 1976.

64.3 Grimmia laevigata, clay roofing tiles, barn at Seabeach House, Selhurst Park, Eartham (13), Matcham.

64.11 G. atrata, on boulder in block scree, valley NE of summit, Ben Wyvis (106), Long & B.M. Murray.

64.17 G. trichophylla a var. trichophylla, delete 51, record is unlocalised and no specimen has been traced, comm. Hill: c var. stirtonii, Mount Orgheil Castle, Jersey (C), Appleyard.

64.19 G. retracta, on boulder on shore, shore of Loch Ness below Abriachan (96), Long & Lightowlers.

64.20 G. decipiens, on boulder in marsh, Arthur's Seat, top of Whinny Hill (83), Lightowlers, 1978 (E); on exposed basic boulder, basic outcrop below N coire of Croagh Patrick (H27), Rothero.

66.3 Racomitrium aquaticum, on wet rock ledge on millstone grit by stream, Crowden Great Brook, Longdendale (58), Blockeel.

66.9 R. canescens, on dunes by Kinshaldy car park, Tentsmuir, 7 km. N of St Andrews (85), Hill; on gravelly limestone rock ledges and slopes, Coire Cheap, Aonach Beag, Ben Alder range (97), Corley et al.

66.10 R. ericoides, old gravel workings, Rewell Wood, Slindon (13), Appleford.

66.11 R. elongatum, stony roadside nr small quarry, 1 km E of Irthing Head, Kielder Forest (67), Hill; peaty heathland, Inchnadamph N.N.R., north of Beinn Nan Cnaimseagh (108), M. Woods, 1986.

68.1 Glyphomitrium daviesii, on rocks in opened out area of gorge ca. 500' above sea level mixed with Ptychomitrium, W slopes of Mweelrea (H27), Newman.

71.2 Funaria muhlenbergii, soil on rocky limestone bank, Hall Dale, near Alstonefield (39), Blockeel.

71.6 F. obtusa, locally abundant on peaty sides of forestry ditch, by track between Rapley Farm and New England Hill, Easthampstead (22), Bates.

73.1 Physcomitrella patens, on moist soil exposed at edge of pond, 1 km. W of Cynwyd (48), Benoit, comm. Hill; with Riccia cavernosa on clay soil, pond edge, Rauceby Warren nr. Sleaford (53), Wigginton; bare soil, vertical bank at edge of moor by road, near Keillmore, Kintyre (101), Cocking; on mud under Salix by river, E bank of Cloon River near Partry (H26), Long.

75.5 Ephemerum serratum a var. serratum, raised mud bank, near Cloon River, near Partry (H26), Burton; amongst Fossombronia pusilla var. maritima, flat sandy area behind strand, Trawmore sand, nr. Dookinelly, Achill Island (H27), Paton: b var. minutissimum, marshy area on edge of wood, nr. Rose Cottage, NW of Westport House (H27) Paton.

78.2 Tetraplodon mnioides, on dung, Yateley Heath (12), Rose; on a dead sheep on moorland slope, Ashop Clough, High Peak (57), Blockeel.

83.1 Orthodontium lineare, shady peaty bank under shrubs, valley above Sraheens Lough, Achill Island (H27), Long.

84.1 Leptobryum pyriforme, barley stubble, Derrybrat, 5 km. north-west of Kilcormac (H18), Whitehouse.

85.1 Pohlia elongata a ssp. elongata var. elongata, sandy soil below scree, E slope of N corrie, Mweelrea (H27), Paton.

85.3 P. cruda, under boulder in block scree, Caheraspic corrie, Sheeffry Mts. (H27), Synnott.

85.6 P. drummondii, track near car park, 1 km. N of Ballo Reservoir, Lomond

Hills (85), Hill.

85.7 P. filum, sandy roadside, nr. Pithouse Crags, Kielder Forest (67), Hill; disused sand pit, E of L. Doo, E of Dugort, Achill Island (H27), Paton.

85.11 P. camptotrachela, on gravelly roadside, lane below Slievemore, Dugort, Achill Island (H27), Long.

85.12 P. muyldermansii, rock crevice on cliffs above Llyn Fach, Craig-y-llyn (41), A.J.E. Smith, 1962 (**NMW**), comm. Perry; on wet soil at base of gully in north corrie, Slievemore (H27), Blockeel; all material from the British Isles is referable to var. pseudomuyldermansii Arts, Nordhorn-Richter & Smith (1987).

85.14 P. lutescens, edge of path, Duchess Wood, Thornham Magna, near Eye (25), A.C. Smith; on soil on crumbling slope by stream, Ooghnadirka, Achill Island (H27), Long.

85.16 P. carnea, disturbed soil between graves, Heathstown churchyard, NW of Kinnegad (H23), Whitehouse.

87.1 Plagiobryum zieri, on soil among limestone rocks facing south-east, Eileach a Naoimh, Garvellach Islands (102), Corley.

88.1 Anomobryum filiforme b var. concinnatum, in peaty crevice on limestone pavement, Keel Bridge, Lough Carra (H26), Long.

89.4 Bryum algovicum var. rutheanum, sandy soil, Rauceby Warren, Rauceby (53), Wigginton.

89.12 B. weigelii, near Waterford (H6) in (), E. Madden, 1852 (**DBN**), comm. Synnott, confirmation of only Irish record.

89.17 B. knowltonii, sparingly amongst Juncus maritimus, by Dovey Junction railway station (47), Benoit, comm. Hill.

89.23 B. flaccidum, on elder in hedge by road, Wetton Mill, Manifold Valley (39), Blockeel; on rotting Quercus robur log in Oak-Hazel woodland, Newell Wood, nr. Castle Bytham (53), Wigginton.

89.27 B. pallescens, at base of derelict shed, disused limestone quarry, Craig Llwyn (40), Benoit, comm. Hill; on sandy soil in hollow in dunes, Stackpole Warren, Bosherston (45), Orange, 1986.

89.34 B. riparium, on disturbed soil on outwash from landslip, Pollochro Woods, Inversnaid (86), Orange; Corryphuill, Nephin Beg Mts. (H27), Synnott, 1982.

89.37 B. bicolor, barley stubble, Derrybrat, 5 km. north-west of Kilcormac (H18), Whitehouse.

89.40 B. dunense, chalky soil, footpath on Newmarket Hill, Woodingdean, nr. Brighton (14), Matcham; thin soil on boulders in disused stone pit, Holton, nr. Oxford (23), Corley, 1968.

89.42 B. radiculosum, mortar in wall of building, Glenbain, Traligill Valley, nr. Inchnadamph (108), Yeo; mortared walls, Portumna Abbey (H15), Whitehouse; lime kiln at roadside, Slieve Bloom mountains, 5 km. east of Kinnitty (H18), Whitehouse; on shady wall, lane below Slievemore, Dugort, Achill Island (H27), Long.

89.43 B. ruderale, chalk grassland, Whitland Copse, Butser Hill (11), Stern; barley field, 2 km. south-west of Ballinderry (H10), Whitehouse; barley field, 2 km. west of Mountmellick (H14), Whitehouse; barley stubble, Derrybrat, 5 km. north-west of Kilcormac (H18), Whitehouse; side of roadside drain at Cloughmore Pier, Achill Island (H27), Synnott.

89.44 B. violaceum, barley stubble, Derrybrat, 5 km. north-west of Kilcormac (H18), Whitehouse; barley field, 2.5 km. east of Rathangan (H19), Whitehouse.

89.45 B. klinggraeffii, arable field, Glasbury (43), Port; barley field, 2 km. west of Mountmellick (H14), Whitehouse; barley stubble, Derrybrat, 5 km. north-west of Kilcormac (H18), Whitehouse; barley stubble, 2.5 km. east of Rathangan (H19), Whitehouse.

89.46 B. sauteri, amongst Anthoceros and Riccia spp., damp trackside below Slievemore, N of Slievemore Hotel, Dugort, Achill Island (H27), Paton.

89.48 B. microerythrocarpum, on peaty soil by track, Dooega, Achill Island (H27), Blockeel.

89.50 B. rubens, barley field, 2 km. south-west of Ballinderry (H10), Whitehouse; barley stubble, Derrybrat, 5 km. north-west of Kilcormac (H18), Whitehouse; barley field, 2.5 km east of Rathangan (H19), Whitehouse; cindery path round cottage, Killanummery, Dromahair (H29), Fisk, 1982.

91.2 Mnium thomsonii, crevices of north-facing limestone rocks, Hall Dale, nr. Alstonefield (39), Blockeel.

92.1 Cinclidium stygium, in mire, on N side of Vaila Sound, W of Walls, Shetland (112), Corner.

93.3 Rhizomnium pseudopunctatum, base-rich flush in marshy field, E of Rhosgoch, ca. 1.5 km. S of Mydroilyn (46), Yeo & T. Blackstock.

94.2 Plagiomnium affine, Hartlebury Common (37), Fisk, 1980; on shaded bank in tall grass, Rauceby Pit LNR, Rauceby (53), Wigginton; amongst mosses over shaded boulder on raised beach, Gt. Cumbrae, Strathclyde (100), Cocking.

94.7 P. rostratum, stone beside path on edge of wood, nr. Rose Cottage, NW of Westport House (H27), Paton.

104.1 Bartramidula wilsonii, on soil on gravelly scree slope, NE corrie of Mweelrea (H27), Long (E).

108.1 Amphidium lapponicum, damp calcareous rock crevice in crags, Cwm Cywarch, nr. Dinas Mawddwy (48), Yeo.

108.2 A. mougeotii, wet crevice at foot of millstone grit cliff, Crowden Great Brook, Longdendale (58), Blockeel.

109.1 Zygodon viridissimus b var. stirtonii, on limestone outcrop, Wetton Mill, Manifold Valley (39), Blockeel: on coping stones of limestone wall, by Newell Wood, Castle Bytham (53), Wigginton.

109.2 Z. baumgartneri, on old Ulmus, Glenkinnon Burn, Peel (79), Corner; on trunk of large ash in woodland, Pollochro Woods (86), Orange; on trunk of Quercus robur in parkland, Temple House, near Ballymote (H28), Orange.

109.3 Z. conoideus, in small quantity on slightly base-rich millstone grit boulder in moorland clough, Abbey Brook, Upper Derwent Valley, NW of Sheffield (63), Blockeel.

110.12 Orthotrichum urnigerum, delete the entire entry (Blockeel, 1987).

111.6 Ulota phyllantha, small tuft on elder, Clipsham Park Wood, Clipsham (55), Stern; old ash, bed of Danes Dyke, near the coast, Flamborough (61), Wall.

112.1 Hedwigia ciliata, tile on top of ragstone wall, near Platts Heath (15), Pitt, comm. Side.

113.1 Fontinalis antipyretica c var. gigantea, dripping wet cliff, south end of island, Wee Cumbrae (100), Cocking.

116.1 Leucodon sciuroides a var. sciuroides, on south-east facing limestone rocks, Eileach a Naoimh, Garvellach Islands (102), Corley; on Sorbus tree beside main Rd., Moate town centre (H23), Fletcher & Newman.

118.1 Pterogonium gracile, rocks at outlet of L. Bunnafreva East, Achill Island (H27), Synnott.

121.3 Neckera pumila, Rhododendron branch, woodland near Glendarary House, W of Achill Sound, Achill Island (H27), Paton.

122.1 Homalia trichomanoides, on roots of Horse Chestnut by roadside, Rose Cottage woods nr. Westport (H27), Newman.

127.1 Daltonia splachnoides, on sloping rock slab by stream, ravine below N ridge of Devils Mother (H27), Long.

128.1 Myurella julacea b var. scabrifolia, on damp slabby limestone, crags E of Loch Loch, Beinn a Ghlo (89), Rothero; on limestone rocks at 2700 ft., Beinn Dorain (98), Corley, 1971.

130.1 Habrodon perpusillus, on bole of ash tree in coastal valley, near Chapman's Pool, Isle of Purbeck (9), Blockeel.

131.1 Pseudoleskeela catenulata b var. acuminata, patches on limestone crag,

ca. 950 m., Coire Cheap, Geal Charn (97), Rothero.

132.1 Leskea polycarpa, on silty boulder on wooded river bank, E bank of Cloon River near Partry (H26), Long.

135.1 Heterocladium heteropterum b var. flaccidum, on stone in wood, River Wood, Lodsworth, near Petworth (13), Matcham; boulder in mixed woodland, woodland E of Cloon River near Partry (H26), Long; on large boulder under trees, N of Bunanakee River, W of Mweelrea (H27), Long.

136.3 Anomodon viticulosus, on rock face in woodland, by R. Bunanakee, south bank, W slopes of Mweelrea (H27), Newman.

140.1 Campylium stellatum b var. protensum, side of boulder on limestone pavement, W side of Keel Bridge (H26), Synnott.

140.5 C. calcareum, on decaying root in bank, Chalkney Wood, Earls Colne (19), Hill; limestone boulder in old quarry, Nantporth nr. Bangor (49), Yeo & S. Shea; sandy bank in lee of storm beach, Bull's Mouth, Achill Island (H27), Synnott.

141.4 Amblystegium varium, on tree roots on wooded lake shore, by lake, Westport House (H27), Long.

141.6 A. saxatile, base of Molinia tussock in acid mire, Cwm Nantcol nr. Llanbedr (48), Yeo & T. Blackstock, new to Wales.

143.4 Drepanocladus fluitans b var. falcatus, wet peat in acid valley mire, between Bryn Ala and Clegir Mawr, NW of Gwalchmai (52), Yeo & T. Blackstock.

143.5 D.exannulatus b var.rotae, boggy ground, E of Srah village, E of bridge over Cloon River (H26), Rothero; in stony flush on roadside, coast near Dugort Quay, Achill Island (H27), Long.

144.3 Hygrohypnum luridum a var. luridum, shaded base of limestone wall of Stoke Rochford church, near Grantham (53), Wigginton.

144.4 H. eugyrium, wet rocks by waterfall in ravine on S side of Ben Gorm, above Killary harbour (H27), Rothero.

147.2 Isothecium myosuroides b var. brachythecioides, base-rich rocks in crags, Cwm Moch, W of Llyn Trawsfynydd (48), Yeo.

147.4 I. striatulum, on Fraxinus roots, Old Wood, Castle Combe (7), Rose, 1986.

150.5 Brachythecium mildeanum, dyke (peat substrate) bordering semi-intensive permanent grassland, Langley (27), Boyce; damp sandy ground on open grassy dunes, near Lough Nambrack, E of Dugort, Achill Island (H27), Long & Blockeel.

150.12 B. populeum, stone on NE shore, Cooley Lough, S of Ballyhean (H26),Paton.

153.1 Cirriphyllum piliferum, on bank in damp woodland, near lake, Westport House (H27), Long.

154.2 Rhynchostegium lusitanicum, on shale rocks in Nant Pant-y-llyn above falls, Treheslog, Llansantffraed Cwmdeuddwr (43), R.G. Woods; on rocks at edge of stream, R. Goyt, Errwood, Goyt Valley (58), Blockeel; submerged on rock in waterfall in small stream, Keem Bay, Achill Island (H27), Blockeel.

155.5 Eurhynchium praelongum b var. stokesii, on moist sandy clay soil, woodland floor, Wilsford (53), Wigginton.

155.6 E. swartzii b var. rigidum, on soil over Liassic limestone, Cosmeston lakes, S of Penarth (41), Perry.

156.3 Rhynchostegiella teesdalei, on stones in bed of small stream in limestone woodland, Manifold Valley, near Wetton (39), Blockeel.

157.2 Orthothecium intricatum, moist crevices in shaded limestone rocks, near Thor's cave, Manifold Valley, near Wetton (39), Blockeel.

159.4 Plagiothecium ruthei, base of old Molinia tussock in acid mire, Cwm Nantcol, nr Llanbedr (48), Yeo & T. Blackstock.

159.6 P. laetum, on coppice stool, Chalkney Wood, Earls Colne (19), Hill; steep wooded escarpment, Crosscliff, Dalby Forest (62), Bowes, 1986.

159.8 P. cavifolium, basalt crevices, The Storr, Isle of Skye (104), Sleath; on mossy cliff ledge, E corrie of Slievemore, Achill Island (H27),

Long.

159.10 P. nemorale, tree base by stream, Wellow Park, Ollerton (56), Stern.

168.4 Hypnum mammillatum, on bole of sycamore by stream, Manifold Valley, near Wetton Mill (39), Blockeel.

168.9 H. callichroum, humid steep N-facing slope with broad-leaved woodland on neutral to acid mudstone, S bank of the river Llyfnant, W of Glaspwll (46), Benoit, 1974, comm. Hill.

169.1 Ptilium crista-castrensis, on steep grass covered scree at ca. 2000 ft on the western side of the N-facing corrie, Mweelrea (H27), Synnott, new to Ireland.

170.1 Ctenidium molluscum b var. fastigiatum, with Neckera crispa on dry shaded calcareous rock face, Cwm Cneifio, Glyders (49), Yeo; c var. condensatum, flushed base-rich rock face, Bwlch y Fign, ca. 9 km E of Dolgellau (48), Yeo; on wet rock in north corrie, Slievemore, Achill Island (H27), Blockeel.

175.1 Hylocomium brevirostre, limestone scree in wood, W side of Morlais Hill, N of Merthyr Tydfil (41), Perry & Orange.

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Contributors of records, 1987

Mrs K. Appleford, Mrs J. Appleyard, T. Arts, J.W. Bates, P.M. Benoit, T.L. Blockeel, H.J.M. Bowen, P.C. Bowes, D. Boyce, Dr M.A.S. Burton, Mrs K.M. Cocking, M.F.V. Corley, R.W.M. Corner, A.C. Crundwell, R.J. Fisk, M.V. Fletcher, Ms H. Grogan, L.E. Hall, M.O. Hill, R.P. Libbey, P.J. Lightowlers, D.G. Long, P. Martin, H.W. Matcham, D.A. Newman, A. Orange, J.A. Paton, A.R. Perry, Ms J. Pitt, M. Pool, P.J. Port, T. Pyner, F. Rose, E.J. Rosen, G.P. Rothero, Mrs A.G. Side, J.D. Sleath, A.C. Smith, R.C. Stern, R. Stevenson, D.M. Synnott, M.B. Usher, C. Wall, H.L.K. Whitehouse, M.J. Wigginton, M. Woods, R.G. Woods, M. Yeo.

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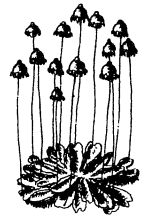
Add the following, inadvertently omitted from the list of contributors for 1986: J.H. Field, P.W. Richards.



Edited by

A.R.Perry, Department of Botany, National Museum of Wales, Cardiff CF] 3NP, U.K.