

BRITISH BRYOLOGICAL SOCIETY

PRESIDENT: PROF. P. W. RICHARDS

BULLETIN

No. 31. January, 1978

Price £0.30

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SUBSCRIPTIONS

Subscriptions for 1978 are now due and should be sent immediately to the Treasurer, Dr W.D. Foster, Department of Pathology, Macclesfield Hospital, Prestbury Road, Macclesfield, Cheshire, SK10 3BL. The Ordinary membership subscription is £6.00; the Junior membership subscription is £3.00. In order to save postage it is proposed not to send invoices to foreign members. Subscriptions are due each January 1st and the Treasurer would be most grateful if members would pay without his having to resort to the trouble and expense of sending reminders. Foreign members should pay their subscription in £ sterling. A convenient means of payment is by a "Post Office Money Order - Mandat de poste international". Euro-cheques are not acceptable.

BRITISH BRYOLOGICAL SOCIETY
INCOME AND EXPENDITURE ACCOUNT YEAR TO 31 DECEMBER 1976

INCOME	£	EXPENDITURE	£
Subscriptions	3,007.01	Printing Journal - Blackwells	
Gift	500.00	Volume 9 (1 & 2)	3,692.49
Sales - Blackwells Journals	2,742.81	Cost of reprinting Volume II	1,125.27
Less Commissions - Blackwells	<u>1,099.10</u>	Printing Bulletin 27 & 28 and	
Sale of Literature	229.83	Membership list	333.45
		Postages	24.40
Dividends Received (Net)		Commercial Union Ass.	10.30
Drayton Inv. Trust	23.49	Librarian's expenses	16.93
British Savings Bonds	8.40	Refund on returned Journals	29.70
Lloyds 3rd. Units	41.26	Credit recollected	5.25
Save & Prosper	<u>32.48</u>	Blackwells	35.37
Deposit Interest Lloyds (Gross)	370.22	Expenses - Meetings, Recorders	
Sundries	8.79	Teach-in	58.81
		Unpaid Cheques	16.98
		Excess Income over Expenditure	516.24
	<u>5,865.19</u>		<u>5,865.19</u>

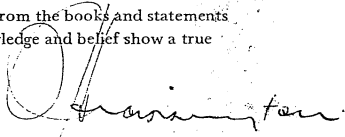
STATEMENT OF AFFAIRS AS AT 31 DECEMBER 1976

Advance Subscription	87.70	Cash on Deposit - Lloyds Bank	5,011.23
Creditor - Blackwell	2,048.78	Cash on Current - Lloyds Bank	473.47
Capital Account	5,013.25	Savings Bonds	120.00
Add Excess Income		Drayton Premium Unit Trust	459.37
over expenditure	<u>516.24</u>	Save & Prosper	530.00
	5,529.49	Lloyds 3rd Units	1,071.90
	<u>7,665.97</u>		<u>7,665.97</u>

CERTIFICATE.

I hereby certify that the Income & Expenditure account has been prepared from the books and statements presented to me by W.D. Foster, Hon. Treasurer and to the best of my knowledge and belief show a true statement of the affairs of the Society as at 31 December 1976.

4, Oakwood Drive,
Prestbury,
Cheshire.


J. Braxington
Certified Accountant
18th July, 1977.

NON-DELIVERY OF THE JOURNAL

All queries about non-delivery of the Journal of Bryology should be addressed without exception to the Secretary, A. R. Perry, National Museum of Wales, Cardiff, CF1 3NP, U.K., not to Blackwell's. Members in arrears with their subscriptions should note in any case that they will not be sent the Journal until they have paid up; they should also note that not paying their subscription until the autumn after it falls due will not lead to an immediate despatch of their missing parts: it takes some time for these members to be got into circulation again. Volume 9 part 4 of the Journal was posted to members at the beginning of 1978 and should have reached most inland addresses by about 12 January.

PROCEEDINGS OF THE BRITISH BRYOLOGICAL SOCIETY

THE SUMMER MEETING, 1977.

First week - Perthshire (23 - 30 July)

About a dozen members and friends joined the first week of the meeting which was based at Pitlochry and made use of facilities at Kindrogan Field Centre. The majority of sites visited were on calcareous ground with a wide range of altitude and a number of interesting discoveries were made.

24 July: Glen Tilt (lower) 27/86 (v. c. 89)

This part of the Tilt Valley is mainly in limestone and has a quite impressive gorge. Dykes of lamprophyre occur within the limestone and provide a rather more acidic substrate. There was a moderately persistent drizzle early in the day but this cleared up after lunch. This part of the glen is notable for the considerable amounts of Orthothecium rufescens and O. intricatum on the rock faces, often associated with Cratoneuron, encrusted with thick calcareous tufa. Anthelia juratzkana was found at a remarkably low altitude (800ft) growing on a moist outcrop of limestone and Ptilium crista-castrensis was seen in one of the conifer plantations above the gorge, along with Dicranodontium denudatum.

25 July: Glen Loch and Loch Loch cliffs 27/96 (v. c. 89)

The area is extremely complex geologically but again the party concentrated on calcareous areas (calc-schists and graphitic schists) and base-rich flushes. Unfortunately, even with the permission of the landowner to take our vehicles up to Daldhu, about 3 miles from Loch Loch, we did not manage to reach the richest areas at the northern end of the Loch, but a great deal of useful material was seen. Myurella julacea and the var. scabrifolia were seen on dry earthy ledges, mixed with a number of species of Encalypta: M. julacea was fairly common but the variety occurred mainly as isolated stems and was a new county record. The abundance of Pseudoleskea catenulata was quite remarkable and Funaria obtusa was found in a number of places together with Encalypta rhabdocarpa c. spor. Earthy crevices were searched thoroughly for Stegonia latifolia, which had been found in the area, and Desmatodon leucostoma, but to no avail. On the way back to the cars the base-rich flushes were briefly examined and provided Catoscopium nigrum, Meesia uliginosa and Amblyodon dealbatus for our mapping card, growing in handsome tussocks of Gymnostomum aeruginosum.

26 July (morning): Edintian 28/86; and (afternoon): Tomphubil and Lochan an Daimh 27/75 (v. c. 88)

Edintian and Tulach Hill have several interesting habitats and Rhytidium rugosum is recorded from dry limestone areas on the latter, but the site was not found. Edintian has some calcareous flushes and a somewhat derelict raised bog (Cladopodiella francisci and Sphagnum imbricatum were found here). Good material of Mnium seligeri and Dicranella staphylina was found on the banks of a drainage ditch by Miss Hooper and Mr. Townsend but generally the area offered little else of interest. After lunch, we visited Tomphubil, a disused limestone quarry and limekiln which is under threat of development for recreational purposes. The site is not remarkable bryologically but is noted for the occurrence of Gentianella amarella ssp. druceana in one of its few localities; the main reason for our visit was to provide the Nature Conservancy Council with a detailed bryophyte list for their records.

We then travelled a few miles to Lochan an Daimh, north of Schichallion. This is an interesting area with good Dalradian limestone pavement and calcareous flushes in a mosaic with Calluna and Pteridium. A little to the west is a small area of birch wood which has developed on limestone pavement covered with a thin layer of drift. The area yielded a good selection of Barbula spp. and Entodon orthocarpus was almost as abundant as Hypnum cupressiforme var. tectorum and H. cupressiforme var. lacunosum. Some members collected Tortella tortuosa c. spor. and the differences between the bryophyte communities of the exposed clints and the sheltered and often deep grikes were seen to good advantage.

27 July: Schichallion 27/75 (v. c. 88)

Most of the party returned to the Schichallion area and looked at some of the high-level calcareous areas which turned out to be very interesting. A total of 108 mosses and 55 hepatics was recorded including Anoetangium warburgii, Cinclidium stygium and several interesting species of Scapania including S. scandica. The old record for Trematodon ambiguus, once found in a tuft of Bryum alpinum, could not be refound in spite of careful searching in likely sites. The limestone was north-facing and both damper and higher up the mountain than in the areas visited the previous day; as a consequence of this Myurella and Pseudoleskea were not seen, although both occur on calcareous schist rocks at a similar altitude on Creag ne Chailleach and other places in the Lawers area, a few miles to the south. Acrocladium trifarium was found in some abundance in a base-flushed mire.

Two members of the party went to Killiecrankie 27/96 (v. c. 89) to investigate the way in which the bryophyte flora was affected by the increasing public use of the area which was owned by the National Trust for Scotland. Killiecrankie is predominantly Quercus petraea-Betula woodland with little calcareous influence apart from the stones and mortar of the railway viaduct. Fortunately the public use of the area appears to have been restricted to areas along paths and by the R. Garry and the bryoflora does not seem to have suffered unduly.

28 July: Glen Tilt (upper) 27/87 and 27/97 (v. c. 89)

It had been intended to look at Ben Dearg but the consensus of the party was that a visit should be paid to the upper reaches of Glen Tilt. The area around Auchgobhal was rather dry and few hepatics were found apart from Solenostoma levieri and Plectocolea subelliptica; Anoetangium warburgii was found by some members. The best ground was found on the crags to the NE of Forest Lodge (Craig Mhor), with small areas of Dryas-heath just above the river (expertly forded without incident by the party). Just above the Dryas were bands of mica - graphitic schists interspersed with bands of more acidic material. Here, a number of interesting species of Pohlia were found, together with more Myurella julacea and Pseudoleskea catenulata; Pterogonium gracile, Ulota phyllantha and Pterigynandrum filiforme were seen by several of the party and Dr. Watson collected the now rare Bryum uliginosum.

29 July: Ben Vrackie 27/96 (v. c. 89)

Heterocladium heteropterum was seen on some sycamores and lime trees by the car park and after a pleasant walk over moorland on which we gradually gained height Acrocladium sarmentosum and A. trifarium were seen in a peaty area below the dammed lochan. The party (inadvertently!) split up and searched the peak for basic ground - in this case, mainly epidorite.

Cinclidium stygium was seen in a flushed area and Mr. Crundwell found Tayloria lingulata. Tetraplodon mnioides, occasionally found in the area, turned up in several places, including the corpse of a vole. 'Pohliophiles' found 8 species including Pohlia prolifera, P. gracilis and P. bulbifera and hepatics were well represented. Scapania degenii, S. scandica, Barbilophozia quadriloba and Cynodontium tenellum were seen. Several members (the hardier ones) enjoyed a swim in the lochan on the way back.

During the course of the week, five 10 km grid squares were visited and because the area was well-known bryologically very few new county records were made. The meeting seemed to be very successful, partly because the group was quite small and tended to keep together; the less-experienced bryologists certainly benefitted from the field and laboratory work. We were also very fortunate in having good weather for the majority of the time. Our thanks are due to the landowners who gave their permission to collect material from their estates and to use private roads; to Mrs. Paton and Mr. Crundwell for devoting much of their time in the field and the lab. to helping the less experienced members, and to Brian Brookes and his staff at Kindrogan for helping with the organization of the meeting and providing facilities which were appreciated by the participants.

P.D. COKER

Second week - Elginshire (30 July - 5 August)

On 30 July Dr. Agneta Burton and I drove north for the second week of the meeting based on Elgin and organized by Dr. Roland Richter. Mrs. Joan Appleyard, Mr. Michael Fletcher, his wife and family were the only other people present. The majority of places visited were in Morayshire (v.c. 95), the first day being spent on the coast. Crossing a dry heathy slope at Covesea W. of Lossiemouth, to the shore near Gow's Castle where the sea has eroded the basic triassic sandstone cliffs into spectacular stacks and caves, we passed Pottia heimii on the path, and Grimmia maritima associated with Ulota phyllantha on boulders on the upper shore. Plants on the moist sandstone and on vertical dripping cliffs behind a mass of Urtica dioica, included Leiocolea turbinata, Amblyodon dealbatus, Amblystegium compactum and fruiting Gymnostomum calcareum. Dr. Richter showed us a few plants of Mertensia maritima on the shore before we retreated from the incoming tide and the clamour of nesting seabirds.

After lunch we examined part of the extensive old gravel works W. of Kingston, now partly colonized by Calluna vulgaris and, in the shallow hollows, by Salix spp. Here we were joined by the Fletcher family all of whom happily took part in the search for bryophytes. Haplomitrium hookeri, Preissia quadrata, Riccardia incurvata, Aongstroemia longipes, Drepanocladus aduncus and Campylium polygamum occur in some of the damper depressions, but the most abundant species are C. stellatum and Scorpidium scorpioides. Lophozia excisa and L. bicrenata, scattered in drier, less densely vegetated areas, were seen again in Lossie Forest when we explored a flooded gravel pit (with Mnium rugicum), and old sandpit (with Tritomaria exsectiformis) and the surrounding conifer plantation in the area N. of Speyslaw. Barbilophozia hatcheri, which grows on sandy banks here, subsequently proved to be a common plant on rocks in this part of Scotland, whereas B. floerkei was recorded only once.

On 1 August the venue for our single excursion into Easternness (v.c. 96) was Loch Loy in the western part of the Culbin conifer forest. In deciduous woodland south of the loch we saw a few plants of Goodyera repens and

Corallorhiza trifida; Scapania umbrosa and Tritomaria exsectiformis were noted on rotten logs and Ptilidium pulcherrimum on a Betula trunk. Despite the high level of the water in the loch and the flushes and marshes on the margin we managed to slosh along the S.E. shore, enjoying what became a nature ramble thanks to the presence of the Fletcher children. Some of the flushes are base-rich with Cratoneuron commutatum and Scorpidium scorpioides, whilst Acrocladium cordifolium, Mnium rugicum, Sphagnum fimbriatum and S. squarrosum are present in the marshy areas. Much of the moist sandy shore was too densely vegetated for small bryophytes but a few plants of Haplomitrium hookeri were seen, and Riccardia incurvata in an unusual association with R. latifrons.

Dr. Richter then led us along forestry tracks south of the lane (with Diplophyllum obtusifolium and Pohlia bulbifera) to a small wet heath. In the 1930's the area consisted of completely bare peat but is now covered in an almost continuous stand of Sphagnum auriculatum. On the sandy banks of a water-filled pit, Mrs. Appleyard found Pohlia camptotrachela new to the vice-county.

Finally we visited an area of concretionary limestone in Old Red Sandstone exposed in shaded disused quarries and on the east bank of the R. Findhorn near Mundole 3 km S.W. of Forres (v.c. 95). Here we saw Barbula reflexa and Trichostomum crispulum near the river, Brachythecium glareosum and Gymnostomum calcareum on an old wall, Campylium calcareum on isolated blocks, Mnium stellare on a bank, and sheets of Eucladium verticillatum (some of it fruiting) on a vertical rock face. Barbula hornschurchiana and large quantities of Riccia sorocarpa occur on the well-trodden path which is lined by masses of the magnificent Heracleum mantegazzianum.

On 2 August four of us drove to Bridge of Brown in the hills N.W. of Tomin-toul, from where we explored the Allt Iomadaidh valley, ascending to the steep-sided part at about 400 m. Most of the rock is siliceous schist and granulite but small quantities of metamorphic limestone are exposed in the upper part of the valley where the local drift is basic, and the general vegetation contrasts sharply with the Calluna-clad peaty slopes flanking the stream lower down. On the N.E.-facing slope there are several base-rich springs and flushes with Blepharostoma trichophyllum, Leiocolea bantriensis, Scapania degenii, Ditrichum flexicaule, Philonotis calcarea, Amblyodon dealbatus, Meesia uliginosa and hummocks of Catoscopium nigrum, as well as abundant Cratoneuron commutatum, Ctenidium molluscum, Drepanocladus revolvens and Scorpidium scorpioides. Ulota drummondii and several species of Orthotrichum were seen in deciduous woodland in the lower N.E. part of the valley, but trees are replaced further up by extensive stretches of Juniperus communis, with Lophozia longidens and Orthotrichum speciosum on some of the shrubs. Antitrichia curtipendula, Hookeria lucens, Plagiothecium denticulatum var. obtusifolium and Grimmia donniana were noted on non-basic block screes, G. torquata, Isopterygium pulchellum, Pterygandrum filiforme and Metzgeria pubescens on limestone, Acrocladium giganteum, A. sarmentosum and Mnium rugicum in some of the marshy areas, and a few stems of Barbilophozia kunzeana amongst turf. Blasia pusilla, Plectocolea subelliptica, Riccardia incurvata, Solenostoma pumilum, and Pohlia camptotrachela occur on sand or gravel near the stream, and in one place P. bulbifera, P. gracilis, P. myldermansii and P. prolifera were associated with Atrichum tenellum and A. undulatum. Cinclidium stygium grows on a moist base-rich turfy slope in the upper part of the valley, and there is luxuriant Marchantia alpestris in a similar situation near by. Unfortunately it was raining hard by the time we reached these calcareous slopes and we were unable to work them adequately. It was during our long walk back through thick Calluna that the tragedy of the meeting occurred. Mrs. Apple-

yard stumbled and badly damaged an ankle. With great courage she reached the car unaided but most regrettably she was unable to attend any subsequent excursions. Our sympathy and concern did nothing to assuage her frustration and disappointment.

Thus, on 3 August only three of us visited the gorge at about 300 m altitude near Huntly's Cave $4\frac{1}{2}$ km N. of Grantown-on-Spey. Our first find in the lay-by where we had parked, was a saturated wallet containing bank notes and other treasures. Its safe return by post to its owner produced a small reward for the President! Intrusive granite is exposed on the roadside here, whilst the rocks and boulders near and in the stream consist mostly of non-basic gneisses and schist, but base-rich water seeps over some of the rock cuttings beside the disused railway line partway down the slope. Deciduous trees and conifer plantations help to shelter the valley which is reminiscent of more western sites, with luxuriant ferns and woodland mosses such as Hylacomium splendens, Ptilium crista-castrensis and Rhytidiadelphus triquetrus. Bazzania trilobata, Lophozia longidens, Scapania gracilis, Ptilidium pulcherrimum (with sporophytes), Antitrichia curtipendula and Plagiothecium laetum occur on boulders, P. curvifolium, Riccardia palmata and Scapania umbrosa on rotten wood, and Trichostomum tenuirostre on rocks in the stream where Plectocolea obovata is abundant. Steep earthy banks yielded P. subelliptica, Dicranella rufescens and Bryum riparium.

During a quick look at an area of degenerate heath bordering Dorback Burn near the old Dava railway station, several common Sphagna were added to the list, and small populations of Cephalozia leucantha, Lepidozia trichoclados, Mylia anomala, Odontoschisma denudatum, O. sphagni and Sphenoporus minutus were seen on horrible algal-covered peat cuttings.

Mr. Fletcher joined us on 4 August when we explored the east bank of the R. Findhorn in the picturesque vicinity of Randolph's Leap and its junction with the R. Divie. The numerous trees here include several interesting conifers, some of them of splendid proportions, and the path down to where the R. Findhorn narrows dramatically, passes a stone marking the terrifying fifty foot height of the 1829 floods. Much of the exposed rock is non-basic gneiss but close examination of small areas of base-rich schist revealed Blepharostoma trichophyllum, Lelocolea heterocolpos, Scapania mucronata and Isoterygium pulchellum scattered among Anoetangium compactum and Amphidium mougeotii. Other plants noted on rocks by the river included Cirriphyllum crassinervium, Grimmia hartmanii, Isoetecium holtii, Pterygynandrum filiforme, Ulotia hutchinsiae, Gymnomitrium obtusum (at an unusually low altitude of 60 m), Hygrobiella laxifolia, Lophozia alpestris, Scapania subalpina, abundant Lophocolea cuspidata on silt, and a small quantity of Dicranella crispa on a sandy ledge. On the way back to Elgin, Dr. Richter took us on a slight detour to see Orthotrichum speciosum on the bole of a roadside Fraxinus.

On our final day Dr. Richter showed us Orthotrichum obtusifolium growing with Tortula papillosa and T. laevipila on an Ulmus at Fochabers, and we stopped in Speymouth conifer forest to look at a small, deep ravine in Old Red Sandstone conglomerate below Gallows Hill. Nowellia curvifolia and Riccardia latifrons were seen on a rotten log, Campylium protensum and Gyroweisia tenuis (both with sporophytes) on rocks above the stream, and Brachythecium mildeanum on a roadside bank; the last two species were new to the county, bringing our total records for v. c. 95 up to thirty.

The three of us spent most of the day in Banffshire (v. c. 94) in which two of us had made a short stop on our way to Elgin. This was at a rather unpromising site near Bridge of Derrybeg 3 km S.W. of Charlestown of Aber-

lour, but Fossombronina incurva, Riccia sorocarpa, Pohlia bulbifera and P. gracilis were found near the road, and Dr. Burton located Cryptothallus mirabilis in the small Betula wood. On 5 August we visited Tarnash S. E. of Keith where a stream flows north through deciduous woodland and cascades over an outcrop of metamorphic limestone. Metzgeria pubescens amongst Ctenidium molluscum, and Trichostomum crispulum were seen on limestone near the waterfall, Leiocolea muelleri and Rhynchostegiella pumila on earthy banks, and a few stems of Amblystegiella confervoides in a crevice at the base of one of the rocks. Calypogeia arguta, Scapania scandica and Pohlia delicatula grow on banks beside the path, and typical woodland mosses include Cirriphyllum piliferum.

We then explored the old limestone workings in the valley to the west of Meikle Androne, E. of Keith, where deciduous woodland contains a large patch of Paris quadrifolia. Metzgeria pubescens on metamorphic limestone here is associated with Distichium capillaceum and Scapania aspera, whilst S. aequiloba, Lophozia excisa and Leiocolea badensis are present on earthy base-rich spoil, and Grimmia stricta is one of several mosses on rocky waste.

Our final stop in Banffshire was at a roadside cutting on the vice-county boundary W. of Fife Keith where a few plants of Funaria pulchella were found on earthy rock ledges. This was not only one of our nineteen new records for v.c. 94, but was also new to Scotland.

The total number of species seen during the week was not expected to be particularly high since the rainfall in this part of north-east Scotland is very low; this was sometimes difficult to appreciate as it rained for part of every day except the first. Also, since we did not ascend above 400 m (1300 ft), we did not see any of the montane species characteristic of the Cairngorms. Nevertheless, we found several interesting additions to the flora of the area, and recorded in fifteen 10 km grid squares. Our lists, however, would have been more comprehensive had there been more participants. The paucity of members was also a disappointment to Dr. Richter who had taken so much trouble over the arrangements for the meeting, for which we were very grateful.

JEAN A. PATON

THE ANNUAL MEETING, 1977.

The annual meeting was held on the weekend of 1-2 October in Beaumont Hall situated in the Botanic Gardens of Leicester University. About sixty members and guests attended on the Saturday when the President introduced seven speakers, summaries of whose papers are given here.

D. GLYN JONES (Nature Conservancy Council, Aberystwyth): "Aspects of growth and development in Sphagnum cuspidatum."

The production of innovations on mature Sphagnum shoots was discussed. An innovation is a branch of unlimited growth resembling the parent Sphagnum shoot in that it has a comal tuft and lateral branches in groups, known as fascicles. As Sphagnum shoots die and disintegrate from below, innovations become separated from the parent axis and give rise to new individuals. The frequency with which innovations are produced determines the extent to which Sphagnum is able to exploit its habitat and it is surprising that so little attention has been paid to the factors affecting innovation production by plant ecologists. Results of a number of field experiments suggested that innovation production was related to initial nitrogen concentration within

the Sphagnum shoot. Results of decapitation experiments suggested that the apex was exerting some sort of control over innovation production, possibly a hormonal type of control.

Since algal infestation of culture solutions containing nitrates hampered experiments with mature shoots, experiments with aseptically-produced primary shoots (shoots from protonemata) were carried out. Originally, the aim of the work described was to investigate the factors affecting the initiation and development of innovations on primary shoots. However, difficulty with interpreting growth of primary shoots in liquid culture led to a study of the developmental morphology of the Sphagnum shoot as a whole.

Shoots grown in balanced inorganic culture solution, with the concentration of ions resembling that of bog water, showed little or no inclination to branch. However, with increased nitrate concentrations branching increased, although these shoots did not resemble mature shoots, in that the branches continued growing and comal tufts failed to develop.

Other investigators have failed to grow Sphagnum shoots of normal appearance in liquid culture, unless some organic carbon source was present, but no explanation for this requirement was suggested.

The addition of 1% sucrose to low nitrate cultures did not produce Sphagnum shoots of normal appearance. However, addition to high nitrate cultures produced shoots of normal appearance with comal tufts and branches of limited growth, in fascicles.

The production of a great variety of extracellular substances, including both simple and complex polysaccharides by a large number of taxonomically diverse algae is now well established.

On testing some inorganic culture solution, containing primary shoots, for soluble carbohydrates by the Anthrone test, a positive result was obtained. The only source of carbohydrate was the Sphagnum shoots themselves. It was concluded that, to grow normally in liquid culture, Sphagnum shoots require sugars to compensate for that lost by leakage. Further evidence for this was that Sphagnum shoots growing into air above inorganic culture medium showed normal growth on the aerial portions.

In a final experiment with S. papillosum, in the presence of high nitrate and high sucrose, 30% more branches were produced than in any other treatment - and only in the presence of high nitrate was a significant proportion of the branches innovations.

It is difficult to relate these experiments directly to the field condition because the concentrations of nitrate found to be effective are relatively so high. It should be remembered, however, that the typical habitat for S. cuspidatum is a shallow depression on the bog surface which is not permanently flooded. During wet periods, therefore, the rain which has a considerably higher concentration of nitrate than bog water, in effect flows through the Sphagnum mat and it is well known that ions are absorbed more efficiently from flowing than from stagnant water. Also, it is likely that the growth-rate of shoots in the lower temperatures of field conditions is slower than in experimental conditions, with the result that more efficient use can be made of the nitrogen absorbed, and furthermore there will be other N_2 sources, such as ammonium, in the bog system. So far as sugars are concerned concentrations in excess of 0.01% have been measured in cold water extracts of peat, but because the shoots are exposed for much of the time leakage should be less severe than in water cultures. Also, long unbranched shoots, resembling primary shoots, have been found in permanent pools on ombrotrophic bogs.

The results presented indicated that high levels of nitrogen and sugar together stimulate the development of lateral meristems and, at the same time, limit the period of activity of some, which thus become fascicular branches and promote the activity of others, which become innovations. But so far we have not been able to throw light on the mechanism which controls the type of branch into which a lateral meristem develops.

Dr D. J. BOATMAN (Department of Botany, University of Hull): "Experiments on the growth of protonemata of Sphagnum papillosum."

Protonemata were grown on cellophane discs supported at the surface of a balanced inorganic culture solution in 25 ml beakers (Boatman & Lark, 1971). Previous work in which the concentration of the whole nutrient solution and that of individual ions was varied indicated that the growth of protonemata was directly related to the concentration of phosphate and indirectly related to the concentration of calcium. Subsequent investigations revealed that although the pH of the solutions was only slightly affected by autoclaving in the absence of cellophane discs, they were considerably and differentially affected by the presence of discs. Initially the pH of all solutions was about 5.1 but after autoclaving in culture beakers containing cellophane that of the most dilute solutions exceeded 7.0 while that of the most concentrated was about 5.8.

When solutions and the cellophane discs were autoclaved separately the pH of the diluted and undiluted solution was similar even after the culture chambers had been assembled, the range being 5.8 to 6.7. The addition of small quantities of 0.01N hydrochloric acid had a differential effect on the growth of protonemata although the effect on the pH of the various culture solutions was similar. It was concluded that the acid might be having a differential effect on the amounts of metal ions adsorbed on the cellophane discs and this in turn might be affecting the growth of the protonemata.

This hypothesis was tested by treating cellophane discs from the culture chambers with 0.05N nitric acid and determining the amounts of sodium, potassium, magnesium and calcium in the leachate. The amounts of all ions in the leachate decreased with increasing dilution of the culture solution and, at all concentrations, with the addition of hydrochloric acid to the culture solution. Only the amount of calcium in the leachate was affected more by the addition of hydrochloric acid to the culture solution than dilution of the solution as a whole.

Since the addition of acid did not affect the concentration of metal ions in the solutions, diluted or undiluted, it was considered that the protonemata must be depending on adsorbed ions for their growth. Both adsorbed calcium and growth of protonemata are more affected by the addition of acid than dilution of the solution. It is unlikely that the growth of protonemata is directly related to the amount of available calcium but other ions present at low concentrations which are more likely to affect growth, particularly iron, might behave in a similar way to calcium. This has yet to be tested.

Experiments on the growth of protonemata completely immersed in culture solution have also been carried out. No leafy buds developed in inorganic solution but in similar cultures containing glucose at a concentration of 1% almost all of the protonemata produced buds.

Boatman, D.J. & Lark, P.M. (1971). Inorganic nutrition of the protonemata of Sphagnum papillosum Lindb., S. magellanicum Brid. and S. cuspidatum Ehrh. New Phytol. 70, 1053-9.

Dr M. A. S. BURTON (Chelsea College, London University): "Heavy metals in aquatic bryophytes."

Metal accumulation by terrestrial bryophytes in ore-bearing and polluted habitats is well known, but less information is available on aquatic species. Analysis of bryophytes collected from rivers and streams in a lead-zinc mining area in Wales has demonstrated their capacity to accumulate high concentrations of zinc: up to 7,000 ppm/dry weight in Philonotis fontana; and of lead: up to 16,000 ppm/dry weight in Solenostoma crenulatum.

Investigations on the localisation of zinc in aquatic bryophytes showed that the distribution between soluble and insoluble fractions was 10-20 % soluble and 80-90 % insoluble. There have been similar reports for lead in terrestrial bryophytes, and in algae and grasses zinc has also been shown to be present chiefly in the cell walls. Zinc in the soluble fraction was found to be cationic. A wide range of tolerance to metals is indicated by the occurrence of the bryophytes in waters polluted with up to 50 ppm zinc and 6 ppm lead and the extent of accumulation was found to reflect the state of metal pollution in the water.

Dr M. E. NEWTON (Stalybridge, Cheshire): "Environmental factors controlling sexual reproduction in mosses of the genus Mnium."

Although Mnium hornum and M. undulatum are both dioecious, sexual reproduction is rare only in the latter, apparently due to the wide separation of male and female inflorescences. Male plants of M. undulatum are outnumbered by female plants but this alone can not account for the rarity of sporophytes, since most populations are potentially bisexual. The difference appears to be related to male inflorescence development as well. Thus, the regular annual production of male and female inflorescences of M. hornum is determined by an endogenous rhythm, whereas M. undulatum is critically controlled by photoperiod and temperature. Stimuli required by male plants of the latter species are much more exacting than those necessary for female inflorescence production and are such that they are likely to be received by few actively growing male plants in the field. Spatial separation of male and female gametes of M. undulatum appears, therefore, to be directly related not only to the unequal sex ratio but also to the lower fertility of male than female plants. Since environmental factors determine the frequency of sexual reproduction in M. undulatum, and hence of genetic recombination, they must also control the variability and to some extent the further evolution of the species.

Dr J. GORHAM (Department of Biological Sciences, Portsmouth Polytechnic): "Recent research on lunularic acid."

Lunularic acid, a bibenzyl compound originally isolated as a dormancy factor in Lunularia cruciata, has been identified together with lunularin in extracts of a wide range of liverwort species. It was not detected in any of the members of the Anthocerotales which were examined, nor in any of the mosses. This finding supports previous chemotaxonomic evidence for the separation of the Anthocerotales from the other orders of liverworts. Contrary to earlier reports, neither lunularic acid nor lunularin could be detected in algae. Traces of lunularic acid, lunularin, 3,4'-dihydroxystilbene and a bound form of lunularic acid, possibly the 3- β -D-glucopyranoside, were identified in extracts of the roots of Hydrangea macrophylla.

Lunularic acid was found in all parts of Marchantia and Preissia and in sporophytes of Pellia epiphylla. The greatest concentration (more than 600 $\mu\text{g/g}$ fresh weight) was found in the young thallus tips of Conocephalum conicum grown in continuous light. In general the quantities of lunularic acid present increased at higher light intensities and decreased in older tissues. Members of the Jungermanniales contained smaller quantities of lunularic acid (between 1 and 50 $\mu\text{g/g}$ fresh weight). When thallose liverworts were grown in different daylengths, in which a basic 8 hr photoperiod was extended by light of the same intensity, both fresh weight increase and lunularic acid content were greater in continuous light. In these conditions either lunularic acid was not inhibitory or the inhibition was overcome by the products of photosynthesis.

When tested in Marchantia and Lunularia gemmaling assays and the cress root growth test, lunularic acid was not found to be more effective an inhibitor than a wide range of similar compounds. Indeed, lunularin was slightly more active than lunularic acid. No correlation between structure and inhibitory activity was observed for a number of analogues of lunularic acid.

Attempts to relate the inhibitory activity of lunularic acid and its analogues to their ability to modify indol-3ylacetic acid oxidase (IAA-oxidase) activity were frustrated by the ambiguous nature of results obtained from in vitro experiments. Both stimulation and inhibition of the IAA-oxidase activity of horseradish peroxidase were observed, depending on the nature and concentration of other cofactors. In the presence of 2,4-dichlorophenol, polyphenols were generally inhibitory to IAA-oxidase activity whereas carboxylic acids, monophenols and non-phenolic compounds had little effect. Whilst the IAA-oxidase modifying effect of strong acid fractions of extracts of Conocephalum was attributable to lunularic acid, a stronger modifier, which had the properties of a phenolic glycoside, was found in aqueous extracts. Inhibition of glucose-6-phosphate dehydrogenase activity by lunularic acid was also observed.

The proposed biosynthesis of lunularic acid and lunularin via the phenylpropanoid pathway was supported by the demonstration of the enzymes phenylalanine ammonia lyase, cinnamic acid-4-hydroxylase and lunularic acid decarboxylase in Conocephalum, and by tracer studies. ^{14}C -phenylalanine was more readily incorporated into lunularic acid than was tyrosine. Over 16 hours, 12.5 % of phenylalanine fed to Conocephalum was converted to lunularic acid. Time-course and pulse-labelling experiments showed that radioactivity derived from ^{14}C -phenylalanine remained high in lunularic acid and lunularin over a period of 144 hours, whereas radioactivity in ^{14}C -lunularic acid declined rapidly when it was fed to Conocephalum. An analysis of material which had been incubated with ^{14}C -lunularic acid revealed that most of the radioactivity had been incorporated into an insoluble residue which was resistant to attack by lytic enzymes and solvents.

The role of lunularic acid as an endogenous dormancy factor in all liverworts is not established. The compartmentation of lunularic acid metabolism within cells of liverworts renders interpretation of extraction and assay experiments hazardous.

Dr M. C. F. PROCTOR (Department of Biological Sciences, The University, Exeter): "Structure, function and environment in some poikilohydric bryophytes."

Bryophytes share the poikilohydric habit with many other plants and animals, e.g. many bacteria, lichens, seeds, nematodes and rotifers.

Tolerance of desiccation is a prerequisite for all, and features of response to desiccation may be common to widely differing organisms.

Behaviour in relation to water during moist periods is also important in the biology of poikilohydric bryophytes. Species of continuously moist habitats (e.g. *Pellia epiphylla*, *Hookeria lucens*) reach maximum photosynthesis only at water contents in the region of 500% to 1000% of dry weight; respiration is little affected until very much lower water contents are reached. In such species as *Tortula intermedia* and *Anomodon viticulosus* photosynthesis and respiration show a much more nearly parallel response to water content, but with a strongly marked decline in photosynthesis at high water contents due to the superincumbent water interfering with diffusion of carbon dioxide. It is suggested that strongly poikilohydric species possess adaptations that tend to regulate the distribution of water to the photosynthesising shoots and maximise the time at near-optimal water content. The papillose cells of *Tortula intermedia* provide a system of capillary spaces covering the surface. The volume of the spaces is too small for significant water storage in an exposed situation, but calculation shows that they provide a conducting system adequate to balance high rates of evaporation in the field as long as water is freely available at the leaf base. *Thuidium tamariscinum* combines papillose abaxial leaf surfaces and the conducting 'wick' of paraphyllia on the stems with storage in the non-papillose concavities of the branch leaves; *Cololejeunea rossettiana* shows a somewhat similar combination of features. In bryophytes with smooth leaf surfaces conduction through the cell walls is likely to be important, and this may be a major factor in the evolution of the thick cell walls of many species of dry habitats. At low windspeed, low radiation income and high humidity (as in sheltered woods) evaporation rates may be very much lower, and local storage of water becomes a viable adaptation for prolonging periods of near-optimal cell water content. Structures such as the "water sacs" formed by the postical lobes of the small Lejeuneaceae may function in this way.

Dr S. R. EDWARDS (The Museum, Manchester): "Taxonomic implications of cell patterns in haplolepidous moss peristomes."

Since Philibert divided the arthrodontous mosses (Bryopsida) into the Haplolepidae and Diplolepidae in 1884, bryologists have questioned whether these groups are natural. The problem has been confused by taxonomically misplaced families, and also by the misassumption that haplolepidy means a single peristome and that diplolepidy means a double peristome.

The haplolepidous peristome (and also the inner peristome of the Diplolepidae) is formed from thickenings of the periclinal wall-pairs common to the innermost two cell layers of the amphithecium (working outwards, the inner three amphithecial layers have been termed by Blomquist and Robertson the Inner, Primary and Outer Peristomial Layers, or IPL, PPL, OPL in Fig.1). In the Bryopsida there are almost always 16 columns of cells in the PPL, but only on the Haplolepidae is each pair of columns (or pair of teeth) faced with three columns of IPL cells; in the Diplolepidae any number except three may be found. Thus haplolepidous teeth are alternately left and right handed, each being faced by $1\frac{1}{2}$ IPL cell-columns; in the Diplolepidae all teeth are generally symmetrical.

Although a 16:24 PPL:IPL ratio had previously been noted in transverse sections of haplolepidous moss capsules by Evans and Hooker, Kreulen,

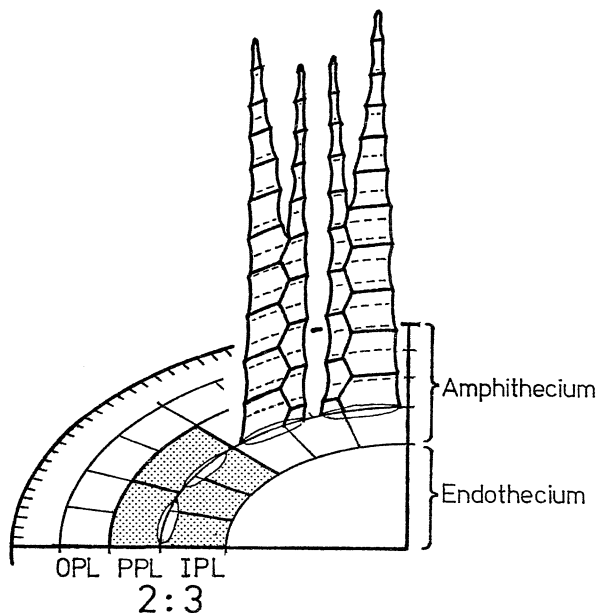


Fig. 1. Stereogram of a haplolepidous peristome loosely based on Dicranella heteromalla.

and Mueller, it has never been recognised in mature teeth where ironically it is most easily seen. In section the 16:24 ratio usually becomes approximate owing to irregularities in peristome development and also to the limited vertical extent of the pattern; but when even very reduced haplolepidous peristomes are viewed from the inside it is generally possible to detect a 2:3 PPL:IPL ratio. Moreover, the above authors have each reported the pattern only in one species or in one case two species in one family, and none has suggested it as an essential haplolepidous character.

Thus a survey was conducted of over 60 arthrodontous species to see i) whether the 2:3 ratio was universal to all the five haplolepidous orders (Dicranales, Fissidentales, Pottiales, Syrrhopodontales and Grimmiales), and ii) whether it was absent from the remaining eight diplolepidous orders. The PPL:IPL ratio of 2:3 was indeed found throughout all five haplolepidous orders, and the only "diplolepidous" species found to shew this pattern (such as Ptychomitrium and Glyphomitrium) are clearly misplaced. It is thus concluded that the Haplolepididae form a natural monophyletic group characterised by a PPL:IPL ratio of 2:3 except in species where the peristome is very degenerate or secondarily aberrant. All Encalypta species examined shewed an OPL:PPL:IPL ratio of 4:2:4, which together with the frequent development of an outer peristome weakens any suggestion that the Encalyptales form a link between the Haplolepididae and the Diplolepididae. Also, characters distinguishing the Dicranales from the Grimmiales were discussed, and it was suggested that the Seligeriaceae is ill-placed in the Dicranales. In Splachnum ampullaceum, 16 vertical ducts were noticed which communicated between the air-sac and the PPL where PPL/IPL walls ruptured upon dehiscence.

The A.G.M. was held after tea. In the evening members were generously provided with a reception at Beaumont Hall where the following were displayed:

Dr H.J.B. Birks: "Photographs of some British Hepatics."

Dr K.J. Adams: "Publications of the British Bryological Society."

Dr S.R. Edwards: "Stereograms of moss peristomes."

Drs H.L.K. & M.P. Whitehouse: "A nest of Carder Bees, Bombus agrorum, composed of Eurhynchium praelongum."

The Society is most grateful to Dr C.A. Stace (Department of Botany, University of Leicester) who acted as local secretary not only for the organisation of this meeting, but also for making arrangements for members to stay at Beaumont Hall over the weekend.

J.G. DUCKETT.

FIELD EXCURSION, RUTLAND AND SOUTH LINCOLNSHIRE

On 2 October, members explored several localities in Rutland (v.-c. 55) and South Lincolnshire (v.-c. 53) to the north of Stamford. The convoy of cars was indicative of the interest engendered in the autumn meeting as a whole and not necessarily the field trip. But it was pleasing to see such a good turn-out to study bryophytes in Lincolnshire - a county not hitherto visited by the B.B.S.

Ketton limestone quarry (43/974057, v.-c. 55) furnished a useful list of over 50 bryophytes, the most interesting of which were Aloina aloides var. aloides and Rhynchostegiella tenella.

After refreshment at "The George", Stamford, bryology was renewed with full vigour. At Holywell (53/006161, v.-c. 53) one of the few remaining areas of limestone grassland hereabouts was investigated. Unfortunately a change in management of the area had radically changed the flora in recent years: it proved bryologically and lichenologically poor, and the single remaining plant of Thesium humifusum was located by Miss Conolly in a manner best described as "buried treasure picing". A range of substrates was investigated, including a streamside, trees, logs and walls, but the most profitable habitats were located in an abandoned garden (53/004163). Dicranella schreberana* found on moist clay by the stream was amongst the notable finds which also included Tortula laevipila on a log, and Neckera crispa which has been rarely seen in the county this century. The poor hepatic flora here was typical of all the sites visited on the excursion.

Clipsham quarry (43/981154, v.-c. 55) provided the most interesting bryophyte flora. Thuidium abietinum on a roadside, Brachythecium glareosum on a limestone bank, and Gyroweisia tenuis c.spor. in limestone crevices were particularly handsome. The epiphytic flora was relatively good here, and a Prunus thicket supported Bryum flaccidum*, Orthotrichum affine and Radula complanata. A form of Bryum bicolor with rhizoid tubers was collected by Mr Long.

Lincolnshire Gate (53/002148, v.-c. 53) contrasted markedly with the other sites visited; here one of the few pockets of sand in the region is found. Unfortunately, by this time the members were strung out over the countryside (many of them still crawling around Clipsham quarry), and the site did not receive the full attention it deserved. Mr Wanstall displayed his taxonomic skills in a failing light - large areas of the sand being in various stages of colonisation by Polytrichum spp. with particularly fine patches of P. piliferum and P. urnigerum.

*= new vice-county record.

M.R.D. SEAWARD.

MINUTES OF THE ANNUAL GENERAL MEETING, 1977

Minutes of the Annual General Meeting held at 1650 hrs on Saturday 1 October, 1977, in Beaumont Hall, University of Leicester.

PRESENT: Mrs J. A. Paton (President - in the Chair) and 42 other members.

CONDOLENCES: It was announced that our member Mr W. E. Warren of Woking, Surrey had died.

(1) APOLOGIES: Apologies for absence received from Dr G. C. S. Clarke, Mr N. Collins, Mr S. G. Harrison, Mr E. C. Wallace and Dr E. V. Watson.

(2) MINUTES: The Minutes of the Annual General Meeting held on 25 September, 1976, in the University College of North Wales, Bangor, were approved and signed.

(3) MATTERS ARISING:

READING CIRCLE: Reported:- That Mr B. J. O'Shea had taken over the running of the Reading Circle and had carefully researched the different methods of doing this. A discussion took place on the advantages and disadvantages of a) distributing lists of contents of journals to Reading Circle members and the members then requesting photocopies of the various papers they wished to read, and b) distributing the journals themselves.

Reported (by Dr K. J. Adams):- That our subscriptions to Revue bryologique et lichénologique and to the Bryologist had lapsed.

Resolved:- That we renew our subscriptions to these journals immediately and buy any missing back-numbers.

Resolved:- That Mr O'Shea send out contents lists to members of the Reading Circle who could then request photocopies of articles.

(4) OFFICERS' REPORTS FOR 1976:

(a) SECRETARY'S REPORT: The Secretary reported that there had been 32 new members since last January (1977), but that 34 were still on the 1977 Stop List. The Society had been very active recently, not only in the field, but behind the scenes; he mentioned especially work on Conservation, the Mapping Scheme and on the production of new Census Catalogues of mosses and liverworts. Were we doing enough for beginners? Cooperation with the Field Studies Council was mentioned. Were members happy with the way in which the Society was being run? He welcomed suggestions.

There were cheers from the floor when someone thanked the Secretary for his work on the Bulletin.

(b) TREASURER'S REPORT: The Treasurer, Dr Foster, reported that the Society was not in financial difficulties but urged members to pay their subscriptions promptly on 1 January each year.

(c) EDITORS' REPORT: The Editor, Dr Whitehouse, announced the theoretical publication date of the end of November, 1977, for vol. 9 part 4 of the Journal, and thanked Mr Crundwell for preparing the Index for vol. 9.

(d) REPORT OF THE RECORDER FOR MOSSES: Mr Hill said the proposed new editions of the Census Catalogues would not be rushed ahead and that it was intended to combine the mosses and liverworts in one volume. He urged members sending in voucher specimens to print difficult words and not to use too small packets.

(f) LIBRARIAN'S REPORT: Dr Adams asked members who were ordering items from the Library not to send money, but said they would be invoiced. He announced that a library catalogue is now on sale.

(i) REPORT OF THE MAPPING SECRETARY: It was reported by Dr Smith that it was proposed to complete the mapping scheme by about the end of 1982. In Britain about 75% of the 10 km squares had been visited; in Ireland about 40%. Members were urged to send in all their mapping cards as soon as possible. Anyone willing to record in certain squares should volunteer. We aim to have a 100% coverage by the end of 1982. It was announced that funds may be available for recording in Ireland.

(j) REPORT OF MEETINGS SECRETARY: Dr Duckett said that all recent meetings except the 1977 Scottish summer meeting had been well attended. Members were encouraged to persuade beginners to attend meetings.

(5) CONSERVATION:

Reported (by Dr P. D. Coker):- That a bryophyte Code of Conduct was in an advanced stage of production. That we are liaising with the Nature Conservancy Council now, and will eventually liaise with County Naturalists' Trusts. Thanks were due to the Conservation Committees of the British Lichen Society and of the Botanical Society of the British Isles for their help.

Thanks were proposed to all Officers for their work.

(6) ELECTION OF OFFICERS, 1978-9:

(a) VICE-PRESIDENT: Resolved:- That Dr S. W. Greene be elected Vice-President as from 1 January, 1978.

(b) EDITOR: Resolved:- That Dr A. J. E. Smith be elected Editor as from 1 January, 1978.

Mr Crundwell paid a tribute to Dr Whitehouse who had been our Editor for the last 10 years. During that time the Journal had increased from one to two parts per year and there had been a considerable increase in the number of pages. During his term of office Dr Whitehouse had dealt with troubles and difficulties admirably. He had put in an enormous amount of work. For example, the amount of correspondence an Editor has to undertake is formidable; much of it is irritating, originating from people's carelessness, proofs, wrong references, for example. Dr Whitehouse has always been courteous and tactful. For all the work he has done on them each paper should have an acknowledgement of the fact. A journal is a reflexion of the work and ability of its Editor; ours is no exception. Dr Whitehouse now deserves a rest from his labours of the last decade.

Dr Whitehouse replied, mentioning his debt to the Assistant Editor, Dr Birks and to the anonymous referees.

(c) OTHERS: Resolved:- That as all other Officers had expressed their willingness to serve again they be re-elected for a further two years as from 1 January, 1978.

(7) ELECTION OF THREE MEMBERS OF COUNCIL:

Resolved:- That as there had been no further nominations for Elected Members, Mr A. J. Harrington, Mr B. J. O'Shea, and Mr M. A. Pearman, nominated by Council, be elected to serve for two years as from 1 January, 1978.

(8) PLACE AND DATE OF A.G.M., 1978:

Resolved:- That the Annual General Meeting in 1978 be held on 19 August in Bangor, North Wales.

(9) OTHER MEETINGS IN 1978 AND 1979:

(a) SPRING FIELD MEETING, 1978: Reported:- That arrangements for this meeting, to be based on Trinity College, Carmarthen, were well in hand.

(b) TAXONOMIC WORKSHOP, 1978: Considered:- That this might be based on Leeds.

(c) SPRING FIELD MEETING, 1979: Reported:- That arrangements were being considered to base this on Ludlow. Mr M. A. Pearman agreed to make arrangements for accommodation for this.

(d) SUMMER FIELD MEETING, 1979: Considered:- That this might be in Ireland, one week based on Limerick City followed by a week in Co. Cork.

(e) ANNUAL GENERAL MEETING, 1979: Considered:- That Manchester might be a possibility for this.

(10) ANY OTHER BUSINESS:

(a) NORDIC BRYOLOGICAL SOCIETY: Reported (by Mr Crundwell):- That the N.B.S. is holding its 1978 summer meeting in Western Argyll, 5-12 July, and that British bryologists were welcome to attend it. More details would appear in the next Bulletin.

(b) TORTULA AMPLEXA: Reported (by Dr Whitehouse):- That Tortula amplexa occurs near Leicester and that there were copies of his paper on this species available.

(c) LOYAL GREETING: Reported (by Mrs Paton):- That she had sent, on behalf of the Society, loyal greetings to Her Majesty the Queen on the occasion of her Silver Jubilee and had received a gracious reply.

(d) VOTE OF THANKS: Resolved:- That the Officers of the Society be thanked for their work.

(e) THANKS TO MRS J.A. PATON: Resolved (proposed by Mr J.C. Gardiner):- That Mrs Paton be warmly thanked for her two years hard work as President of the Society, and for her devotion to duty - she had not missed attending a meeting in that time.

The meeting closed at 1753 hrs.

A. R. PERRY,
Hon. Secretary,
10 October, 1977.

TAXONOMIC WORKSHOP, NOVEMBER, 1977

The fourth Taxonomic Workshop was held in the University Department of Botany in Oxford on Saturday 19 November, 1977. About 28 members attended. In the morning Dr H. L. K. Whitehouse talked on 'Rhizoidal Gemmae and Tubers' of mosses; with the aid of colour photographs and drawings he demonstrated the diversity of form which may exist within a family and the value of rhizoidal gemmae as specific characters. In the afternoon Martin Corley talked on the identification of the British species of Campylopus and species of Dicranodontium, Dicranum and Ditrichum which might be confused with Campylopus; he stressed the critical features in the nerve-section, shape of leaf and areolation.

In the evening members gathered for a conversazione. The early bryological collections in the University Herbarium were illustrated by sheets from Dillenius' and Morison's Herbaria relating to the fragrant 'moss' (Chiloscyphus

pallescens) which had long been known from St Winifred's Well at Holywell, Flintshire (see Grolle, Transactions of the British Bryological Society 5, p. 766 for a discussion of the taxonomic significance of these specimens). Boswell's Herbarium, built up during the second half of the 19th C. was illustrated by specimens of the first English gatherings of Dicranum strictum (1864), D. montanum (1869), D. flagellare (1874) and D. polysetum (1887), and by Boswell's annotated copy of Wilson's Bryologia Britannica.

We are deeply indebted to Professor F.R. Whatley for permission to use the laboratory, to Dr S.C. Watkinson for acting as local secretary, and to Dr Whitehouse and Mr Corley for giving up their weekend to come and teach us.

On Sunday 20 November we enjoyed perfect weather in Wytham Wood (the property of the University) by kind permission of the University Land Agent and, in the afternoon, on White Horse Hill. In Wytham Wood Platygyrium repens proved to be abundant and in fine condition, densely covered with deciduous branchlets; it has certainly increased considerably in abundance since it was first discovered there. Dicranum strictum was seen, as small cushions, on several bushes; this also is clearly increasing in frequency in the wood. On White Horse Hill it was too early to find sporangia of Weissia sterilis though the plants were found. Pottia caespitosa had young sporangia which were much less mature than they have been at this season in some years.

E. W. JONES

FUTURE MEETINGS OF THE SOCIETY

(a) Spring Field Meeting, 1978: Carmarthen, 5-12 April. Local Secretary: A. R. Perry, National Museum of Wales, Cardiff, CF1 3NP (Tel: Cardiff (0222) 397951 ext. 41 (work); Cardiff (0222) 795387 (home)).

Plans are now well in hand for this meeting and all members wishing to participate should inform the Local Secretary. Accommodation has been reserved at Trinity College, Carmarthen, which will be the HQ. Full board here is £7.00 per day and it is hoped that all participants will take advantage of this chance of staying together under the same roof for the meeting. Bar facilities will be available. A list of alternative accommodation can be provided by the Local Secretary if required.

Bookings for accommodation at Trinity College must not be done through the College, but through Mr Perry from whom booking forms should be obtained as soon as possible. These need to be returned to him by 16 March at the latest.

Beginners and those who feel they may profit by spending time with some more-experienced members, are especially welcome on this meeting. Indeed, it has been the intention of the Local Secretary to ensure that those requiring guidance both in the field and in the lab. shall be given it; several of the more-experienced have expressed their willingness to cooperate in this venture. It is not, of course, that beginners are not usually helped on our field meetings, but on this occasion a planned effort is being made. It is hoped to set up laboratory facilities for work in the evenings. A Council Meeting will be held at 2015 hrs on Saturday 8 April, 1978 in Trinity College.

Carmarthenshire (v. -c. 44), except for a few well-known localities in the east, is exceptionally poorly worked for bryophytes. It is hoped to improve this situation on this meeting by making a concerted effort to fill in the numerous gaps for the Mapping Scheme, and to search bryologically unknown but potentially good sites. A range of habitats from sand dunes to mountains is available withing easy reach. A plan of campaign will eventually be obtainable from the Local Secretary.

(b) International Symposium, A.G.M. and Summer Field Meeting, 1978: Bangor, Gwynedd, North Wales, 16 - 26 August. Local Secretary: Dr. J.G. Duckett, School of Plant Biology, University College of North Wales, Bangor, from whom full details of the programme, accommodation and field excursions can be obtained.

Accommodation: Plas Gwyn Hall of Residence, 10 minutes walk from the School of Plant Biology. All rooms are single, each is equipped with a washbasin and there are showers and baths on each corridor. For members not wishing to stay in a hall of residence details of other accommodation in Bangor can be obtained from Dr. J.G. Duckett. However, early booking is essential since the symposium coincides with the peak holiday season. All meals can be provided in the hall of residence but self catering facilities will also be available.

17 - 19 August. The B.B.S. jointly with the Systematics Association. An International Symposium on

MODERN APPROACHES TO BRYOPHYTE SYSTEMATICS

The symposium will contain reviews of the current state of taxonomy in different bryophyte groups and in diverse phytogeographical regions. Major contributions on climatic adaptation, chemotaxonomy, chromosome cytology, rhizoids, secretory cells, spore morphology and conducting tissues will highlight inter-relationships between traditional taxonomy and experimental bryophyte disciplines. Hitherto, unreviewed areas such as peristome ultra-structure and comparative spermatology should reveal exciting new information on the higher orders of classification and possible phylogenetic relationships between bryophytes and other archegoniate groups.

Participants will include:

G.C. Argent (Edinburgh)	M. Kzrakowa (Poznan)
Z.B. Carothers (Illinois)	R.E. Longton (Winnipeg)
G.C.S. Clarke (London)	H.A. Miller (Florida)
A.C. Crundwell (Glasgow)	M.E. Newton (Manchester)
J.G. Duckett (Bangor)	J.A. Paton (Truro)
A. Eddy (London)	M.C.F. Proctor (Exeter)
S.R. Edwards (Manchester)	P.W. Richards (Cambridge)
S.R. Gradstein (Utrecht)	R.M. Schuster (Massachusetts)
S.W. Greene (Penicuik, Midlothian)	A.J.E. Smith (Bangor)
P. Greig-Smith (Bangor)	W.C. Steere (New York)
C. Héban (Montpellier)	C. Suire (Bordeaux)
E.W. Jones (Oxford)	H. Volker-Niedhart (Hannover)
T. Koponen (Helsinki)	E.V. Watson (Reading)

Lectures: School of Plant Biology, University College of North Wales, Bangor.

Conference Fees (for the 3 days of the symposium only): £6/day for non-members. £3/day for members of the B.B.S. and S.A. £2/day for full time students. N.B. for B.B.S. members just wishing to attend the A.G.M. (19 August) and the field excursions there will naturally be no conference fees.

Publication: All papers will be published in a special symposium volume.

19 August. Annual General Meeting.

20 - 26 August. Field Excursions to diverse sites in Snowdonia and on Anglesey. Transport by private car or by coach. A laboratory fully equipped will be available in the School of Plant Biology throughout the meeting.

This meeting has now been widely advertised outside the B.B.S. (e.g. by the International Association of Bryologists and at the International Bryology Symposium at Bordeaux, France, Nov. 1977) and we expect it to be very well attended by overseas bryologists.

c) Taxonomic Workshop, November 1978: Leeds University.

d) Easter Field Meeting, 1979: Ludlow, Salop.

e) Summer Meeting, 1979: Limerick and Glengariff, Ireland.

J.G. DUCKETT.

FIELD MEETING IN OXFORDSHIRE

During the course of the Taxonomic Workshop in November, 1977 it became evident the Society now has several members within easy reach of Oxford who would welcome occasional local meetings. I shall be pleased to arrange and lead a field meeting, possibly in the Witney neighbourhood, some time in February 1978. Will members who would like to attend please send me a stamped and addressed envelope, and also indicate whether they have any preference for a Saturday or Sunday meeting. I will then inform them as to the time and place of the rendez-vous.

E. W. Jones, The Green, Kirtlington, Oxford, OX5 3HJ.

MEETING OF THE NORDIC BRYOLOGICAL SOCIETY IN SCOTLAND, 1978

The Nordic Bryological Society will be meeting from Wednesday 5-12 July, 1978, at Ardtornish, Morvern, Argyll, by courtesy of Mr and Mrs J. E. Raven. British bryologists are most welcome to attend. Further particulars are available from the local secretary, Mr A. C. Crundwell, Department of Botany, The University, Glasgow, G12 8QQ, to whom all correspondence should be addressed.

BRYOLOGICAL COURSES AT FIELD CENTRES, 1978

5 - 12 April. The Drapers' Field Centre, Rhyd-y-creuau, Betws-y-Coed, Gwynedd, LL24 0HB. Mosses and Liverworts, Dr D.H. Dalby and Dr Anne Bebbington.

23 - 30 August. Malham Tarn Field Centre, Settle, Yorkshire, BD24 9PU. Mosses and Liverworts, Dr M.C.F. Proctor.

8 - 15 September. Preston Montford Field Centre, Montford Bridge, Shrewsbury, SY4 1DX. Mosses and Liverworts, Dr J.G. Duckett.

27 September - 4 October. Kindrogan Field Centre, Enochdu, Blairgowrie, Perthshire, PH10 7PG. Bryophytes, Brian Brookes.

Further information may be obtained from the Wardens of the Field Centres.

The course at Kindrogan is run by our member, Brian Brookes, who is Warden, and is particularly suitable for beginners. He welcomes individuals and small groups at Kindrogan, either to participate in advertised course or on an assisted basis. The fee for the bryophyte course is £52 which includes board, accommodation and all academic facilities. He would be pleased to provide copies of the full programme and further details of any 1978 courses.

B. B. S. MAPPING SCHEME

It has been decided that the bryophyte mapping scheme should be completed by the end of 1982. With the very limited bryological activity in Ireland only Britain can be considered seriously although records from Ireland are still required. The present mapping situation in Britain and Ireland is as follows:

Well-worked squares	Under-worked squares	Un-worked squares	Total
BRITAIN			
890 (34%)	1099 (42%)	644 (24%)	2633
IRELAND			
47 (5%)	320 (42%)	590 (63%)	947

To complete the scheme by the end of 1982 it will be necessary to record in 130 unworked and 220 underworked squares per annum. A situation map will appear in J. Bryol. 10 (1) and an indication of the situation on a vice-comital basis is as follows:

- (a) vice-counties which are well-worked or in the process of being worked:

1, 2, 6, 9-11, 15-17, 29, 31, 41, 47-54, 67, 68, 71, 81-84, 90, 91, 95, 99-101, 104, 112.

- (b) vice-counties in which there has been some recording or for which there are literature records (usually of rarer species):

3, 4, 5, 13, 14, 18, 19, 20, 22, 23, 27, 28, 30, 35, 36, 42, 43, 46, 55, 57, 59, 60, parts of Yorks., 66, 69, 70, 72-80, 85-89, 97, 98, 102, 103, 105, 106, 108, 109, 111.

- (c) seriously under-worked vice-counties:

7, 8, 12, 24-26, 32-34, 38-40, 44, 45, 56, 58, parts of Yorks., 75, 92-94, 96, 107, 110.

Your help is required if the mapping scheme is to be successfully concluded and a bryophyte atlas produced. Will members willing to record please let me know which areas they can work (I can provide information about individual 10 km squares, vice-counties or 100 km squares). If you have record cards from squares that you are unlikely to visit again will you please let me have them.

It may be possible to obtain travelling expenses to record in certain areas. I will make enquiries about this if requested.

Field record cards are available from me at 35p for 10 including postage.

A. J. E. Smith.

PROVISICNAL ATLAS OF BRYOPHYTES

A provisional atlas of 100 commoner species of bryophytes will be published by the Biological Records Centre, in spring. The price is not yet fixed but will be very reasonable. Will members who wish to buy a copy please let me know and I will arrange for copies to be sent out when the atlas is ready.

A. J. E. Smith, School of Plant Biology, University College of N. Wales,
Bangor, Gwynedd, LL57 2UW

LIBRARY SALES AND SERVICE, 1978.

FOR LOAN:

(a) Approximately 200 bryological books, bryological journals and several thousand reprints of individual papers. Catalogue to the books and journals available from the Librarian, price 10p plus postage and packing.

(b) Transparency collection, list available (S.A.E.). 624 slides in the collection. Loan charge 25p plus return postage. Only 50 slides may be borrowed at once to minimise possible loss.

FOR SALE:

Moss Exchange Club Reports for 1902 (5p each)

British Bryological Society Reports: 1927, 1928, 1934, 1935 (13p each)
1944/5 (25p)

Transactions of the British Bryological Society - annual parts:

- Vol. 1 parts 1-5 (£1.60 each)
- Vol. 2 parts 1-4 (£3.00 each)
- Vol. 3 parts 1-5 (£3.00 each)
- Vol. 4 part 1 (£3.00), part 2 (£1.50), parts 3-5 (£2.00 each)
- Vol. 5 part 1 (£2.00), parts 2-4 (£3.00 each)
- Vol. 6 part 1 (£3.00), part 2 (£4.00)
- Vol. 7 parts 1-4 (£2.50 each)
- Vol. 8 parts 1 & 2 (£3.00 each), part 3 (£3.50), part 4 (£5.00)
- Vol. 9 parts 1 & 2 (£4.50 each), part 3 & 4 (£6.00 each)

Volume 6 part 2 completes the series of Transactions; volume 7 part 1 continues the series, but is renamed Journal of Bryology.

Postage and packing is extra on all orders. Standard packing charge 7p per one to five parts for Jiffy bag.

Duncan, J.B. Census Catalogue of British Mosses, ed 2. 1926. (13p)

Sherrin, W.R. Census Catalogue of British Sphagna. 1946. (5p)

Paton, J.A. Census Catalogue of British Hepatics, ed 4. 1965. (38p plain, 43p interleaved)

Warburg, E.F. Census Catalogue of British Mosses, ed 3. 1963. (38p plain, 43p interleaved)

POSTAGE EXTRA. If including cash with order please allow sufficient for postage and packing.

All the above items are available from the B.B.S. Librarian:

Dr. K. J. Adams, 63 Wroths Path, Baldwins Hill, Loughton, Essex IG10 1SH

REFEREES (JANUARY 1978)

Specimens sent to the referees should have a 4- or 6- figure grid reference in addition to the locality description. THEY SHOULD ALWAYS BE AC - COMPANIED BY A STAMPED, ADDRESSED ENVELOPE, EVEN IF MATERIAL IS SENT TO UNIVERSITIES OR INSTITUTIONS.

The general Referee will help beginners who are having difficulty in placing their material in a genus. The numbers refer to genera in the current editions of the Census Catalogues.

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

Hepatic Referees:

- 1-9, 14-19, 21-30, 66, 67, 76-82: Dr. J.G. Duckett, School of Plant Biology, University College of North Wales, Bangor, Gwynedd, LL57 2UW.
- 10, 11, 71-74: Dr. H.J.B. Birks, Botany School, Downing Street, Cambridge, CB2 3EA.
- 12, 13, 20, 31-33, 45-47, 68-70: D.G. Long, The Herbarium, Royal Botanic Garden, Inverleith Row, Edinburgh, EH35LR.
- 34-44, 63-65: M.F.V. Corley, Pucketty Farm Cottage, Faringdon, Oxon., SN7 8JP.
- 48-53: Dr. G.C.S. Clarke, Department of Botany, British Museum (Natural History), Cromwell Road, London, SW7 5BD.
- 54-56: Mrs. Hilary H. Birks, 16 Greystoke Road, Cambridge, CB4 1DS.
- 57-61, 75: M.O. Hill, Institute of Terrestrial Ecology, Penrhos Road, Bangor, Gwynedd, LL57 2LQ.
- 62: Mrs. J.A. Paton, Fair Rising, Wagg Lane, Probus, Truro, Cornwall, TR2 4JU.

Moss Referees:

- 1: M.O. Hill (address above); A. Eddy, Department of Botany, British Museum (Natural History), Cromwell Rd., London, SW75BD.
- 2-7, 131: M.O. Hill (address above).
- 8-9, 54-56: Dr. A.J.E. Smith, School of Plant Biology, University College of North Wales, Bangor, Gwynedd, LL57 2UW.
- 10-33: M.F.V. Corley (address above).
- 34, 57-69, 80-89, 91-97, 100-124: E.C. Wallace, 2 Strathearn Road, Sutton, Surrey.
- 35-53: Dr. D.F. Chamberlain, Department of Botany, Royal Botanic Garden, Edinburgh, EH3 5LR.
- 70-78, 90: Dr. E.V. Watson, Department of Botany, The University, London Road, Reading, RG1 5AQ.
- 79: Dr. P.D. Coker, School of Biological Sciences, Thames Polytechnic, Wellington Street, London, SE18 6PF.
- 98, 99: Dr. S.W. Greene, Institute of Terrestrial Ecology, Bush Estate, Penicuik, Midlothian, EH26 0QB.
- 125-130, 132-161: Mrs. J. Appleyard, Sunnyside, West Horrington, Wells, Somerset, BA5 3ED.

CONTRIBUTIONS FOR THE NEXT BULLETIN
SHOULD REACH THE SECRETARY
BY 1st JUNE, 1978

THE READING CIRCLE

The Reading Circle is now under way again (the first despatches were made in early December, 1977), and membership is open to all BBS members - just let the Reading Circle Secretary (name and address below) have your name and address for full details. We are starting off with five journals: The Bryologist, Revue Bryologique et Lichénologique, Lindbergia, Journal of the Hattori Botanical Laboratory and Annales Botanici Fennici. Rather than distributing the journals themselves (which is expensive in postage, is damaging to the journals, makes them unavailable to other members for long periods, and has even resulted in their loss), a photocopy of the contents list for each journal subscribed to is sent to members as each issue becomes available. Photocopies of articles of interest can then be requested to be read (for the cost of the postage) or to be retained (for the cost of the photocopying and postage). The charge to cover photocopying of contents lists and postage is 15p per issue per journal per annum - i.e. a 4-issue per annum journal such as the Bryologist will cost 60p per year: all five journals would cost £2.25 per year.

Reading Circle Secretary: Brian O'Shea,
47 Lansdowne Hill,
London SE27 0LS.

RARE AND ENDANGERED SPECIES OF BRITISH BRYOPHYTES

Members may be aware that the Society has an active conservation committee which is currently producing a Code of Conduct for bryologists. Another task in hand is the preparation of a 'data bank' on a number of rare and/or endangered species. The first stage of this has been to select a number of species (15) which are either rare, endangered or both, and to extract records from the literature and herbaria, and to supplement this information with contemporary data from BBS members who may have personal knowledge of the sites.

The first list of species is as follows:-

Acaulon triquetrum	Jamesoniella undulifolia
Acrobolbus wilsonii	Leptodontium gemmascens
Anomodon longifolius	Orthodontium gracile
Bartramia stricta	Orthotrichum obtusifolium
Bryum warneum	Pterygoneuron lamellatum
Dicranum undulatum	Sematophyllum demissum
Grimmia anodon	Trochobryum carniolicum
Habrodon perpusillus	

If you have any information on the recent status (say, over the last 20 years) of any of these species, could you please let me know? Any information supplied will be treated as strictly confidential.

The eventual aim is to build up as detailed a picture as possible of the distribution, abundance and environmental conditions of each of these species, together with information on the ownership of and possible threats to sites. This could be of considerable use both to the Society and to the Nature Conservancy Council, particularly if the site were threatened with development.

P.D. Coker, School of Biological Sciences, Thames Polytechnic,
Wellington Street, London, SE18 6PF

ON THE DISTINCTION BETWEEN SCAPANIA AEQUILOBA AND S. ASPERA

By D. G. LONG

In the past many bryologists in Britain, Ireland and elsewhere have confused these two species, both of which are calcicolous and have papillose cuticles. Large plants were usually (correctly) ascribed to S. aspera and small plants (often wrongly) to S. aequiloba. Hence the early concept of the latter species (as defined by Carrington, Pearson and, to a lesser extent, Macvicar) was a very cloudy one. That they (and others using their Floras) could not reliably name S. aequiloba is clear from their herbaria. More recent Continental authors such as H. Buch and K. Müller have cleared up much of the confusion between these species. For those who rely on Macvicar's Flora the following notes may be of assistance.

In preparing these notes, as well as revising the distribution of S. aequiloba, I have examined about 360 British and Irish specimens labelled S. aequiloba of which only about 160, mostly more recent gatherings, proved correct. This revealed much over-recording in lowland areas, primarily due to confusion with S. aspera. Some early Irish bryologists frequently confused S. gracilis with S. aequiloba. In working through this material an attempt was made to find the most practical and reliable diagnostic characters, i.e. those which are easy to observe and correlate in a majority of specimens. The Table below summarises these characters in decreasing order of usefulness.

As with all Scapaniae, accurate naming can be aided greatly by (a) searching in the field for plants bearing gemmae or perianths, and (b) making good microscopic preparations by placing several stems on the slide, anterior (smaller) lobe upwards, and chopping the stems into short lengths with a razor blade to expose leaf bases which otherwise are invariably hidden by adjacent leaves. Gentle squashing with a coverslip will usually detach gemmae even when scarce. Gemma colour is best observed en masse with a lens or binocular microscope.

Some useful characters separating S. aspera and S. aequiloba

Character	<u>S. aequiloba</u>	<u>S. aspera</u>
1. Shape and decurrence of base of anterior lobe.	Base subauriculate to auriculate; never decurrent (fig. 1).	Base tapering weakly to strongly decurrent (fig. 2).
2. Length of mature 2-celled gemmae.	Mostly 20-26 μ m, rarely to 30 μ m (i.e. none over 30 μ m).	Mostly 25-35 μ m, occasionally to 40 μ m (i.e. many over 30 μ m).
3. Divergence of leaf lobes.	Ant. lobes usu. + flat; stiffly divergent from stem (gives plants a much less flattened appearance than in <u>S. aspera</u>).	Ant. lobes usu. + convex and appressed to stem, esp. near stem apex (N.B. on older lvs part of the ant. lobe may be reflexed but never from the keel).
4. Shape of apex of posterior lobe.	Usu. acute to very acute, never obtuse.	Usu. obtuse; sometimes subacute in small forms.
5. Dentation of posterior lobes	Often entire; if dentate then usu. all 1-celled.	Usu. dentate and usu. some (or many) teeth 2-celled.
6. Length of leafy shoots.	5-15(-25) mm.	(10-)20-40 mm.

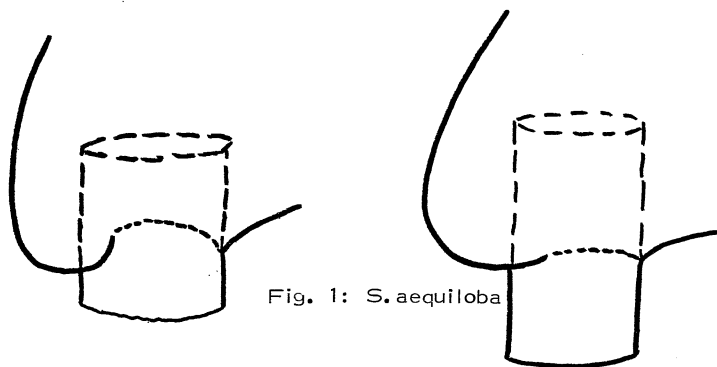


Fig. 1: *S. aequiloba*

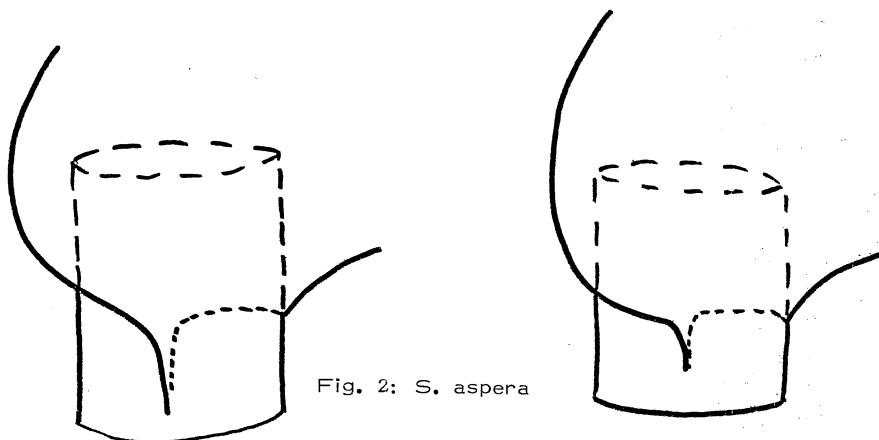


Fig. 2: *S. aspera*

I have found the first three characters most useful and they usually correlate well. The others are useful only for 'average' specimens; for example, *S. aspera* is usually more robust than *S. aequiloba* but small forms of the former (not infrequent) are much smaller than large forms of the latter. Character 3 is the most useful in the field although character 1 can be observed with a good lens.

Scapania gracilis is sometimes confused with them but can readily be distinguished from both in being basifugous, having a smooth cuticle and having the base of the anterior lobes ciliate or strongly dentate (*S. aspera* and *S. aequiloba* are strictly basicolous, have papillose cuticles and entire bases to the anterior lobes).

Scapania aequiloba appears to be a much more montane plant than was formerly appreciated, common only in parts of the Scottish Highlands. Only in v.-c.'s 97, 108 and 110 has it been found on coastal sand-dunes; elsewhere it rarely occurs below 300 m. Conversely *S. aspera* is a southern species, much commoner at lower altitudes, especially in England, Wales and Ireland. It is rare in montane habitats but does occur up to 800m.

The distribution of S. aspera in the Census Catalogue is probably largely correct. I will gladly examine specimens of either species for preparation of distribution maps.

Vice-county distribution of S. aequiloba

(a) Records for the following v.-c.'s published in Trans. brit. bryol. Soc., J. Bryol. and Bull. brit. bryol. Soc. are correct: 70, 72, 79, 80, 83, 91, 99, 101, 104, 105, 107, 110. H 7.

(b) The following records published in the above periodicals are erroneous: all refer to S. aspera: 52, 82, 86, 94, 102. H 16, 33, 35. That from 102 (Garvellach Isles, Stirling & Wallace, 1966: BBSUK) is a new v.-c. record for S. aspera.

(c) All other correct vice-county records. The following are the earliest specimens seen:

49	Llyn Idwal	Knight & Nicholson	1915	CGE
64	Wharfedale	Spruce	1841	BM,E,MANCH
65	Below Winch Bridge	Spruce	1843	BM,MANCH
66	Widdy Bank Fell	Ingham	1897	BM
69	Brown Gill, Langdale	Paton	1965	Hb. Paton
85	Glen Queich	Evans	1904	BM
87	Ben Ledi	Crundwell	1971	Hb. Crundwell
88	Killin	Ewing	1883	GL
89	Gleann Beag	Paton	1964	Hb. Paton
90	West Wirren	Croall	1854	MANCH
92	Glen Callater	Drummond	1844	MANCH
94	Glen Bulg nr. Inchroay	Wallace	1958	Hb. Wallace
96	Ord Ban, Aviemore	Knight	1920	CGE,NMW
97	Smirisary, Moidart	Macvicar	1899	BM,E
98	Glen Nant	Macvicar	1903	BM,E
108	Culbackie, Tongue	Lillie	1912	GL
H28	Gleniff	Young	1928	LIV
H35	Analoge Hill, Dunfanaghy	Paton	1969	Hb. Paton

(d) Other erroneous records. The following are or may be the specimens on which vice-county records were based. In some cases several or many later records have also been checked and found to be erroneous.

6	Cheddar Gorge	Rhodes	1915	BM	= aspera
48	Cader Idris	Jones & Knight	1913	NMW	= aspera
57	Lover's Leap, Buxton	Wild	1881	BM	= aspera
59	Pendle Hill	Wheldon	1908	NMW	= aspera
60	Silverdale	Wilson	1899	NMW	= aspera
76	Ashton	West	1903	BM	= aspera (N.C.R.)
95	Rafford	Croall	1848	BM	= aspera (N.C.R.)
H1	Cromaglowen	McArdle	1877	DBN	= gracilis
H2	O'Sullivan's Cascade	McArdle	1893	BM	= gracilis
H13	Graigine, Co. Carlow	McArdle	1895	DBN	= gracilis & is in H
H20	Lugnaquilla	Moore	n.d.	MANCH	= gracilis
H21	Howth	McArdle	1894	DBN	= gracilis
H29	Glenade	Moore	1875	DBN	= aspera
H39	Sallagh Braes	Lett	1895	DBN	= gracilis
H40	Magilligan	Lett & Waddell	1900	BM,DBN,GL	= aspera

ADDITIONS AND AMENDMENTS TO THE MEMBERSHIP LIST

NEW MEMBERS TO JANUARY, 1978

- BABB, H.E.E., Rochdale, Bromsgrove Road, Clent, Nr. Stourbridge,
West Midlands, DY9 9PY. (1978)
- BEALE, R., 4 Valleyfield Street, Edinburgh, EH3. (1978 Junior)
- CHRISTIE, Miss Alison, 49 Hillview Road, Southport, Merseyside,
PR8 3PN. (1977 Junior)
- ELLIS, David E., 8 Langholm Street, Newcastleton, Roxburghshire,
TD9 0QX. (1978)
- FORNWALL, Mark D., 1812C Woodmar Drive, Houghton, Michigan 48101,
U. S. A. (1977 Junior)
- GIAVARINI, V.J., The Cottage, 17 Lower Golf Links Road, Broadstone,
Dorset, BH18 8BQ. (1977)
- HAÜSLER, Dr Michael, Brunnengasse 19, D-6945 Hirschberg, West
Germany. (1978)
- HOUSE, Keith L., 100 Kennington Avenue, Bishopston, Bristol. (1977)
- INOUE, Dr Hiroshi, National Science Museum, Hyakunin-cho, Shinjuku-ku,
Tokyo 160, Japan. (1977)
- JEFFERY, Barry G., Mendips, 2 Drawbriggs Lane, Appleby, Cumbria. (1978)
- LOCK, Dr J.M., Department of Biological Sciences, University of Lancaster,
Lancaster, LA1 4YQ. ([1960] 1977)
- MCADAM, Miss S. Vilma, Botany Department, The University, St Machar
Drive, Aberdeen, AB9 2UD. (1977)
- MCCUTCHEON, T.G., 18 Glen Doll, St Leonards, East Kilbride, Scotland.
(1978 Junior)
- MARTIN, Peter, 64 Westfield Avenue, Liverpool, L14 6UZ. (1978 Junior)
- ORANGE, A., 44 Tufthorn Avenue, Milkwall, Nr. Coleford, Glos. (1977)
- ROBERTSON, Paul, 10 Eastbourne Road, Linthorpe, Middlesbrough,
Cleveland, TS5 6QW. (1978 Junior)
- RUINARD, C., Dalinkamp 10, 3085 SJ Rotterdam, Netherlands. (1977)
- RUSSELL, Keith W., 4707-B Rosedale Avenue, Austin, Texas 78756,
U. S. A. (1978)
- SCHLUDERMANN, Helmut, Bauerstrasse 17, A-4020 Linz, Austria. (1977)
- SCHOFIELD, Prof W. B., Department of Botany, University of British
Columbia, Vancouver, Canada. (1977)
- SINGER, Miss Catherine E., 28 Twyford Road, West Harrow, Middlesex,
HA2 0SL. (1977 Junior)
- SLACK, Dr Nancy G., Biology Department, Russell Sage College, Troy,
New York 12180, U. S. A. (1978)
- SMITH, Mrs F.D.J., The Thorns, Laneside Road, Low Leighton, New
Mills, via Stockport, Cheshire, SK12 4LU. (1978 Family)
- SNOW, Mrs Lorna, Ein Shemer, Upper Hyde Farm Road, Shanklin, Isle of
Wight, PO37 7PS. (1977)
- SNOW, Mr R.A., Ein Shemer, Upper Hyde Farm Road, Shanklin, Isle of
Wight, PO37 7PS. (1977 Family)
- VICKERS, M.D., Eulerweg 32, 6103 Griesheim, West Germany. (1978)
- VICKERS, Mary E., Eulerweg 32, 6103 Griesheim, West Germany. (1978 Fam)
- VITT, Ass.Prof. Dale H., Department of Botany, University of Alberta,
Edmonton, Alberta, Canada, T6G 2E9. (1977)
- YURKY, Paul A., 977 Wayne Avenue, Indiana, Pennsylvania 15701, U. S. A.
(1977 Junior)

RE-ENTRY

- GJAEREVOLL, O., Videnskabers Selskab Museet, Trondheim, Norway. (1947)

CHANGES OF ADDRESS AND TITLE

- BESCOBY, Mrs B.E., 1 Hull Mill Lane, Delph, Oldham, OL3 5UR.
BRISTOW, B.R., Knoll Cottage, The Street, Mortimer, Reading, Berks., RG7 3PE.
BURTON, Dr M.A.S., A.R.Q.A., Atmospheric Environment Service, 4905 Dufferin Street, Downsview, Ontario, M3H 5T4, Canada.
CRITTENDEN, Dr P.D., Department of Botany, The University, Sheffield, S10 2TN.
EGUNYOMI, Dr A., Department of Botany, University of Ibadan, Ibadan, Nigeria.
GEISSLER, Dr Patricia, Conservatoire et Jardin Botaniques, Case Postale 60, CH 1292 Chambesy, Switzerland.
HARDY, Dr D.A., 9 Trent Avenue, Huntington, York, YO3 9SE.
HAWKSFORD, John E., Owlerslaak, Laneside Road, Low Leighton, New Mills, Stockport, Cheshire, SK12 4LU.
HILL, Mrs J.J., The Meadows, 167 Cheney Manor Road, Swindon, Wilts., SN2 2NY.
HOELLWARTH, Dr Michael, Albert-Schweitzer Str. 4A, 6161 Messel, West Germany.
JANSSENS, J., Department of Botany, University of Alberta, Edmonton, Alberta, Canada, T6G 2E9.
JONES, M.P., Department of Applied Biology, Chelsea College, Hortensia Road, London, SW10 0QX.
KUWAHARA, Dr Y., Fusetsu Secondary School, Kurume University, 2-20 Nonaka-machi, Kurume, Fukuoka, 830 Japan.
LACEY, Prof W.S., School of Plant Biology, University College of North Wales, Memorial Buildings, Bangor, Gwynedd, LL57 2UW.
LEWIS-SMITH, Dr R.I., N.E.R.C., British Antarctic Survey, Madingley Road, Cambridge, CB3 0ET.
LICENCE, S.T., Department of Immunology, A.R.C., Institute of Animal Physiology, Babraham, Cambridge, CB2 4AT.
LINDSAY, D.C., Environmental Sciences Centre (Kananaskis), University of Calgary, Calgary, Alberta, Canada, T2N 1N4.
NEWELL, P.S., Rowanshaw, 35 Wyedale Crescent, Bakewell, Derbyshire, DE4 1BE.
OTTLEY, Mrs B.A., 1 Barracks Lane, Ravensmoor, Nantwich, Cheshire.
PATON, Mrs J.A., Fair Rising, Wagg Lane, Probus, Truro, TR2 4JU.
REIJDEN, W.R. van der, Glencourt, Paradise, Coldingham, Eyemouth, Berwickshire, TD14 5NP.
RICHARDS, Prof P.W., 14 Wootton Way, Cambridge, CB3 9LX.
RUBERS, Dr W., Rijksherbarium, Schelpenkade 6, Leiden, Netherlands.
SCOTTER, Mrs Bronwen, 44 Richmond Drive, South Wigston, Leicester.
SOLLMAN, F., V. Weberstr. 32, Zevenaar, Netherlands.

CHANGE OF NAME

- BEBBINGTON, Dr A.L.D. (formerly Southorn).

CORRECTION

- WATSON, Alan, Ivy Cottage, Torpenhow, Carlisle, Cumbria.

DEATHS

- ALLORGE, Mme V., 7 Rue des Wallons, Paris 13e, France.
DALBY, Miss M., 41 Cleasby Road, Menston, Ilkley, West Yorkshire.
LOBLEY, Miss E.M., 17 Southlands, Hexham, Northumberland.
WARREN, W.E., Selbourne, Horsell Rise, Horsell, Woking, Surrey.

RESIGNATIONS

GODFREY, M.F., Norwich.
GUERKE, Dr Wayne R., Illinois.
HALL, A.R., Cambridge.
PAICE, Miss J.P., Cambridge.
SAYRE, Prof G., Massachusetts.
THORPE, P., Shoreham-by-Sea.

STRUCK OFF FROM THE MEMBERSHIP LIST

BLANCHARD, D.L., Bourne.
CLIFFORD, H.T., Brisbane.
FRENGUELLI, I.M., Chichester.
HÉBANT, C., Montpellier.
KETCHLEDGE, Prof E.H., Syracuse.
LYE, Dr K.A., Norway.
MUIRHEAD, Miss C.W., Edinburgh.
RANDALL, Ass.Prof E.A., Buffalo.
RATCLIFFE, J.B., Buckley.
SCHELPE, Prof E.A.C.L.E., South Africa.
SHIMWELL, Dr D.W., Manchester.
SMITH, G.L., New York.
WALL, Miss C.L., Unstone.
WILKINS, Paul, Exeter.

Changes of address and resignations should be promptly reported to the Hon. Secretary, A.R. Perry, National Museum of Wales, Cardiff, CF1 3NP, U.K.

REQUEST FOR MATERIAL

D. G. Long, Royal Botanic Garden, Edinburgh, EH3 5LR is preparing distribution maps of Scapania aequiloba, S. aspera and Metzgeria fruticulosa agg. (including M. fruticulosa s.s. and M. temperata) and would like to borrow specimens of these species from the British Isles. Metzgerias should preferably contain notes on host species or other substrate.

SAILING TRIP TO THE SHETLANDS

Our member, Brian Burnett, and his wife Wendy are intending to sail in their 6-berth sailing cruiser from Conway up to the Shetlands. They will be leaving in April and will take about 6 weeks to reach Thurso; two months will be spent around the Orkney-Shetland area before sailing south again down the East Coast. They both have good experience (and Brian is qualified) in offshore sailing, and they are both keen on natural history including bryology. If any of our members are interested in joining Brian and Wendy as paying guests on their expedition would they please write to them at Min y Grug, Llandegla, nr. Wrexham, Clwyd, LL11 3AA.

A. R. Perry, Hon. Secretary, National Museum of Wales, Cardiff, CF1 3NP.
