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A Device for Measuring the Influence of Constant Magnetic Fields on Experimental Populations of Bryophytes

by Jan Sarosiek and Krzysztof Kolon

Techniques Column. Send contributions to the column editor M.L. Sargent, University of Illinois, School of Life Sciences, 393 Morrill Hall, 505 South Goodwin Avenue, Urbana, Illinois 61801, U.S.A.

Although scientists have, for years, examined the influence of magnetic fields on organisms, little is known about the effects on plant growth of a constant magnetic field (Barnothy, 1969; Wadas, 1978). Results from this type of experimentation may have useful applications, for example to increase agricultural crop production (Kholodov, 1978). The effects of a constant magnetic field on animal and human blood have been established experimentally (Bellosi & Toujas, 1982; Bellosi & de Certaines, 1979). Savostin (1937) has reported physiological effects of magnetic fields on growth of roots and circulation of cytoplasm in cells. The Bryophyta, because of their life strategies, small size, and rate of vegetative reproduction, comply with the criteria for experimental plants

in laboratory tests employing a constant magnetic field of various intensities. Sarosiek and Wiewiórka (1986) have investigated the sensitivity of liverworts (Hepaticae) to electromagnetic radiation.

We have designed a prototype device for generating a constant magnetic field. It is adapted for research on experimental cultures of bryophytes including *Riccia fluitans*, *Ricciocarpus natans*, *Conocephalum conicum*, *Marchantia polymorpha*, *Lunularia cruciata*, *Drepanocladus aduncus*, *Fontinalis antipyretica*, and *Scapania undulata*.

It is advisable to cultivate the bryophytes in nutrient media that have been verified to yield optimum growth; the media are different for various species of the Bryophyta (Sargent, 1988).

The designed device consists of a direct-current feeder cable and two coils, connected in series and placed at an appropriate distance apart (photo 1). The poles of the magnetic field are contained within the area between the coils, and outside this space the field begins to decline quickly with distance, generating no interference. The series resistance of these two coils is 2.12 ohms. Each of the coils is com-

Bryological Expeditions to Tropical Africa

This summer will see two important bryological expeditions to tropical Africa: one to Malawi organized by the British Bryological Society and another one to Zaire in the framework of the German 'Bryotrop' project. In forthcoming issues of the Bryological Times we hope to publish details on the results of these important expeditions. We also hope to have more news on the international expedition to Usambara Mountains, Tanzania, earlier this year, in which Dr. T. Pócs has been participating. All of these undertakings are focusing on the ecology and conservation of the threatened african tropical forest ecosystems and are contributing in one way or another to the 'Bryologia Africana' project (*Bryol. Times* 60: 1).

The below notice on the Malawi expedition is a shortened version of the article by R.E. Longton which appeared in *Bulletin of the B.B.S.* 57: 28-29, 1991. The announcement of the 'Bryotrop' expedition was provided by J.-P. Frahm.

BBS Expedition to Malawi

The Tropical Bryology Group of the British Bryological Society is organizing an Expedition to Mt. Mulanje, Malawi, June/July 1991. The Mulanje massif is the most impressive mountain region in south-central Africa, rising to almost 3000 m, and forms a biotically isolated island, a member of the Afro-Montane archipelago that extends from Ethiopia to the Cape. The natural vegetation of the lower slopes comprises mixed evergreen forests, whilst much of the higher altitude montane forest is

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International Association of Bryologists – British Bryological Society
FIRST INTERNATIONAL SYMPOSIUM ON THE BIOLOGY OF SPHAGNUM
and the I.A.B. Biennial Meeting
'EXPERIMENTAL BRYOLOGY'
University of Exeter, United Kingdom, 17 - 24 July 1991

Sphagnum Symposium – Preliminary Programme

WEDNESDAY 17 JULY 1991

Introduction

Special contribution

H. Sjörs (Sweden): *Sphagnum* - a mossy story

Session 1. Taxonomy and classification

R. Andrus (USA): North American Pacific coast *Sphagnum* species and their relationships.

N. Miller (USA): The ecology and taxonomic implications of a deep water form of *Sphagnum cuspidatum*.

E. Fuertes Lasala (Spain): Taxonomy, ecology and chorology of *Sphagnum capillifolium* and *S. subnitens* from Spain.

H. Suzuki (Japan): A revision of the *Acutifolia* group of Japanese *Sphagnum*.

He Xiao-lan (China): Phylogenetic analysis of *Sphagnum* in North-east China.

K. Flatberg (Norway): Taxonomy of European *Sphagna* - present status.

Session 2. Distribution and Biogeography

D. Lane (USA): Exploring *Sphagnum* biogeography with geographic information system (GIS) software.

A. Eddy (UK): [Title to be decided.]

A. Seneca Cardoso et al. (Portugal): *Sphagnum auriculatum* in Portugal, with quaternary occurrences.

M. Infante (Spain): *Sphagna* from the Basque country (northern Spain).

R. Krisai (Austria): Distribution patterns of *Sphagnum* in the eastern Alps.

Session 3. Population Genetics

R. Daniels (UK): Partitioning of genotypic and phenotypic variation within and between *Sphagnum* populations.

C. McQueen (USA): Niche breadth and overlap of *Sphagnum* species in South America.

M. Krzakowa (Poland): Peroxidase interpopulational variability of *Sphagnum girgensohnii*.

R. Overath (USA): Genetic variation in *Sphagnum torreyanum* Sull.

N. Cronberg (Sweden): Genetic diversity of Scandinavian populations of *Sphagnum capillifolium* and *S. rubellum*.

Session 4. Physiology and Biochemistry

H. Rudolph (Germany): The physiology of *Sphagnum* - new aspects of nitrogen metabolism.

R. Baker (UK): Hyaline cell development in *Sphagnum* branch leaves.

Z. Gagnon (USA): pH-lowering ability of *Sphagnum magellanicum*.

THURSDAY 18 JULY 1991

Session 5. Physiological Ecology

J. Glime (USA): Physiological and morphological responses of two *Sphagnum* species to water level.

J.A. Lee (UK): Ecophysiological aspects of the mineral nutrition of *Sphagnum* species.

R. Aerts (Netherlands): Growth limiting nutrients in *Sphagnum*-dominated bogs subject to low and high atmospheric nitrogen supply.

S. Lütt (Germany): Decomposition and growth of several *Sphagnum* species under different environmental conditions.

Session 6. Ecology

K. Dierssen (Germany): The delimitation and importance of *Sphagnum*-dominated synusia for mire community typification and synecology.

H. Rydin (Sweden): Competition among *Sphagnum* species.

B. Wojtun (Poland): Chemical properties of *Sphagnum* microsites on the lower Silesian peat bogs.

G. van Wirdum (Netherlands): Eco-hydrology of *Sphagnum* invasions in guagfens.

H. Vasander (Finland): Habitat partitioning of *Sphagnum* species in a kettle hole mire in southern Finland.

Session 7. Peat-forming systems

N. Malmer (Sweden): Mineral nutrients, primary productivity and decay in peat-forming systems.

J. Janssens (USA): Ecology of peatland Sphagnaceae and other mosses, and their use in the paleoenvironmental reconstruction of peatland development.

L. Johnson (USA): Causes of peat accumulation and the role of *Sphagnum* decay resistance.

M. van Dierendock (Netherlands): Simulation of peat accumulation.

P. van der Molen (Netherlands): Hummock-hollow complexes on Clava bog (Co. Offaly, Ireland): a habitat and niche approach.

K. Tolonen (Finland): Dating of surface peat, with environmental applications.

Session 8. Sphagnum and Man

P. Pakarinen (Finland): Anthropogenic effects on *Sphagnum* mosses and their habitats in boreal mires.

R. Turner (UK): Use of peat by man.

Special contribution

R. Clymo (UK): *Sphagnum* - a forward look.

Close of Symposium**Experimental Bryology Meeting - Preliminary Programme**

The programme set out below is still provisional; papers will not necessarily be presented in this order, in some cases titles have yet to be decided, and there will be additional papers in many of the sessions

FRIDAY 19 JULY 1991**Session 1. Biochemistry and metabolism**

N.W. Ashton, D.A. Resansoff & G. Jones (Canada): Analysis of stable kanamycin resistant transformants of *Physcomitrella patens* by the polymerase chain reaction.

Z. Gagnon (USA): Effects of ozone exposure on photosynthesis and growth of three species of *Sphagnum*

J.A. Lee (UK): Effect of airborne pollutants on nitrogen metabolism and growth of *Racomitrium lanuginosum*.

A. Matsuo (Japan): Formation of terpenoids by cell suspension cultures of liverworts.

R.M. Ros-Espin (Spain): Changes in protein pattern in mosses suffering drought stress.

W. Seel (UK): Metabolic responses of bryophytes to desiccation.

N. Smirnoff (UK): Biochemical aspects of desiccation tolerance in bryophytes.

O. Werner (Germany): Protein phosphorylation in *Funaria hygrometica* wild type and auxin-defective mutants.

Session 2. Cell biology and fine structure

J.G. Duckett (UK): [Title to be decided.]

E. Chauhan (India): Ultrastructural studies on the foot-vaginula complex of some liverworts.

SATERDAY 20 JULY 1991

Free day, with possibility of local bryological excursions.

SUNDAY 21 JULY 1991

Field excursion to Dartmoor: granite tors, a small upland valley mire, and sheltered oak woodland on granite and rocky riverside habitats in the valley of the R. Dart.

MONDAY 22 JULY 1991

Session 3. Reproduction and control of development

D. Basile (USA): Experiments with *Sphagnum* in axenic culture.

M. Basile (USA): Cyto differentiation correlated with leaf development in *Plagiochila arctica*.

D.M. Bergstrom (Australia): The effect of applied stress on the germination of bryophyte diaspores.

T. Hedderston (UK): Life history variation among populations of three Polytrichaceous mosses.

P. Poschlod (Germany): The diaspore bank of bryophytes in a South Bavarian bog along a transect with different water economy.

R.E. Longton (UK): The life-history of *Archidium*.

B.D. Vashistha (India): [Morphogenesis in bryophytes.]

Session 4. Ecophysiology and experimental ecology

J.W. Bates (UK): Mineral nutrient uptake and retention by bryophytes.

J.M. Glime (USA): Stresses of geothermal bryophytes.

R.I. Hastings (Canada): Relationship of peristome movement to phylogeny in the Grimmiaceae.

L. Kappen (Germany): Modelling photosynthetic production of cryptogams with respect to major stress situations at polar habitats.

C. Lopez & F. Lara (Spain): Ecology of corticolous communities in the Spanish central range.

You Fang Wang (China): Experiments on bryophytic culture in various substrata.

P.M. Selkirk (Australia): Bryophyte distribution in relation to habitat and physiology on subantarctic Macquarie Island.

M. Tarnowski, D. Mellick, D. Roser, H. Adamson & R.D. Seppelt (Australia): In situ carbon dioxide levels in cushion and turf forms of *Grimmia antarctici* at Casey Station, East Antarctica.

Xiong Yuanxi (China): Ecological groups and distribution of *Fissidens* in Guizhou.

TUESDAY 23 JULY 1991

Session 5. Biosystematics and population ecology

R. Wyatt, A. Stoneburner & I.J. Odrzykoski (USA): Using isozymes to unravel systematic affinities in the Mniaceae.

H. Bischler (France): Variation in a polyploid, dioicous liverwort *Marchantia globosa* Brid. ex Web.

H.J. During (Netherlands): [Experimental population dynamics.]

E. de Lima (USA): Morphometric analysis of character variation in field and cultured populations of the moss family Hedwigiaceae

E. Ron (Spain): On the anatomy, flavonoid pattern and sporeling types in mosses.

Session 6. Pollution and conservation

E. Adamson, R.D. Seppelt & H. Adamson (Australia): Cement dust pollution at Casey Station, East Antarctica.

D.H. Brown & M. Sidhu (UK): Heavy metal effects on mosses.

J. Martínez-Abagair (Spain). Alterations of mineral nutrition of aquatic bryophytes caused by organic pollution.

V. Mazimpaka, J.A. Hernandez & V. Bermejo (Spain): Use of *Scleropodium purum* (Hedw.) Limpr. as collector of airborne heavy metals in the town of Madrid (Spain).

S.M. Morgan (UK): Responses of bryophytes to NO_x fumigation.

C. Sergio (Portugal): [Title to be decided.]

G. Pant (India): Vanishing greenery in the Kumaon Himalayas; whither bryophytes?

WEDNESDAY 24th JULY 1991

Field excursion to East Devon: wet and dry heathland and a small valley-bog on Triassic pebble beds; seral woodland and fragments of calcareous grassland on area of 19th century coastal landslip on Cretaceous rocks.

End of meeting

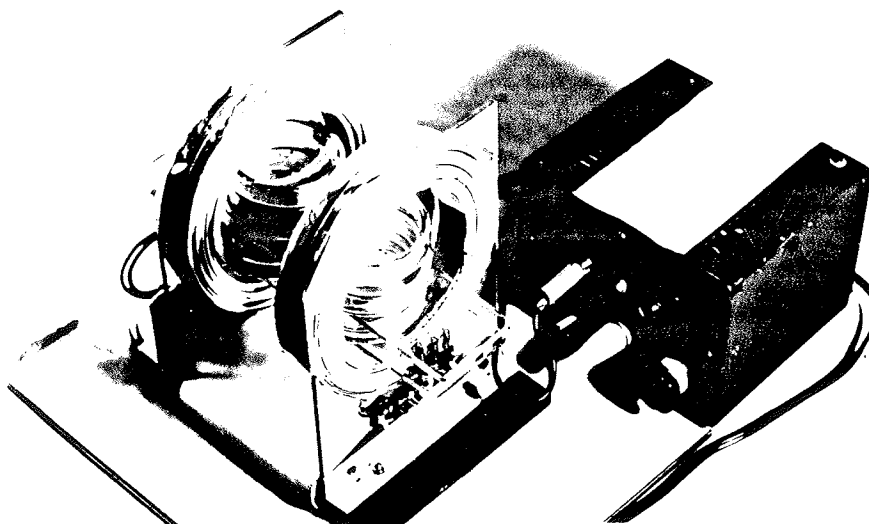
contd p. 1: **Magnetic Fields**

posed of 100 revolutions of enamel-insulated copper wire. The result is that with the maximum feeder current of 3A, the coils generate a field of 13.5 Oersteds. This enables one to obtain any intensity of a constant magnetic field within the range from 0 to about 13.5 Oersteds, the coils being separated by a distance of about 20 cm.

The feeder construction has the characteristic simplicity of the system. It is also highly failure-proof for long periods of time. Because some direct-current oscillations could occur in the coils, an electronic stabilizer has been employed. If any current oscillations were permitted, a weaker variable field (frequency of 100 Hz) would overlap the stronger constant component of the magnetic field. This would hinder the proper interpretation of the experimental results.

Regulation of the magnetic field intensity to a desired value is accomplished by means of a potentiometer. The system is protected from the grid side by a cut-out of 0.315 A. The device is supplied with current (220 V; 50 Hz) from the building's electrical lines.

Containers with the bryophytes are put under a glass plate between the coils. The temperature of the air between the coils does not increase even when the field intensity is at a maximum, because the coils get only slightly warm. Fluctuations in temperature do not exceed 0.1°C. Distance between the coils, as well as the way in which they are fastened, permit a free access of air (without ventilation devices) and unrestricted lighting of the research objects. The magnetic field generated between these Helmholtz-Gauguin coils is homogeneous (Kohlrausch



1956) as confirmed by intensity measurements. The intensity of the magnetic field was measured by a teslometer with a hallotron (Siemens EA 218).

Failure-free functioning of the device for over a year has been recorded with fluctuations of the ambient temperature from +10 to +35°C and a wide range of changes in air humidity.

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Personalia

Rob Gradstein will be travelling to Bolivia, Colombia, and Panama during May-June 1991. In Bolivia he will participate in the annual meeting of the Organization for Flora Neotropica, in Colombia he will be doing fieldwork in the surroundings of Bogotá, and in Panama he will be teaching bryology at the University of Panama and do fieldwork together with Noris Salazar in the Darien National Park at the Colombian border.

contd p. 1: Bryological Expeditions

dominated by Mulanje Cedar (*Widdringtonia cupressoides*). The vascular flora of Mt. Mulanje is reasonably well known and comprises around 30 endemic species, but bryologically it is one of the most poorly documented African mountain massifs.

Although the area has been managed as a forest reserve since 1927, the forest vegetation is sadly diminishing by a rapidly expanding human population. The forest destruction, much of it illegal, threatens not only the indigenous biota but also water supplies vital to agricultural communities in the lowlands. It is believed that the epiphytic bryophyte vegetation of the natural forests, with its remarkably high water-holding capacity, may play an important and highly beneficial role in regulating water supplies.

The general aim of the expedition will be to document the bryophyte flora as insurance against the possibility of continuing forest destruction and, more optimistically, to strengthen the impetus for conservation of the biota as a whole. The expedition will operate from Zomba, located 70 km from Mt. Mulanje, from approximately 12 June to 3 July, 1991, when cool, dry weather may be anticipated. Four periods of three to four days will be spent in the field, based at mountain huts in different parts of the Mulanje massif. The expedition will take place in close collaboration with the National Herbarium and Botanic Gardens of Malawi at Zomba.

The following persons will participate in the expedition:

Shaun Russell, leader, University of Namibia.
Royce Longton, UK coordinator, University of Reading
Nick Hodgetts, Nature Conservancy Council.
Liz Kungu, University of Nairobi, Kenya.
Z.L.K. Magombo, National Herbarium & Botanic Gardens of Malawi.
Brian O'Shea, British Telecom.

Ron Porley, Nature Conservancy Council.

Martin Wigginton, Nature Conservancy Council.

The specific objectives of the expedition are:

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

Bryotrop III expedition to Zaire

'Bryotrop' will continue with fieldwork in Zaire during August and September, 1991. This is the third (and last) expedition of the German interdisciplinary project 'Ecology, Geography, Phytosociology and Taxonomy of Tropical Rainforest Bryophytes', which was started in 1982 in Peru and continued in 1986 in Borneo. Floristic data of the Borneo expedition have been published in *Willdenowia* (Enroth 1989, Frahm & Mohamed 1987, Hyvönen 1989, Inoue 1989, Menzel 1988, Menzel & Schultze-Motel 1990, Piipo 1989, Tan 1989, Tan & Iwatsuki 1989, Touw 1989a,b, Yamada 1989) and results of the ecological investigations appeared in *Nova Hedwigia* vol. 51 (Frahm 1990a,b,c, Frey et al. 1990, Kürschner

1990, Frahm & Kürschner 1989). In addition, an illustrated guide to the bryophytes of the Mt. Kinabalu Park in Borneo has been prepared (Frahm et al. in press).

The 'Bryotrop' project is part of a special program for the study of tropical rain forests supported by the German Research Foundation with grants to Dr. Jan-Peter Frahm, University of Duisburg, and Dr. Wolfgang Frey, University of Berlin. Further participants in the expedition to Zaire will be Dr. Harald Kürschner, University of Berlin, Dr. Rainer Lösch, University of Düsseldorf, Dr. Eberhard Fischer, University of Bonn, and as foreign guest, Dr. Tamás Pócs, Hungarian Academy of Sciences, Vácrtót.

Fieldwork in Zaire will be carried out in the National Park Kahuzi-Biega, a 600,000 ha area in the East of Zaire just South of the Equator (1°36' - 2°37'S and 27°33' - 28°46'E), consisting of rain forests and tropical alpine vegetation. The park ranges from 800 to 3300 m alt. and has mainly been established for the protection of the gorilla; the vegetation is relatively undisturbed. As during previous expeditions, a transect will be studied from about 400 m alt. (outside the park) to the summit of Mt. Kahuzi (3300 m). Along this transect, relevés at 200 m intervals will be inventoried. In addition, the zonation of bryophytes along the transect, the ecology of epiphytic bryophytes and a vegetation analysis of the epiphytic bryophyte communities will be investigated. The results of the Zaire fieldwork will be published in a special volume of the journal "Tropical Bryology".

After completion of the third phase of 'Bryotrop', a detailed comparison of the bryophyte floras and vegetations in the investigated equatorial rain forests of America, Africa and Asia will be feasible.

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New Dissertations

Alexey D. Potemkin (Leningrad): "The liverworts of the Yamal peninsula" (in Russian). Carried out under the supervision of N.S. Golubkova and A.L. Zhukova and defended at the Komarov Botanical Institute, Leningrad on 16 May 1990. Individual parts have been published in *Bot. Zhurn.* (Leningrad) in vol. 73: 685-690, 1988; vol. 74: 806-815, 1989; vol. 75: 1086-1092, 1742-1753, 1990, and in *Novosti Sist. Nizsh. Rast.* in vol. 27: 147-153, 1990, and will be published in *Novosti Sist. Nizsh. Rast.* and *Bot. Zhurn.* Brief information in English is in Abstracts and Reports of 7th meeting CEBWG. This is a floristic and systematic study of arctic hepatics including numerous data on their malleability and its dependence on different ecological factors. Author's address: Department of Cryptogams, Komarov Botanical Institute, Prof., Popov St. 2, 197376 Leningrad, USSR.

Irina V. Chernyadieva (Leningrad): "Mosses of the North-West of the Putorana Plateau (Siberia)" (in Russian). Carried out under the supervision of N.S. Golubkova and defended at the Komarov Botanical Institute, Leningrad on 19 October 1988. Individual parts have been published in *Novosti Sist. Nizsh. Rast.* in vol. 24: 232-233, 1987; vol. 27: 153-157, 1990; in "Mountains phytocenosis systems of the Subarctic", Leningrad, 1986: 91-123 (in Russian) and in Abstracts and Reports of 7th meeting CEBWG (in English). This is a floristic study of mosses of the Putorana Plateau. Some problems of ecology, geographical distribution and activity of the studied species are discussed. Author's address: Department of Cryptogams, Komarov Botanical Institute, Prof. Popov St. 2, 197376 Leningrad, USSR.

Best Book Buys

In 1964, Henry Darlington wrote a moss flora of the state of Michigan. This book is an identification guide to 377 species of mosses. It includes keys, species descriptions, and illustrations. The book has 212 pages and a nicely illustrated, white, hard cover. This is one of several state floras produced in the mid 1900's, all of which were handsomely produced at extremely reasonable prices. Darlington's state flora belongs on the book shelf of any bryologist. The reference is as follows.

Darlington, Henry T. 1964. Mosses of Michigan. 212 pp. Hardcover. Available from the original publisher - Cranbrook Institute of Science, 500 Lone Pine Road, P.O. Box 801, Bloomfield, Michigan 48013. Still available at the original price of US \$12.00 plus 10% handling and postage.

Dale H. Vitt

New Publications

P.K. Holmgren, N.H. Holgren, and L.C. Barnett 1990. *Index Herbarium Part I: The Herbaria of the World*, 8th edition. Published by the New York Botanical Garden as *Regnum Vegetabile* Vol. 120, 704 p. ISBN 0-89327-358-9, hardcover. Price US \$ 62.00 for members of IAPT, US \$ 76.00 for non-members. Orders should be prepaid in US dollars; for non-US orders add \$ 2.50 to cover postage.

Since 1952 the *Index Herbariorum* has been the definite directory of the institutional herbaria of the world. The eight edition provides the following information on 2639 herbaria in 147 countries: address; institutional affiliation; official acronym; telephone, fax, and cable numbers; CITES permit number and status; year of foundation; important collections; number of specimens; name, year of birth, and telephone number of the herbarium curator(s), director, and staff; periodicals and serial works published by the herbarium; information about loans and exchange procedures. A novel feature of this edition is that the herbaria are primarily arranged by country rather than by city; within each country the arrangement is alphabetical by city as usual. There are five major indexes: of herbaria sorted by city, by country, and by acronym; of important collections and where they are kept; and of herbarium staff.

The new *Index Herbariorum* is a gold mine of information on the herbaria of the world and an indispensable reference for taxonomists. Bryologists who are used to work with the *Compendium of Bryology* should consult the new Index for updates.

J.J. Engel 1990. *Falkland Islands (Islas Malvinas) Hepaticae and Anthocerotae: A Taxonomic and Phytogeographic Study*. - Published by the Field Museum of Natural History, Chicago, as *Fieldiana, Botany*, N.Ser. 25, 209 pp., ISSN 0015-0746. Price not

given.

This work is the updated version of the author's unpublished doctoral dissertation and provides a detailed account on the taxonomy, distribution and ecology of all 131 species of liverworts recorded from the Falkland Islands. The volume contains a very useful introduction to the geology and ecology of the islands as well as an overview of the occurrence of mosses and liverworts in the various plant communities. Elaborate keys to families, genera and species of liverworts facilitate the identification of the taxa. Of many species geographical dot maps are provided, illustrating the phytogeographic make-up of the flora; a few species are illustrated. The Falklands liverwort flora has a characteristic austral character and shows relationships with southern South America, South Africa as well as Australia and New Zealand. The author is to be congratulated with this thorough study which should be on the shelves of all those interested in the bryophyte flora of the Southern Hemisphere.

J.-P. Frahm 1991. *Dicranaceae: Campylopodioideae, Paraleucobryoideae. Flora Neotropica Monograph 54*, 238 pp., 167 Figs. Published for the Organization for Flora Neotropica by The New York Botanical Garden. ISSN 0071-5794. Price not given.

This is the first major bryophyte monograph published in *Flora Neotropica*. Keys, descriptions, illustrations, and distribution maps are provided for the neotropical species of the following genera: *Atractylolcarpus*, *Bryohumbertia*, *Campylopodium*, *Campylopus*, *Dicranodontium*, *Microcampylopus*, *Pilopogon*, *Sphaerothercium*, *Brothera*, *Campylopodella*, and *Paraleucobryum*. In all 87 species, including 65 in *Campylopus*, are accepted from about 350 described ones, hence a reduction in number of over

75%! The morphological and anatomical features of the group are discussed in a richly illustrated introduction. The species of *Campylopodioideae* and *Paraleucobryoideae* inhabit rather open environments in the neotropics, such as savannas and páramos, and are common pioneers of disturbed habitats such as road sides and lava flows. Frahm's treatment is a major and most valuable contribution to our knowledge of neotropical mosses and the author is to be thanked for his efforts to put this monograph together.

M.O. Hill, C.D. Preston & A.J.E. Smith (eds.) 1991. *Atlas of the Bryophytes of Britain and Ireland Vol. I: Liverworts*. - 352 pp., 303 maps, hardback, ISBN 0 946589 29 1. - Published by Harley Books, Martins, Great Horkeley, Colchester, Essex CO6 4AH, England, Telephone 0206-271216. Price £19.95 excluding postage; price rising to £22.50 from 1 September 1991.

The main feature of this new book, which is clad in a superb cover showing *Mylia taylori* in colour, are the 289 dot maps of the distribution in the British Isles of all liverwort species recorded from the area. A distinction, by means of different symbols, is made between records from before 1950 and those made afterwards. Each map is accompanied by notes on the ecology and reproductive biology of the species as well as their world distribution. Additional maps showing the distribution of various relevant environmental factors (temperature, rainfall, elevation, calcareous rocks, peat bogs, and atmospheric sulphur dioxide) are also included. Introductory chapters deal with the history of floristic work on liverworts in the British isles and the BBS mapping scheme. This Atlas is the ideal companion to the recently published *The Liverworts of Britain and Ireland* by A.J.E. Smith (see *Bryol.*

Times 59: 10) and is an essential reference for those concerned with the biology and conservation of the British liverworts.

S.L. Jury, P.J. Lightowlers & R.E. Longton (eds.) 1990. Bryophytes in terrestrial ecosystems. Botanical Journal of the Linnean Society 104: 1-291.

This volume contains the proceedings of the symposium on Bryophyte Ecology organized by the British Bryological Society and the British Ecology Society at the University of Edinburgh, July 1988. The sixteen invited papers, which are presented here, include reviews of bryophyte production and decomposition in tundra (Russell), temperate (Vitt) and tropical (Frahm) ecosystems as well as of the physiological basis for production (Proctor). A group of papers deal with interactions between bryophytes and other organisms including plants (During & van Tooren) and invertebrates (Koponen), as well as examining herbivory (Davidson, Harborne & Longton). The third group considers population biology from the viewpoints of reproductive strategies (Miles & Longton), genetic structure of hepatics (Newton), niche theory (Slack) and plant strategy (Grime, Rincon & Wickerson). The final section reviews bryophytes and heavy metals (Tyler), mineral deposition (Lee, Baxter & Emes), and the effects of tropical forest disturbance (Norris) and the urban environment (Burton).

A very limited number of copies of these proceedings are available post free to members of the two organizing societies. Members interested in purchasing a copy should send a cheque for £18 made out to British Bryological Society to Dr. Roy Perry, Dept of Botany, National Museum of Wales, Cardiff CF1 3NP, United Kingdom.

Bryophyte Conservation

by Nick Hodgetts

Secretary European Committee for the Conservation of Bryophytes

Bryophytes Conservation Column. Send contributions to the column editors E. Urmi, Institut für Syst. Botanik der Universität, Zollikerstrasse 107, CH-8008 Zürich, Switzerland, or, T. Hallingbäck, The Swedish University of Agricultural Sciences, Dept. of Ecology and Environmental Research, P.O. Box 7072, S-75007 Uppsala, Sweden.

The board of the European Committee for the Conservation of Bryophytes (ECCB) met in Zürich at the end of February to discuss ways in which bryophyte conservation in Europe can be furthered. It was decided that a European Red Data Book for bryophytes was a priority, and the Board is currently exploring various options for the funding of such a project. As a first step, we are taking Duell's lists of European bryophytes and excluding all those species that are clearly not threatened.

At the Zurich meeting the area to be covered by the RDB project was defined as basically the same as that covered by the Flora Europaea, including Macronesia, Novaya Zemlaya and European Turkey, but excluding the Cape Verde Islands and Asiatic Turkey. In the Caucasus, the boundary will follow the ridge of the mountains.

The categories used by IUCN (i.e. Extinct, Endangered, Vulnerable and Rare) are to be used, though the precise definitions of these categories may have to be altered somewhat for bryophytes. The project will also include a review of the most important bryophyte sites in Europe, with detailed information on the "top 50" sites. Areas where more information on the bryophyte flora is needed include Greece, S. Italy, the Italian Alps and parts of Eastern Europe.

At the same meeting it was decided that a "congress" (along the lines of last year's Uppsala meeting) should be held every three years, at which the ECCB Board will be elected. It was suggested that the next Congress should be based in Zurich and have the theme "Conservation measures and management".

Meanwhile, the other committee inaugurated at the Uppsala meeting, the IAB Standing Committee for Endangered Bryophytes, has now been officially invited to be the IUCN Bryophyte Specialist Group. We look forward to furthering the cause of international bryophyte conservation through this group.

Connected with both committees, a questionnaire is being circulated to bryologists worldwide in order to gather information on the most important and most threatened sites. This will contribute towards both the European RDB project, and the work of the IUCN Bryophyte Specialist Group.

author's address

Joint Nature Conservation Committee
Monkstone House, City Road
Peterborough PE1 1JY
United Kingdom

Request

Mosses for tropical greenhouse.

The technician in charge of the tropical greenhouse of the Botanical Garden of the University, Basel, Switzerland, would like to start growing tropical moss species – terrestrial and/or epiphytic in his precincts. Any assistance through information on pertinent experience and by supply of suitable planting materials (spores, vegetative propagules etc.) from bryologists with tropical and gardening experience would be highly appreciated. Please write to Mr. René Pfeifer, Botanical Garden of the University, Schoenbeinstrasse 6, CH-4056, Basel, Switzerland.

Colophon

The Bryological Times, founded in 1980 by Stanley Wilson Greene (1928–1989), is the bimonthly newsletter of the INTERNATIONAL ASSOCIATION OF BRYOLOGISTS. It is published in Edmonton (Canada) and distributed from Canberra (Australia), Edmonton (Canada), Eger (Hungary), Geneva (Switzerland), Hiroshima (Japan), Moscow (U.S.S.R.), Praha (Czechoslovakia) and St. Louis (U.S.A.).

Important change from no. 57/58 onwards: all items for publication in *The Bryological Times* are to be sent, preferably on diskette, to the Managing Editor, Guido B.A. van Reenen, University of Amsterdam, Hugo de Vries Laboratorium, Kruislaan 318, 1098 SM Amsterdam, the Netherlands, **except** those for the regular columns, which may go **direct** to the column editors.

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For details regarding membership of the INTERNATIONAL ASSOCIATION OF BRYOLOGISTS (currently US \$10.00 p.a.) write to the Honorary Secretary, Dale H. Vitt, Department of Botany, University of Alberta, Edmonton, Alberta, Canada T6G 2E9. All correspondence concerning mailing to Sandi Vitt at the same address.

Diary

Send contributions to D.H. Vitt,
University of Alberta, Department of Botany, Edmonton, Alberta, Canada T6G 2E9.

1991

May 31–June 2. Swiss Bryological and Lichenological Association annual meeting. Montbovon (Fribourg), Western Prealps. Inquiries: Dr. Philippe Clerc, Conservatoire et Jardin botaniques, C.P. 60, CH-1292 Chambésy, Geneva, Switzerland.

July 5–12. Nordic Bryological Society Annual Meeting. Kongsvald, Norway. Twenty-fifth anniversary meeting. Inquiries: Gert Mogensen, University Botany Museum, Gothersgade 130, DK-1123, Copenhagen K, Denmark.

July 17–18. IAB Symposium: The Biology of Sphagnum. Exeter, U.K. Symposium preceded by field meeting on July 12–16. Contributed papers are invited. Offers of papers and inquiries should go to R. E. Daniels, Institute of Terrestrial Ecology, Furzebrook Research Station, Wareham, Dorset BH20 5AS, U.K. Tel. 09295 51087.

July 19–24. IAB/BBS Joint Meeting on Experimental Bryology, Exeter, U.K. Symposia, contributed paper sessions and field days. Offers of papers and inquiries should go to M.C.F. Proctor, Hatherly Laboratories, The University, Prince of Wales Road, Exeter EX4 4PS, U.K.

Aug. 4–8. Bryological and Lichenological Section of the Botanical Society of America. Annual meeting with the American Institute of Biological Sciences. Convention Center and Trinity University, San Antonio, Texas. Inquiries: Ann Rushing, Department of Biology, Baylor University, Waco, Texas 76798, U.S.A.

Aug. BBS Summer Field Meeting, Massif Central, France. To be held probably during the third week of August. Inquiries: Roy Perry, Department of Botany, National Museum of Wales, Cardiff CF1 3NP. Tel. 0222 397951, Ext. 267.

Sept. 6–8. Bryologisch-lichenologische Arbeitsgemeinschaft für Mitteleuropa field trip with prof. Poelt. Inn valley, Austrian Alps. Inquiries: Dr. G. Gärtner, Institut für Botanik, Sternwartestrasse 15, A-6020 Innsbruck, Austria.

Sept. 12–15. Swiss Bryological and Lichenological Association and Bryological-Lichenological Arbeitsgemeinschaft für Mitteleuropa. Field meeting. Göschenen (Uri), Central Alps. Inquiries: E. Urmi, Institut für Systematische Botanik, Zollikerstrasse 107, CH-8008 Zürich, Switzerland.

Sept. 14–15. BBS Annual General Meeting and Symposium Meeting, Sheffield, U.K. Inquiries: Tom Blockeel, 9 Ashfurlong Close, Dore, Sheffield, S17 3NN. Tel. 0742 366861.

Sept. 24–27. IX Simposio Nacional de Botánica Criptogámica. Symposia with invited speakers, poster sessions and colloquia. Salamanca, Spain. Inquiries: F. Amich, Departamento de Biología Vegetal (Botánica), Universidad de Salamanca, 37008 Salamanca, Spain.

Late Sept. Australian Bryological Workshop, Canberra, Australia. Tentative dates are for the 21st to 30th. Inquiries: Heinar Streimann, Cryptogamic Herbarium, Australian National Botanic Garden, Canberra, A.C.T. 2601, Australia.

Oct. 11–13. BBS Bryophyte Workshop, Rogate, West Sussex. Inquiries: June Chatfield, 44 Ashdell Road, Alton, Hampshire GU34 2TA U.K., Tel. 0420 82214.