

## Index Hepaticarum Completed

by Helène Bischler-Cause

The last volume of *Index Hepaticarum* was published at the beginning of this year. Silently, as if it was in the nature of things, it joined the earlier eleven issues on the shelves beside the desks of many bryologists. Yet it is the completion of an important work; the whole series contains about 40000 carefully checked references.

It is now worth remembering how this project came into being, thanks to a few who spent their time disinterestedly and to many who assisted and helped out.

C.E.B. Bonner, curator of the

cryptogamic herbarium of Geneva, proposed in 1954, at the International Botanical Congress in Paris, to produce an *Index* for hepatic names accounting for all validly published taxa. Nothing similar had existed before. At the same time, *Index Muscorum* was proposed. The latter had a forerunner (*Paris Index Bryologicus*), a later nomenclatural starting point (1801), an editorial committee, financial assistance and a staff of several members. *Index Muscorum* was completed within ten years, whereas *Index Hepaticarum*,

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## Letter from the General Editor

1990 has been a good year for *The Bryological Times*. After a somewhat slow start we managed to have the newsletter published on a regular basis, with much of the news appearing with little delay. Much credit for this goes to Guido van Reenen who has turned the production of the *Times* into an efficient, desk-top publishing operation. I am pleased to announce that Guido has accepted the Managing Editor position of *The Bryological Times*, effective with the present number. Guido's responsibilities will include the handling and copy editing of all incoming material, in consultation with the General Editor and the Assistant Editor. Please notice that material for publication in *The Bryological Times* should be sent to Guido B.A. van Reenen, University of Amsterdam, Hugo de Vries Laboratorium, Kruislaan 318, 1098 SM Amsterdam, The Netherlands. We are particularly keen to receive "ready-to-print" news items, as the newsletter is produced without any secretarial help. Contributors are therefore urged to send their contributions on diskette, at least for items longer than 200 words.

Publication and distribution of *The Bryological Times* continues to be done in Edmonton, Canada at the office of the Secretary of I.A.B., Dale H. Vitt, with the help of associate distributors in many parts of the world, including Robert Magill, Missouri Botanical Garden (North and South America), Patricia

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## Sporophyte of Takakia discovered

by David K. Smith

Ten years ago Dr. Hattori (1980) published a short passionate article entitled "Can we find the sporophyte of *Takakia*?" challenging experimental botanists to attempt induction of antheridia in *Takakia* and artificially create its sporophyte.

Mr. Paul Davison and I can finally answer his call – not by experimental manipulation; rather, by determined field work in the central Aleutian Islands during the past two years. We have recently collected both antheridial and sporophytic material that is currently under study in my laboratory.

Antheridial plants discovered in 1988 (Davison *et al.* 1989, McFarland *et al.* 1989) were the source of

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which had none of these advantages, proceeded very slowly. It continued to be supported by Dr. Bonner alone until 1976. Even if the Conservatoire Botanique in Geneva, with its very complete library, was the ideal place to carry out the project, Dr. Bonner had so many other tasks that work on the *Index* took place mostly during evenings and holidays. At his death in 1976, he had published the volumes A-J and left large files for K-Z. The bryological community owes to him the very existence of the *Index*. In our days whom would have the courage to undertake such a gigantic task?

After Dr. Bonner's death, Ruth Bonner did not want her husband's work to remain incompleting. She moved heaven and earth to find a way to go ahead, with Dr. Stafleu of the I.A.P.T., with Dr. Al Miller and the American National Science Foundation that had supported *Index Muscorum*, with me, Bonner's former pupil. Her efforts were crowned with success; the *Index* was saved.

I was familiar with Dr. Bonner's work on the *Index*. Together with D. Lamy, we first completed the two volumes which were lying all but ready for printing. However, I felt that the completion of the *Index* could not be achieved by a single person and needed an improved format. I searched for international collaboration. Proposals for help and improvement readily arrived: Dr. Stafleu offered the *Index Nominum Genericorum* files, Dr. Hattori and Dr. Fulford offered their personal files of specific names, Dr. Grolle offered to check the files and to solve nomenclatural problems, and twenty-one eminent hepaticologists agreed to complete the files for their specialities. Format changed as well, especially in including the nomenclatural status of the taxa. With the appointment of Dr. Geissler in Geneva as Dr. Bonner's successor, the

*Index* gained an enthusiastic and effective coordinator who managed to obtain additional support from the director of the Conservatoire Botanique and, particularly, from the Fonds National Suisse pour la Recherche Scientifique. This allowed Sylvia Willi-Bonner, Dr. Bonner's daughter, to obtain a full-time position for the *Index* for seven years, to work up the genera for which specialists were lacking, to check for consistency between the sets of files sent in, and to standardize the information. S. Willi rapidly became an expert in nomenclatural matters, bryological literature and computerized treatment of the collected informations. The final volumes of the *Index* are in large part her work.

From the beginning of the international reorganization of the work on the *Index* onward, we expected to be using computers, but convenient equipment was available only after 1982. Dr. Geissler then organized electronic data processing. Full information prepared for typography of vol. 8-12 (J-Z) is now ready for use in the data bank at Geneva. It should be introduced for A to J as well, and periodically updated. It also allows for introduction of synonymy and lectotypifications. If it keeps on to be supported by the bryological community, *Index Hepaticarum* can reach, in the forthcoming editions, the standard of the best indices at the disposal of our colleagues in botany and zoology.

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In *Bryol. Times* 56, p. 8 the publication of *Cryptogamic Flora of the Yantze Delta and Adjacent regions* was announced. The price of this work is US\$ 40, not \$ 400.

*contd p. 1: Letter General Editor*

Geissler, Jardin Botanique, Geneva (southern Europe), Zennoske Iwatsuki, Hiroshima University (Japan and China) and Heinar Streimann, Australian National Botanic Gardens, Canberra (Australasia). With the opening of the iron curtain, colleagues in eastern Europe are increasingly interested in establishing contacts with colleagues abroad (see e.g. Heinjo During's report of the Kirovsk meeting, p. 3) and to receive *The Bryological Times*. To meet this demand, a new distribution system has been set up for eastern Europe. Bryologists in the U.S.S.R. will from now on receive *The Bryological Times* from Misha Ignatov, Main Botanical Garden, Moscow, with copying being done by Lars Söderström, University of Umea, Sweden. Copying and distribution to other eastern European countries will be done jointly by Sándor Orbán, 'Eszterházy Károly' Teachers Training College, Eger and Jiri Váňa, Charles University, Praha. Bryologists in this part of the world wishing to receive *The Bryological Times* should contact one of these individuals. A revised dues structure will be announced in 1991.

I hope that these new arrangements will enhance the spreading around the world of bryological news in an efficient and effective manner. On behalf of the editorial staff I would like to express our gratitude to all colleagues who have helped with the distribution. Also, we would like to say "Happy New Year" to our readers - we look forward to receiving your contributions for publication in *The Bryological Times* in 1991.

S. Rob Gradstein

## Seventh CEBWG Meeting in the U.S.S.R.

by

Heinjo During

The Khibiny Mountains are situated at ca 67-68° N in the central part of the Kola Peninsula (Murmansk Region, U.S.S.R.); Chasnachorr Mountain, the highest point, reaches 1191 m a.s.l. The massive was formed in the Tertiary by tectonic uplifting of alkaline intrusions of Palaeozoic (mostly Devonian) age. The topography of the area was mainly shaped by glacial activity during the Pleistocene.

The discovery early this century of many minerals, among which apatite (calcium phosphate) in these mountains led to extensive mining activities, to the expansion of the city of Kirovsk and the founding of the city of Apatity (named after the mineral), and to the establishment of the Kola Branch of the Academy of Sciences of the U.S.S.R., with divisions of Geology and Botany.

In this area, in Apatity, the seventh meeting of the Central and East European Bryological Working Group (CEBWG) was held from 25 to 30 June 1990. This first international conference on bryology to be held in the U.S.S.R. had been organized by Dr. Nadya Konstantinova and co-workers of the Polar-Alpine Botanical Garden of the Academy, Kirovsk.

It was a truly international meeting, with nearly one hundred participants originating from many different countries. The Russian republic was particularly well represented (32 participants from various parts of the republic); with people from seven other republics (Ukraine: 8; Byelorussia: 2; Tajikistan: 2; Estonia: 2, Latvia: 1; Armenia: 1, and Kirghizia: 1) bryologists from all over the Soviet Union were assembled here. Add people from ten other countries (Poland: 9; DDR: 9; Fin-

land: 8; Hungary: 5; Czechoslovakia: 4; Spain: 3; Sweden: 2; The Netherlands: 2, and Switzerland and the U.S.A.: 1), and you can imagine that there were a lot of new friends to be made for everybody.

During Sunday 24 and Monday 25 June, the participants gradually assembled in the Amethyst hotel in Apatity, where we all were housed. In the course of Monday, most people took the opportunity offered by the organisation to visit the Botanical Garden in Kirovsk and the Geological Museum in Apatity.

The Polar-Alpine Botanical Garden (67°38' N) is the northernmost botanical garden in the world. Founded in 1931, it now covers over 1670 ha, extending from the bases of Mts. Vudjavrchorr and Takhtarvormchorr at 312 m a.s.l. to their summits (up to 1068 m). At the lower part of the garden, many plant species from a variety of provenances are grown, mostly outdoors but also in heated greenhouses; by far the largest part of it, however, is set aside as a nature reserve. Its vegetation ranges from mixed spruce-birch forest via birch krummholz and tundra vegetation to the cold stony desert of the highest regions - altogether, a phantastic area for research on arctic plants!

In sunny and unusually warm weather, everybody enjoyed the beds of beautifully flowering plants in the garden and the spring aspect of the vegetation of the spruce-birch, krummholz and tundra vegetation belts. Some participants also visited the herbarium of the Botanical Institute, which is situated in the garden; it contains over 116,000 specimens, among which 5,000 hepatics and 7,000 mosses.

After dinner, we assembled in the lecture hall of the Kola Science Cen-

ter in Apatity for the first time to see nice slide shows on landscape and vegetation of the Khibiny Mountains and the coast of the White Sea by Wolfgang Wiehle and Lena Andreeva.

Tuesday and Wednesday were devoted to the lectures; on Wednesday afternoon, this was followed by a poster session. All posters and nearly all lectures were in English; two of the few held in Russian were simultaneously translated into English. There were many interesting contributions on a wide variety of aspects of bryology. The following account is inevitably biased by the interests of the reporter.

In the first session, chaired by Diana Horton and devoted to Evolution and Paleobryology, G.F. Rykovsky (Minsk) discussed the origin of bryophytes as a group of higher plants, whereas R. Grolle (Jena) showed how hepatics in amber could be used as a "window into the past".

Taxonomy was the topic of session 2, with R.N. Shljakov as chairman. A thought-provoking lecture by J. Szweykowski (Poznan), in which he discussed the problems posed by sibling species differing only in chemical or physiological characters, was followed by interesting contributions of S. Huneck (Halle) on chemotaxonomy of the Marchantiidae, and of U.K. Mamatkulov (Duschanbe) on the genus *Tortula* in the U.S.S.R.

In combination with a number of posters, session 3, chaired by J. Vána, provided a wealth of information on floristics and phytogeographical aspects of the bryoflora in many areas of the U.S.S.R. and neighbouring countries. A proposal to use a landscape ecological approach to the analysis of bryophyte floras (O.M.

Maslovsky, Minsk) was particularly interesting.

Ecology and sociology of bryophytes was the topic of both a number of posters and several lectures, brought together in session 4 (chairman R.T. Ripetsky). Several contributions discussed field observations on dynamics of bryophyte populations or synusiae; others focused on the role of bryophytes in forest ecosystems (T.V. Malysheva, Uspenskoe) or on growth patterns. Thus, there were reports on seasonal patterns in growth of some species of *Sphagnum* (M.S. Boc & E.O. Kuzmina, Leningrad), of a negative correlation between annual growth and sporophyte production in *Sphagnum fuscum* (S.I. Grabovik, Petrozavodsk), and of increased sporophyte production in polluted areas in combination with higher tolerance of the sporophytes (E.N. Andreeva, Leningrad).

In session 5, on the closely related topic of endangered bryophytes (chairman M.S. Ignatov), O.A. Druzhinina (Moscow) reported on the present status of the 'red list' of bryophytes in the U.S.S.R. and on the activities needed to make it better and more useful. An experimental approach to elucidate the mechanisms responsible for the decrease of rich-fen mosses in The Netherlands was presented by A.M. Kooijman (Utrecht).

The final session, on Cytology and other topics (chairman R. Fritsch), contained some highly interesting reports on karyological investigations in the U.S.S.R. (I.S. Danilkiv, Lvov), on the morphogenesis of the moss gametophyte (O.T. Demkiv, Lvov), and on the developmental consequences of apomixis (R.T. Ripetsky & N.A. Kit, Lvov). A number of exciting studies on genetics, ultrastructure and developmental studies were presented in the poster session.

After a day of lectures, poster session and dinner, there was still

great interest in a discussion about aims and future of the CEBWG, with Jiri Vána as a skilful 'moderator'. In spite of its informal status, the Working Group appears to be very much alive and active! The discussions about the possibilities of starting a new bryological journal will be continued at the next meeting, to be held in Poland (probably in Katowice) in 1992.

Altogether, the lectures and posters provided a very good basis for further discussions and exchange of information about each other's work. Both during the lively evening parties and the excursions, many participants fully used this opportunity; thanks to the highly appreciated help of a professional translator and several bi- or multilingual participants, all language barriers could be overcome.

The excursions included an evening trip to a rich-fen area along Lake Imandra on Tuesday, a full-day trip (with splendid field lunch) to the southern slopes of the Khibiny Mountains on Thursday, and a fascinating excursion in the central part of these mountains, high above the tree line, on Friday. Thus, it was possible to collect in different vegetation belts, along snow patches and rivulets, in tundras, and in forests. Many full bags showed the eagerness of the participants to get acquainted with an arctic bryoflora!

As was stressed in all speeches during the magnificent farewell party on Friday evening, the meeting was an enormous success. Thanks to the great efforts of Nadya Konstantinova and her colleagues, the organisation ran as smoothly as possible, which contributed very much to the marvellous atmosphere. It provided not only a rare opportunity for people from many parts of the Soviet Union to meet each other and discuss bryological issues, but it also strongly furthered contacts and mutual interest between bryologists of many countries from east and west. I am con-

vinced that its effects will be seen in many publications in the years to come!

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*contd p. 1: Sporophyte of Takakia*

new, critical information on the relationship between *Takakia* and mosses. Sporophytic and additional antheridial material acquired in 1990 further clarifies the systematic position of *Takakia* as a moss with undeniable links to *Andreaeopsida* – an interpretation intimated earlier by Mizutani (1974) and Murray (1988).

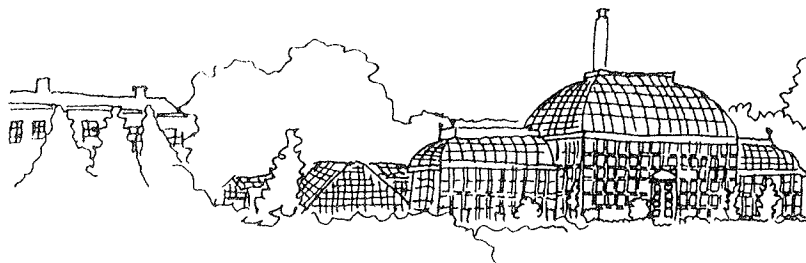
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# Congress of East Asiatic Bryology



Helsinki, August 12—19, 1990

by Jette Lewinsky

During the evening of 12th August, 63 enthusiastic bryologists gathered in the Botanical Garden Greenhouse in Helsinki, Finland, for a welcome party of the Congress of East Asiatic Bryology. Seventeen nations were represented and many participants were residents in East Asia. It was time to meet old friends and say hello to new ones. That we at the same time could enjoy champagne, Finnish salmon, and fresh berries from the forest was no disadvantage.

The following morning the official opening of the congress was marked by a speech by the vice-president of the University of Helsinki followed by a festive fanfare. Timo Koponen then talked about our present knowledge of bryology in East Asia, about what is going on right now, and what we will have to concentrate on in the future. Pekka Isoviita emphasized the old bryological tradition in Finland bringing our minds back to the days of Lindberg and Brotherus. A warm welcome was expressed on behalf of the Finnish Bryological Society and the International Association of Bryologists.

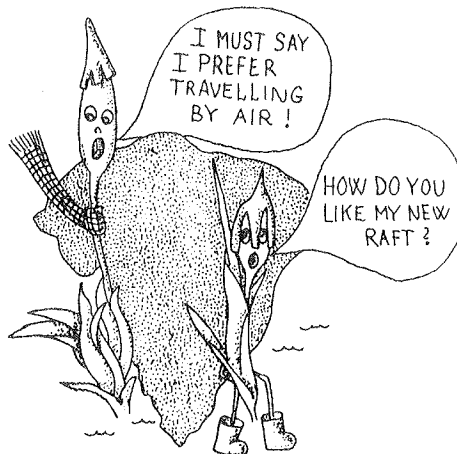
The first session dealt with **Bryological research and bryogeography in East Asia**. Emphasis was placed both on the bryofloras' connections with other areas in the

world (Z. Iwatsuki: The moss flora of Japan and its North American connection; R.E. Stotler: The hepatic flora of North America (North of Mexico) and its Japanese connection; T. Pócs: Correlations between tropical African and Asian bryofloras, II) and on analysis of the mosses and liverworts of more restricted areas (S.S. Kumar: Bryoflora of India, present state of research; D.G. Long: Bryofloras of Bhutan and East Himalaya; P.-C. Wu: The East Asiatic genera and endemic genera in the bryophyte flora of China; U.K. Mamatkulov: Bryoflora of Central Asia; B. Murray: Steppe bryophytes, bryogeographic connections between Alaska and Siberia; O. Afonina: Bryoflora of Chukotka and the ways of its formation; M. Ignatov: Relationships of moss flora of Altai Mts).

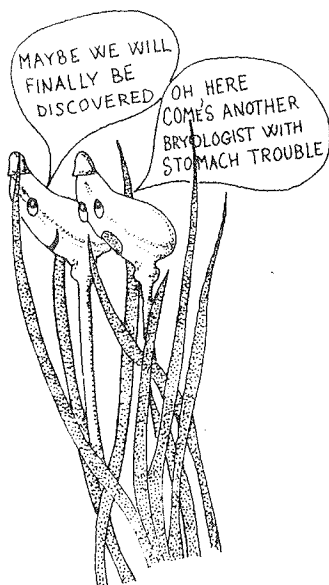
Many of the talks were illustrated by excellent slides giving the audience a chance to travel in their minds to these fascinating areas. We were also taken on a travel back in time when we followed R. Grolle into the interesting world of hepatics in amber.

An excursion was planned for the evening to the new bryophyte herbarium ca. 5 km out of town. With ample space for the collections as well as for resident and visiting researchers, Finnish bryologists have got a good framework for their work. Unfortunately this is yet another temporary solution. In five years we may see the bryophytes on the move again. If this time it will be to the planned Natural History Museum is unknown. The photocopying machine was busy that evening and some mosses were studied under the microscopes, but since champagne was again available in great quantity (Do they have it on tap in the new herbarium?) most serious work was postponed to Wednesday afternoon.

On Tuesday 14th the morning session continued with talks on bryophytes from particular areas (D.Y. Joshi *et al.*: Liverwort flora from the tropical rain forests of Andaman Islands, India; P.-J. Lin *et al.*: bryophyte flora of Jianfengling Mts, Hainan Islands, China; J.-X. Lou: A study of the mosses from Mt. Emei



of Sichuan province, China; B. Tan: Muscology in the Philippines 1979-1989; A. Touw: Bryogeographic observations on the moss flora of South Malesia; M.-J. Lai: Bryofloristics of maritime and insular eastern and southern China). A new tip on how to find *Buxbaumia* in New Guinea was given by Dan Morris during the discussion. It can usually be found at the bases of tree fern trunks when grass is removed for cleaning after the performance of a certain biological procedure. The tip was received with great enthusiasm by the audience.



After lunch the subject was changed to **Systematics of East Asian bryophytes**. J.-P. Frahm talked about the SE Asiatic species of *Campylopus* and expressed doubts as to whether the Palaeotropics could be maintained as a phytogeographical unit for bryophytes, a doubt which met some opposition within the audience. *Fissidens* in China was treated by Z.-H. Li and in Asia and Africa by R. Pursell, H. Bischler-Causse's cladistic analysis of *Marchantia* ended in two trees of similar parsimony values. B.M. Thiers and S.R. Gradstein introduced us to the Lejeuneaceae in Australia and Asia, and J. Vána finally talked on Jungermanniaceae in East Asia.

In the evening the president of the University received the participants at a reception in the old, very beautiful, neo-classic building on the Senat Square. Tamás Pócs was presented with a Helsinki University Medal during the event for his co-operation with Finnish bryologists on tropical issues. Krister Karttunen had the Great Hall of the University opened for us. It is very impressive with tall columns and murals which among other events shows the foundation of Helsinki University in Turku 350 years ago. Unfortunately the grand piano was locked; no concert this time. Later in the evening some enjoyed a beer in a small local café. The very warm summer evening and the good company made one of the participants exclaim that Helsinki was much better than home. What more could organizers ask for?

Wednesday 15th August still more genera of mosses were to be treated. T. Cao gave an account of *Encalypta* in China and reported *E. sibirica* as the newest addition to the flora. *Chaetomitrium* was moved from the Hypnaceae to the Chaetomitriaceae by Dan Norris. He further mentioned a new genus with the charming name *Unclejackia*. N. Nishimura continued with *Ectropothecium* in East Asia. After coffee followed *Orthotrichum* in SE Asia by J. Lewinsky, and the distribution of *Desmotheca* was seen in relation to Gondwanaland fragmentation by J.-P. Frahm.

After a free afternoon the programme continued with a poster-session Thursday morning. Fourteen posters dealt with East Asian bryophytes whereas the remaining four presented work done on the Finnish moss flora. Discussion was lively and hard to stop when we had to continue with the last session of the congress: **Morphology and ecology of East Asian bryophytes**. J.-P. Frahm in his third performance gave an interesting account of the Bryotrop's transect on Mt. Kinabalu, Borneo.

Comparison was made with the transect in Peru and it was shown how good a tool bryophytes are for altitudinal zonation. H. Ochi continued with *Bryum* s.l. (ca. 252 species) in East Asia. He was followed by D.D. Wani (On the antibacterial activity of liverworts from Western Ghats, India. Preliminary review) and X.-J. Li (Study on the winter host mosses of gall aphids from China).

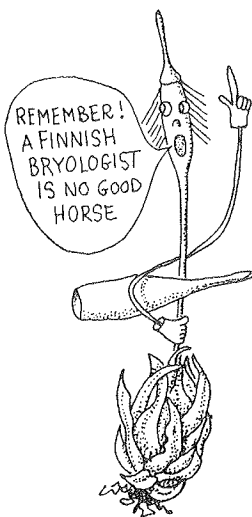


After lunch B. Crandall-Stotler gave a very interesting and beautifully illustrated talk on the hepatic *Mizutania riccardioides*. Using paraffine-sectioning, fluorescence microscopy, SEM and TEM it was convincingly shown how the growth of the thallus is from a small, generalized meristem rather than from one apical cell. M. Zang's paper dealing with fungi associated with mosses from Yunnan and Tibet, China was illustrated by fascinating slides making everyone in the audience wanting to visit this part of the world. Ultrastructure of the sporophyte-gametophyte junction in *Phascum cuspidatum* with special emphasis on the transfer was treated by E. Chauhan. Finally B. Crandall-Stotler again was on the podium (second talk in the same afternoon!) giving another excellent lecture, on the capsule wall of *Haplomitrium*. It was particularly interesting to hear about the role of the thickening bands in dehiscence of the capsule. Before the official closing of the congress the

resolution committee proposed two resolutions: one concerning the rapid disappearance and transformation of the forest of Asia, and one concerning the loss of research positions in the British Museum of Natural History (see p. 8).

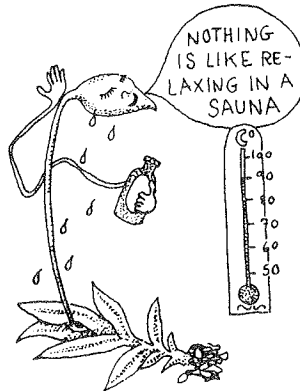
The proceedings of the congress will be published in a special volume by the Finnish Bryological Society. To make sure the manuscripts are in before October 1st Timo Koponen in his final address promised each author a gift if he or she made it on time – the new 1 FM with *Polytrichum*.

The official programme of the congress was then over, but during the evening an enjoyable party was held in a nearby restaurant. The welcoming glass was a mixture of lakka (Finnish cloudberry liqueur) and vodka and the menu included such delicacies as reindeer and for dessert cloudberry. Lively scattering voices heard around the tables during the whole evening told our Finnish hosts the congress had been a success.



Early next morning we headed out of Helsinki for the first planned site of the two day's excursion. The sun was still shining as it had been for the whole week. The sites were all chosen to show typical Scandinavian habitats and mostly not rarities. Ukiva Hill is a small granitic outcrop where such bryophytes as

*Anastrophyllum saxicola*, *Barbilophozia barbata*, *Lophozia ventricosa*, *Ptilidium ciliare*, *Amphidium mougeotti*, *Cynodontium tenellum*, *Dicranum spurium*, *Paraleucobryum longifolium*, *Pterigynandrum filiforme* and many more were seen and in some cases collected.

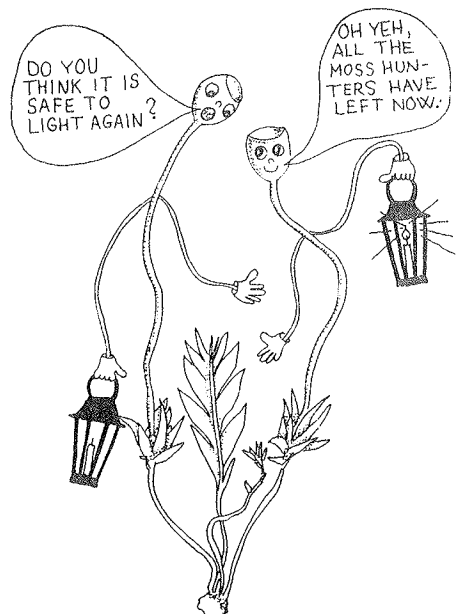


From Ukiva we headed for Lake Lohjanjärvi, the biggest lake in southwestern Finland. On the way we stopped at the old church in Lohja partly to see the frescoes, partly because one of our hosts was afraid of getting wet feet in the bog the following day so he had to buy new gum boots. I guess the latter was the most important reason for the stop, but I should not complain since *Orthotrichum* were plentiful on trees in the churchyard. During the morning much speculation had been made about the kind of boat we were going to cruise in on the lake. Suggestions from small open boats to large sea-going vessels with pool and bar had been given. In the end it turned out to be a boat of just the right size allowing all the people who wanted to have an open-air cruise to get so. Since this is the lake on which Aune and Timo have their summer cottage ample information on both geology and natural history of the lake and its surroundings was given during the 3 hours' ride. Back on firm ground we bryologized along the lake shore seeing e.g. *Calliergonella cuspidata*,

*Hypnum lindbergii*, *Plagiomnium ellipticum* and *Fontinalis fontana*. We almost managed to lose one of the participants here thus opening up a bryological position at Missouri Botanical Garden – but in the last minute we failed.

Fagervik Mansion, the third site of the excursion, was another paradise for those interested in epiphytes. On old *Fraxinus* and *Ulmus* in the park *Leskeella nervosa*, *Leucodon sciuroides*, *Tortula ruralis* and several species of *Orthotrichum* could be seen. The day ended with sauna bath at Tvärminne Zoological Station on the coast of the Gulf of Finland. A small group of female bryologists first tried it out, followed by a horde of males. We all felt very relaxed afterwards so the bus going back to Helsinki was very quiet.

Suurisuo mire N of Helsinki was where we headed on Saturday morning. A light rain fell so all bryophytes could be seen in their Sunday bests. The mire covers an area of 400 ha and the number of *Sphagnum* species are ca. 23. The composition of the mire is fairly complex with ombro-, oligo-, meso- and eutrophic areas. In an area with *Betula* and *Alnus* along the border *Cryptothallus*



*mirabilis* was found and demonstrated. It was the find of the day before those who had not seen it before. After lunch at Lammi Biological Station our final stop was at Valkea-Kotinen virgin spruce forest. Since the organisers so far had managed to get us all back on the bus after each stop, they seemed to be very worried if anybody should try to escape now having realized this was the last change. Whistling and keeping the group close together did, however, prevent such a disaster.

Being safe back in Helsinki the congress and the field trips had come to an irrevocable end. The hour of farewell could not be postponed any longer, but I am sure we all left Helsinki with much new knowledge and many happy memories wishing we had attended not just the Congress of East Asiatic Bryology but the First Congress of East Asiatic Bryology.

Hoping to see you all again soon!

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**Congress of East Asiatic Bryology, Helsinki, August 12-19, 1990**

*Resolutions adopted at the Closing Session of the Congress, August 16, 1990.*

**Resolution 1:** Be it resolved that this Congress supports and urges the support of all efforts to preserve the forests of Asia.

We express great concern about the rapid disappearance and transformation of the forests of Asia. This loss with resultant loss of moss and liverwort diversity has repeatedly been a theme of papers delivered here, and it is especially saddening because the forests of S.E. Asia are among greatest centers of bryophyte diversity.

Because the loss of each animal and plant species creates a ripple effect throughout the entire ecosystem, we as professional bryologists must have concern which extends beyond our particular area of expertise to all of the natural world.

We further point out that preservation of small and scattered patches of forest saves little of the diversity. The ecosystems of tropical rainforests are so complex that slow but steady loss of diversity will inevitably occur in each of the preserved but small patches of forest.

While the areas of preservation should be large and continuous, we are not necessarily discouraging the use of the forest by small populations of aboriginal peoples. Shifting agriculture on small plots of forest land has been practised for thousands of years without demonstrable damage to the ecosystem. In contrast, large scale agriculture and forestry creates cleared areas of such size as to change the climate and permanently alter the soils and hydrology.

**Resolution 2:** Be it resolved that this Congress expresses great concern about the loss of positions in bryology (mosses and liverworts) in the British Natural History Museum.

The British Natural History Museum houses the largest and one of the most important collections of bryophytes in the world. Many of our countries have virtually none of the plants collected in our homelands but housed in the British Natural Museum. We remind the British Government that its museum must be viewed as holding in trust materials obtained from our several lands. We continually rely upon the British Natural History Museum for specimen loans in support of our research – loans which can be effectively filled only by a person with the expertise which comes only from continuing research in the field.

Obviously, knowledge of the tropical rainforests and other endan-

gered habitats in our several countries must rely upon the competency of our research. If there is a loss of positions in bryology (mosses and liverworts) at the British Natural History Museum, our own research will be seriously impacted.

Why is the continued effectiveness of the curation of plant and animal collections so necessary to productive research? A museum is best compared to a library. No scholar in music, literature or art could conceive of doing his research exclusively using second-hand information funneled through the work of another scholar's first hand knowledge of the work. We in the taxonomic sciences have the same continuing obligation to see materials first-hand. Our original work of art is the *type specimen* – the one example of what the original worker meant by a certain name. We, like the artist, cannot rely on secondary sources.

The science of plant or animal taxonomy is not simply a static endeavor. With every advance in biological science, be it biochemistry, genetics or ultra-microscopy, we must review our separate specialities with a view toward creating a more effective classification or evolutionary schema.

The loss of professional curation of the bryophyte collections at the British Natural History Museum will exact an incalculable toll upon the entire profession of bryology. Decay of competencies in bryophyte taxonomy is not simply a loss felt by us in our perhaps esoteric specialty. As we stand on the brink of a world shaped around biotechnology, we must note that bryophytes offer such unique physiological traits as the ability to photosynthesize at temperatures approaching 0° Celcius, or the ability alternately to become completely dry and dormant, and then to become moist and photosynthetically active. The agricultural value of the transfer of such genetic systems into crop

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plants is patently obvious. As we view our polluted world, we must be aware that bryophytes and lichens are the best of polluted monitors.

The British Natural History Museum and the supporting British Government have the economic misfortune of possessing a collection which must permanently be preserved and curated. The British Natural History Museum and the British Government have the unusual privilege of being able to make unique contributions to mankind through the continued support of research in bryophytes – plants significant both on their own, and in a social and economic sense.

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#### Mysterious moss in Germany and Holland

The second issue of the *Bryologische Rundbriefe*, June 1990 (see *Bryol. Times* 55: 4, 1990), as well as *Buxbaumia* 23, have announced the discovery of a mysterious pleurocarpous moss in Saarland, Germany and Drente, The Netherlands. The moss has been sent to at least a dozen specialists in all parts of the world but nobody has been able to name it. The plant is particularly characterized by its catkin-like habit, short leaf cells, short double costa and long acuminate leaf apex and has a "normal", hypnoid peristome. It has been suggested that a new species of *Homomallium* is at hand but it might even be a new genus. The fact that such a taxonomic treasure would show up in one of the most thoroughly investigated regions of the world is certainly sensational and the scientific publication on this moss, which is now in preparation by a team of specialists, is eagerly awaited. We would assume that further localities will become known in due course and hopefully its origin can also be elucidated.

#### Bryology at the V Latin American Botanical Congress

by Claudio Delgadillo M.

On June 26th several bryologists met in Cuba for the II Latin American Symposium of Bryology. This meeting was part of the activities of the V Latin American Botanical Congress which was held in Havana's Convention Palace from June 24th through the 29th.

The Symposium featured papers by K. Mustelier and D. Reyes, on the *Leptolejeunea-Harpalejeunea*-Complex; A. Motito and M.E. Potrony on the order Polytrichales in Cuba; J. Reyes, D. Reyes, K. Mustelier and A. Vicario on the altitudinal and geographical distribution of the Hepaticae in Cuba, and on the world distribution of the Cuban liverworts. A. Motito, M.E. Potrony and J. Reyes also spoke on the altitudinal distribution of mosses in Cuba and O. Yano on the Frullaniaceae in Brasil. C. Delgadillo was in charge of the Symposium Conference on the patterns of distribution of neotropical mosses. Two other oral contributions and a poster were expected, but most unfortunately the speakers were unable to attend the meetings.

Besides those sited above, Jaime Aguirre (Colombia), Cristina Panfet (Cuba), Denise Pinheiro (Brazil) and María Teresa Moyá (Puerto Rico) were also in attendance.

Following the oral presentations, there was an informal business meeting of the Sociedad Latinoamericana de Briología. It was proposed, but not voted upon, that the III Symposium be held in Mexico City in 1992.

Two other bryological items were scheduled for the Congress. The first was an oral presentation by Jan Wolf on lichen and bryophyte alpha and beta diversity along an altitudinal transect in Colombia. The second was a display of several line drawings of Duarte's manual of Cuban mosses, which may be published later this year.

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#### Recent Bryological Progress in SE Asia 1988-1990 (3) \*

by B.C. Tan

Asiatic bryophytes continues to be accomplished by colleagues working in the temperate countries such as Japan, England, The Netherlands and the United States. One of the reasons for this ironic contrast is the lack of interest among the resident botanists in the tropics in this lowly group of green plants. The situation, however, seems to be improving lately.

In a symposium organized last August at Leiden in honor of the late Prof. van Steenis of the Rijksherbarium, a group of Indonesian botanists from Bandung Institute of Technology, namely, Drs U.A. Dasuki, I.

Birsyam, Sri H. Widodo and R. Galih, presented a poster detailing the results of their investigative study on the bryophytes and lichens of Mt. Tangkubanparahu in west Java. This is a small but significant step taken by the Indonesian colleagues contributing towards a better understanding of their country's bryoflora.

Considering the fact that our present knowledge of the moss flora of Indonesia remains patchy and outdated, the study undertaken presently by Dr. A. Touw of the Rijksherbarium on the mosses of Flores, Lombok

and other adjacent islands of the Lesser Sunda Islands is another encouraging development. Since 1986, Dr. Touw has made several trips to the Lesser Sunda Islands and has collected a large number of bryophytes from various habitats. The preliminary results of his study were presented in August of this year at the Congress on East Asiatic Bryology held at the University of Helsinki.

From the Malay Peninsula, Dr. H. Mohamed had taken a sabbatical leave of absence from his university in Kuala Lumpur last November to be at the US Smithsonian Institution as a visiting researcher for a period of ten months. While at Washington, DC, Dr. Mohamed chose to revise the Malayan taxa of the Hookeriaceae in collaboration with Dr. H. Robinson of the Smithsonian Institution (to be published in the *Smithsonian Contributions to Botany*, in 1991).

Earlier Dr. Mohamed co-authored with Dr. B.C. Tan of Farlow Herbarium on an article reporting three new generic records for the Malay Peninsula, i.e., *Henicodium*, *Distichophyllidium* and *Isocladia*, and several new species records. The article has been accepted for publication in *Cryptogamie*, vol. 11, 1990.

Congratulations go to Mr. A.D. Mohamed of Malaysia who recently obtained a M.Sc. degree in Bryology from the University of Malaya with Dr. H. Mohamed as thesis adviser. Mr. A.D. Mohamed is well known for his many noteworthy collections representing new records of Peninsular Malayan mosses and is honored at present with a new species, *Dicranoloma damanhurii* Tan & Mohamed.

The year 1990 sees a young Philippine bryologist, Mr. G. Penecilla, studying bryology for a year in an American university under the sponsorship of USAID. Mr. Penecilla, a former student of Dr. R.M. del Rosario, has an M.Sc. degree from the University of Santo

Tomas in Manila. Currently, he is registered as a special graduate student at the University of Georgia in Athens learning the principles and techniques of molecular biosystematics under the tutelage of Drs. R. Wyatt and A. Stoneburger. Mr. Penecilla visited the Farlow Herbarium in August to discuss a possible joint project with Dr. B.C. Tan before returning home to resume his teaching position in a university in Central Philippines.

The Philippine moss flora receives renewed monographic attention from Dr. B.C. Tan who has taken a full-time research position at the Farlow Herbarium in January. Dr. Tan has just published with Dr. H. Robinson a revision of Philippine hookeriaceous taxa. In the publication (*Smithsonian Contributions to Botany*, no. 75), the number of the Philippine taxa was increased from the 30 species and 10 genera reported by Bartram in his 1939 treatment of the Philippine mosses to a new count of 53 species and 12 genera. Another article by Dr. Tan describing six new taxa of Malesian mosses is in press with the winter issue of *The Bryologist*.

Furthermore, Dr. W. Buck of the New York Botanical Garden has joined force with Dr. Tan to revise the family Sematophyllaceae for tropical Asia. Together they published a revision on the Philippine taxa of Clastobryoideae and Heterophylloideae in the *Journal of the Hattori Botanical Laboratory*, no. 66, 1989. A second joint article discussing the generic concepts of *Trichosteleum* and its related taxa in the old world tropics was published in volume 1 of *Acta Bryolichnologica Asiatica*, 1989/1990. *Papillidiopsis* and *Radulina* are two new segregate genera proposed in this article.

In May 1989, with financial supports provided by the NYBG William C. Steere Fund and the Chicago's Field Museum of Natural

History, Dr. Tan successfully collected hundreds of bryophytes from Mt. Kiabalu of North Borneo, Fraser Bukit of Malay Peninsula and Palawan island of the Philippines. The collections were divided between the two sponsoring institutions with additional replicates to be sent to other herbaria for exchange. An account of this field trip will appear in the *Flora Malesiana Bulletin*, vol. 11, 1990.

A new effort in plant conservation campaign in Malesia is the production of a poster picturing some endangered Philippine plants in full color. Among the plants featured is Philippine moss, *Bryum russulum*, the first of Malaysian bryophytes to be posted as being endangered. The said poster was prepared by Dr. Tan and his former colleagues at the university of the Philippines at Los Baños with funding provided by the Conservation International in Washington, DC. Interested persons may write to Dr. Tan to request for a free poster.

The past two years also saw new information of Bornean mosses published by the German Bryotrop project in *Willdenowia*. The latest family accounted is Calymperaceae authored by Mario Menzel of the Berlin Botanical Museum and Garden. This is an important addition to the other taxa already revised, namely Polytrichaceae, Rhizogoniaceae, Buxbaumiaceae, Fissidentaceae, Leucobryaceae, *Dicranoloma*, *Brotherobryum* and several other hepatic groups.

Not to be overlooked, the New Guinean Huon Peninsula moss flora project started by Koponen & Norris and their associates at the University of Helsinki has also made tremendous progress this past year. Dicranaceae, Pterobryaceae, Dicnemonaceae, Pottiaceae, Leucobryaceae, Neckeraceae and *Pogonatum* are their latest contributions. A summary report was presented in July-August 1989 by Dr. T. Koponen at the symposium on Trop-

ical Bryology organized by IAB/Missouri Botanical Garden in St. Louis. The report is published in *Tropical Bryology*, vol. 2, 1990.

Dr. A. Eddy of the British Museum is to be congratulated for publishing volume 2 of his handbook of Malesian Mosses.

Other research progress has also been made in the bryology of South China, Sri Lanka and Australasia by workers such as L. Ellis of the British Museum (*Calymperaceae*), C. Townsend of Kew Botanic Garden (*Distichophyllum*), B. Thiers of the New York Botanical Garden (*Lejeuneaceae*) and A. Touw of the Rijks-herbarium (*Thuidiaceae*). Although these areas are geographically peripheral to Malesia, nonetheless, the knowledge of the floras is pertinent to the understanding of the origin and evolution of the tropical south-eastern Asiatic bryoflora as a whole.

In summary, one can still be optimistic about the continuous progress made in the regional bryology albeit at a slow pace. The efforts need to be doubled in the coming years to race against the fast tempo of destruction of tropical rain forests together with their bryophyte components.

Undoubtedly, the problems confronting the workers in the region are many and difficult to surmount. Hopefully these problems can be crystallized in a survey initiated recently by the IAB committee on Tropical Bryophytes and solutions can be suggested. It is important for all tropical and non-tropical bryologists to participate in this survey by returning the completed questionnaires as soon as possible to Dr. B.C. Tan

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\* See *Bryol. Times* 30, p. 3, 1985; and 47, p. 5-6, 1988 for the first and second reports.

## Are bryophytes primitive or advanced?

by Ann Stoneburner

I enjoyed reading Janice Glime's Ecology Column on the primitive vs. advanced nature of bryophytes and support such an informal forum for discussion and exchange of ideas. I agree with Janice's general premise that bryophytes are not primitive, regardless of how one wishes to define the word. Moreover, I wonder why the viewpoint of bryophytes as primitive organisms is so ingrained in our thinking.

Fossil evidence is often cited as an indication of the primitive nature of bryophytes. However, in the Devonian when fossils of liverworts first appear, there were established lineages of vascular plants, as well as plants bearing gymnospermous seeds, and fossil mosses first appeared after the liverworts in the Carboniferous period, contemporaneous with seed ferns and coniferophytes (Bold *et al.*, 1980). According to the thorough, highly readable account of Paleozoic and Mesozoic fossils by Krassilov and Schuster (1984), extant genera and species of bryophytes are not represented in the fossil record until after the Mesozoic. However, the authors accept the assumption (drawn largely from phyto-geographic data) that many modern genera must have been present earlier, by the end of the Cretaceous. The Cretaceous, of course, is associated with the advent of flowering plants, which also are customarily assigned to extant families and genera (Bold *et al.*, 1980). Additionally, fossil evidence demonstrates that the origin of ferns preceded that of bryophytes, and yet the fern literature does not seem especially preoccupied with the primitive nature of present-day pteridophytes. It seems that undue emphasis is placed on the time of origin of bryophytes as an explanation for our perception of their primitive nature.

While bryophytes are anatomically simple or lack elaborated tissues and organs as compared to vascular plants, I do not agree that they are morphologically primitive. They appear to possess a wealth of morphological features whose origin and possible significance continue to baffle bryologists. The complex biochemical nature of bryophytes has been well-documented, and their physiological responses to the environment are sufficiently intricate to elude easy explanations by scientists. If detected levels of isozymic variation reflect overall levels of genetic variation in bryophytes (Stoneburner *et al.*, 1991), then that variation should be expressed morphologically, as well as physiologically.

Based on the available evidence, it appears that bryophyte evolution did not precede that of vascular plants or even seed plants, but occurred in concert with them. Bryophytes are not ecologically unsophisticated, but they have successfully exploited habitats created in large part by the vascular plants. Like other organisms, present-day bryophytes reflect cumulative morphological and physiological responses to the pressures of natural selection.

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## Bryophyte Ecology in Panama

by Noris Salazar Allen

Ecology Column. Send contributions to the column editor J.M. Glime, Michigan Technological University, Department of Biological Science, Houghton, Michigan 49931, U.S.A.

Ecological studies are often published in non-bryological journals or regional journals that are not circulated widely among bryologists. As a result, we often are unaware of the work being done in other countries, especially those on other continents, or where the publication is not in our native tongues. I have called upon several bryologists to help us become familiar with the ongoing bryoecological research in some of these regions, and I hope others will contribute articles on the bryoecological work in their own countries.

My current research is a biosystematic study of the Neotropical species of *Octoblepharum*. This includes several ecological aspects:

1. A study of the reproductive mechanisms of some of the species occurring in Panama and their relationships, if any, with the morphological-systematic circumscription of the species.
2. Determination of potential associations of communities of the species recognized.
3. Observations on any moss-animal interaction affecting growth, development and/or reproduction of selected communities in Panama. Evidence of herbivory is recorded and pellets produced by animal activities have been collected and are being studied to determine the kind of animal(s) responsible for them and the potential activities and uses that they may derive from moss material.

Currently, there is an ongoing project on resource states in 15 selected populations of three species of *Octoblepharum*: *O. albidum* Hedw., *O. cocuiense* Mitt. and *O. pulvinatum* (Doz. & Molk.) Mitt. in three localities in Panama. The sites selected are located in the lowland tropical rainforest of Barro Colorado Island and the premontane forests (ca. 800-900 m) of Parque Nacional Altos de Campana and Cerro Jefe. *Octoblepharum albidum* occurs in all three sites, *O. pulvinatum* is known for Altos de Campana and Barro

Colorado Island. Tree trunks have been divided into base, midsection, and upper section with random sampling every two weeks in Barro Colorado Island for those populations having a relatively dense cover (90-100%) and every month for all other populations. Maximum and minimum temperatures are read every time samples are taken and daily rainfall is recorded for Barro Colorado and Altos de Campana. Five stems are collected from each level for measurement of length of stem, position of gametoeceia on the stem (as distance from apex), number of sex organs per gametoeceia, and state of development. A modification of Greene (1960) and Stark (1983) stages of development is being used. Data have been collected for one year. Observations on insect-moss relationships are being made and some insects will be identified to determine their role, if any, in growth and development of moss communities of *Octoblepharum*.

Small ecological projects have been done in the forest of Barro Colorado Island in the past. M.E. Mitch (1983) did a small project under the supervision of Dr. S. Munch on "The distribution of epiphytic mosses in relation to humidity of microhabitat." Moss samples were collected from ca. 1.5 m high on trees and the following information was recorded: diameter of the tree or branch on which sample grew, tree species, location on trail (km marker), and to-

pography of site. Three trails were sampled: Shannon, Standley, and Wetmore. Distribution data were divided into two sections. The first dealt with information pertaining to nonvascular epiphyte distribution versus substrate diameter; the second was devoted to information on the diversity of epiphytes on the tree sampled. Tree diameter data were grouped into three categories: trees six inches or more in diameter, trees 4-5 inches in diameter, and trees and/or branches of three inches or less in diameter. For each trail, the average number of trees found per tenth of a kilometer was calculated for each size category. Data recorded on epiphytes were divided into four categories: 1] trees without nonvascular epiphytes growing on them; 2] trees with only lichens growing on them; 3] trees with liverworts or liverworts and lichens; 4] trees with mosses and any combination of lichens and/or liverworts.

Another set of ecological projects was done as part of the Biosystematics of Bryophytes and Lichens course taught by Dr. N. Salazar of the University of Panama and Dr. A. Smith, ecologist of the Smithsonian Tropical Research Institute. Moss communities on four selected angiosperms: *Apeiba membranacea* Spruce et Benth., *Pseudobombax septenatum* (Jacq.) Dugard, *Scheelea zonensis* Bailey and *Hura crepitans* L. were studied at three levels on the trunk. Each level was divided into

four quadrats according to their orientation (N, S, E, W). Cover was estimated by placing transparent plastic sheets around the trunk and demarcating the communities of bryophytes. The area covered by each morpho was calculated. A study of saxicolous communities was also done on ten rocks located along Snider-Molino trail and R.C. Shannon Creek. Each rock was divided into sections and its height, length, and width as well as its angle of inclination were recorded. Three rocks, one in Shannon Creek and two on Snider-Molino trail, were covered with a herring net divided into 2.5 cm<sup>2</sup> quadrats. After the net was securely fastened to the soil the rock was divided into 16 sections; these were subdivided into units of 250 cm<sup>2</sup> each delimited by colored thread. Presence of morphos was recorded every six quadrats (2.5 cm<sup>2</sup>) in the 250 cm<sup>2</sup> units. Voucher specimens of all collections are kept in the bryophyte and lichen herbarium at the University of Panama (PMA).

A third set of projects under my supervision include studies of composition of bryophyte communities with information on the reproductive state of component members on selected trees, tree ferns, and shrubs in the cloud forest of Parque Nacional Altos de Campana. Two categories have been selected for the studies: 1) tree ferns and trees with a dbh of more than 10 cm; 2) trees and shrubs with dbh of 5-9 cm. Each tree and tree fern were divided into three levels. Collections were done systematically around the trunk at each level. Samples were identified and the association of species recorded as well as the reproductive state of the samples. Data are currently being analyzed.

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Panama 6

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## IAB E-MAIL Directory on Disk

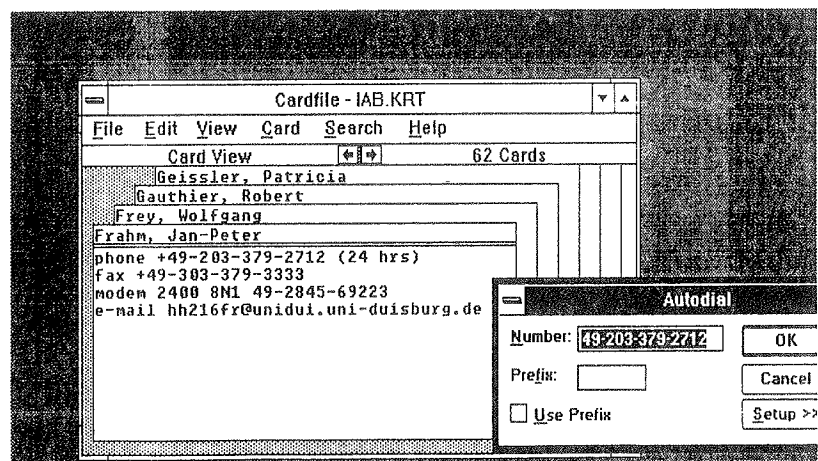
Phone and Fax numbers as well as Electronic Mail connections of those IAB members who returned the E-mail questionnaire are available on disk as #324 of the IAB software library for MS-DOS computers. The directory comes in different formats:

- as a dBaseIII+ file. For evaluation, the programs PC-File:dB (#174-176) or Wampum (#80-81) are required. Under dBase it is possible to provide an output of the data in any style, e.g. only names and fax numbers. This allows to import the data in BitFax software and to automatically dial a selected number when sending faxes with the computer.
- as ASCII file, allowing to load the file in any wordprocessor. Since every record is delimited with a

carriage return, it is also possible to import this file in other database programs.

- as ANSI file for the use with MS-Windows Write or Notebook.
- as MS-Windows cardfile. This is the most perfect way to use the data. Every record is on a separate cardfile. Using the notebook program of "Active Life" (#293) or Windows 3.0 cardfile, one can mark the phone number and automatically dial the number, if the computer has a modem and is hooked to the telephone line.

The directory is available (as ever free for IAB members) by sending a blank 5,25" disk to Jan-Peter Frahm, Universität Duisburg, Fachbereich 6, Botanik, Postfach 101503, 4100 Duisburg, Germany.



## dBase Programs

by Brian O'Shea

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Computer Techniques Column. Send contributions to the column editors  
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dBase as a product is now very widely used in botanical circles – it has one of the longest entries in the IAB Software Library index (see Appendix B).

dBase is a *generalised* database. A database is a way of storing data that takes account of inter-relationships within the data, e.g. a herbarium system will contain (i.a.) lists of taxa, lists of accessions, and the relationships between them.

A generalised database is a general purpose product, that allows you to create a database of inter-related records about anything you choose. There are a lot of such products about, some of them public domain/shareware e.g. PC-File+ in the IAB Software Library. So what is special about dBase?

1. One thing that is a bit special is its price – c. £400 full list price in the U.K., although it can be found under £300.
2. It was one of the first on the scene, and so although not the best, it became a 'de facto' standard.
3. Its data file format (dbf) is widely used as a standard, both for 'clones' (copies that look and work the same way), and as a general purpose file format for holding data and moving it about e.g. the IAB Software Library Kwik-Stat program. There are two main reasons for this: [3.1] dBase provides facilities within the product for moving standard ASCII files into dbf format, and vice versa. I have used it widely for this purpose, e.g. a) converting the IAB Compendium names file into a dbf file; b) taking a file from an

unknown data base into dBase; c) using dBase as a sort program for a system written in BASIC.

Most ASCII files can be converted, which means that it is then possible to use a large set of powerful facilities on the file, such as selecting only records of a certain type or field content. [3.2] The data file structure is fairly simple – a header which contains a description of the record layout, number of records etc., and then each record in sdf format. (SDF (structured data format) allows for no data compression, and each field is of a pre-defined, constant length – which makes data very easy to deal with, but can lead to very large files). I have produced a very simple program (dBList – included in IAB Software Library) that can be used by those without dBase to convert dbf format files to a standard ASCII format.

4. It contains its own powerful programming language. There are public domain programs such as WAMPUM that give you most of the facilities of dBase bar one – the language. There are some commercial implementations of the dBase language that Ashton-Tate, who developed dBase, are disputing in the courts, because they claim that the language itself is copyright; this in turn is being disputed by the companies such as Foxbase who developed these competitive imitations. By contrast, programming languages such as BASIC or FORTH or COBOL can be implemented by anyone, and there are international agreements about the syntax.

Because the language is powerful and comparatively easy to use, it provides a significant extra dimension to the database, allowing applications to be tailored much more specifically to the needs of the user, and also allowing the dBase commands to be hidden behind menu choices.

Because the types of applications developed using dBase have many parallels, it becomes feasible to develop a framework of facilities that is common to most database applications – a skeleton program into which it is only necessary to plug the details of your specific application. To me this is probably its most useful feature, and why I use it instead of, say, PC-File+. Some of the commands in dBase are quite complex and even for an experienced user it is easier to embed the commands in a program. It also allows you to embed your favorite word processor within dBase to write the program code.

I suppose all people who develop software try to reuse old software when they develop anything new, and for this reason it is important to try to generalise software so that the areas that require change are only localised (i.e. the code is driven by variables). It is also important to avoid the 'not invented here' syndrome, and to use other people's code when it is available. This is another reason for writing code that is generalised, but it also points to another common failing in source code for software that is delivered for distribution via the IAB Software Library: it cannot be emphasized too strongly that the layout of the code is important. The ease with which well-

---

formatted code can be understood is much greater, which significantly speeds up comprehension, debugging, amendment and sharing.

As an example, a basic menu for a dBaseIII+ system was demonstrated (see Appendix A for a description of dBase versions). Because of the way dBaseIII+ works, it is usually quicker to have all the processings in one large file of procedures, rather than a set of independent programs, because it holds the procedures permanently in memory, but reads in programs from disk. I have also shown how to link through the menu to other dBase systems you may have developed.

This menu and other information is available from the author. See Appendix B for some dBase programs available from the IAB Software Library.

#### Appendix A. Versions of dBase

**dBaseII.** dBaseIII differs from dBaseII in having a different file structure, many more commands and facilities, some commands renamed, changes to field naming conventions and different assumptions. dBaseII programs will run under dBaseIII following conversion using a dBaseIII utility, which also converts the files. dBaseIII files can be converted back to dBaseII in certain circumstances, but because many of the basic commands changed, the dBaseIII programs will not work under dBaseII without manual amendment.

**dBaseIII.** The files changed by allowing more characters and fields per record, more records (max. file size is now 2 billion bytes), and more open files. Because of the increased number of files per record in dBaseIII, the file header record that contains this information (previously of a standard length) is now of variable length.

**dBaseIII+.** Looks very different to dBaseIII, but dBaseIII programs and data are more or less upwards compatible to dBaseIII+ (only a few commands/functions were changed), although dBaseIII+ has more facilities, such as graphics and new commands and functions.

**dBaseIV.** dBaseIV was introduced during 1989, and again looks very different from its predecessors, but appears to be totally upwardly compatible with previous versions – that is, dBaseIII+ data files and programs still work perfectly correctly with dBaseIV. Because dBaseIV compiles the program before running it (i.e. it checks that all the program code is syntactically correct, and then stores it in a condensed and more efficient form) programs will work very much faster, but also some errors may be revealed that did not appear before. There are an enormous number of additional facilities, particularly in supporting pull-down menus and pop-up windows. Using the new facilities will mean that dBaseIV programs will not be usable with dBaseIII+, but the standard 'dbf' database structure is unchanged, although there is a better file indexing facility that will not work on older versions, and memo files have changed.

#### Appendix B. Some dBase programs in the IAB Software Library.

- #10 \*Compendium (Dale Vitt)
- #14 Herbarium label programs (Richard Zander)
- #21 LIT (Brian O'Shea)
- #37 LABEL3 (Beal Darlington Herbarium)
- #38 HERB (Brian O'Shea)
- #53 Determination Lists (L. Skog)
- #64-65 Herbarium curational programs (Michigan)
- #68 \*LITCHINA, CHINALIT (Paul Redfearn jr)

- #69-70 \*CHINA 1,2 (Paul Redfearn jr)
- #80-81 WAMPUM (shareware)
- #86 Herbarium Labels (Rudi May)
- #96 LITKEY (G. Wagenitz)
- #101-2 LITFLOR (G. Wagenitz)
- #103 LOAN (G. Wagenitz)
- #104-5 Herbarium Manager (Barbara Thiers)
- #111 \*Various dBase files (Alain Empain)
- #120 \*Campaftr – characters of African *Campylopus* species
- #162 INFO – literature filing program

\* = data file

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#### The Steere Fund

The William Campbell Steere Fund, established in 1987 at the request of the Steere family after the death of Dr. Steere, provides funds for bryologists to visit the New York Botanical Garden and use its herbarium and library. The fund has been generously supported by the friends and family of Dr. Steere and the Hearst Foundation, and is still accepting donations. We are now in a position to begin to offer grants to individuals. Interested bryologists should have a specific project for which the resources of the New York Botanical Garden are particularly suited. Depending on the size of the request, we can provide funding for a full or partial airfare to New York and a stipend for room and board near the Garden. Interested individuals who want more information should contact William R. Buck, New York Botanical Garden, Bronx, NY 10458-5126, U.S.A.

## Stereoscopic Photography of Bryophytes

by H.L.K. Whitehouse

Techniques Column. Send contributions to the column editor

M.L. Sargent, University of Illinois, Department of Genetics and Development, Urbana, Illinois 61801, U.S.A.

Stereoscopic photography has considerable advantages over ordinary photography for recording small living organisms in their natural environment. The subject is not lost in its background and the characters for field identification are revealed.

For stereo photography of bryophytes I have used a camera designed and constructed by my wife Pat just before she died in 1988. It consists of an old, ordinary, single lens, 120 roll film 'Agfa Isola' camera in which she extended the lens barrel and fitted two lenses from a Nimslo camera. These lenses have a focal length of 30 mm. They are set with centres 12 mm apart. To achieve this small separation, one side of each had to be ground away. The stops fitted are f80, giving an apparent depth of focus of 10 mm. A flash-synchronised Prontor shutter from another camera was fitted in front of the two lenses to expose both images simultaneously. A septum (dividing plate) was constructed between the two lenses extending to a plate fitted into the back of the camera. This plate masks off 12.5 mm of the opening at each end, reducing the length of film exposed in each photograph from 56.5 to 31.5 mm. In this way, pairs of images are obtained with each exposure measuring individually 31.5 mm in height and 26 mm in width.

After Pat's death, David Burder fitted a bracket to point a Nimslo flash gun down so that it is only about 55 mm from the subject, and adapted the flash gun to work at maximum output. He also fitted two 'antennae' to indicate the plane of focus, which is about 30 mm in front of the shutter. The camera measures

140 x 110 x 100 mm and so fits into a large pocket. It weighs 360 g, plus 200 g for the flash.

Using Fujichrome 120 professional film, ASA 100, 25 stereo pairs can be obtained on each film by exposing at the first of each trio of dots on the backing paper as well as at the 12 numbered positions, with an extra exposure half a turn of the winding knob after the last number. For viewing, the photographs are attached to aluminium foil mounts measuring 101 x 41 mm (Fig. 1). These have openings 23.5 mm high and 21 mm wide placed with their centres 62 mm apart, which is slightly less than the average human eye separation. The area of the subject seen after mounting is about 10 mm wide in the foreground and 15 mm in the background, implying a magnification of twice life size on the film.

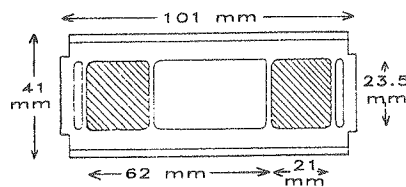


Fig. 1

The first step in mounting each stereo pair is to choose the most interesting part because, as already indicated, the transparencies are larger than the openings in the mounts. In the vertical direction there will be 8 mm to be masked off. The scope for choice of field in the horizontal direction is more limited. The second step in mounting is tedious, as the transparencies have to be co-oriented with precision, so that (a) there is no

displacement up or down of the one image relative to the other, and (b) the displacement to left and right is such that the three-dimensional image just reaches the 'stereo window'. Viewing a mounted stereo pair gives the impression of looking through a window. The 'window' is formed by the fused images of the openings in the mount. As these are 62 mm apart, the two images of the nearest part of the moss or liverwort should also be 62 mm apart. The images of more distant parts of the subject will have a greater separation. Moving one of the transparencies laterally relative to the other will bring the fused image forward or backward. It is acceptable visually to have a central part of the fused image coming through the window, that is, a separation of less than 62 mm between the images on the two transparencies, but it looks unnatural to allow this to happen at the edge, as the fused image will then appear to be cut by the window frame. In mounting the photographs it is not necessary to make measurements of their separation: the best relative position of the two photographs can be judged from the 3-D image. I have a mounting device, with horizontal lines on ground glass, to facilitate mounting the stereo pairs. Once the transparencies have been correctly co-oriented, they are secured to the aluminium frame with translucent tape and can be viewed through a stereoscope. For greater protection, glass covers are available, which can be held in place with silver polyester tape.

The chief difficulty that I have encountered in stereo photography of bryophytes has been how to avoid getting to much depth in the photo-



graph. Depth needs to be limited not merely because parts of the image will be out of focus but also because of 3-D problems. With a large moss cushion, the two images of distant parts of it will be unacceptably far apart, that is, more than ca. 65 mm when the foreground is close to 62 mm separation. One cannot fuse such widely-spaced images without eye-strain. Large mosses may form a tuft that is sufficiently dense to prevent one seeing too far into it. Alternatively, it may be necessary to remove the background material and photograph just the superficial 5 or 10 mm. If this is hand-held, the background will appear black. This is preferable to inserting a sheet of black paper or card into the tuft, as the camera will reveal this.

Another problem arises when photographing glossy surfaces, such as wet leaves and some thallose liverworts which, even when dry, reflect too much light and over-expose the film. A single thickness of white polythene (polyethylene film) placed over the flash head will reduce the light intensity sufficiently.

Aquatic bryophytes pose difficulties for photography because of reflection of light from the water surface. If the flash gun is hand-held, the angle between it and the axis of the camera can be varied and a position found that avoids such reflections. With bryophytes in rock crevices the flash gun may also need to be hand-held in order to illuminate the plant. A narrow crevice may be inaccessible for the camera and the plant will then have to be removed for photography.

I have now photographed stereoscopically about 400 species of bryophytes, mostly in Britain, but some in Portugal, Spain, France, Canada and the U.S.A. I hope soon to start publishing them.

Excellent stereo photographs of bryophytes can be obtained without a stereo camera. All that is required is a close-up attachment to an ordinary

single-lens camera, and a small tripod with a slide bar (Fig. 2). This is an angled shelf of wood or aluminium clamped to the tripod.

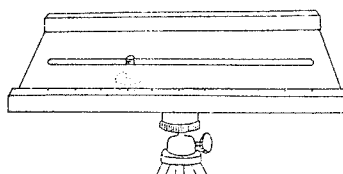
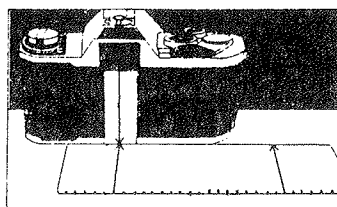


Fig. 2

The camera is placed on this platform, which should be horizontal and perpendicular to a line joining camera and subject. Two exposures are made, and before the second one the camera is moved along the shelf (Fig. 3) a distance equal to one thirtieth of the distance between the lens and the nearest part of the plant to appear in the photograph. If flash is being used to illuminate the bryophyte, the flash gun must not be mounted on the camera. A second tripod to carry the flash would be ideal, as the flash gun must not be moved between the two exposures. If 35 mm film is used, mounting the stereo pair for viewing is straightforward. One possibility is to mount the photographs in ordinary 50 x 50 mm frames and look at them through a pair of viewers held together with a rubber band. Alternatively, the pair of photographs can be attached to a 101 x 41 mm foil mount. These have slots to take 35 mm transparencies. They can then be viewed with a stereoscope.

Stereo photographs can be pro-



jected for an audience. A double projector to take the 101 x 41 mm slides is needed, or two single projectors if the transparencies are mounted in individual 50 x 50 mm frames. The projectors have polarizing filters. A metallic screen is used and the audience wears polarizing spectacles.

A booklet about stereo photography, entitled 'Photographing in 3-D', by David Burder and Pat Whitehouse, can be obtained in Britain from Eric Silk, Publications and Supplies Secretary of the Stereoscopic Society, 221 Arbury Road, Cambridge CB4 2JJ, and in North America from Susan Pinsky and David Starkman, Reel 3-D Enterprises Inc., P.O. Box 2368, Culver City, California 90231, U.S.A., tel. 213-837-2368. Information on all aspects of stereo photography can be obtained from David Burder, 3-D Images, 31 The Chine, Grange Park, London N21 2EA, tel. 081-364-0022, or from Reel 3-D Enterprises.

#### Acknowledgements

I thank David Burder, Chris Preston and Line Rochefort for helpful comments on this manuscript. I am grateful to David Burder for permission to publish the drawings, which are taken from his manuscript entitled 'Stereoscopic projection using two standard projectors' (Fig. 1) and from the publication 'Photographing in 3-D' referred to above (figs. 2-3).

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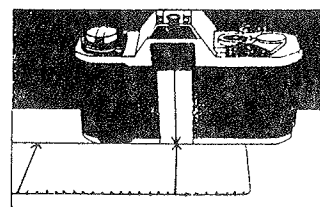


Fig. 3

### New Dissertations

The editor of *The Bryological Times* would be grateful to receive contributions to this new column.

**Bart van Tooren** (Utrecht): "The ecological role of the bryophyte layer in Dutch chalk grasslands". Carried out under the supervision of H.J. During and defended at the University of Utrecht on 26 October 1989. Privately published. This work discusses the various ways by which the habitat and plant species diversity of the chalk grasslands of The Netherlands, including notably the establishment of phanerogams, is affected by the bryophyte layer. Author's address: Vereniging tot Behoud van Natuurmonumenten, 's Graveland, The Netherlands.

**Katia Cavalcanti Porto** (Paris): "Bryoflores d'une Forêt de plaine et d'une forêt d'altitude moyenne dans l'état de Pernambuco, Brasil". Carried out under the supervision of P. Tixier and defended at the University of Paris on 10 November 1989. To be published in *Cryptogamie, Bryol. Lichnol.* (the first part has appeared in vol. 11: 109-161, 1990). This is a floristic and ecological study of the bryoflora of two contrasting tropical rain forest types in N.E. Brazil. Author's address: Dept. de Botanique, Université Fédérale de Pernambuco, 50.000 Recife, Brazil.

**Jaako Hyvönen** (Helsinki): A synopsis of the genus *Pogonatum*. See *Bryol. Times* 53: 7.

**Sharon E. Bartholomew-Began** (Carbondale): "A morphogenetic evaluation of *Haplomitrium* Nees (Hepatophyta)". Carried out under the supervision of B. Crandall-Stotler and defended at the University of Southern Illinois, Carbondale, in the spring of 1990. To be published in *Bryophytorum Bibliotheca*. This work presents a new species delimitation and classification of *Haplomitrium* based on detailed

analysis of the ontogenetic patterns responsible for morphological features, using culture techniques, light and electron microscopy. Author's address: Dept. of Biology, Georgia Southwestern College, Americus, Georgia 31709, U.S.A.

**Irene Bisang** (Bern): "Biosystematische Studien an *Lophozia* subgen. *Schistochilopsis* (Hepaticae)". Carried out under the supervision of E.P. Geissler and E. Urmi and defended at the University of Bern, Switzerland, on 12 July 1990. To be published. This work presents a new classification of the *Lophozia incisalopacifolia* and *L. capitata/laxa* complexes and an evaluation of the evolution of the subgenus *Schistochilopsis*, using various biosystematic methods, including karyology, TLC, gel electrophoresis and cultivation experiments. Author's address: Botanisches Institut, Altenbergrain 21, 3013 Bern, Switzerland.

**Jörg Spörle** (Saarbrücken): "Phytochemische Untersuchungen an ausgewählten Panamaischen Lebermoosen". Carried out under the supervision of H. Becker and defended at the University of Saarland, Saarbrücken, on 13 July 1990. Privately published. This study deals with the terpenoids and other lipophilic compounds (structure, variation, biological activity, chemotaxonomic relevance) of selected liverworts of Panama, especially *Monoclea*, *Plagiochila moritziana* and *Symphyogyna brongniartii*. Author's address: c/o Institut für Pharmakognosie und Analytische Phytochemie, Universität des Saarlandes, 6600 Saarbrücken, Germany.

**Erik Veneklaas** (Utrecht): "Rainfall interception and aboveground nutrient fluxes in Colombian montane tropical rain forest". Carried out under the supervision of M.J.A. Werger and A.M. Cleef and defended at the University of Utrecht on 20 September 1990. Privately pub-

lished; individual chapters will appear in *Vegetatio*, *Journal of Ecology*, *Journal of Tropical Ecology and Hydrological Processes*. This study deals with water and nutrient fluxes in two different montane rain forests types in the tropical Andes - at 2250 m (rich in vascular epiphytes) and at 3370 m ("mossy forest") - in relation to the epiphyte loads of these forests. It is shown experimentally that the contribution of epiphytic bryophytes in the mossy forest to rainfall interception may be much smaller than generally believed. Author's address: Dept. of Plant Ecology and Evolutionary Biology, Lange Nieuwstraat 106, 3512 PN Utrecht, The Netherlands.

### Best Book Buys

by Dale H. Vitt

Over the years I have come across a number of excellent prices for bryological books that are still available from their original publisher. I will use this book corner to make these known to members of IAB. I would appreciate any items for this column that any of you know of. My first offering is as follows.

**Flowers, Seville. - Mosses: Utah and the West.** Published in 1973 by Brigham Young University Press, this hard cover book of 567 pages contains an excellent treatment of the mosses of the dry interior of western North America. The drawings are some of the nicest ever to have been done. The treatment of *Brachythecium* is particularly well conceived. Howard Crum rigorously reviewed and edited the manuscript upon Dr. Flowers death in 1968, and the book was brought to its final published form by Arthur Holmgren.

Still available from the publisher for a remarkable price of US\$ 7.95 plus postage. Order from Brigham Young University Press, 205 University Press Building, Provo, Utah, 84602.

### New Publications

**B.J. O'Shea. 1989. A Guide to collecting Bryophytes in the Tropics. British Bryological Society Special Volume No. 3. 24.5 x 16.4 cm. 28 pages with 1 text figure.**

Published and available from the British Bryological Society, National Museum of Wales, Cardiff, CF1 3NP, United Kingdom. ISBN 0950763942. Price £3.50p + 50p (inland), £1.00 (overseas) package and postage. Note: Bryologists may be interested to order this publication together with M.E. Newton's Guide to Bryophyte Chromosomes, announced in *Bryol. Times* 55: 9, 1990.

This guide is intended for any individual or group going to collect bryophytes in the tropics, but is particularly aimed at student or amateur expeditions. It includes contributions from a number of bryologists with experience of collecting in the tropics. It covers: preparation (although not expedition planning in general); how much you need to know about bryophytes and how to go about identifying them (including suggested literature); where to look; how to collect, label and dry them and how to get them home. There are also suggested research topics and an extensive annotated bibliography. There is an orientation towards a UK/European readership in sources of books, materials and information, but the booklet would otherwise be suited to any bryologist who has not previously visited the tropics – and indeed would be useful to a student of any other plant group.

#### Deadline Stanley Greene Award

Please notice that the deadline for applications for 1991 Stanley W. Greene grants is January 1 (see *Bryol. Times* 55: 1-2, 1990). Awards may be worth up to US\$ 1000. Send proposals, in triplicate, to Dr. D.H. Vit.

### Personalia

**Inés Sastre-de Jesus, Puerto Rico,** will be working at the Institute of Tropical Forestry, Puerto Rico, starting September 1990, on a post-doctoral position sponsored by the Ford Foundation. She will be involved in an ecological study on wood decomposition in the Luguillo mountains (El Yungue), collaborating with a team of ecologists. Her new address: Institute of Tropical Forestry, Southern Forest Experimental Station, USDA Forest Service, Call Box 2500, Rio Piedras, Puerto Rico 00928-2500.

**Marko Lewis, Bolivia,** has been contracted by the Herbarium of La Paz (LPB) to write a 125 page "Manual Ecologico de los Musgos de Bolivia" in 1990-91. For this publication Marko intends to write a series of small florulas from plots representing different vegetation types of Bolivia, from the lowland savanna's to the alpine zone. Each plot will include between 5 - 25 moss species, especially the most common ones. A plate for each species and a key will accompany the description of the plot. A key to the genera and an illustrated glossary should complete the booklet, which should serve as a training manual for Bolivian students.

**D.Y. Joshi, Abasaheb Garware College, India** has recently been announced as the recipient of Young Scientist Award of the year 1989, instituted by the Academy of Plant Sciences, India. The award includes a Gold Medal and a citation. Furthermore, a research project entitled "Investigations into the bryophytic flora, particularly liverworts, from South-west India and their possible relationships with mushrooms", submitted to the Council of Scientific and Industrial Research, New Delhi, has recently been approved.

**Steve Churchill, New York Botanical Garden,** has carried out fieldwork in Colombia during March-May 1990 in the framework of his NSF-sponsored 'Moss Flora of Colombia' project. He will return to Colombia for more collecting during November 1990 - February 1991. A synopsis of the Colombia mosses, including keys and descriptions for families and genera, is now nearly completion.

### Deaths

**Jan Johannes Barkman,** internationally known Dutch ecologist and cryptogamic botanist, died on 14 September 1990 at the age of 68. Jan Barkman was a professor in plant ecology at the University of Utrecht and director of the Biological Station of the University of Wageningen, The Netherlands. In bryology he is best known by his *Phytosociology and Ecology of Cryptogamic Epiphytes* (1958), which remains the standard work on epiphyte ecology in temperate regions.

### Announcements

**Dr. Sándor Orbán, Ho Shi Min University, Eger** informs us that the name of his institution has changed. The new name and (unchanged) address are now as follows: "Esterházy Károly" Teacher's Training College, H-3301 Eger, Pf. 43, Hungary (Telephone 36-10466, Fax 36-10119).

### Requests

#### Living material of Pottia

**Dr. Rosa Ros** is working on the biology and development of the genus *Pottia* and would like to receive living specimens with mature capsules of *Pottia intermedia*, *P. lanceolata* and *P. starckeana*, preferable from Europe, for cultivation. Please send material to her address: Rosa Ros, Botanisches Institut der Universität Heidelberg, Im Neuerheimer Feld 360, 69 Heidelberg, Germany.

### 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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#### Correspondents

R.D. Seppelt (Australasia); B.C. Tan (East Asia)

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.

#### 1990

**Dec. 27-30.** American Bryological and Lichenological Society (ABLS) Annual Meeting and Field Days. Walkulla Springs, Florida. Inquiries: Bill Buck, New York Botanical Garden, Bronx, New York 10458, U.S.A.

#### 1991

**April 3-10.** BBS Spring Field Meeting. Clevedon, U.K. Inquiries: Peter Martin, 37 Hughenden Road, Horfield, Bristol BS7 8SF, U.K. Tel. 0272 240355.

**April 11-13.** International symposium on the physiology, developmental biology, cell biology, cell biology and genetics of bryophytes in Heidelberg, Fed. Rep. of Germany. Inquiries: W.O. Abel, Universität Hamburg, Ohnhorstrasse 18, D-2000 Hamburg 52, Germany, B.R.D.

**July 5-12.** Nordic Bryological Society Annual Meeting. Kongsvold, 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 19-23.** 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. 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.

**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. Tel. 0420 82214.