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BRYOLOGY AT DUKE UNIVERSITY

by

L. E. Anderson and B. D. Mishler

Bryology at Duke was begun by the late Professor H. L. Blomquist, who came here (then Trinity College) in 1921 as a morphologist. Professor Blomquist received his Ph.D. degree from the University of Chicago. His dissertation resulted from studies on developmental morphology of the fern, *Dicksonia*, under the supervision of W. J. G. Land, the noted morphologist; while at Chicago he came under the influence of its strong morphology tradition. His teachers included the noted botanists Coulter, Chamberlain, Cowles, and the young physiologist, Charles R. Barnes, who published the first keys to the mosses of North America, based on the Lesquereux and James Manual. There was no taxonomy at Chicago in those days, and so Blomquist got no taxonomic training.

He had a fundamental knowledge of bryophyte morphology and introduced a course called "morphology of bryophytes and ferns". Blomquist had little knowledge of bryophytes in the field and was fascinated to find mosses and hepatics that he had seen only in preservatives and on slides. Thus, he began to collect. He had no concept of an herbarium and no experience in collecting and preparing specimens. He joined the Sullivan Moss Society (now the American Bryological and Lichenological Society) and soon began correspondence with George Canklin, George B. Kaiser, A. J. Grout, and Alexander W. Evans, all of whom identified specimens for him and provided instructions on how to prepare and packet bryophytes. This, in the early 1920's, was the beginning of the bryophyte herbarium at Duke, a shoe box of mosses casually placed on a shelf.

Blomquist was a generalist, interested in all groups of plants. His shift from morphology to taxonomy occurred when he met an amateur botanist and plant collector from Winston-Salem, North Carolina, P. O. Schallert, a physician by profession. Schallert, too, collected all groups of plants being an avid collector with a good eye for the unusual, but he was a bad influence on the impressionable Blomquist. Unfortunately Schallert, who collected in huge quantities and whose specimens are distributed all over the world, was careless and slipshod in his collecting and processing habits. For example the locality data for Schallert's own collections are not trustworthy and his mis-labelled specimens have produced some odd distributional anomalies.

In 1930, Schallert sold his entire herbarium, consisting of 16,000 specimens, to Duke University. About 4,000 of these were bryophytes, lichens and algae. There is no exact inventory of the bryophytes, but we estimate them at about 3,000. Schallert exchanged widely, and many of these exchanged specimens are excellent, reliably labelled and accurately determined. Schallert's herbarium and Blomquist's early collections thus formed a small nucleus around which the Duke herbarium grew and expanded.

Professor Henry J. Oosting joined the Department of Botany at Duke in 1932, as a plant ecologist, and began a research program in vegetational analysis. Desperately needing a working herbarium for his vascular plant studies, he volunteered to serve as curator of the entire collection.

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The Revision of Machado's Portuguese Moss Collection

by

Ana M. S  neca Cardoso

Study of the Portuguese bryoflora started in the 18th century with F. Brotero (1804) and was advanced by the work of a series of subsequent collectors and bryologists. Nowadays the work of Cecilia S  rgio, who is engaged in the exploration of poorly-known areas and in the study of epiphytic communities related to pollution control, has greatly enhanced knowledge of bryophyte occurrence and distribution. Nevertheless the eastern and southern areas of the country, except perhaps the Algarve, are still badly explored. On the other hand, Portuguese herbaria contain important collections of bryophyte specimens, collected from all over the country by early Portuguese and European bryologists and botanists, that still await careful study.

The Portuguese moss collection of Ant  nio Machado (1883-1969), the author of our only complete bryophyte flora (Machado, 1925-32), is kept in Porto University's herbarium (PO), and has now been taxonomically revised, with the valuable help of C. S  rgio. Additionally the distribution and phytogeography of the moss species represented in this collection was studied for the whole country by the methods of Duell (1984,1985). The collection also contains hepatic specimens which C. S  rgio is studying from the same point of view.

The mosses are represented by 848 specimens which belong to 272 different taxa. Most of these were collected in the northern area and around Lisboa between 1878 and 1942. Machado in his book mentions observations and indicates the

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Bryology at Duke (Continued from p.1)

Oosting had an excellent training in systematics, first at Michigan State University, under Darlington, and later with Rosendahl and Butters at the University of Minnesota, where he had studied ecology with Cooper. It was Oosting's interests and energies that organized and guided the Duke herbarium into a working facility. All the Schallert bryophytes were repackaged and mounted on sheets, with the packets segregated geographically.

In 1936, Lewis E. Anderson was added to the Botany staff to teach and develop a research program in cytology. Earlier, Anderson had developed a side interest in mosses during a portion of a summer in the Ozarkian Highlands in Arkansas. This interest was heightened when he took Blomquist's course in mosses and ferns as a Master's candidate at Duke in 1931, and during the two summers that he spent with Blomquist in the Southern Appalachian Mountains. Anderson was given the responsibility of curating the moss herbarium, duties he retained until he retired in 1982. Gradually, Anderson's research interests shifted from cytology of cell organelles to the systematics, ecology, and cytogenics of mosses. A considerable amount of his energies went into the expansion and development of the bryophyte herbarium, disproportionately concentrated on mosses, and to the acquisition of a bryophyte library. Eventually, a graduate program in bryology was established and a course in bryology was offered, emphasizing field studies, a tradition which continues today.

R. M. Schuster spent three years at Duke, from 1953 to 1956. A set of Schuster's collections made during this period is in the Duke bryophyte herbarium. M. Al-Aish was at Duke from 1958 to 1962 where he carried out extensive cytological studies in conjunction with Anderson. Also in 1962 J. Szwedkowski and in 1962-1963 R. N. Chopra spent time at Duke studying bryophyte cytology and systematics with Anderson.

The bryophyte herbarium has grown from about 3,500 specimens in 1936 to 184,000 in 1987. Of these, about 168,000 are mosses and 16,000 are hepatics. In 1939, Duke acquired

the A. J. Grout herbarium, which had provided the basis for Grout's three-volume work, *Mosses of North America*. The moss herbarium of the American Bryological and Lichenological Society (long housed at Duke) was given to the University in 1981. Although strongest in Eastern North American material, through exchanges and donations the Duke bryophyte herbarium has considerable European material and more recently has increased its tropical American representation. It has strong holdings in North American *Sphagna*. A major emphasis of recent collecting has been on bryophytes of the American Southwest. The herbarium has 50 sets of exsiccata and houses 336 moss and 44 hepatic type specimens. The large permanent slide collections of A. J. Grout, E. B. Bartram and L. E. Anderson are easily accessible.

The bryological library is not the equal of those of the New York Botanical Garden or of Harvard, but it has an excellent working collection of bryological books, both old and new, and other Duke libraries have good periodical holdings. The library is housed conveniently in the herbarium, along with the extensive reprint collections of Blomquist, Bartram (whose library was acquired by Duke) and Anderson. Like most herbaria these days, the Duke herbarium is crowded, and the hallways are lined with herbarium cases. There are plans for additional herbarium space, but how soon is not known.

A number of students receive graduate training in bryology at Duke. Blomquist supervised two Master's candidates, Lora Lee Robertson and Evelyn Beavan. Robertson worked on peristome development in *Aulacomnium heterostichum*, the results of which were published jointly with him. This work has become something of a classic over the years. Beavan did a floristic study of the mosses of Franklin County, North Carolina.

Up to now, nine students have received Ph.D. degrees in bryology, all under the supervision of Anderson. They include, Harold Robinson, now at the Smithsonian Institution; Ardie Johnsen, Tuscon, Arizona; Virginia S. Bryan, recently retired as Assistant Dean of Trinity College, Duke University and now Senior Research Associate in the bryology program here; Marshall Crosby, Missouri

Botanical Garden; Richard Zander, Buffalo Museum of Science; Jerry Snider, University of Cincinnati; Claudio Delgadillo, University of Mexico; Ann Stoneburner, University of Georgia; and David Lane, University of New Hampshire. Although W. B. Schotfield completed a Ph.D. in ecology under the supervision of Oosting, he was actually a member of the bryology group.

Three Master's students who worked with Anderson were Betty Klepper, U.S. Department of Agriculture; Rob Sutter, Botanist, Plant Conservation Program, North Carolina Department of Agriculture and Iñigo Granzow de la Cerda, Botanical Garden, Madrid, Spain. Several additional students who took Anderson's bryophyte course went on to do professional work in bryology. These include: Jeff Holcombe, Dan Norris, Ann Rushing and Robert Wyatt.

Brent D. Mishler was hired as a replacement for Anderson in 1984. His main current research involves evolutionary and systematic studies of the diverse moss genus *Tortula*. He is also interested in bryophyte phylogeny, ecology, and more generally in the theory of systematics. Mishler has always been especially intrigued by desert bryophytes; along these lines he is collaborating with physiologist and molecular biologist Melvin J. Oliver of New Mexico State University on studies of evolution and ecology of desiccation-tolerance in the *Tortula ruralis* complex, and with Robert Magill of the Missouri Botanical Garden on a projected moss flora of the Desert Southwest.

Several graduate students are currently working for a Ph.D. in bryology with Mishler. Iñigo Granzow de la Cerda (Madrid) is currently pursuing field work for his projected dissertation on *Tortula* sections *Cuneifoliae* and *Tortula* in the Mediterranean region. Allen Risk (Kentucky) is just completing a Master's Thesis on habitat separation in aquatic *Sphagnum* species in the Southeast coastal plain and plans to carry out a biosystematic study of a *Sphagnum* species complex. Angela Newton (England) recently completed a Master's degree at Reading University with Royce Longton and began work in the academic year 1986-87 as a graduate research assistant with

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Bryology at Duke (Continued)

Mishler. She attended the Organization for Tropical Studies course in Costa Rica last summer, and plans a dissertation on the systematics of *Pireella*.

Efraín De Luna (Mexico) also began graduate studies in the academic year 1986-87. He is employed as the curator of the bryophyte herbarium at XAL and is the recipient of a prestigious scholarship from the Mexican government. He plans systematic studies on the Hedwigiaceae, beginning with the difficult genus *Braunia*. Owen Schwartz (New York) is a plant anatomy student working jointly with Mishler and with Dr. Richard White, on the development of the peristome region in the Funariales.

Jonathan Shaw has recently completed a three-year stay at Duke. In the fall of 1987, he moved to the Department of Biology, Ithaca College, as an assistant professor. He came to Duke in 1984 as a Research Scientist to work with L. E. Anderson and J. Antonovics on a research grant investigating the evolution of heavy-metal tolerance in bryophytes. His other projects at Duke included biosystematic studies of a number of different taxa, and continuing taxonomic work on *Pohlia* and *Mielichhoferia*. He has also been involved, along with Anderson and Mishler, in a research project focusing on developmental anatomy of the major types of moss peristomes in relation to systematics and evolution.

The 1987-88 academic year is a period of continued activity. Dr. Virginia Bryan has resumed her cytological investigations of mosses since her retirement as an Assistant Dean at Duke. Dr. Gert Mogensen of the Botanical Museum, University of Copenhagen, is spending the year at Duke on sabbatical leave as a Visiting Scientist. He is devoting time to synthesizing his studies of systematics, biogeography, and ecology of arctic mosses.

In addition to the herbarium and library, other useful facilities are available to bryologists. These include fully-equipped cytological and culture preparation laboratories, two separate controlled-environment growth rooms,

several fully-equipped compound and dissecting microscopes with photographic capabilities, and a darkroom. The Botany greenhouses, the Duke phytotron and other departmental laboratories are also actively used by bryologists.

Visiting scientists are welcome; we will make every effort to make facilities available and to provide a

stimulating environment for bryological research. Applications from highly qualified prospective graduate students will be welcomed from those resident in the U.S.A. as well as from foreign scientists.

Department of Botany, Duke University, Durham, NC 27706, U.S.A.

IAB SOFTWARE LIBRARY for IBM PCs and compatibles

Amendments to Version 2.6

Since version 2.6 of this list was issued, December 15, 1987, (Bryol. Times, 45 S.: 1-4) the following changes and additions have been made:

Changes

#27 UTILITIES The following extra programs are now included on this disk:

KPRINT Printer program to print 'readme' files or manuals from diskette, with several options for formatting output.

MOVE Moves files from one sub-directory to another.

MBRAIN12 Creates additional disk in RAM.

#37 LABELS3 The following note should be added: "Users of this program are asked to write for a manual and registration to Dr. John Beaman, Department of Botany, Michigan State University, East Lansing, Michigan 48824-1312, USA."

#51 ASKATAXA The description should now read: "Computerised synoptic keys, generated by the TAXON program. ASKATAXA allows a generated database of fungi, mosses and lichens to be used, but not altered. An additional disk of mycological keys is available on request. The full TAXON program is available for \$75 (including shipping charges), from COMPRESS, PO Box 102, Wentworth, NH 03282, USA."

#59 BIBLIOGRAPHIC UTILITIES Rename the disk "Bibliographic utilities II", and add the following note to the description of **KWSEARCH**:

"A literature file is provided for demonstration of the program."

Additions

#1 BIBLIOGRAPHIC UTILITIES I (See also #59)

TEXTLIT (J. Glime) Finds reference citations in a text (saved as ASCII file) and makes a list by author, year and page to check bibliographic citations in a manuscript.

LITCIT (J. Glime) Generates a list of authors and years to set up a reference list from a manuscript.

BRYOLOGICAL DICTIONARY (J. Glime) A spelling checker for MS-WORD, including all generic and specific names in the North American checklist, all vocabulary in the glossary of Crum's Mosses of the Great Lake Forests, and numerous other bryological terms.

#7 PC-OUTLINE (freeware) An outlining and planning tool. Allows random input of information, and the organisation of this into a hierarchical structure, which can then be viewed at any level of detail. Useful for producing a document with a complex structure, or for making lists. Can read/write ASCII and WordStar formats.

#18 CLUSTER (Frahm/Empain/Vanmaele/O'Shea) A cluster analysis program, which has been extended and improved since described in Bryol. Times, 32:5. Simple to use, with menus, allowing maintenance of a data matrix, manipulation of data using different primary characters, printing of dissimilarity coefficients etc., display and printing of dendrograms.

(Continued over)

A contribution to the Computer Column edited by J.-P. Frahm and B. J. O'Shea.

Software library (Continued from p.3)

≠69 LITCHINA, CHINALIT (P. L. Redfearn, Jr.)

dBaseII/WordStar files of a bibliography of Chinese bryology.

≠69-70 CHINA 1,2 (P. L. Redfearn, Jr.)

List of Chinese mosses with index of family, province and literature reference. dBaseII file.

≠71 INSTANT RECALL (shareware)

Memory resident, free form database program for creating unstructured datafiles. Shareware version limited to 80k of data. Allows e.g. bibliographic files to be set up during work with a word processor. No organisation needed for the database; every word is indexed and can be searched for. Reads all ASCII files, so existing datafiles can be used.

≠72-73 KWIKSTAT V.1.0 (shareware)

Graphics orientated program for scientific statistical analysis. It can import ASCII and dBase files or build up its own databases. Entirely menu driven with help screen. Graphic output includes histograms, scatterplots, box plots and 3D bar charts. EGA required. 30 p. manual on diskette.

≠74 FINGERPAINT (shareware)

Paint program like MS Paint, PC Paintbrush, GEM Paint or others, but not mouse driven. Version without printer drive, which can be purchased for \$7. For CGA card; simulator for Hercules card on diskette.

≠75-76 PC KEYDRAW (shareware)

Drawing program to create and print computer graphics (CAD) with slide show capability. Can be operated by a mouse. Required CGA. Emulation does not work. Program on first disk, demonstration files with slide show on second disk.

≠77-78 DANCAD 3D (shareware)

Graphics program to create, magnify and rotate complex 3D figures or just to draw and print letters and text. Menu driven. Requires 640K memory and CGA (emulation does not work). Demo files with slide show on second diskette.

≠79 DBS-KAT v. 1.3

Diskette catalogue, especially for hard disk user who wants to catalogue backup diskettes. Manages 9999 diskettes and 16 M filenames, password protected. 40 p. manual on diskette.

≠80-81 WAMPUM v. 3.1.B (shareware)

dBase compatible database program, fully menu driven. Installation only possible on hard disk, as the files come archived and must be 'unsqueezed'. 80 page manual on diskette. This program creates and uses dBaseIII files and is therefore useful for anyone who wants to use dBase, but have no access to dBaseIII. Wampum does not support dBase program files (which is how most of the Software Library dBase applications are presented), but it does provide a very straightforward updating menu for any dBaseIII files.

≠82-84 ANALYTICALC

Integrated package with spreadsheet, database, graphics, word processor, complete with manual.

≠85 HERBARIUM LABELS (A. Batten)

A label program from the University of Alaska museum, based on an original by Bob McGill, converted from CP/M. Still being developed, but usable.

≠86 HERBARIUM LABELS (R. May)

dBaseIII program with facilities for installation, change of field names and two column print. German version available on request.

≠87 HARD DISK UTILITIES (shareware)

Some useful utilities taken from PC-SIG ≠726 (Automenu):

DELDIR Deletes a subdirectory together with its files.

LISTFRAG Lists all fragmented files in the drive.

NAMEDIR Renames a subdirectory.

PACKDISK Eliminates file fragmentation and unallocated space between files, reintegrates lost clusters.

TRANSDIR Transfers a subdirectory together with its files and sub-directories into another directory.

PARK 'Parks' the hard disk reading heads, so the computer can be moved.

≠88 POLYCOPY (freeware)

Coies up to 75 disks per hour from the same diskette.

≠89 PRINTER UTILITIES (freeware)

Several programs for Epson-compatible matrix printers:

POSTER Prints text sideways in different sizes and with different symbols.

LBL-IX Prints diskette labels: 5, 6, or 7 lines, single or double strike, in 1 or 2 columns.

SWPTR Swops printer LPT1 with LPT2. Software switch, if two printers are used.

≠90 DESKCOMMAND (shareware)

Desktop utilities with advanced features, such as a clock with 15 alarms, autodialer for modems, scientific calculator, text editor with word-wrap and block commands, calendar, ASCII table, DOS commands, Rolobase (address file with print facility) and main menu to start 9 user-definable programs.

≠91 GALAXY v. 2.2b (shareware)

Memory resident word processor, with pull-down menus and word-wrap, different printer codes, second window, block commands. Accepts WordStar commands and files; with support for numerous printers.

≠92 RESICALC (shareware)

Memory resident scientific calculator.

≠93 DOSAMATIC (shareware)

'Shell' program with multitasking facilities. Can switch between up to seven programs and run them simultaneously.

≠94 POWERMENU (shareware)

Password protected menu program, with disk manager.

≠95 DISKCOMMAND (shareware)

Advanced disk utilities such as unerase, disk optimiser, disk testing and disk editor similar to Norton Utilities. 45 pp manual on disk. The files are compressed, and a hard disk is necessary for extraction.

≠96 LITKEY (G. Wagenltz)

dBaseIII+ literature program with specialities such as a checker for journal abbreviations (according to B-P-H) and automatic abbreviations for keywords.

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Machado's Portuguese Mosses

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distribution of 28 other taxa not represented by specimens in his collection. These records were submitted to the same distributional and phytogeographical studies as the 272 taxa referred to above.

After taxonomic revisions 126 specimens were found to have been misidentified. Of these 67 were included in taxa already represented in the collection; 47 were included in 23 taxa which did not belong to the collection until then; and 12 were included in 7 taxa new to the Portuguese bryoflora, i.e. *Pogonatum urnigerum*, *Didymodon luridus* var. *nicholsonii*, *Leptodontium flexifolium*, *Lescuria incurvata*, *Grimmia alpestris*, *Hylocomium brevirostre* and *Plagiothecium succulentum*. Other consequences of the misidentification of these specimens are that: 5 taxa were excluded from the collection, persisting only in Machado's literature observations which did not agree with the location of the material excluded; 6 other taxa were also excluded from the collection but as their location was coincidental with the location of Machado's bibliographic references, these should not be considered; and finally, 3 taxa had to be excluded altogether from the Portuguese bryoflora, i.e. *Plagiomnium ellipticum*, *Cratoneuron filicinum* var. *falax* and *Lescurea patens*.

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Latest version

The latest version of this list (which includes all the changes and additions listed above) is Version 3 (March 23, 1988), a copy of which can be obtained from:

Dr. Jan-Peter Frahm, Universität Duisburg, Fachbereich 6, Botanik, Postfach 101629, D 4100 Duisburg, F.R. Germany.

Studies of the distribution and phytogeography of these taxa also provided interesting results. A few areas could be quite correctly characterized by the predominant occurrence of some elements while others could not, either because the taxa studied were collected mostly in regions with different characteristics or because the regions remain too poorly explored.

This work was presented as my master degree thesis and is now available for further studies. All its content has been computerized and can be used as a data base so it will not be difficult to find any information anyone might need. Though limited in itself it has proved valuable in indicating, once again, (i) the importance of revising old collections in order to complete the national catalogue, and to continue the mapping of, Portuguese mosses; (ii) the areas where thorough exploration is needed and (iii) those groups that need to be studied accurately and revised taxonomically. Furthermore, the results can be integrated into a more general plan of updating the catalogue of Iberian mosses and of mapping their distribution, one of the major goals of Iberian bryologists.

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Nomenclature at Berlin

by

Gea Zijlstra

The Nomenclature Section of the XIV International Botanical Congress in Berlin, July 1987, had to decide upon 334 proposals to amend the Code. In this article, a few of the most important decisions are reported, along with some comments, where appropriate.

Typification

An important decision was to abolish the Guide for the determination of types, and to incorporate most of its contents under Articles 7 and 8. Several more additions to these Articles have been accepted, the most important being:

1. Clear decisions have been made with respect to the possibility of having descriptions and/or illustrations as holotypes or lectotypes: descriptions are definitely outlawed as potential types. A logical decision, if you wish to retain the concept of neotypification. (To allow that a description may be a type, is a hang-over from the old circumscription method.)

A footnote defining "original material" has been added at its first mention in Art. 7.4:

"Original material: specimens or illustrations examined by an author prior to publication of a name and used by him/her to establish the concept of the taxon as presented in the protologue."

Moreover, one element of the Guide has not been transferred to Articles 7-8: T.4.(b): "A specimen is to be given preference over pre/Linnaean or other cited descriptions or illustrations when lectotypes of names of species or infraspecific taxa are designated (see Art. 9.3)."

Conclusion: an illustration is just as well available as a specimen, to be chosen as the lectotype of a name.

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A contribution to the Nomenclature Column Edited by G. Zijlstra.

Nomenclature at Berlin (Continued from p.5)

2. The possibility for neotypification has been enlarged, through acceptance of Prop. F to Art. 7. The essential element of this is appended in Art. 7 (along with three additional changes in Arts. 7 and 8.)

"When a holotype or a previously designated lectotype has been lost or destroyed and it can be shown that all the other original material differs taxonomically from the destroyed type, a neotype may be selected to preserve the usage established by the previous typification, as an exception to Arts. 7.4 and 7.8."

3. Berlin had to cope with a lot of proposals under Arts. 8 and 9. The big majority of them have been rejected and referred to a new Special Committee on Lectotypification. This implies that the current problems with the interpretation of Art. 8.1 (how to deal with choices that were based on a largely mechanical method of selection) have not been resolved. A few of the rejected (eventually partly) solutions are worth mentioning, since they can be expected to be brought up again in Tokyo:

a) to introduce a 1935 starting point for lectotypification (Art. 8, Prop. A), was rejected a.o. because only its effect on the typification of generic names had been studied to some degree. Its possible effect on species names is completely unknown. This will be studied in the next few years, especially for Linnaean species;

b) to delete the words "or that it was based on a largely mechanical method of selection" (Art. 8, Prop. H);

c) to incorporate a Note, to have the so-called "residue method" formally accepted as lectotypification, under restricted conditions (Art. 8, Prop. P).

Even though almost all proposals under Art. 8 have been rejected and referred to the new Committee, the proposal to add a new Art. 8.2. has been accepted:

"For purposes of priority under Art. 8.1, designation of a lectotype or a neotype is achieved only if the designation is definitely accepted by the typifying author, and if the lectotype (or neotype) element is clearly indicated by direct citation including the term 'type' or an equivalent."

Art. 37, treating the requirement of indication of a holotype in the context of valid publication from 1958 on,

received some rewording and several additions:

1. Since family names are typified automatically, they need not be mentioned under Art. 37; therefore "family" was replaced by "genus".

2. The phrase "nomenclatural type" was replaced by "holotype of the name" (to stop taxonomists who think that the indication of syntypes meets the requirements of Art. 37).

3. Two Notes have been added, to explain what may be assumed to be an indication of the holotype even without a direct statement that this is so: for name of (subdivisions of) genera, the inclusion of a single type of a names suffices; for names of lower ranks, citation of a single specimen or illustration is enough. Mere citation of a locality without further reference to a herbarium specimen, however, does not constitute indication of a holotype (Art. 37, Props. M (amended) and D).

4. From 1 Jan. 1990 onwards, the requirements will be more severe, by acceptance of Props. J and G (amended):

"On or after 1 Jan. 1990 for purposes of valid publication indication of the holotype must include explicit use of the word 'holotypus' or 'typus', their abbreviation or their direct equivalent."

"On or after 1 Jan. 1990, when the nomenclatural type of a taxon at or below the rank of species is a specimen, the herbarium or other institution in which a type specimen is permanently conserved must be stated. Such a statement of an herbarium or other institution may be in an abbreviated form such as recommended in *Index Herbariorum* or similar work."

Conservation of specific names

In Sydney the possibility of conservation of specific names was accepted, restricted "to species of major economic importance". For all other specific names, rejection was the only method to solve the problems that arise as soon as one detects that the type of a name does not belong to the taxon for which the name is commonly used.

The procedure to have a name conserved does not take more time than the procedure to have a name rejected. After heated discussions, amendments of the proposals and votes close to the critical boundary of 60% necessary to have a proposal accepted (60.1%; 59.7%; 63.4%), it was decided that the possibility of conserving specific names should be enlarged. To enable

this, the following additions have been made:

In Art. 14.1, the present 14.1 was numbered 14.1(a) and 14.1(b) was added:

"A name may also be conserved in cases provided for by Art. 69."

In Art. 69 two Notes were added:

"A name of a genus or species that has been widely and persistently used for a taxon or taxa not including its type and would be the correct name for another taxon, may also be conserved or rejected under Art. 14.1(b)."

"The name proposed for conservation under Art. 14.1(b) may be either the name which has been widely and persistently misapplied or another against which the latter is rejected."

Moreover, the following Recommendation has been accepted:

"A name that has been widely and persistently used for a taxon or taxa not including its type should not be used in a sense that conflicts with current usage unless and until a proposal to dispose of it under Art. 69 has been submitted and rejected."

"Incidental mention"

In Art. 34, the efforts to delete 34.1(c) and 34.3 finally had effect. Thus the argument that a name was not validly published because it was merely mentioned incidentally, cannot be used any longer.

The use of "in" and "ex"

The Recommendations 46D and E, on the use of "in" and "ex" in the citation of authors' names, describe a correct procedure, departures from which are necessarily incorrect. Therefore it was decided that they should receive the status of rules. To transfer them into Articles, a slight rewording was necessary (Props. A and B to Rec. 46D, and Prop. A to Rec. 46E accepted).

Besides the Special Committee on Lectotypification, mentioned above already, five more new Special Committees have been appointed. A few of them are worth mentioning here:

Registration

Almost all proposals concerning effective publication, registration of plant names, as well as the compilation of a list of approved publications, were rejected. After extensive discussions, with amendments of proposals followed by delay of the decisions until the

(Continued opp.)

Nomenclature at Berlin (Continued)

following day, finally agreement (i.e. a more than 60% majority vote) could be found to accept the following proposals:

"A Special Committee on Registration to be set up to report to the XV IBC."

"That the Special Committee on Registration be given a mandate to determine the desirability and feasibility, and, if appropriate, to actively investigate, negotiate and test the structures, procedures and mechanisms, including finance, required for the implementation of a system for the registration of new plant names."

Retroactivity

Another hot issue on which Berlin could not yet decide (even though some proposals were accepted/rejected already!) was retroactivity. In my opinion, two themes are under consideration here:

1. the retroactivity of lectotypification;
2. the retroactivity of Appendices II and III of the Code.

To resolve the question "is lectotypification retroactive?" and related questions, Berlin established a Special Committee on Retroactivity, Superfluity and Illegitimacy.

In a future number of the Bryological Times I shall discuss this further.

In the final session nomina conservanda and rejicienda proposita were approved as recommended by the General Committee. This implies that the names in the report of the Committee for Bryophyta (Taxon, 36: 429-431, May 1987) have now come through the final stage of the procedure, and will appear in App. III of the Berlin Code:

Pellia Raddi 1818, nom. cons. against *Merkia* Borckhausen 1792, nom. rej.;
Calypogeia Raddi 1818, orth. cons.;
Lopholejeunea (Spruce) Schiffner 1893, nom. cons. against *Lopholejeunea* Stephani 1890, nom. rej.;
Acrolejeunea (Spruce) Schiffner 1893, nom. cons. against *Acro-Lejeunea* Stephani 1890, nom. rej.;
Trachylejeunea (Spruce) Schiffner 1893, nom. cons. against *Trachylejeunea* Stephani 1889, nom. rej..

In App. II, Lophoziaceae will be deleted.

Institute of Systematic Botany,
Heidelberglaan 2, 3584 CS Utrecht,

IAB sponsored

COMPUTER TECHNIQUES WORKSHOP

MONT RIGI, BELGIUM, SPRING 1989.

Preliminary notice

As a result of the great interest shown in the computer techniques section of the Bryological Methods Workshop in Mainz, and also the successful introduction of the IAB Software Library, a Computer Techniques Workshop is to be held at the University of Liège's Mont Rigi field station, in the Belgian Ardennes, in spring 1989.

The meeting is intended for all levels of experience from beginner to experienced user and specialist. All participants will be able to register their own particular interests and level of experience on the sheet coming with the registration form. The meeting will cover, on three levels:

- | | |
|---------------|--|
| - discussions | - demonstrations of computer applications |
| - seminars | - practical work with computers and equipment. |

Level I

Demonstrations and seminars on computer applications in bryology:

- demonstrations of commercial programs (word processors, databases, spreadsheets, statistics/calculation programs, integrated packages, graphics (CAD and Paint) programs, graphical environment programs). A specific list of the packages available for demonstration will be given in the final programme.
- demonstrations of programs from the IAB Software Library. Programs can be tested and copied free.
- special bryological applications, such as label production, herbarium management.
- special topics such as computer and microscope; computer-aided microscopic measurement; computer and video, digitising and scanning of illustrations.

Level II

Development of standards for text and data exchange. Computer users are primarily producers of data in two formats - text and data files - by producing written text, bibliographies, addresses or computerised illustrations, for instance. Once something has been written on a computer, ideally it should never need retyping, providing there are standards for storing and merging data between different pieces of hardware and software. These sessions will look at standards for the exchange of bibliographies, herbarium records, taxonomic descriptions, graphics files, and the merging and extension of existing data files, via standard data structures and content.

Level III

Specialist solutions. Programming in BASIC, PASCAL, FORTH and dBase. Software interfaces, conversion of different disk formats.

The meeting is primarily aimed at MS-DOS users, and it is expected that all demonstrations and examples will be MS-DOS based - but users of Apple, Atari, CP/M and Commodore 64/128 should also benefit.

It is hoped to publish all papers presented as well as the results of discussions, and details of the demonstrations. The form of this publication has yet to be decided. The final program will depend on the availability of particular expertise and the interests of participants. For this reason, if you are interested in attending, please write to:

Dr. J.-P. Frahm, Universität Duisburg, Fachbereich 6, Botanik, Postfach 10 16 29, D-4100 Duisburg, Federal Republic of Germany.

stating your specific interests and experience. This will allow the published program to reflect as accurately as possible the needs of those attending.

The exact date of the meeting will be announced in the Bryological Times as soon as it is known. A second notice will be published in these columns later.

HUMAN USES OF BRYOPHYTES

II. Use of Bryophytes as Decorations for Nativity Scenes in La Paz, Bolivia

by

Marko Lewis

Bryophytes are widely used as decorations for nativity scenes throughout the Western Hemisphere. I have observed them in use in Canada, Mexico, Ecuador and Bolivia. Father Javier Corda, a priest of the San Calixto parish in La Paz, Bolivia, also reports that bryophytes are widely used in Spain for the same purpose. I was able to give my full attention to their use in La Paz, during Christmas week of 1982, and observed a local family construct and bless their Baby Jesus.

The street markets of La Paz are extensive covering, in 1982, well over 4km² in the barrios Roasario, San Pedro and Gran Poder. Many of the people in these districts have only just recently arrived from rural districts and live in small adobe structures built around cobble or dirt patios behind the facade of colonial-style buildings. Many of the men are employed as porters, in industries, or trades. But, a

mainstay of the economy are the women and girl child vendors who sit on the sidewalks selling small piles of produce, household goods, clothing, electronic supplies, herbal cures, magic potions, hardware, and other items important to the local economy. The women are for the most part of the 'chola' class, wearing brilliantly-coloured thick skirts called 'polleras', derby hats, and colourful embroidered shawls. Though adult illiteracy is undoubtedly high, their children are being educated and are in the transition to becoming incorporated into the urban mestizo class. It is in these barrios that my observations were made.

Plants to be sold for use in nativity scenes were brought to La Paz, beginning December 20th and were sold in two areas: on Calle Tarija between Calle Mianpu and Calle Murillo near Mercado Rodriguez, and to a lesser

degree in the flower market of Mercado Lanza near the Plaza San Francisco. The area near Calle Tarija is a true 'cryptogam market' and plants for sale include spikemosses (*Selaginella* spp.), clubmosses (*Lycopodium* spp.), many small ferns, as well as *Juniperus* spp. and other decorative plants. Lichens were not found, bryophytes being the major and conspicuous part of the plants on sale.

Judging from the species which I purchased the bryophytes must have been brought from the cold cloud forests near Unduavi, about 60 km NE of La Paz. The bryophytes were brought in damp bundles held together with flour sacking in the early morning. From then until late afternoon, between 20th and 24th December, women and young girls sat on the cobblestone sidewalks surrounded by their piles of bryophytes and other plants. Small cradles for the Baby Jesus made of stiff grass stems were also sold in the same locale. Some species were tied into small bundles with stems of grass and dipped into buckets of brilliant, green acrylic dyes, a procedure which also turned the hands of the vendors the same brilliant colour! A sheet of pleurocarpous moss, about 600 cm² cost the equivalent of \$US 0.05, a 100 cm² tuft of dyed acrocarp cost about \$US 0.10. As a comparison, one large egg at this time cost \$US 0.12.

(Continued opp.)



Figures 1 (left) and 2 (right) Use of bryophytes for nativity scenes. 1. 'Cholita' women selling bryophytes and cradles on Calle Tarija, near Mercado Rodriguez. 2. A cradle for the Baby Jesus made by two young Catholic girls.

Human uses of bryophytes
(Continued)

I collected at least one sample of every species which I found for sale in these two markets. They were identified at the herbarium at F, where vouchers have been deposited. Species which were dyed green, were: *Breutelia nigrescens* Herz., *Calliergon sarmentosum* (Wahlenb.) Kindb., *Leptodontium wallisii* (C. Müll.) Kindb. and *Sphagnum recurvum* P. Beauv. The *Sphagnum* was also found in powdered form. Undyed species included: *Breutelia nigrescens* Herz., *Breutelia cf. straminea* Herz., *Ertodon*, 2 spp., *Leptodontium luteum* (Tayl.) Mitt., *Mittenothamnium andicola* (Hook.) Mitt., *Plagichila*, 2 spp., *Thuidium minutulum* (Hedw.) Mitt., and *Thuidium delicatulum* (Hedw.) Mitt.

Two young catholic girls, Tania Gomez Lanza and Isela Pinto Lanza were kind enough to allow me to accompany them as they prepared their 'Nino Jesus' and had Him blessed. Tania acted as the Godmother and she was especially concerned with purchasing the necessary items. She first bought a cradle made of tough

grass from a street vendor at Mercado Lanza. The vendor sold the cradle with a soft bed of dampened *Thuidium delicatulum*, the roof of which he had decorated with a tough dyed fern. The purchase price of the cradle was \$US 0.50. Tania bought most of the mosses for the nativity scene in Calle Tarija. A glossy silvergreen *Ertodon* sp. was added to the bed, *Breutelia nigrescens* was used as small trees near the head of the baby Jesus, and *Leptodontium luteum* was used as a pillow. A porcelain figure of the baby Jesus was then dressed in a white satin gown embroidered in gold lace, and a pair of tiny leather sandals. A small ceramic lamb, and a number of miniature presents were placed along the edges of the cradle, and finally the Baby Jesus was laid in His bed of moss.

On Christmas Eve the nativity scene was brought to the Buen Pastor Cathedral in Barrio Rosario. At the end of the Mass the Priest dipped a red carnation into a vase of Holy Water and baptised the Baby Jesus by sprinkling it with the water. Tania said this would bring good luck for next year.

I observed hundreds of these small nativity scenes being brought to cathedrals for blessing throughout Christmas Week. While in middle and upper class barrios many of them were brought on silver or porcelain plates resting on satin mattresses, in the poorer barrios and in the rural areas the Baby Jesus commonly rested on a bed of bryophytes.

My thanks to the National Geographic Society who supported field work in Bolivia from 1982 until 1985, and the Field Museum of Natural History, Chicago who also aided the project. I would also like to thank Dr. John Engel for many kindnesses, and Tania Gomez Lanza and Isela Pinto Lanza for sharing their 1982 Christmas with me.

For Human uses of bryophytes I. Use of mosses for chinking log structures in Alaska, see *Bryologist*, 84(4): 571-572, 1981.

Herbario Nacional de Bolivia, Museo Nacional de Historia Natural, Casilla 20127, La Paz, Bolivia.

D I A R Y

For explanation of acronyms, see *Bryol. Times*, 31:7-8, 1985.

1988

June 1-8. Tropical bryological workshop. Puerto Rico. Organized by Inés Sastre-De Jesús and S. Rob Gradstien primarily to acquaint temperate bryologists with tropical bryophytes. Registration and information available from: Dra. Inés Sastre-De Jesús, Dpto. de Biología, Universidad Católica, Ponce, Puerto Rico 00731.

June 17-19. SBLs Annual assembly. Steg (principality of Liechtenstein) with lectures and excursions to Saminatal and Sareiserjoch (northern calcareous Alps). Further information from Dr. Klaus Ammann, Syst.-Geobot. Institut, Altenbergrain 21, 3013 Bern, Switzerland.

July 19-23. Joint BBS - British Ecological Society Meeting, Edinburgh. International

Symposium on bryophyte ecology. For outline programme see *Bryol. Times*, 44:3. Local Sec.: Dr. P. J. Lightowlers, Institute of Terrestrial Ecology, Bush Estate, Penicuik, Midlothian, Scotland EH26 0QB.

July 23-30. BBS Summer field Meeting, Aigas Field Centre, Beaulieu, Invernesshire. Local Sec.: Dr. P. J. Lightowlers. Participants at the BBS ecological symposium (see July 19-23) will be most welcome.

Aug. 5-7. BSJ 17th Annual Meeting, Sanda City, ca. 25km N. of Kobe City, with paper-reading sessions and field study. Further information from Dr. N. Kitagawa, Biological Laboratory, Nara University of Education, Takabatake-cho, Nara 630, Japan.

Aug. 7-12. NBS Annual Meeting and Excursions, Kitee, Pajarinhovi Travel Centre, Finland. Further details from Dr. Matti Haapasaari, Kuopio Museum of Natural

History, Myhkyrinkatu 22, 70100 Kuopio, Finland.

Aug. 7-11. ABLs Annual Meeting in conjunction with AIBS meeting, University of California, Davis, U.S.A.

Aug. 13-14. ABLs Field trip to Mendicino County, California, through redwood forests, coastal bluffs, pine forests and oak woodlands. Further details from Brent D. Mishler, Dept. of Botany, Duke University, Durham, N.C. 27706, U.S.A.

Aug. 28-2 Sept. BLAM Virgen (Osttirol). Leaders: J. Poelt (Graz) & G. Gärtner (Innsbruck). Further information from Doz. Dr. G. Gärtner, Institut für Botanik, Sternwartestr. 15, A-6020 Innsbruck, Austria.

Aug. 31-2 Sept. Phytochemical Society of Europe. Saarbrücken. International Symposium on the chemistry and chemical taxonomy of bryophytes. Further information (Continued over)

Diary (Continued)

- mation from Prof. H. D. Zinsmeister or Dr. R. Mues, Fachrichtung Botanik der Universität der Saarlandes, D-6600 Saarbrücken 11, B.R.D. (See *Bryol. Times*, 43:11).
- Sept. Alma-Ata, Kazakhstan. Meeting of the Bryology Section of the Scientific Council of the Academy of Sciences of the USSR. Information from Dr. V. K. Mamatkulov, Institute of Botany, Academy of Sciences, Tadzhiik S.S.R., Karamova St. 27, Dushambe, Tadzhiik SSR. 734017, USSR.
- Sept. 4-10 AETFAT Congress, Hamburg, F.R.G. Symposium on African bryology and lichenology. See preliminary notice in *Bryol. Times*, 44:3.
- Sept. 12. 6th CEBWG Meeting, Liblice (Village near Melnik) Czechoslovakia. For preliminary announcement of this 4-5 day meeting, see *Bryol. Times*, 40:10.
- Sept. 14-18. SBLs Field work in the Jura Neuchâtelois (La Côte aux Fées) bryophyte mapping of the region. Further information from Dr. Klaus Ammann, Syst.-Geobot. Institut, Altenbergrain 21, 3013 Bern, Switzerland.
- Sept. 16-18. 6th Midwestern bryological foray. Black River Falls, Wisconsin U.S.A. See this issue, p. 6. Further information from Dr. John A. Christy, Bryological Foray, Botany Section, Milwaukee Public Museum, 800 West Wells St., Milwaukee, WI 53233, U.S.A.
- Sept. 17-18. BBS A.G.M. and paper reading meeting, Liverpool, Local Sec.: Dr. J. Edmonson, Merseyside, County Museums, William Brown St., Liverpool L3 8EN, U.K.
- Sept. 23-25. The 1988 Andrews Foray, U.S.A. Pocono Environmental Education Centre (PEEC), Dingman's Ferry, PA. Contact Dr. Richard Andrus, Dept. of Biological Sciences, SUNY Binghamton, Binghamton, NY 13901, U.S.A.
- Sept. 24-25. SBLs Taxonomic workshop on the genus *Tortella*, with R. May (Duisburg). Botanical Institute, University of Zürich. Further information from Dr. Klaus Ammann, Syst.-Geobot. Institut, Altenbergrain 21, 3013 Bern, Switzerland.
- Sept. 30-2 Oct. 4th Annual Blomquist Bryological Foray, Georgia, U.S.A. Based at Cloudland Canyon State Park, Dade Co., in the northwestern corner of Georgia. See this issue p.6. Application forms and further information from the organizers: Ann Stoneburner or Robert Wyatt, Department of Botany, University of Georgia, Athens GA 30602 USA.
- Oct. 18-23. SLAB Bogotá, Colombia. 1st Simposio Latinoamericano de Briologia. See this issue p.4. Further information from Prof. Jaime Aquirre C., I Simposio Latinoamericano de Briologia, Apartado Aéreo. 7495, Bogotá, D.E., Colombia.
- Oct. 29-2 Nov. 4th WGMBE Meeting, Mont-Rigi, Belgium. Further information from Prof. Dr. R. Schumacker, Université de Liège, Station Scientifique des Hauts-Fagnes, B-4898 Waimies, Belgium.
- Nov. BBS Bryological Workshop, Bristol. Local Sec.: Dr. D. H. Brown, Dept. of Botany, The University, Bristol, BS8 1UG.
- Nov. 26. VWGB Joint meeting with Royal Belgian Botanical Society. Further information from L. Smets, A. Van Dijkstraat 13, 2300 Turnhout, Belgium.

1989

- Feb. or March. BBS Special overseas spring meeting, The Algarve. Local Sec.: Mr. A. R. Perry, Dept. of Botany, National Museum of Wales, Cardiff, CF1 3NP.
- April. BBS Spring field meeting, Salisbury. Local Secs.: Mrs V. Williams, Two Bridges, Lyburn Road, Hamptworth, Salisbury, Wilts., SP5 2DB, and Mr. R. C. Stern, Botany Bay, Main Road, Fishbourne, Chichester, West Sussex, PO18 8AX.
- July or Aug. BBS Summer field meeting, Aberystwyth. Local Sec.: Mr. A. Orange, Dept. of Botany National Museum of Wales, Cathays Park, Cardiff, CF1 3NP.
- Aug. 6-10. ABLs Annual Meeting in conjunction with AIBS Meeting, Univ. of Toronto, Canada.
- Sept. BBS A.G.M. and paper-reading meeting, Lincolnshire. Local Sec.: Dr. M. R. D. Seaward, Postgraduate School of Studies in Environmental Science, The University, Bradford, BD7 1DP.

1990

- July. 1-7. IV International Congress on systematic and Evolutionary Biology. Maryland, University of Maryland, College Park, U.S.A.
- Aug. 12-18. Helsinki, Symposium on SE Asian bryophytes. See preliminary announcement in *Bryol. Times*, 41:4.

THE INTERNATIONAL ASSOCIATION OF BRYOLOGISTS publishes *The Bryological Times* every two months, the *Bulletin of Bryology* twice a year, and the *Advances in Bryology* irregularly. Material for the *Bryological Times* can be sent at any time, but submission dates for the *Bulletin* and the *Advances* should be discussed with the Editors, Dr. Diana G. Horton (University of Iowa) U.S.A. and Dr. Norton G. Miller (Albany) U.S.A. respectively. The Editors do not accept responsibility for the views of the authors.

For details regarding membership of the international Association of Bryologists (currently U.S. \$8.00 p.a.), write to the Honorary Secretary, Dr. Dale H. Vitt, Department of Botany, University of Alberta, Edmonton, Alberta, Canada, T6G 2E9.

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All items for future issues to be sent to the Editor, Dr. S. W. Greene, Department of Botany, The University of Reading, London Road, Reading RG1 5AQ, Berkshire, England (Telex 847813 RULIB) except those for the regular columns, should go direct to the column editors, whose names and addresses will be found in *Bryol. Times*, 31:9, 1985.