

a newsletter from
**INTERNATIONAL
ASSOCIATION OF
BRYOLOGISTS**

The Bryological Times

Issue 101

July 2000

ISSN 0253-4738

DALE VITT, IAB SECRETARY-TREASURER, MOVES

From mid October IAB's secretary-treasurer, Dale Vitt, will move from Edmonton and take up a chair position in Carbondale, Illinois. His address will then permanently change to:

What Bryological terms should we use?

Many bryological terms are inherited from vascular plants since they are erroneously interpreted as homologous with structures there. Jan-Peter Frahm discusses this and suggests some alternative terms. *page 2*

Department of Plant Biology
Southern Illinois University
Carbondale, IL 62901-6509
USA

BRYONET

BRYONET is now officially an IAB run electronic discussion group. Janice Glime is administrator and gives an overview of the site and how to subscribe. *page 15*

Bryology in

Russia

What is happening in Russian bryology today? Are the conditions for bryologists better or worse than in the Soviet period? Misha Ignatov describes the situation and summarizes what has been done in the last decade. *page 4*

China

Tong Cao concludes his summary of the diverse and intense activities in China during the 1990's.



page 6

Singapore

Singapore is a small state often associated with skyscrapers and cheap shopping. However, there are also some bryologically rich rain forests in Singapore and neighbouring Malaysia, where research is going on. Ben Tan describes the activity in this part of the world *page 8*

BRYOLOGICAL MEETINGS AROUND THE WORLD

There are several Bryological societies that arrange Meetings in the near future (see also Diary at the end of each issue). In this issue the sessions proposed for the IAB Meeting IAB in India 2002 are presented and the IAB *Sphagnum* meeting in Scandinavia announced. In addition the 6th Australasian Bryological Workshop, the BBS Summer Field Meeting, the Blomquist Bryological Foray and a conference on genetic diversity and taxonomy in are Poland announced. *page 13*

Tools and tricks useful for bryologists

Jan-Peter Fram presents some tools that can be useful for bryologists. *page 5, 12*

Student Profile Perpetua Blanks

In the series of student presentations, Perpetua Blanks, Australia, presents herself and her work. *page 10*

THESIS IN BRYOLOGY

Three new PhD thesis, by Judy Harpel, Jan Kučera and Xiao-Lan He, are presented. *page 5*

Recent deaths

The sad news of bryologists passing away continues to reach us.

Recently **Bill Hoe** passed away after heart failure.

Patricia Geissler, long an active member of IAB and in periods a councillor, died in a traffic accident in May. She was the distributor of BT for large parts of central Europe. Distribution of BT 100 was therefore delayed to those of you that usually received it from her. *page 11*

University of Calgary moves their bryophyte herbarium to Edmonton

Due to lack of curatorial expertise, money and space, the UAC herbarium is transferred to and incorporated into the PMAE in Edmonton. *page 9*

International Association of Bryologists (IAB) is an organisation open for all interested in bryophytes. For membership, contact Sandi Vitt, Dept of Biol. Sci., Univ. of Alberta, Edmonton, Alberta T6G 2E9, Canada (svitt@ualberta.ca). Visit also our web site at <http://www.devonian.ualberta.ca/iab/>. Bryological Times is issued 4 times per year.

BRYOLOGICAL TERMS – CRITICALLY SEEN

Jan-Peter Frahm

Botanists have studied bryophytes for about 250 years. However, only since Hofmeister clarified the life cycle 150 years ago, in 1851, has it been known that bryophytes are not flowering plants. In the 18th century, bryophytes were included in Linnaeus' 24th division of plants, the cryptogams, in which they were united with ferns, horsetails, lycopods, fungi, lichens and algae, because in all these plants the method of propagation was not known (was cryptic, hence the name). This was not only caused by insufficient quality of the microscopes, which did not allow detailed studies, but also by prejudice (cryptogams propagate only asexually) or low interest in anatomical studies. Linnaeus interpreted the moss capsule as a stamen with pollen in it. Hedwig was the first to discover the sexuality of mosses (Frahm in press). He observed for the first time a bursting antheridium and interpreted it as stamen with pollen in it. Consequently, he interpreted the capsule as fruit with seeds in it (contrary to Linnaeus!).

It is problematic that most of the terms used to describe the anatomy and morphology of bryophytes were created during this period, when their cryptogamic nature was not known. Therefore phanerogamic terms were adopted for bryophytes, and these are still in use although they are anachronistic. In my opinion, however, historical reasons are not sufficient to keep these wrongly applied terms.

Another reason for a critical view of bryological terminology is that different terms are used in different branches of cryptogamic botany for homologous organs. It would be also in the interest of students that these terms be adjusted.

In the following some terms are listed which need critical reconsideration:

CAPSULE

As already mentioned, these terms originated in the 18th century, when the capsule of mosses was interpreted as fruit with seeds in, similar to a capsule of *Papaver*. Capsules of hepatics do not have the same shape but are nevertheless called so. In general, however, the organ producing meiospores is called a sporangium. And there seems to be no reason not to call the capsules of bryophytes sporangia. Some American textbooks do so (e.g. Schofield 1985).

The lid of the "capsule" could be named "operculum". Operculum is the latin word for lid. To find an appropriate word for "urn" is difficult. The name itself illustrates the shape, but is not a matter of good taste. The latin term "theca" is problematic, because it is again an angiospermic word for the anthers. In my opinion it is not possible to use the same word in botany for part of a sporangium and two pollen sacs. I do not know of any solution to this problem except to create a new term (which is surely the worth-

while solution): in according with hypophysis it could be named epiphysis. This would have a nice resemblance to the epitheca and hypotheca of diatoms. The term hypophysis, used as a synonym for apophysis (cf. Magill 1990) should be preferred, since hypo means below, whereas apo means off or away from.

C. FR. (CUM FRUCTIBUS)

This abbreviation for bryophytes with "fruits" originates also from Linnean times. "C. spor." (*cum sporangiis*) would be the correct alternative.

ANTHERIDIUM

Hedwig named this organ in this way because he thought it was a stamen with pollen. One could keep this term as a historical reminiscence, albeit one of heavy misinterpretation. The general cryptogamic term for this organ would be spermatogonium, the organ that produces the spermatozoids.

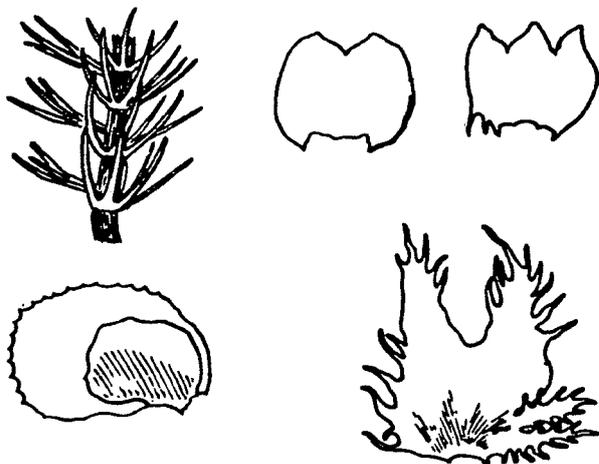
In contrast, the term archegonium carries no problems. It is the organ in which the sporogonium starts its development.

PERIGONIUM

The leaves around the antheridia are called the perigonium. The name was applied because the whole was interpreted as a male flower, which seemed especially obvious in genera like *Mnium*, *Polytrichum*, or *Philonotis*. The perigon of flowering plants has nothing to do with the perigon of mosses. A direct alternative does not seem to exist. A possibility would be to call the perigonium a male perichaetium. The term perichaetium is only used in the English literature for the sheathing leaves around the archegonia (Magill 1990). However, it was always used also as a synonym for the perigonium in the German literature. The word perichaetium itself is sex-neutral as it just means a sheathing cover. Therefore one could speak about male and female



Bruchia with capsule sporangium



Hepatic leaves phylloids are variable.

perichaetia. Another possibility would be to call the (female) perichaetium a perigynium and retain perichaetium for males. This would, however, change the use in the English literature.

LEAVES

It is sufficiently known that bryophyte "leaves" are not real leaves, but this is rarely mentioned. The term rhizoid is well established, curiously the term phylloid not. Why should we not be consistent?

STEMS

As with rhizoids and phylloids, the term cauloid should be applied here. Roots, stems and leaves characterise cormophytic structures.

APOCARPOUS, PLEUROCARPOUS

These terms seem to bear no problems. Although "karpos" means fruit, the term carp is used widely in the cryptogamic botany (e.g. carposporophyte of the red algae).

PERIANTH

This term indicates petals and sepals of flowering plants but in hepatics the cover around the archegonium. The two terms absolutely do not refer to homologous structures. The question is generally whether terms must always be different for analogous organs. In my sense they should, especially if an alternative is available. This alternative is perigynium.

ANDROECIUM, GYNOCICIUM

Androecium is the word for the male gametangia in bryophytes but for all stamens in flowering plants. This term was applied to bryophytes at a time when antheridia were interpreted as stamens. Thus this application is not only wrong but superfluous, since male gametangium will say the same. The same concerns gynoecium. If androecium and gynoecium are used in the verbal sense (male and female house, place of male and female sex organs), these terms could be justified. They cannot, however, under the criterion of homology.

EXOSTOME, ENDOSTOME

There is also a double use of these terms in bryology and the botany of flowering plants. In flowering plants, they mean the opening between the integuments, in mosses the two peristome circles. I see, however, no alternative in this case, especially because of the affinity of endo- and exostome with peristome. I must confess, however, that the words endo- and exostomes do not make as much sense for mosses as for flowering plants. Stoma means mouth, opening. Accordingly peristome is the organ arranged around the stoma, but exo- and endostome? In embryology, endostome is the inner opening and exostome the outer one, which seems logical. More logical for mosses would be the terms endoperistome and exoperistome.

EXOTHECIUM, ENDOTHECIUM

In flowering plants a description of the layers of the walls of Anthers, in mosses a term for the layers of the wall of the sporangium. Both pollen sacs and the urn of bryophytes were called thecae, since they

were regarded as identical. I have seen no alternative in this case. A possibility would be exocarp and endocarp, which are also used for flowering plants.

CHLORO CYST, HYALOCYST

Cysts are, in medicine, hollows filled with liquids. In cryptogamic botany, the word is used for thick-walled cells (cf. Wagenitz 1996). The terms chlorocyst and hyalocyst as listed in the "Glossary" are, however, cells filled with chloroplasts or empty cells. A cell is called "Cyte" and not "Cyste". We speak about cytology and not about cystology. The right words are chlorocyte and hyalocyte.

EPIDERM

The question here is whether a term can only be applied to two organs if both have the same function or also if they look similar. An epiderm of flowering plants has a different structure and a different function from an epiderm of bryophytes. In this case I use a compromise, epidermal layers in bryophytes, which is just a description.

DEUTER

Deuters are large cells in the transverse sections of the costa of acrocarpous mosses. Lorentz introduced the term in the last century. The etymology is simple: it means pointer. These cells point to something (I don't know what). The latin circumscription "duces" was translated into English as "guide cells". All these terms seem to make no sense. A circumscription would be eurycytes (for large cells).

SOCII

Lorentz called Socii the "companions" of the Deuters. Morin named them stenocytes, which seems to make more sense.

CONCLUSION

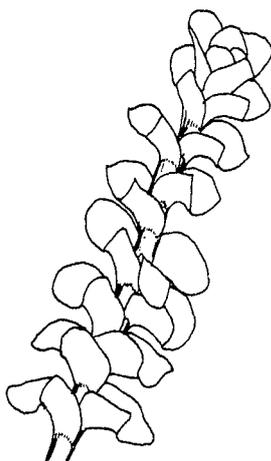
As a consequence, others that would make more sense should replace the following terms:

Antheridium	Spermatogonium
Leaf	Phylloid
Capsule	Sporangium
Lid	Operculum,
Perigonium	male Perichaetium
Stem	Cauloid
Urn, Theca	??
Perianth	Perigynium
Exostome	Exoperistome
Endostome	Endoperistome
Deuter	Eurycytes
Socii	Stenocytes
Chlorocyst	Chlorocyte
Hyalocyst	Hyalocyte

I would imagine that not all my colleagues share this view. Maybe this could stimulate a discussion on the bryonet.

REFERENCES

- Frahm, J.-P. Im Druck. The life and work of Johannes Hedwig. Nova Hedwigia 70(1-2):
 Magill, R.E. (ed.) 1990. Glossarium Polyglottum Bryologiae. St. Louis.
 Wagenitz, G. 1998. Wörterbuch der Botanik. Stuttgart.



A *Scapania* stem cauloid with leaves phylloids.

Jan-Peter Frahm is at Bonn University. He is a councillor of IAB and the 1995 winner of the Spruce plaque. He can be reached on email frahm@uni-bonn.de

RECENT ADVANCES IN RUSSIAN BRYOLOGY

Before 1985, due to the iron curtain, scientists from the USSR had difficulty communicating and co-operating with their foreign colleagues, especially those from capitalist countries. The situation changed in the late 1980s-early 1990s, though the political border was in many respects replaced by a financial one. Nevertheless, in 1990 IAB and Russian bryologists elaborated a formula for participation of the latter in the former, via paying annual dues for the newly established bryological journal *Arctoa*. This, I believe, acted as an additional stimulus for the promotion of bryology in Russia, and enriched the contacts of Russian and foreign colleagues, in agreement with the main goal of IAB. These 10 years may be summarised as follows.

First, floristic investigation remains the main subject of most projects. This is very important for a country as large as Russia, still with extensive "white spots" which have never been visited by bryologists. In 1992, as a result of collaboration among 18 bryologists from the former USSR (11 from Russia) a check-list of the region was published. Now, only 8 years later, many additions make it necessary to publish a new and updated version. This is planned for the coming years. The most important completed and continuing regional projects are mentioned below.

MOSSES. Afonina and Chernyadjeva (*St. Petersburg*) nicely summarised a lot of data on the Russian **Arctic**, revising many herbarium specimens. More and more data are becoming available from different parts of **Siberia**, a big and poorly explored area. Very active are studies in Yakutiya by Ivanova and Krivoschapkin (*Yakutsk*), who completed studies of the southern part of this region and are now working on its whole moss flora. Lapshina and Muldiyarov (*Tomsk*) provided a synthesis of data on lowland Western Siberia. Rich data have been published for the South Siberian Mountains, rather well studied in 1960-70s by Bardunov (*Irkutsk*), and with important additions in the 1990s for the Salair Range (Pisarenko, *Novosibirsk*), Altai (Ignatov, *Moscow*), Sayans (Vassiljev, *Krasnoyarsk*), and mountains of the Baikal Region (Kazanovsky, *Irkutsk*). Cherdantseva and Gorobets (*Vladivostok*) have studied selected areas of The Russian Far East, and Cherdantseva and Bardunov (*Irkutsk*) are working now on a handbook for this area.

In the long ridge of the **Ural Mts.** studies have been conducted from Bashkortostan, in the south (Baisheva, *Ufa* and Ignatova, *Moscow*) through the Middle Ural (Bezgodov, *Perm* and Dyachenko and Goldberg, *Ekaterinburg*), to Northern (Bezgodov, Zheleznova, *Syktvykar*), and Subarctic areas (Chernyadjeva, Dyachenko). Dyachenko has also undertaken a synthesis of the entire Ural moss flora. Studies of **NE European Russia** are concentrated in *Syktvykar*, where Zheleznova published an account of mosses of the Komi Republic, and currently she and Shubina are working on some particular local floras of this waste area. Studies in **Kola Peninsula**, a relatively well known part of the Russian North, continue and bring interesting findings from many still unexplored mountain areas (Belkina and Likhachev, *Kirovsk*). The republic of **Karelia** was much studied in the 1970-80s by Volkova and Abramova and Abramov (both *Leningrad/St. Petersburg*), but only recently was a checklist (Volkova and Maksimov *Petrozavodsk*) and handbook (Abramov & Volkova) published for the region.

Data on the southern part of **Central European Russia**, a big region with moderately xeric vegetation were summarised recently in a thesis by Popova (*Voronezh*), who plans to publish her data soon. Studies on the **Middle Volga River** are rather complete in its southern part (Mordvinov, *Ulyanovsk*), but actively continue in more northern portions of the territory (Popov, *Nizhnij Novgorod* and Mordvinov). Also in progress are studies of **NW European Russia** in Leningrad/*St. Petersburg* Province (Kurbatova, *St. Petersburg*) and Kaliningrad Province (Napreenko, *Kaliningrad*) and of the xeric area of the **Lower Volga River** in Volgograd Province (Suragina, *Volgograd*). There are still very few data from the Russian **Caucasus**, although the recent rich collection of Akatova (*Maikop*) allows us to expect a good comprehensive local flora from its western part soon.

HEPATICES have received less attention in the recent past. Studies of **Arctic** hepatics were summarized in an informative checklist by Konstantinova (*Kirovsk*) and Potemkin (*St. Petersburg*), and Konstantinova also prepared maps for about 100 species, which are to be published in the next volume of *Arctoa*. Gambaryan (*Vladivostok*) published an annotated list of hepatics for the southern part of the **Russian Far East**. Collections have been published for 4 regions of **Siberia**: The Baikal Region (coll. Kazanovsky/det. Kazanovsky & Potemkin), Sayan (coll. Vassil'ev/det. Konstantinova), Altai (coll. Ignatov/det. Vana, *Praha*), and the Lower Lena (coll. Filin/det. Konstantinova). Also in print is a list from Central Yakutiya (coll. Safronova, *Yakutsk*/det. Safronova & Potemkin). However these data are probably not complete and further studies are needed. In European Russia, progress in hepaticology has been achieved in **Karelia** (Bakalin, *Petrozavodsk & Kirovsk*).

THE SAME PEOPLE WHO DEAL WITH FLORISTIC STUDIES MOSTLY CONDUCT TAXONOMIC INVESTIGATIONS. Most of these (published and in progress) are restricted to particular areas (Chernyadjeva - *Pohlia* and *Hygrohypnum* in Russia; Ukrainskaya (*St. Petersburg*) - *Plagiothecium* in Russia; Afonina - *Hypnum* in Russia; Ignatov & Cherdantseva - Leucodontaceae, Cryphaeaceae & Leptodontaceae in Russia; Kurbatova - *Scouleria* in Russia; Ignatov - several families for Altai, in collaboration with Ochyra, Lewinsky-Haapasaari, Merrill Smith, Ando, Ignatova, etc.; Zolotov (*Moscow*) - *Bryum* in Central European Russia; Otnyukova (*Krasnoyarsk*) - *Didymodon* (in part) in South Siberia. More broad ranging is a revision of *Scapania* by Potemkin.

Other subjects of investigation include geobotany (Baisheva, Pisarenko and Malysheva, *Moscow*), ecology of *Sphagnum* (Grabovik, *Petrozavodsk*) and morphology (Filin and Demidova, *Moscow*).

Michal S. Ignatov is a Councillor of IAB. He is also the editor of the Russian bryological journal *Arctoa*. His address is Main Botanical Garden of Russian Academy of Science, Botanicheskaya 4, Moscow 127276 Russia, arctoa@eignatova.home.bio.msu.ru

More complete information on the activities of bryologists in Russia can be obtained from the "Recent literature of the former USSR", published from time to time in *Arctoa* (vols. 2, 6, 8).

Michal S. Ignatov

THESES IN BRYOLOGY 2

ed. Bill Buck

As reported in *The Bryological Times* (99: 17, 1999), the International Association of Bryologists has decided to begin a repository of bryological theses. These theses will be housed in the Library of The New York Botanical Garden. They will be available via interlibrary loan. The NYBG Library online catalog (CATALPA) may be viewed at: <http://www.nybg.org/bsci/libr/Catalog.html>. As theses arrive, bibliographic data and a brief synopsis will be published in this column (see examples below). Bryological theses for any degree, covering any aspect of bryology in any language, will be included. Please send theses to Bill Buck at the address above. Please refer to the preliminary notice (cited above) for information on financial assistance from IAB for reproduction of theses.

Harpel, Judith Strachen. 1997. The phytogeography and ecology of the mosses within the San Juan Islands, Washington State. Ph.D. Thesis, Department of Botany, University of British Columbia, Vancouver, BC, Canada. x + 275 pp. In English. Current address of author: P.O. Box 490, Brush Prairie, WA 98606, U.S.A. <Harpel_Judith_A/r6pnw_gp@fs.fed.us> and <harpel@csci.clark.edu>.

This doctoral thesis covers the mosses of an archipelago off the northwestern coast of Washington State, U.S.A., just a stone's throw from British Columbia, Canada. Interestingly, this island group was first visited botanically as early as 1791. Extensive information is given on both the ecology and phytogeography of the area, which was completely glaciated during the Pleistocene, including distribution maps for each species within the flora. Very helpfully, a key is provided to all the islands' 224 moss taxa. Four species are reported new to Washington State, and one taxon, *Tortula laevipila* var. *meridionalis*, is new for the United States. Most of the flora consists of circumboreal species that were derived from a once widespread Arcto-Tertiary flora.

DIGITIZED SLIDES WITHOUT SCANNER

Until now lectures have been mainly based on slide shows. The development of computerised presentations allows us to use not only pictures but also graphs, pictures and text combined, which are much more easy to prepare than slides in the same style. These presentations require pictures, but these are usually still available only as slides. Therefore the slides have to be digitised, usually with a slide scanner (digitizer). These machines cost now from \$400 upwards. They allow slides to be scanned at resolutions of 2700 dpi, resulting in files which are 45 MB (nonsensical, especially for computer presentations, where a digitised slide should not be larger than 0.5 MB). The scan process is relatively tedious and costs time. The simple alternative is to take a picture of the slide through a digital camera. For that purpose you need a small, plastic, \$2.50 slide viewer. You put the slide in and take a picture with the digital camera through the front lens. This will work only with cameras having a tele zoom, else one will get only a small light spot. With digital cameras like the Nikon 950 the picture will be automatically sharp by the autofocus. For easier handling the slide viewer can also be attached directly to the camera by tape or more professionally by connecting it to the filter of the objective (you buy a filter of that size, remove the glass and glue the filter ring on the slide viewer). If the camera allows a choice of resolution, an SVGA resolution of 600 x 800 pixels (=usual resolution of the computer monitor) is sufficient and will keep the file size small.

Jan-Peter Frahm (Frahm@uni-bonn.de)

Kučera, Jan. 1999. A taxonomic study of the *Didymodon rigidulus* group (Bryopsida, Pottiaceae) in Europe. Ph.D. Thesis, Faculty of Biological Sciences, University of South Bohemia, České Budějovice, Czech Republic. ? pp. In Czech with 16 pp. English summary booklet. Current address of author: University of South Bohemia, Faculty of Biological Sciences, Branišovská 31, CZ-370 05 České Budějovice, Czech Republic <kucera@tix.bf.jcu.cz>.

This doctoral thesis presents a taxonomic treatment of the *Didymodon rigidulus* group in Europe. Nine taxa were considered. Morphological data were subject to multivariate analyses. Isozymes of the taxa were also examined. *Didymodon glaucus*, *D. verbanus* and *D. subandreaeoides* (syn. *Grimmia andreaeoides*) are specifically distinct from *D. rigidulus*. Also specifically distinct, but more closely related to *D. rigidulus*, are *D. validus*, *D. acutus*, and *D. icmadophilus* (syn. *Barbula abbreviatifolia*). *Didymodon mamillosus* is synonymized with *D. rigidulus*. An undescribed species in the western Mediterranean region needs additional study.

He, Xiao-Lan. 1999. A taxonomic monograph of the genus *Pycnolejeunea* (Lejeuneaceae, Hepaticae). Academic Dissertation, Faculty of Science, University of Helsinki, Helsinki, Finland. Published in English in *Acta Botanica Fennica* 163: 1-77 (1999). Current address of author: Botanical Museum, University of Helsinki, P.O. Box 47, FIN-00014 Helsinki, Finland <xhe@cc.helsinki.fi>.

This doctoral dissertation is the culmination of several earlier articles by the author on species either currently recognized in *Pycnolejeunea* or previously placed in the genus. Nine species are recognized in the pantropical genus, divided into subgenus *Densistipulae* (subg. nov.) with two species and subgenus *Pycnolejeunea*. The latter is subdivided into section *Macrolobae* (sect. nov.) with three species and sect. *Pycnolejeunea* with four species, including *P. monophthalma* (R. M. Schust.) n. comb. and *P. papillosa* n.sp. Keys, descriptions, illustrations, and distribution maps are provided for each species and a cladistic phylogenetic analysis based on morphological characters is presented.

IAB STRATEGY PLAN

Following the strategy plan presented in BT 100, I announce the following new assignments of tasks within the Council:

Janice Glime: Bryonet Manager

Barbara Crandall-Stotler: Organization of IAB Workshops on current topics in bryology

Royce Longton: Public Relations

Rod Seppelt: Educational networking (compilation of list labs that could have interns)

Rob Gradstein, President

OUTLINE OF THE ACTIVITIES AND ADVANCES OF BRYOLOGICAL RESEARCH IN CHINA DURING 1990's

Continue from the last issue

2) Ecological studies

Besides taxonomic and floristic research, more and more attention is being paid to the ecology of Chinese bryophytes. These studies mainly concentrate on the ecological function and roles of bryophytes in different ecosystems and habitats on Changbai Mountains, Northeast China (Cao *et al.* 1994, 1995c, Guo & Cao 1999 a,b, Guo *et al.* 1999a,b), Helan Mountain, Inner Mongolia (Bai *et al.* 1998) and Karst areas of south China (Zhang, Z. H. 1993, 1996, 1997 a,b,, 1998). In addition some studies focus on bryophytes as biological indicators of pollution (Gao & Cao 1992b, Lin, Q. W. *et al.* 1994,, Lin, Q. W. 1995, Cao *et al.* 1998b, Xie *et al.* 1999).

3) Cytological studies

Zhou *et al.* (1998) note that between 1988, when the first cytological investigations of Chinese moss species were reported based on four species, and 1997, chromosome numbers of 94 bryophytes species and karyotypes of 8 species have been reported in 19 papers in China.

4) Studies on bryophyte diversity and its conservation

Bryophyte diversity and its conservation have received some attention from Chinese bryologists. There are several papers deal-

ing with rare and endangered species of bryophytes, and 23 families, 37 genera and 54 species have been suggested as candidates for a red list of Chinese bryophytes (Cao, T. 1992, Chen, L. Z. 1993, Zhu *et al.* 1994, Cao *et al.* 1997, Jia & Wu 1998, Wang *et al.* 1999). The criteria for endangered status, the causes of endangerment and suggestions for conservation were also discussed in these papers.

5) Studies on Utilisation of bryophytes

Chinese scientists have paid special attention to utilisation of bryophytes in medicine and production of gall aphids. The medicinal bryophytes in Guizhuo, Southwest China were introduced and discussed by Lin & Xiong 1998, Xiong & Luo 1995 and Xiang & Qian 1997. The moss species which serve as the over-winter hosts of gall aphids that produce important chemical products were studied in respect of their distribution, ecology and cultivation by Li & Longton 1993, Liu *et al.* 1994 and Li, J. *et al.* 1999).

6) Studies on Antarctic bryophytes

In addition to producing a book about Antarctic bryophytes, Chinese bryologists have studied the species, their distribution and ecology in the Antarctic. (Wu & Hu. 1990, Li & Lin 1996, Hu, S. S. 1998, Li X. -D. *et al.* 1998, Liu & Li 1998).

LITERATURE CITED

- Aur, Z.-W. & C. Gao (Eds.) 1992. Mosses of Heilongjiang and Mts. Daxinanling. Northeast- China Forestry University Press, Harbin.
- Bai, X.-L. (ed.) 1997: Flora Bryophytarum Intramongolicarum. Typis University Intramongolicae. Huhehot.
- , 1998: A preliminary study on the species diversity, phytomass and ecological effects of bryophytes in Helan Mountain, China. Acta Sci. Nat. Univ. Intramongolicae. 27(3):412-416.
- & P.-C. Wu. 1997: A genus and two species of Pottiaceae new to China (II). Acta Phytotax. Sin. 35(1): 83-85.
- Bai, Z.-K. & D.-K. Li 1998: A study on Pleuroziaceae (Hepaticae) of China. Acta Bot. Yunn. 20: 174-178.
- Cao, T. 1992: Endangered bryophytes in northeast China. Biol. Conservation. 59: 243-245.
- , 1997: Report from the IAB Symposium on 2000's Bryology. The Bryological Times 94: 2-3.
- , 1999: Bryological Activities in China in 1998. The Bryological Times. 98:7.
- , Fu, X., Gao, C. Wu, Y.H., Belland, R. J. & D. H. Vitt. 1999. Discovery of a moss family Schistostegaceae in Changbai Mountain, China. Acta Phytotax. Sin. 37(4): 403-406.
- , Gao, C. & X. Fu 1994: Water storage of bryophytes and its effects on water circulation in forest ecosystem in Changbai Mountains, Northeast China. Res. Forest Ecosys. 7: 74-79.
- , —, & X.Y. Jia. 1995c: Phytomass of bryophytes in forest ecosystems in Changbai Mountain, Northeast China. Acta Ecol. Sinica 15, Supp.(B): 68-74.
- , —, & Y. Lu 1997: Diversity of bryophytes and their conservation. Chin. J. Ecol. 16(2): 47-562.
- , — & D. H. Vitt. 1995a: A revised taxonomic account of the genus *Andreaea* (Andreaeaceae, Musci) in China. Harvard Papers Bot. 7: 11-24.
- , —, & —, 1995b: A taxonomic revision of the genus *Ptychomitrium* (Bryopsida, Ptychomitriaceae) in China. Harvard Papers Bot. 6: 75-96.
- , —, & Y.-H. Wu. 1998a: The genus *Indusiella* and *Jaffueliobryum* (Bryopsida; Grimmiaceae) in China. Chenia. 5: 25-30.
- , — & —, 1998b. A synopsis of Chinese *Racomitrium* (Bryopsida; Grimmiaceae). J. Hattori Bot. Lab. 84: 11-19.
- , Horton, D.G. & Gao, C. 1992: A revision of the genus *Encalypta* (Encalyptaceae, Musci) in China. Bryobrothera. 1: 251-268.
- , Lai, M.-J. & T. Koponen. 1991: *Conscinodon* (Musci, Grimmiaceae) new to China. Acta Bot. Yunnan. 11(2): 29-31.
- , Lu, Y. & Y. H. Wu 1998: Bio-indication of bryophytes to environmental pollution in Anshan city. Chin. J. Appl. Ecol. 9(6): 635-639.
- Chao, R.-F. & S. -H. Lin 1991: A taxonomic study of Frullaniaceae from Taiwan (I). Yushania. 8:7-19.
- Chen, F.-D., Li, X.-D. & J.-X. Liu 1995. Handbook of Fildes Peninsula Antarctic Mosses. Ocean Press, Beijing.
- Chen, L.-Z. (ed.) 1993. Current Situation and Conservation Strategy of Biodiversity in China. Science Press, Beijing.
- Chiang T.-Y. 1997: *Miehea* (Family Leskeaceae), a genus new to the mossflora of China. Bot. Bull. Acad. Sin. 38: 263-266.
- , 1998. Taxonomic revision of *Andreaea* (mosses, Andreaeaceae) of Taiwan. Bot. Bull. Acad. Sin. 39: 57-68.
- Frahm, J.-P. 1992: A revision of the East-Asian species of *Campylopus*. J. Hattori Bot. Lab. 71: 133-164.
- Gao, C. (ed.) 1994: Flora Bryophytarum Sincorum vol. 1. Sphagnales Andreaeales Archidiales Dicranales. Science Press, Beijing.
- (ed.) 1996. Flora Bryophytarum Sincorum vol. 2. Fissidentales Pottiales. Science Press, Beijing.
- & T. Cao 1992a: Studies of Chinese bryophytes (4). The family Theliaceae (Musci). J. Hattori Bot. Lab. 71: 367-375.
- & —, 1992b: A preliminary study on indication of bryophytes to air pollution (including acid rain) in Southwest China Chin. J. Appl. Ecol. 3(1): 81-90.
- & —, 1992c: A synopsis of Chinese *Dicranum* (Dicranaceae, Musci). Bryobrothera. 1: 215-220.
- & M. Crosby (eds.) 1999. Moss Flora of China, English version, vol. 1. Sphagnaceae-Leucobryaceae. Science Press, Beijing & Missouri Botanical Garden St. Louis.
- , Jia, X.-Y. & T. Cao 1999: A taxonomic study of *Notoscyphus* Mitt. (Hepaticae) in China. Bull. Bot. Res. 19(4): 361-367.
- Grolle, R. & M.-L. So 1997: Studies on *Plagiochila* in China I. Bryologist. 100: 467-477.
- & —, 1998: Studies on *Plagiochila* in China II. Bryologist. 101: 282-292.
- & —, So 1999a: Studies on *Plagiochila* in China III. Bryologist. 102:
- & —, So 1999b: Studies on *Plagiochila* sect. *Tayloriae* in Asia. Bryologist 102: 287-293.
- & —, So 1999c: Notes on *Plagiochila* sect. *Caducilobae* in East Asia (Hepaticae). Syst. Bot. 23(4): 459-465.
- & —, 1999d: Studies on *Plagiochila* sect. *Contiguatae* in East South Asia. Bryologist. 102(2): 294-303.

- Guo, S. L. & T. Cao 1999a: Distribution pattern of moss species on ground in main ecosystems in Changbai Mountains. *Chin. J. Appl. Ecol.* 10(3): 270-274.
- & Cao, T. 1999b: Studies on distribution patterns of saprophytic bryophytes in forest ecosystems in Changbai Mountain. *Chin. J. Appl. Ecol.* 10(4): 399-403.
- , — & K.-Q. Ding 1999a: Application of ordinations to study ecological differentiation of *Dicranum* (moss) in the Changbai Mountain. *Chin. J. Ecol.* 18(4): 14-18.
- , Han S. J. & T. Cao. 1999b: Indicative value of bryophytes on forest eco-boundary. *Chin. J. Appl. Ecol.* 10(1): 1-5.
- Hu, S.-S. 1998. Moss community types and species diversity of southern Fildes Peninsula (King George Island, south Shetland Islands). *J. Hattori Bot. Lab.* 84: 187-198.
- Hyvönen, J. & M. J. Lai 1991: Polytrichaceae (Musci) in Taiwan (Chian). *J. Hattori Bot. Lab.* 70:119-141.
- Jai, Y. & P.-C. Wu 1998: Conservation of bryophytes in China. *Chenia*. 5: 123-128.
- Koponen, T. 1997: Notes on *Philonotis* (Musci, Bartramiaceae) 3. A synopsis of the genus in China. *J. Hattori Bot. Lab.* 84: 21-27.
- Lewinsky, J. 1992: The genus *Orthotrichum* Hedw. (Orthotrichaceae, Musci) in southeast Asia. A Taxonomic Revision. *J. Hattori. Bot. Lab.* 72: 1-88.
- Lewinsky-Haapasaari, J. & M. R. Crosby 1996: *Orthotrichum tuberculatum*, (Orthotrichaceae), a new genus and species from Guizhou, China. *Novon.* 6: 1-5.
- Li, D. K. & P.-C. Wu 1995: *Physconmitrella* (Musci) new to China. *Acta Phytotax. Sin.* 37: 103-104.
- Li, J., Liu Y.-D., Cao, T. & Y.-H. Wu. 1999: A comparative study on ecophysiological characteristics of the two overwintering host mosses of gallaphids. *Nova Hedwigia.* 68: 233-240.
- Li, X.-D., Liu, J.-X. & F.-D. Chen. 1998. A preliminary study on bryoflora of the Fildes Peninsula, King George Island, Antarctica. *J. Hattori Bot. Lab.* 84: 199-202.
- Li, X.-J. & Z. Iwatsuki 1996: Studies on Chinese Pottiaceae (I): subfamilies Timmielloideae, Chionolomoideae and Trichostomoideae. *Hikobia.* 12: 25-36.
- & —. 1997: Revision of the genus *Anoetangium* from China. *Acta Bot. Yunnan.* 19:243-250.
- & D.-C. Zhang 1997: A revision of the family Tetrarhiaceae of China. *Acta Bot. Yunnan.* 18(4): 415-418.
- Li, Y.-M. & R. E. Longton. 1993: Mosses and the production of Chinese gallnuts. *J. Bryol.* 17: 427-430.
- Lin, P.-J. & B. C. Tan 1995: Contribution to the bryoflora of China (12): a taxonomic revision of Chinese Hookeriaceae (Musci). *Harvard Papers in Botany.* 7: 25-68.
- , Wu, P.-C. & Z.-H. Li 1994: A survey of bryological research activities in Hainan, China. *Chenia* 2: 47-73.
- Lin, Q.-W. 1995. A comparative study of indication of bryophytes to air pollution by means of ecology. *Sci. Pollut. Protec.* 2: 8-12.
- & P.-C. Wu 1994. A study of bryophytes of Guizhou (I) - an outline of the research history (1896-1949) of Guizhou bryology. *Chenia* 2:75-96.
- , Li, Q.-X., Zhai, L.-H., Li, M., Qau, M.-H. & J. Zhuo 1994. A preliminary study of indication of bryophytes to air pollution by means of eco-physiology. *Sci. Pollut. Protec.* 1: 27-30.
- Lin, Y.-G. & Y.-X. Xiong, 1998: Study on morphology of congener species and classification of medicinal bryophytes in Guizhou. *J. Mountain Agric. Biology.* 17(3): 146-155.
- Ling, P.-P. & Q. Wang, Q. 1997: The study of bryophyte flora of Jiansu Province I. *Chenia.* 3: 4:75-100.
- Liu, J.-X. & X. -D. Li 1998: Studies on the plant morphology of *Andreaea* Hedw. from Fildes Peninsula, Antarctica. *Chin. Bull. Bot.* 15: 55-57.
- Liu, Y.-D., Li, Q. & J.-X. Shi 1994: The effect of high temperature and desiccation on the water content and vitality of the over-wintering host (Mosses) of Gallaphides. *Chenia.* 2: 25-32.
- Luo, J.-X. & J.-C. Zhao 1991: New record of *Calliergidium* (Musci) in China. *J. Xinjiang Univ. (Nat. Sic.)* 8(1): 68-71.
- Piippo, S. 1990: Annotated catalogue of Chinese Hepaticae and Anthocerotae. *J. Hattori Bot. Lab.* 68: 1-192.
- , 1997a: A study of some Chinese *Plagiochila* species (Plagiochilaceae, Hepaticae). *Ann. Bot. Fenn.* 34: 207-222.
- , 1997b: Two new *Plagiochila* species (Plagiochilaceae, Hepaticae) from Yunnan, China. *Ann. Bot. Fenn.* 34: 207-222.
- , He, X.-L. & T. Koponen. 1997: Hepatics from Northwestern Sichuan, China, with a checklist of Sichuan hepatics. *Ann. Bot. Fenn.* 34: 51-63.
- , —, —, P. J. Redfearn, Jr. & Li, J.-X. 1998: Hepaticae from Yunnan, China, with a checklist of Yunnan. Hepaticae and Anthocerotae.
- Rao, P.C., Enroth, J., Piippo S. & T. Koponen. 1997: The bryophytes of Hunan province, China: An annotated checklist. *Hikobia.* 12: 81-103.
- & —. 1999: Taxonomic studies on *Cryphaea* (Cryphaeaceae, Bryopsida) 1. The Chinese species and notes on *Cyptodontopsis*. *Bryobrothera.* 5: 177-188.
- Redfearn, P. L. Jr., C. T. Banito & H. Si, 1996: A newly updated and annotated checklist of Chinese mosses. *J. Hattori Bot. Lab.* 79: 163-357.
- Reese, W. D. & P.-J. Lin 1991: A monograph of the Calymperaceae of China. *J. Hattori Bot. Lab.* 69: 323-372.
- So, M.-L. 1995: Mosses and Liverworts of Hong Kong. Heavenly People Depart. Hong Kong.
- Tan, B. C. 1992: The first national symposium of Chinese bryology. *Bryol. Times.* 70: 1,7,9.
- , 1993. A successful bryological symposium / workshop held in Shanghai. *Bryol. Times* 76: 13.
- & Y. Jia 1997: Mosses of Qinghai-Tibetan Plateau, China. *J. Hattori Bot. Lab.* 82: 305-320.
- & —. 1999. A preliminary revision of Chinese Sematophyllaceae. *J. Hattori Bot. Lab.* 80: 1-70.
- , et al. 1996: A contribution to the moss flora of Henan Province, China. *Acta Bot. Yunnan.* 18(1):61-71.
- , Zhao, J.-C. & R.-L. Hu, 1995: An updated checklist of mosses of Xinjiang, China. *Arctoa* 4:1-4.
- Vitt, D. H., Cao, T., Campenot, M. K. & R. Gauthier 1990: The genus *Tomenthynum* in Northwest China. *J. Bryol.* 16: 79-87.
- Wang, Q., He, S.-A. & P.-C. Wu. 1999: The role of bryophytes in biodiversity. *Chin. Biodiv.* 7(4):332-339.
- Wang, Y.-F. & R.-L. Hu 1998: Notes on Chinese Brachytheciaceae. *Acta Phytotax. Sin.* 36:255-267.
- Whittemore A., Zhu, R.-L., Hu, R.-L. & J. C. Zhao. 1998: A checklist of the liverworts of Xinjiang, China. *The Bryologist* 101(3): 439-443.
- Wu, P.-C. 1998. *Bryological Biology*. Science Press, Beijing.
- , 1999: Preliminary review of Chinese Thuidiaceae (Bryopsida). *Bryobrothera* 5: 231-236.
- & S.-S. Hu 1990: The bryophytes of the King George Island, Antarctica. *Acta Bot. Sin.* 32(6): 477-482.
- Xie, S.-L. & L.-C. Qiu 1992: The bryophytes in Shanxi Pro., North China. *Journ. Shanxi Univ. (Nat. Sin.)* 15(1): 78-81.
- Xie, W., Cao, T., Lai, Y.-B., Jin, F.-J., Hai, G.-C. & X.-Y. Shun 1999. Studies on indication of bryophytes to air pollution in Fushun district, northeast China. *Chin. J. Ecol.* 18(3): 1-5.
- Xiong, Y.-X 1998: Addition to the moss flora of Guizhou Province China. *Chenia* 5: 167-172.
- & J. Qian, 1997: The analysis of application on medicinal bryophytes in ICD-9 in Guizhou. *J. Guizhou Agric. Coll.* 16(1): 46-49.
- & Y.-C. Luo 1995: Distribution and floral features of medicinal bryophytes in Guizhou. *J. Guizhou Agric. Coll.* 14(4): 42-46.
- Yi, Y.-J. & C. Gao 1998: The genus *Hattoria* of Jungermanniaceae new to China. *Acta Phytotax. Sin.* 36(6): 555-557.
- & —. 1999: Three genera and four species of Cephaloziaceae new to China. *Acta Phytotax. Sin.* 37(3): 297-302.
- , Liu, J.-Y. & C. Gao 1998: *Horikawaella* (Hepaticae) new to China with a new species from Yunnan Province. *Acta Phytotax. Sin.* 36(3): 284-285.
- Zhang, L. 1996: Additions to the bryophytes flora Hainan Island, China. *J. Bryol.* 19: 143-147.
- & P.-J. Lin 1997: A checklist of bryophytes from Hong Kong. *J. Hattori Bot. Lab.* 81: 307-326.
- Zhang, Z.-H. 1993: The moss communities in Karst Caves of Maolan, Lipo County, Guizhou Province. *Chenia* 1: 51-56.
- , 1996: Contributions to the bryoflora of Guizhou, SW China: new records and habitat notes on mosses from Huangguoshu Karst area. *Journal of Bryology.* 19: 149-152.
- , 1997a: Bryoflora and some speleothems of Karst caves in Guizhou, SW China. *Proceedings of the 12 International Congress of Speleology.* Vol.3: 297-300.
- , 1997b: A preliminary study on bryophytes from tree black leaf monkey's Nature Reserves in Guizhou and Guangxi Province, SW China. *Guihaia.* 17(4): 331-337.
- , 1998: A preliminary taxonomical study on Tufa-bryophytes in Guizhou, SW China. *Chenia* 5: 173-176.
- Zhao, J.-C. & L.-F. Han 1999: A revision of the genus *Timmia* Hedw. (Timmiaceae, Musci) of China. *Acta Bot. Boreal.-Occident. Sin.* 19(1): 151-161.
- Zhao, Z.-T. & T. Cao (ed.) 1998. *Flora Bryophytorum Shandongicorum*. Shandong Science and Technology Press, Jinan.
- Zhou, Y.-L., Sha, W., Du, G.-S. & Li L.-X. 1998: A summary of the studies on bryophytes chromosome in China. *Chenia* 5: 87-91.
- Zhu, R.-L., Hu, R.-L. & Y.-J. Ma 1994: Some comments on rare and endangered liverworts in Mainland China. *Arctoa* 3: 7-12.
- & So, M.-L. 1996: Mosses and Liverworts of Hong Kong. vol. 2. Heavenly People Depart. Hong Kong.
- & —. 1997. A new record of the genus *Otolejeunea* (Hepaticae, Lejeuneaceae) in subtropical China. *Ann. Bot. Fennici* 34: 285-289.
- & —. 1999: Studies of *Plagiochila* sect. *subtropicae* in Asia. *The Bryologist* 102(1): 67-75.
- , — & L.-X. Ye 1998: A synopsis of the hepatic flora of Zhejiang, China. *J. Hattori Bot. Lab.* 84: 159-174.

BRYOLOGY IN SINGAPORE AND BEYOND, 1999!!

Benito C. Tan

Since the last report of "PEET-mossing in SE Asia" in the Bryological Times vol. 97 (1998), another year has quickly gone by. In the past year Bryology has not been idle in Singapore and beyond.

The year 1999 started fortuitously with the visit of Prof. Timo Koponen and his wife, Aune, to Singapore and Kuala Lumpur during the second week of January to do field observations on mosses and to celebrate the occasion of his 60th birthday. While in Singapore, Timo and Aune visited a number of natural forests, including the famous Bukit Timah rainforest reserve where M. Fleischer had collected some moss specimens more than a hundred year ago in 1898. On the day of their visit to Bukit Timah, a large number of monkeys had descended from the forest canopy and followed the two visitors as if to welcome them. Impressed by what they saw of the biodiversity preserved in Singapore and Kuala Lumpur, the couple has decided to return this year in late January for a second visit with an entourage of 11 people from the University of Helsinki. Welcome back, Timo and Aune!

In May, I went to Berlin on a German DAAD short-term research fellowship and stayed at the Berlin Botanical Gardens and Museum for a month to finish the long overdue identification of my 1994 moss collections from Mt. Wilhelm, Papua New Guinea. A publication is now in preparation for submission to the garden's journal, *Wildenowia*. During my stint in Berlin, I attended the symposium organized by Prof. Rob Gradstein at the University of Goettingen in commemoration of the 200th anniversary of the death of Johannes Hedwig. After the symposium, I went to visit Prof. R. Grolle and the Herzog Herbarium in Jena. The purpose of my herbarium visit was to check on the types of Herzog species described from SE Asia.

After a six year interval, the XVI International Botanical Congress took place in St. Louis of Missouri from August 1 to 7, 1999. Fortunately, I was able to attend and became the only bryological representative from Singapore and the nearby region. I presented a paper at the congress in collaboration with Prof. Zen Iwatsuki and Mr. Dennis Hall discussing the comparative diversity and distribution pattern of mosses in East Asia and Oceania. The occasion also served as a good opportunity for bryologists the world over to meet and exchange information as well as to renew friendships.

In September, I made a short visit to Kuala Lumpur and Bangi in Peninsular Malaya to further my collaboration with Prof. Haji Mohamed at the University of Malaya and Damanhuri Mohamad at the Universiti Kebangsaan of Malaysia. Haji had just returned from his visit to Japan to discuss research and teaching collaborations with Prof. Hironori Deguchi of Hiroshima University and other Japanese colleagues around Tokyo area.

Another purpose of the visit was to introduce my student at the National University of Singapore, Mr. Choy Meng Shyan, who studies the *Fissidens* flora of Singapore and nearby places, to fellow workers in the region. In the end, I also

took the visit to check out herbarium collections of mosses made from Pulau Tioman, a small island off the east coast of Pahang State of Malaya, that are preserved in these two universities. Since I have an on-going project to document the remaining diversity of mosses in Singapore, I am using the rather pristine moss flora of P. Tioman as a test case to illustrate the effects of urbanisation on the local moss diversity and extinction vis-a-vis these two island floras.

At present, both Haji and Damanhuri have a group of students working actively on the moss floras of Cameron Highland and Gunung Tahan respectively. The latter floristic work is of particular importance. The Gunung Tahan National Park is to be recommended to the IAB Committee on Endangered Bryophytes. It, along with Mt. Kinabalu Park in Sabah, is a hot spot of moss diversity in Malaysia.

More visitors arrived in Singapore in October for exchange of academic updates. I hosted Profs. Tomas Pocs and Jeff Duckett for a few days each, at the university. Tomas had stopped by Singapore on his way home to Hungary after months of collecting liverworts in northern Australia in connection with his participation in the Flora of Australia Project. Jeff was on his way to New Zealand for his sabbatical research stint until February of 2000, after when he will go looking for unusual or "primitive" liverworts on Mt. Kinabalu for his ultrastructural and morphological studies of liverwort phylogeny. At about the same time, Dr. Masanobu Higuchi of the Herbarium of the National Science Museum in Japan came to Kuala Lumpur to visit Haji Mohamed and to do some moss collecting in Malaysia.

For me, the month of November and first week of December was the busiest time of the year. I had three consecutive visitors working in my laboratory, namely Misha Ignatov from Moscow, Uwe Schwarz from Germany, and Lesley Lubos from the Philippines. Misha was invited by the NUS-Raffles Museum to visit the university to finish an ecological and phytogeographical paper (together with Zen Iwatsuki and me) based on our 1997 moss collections made from the Bureya Nature Reserve in Siberia. While in Singapore, Misha and I decided to participate in the first Asia-Pacific Congress on the Biology of the Environment held on campus where we presented together a comparison of moss diversity and distribution patterns between Europe and Asia.

On the other hand, Uwe and Lesley came to Singapore to study their large moss collections made recently from Mindanao. Since Mindanao is the second largest island in the Philippines, with a rather imperfectly known moss flora, the new collections brought by these two visitors yielded, not surprisingly, a total of 16 new moss records for the Philippine flora, with two specimens representing possible species new to science. A technical report was completed to publish these new findings in *Tropical Bryology*. Within this same period, Denis Hall passed twice through Singapore on his way to North Borneo (Sabah and Sarawak) and to Peninsular Malaya. Here he collected fresh materials of *Mitthyridium* taxa for his DNA sequencing study under the NSF-PEET grant awarded to his thesis adviser, Prof. Brent Mishler at the University of California at Berkeley.

Continued on page 9

Contribution from
Ben Tan
Regional Editor

Ben Tan is a regional editor of BT and a member of the endangered species committee. His address is Department of Biological Sciences, National University of Singapore, Singapore 11926

PROVINCIAL MUSEUM OF ALBERTA INCORPORATES UAC CRYPTOGAMIC HERBARIUM

In the winter of 1995 the Botany Program at the Provincial Museum of Alberta (PMA) in Edmonton was alerted to the fact that for lack of curatorial expertise, budget, and space the University of Calgary (UAC) was looking to de-accession its non-vascular

BRYOLOGY IN SINGAPORE (Continued from page 8)

Before the end of the month, I had an email from Dr. A. Touw in the Netherlands informing me that Bogor Herbarium in Indonesia would send its bryophyte curator-in-charge, Ms Indah Windadri, to Leiden Herbarium for collection management training and research experience. This is good news to all of us in the region. Finally, the oldest and also the largest herbarium in tropical SE Asia has come to pay attention to the proper curation of its large holding of bryophytes.

My last visitor in Singapore in 1999 was Dr. Hiroyuki Akiyama who arrived in early December with his Japanese colleague from Kyoto University to discuss our participation in a joint study of the moss and fern diversities of the forest canopy in Sarawak. The project was to start a year ago, but owing to some technical problems the tall metallic crane to be set up for the canopy sampling has not been fully built at the study site in Kubah National Park. This project, when completed, will be the first of its kind in tropical SE Asia.

Immediately teaching finished in the first week of December, I took leave from my university to visit Prof. Li Xing-Jiang at the Kunming Institute of Botany to talk about my treatment of the family Sematophyllaceae for the Flora of Yunnan project. While in Kunming, I took a side trip to botanise in Xishuangbanna Thai Autonomous Region in southwestern Yunnan. I visited a few remnants of tropical rain forests to see for myself the similarity or dissimilarity of the tropical moss flora of China and that of Malesia. The trip was indeed educational for me when I saw several wide-ranging tropical moss taxa reaching their northernmost limit of distribution in this part of China located further north than Thailand and Vietnam. The unfortunate observation is the serious disturbance brought to bear upon the forests by local human activities.

With the departure of 1999, a millennium has finally come to a close. In tropical SE Asia, the century old problems threatening the continued survival of bryophytes such as forest logging/clearing, habitat degradation and human economic activities persist and rage on. The hope for the protection of this important component of plant diversity in this part of the world rests upon the successful initiation of a new generation of students and professional workers. These must carry the torch to document in greater detail the local diversity of bryophytes and to champion further the cause of conservation in the region. Meanwhile, visits by foreign professionals, the giving of public seminars, and ongoing research activities *in situ*, should be maintained, if not intensified, to generate more public awareness and interest in this group of spore producing green plants. These have enchanted the minds and hearts of all members of IAB for decades.

A happy, bryological new millennium to all readers of The Bryological Times!

cryptogamic plant herbarium. They were seeking to find a home for the collection. With a mandate to preserve natural and human history artefacts for the Province of Alberta and surrounding regions, the PMA approached the Biol. Dept of the U of C and proposed that the collection be transferred to the museum and be amalgamated with the existing herbarium at that institution. The offer was accepted and in the spring of 1995 the Provincial Museum of Alberta acquired the herbarium from the University of Calgary and amalgamated that collection with the existing herbarium at the Museum (PMAE). Combining the two collections, the PMAE herbarium now houses some 80,000 bryophytes and lichens, 12,000 vascular plants and about 1,000 fungi. While international in scope, the cryptogamic collection's strengths are in the mountains and grasslands of western Canada and in the semi-arid regions of western North America. The collection also has a number of historical exsiccatae from Europe and North America.

The Provincial Museum received two Museum Assistance Program grants from the Government of Canada to upgrade the existing Botany Program collection and to incorporate the UAC collection into PMAE. With matching funding from the Province of Alberta almost \$100,000 was invested into the herbarium over a period of three years. New cabinets were purchased to house the collection, and the collection was re-organized from a taxonomic to a more easily used alphabetic system. Additionally, to facilitate taxonomic studies, species are now stored in coloured folders to match continental plates. The nomenclature of the cryptogamic plants from UAC was about 20 years out of date, making it difficult to use for modern systematic research. Consequently species names for the entire collection were updated to follow the most current North American checklists: Anderson et al (1990) for the bryophytes and Esslinger and Egan (1995) for the lichens.

Recent personnel re-organisations at the Museum resulted in the former botany technician, who had duties outside the program, being promoted to Collections Manager for the Museum. The program was then able to hire a full-time Botany Technician, Donna Cherniawsky who has an M.Sc. in plant systematics and has duties only to the program. In addition to maintaining daily operations of the herbarium the addition of this technical position allows us once again to be able to participate in bryophyte and lichen exchange programs and to efficiently address loan requests. This will allow us to catch up on some of the backlog of exchanges that were initiated by the UAC and which we are obliged to maintain. We will also invite other institutions to exchange material with us. In addition to cryptogamic material collected by the curator on her Ph.D. fieldwork in the western USA, we have an extensive holding of cryptogams from southern Ontario. We encourage researchers to use our collections both as visiting scientists by borrowing material from us. Persons conducting systematic research on bryophytes and lichens, especially from northwestern North America, and for the Bryophyte Flora of North America Project, will find the collection particularly valuable.

Our next major initiative for the collection is to enter the 80,000 cryptogamic plants into our local database and then upgrade the

Continued on page 15

Student Profile

ed. Jennifer Doubt

Bryology Lesson #3: Give unknown species descriptive names, but always ask soon for the correct names! Knowledge is to be shared and sought.

Perpetua Blanks

University of Tasmania

Year 2 PhD Candidate

School of Geography and Environmental Studies, P.O. Box 252-78, Hobart, 7001, Tasmania, Australia

email: pblanks@postoffice.utas.edu.au

Bryological Focus

Community Ecology, Conservation, Forest Management

Supervised by Prof. Jamie B. Kirkpatrick and Dr. Emma Pharo

Background

I grew up in Bendigo, Victoria, Australia - an old country town with a heritage in gold mining. I completed a BSc. in Botany at the University of Melbourne in 1995, and concurrently began my Honours in bryophyte ecology under the supervision of Dr. Mark Burgman and the late Dr. George Scott. George's enthusiasm and his great gift for teaching inspired my fascination with bryology. I became, as George termed us, a 'budding protonema'.

It was George who, on my first bryology field trip, instructed me to give unknown

Perpetua Blanks, Hobart, Australia

species descriptive, Latin names, and to collect them for later identification. Unfortunately, I slowly got used to my descriptive names and had to learn the HUGE flora all over again with the correct names. Now I'm always being told to ask, ask, ask!

My Honours project on the value of Ecological (vascular) Vegetation Classes for predicting bryophyte occurrence introduced me to the magnificent mountain ash forests and green, leechy carpets in the mountains northeast of Melbourne. After I completed my Honours, I worked as a botanist with the Victorian Government, mapping the same Ecological Vegetation Classes that I had assessed in Honours.

I managed, while working with vascular plants for 2.5 years, to maintain my bryological interests, and I assisted with the organisation of the Australasian Bryophyte Conference in Victoria (July 1998). Finally, I chose to attend Tasmania and to venture back into the tall, leechy forests for my PhD research.

Future plans

I really look forward to extending Tasmanian bryology work in forest management and restoration ecology, and to exploring the role and function of bryophyte assemblages in Australian forests. Other topics, such as the role of bryophytes in remnant vegetation and alpine areas, are really gaining attention in Australia. There really is so much to do. Listing the projects can be easy; the hardest thing seems to be drawing attention to these little critters!

On Bryology

I have to agree with Jennifer and Kristian (100th issue of the Bryological Times) regarding the frustratingly low profile of bryology.

Australia is a huge continent, but we have few people employed as bryologists in the major herbaria and institutions. Bryophytes are not popular study subjects in universities here, and bryophytes are not routinely recorded in plant surveys, as there is usually no funding available.

Despite the lack of money, the bryologist network here remains strong through the Australasian Bryological Newsletter and the many professional and amateur enthusiasts here. My 5 years' learning and experience has been fueled by field trips, naturalist groups, meetings, literature, and of course, as Jennifer put it, the 'infectious passion' of other bryologists! The encouragement I receive for my project with Forestry Tasmania is great. It is rewarding to see organisations show interest in the *smaller* picture.

Thesis research

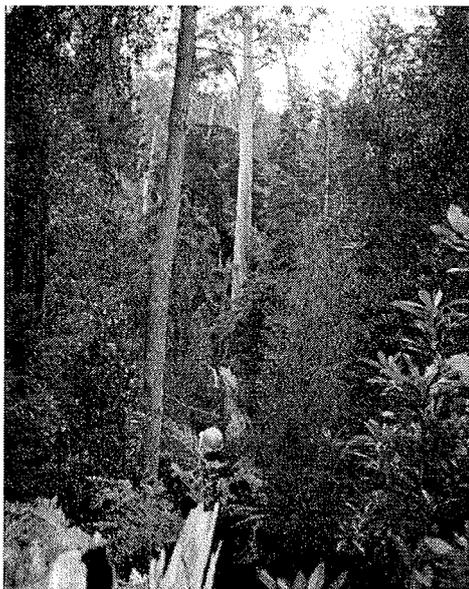
The biodiversity of bryophytes in Old Growth Mixed Forest in Tasmania, Australia, and how it is affected by logging and wildfire

Bryophytes are an important but much-overlooked constituent of Australia's eucalypt (*Eucalyptus obliqua*) forests. The impacts of logging and wildfire on the rich bryophyte diversity of the tall forests of Australia have not been studied in great detail. Even in Tasmania, where a particularly large bryophyte assemblage is found, only preliminary surveys of the bryophytes and lichens have been completed. Ecological studies are urgently needed.

The main purpose of this study is to examine the response of bryophytes to logging and wildfire disturbance in Old Growth Mixed (OGM) Forests in Tasmania. In the absence of information on the bryophyte flora of these forests, it is often assumed that vascular plant diversity can be used as a surrogate for bryophyte diversity. This assumption will also be tested.

OGM forests occur in Tasmania's southwest (including Warra Long Term Ecological Research Site) and northwest (Southern Arthur Forests). Forestry Tasmania has set up Continuous Forest Inventory (CFI) plots in these areas. The CFI plots and other plots set up by Mr. John Hickey of Forestry Tasmania, along with the long records of logging and fire history for these areas, present a rare, invaluable resource. Mr. Hickey's study of vascular plants found that some of the species most susceptible to disturbance were filmy ferns, which are very similar in

Continued on page 11



Perpetua Blanks (right). Old growth mixed forest study site (left).

PERSONALIA

At the end of August 2000, after a month of field work in Arctic Alaska, I will be taking up a 12 month appointment as the Australian Botanical Liaison Officer in London, based at Kew Gardens. Apart from servicing requests from Australian botanists and requests from others about Australian botanical matters, I hope to spend some time at the British Museum and a number of other herbaria in Europe. Access to early or obscure literature and Type and other specimens relevant to my interests in the Antarctic and Subantarctic flora, as well as my ongoing studies on *Ditrichum* and related genera, will be one of my major projects for the year. I also hope to be able to meet up with old acquaintances and to meet new ones.

From the end of August 2000 until the end of August 2001 my email address will be: ablo@rbgkew.org.uk

Rod Seppelt, Australian Antarctic Division, Channel Highway, Kingston 7050, Tasmania, Australia



Dale and Sandi Vitt (here in Vitt, Germany), will move to Carbondale, Illinois, USA

ADDRESS CHANGE

As of October 15, 2000 my address will permanently change to the following:

Dale H. Vitt
Chair
Department of Plant Biology
Southern Illinois University
Carbondale, IL 62901-6509
USA

Students profile: Perpetua Blanks

(Continued from page 10)

their biology to bryophytes.

All bryophyte and vascular plant species are being surveyed in 100 sites. Sites include a) OGM Forest (at least 100 years old) and b) disturbed (burned once by wildfire or logged once in the 1960s or 1990s) forests that were OGM forests prior to disturbance. Variables such as percentage canopy cover, aspect, slope, altitude, geology, basal area (m^2/ha), soil chemistry, and substrate data are also being recorded for each site. After one field season, I have visited half of the sites, and the species collected are currently being identified.

RECENT DEATHS

WILLIAM J. HOE

It is with considerable sadness that I inform you of the death of William (Bill) J. Hoe. He died in early May after a succession of heart attacks following a minor operation.

Clifford Smith

PATRICIA GEISSLER (1947-2000)

Patricia Geissler died in Genève 28th March 2000 after an automobile collided with her bicycle while she was on her way to the University to give a course. This sudden and untimely death left her relatives and friends full of consternation and deep sorrow.

After completing her primary and secondary education, Patricia left St. Gallen for Basel, where her academic education took place. Under the supervision of Prof. Heinrich Zoller, she was awarded a Ph.D. in 1974 for her thesis on the vegetation of flowing alpine waters.

Shortly afterwards, she became the curator of ferns and bryophytes at G, where one of the most important bryophyte herbaria is housed. She devoted most of her time to curatorial and scientific work. She worked as well alone as she did within a team. Rather tireless, she usually worked late into the night and, with few exceptions, her tasks were fulfilled promptly. When her own research, e.g. Lejeuneaceae (especially *Marchesinia*), was sometimes put last, it was usually in favour of a student or a colleague in need of help. This readiness to help was legendary but quite natural for her. She participated in several expeditions, e.g. 'Bryotrop' in South America and a last one in Madagascar. On these occasions and during many excursions in Switzerland and abroad, she collected many thousands of bryophyte specimens.

Patricia was one of the most diligent collaborators on the Swiss bryophyte-mapping project, and the 'Swiss Association for Bryology and Lichenology' relied on her for some 20 years as a dependable secretary. In addition, she was a member of several other national and international bodies, including editorial boards, the board of IAB, and the bryophyte specialist group of IUCN. She was familiar with almost everyone and was an inexhaustible source of information of all kinds. Through mysterious channels she sometimes knew important facts and intentions long before the persons affected did.

As chairwomen of a biological section of the Swiss Academy of Science, Patricia was able to influence the national research policy. In this context only, was she able to be hard. Her intercession on behalf of cryptogams was often badly needed and she will be missed in the future.

Apart from her busy professional life, Patricia was an active musician and an excellent cook. Without descending to excess, she took great pleasure in good wine, as well as in the opera. She enjoyed life and was a cheerful companion. If she experienced sometimes rather serious disagreement, it was with her superiors. One was seldom under the impression that she felt unhappy despite of many friends all over the world.

All in all Patricia Geissler was a gifted and kind person, most popular with colleagues and disciples. We miss her and we have fond memories of her.

Edi Urmi

COMPUTER TIPS & TRICKS: DIGITAL MICROPHOTOGRAPHS

As a consequence of digital imaging, microphotography can now also be done digitally. This has a special advantage, since microphotographs can immediately be printed. Years ago, pictures had to be taken with a camera, the film had to be developed and then pictures had to be enlarged. Then Polaroid adapters allowed us to make instant photographs, but these adapters were expensive, as were the pictures. Video cameras especially designed for, or adapted to, microscopes made it possible to prepare prints on a video-printer, but again this required high investment. Next, video digitizers for the computer allowed one to get pictures from the video camera into the computer. However, the resolution is quite low and thus the quality was never really satisfying. It would have been logical to add a digital camera to the microscope, but this was also not as easy as it sounds. There are digital TTL cameras (such as the Nikon E3 or D1) which can be used instead of a normal camera. Such cameras were sold only for professional purposes, and the prices were accordingly high. Prices were more than US\$10,000 for the camera body; they have dropped recently to US\$5,000. Then microscope producers such as Olympus or Leica offered special digital microscope cameras, but the prices were hardly lower. In the past, I tried to connect one of the common snapshot digital cameras to the microscope, but without success. First it was hard to connect the camera to the microscope because the objectives of such cameras usually have no thread, and next the camera had a wide angle objective, so that only a small round light spot appeared on the camera screen.

Two facts stimulated me to tackle the problem again. I received one of the professional digital TTL cameras (E2) from Nikon Germany, which I tried to use instead of a traditional Nikon camera on the microscope. It did not work, because the camera required an autofocus objective to switch on automatic exposure. When I phoned the Nikon people, they proposed that I use their digital camera Coolpix 950 instead, "which should work". Shortly after, at the Tropical Bryology Course in Helsinki, Misha Ignatov gave an impressive presentation on computer with dozens of pictures taken through dissecting and compound microscopes. When I asked him how he got the pictures, he replied that he had simply photographed through the microscopes with his Sony digital camera. Returning home, I bought the Nikon 950 and held it over the ocular of a microscope, with great success. A day later, I even got the camera very simply fixed to the microscope. When I held the camera before the ocular, it appeared that the diameter of the ocular was almost as wide as the thread of the camera objective. Unfortunately, only *almost* as wide. Looking in my box of microscope equipment, I found Ukrainian oculars that were slightly wider at the top. Thus our workshop could turn a thread in the ocular of the size of the filter of the camera objective, which fixed the camera to the microscope. The objective of the Nikon 950 can be turned around, and thus it can be fixed to the microscope but the screen of the digital camera points to the side so that one can

Continued on page 15

USEFUL TOOLS: HANDHELD PCs

As with all electronic equipment, portable computers evolved greatly. The first were really portable computers, something like a small suitcase. When the lid was removed, it turned out to be the keyboard and the screen showed up with two disk drives beside. The next step was the laptop. My first had a weight of 7,5 kilograms, but with time the weight dropped down to 2-3 kilograms machines now called notebooks. Recently the size was again reduced from A4 to A5 resulting in the subnotebook, at about 1.1 kg. A disadvantage of all of these, however, is that they run short on battery. Two hours are still average, and therefore there are still more portable computers (in fact usually used on the electricity net). But what if you are going in a train, (except for the new European high speed trains, which have wall sockets at every place), start to work, and just within your highest phase of activity, the notebook starts to beep.

There is a solution in the Hewlett Packard Jornada 820. This is a Windows CE-computer and thus has the same system as small handheld or palmtop computers. Such computers are, however, tiny, usually the size of a wallet. If they have a keyboard, it is not for my fingers, and often they are operated with a pencil like stick,

with which the letters are picked up. In total, then, nothing really for wordprocessing. The trick of the Windows CE (or Psion) computers is that they have no drives, no hard disk, nothing which eats up your battery. So they last 10 hours. The Jornada is, however, about 18 x 24 cm, weights 1 kg, and thus has a reasonable keyboard, but by using the same system, also runs 10 hours. So you can work a whole day on it and charge it again in 1.5 hours. All programs are stored in memory, so the computer is on virtually all the time. If the battery runs out of energy, two small safety batteries maintain the memory. If the computer is switched on, only the screen is switched on, and since everything is in memory, there is no need to boot up or to load programs. If you are working with Word, you may switch off the screen during your work and by switching on, you may just continue on the same page.

Data and programs are loaded to the Jornada through a cable from your home computer. Data exchange is even easier with a flash card, if your computer has a PC card drive or adapter. The data can permanently be stored on this flash card without data

Continued on page 15

BRYOLOGICAL MEETINGS AROUND THE WORLD

THE 6TH AUSTRALASIAN BRYOLOGICAL WORKSHOP

The 6th Australasian Bryological Workshop will be held from the 20th - 26th September, 2001. The workshop will be based at the Berringa Conference Centre, Grose Vale, in the lower Blue Mountains, approximately 70 km west of Sydney. The conference centre has its own fern gully and backs onto Blue Mountains National Park. The Blue Mountains National Park comprises massive sandstone plateaus with sheer cliffs which drop into deep valleys which have more gentle slopes of shale. At a number of sites, such as Mt. Tomah, Mt. Wilson, Mt. Banks, there are volcanic intrusions. Vegetation is dominated by *Eucalyptus* woodland and forests, with closed forests (rainforests) in shale gullies and on some basalt caps. Hanging swamps are quite common on some sandstone plateaus. The workshop will combine field trips, identification workshops and paper presentations. Field trips are being planned to a number of bryologically interesting sites, including the Megalong Valley rainforest and Jenolan Caves limestones. We will also visit Mt. Tomah Botanic Gardens and, essential viewing for interstate and overseas visitors, the Three Sisters at Katoomba.

Elizabeth Brown, National Herbarium of New South Wales, Mrs. Macquaries Road, Sydney, NSW, 2000 Email: Elizabeth.Brown@rbgsyd.gov.au

Alison Downing, Department of Biological Sciences Macquarie University NSW 2109. Email: Adowning@rna.bio.mq.edu.au

CONFERENCE ON GENETIC DIVERSITY AND TAXONOMY

After 20 years, we invite you again to come and contribute to the International Conference on "Genetic Diversity and Taxonomy of Bryophytes". We hope to have "diversity" not only in plant material but also in the range of paper subjects. The Conference, organised by the Department of Genetics, Adam Mickiewicz University, will be held in Poznan (W.Poland), October 11-13, 2000. Hotel reservations, fees and abstracts should reach us before June 30th. More information and Registration Forms are attainable by E-mail: malchr@main.amu.edu.pl

Maria Krzakowa, Chairperson

BLOMQUIST BRYOLOGICAL FORAY

The Thirteenth Annual Blomquist Bryological Foray will be held September 29-October 1 at Watoga State Park, 14 miles south of Marlinton in Pocahontas County, West Virginia. Several cabins have been reserved, with prices ranging from \$75.00-\$86.00 per night. They will hold 4-6 people each, so the cost per person is quite reasonable. Meals will be available at the park restaurant, and there is a commissary for purchasing staples. Field trips are still in the planning stage, but collecting will be done in the park and along the Greenbrier River Trail. For further information, please contact Molly McMullen, Cryptogamic Herbarium, Department of Botany, Box 90338, Duke University, Durham NC, 27708-0338, USA. Telephone: (919) 660-7300; e-mail mmcm@duke.edu.

Molly McMullen, Department of Botany, Box 90338, Duke University, Durham NC 27708-0338, mmcm@duke.edu, (919)660-7300 FAX (919) 660-7293

BBS SUMMER FIELD MEETING

BBS Summer Field Meeting 2000, Grange-over-Sands, Cumbria, 19 - 27 August. Local Secretary: Keith Raistrick, 1 Drewton Ave, Cross Cop, Heysham, Lancs, LA3 1NU. Tel. 01524 423325

This meeting will (like the 1995 Spring Meeting at Ambleside) concentrate on the less well-known SSSI, Cumbria Wildlife Trust Reserves, and National Trust sites in Westmorland with Furness. It is a varied programme but will include interesting rocky woods, ravines and, as the August weather is usually kind (!) it should allow one or two trips onto the higher ground with some upland tarns. We are into a second year of a survey covering tetrads, which in that time has produced several new v.-c. records, and a number of refound 'bracketed' species - it has not proved difficult to find new records. Except for the few extensively, and repeatedly, bryologised 'classic' sites the county is very much under-recorded. It is hoped that this meeting will help redress the imbalance; the records gained will be a valuable addition to the Bryoflora of Westmorland project. When you consider finds like *Plagiochila killarniensis* and *P. atlantica* almost anything in Westmorland seems possible. Grange-over-Sands is an attractive coastal resort in a limestone region on the north side of Morecambe Bay in Furness (v.-c. 69b). The headquarters for this meeting will be the Field Studies Council, Castle Head Centre, Grange over Sands, Cumbria, LA11 6QT; tel 0153

953 4300; fax 0153 953 6662. While other accommodation is available locally attendees are encouraged to stay at the centre. Laboratory facilities will be available. Those wishing to attend should contact the local secretary to book, and are encouraged to do so as early as possible as accommodation at the centre is limited and sharing of rooms may be required if the turn out is large.

THIRD INTERNATIONAL SYMPOSIUM ON THE BIOLOGY OF SPHAGNUM UPPSALA - TRONDHEIM 2002

Following the meetings in Exeter and Québec, the third IAB Sphagnum symposium will take place 13-23 August 2002.

The plans are to assemble in Uppsala, Sweden, for a one-week excursion covering a range of boreal, alpine and oceanic mires. This will take us to Trondheim, Norway, where the symposium will take place.

The symposium will cover all aspects of Sphagnum biology. In addition, the excursion and the symposium will focus on the distribution of Sphagnum and the dynamics and conservation of mires.

Organisers:

Håkan Rydin, Uppsala University

Kjell Ivar Flatberg, Norwegian University of Science and Technology, Trondheim

IAB SYMPOSIUM IN INDIA 2002

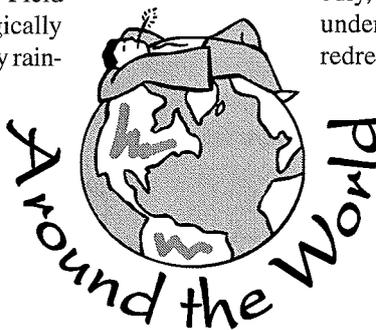
Symposia in the planning for the meeting in India.

Ben Tan & Zen Iwatsuki: Evolution and Historical Biogeography of South and Southeast Asiatic Bryofloras..

David Long: Systematics of Liverworts

Rod Seppelt: Bryophytes of Extreme Habitats

Jon Shaw: Phylogenetic Analyses of Moss Families



Literature Column



ed. Johannes Enroth

BOOK REVIEWS

BRYOLOGICAL RESEARCH
AUSTRIA. Publications of the
Austrian Bryological Meeting
98. (ZECHMEISTER H.G., ed.).
Abhandlungen der Zoologisch
Botanischen Gesellschaft in
Österreich. Band 30. Vienna. 193 p. (in
German with English summaries.) Available
from: Dr. Harald G. ZECHMEISTER, Department of Vegetation Ecology,
Institute for Plant Physiology, University of Vienna,
Althanstr.14, A-1091 Wien. Tel.: ++43 (0)1 31336 1483; e-mail:
Harald.Zechmeister@univie.ac.at; Price: 280.- ATS.

Contents: Publications of oral presentations: GRIMS F. Der 'Catalogus Florae Austriae', part musci (mosses). / GREILHUBER J., VOGLMAYR H., TEMSCH E. M., OBERMAYER R. & KRISAI R. Genome size variation in bryophytes - methods, problems, and biological significance. / SUANJAK M. Rhizoid gemmae in *Atrichum undulatum* (HEDW.) P. BEAUV. and *Atrichum angustatum* (BRID.) B. & S.. / KRISAI R. Distribution of *Sphagnum* in the Eastern Alps. / DÜNHOFEN A. The water tables as main factor for the niche differentiation of *Sphagnum* in 5 Austrian mires. / GEIGER, G. & ZECHMEISTER, H.G. 1999. „BRAUN-BLANQUET“ versus „plotless sampling method“ - a comparison of methods for the evaluation of bryological syntaxa. / ZECHMEISTER H.G. Bioindication with bryophytes.

Publications of poster presentations: ENGLISCH T. Moss dominated communities in the snow bed vegetation in the Eastern Alps. / GÄRTNER G. Bryological research in the Tyrol - status, deficiencies and future. / GRUBER J.P. & KRISAI R. A raised bog at Salzburg University's botanical garden. / HOHENWALLNER D. & ZECHMEISTER H.G. Mapping the bryophyte-flora of the center of Vienna by using a stratified random sampling design. / HUMER K. & ZECHMEISTER H.G. Epiphytic bryophytes in the 'Wienerwald' - site selection by the use of data from the 'Biotope Survey Vienna' and the 'Wienerwald Research' of the Austrian Health Institute (ÖBIG). / KARALL A. & ZECHMEISTER H.G. Monitoring of stands dominated by bryophytes by the use of digital methods. / KLEIN S. & GÄRTNER G. The bryophyte collections in the Herbarium at the Botanical Institute of the University of Innsbruck. / PILSL P. Status of the mapping of the bryophyte distribution in Salzburg. / PUNZ W. Mosses of mining areas and other heavy metal contaminated habitats in the Eastern Alps. / RITTER E. Bryological research in the protected forests at Rohrach (Vorarlberg) - german summary only. / SCHLÜSSELMAYER G. The thermophilous and heliophilous calcareous moss vegetation of the Hainburg mountains (Lower Austria). / SCHRÖCK C. & KRISAI R. Distribution and stands of selected *Sphagnum* species in Salzburg and adjacent counties. / TEMSCH E.M., GREILHUBER J., VOGLMAYR H. & KRISAI R. Genome size determination in *Sphagnum* - a comparison of methods. / VOGLMAYR H. & GREILHUBER, J. Genome size analysis in mosses. / ZECHMEISTER H.G. & TRIBSCH A. The use of bryophytes as indicators for a sustainable landuse in Austria. / ZECHMEISTER H.G., HOHENWALLNER D., HUMER K., TRIBSCH A. & SCHRATT-EHRENDORFER L. The excursion within the framework of the 'Austrian Bryological Meeting 1998'.

Ochyra, R. & Cislo, G.: The moss herbarium of Tytus Chalubinski in the Tatra Museum in Zakopane. (In Polish, with English Abstract). - Polish Bot. Stud. Guidebook Series 22: 1-178. 1999. Pb. Available from: R. Ochyra, W.Szafer Inst. of Bot., Polish Academy of Sciences, Lubicz 46, PL-31-512 Kraków, Poland.

Tytus Chalubinski (1820-1889) was a Polish medical doctor who was much interested in botany and made also some bryological research, especially in the Tatra Mountains. He published two major publications in bryology, *Grimmieae tatrenses* (1882) and *Enumeratio muscorum frondorosum tatrensiensium, hucusque cognitorum* (1886). His moss herbarium, now housed in the Tatra Museum in Zakopane, consists of 2735 specimens, mainly from the Tatra area, and 600 microscope slides, representing a total of 368 species. The authors re-examined all specimens and provide an exhaustive listing of them. Based on examined specimens, there is some new synonymy in the book. Also included is an illustrated account of Chalubinski's impressive bryological library, with numerous classical and rare works. They are cited in chronological order, starting with Dillenius's *Historia Muscorum* from 1741.

I believe most major, and probably many "minor", bryological herbaria worldwide are housing valuable collections and *reliquiae* of various long-gone collectors and bryologists, collections that have never been properly examined and filed, let alone published. For example, quite a few of those are situated right here in Helsinki, just about 10 meters from the room in which I am writing this short introduction. If I had the time and funds, I would be very happy to submerge in those collections for the rest of my life, and surface now and then to produce books like this one. It adds a chapter to the history of European bryology, a previously largely unknown chapter formed of the life of a previously fairly unknown amateur bryologist who did good work. Interesting reading!

Johannes Enroth

Boiko, M. F.: The analysis of the steppe zone of Europe. Phytosociocentre, Kiev, 1999. 180pp. illustrated. In Russian, conclusions in English. ISBN 966-7459-29-2. Advertised price: \$10.00 + postage. Available from: Boiko, M. F., Kherson Pedagogical University, Kherson, 73000, Ukraine.

The species structure of the steppe zone of Europe is critically reconsidered on the basis of long-term research. The flora includes 310 bryophyte species (in 114 genera and 40 families). 59 of these are new for the steppe zone, while 3 doubtful species are excluded from the bryoflora. The following forms are described as new to science: *Leptobryum pyriforme* f. *multigemiferum* Boiko, *Amblystegium riparium* f. *bifidinervium* Boiko, *Pseudoleskeella nervosa* f. *emarginata* Boiko. The families Pottiaceae (56 species), Bryaceae (31), Brachytheciaceae (26), Amblystegiaceae (20), Hypnaceae (12), Polytrichaceae, and Mniaceae (10) prevail in the bryoflora. The ten biggest families contain 217 species, making up 69.9% of the flora. An index based on the ratio between numbers of species in the families Pottiaceae and Amblystegiaceae (IPS P/A couple) is offered for the first time in comparative floristics. High representation of the Pottiaceae indicates aridity, while that of Amblystegiaceae indicates humidity. This index has greatest values in bryofloras of the arid-holarctic type. An index of anthropogenic pressure (IAPR) is also proposed. The taxonomic, evolution-geographical, biomorphological, ecological and coenotic structures of the bryoflora are analysed. Questions concerning the origin and history of the bryoflora, its formation, and anthropogenic changes are addressed. Eight reserves were created with the aim to conserve the rare species, and a further 19 reserves and 2 national parks are being planned.

BRYONET CONNECTS THE WORLD OF BRYOLOGISTS- PROFESSIONAL AND AMATEUR

Janice M. Glime

Bryonet began when many of us still did not have access to email. Being among those without access, I cannot comment on the early days of its existence, but when I announced the desire to set up a discussion group for bryophyte ecology, I was advised to use the original name of bryonet and to broaden the topic to all areas of bryology.

Bryonet has grown considerably in its short existence, with over 700 members passing through in the past 5 years. It has achieved a near-steady-state level of about 400 members, with students coming and going and others who join long enough to ask a question and accumulate the answers. Members include professional bryologists, Forest Service and conservation personnel, hobbyists, gardeners, teachers, and even elementary school children. The activity level seems to average about 3-4 messages per day - it is quieter in the summer when so many members are in the field.

Topics on bryonet have varied widely. A recent discussion on the validity of creating a new phylum, the Sphagnophyta, generated some friendly teasing as well as interesting perspectives. Conservatism of bryologists seemed to prevail as people urged us to wait until phylum names in general settled down and interpretation of our new cladistic information became clearer.

Other popular topics have included the need for ecological studies on liverworts, culturing and moss gardening, uses, conservation and collecting, and questions from students of all ages who are in need of some basic information. Of course it still serves as a news group for announcements of meetings, positions available, courses offered, field trips, and loss of a colleague.

Perhaps the lengthiest discussion was on whether to make bryonet a reply to sender or reply to list server. The membership overwhelmingly supported the spontaneity of direct replies to everyone on an unmanaged list. So far, this method has kept out the spammers and provided rapid exchange of ideas and answers to

Janice Glime is a councillor of IAB and runs the BRYONET. Her address is Dept. Biological Sciences, Michigan Technological University, Houghton, MI 49931 USA (jglime@mtu.edu)

questions. But beware, those personal messages go to everyone, so be sure you know if you are replying to a person or to a list!

Bryonet is a most helpful group, with quick answers to the questions of who is working on X or what is the email address for bryologist Y. It is a source of help in collecting specimens, locating literature, and trying out ideas.

If you care to join us, send a message to:

majordomo@mtu.edu

subscribe bryonet-l

(note that this is the letter l as in list, not the number 1)

To send a message, send it to <bryonet-l@mtu.edu>

Put BRYONET: at the beginning of the subject line

Don't send attachments or long messages because they cause problems for many of the list members. If you want to distribute something that is more than about 1 k, announce it and let members request it.

The list is set up so that all replies go to the entire list. Be sure to include your email address in your message so that people can respond to you privately if they so choose. However, responses to the list are encouraged if they might be helpful to some of the other list members. (There are a lot of lurkers just waiting to glean that small tidbit.)

UAC moves to Edmonton *(Continued from page 9)*

system to a Z39.50 compliant database for distribution on the WEB. We anticipate funding for this project to begin in the spring of 2000, and with the use of voice recognition software for data entry, hope to have the system operational in 18 months from the start. Wish us luck! We are also working to accession a backlog of 3000 cryptogamic plants collected in the Pacific Northwest of the USA and a vascular plant collection of 6000 specimens that are the first plants collected in Banff National Park. The cryptogamic plants from this collection have already been processed.

If you wish to visit our herbarium, borrow material, or arrange for a specimen exchange please contact: *Roxanne Hastings, Curator of Botany, Provincial Museum of Alberta, Edmonton, Alberta, Canada, T5N 0M6, email: rhastings@mcd.gov.ab.ca, tel: 1-780-453-9182, fax 1-780-454-6629*

Computer Tips & Tricks *(Continued from page 12)*

sit before the microscope and easily focus the picture on the screen. Even the autofocus works on the microscope, and this camera has different exposure modes (spot, integral, matrix) as well as the possibility to over- or underexpose, so that even critical subjects can be photographed.

The trick should also work with other cameras. An important point is that they have a zoom, which has to be moved to the tele position. Otherwise one gets only a round dot. Second a filter thread in the objective is useful, because it allows the camera to connect to the microscope.

Jan-Peter Frahm (Frahm@uni-bonn.de)

Useful Tools *(Continued from page 12)*

loss. The Jornada has a 56K modem card, so you can check your mail from a hotel. It has also a built in infrared signal, with which you cannot only print wireless to your HP laserprinter but also get connected to your cell phone. In this way you can go online in the field. The computer comes with a limited Office version so that one can also give PowerPoint presentations with it. There is only a small disadvantage: the Windows CE system needs special programs, so you cannot run normal Windows on it. However, Office and Outlook are sufficient for work abroad. The Jornada is priced in Germany at US\$850.

Jan-Peter Frahm (Frahm@uni-bonn.de)

REPORT ON THE TROPICAL BRYOLOGY COURSE, HELSINKI, APRIL 3-14 2000

by Andi Cairns

Tropical Plant Sciences, School of Tropical Biology, James Cook University, Townsville, Queensland 4811, Australia

A Tropical Bryology course in FINLAND? How bizarre!

I live in Townsville, in north Queensland, Australia. My colleagues were understandably bemused. It was indeed a strange concept to fly from a humid tropical climate to cold Helsinki to attend a course on tropical bryophytes!

The course on Tropical Bryology, funded by the European Union, was the third in the series organised by Timo Koponen of the Division of Systematic Biology, at the University of Helsinki, as part of the program 'Advanced Instruction in Bryology and Lichenology'. The aim of this program is to 'advance mobility of scientists and students of bryology and lichenology between EU member countries'.

Students came from 10 countries: Australia,



Sinikka Piippo awards students Xiang-Yang Li and Xiao-Ping Zhang their 'Bryological Oscars'.



Student Isabelle Franzen practices tree-climbing

China, Estonia, Finland, Germany, Greece, Lithuania, Singapore, Spain, and Sweden. Teachers included: Jiří Váňa (Czech Republic); Johannes Enroth, Sanna Huttunen, Timo Koponen, Pekka Pakarinen, Sinikka Piippo and Viivi Virtanen (Finland); Jan-Peter Frahm (Germany); Tamas Pócs (Hungary); Lars Hedenäs (Sweden); Mikhail Ignatov (Russia); Ben Tan (Singapore); Dan Norris (U.S.A.); and Yelitza Leon-Vargas (Venezuela). What a cosmopolitan group we were!

The 12-day course covered systematics, phytogeography and ecology of tropical bryophytes, as well as herbarium taxonomy and identification of major groups and families in the Neotropics, SE Asia and Australia. Lectures were held at the Kumpula Botanical Garden, followed by practical sessions in the afternoons at the Botanical Museum, Division of Cryptogams. Students were able to examine a great variety of dried specimens, and were given numerous papers and journals relevant to tropical bryology. These will become an important resource, particularly for those students who have limited access to the literature.

The course also included a workshop on the taxonomy of Brachytheciaceae and Bartramiaceae held at Lammi Biological Station. Everyone enjoyed the journey through the snow-covered countryside to the north of Helsinki and gained new insights into the relationship between Finnish sauna and frozen lakes!

Throughout the course teachers freely shared their bryological experience and wisdom – with such a bevy of enthusiastic bryologists the course was guaranteed to be a success. Timo Koponen's presentation on his tropical experiences in PNG and China was particularly entertaining!

Continued on page 17

Diary (cont'd)

August 19 - 27. BBS Summer Field Meeting 2000, Grange-over-Sands, Cumbria, 19 - 27 August. Local Secretary: Keith Raistrick, 1 Drewton Ave, Cross Cop, Heysham, Lancs, LA3 1NU. Tel. 01524 423325. Those wishing to attend should contact the local secretary to book, and are encouraged to do so as early as possible as accommodation at the centre is limited and sharing of rooms may be required if the turn out is large.

September 7 - 10. Autumn meeting of the Dutch Bryological & Lichenological Society on the Dutch island Terschelling: A longer stay is possible. Terschelling can only be reached by boat (2 hours). More information: Bart van Tooren, Venuslaan 2, 3721 VG Bilthoven, the Netherlands email: tooren.leeuwen@hetnet.nl

September 8-10. BBS Autumn Meeting- Annual General Meeting and Paper Reading: University of Reading, Department of Plant Sciences. Leaders: Dr. S. V. O'Leary, J. J. Thomson Physical Laboratory, PO Box 220, Whiteknights, Reading, RG6 6AF. UK. Tel: +44 118 9318576 Fax: +44 118 9750203 e-mail: s.v.oleary@reading.ac.uk and Dr. Royce E. Longton, Department of Botany, School of Plant Sciences, Whiteknights, The University of Reading, Reading, RG6 6AS, Tel: (0118) 987 5123 ext 4083

August 3-5. Annual meeting of the Bryological Society of Japan at Forestry and Forest Products Research Institute, Tsukuba. Contact person: Mr. Hiroshi Taoda.

August 6-10. The annual meeting of the American Bryological and Lichenological Society in Portland, Oregon, with Botany 2000 (a joint meeting of several botanical societies). There are two field trips, a one-day trip on Sunday, August 6, and a longer one on August 10-14, and numerous paper and poster sessions. Those interested should check out either the ABLs website <<http://www.unomaha.edu/abls/>> or the Botany 2000 website <<http://www.botany2000.org/>>.

August 16-20. SVBL/BLAM Summer excursion, annual assembly of BLAM: Finhaut VS (Mont Blanc massif). Information: Patricia Geissler, Conservatoire botanique, CP 60, CH-1292 Chambésy (patricia.geissler@cjb.ville-ge.ch).

August 31-September 3. Field work for the Swiss bryophyte mapping project. Chur (Grison). Information: E. Urmi, Inst. Syst. Botanik, Zollikerstr. 107, CH-8008 Zürich (urmi@systbot.unizh.ch).

September 22-24. ECCB Workshop on "Bryophyte Red Lists for Europe" in Luso, Portugal. Preliminary registration should be sent to Cecília Sérgio, Museu Laboratório Botânico, Faculdade de Ciências, 1250-102 Lisboa, Portugal csergio@fc.ul.pt, not later than 1 April 2000.

September 29-October 1, 2000. Annual Blomquist Bryological Foray. Contact person: Molly McMullen, Cryptogamic Herbarium, Box 90338, Duke University, Durham NC, 27708-0338, USA. Phone: (919)-660-7300. Fax: (919) 660-7293. e-mail: mmcm@duke.edu

November 11-12. Bryological Workshop 2000, Bryological illustrations. Imperial College at Silwood Park (near Ascot, Berkshire). Local Secretary: Dr Jeffrey W. Bates, Department of Biology, Imperial College at Silwood Park, Ascot, Berkshire, SL5 7PY; tel: 01344 294228; e-mail: j.bates@ic.ac.uk

2001

February 16-23. BBS Meeting in Tenerife. Leader Roy Perry, 35 Cardiff Road, Dinas Powys, Vale of Glamorgan CF64 4DH, UK alanperry@aol.com. This week-long excursion will be based on Playa de las Americas in the SW corner of the island of Tenerife.

April 4-11. BBS Spring Meeting on the Isle of Wight. Leader: Mrs Lorna Snow, Ein Shemer, Upper Hyde Farm Road, Shanklin, Isle of Wight, PO37 7PS. Tel. 01983 863704 e-mail: snow@shemer.freemove.co.uk

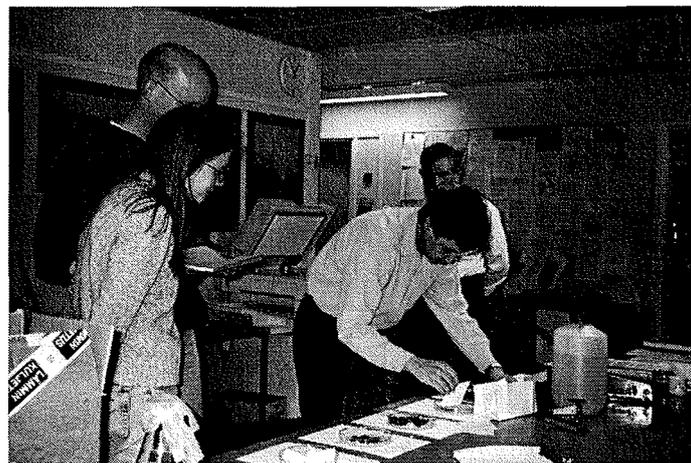
2002

January. IAB Meeting in Lucknow, India. Details will be announced in a coming issue of the Bryological Times

Tropical Bryology Course (Continued from page 16)

The farewell party was held in the warm, humid 'palm room' in the beautiful historical glasshouse at the Botanical Garden. The dinner was the prelude to the presentation of course certificates by Timo Koponen, followed by the inaugural 'Bryological Oscars', awarded by Ben Tan and Sinikka Piippo. Much laughter accompanied these special prizes, and as the only student from the Southern Hemisphere, I was honoured to receive the 'Upside-down Award'! The evening ended with hugs and promises to correspond (email!). The balmy environment was a perfect ending to our tropical course and seemed to symbolise the warmth of our new friendships.

The 'Tropical Bryology' course was a wonderful experience. The organisation of intensive courses such as this can be an arduous task and Timo Koponen and Johannes Enroth are to be congratulated. I know that all students appreciated the opportunity to forge new links and become accepted into the global bryological family.



Students Isabelle Franzen and Andreas Solga watch as Johannes Enroth prepares specimens for course examinations. Tamas Pocs in the background.

The Bryological Times, founded in 1980 by S. W. Greene (1928-1989) is a newsletter published for the *International Association of Bryologists*. Items for publication are to be sent to the Editors or Regional Editors, **except** for those for the regular columns, which may go **direct** to the column editors

Editors

Lars Söderström, Dept of Botany, Norw. Univ. Sci. & Techn., N-7491 Trondheim, Norway. FAX +47 73596100. Email: Lars.Soderstrom@chembio.ntnu.no

Henrik Weibull, Dept Ecol. & Environ. Sci., Swedish Agric. Univ., Box 7072, S-75007 Uppsala, Sweden. FAX +46 18673430. Email: Henrik.Weibull@emc.slu.se

Terry Hedderson, Botany Dept, Univ. Cape Town, Private Bag, 7701 Rondebosch, South Africa. FAX +27 021 650 4041. Email: thedders@botzoo.uct.ac.za

Regional Editors

N. America: René J. Belland, Devonian Bot. Gdn, Univ of Alberta, Edmonton, AB T6G 2E1, Canada. e-mail: rbelland@gpu.srv.ualberta.ca
Latin America: Inés Sastre-De Jesús, Dept of Biol, Univ of Puerto Rico, P.O. Box 5000 Mayagüez, Puerto Rico 00681-5000. Email: L_sastre@rumac.upr.clu.edu

C & E Asia: Cao Tong, Inst of Appl Ecol, Chinese Acad of Sci, P.O. Box 417, 110015 Shenyang, Liaoning, P.R. China. Fax: +86 2423 843313. Email: IFP@iae.syb.ac.cn

SE Asia: Ben Tan, Dept of Bot, School of Biol Sci, National Univ of Singapore, Singapore 119260. Email: dbsbct@nus.edu.sg

Australia and Oceania: Ray Tangney, Dept of Bot, Univ of Otago, PO Box 56, Dunedin, New Zealand. Fax: +64 3 479 7583. Email: ray@phyton.otago.ac.nz

Column Editors

Conservation column: Tomas Hallingbäck, Threatened Species Unit, Swedish Agric Univ, P.O. Box 7007, S-75007 Uppsala, Sweden. Fax: +46 18 673480. Email: tomas.hallingback@dha.slu.se

Literature column: Johannes Enroth, Dept Ecol & Syst, P. O. Box 7, FIN-0014 Univ of Helsinki, Finland. Fax: +358 9 191 8656. Email: enroth@kmus.helsinki.fi

Student profiles: Jennifer Doubt, Dept Biol Sci, Univ of Alberta, Edmonton, AB T6G 2E9, Canada. Email: jdoubt@gpu.ualberta.ca

Theses in Bryology: William R. Buck, Inst of Syst Bot, NY Bot Gdn, Bronx, NY 10458-5126, U.S.A. E-mail: wbuck@nybg.org

Tropical Bryology Column: Tamás Pócs, Eszterházy Teachers' College, Dept of Bot, Eger, Pfl. 43, H-3301 Hungary, e-mail: colura@gemini.ektif.hu

Contents

Bryological terms – critically seen	2
Recent advances in Russian bryology	4
Digitized slides without scanner	5
Theses in Bryology 2	5
IAB strategy plan	5
Activities and advances of bryological research in China	6
Bryology in Singapore and beyond	8
Provincial Museum of Alberta Incorporates UAC cryptogamic herbarium	9
Personalia	11
Recent deaths	11
Computer Tips & Tricks: Digital Microphotographs	12
Useful tools: Handheld PCs	12
Bryological Meetings around the World	13
Book Reviews	14
BRYONET connects the world of bryologists	15
Report on the Tropical Bryology course in Helsinki	16

Diary

The diary are open for all bryological events. Please send information, preferably by email, to the editor.

Courses

2000

July 15-19. Sphagnum mosses. Kindrogan Field Centre, Enochdhu, Blairgowrie, Perthshire, PH10 7PG, U.K. Tutor: Dr. M. Newton. Details from the Warden, Mr. N Morgan. Email: Kindrogan@aol.com. tel. 0125-88126

July 21-24. Mosses and liverworts of grassland and moorland. Malham Tarn Field Centre, Settle, North Yorkshire, BD24 9PU, U.K. Tutor Dr. M. Newton. Details from the warden, Mr. C. Jones at the above adress. email: fsc.malham@ukonline.co.uk.

July 24-28. Woodland mosses and liverworts. Malham Tarn Field Centre, Settle, North Yorkshire, BD24 9PU, U.K. Tutor Dr. M. Newton. Details from the warden, Mr. C. Jones at the above adress. email: fsc.malham@ukonline.co.uk.

July 28-August 4. Mosses and liverworts. Preston Montford Field Centre, Montford Bridge, Shrewsbury, Shropshire, SY4 1DX, U.K. Tutor Dr. M. Newton. Details from the warden, Mr. S. Townsend, at the above adress. email: fsc.montford@ukonline.co.uk.

August 12-19. Mosses and liverworts. Blencantra Field Centre, Threlkeld, Keswick, Cumbria, CA12 4SG, U.K. Tutor Dr. M. Newton. Details from the warden, Mr. R. Lucas, at the above adress. email: fsc.blencantra@ukonline.co.uk.

September 1-8. Understanding conservation through bryophytes. Rhyd-y-creuau, Drapers' Field Centre, Betws-y-coed, Conwy, LL24 0HB, U.K. Tutor Dr. M. Newton. Details from the warden, Mr. J. Ellis, at the above adress. email: fsc.ryc@ukonline.co.uk.

September 10-16. Advanced Bryology; instructor, Norton G. Miller, Principal Scientist, New York State Museum. Further information may be had from: Humboldt Field Research Institute, P.O. Box 9, Dyer Bay Road, Steuben, ME 04680-0009 U.S.A. telephone: (207) 546-2821; (207) 546-3042 (FAX), <http://maine.maine.edu/~eaghill>.

Meetings

2000

July 24 - August 2. Summer meeting of the Dutch Bryological & Lichenological Society in the Alpes Maritimes. The location of the base camp will be St.-Martin-Vesubie, 40 km north of Nice. More information: Bart van Tooren, Venuslaan 2, 3721 VG Bilthoven, the Netherlands email: tooren.leeuwen@hetnet.nl

Continued on page 17