

BULLETIN

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Two years ago, in Portland, Oregon, the Botanical Society began a new chapter of its history. For the first time in decades the Society organized and ran its own annual meeting, independent of the American Institute of Biological Sciences. The organization of the scientific program continued along familiar lines: plenary sessions, paper sessions, and poster sessions. There was one new program innovation, however, open forums. Primarily through the efforts of Bruce Kirchoff, and sponsored by the Developmental and Structural Section, several sessions were organized in which participants could sit down with a cup of coffee and critique and discuss a topic of common interest. The success of that initiative resulted in a series of well-attended discussion sessions (open forums) at last years meeting in Albuquerque.

The focus of one session was "Why Botany?" As many of you know, our sister organization, formerly the American Society of Plant Physiologists, changed its name last year to the American Society of Plant Biologists. What is in a name? Don Kaplan led the discussion that helped many of us to focus on what makes botany distinctive among the disciplines of plant study. One consensus of the group was that we are not doing a very good job of publicizing ourselves to the public.

Developing an accurate and positive image of botany was also a concern of the discussion session on "The Future of Botany at the Undergraduate Level." Gordon Uno, demonstrating an effective use of inquiry, led an exuberant discussion of the problems we face as teaching botanists and how we can resolve them. An impressive array of ideas was generated, many of which are readily doable by individuals at the local level but others of which will require significant levels of organization and financial support.

Financial support, specifically from NSF, was the topic presented by Judith Skog. Her presentation

covered not only what opportunities are available (check out the BSA website for more information <www.botany.org>), but more importantly described what goes into writing a successful grant proposal.

I've asked Don, Gordon, and Judy to summarize the key points of their presentations, as well as the ensuing discussions. For those of you who participated in one or more of these sessions, I'm sure you'll find the following articles to be as refreshing to read as I have. If you were not able to attend, I think you'll find them to be informative and useful. I hope all of us will have a chance to participate in some invigorating discussions in sessions later this summer in Madison, Wisconsin - - see you there! -editor

WHY BOTANY?

As part of its annual meeting in Albuquerque, New Mexico, on August 15, 2001, the Botanical Society of America held an open discussion on the question "Why Botany?" The impetus for this discussion came from the recent name change of the American Society of Plant Physiologists (formerly ASPP) to the American Society of Plant Biologists (ASPB). Given that our Botanical Society had also contemplated a name change from Botany to Plant Biology several years ago, it was a good thing that this proposal was resoundingly rejected by over 90 percent of our membership, otherwise we could have had two societies with the same name! At that time, the natural question on the part of most of our membership was why do we need to make such a name change and what advantage was there in changing it?

Through the 1970s and 80s there was a feeling that the term Botany was outdated and conveyed an outmoded image of "little old ladies in tennis shoes" collecting plants in a vasculum. This was further reinforced by the impression of other sciences such as astronomy, referring to the classificatory

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aspects of their discipline as the “botany of telescopes”, for example. Thus there was an earnest feeling on the part of some members of our society that we should show that we are *with it* and ready to join the rest of contemporary biology by dropping this antiquated term botany in favor of the more modern sounding “Plant Biology”. At the same time, similar tendencies were being expressed in the change of the name of the venerable journal “Botanical Gazette” to the “International Journal of Plant Sciences”.

Given that the Botanical Society of America had never really had an open discussion of why its membership chose to remain to be called botanists, I thought that this name change by the Plant Physiologists could serve as a stimulus for such a discussion by our society. Not only could we reaffirm our common goals as a society but also highlight what makes us distinctive among those who study plants.

I began the discussion by indicating what I considered to be a basic difference between Botany and Plant Biology. In my opinion the difference resides in the reasons one studies the natural (plant) world. Plant Biologists study the natural world to bend it to human interests and needs, whereas Botanists study the natural world to help humans fit into the broader fabric of nature. Since the latter was considered too passive and outmoded, it has been a prime reason that Botany departments have either been closed down and/or sunken into General Biology departments. I think this characterization accurately reflects the fundamental differences and goals between the American Society of Plant Biologists and the Botanical Society of America and therefore are valid rallying points for their respective memberships. In addition to these basic philosophical differences, I have felt that there are two additional differences in orientation between these two organizations and their memberships. One is that the center of gravity of Botany is the organismal biology of plants.

Although organismal biology might have a lesser emphasis today, that does not mean that it is not a legitimate and basic pursuit in its own right. The problem is that plant organismic biology originated from the study of the natural history of plants and we in the United States have never had a natural history tradition comparable to that of Europe. Basically, we are an engineering society, concerned as much with the tools and technology of science as its theory. Hence the emphasis on Plant Biology as I have defined it here is more in harmony with our US scientific traditions and therefore seems more natural to many than a truly botanical one.

The second contrast of Botanists with Plant Biologists is the tendency for Botanists to mentor and nurture their graduate students as colleagues and future independent investigators rather than treating them as cogs in a large lab-group project. It represents a more humane approach that builds for the future. It is a tradition of which I am the proudest and pleased to say I am a botanist.

The most surprising and gratifying aspect of this discussion was that none of those present took any issue with my characterization of Botany *vis a vis* Plant Biology; i. e. they needed no convincing that Botany is a worthwhile endeavor fully worthy of the society’s attention and name. But more significantly, they had valid arguments of their own and a clear vision of what the Botanical Society of America should be in the future.

For example, many felt that Botany is a broader, more all-encompassing subject than plant biology. One of the principal reasons many come to the meetings of the Botanical Society is because of the great diversity of subjects considered, far more than in the meetings of the Plant Physiologists/Plant Biologists. They feel that they are botanists first whose primary interest is in plants, not just molecular biologists who happen to work on plants. Botanists are people who have a genuine love of the study of plants as plants and that special affinity for plants does not seem to be represented by the plant

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biologists. The group felt that Botany provides a basic grounding for the study of all of the various specialties of plant science.

There was a general agreement among the discussants that a principal problem is that botanists have not done as good a job in making the lay public aware of what Botany is in modern times and selling its values to a wider audience. Given that there is an increasing interest in Botanical Gardens by the lay public, we should take advantage of that interest by using gardens to more effectively communicate how central and important botany is to all of our lives. Like the ecologists, we should strive to show the lay public that our interest in plants extends beyond the narrow confines of academia and that it is essential for all aspects of human existence.

What works in our favor in such efforts to broaden the dissemination of our message is that, in contrast with the physiologists/plant biologists, many of our sister societies, for example the bryologists and lichenologists and the American Fern Society have a significant amateur contingent in their membership. We should see that amateur audience as a real asset and tap into it as a way of more effectively communicating what botany is and how significant it is to the public at large.

Thus, the discussion ended on an optimistic, upbeat note. It was clear from the great number of botanists who attended the session and enthusiastically participated in it, that Botany as an endeavor is not only alive and well, but has a very passionate following among the members of our society. And they all are anxious to shout it to the world!

Acknowledgements

I want to express my sincere appreciation and thanks to Judy Jernstedt and Brent Mishler for their critical reading of this article and for their helpful suggestions for its improvement. - Donald R. Kaplan, Department of Plant and Microbial Biology, University of California, Berkeley, California 94720-3102



The Future of Botany at the Undergraduate Level

Nearly 60 botanists engaged in a lively discussion about the future of Botany at the undergraduate level. This session was organized with the Education Committee because BSA members report, with increasing frequency, attempts across the country to eliminate or reduce the number of Botany courses taught at the undergraduate level, to reduce college/university resources directed toward plant science activities, to replace retiring botanists with scientists from other disciplines, as well as attempts to eliminate entire Botany departments and programs. These events have had and will continue to have a major impact on graduate programs and the future of the botanical sciences at the undergraduate level. The Discussion Session was organized around three questions: (1) What's the current problem? (2) What are the main issues? and (3) What is the resolution to the problem?

Current Problem

Participants identified several trends around the country in addition to those listed above. Anecdotal evidence indicates that it is difficult to maintain faculty lines for botanists because Botany programs in colleges and universities are being closed, are merging with other sub-disciplines of Biology, or are in competition for faculty positions with sub-disciplines that have large numbers of majors (such as Zoology and Microbiology). When botanists become part of a Biology Department, botanists are often outnumbered by faculty from other areas, which leads to a reduced voice in departmental decisions—including future faculty hires. The number of Botany majors has never been as great as that in other areas of biology, and in many places, this number continues to decline. Reports also were made of the chronic difficulty of finding highly qualified graduate students who expressed an interest in pursuing advanced degrees in Botany. An editor for a major publishing company who was attending the BSA convention reported a recent, and precipitous, decline in the number of introductory-level botany book sales, which is apparently due to a large number of post-secondary institutions dropping their Introductory Botany courses in favor of Introductory Biology. These problems threaten the number of students who participate in Botany programs, which, in turn, threatens the number of Botany positions available for faculty in colleges and universities around the country. This, of course, leads to the question of whether Botany is a relevant subject or degree in a contemporary biology program.

Issues

After outlining a variety of problems, participants

listed what they thought were the key issues surrounding the future of Botany at the undergraduate level. There was strong feeling that it was important to address the pipeline issue—most students who enter the university, and who think about biology as a degree choice, first think about animals (and Zoology) and not about plants. This is related to the idea proposed by Jim Wandersee and colleagues about “plant blindness”—that people tend to ignore plants and their importance. To get more Botany majors, we need to make more students aware of plants and Botany in the first place. Other related issues that were identified by participants included: (a) the need for greater scientific and biological literacy of students (and the public) in general; (b) the support, or lack thereof, from administrators and colleagues for all things botanical; (c) K-12 education and the need to produce high-quality botanical curricula for young students; (d) undergraduate Botany courses and their appeal or lack of appeal to a wide audience of students; (e) outreach to the communities in which botanists live; (f) support for informal education; (g) identification of plant-related careers and informing students of the usefulness of a Botany degree; and (h) a focus on community colleges.

Many of the above issues are related. For instance, in trying to increase the flow of students coming into colleges and universities who are interested in Botany, it is necessary to produce botanical curricula that will be used by pre-college teachers and that will interest students in the study of plants. It is also important for all botanists to try to provide appealing courses for undergraduate students who might decide to major in Botany. Of course, an undergraduate's decision to major in Botany would be aided by more information about careers that require a knowledge of plants. It was noted that the *Careers in Botany* brochure, produced by the BSA, is currently being revised and should be available for distribution by the next BSA meeting. Also related to the pipeline issue is the need for botanists to work with instructors at community colleges, where over 50% of all college students receive their introduction to Biology. Many of these students will transfer to 4-year colleges and universities and could become interested in the study of plants at community colleges.

Possible Solutions

Discussion Session participants offered a variety of potential solutions to the above-stated problems. Some suggestions were for botanists to:

- offer freshmen-level seminars about botanically related topics to engage undergraduates early in their academic careers.

- develop and distribute botanical activities that illustrate biological principles for use in high

schools and undergraduate biology classes. These activities could be disseminated to secondary or undergraduate instructors to incorporate into their biology courses, to use in place of the typical zoological or microbiological examples, in hope of increasing the awareness of plants and their importance.

- help teachers of younger students with ideas and materials so that Botany can be brought more regularly into the elementary and middle school classrooms.

- apply to federal funding agencies such as the NSF to develop innovative courses in Botany; one appropriate program is the CCLI, the Course, Curriculum, and Laboratory Improvement program.

- model excellent instruction in all our Botany classes so that students would remain or become interested in the subjects we teach.

- mentor undergraduate students in our laboratory or field projects so that students who want to pursue a research-oriented career might gain exposure to Botany. Undergraduate research can be presented at the meetings and disseminated in the publications of such organizations as the Council on Undergraduate Research (CUR) and the National Association of Biology Teachers (NABT).

- keep in touch with undergraduate majors and potential majors by organizing Botany clubs at each of our institutions so that students could meet other students with similar interests to their own.

- become familiar with their state's science standards, which determine which subjects will be taught in pre-college classrooms. Input from botanists to these standards might help expose more pre-college students to the study of plants.

- help write questions for the standardized Advanced Placement, SAT, and GRE exams so that the need for Botany courses is maintained or increased.

BSA members at this Discussion Session agreed that it is important for each botanist to take some action toward promoting Botany at the undergraduate level. It was also agreed that the conversation about the future of Botany at the undergraduate level should be continued at the Madison meeting next year. Comments and suggestions should be directed to Marsh Sundberg, PSB Editor, Sundberm@emporia.edu, Rob Reinsvold, Education Committee Chair, rjreins@bentley.unco.edu, or Gordon Uno guno@ou.edu.

- Gordon E. Uno, Department of Botany and Microbiology, University of Oklahoma, Norman, OK.

Preparing a Grant Proposal for NSF

One of the discussions at the Botany 2001 meeting was entitled "Presidents' Forum: Federal Funding for Botanical Research". Questions were sent to the panelists prior to the meeting. Those for the Program Directors from NSF were:

"What are the possibilities or opportunities for society-wide or integrative or multidisciplinary initiatives? What is your perception of the Botanical Society of America and affiliated societies (American Fern Society; American Bryological and Lichenological Society; American Society of Plant Taxonomists)? How much do you really know about what these societies represent and what they are doing? How best can the styles of research represented by members of these societies (strongly integrative and strongly organismal) fit into new funding initiatives? What do you see as the main failings of unsuccessful proposals (e.g., failure to address the "big questions," poor salesmanship/self-promotion)? What advice would you give to unsuccessful PIs as they revise for resubmission? Are there some proposals that just will never be funded, and if so, why? What are program officers and reviewers looking for that some researchers seem not to be getting?"

Federal funding for the plant sciences is mainly provided by NSF. Based on 1998 percentages, NSF provides 54%, USDA 17%, NIH 15%, DOE 13% and NASA 1% of the federal dollars devoted to the plant sciences. So although NSF is doing well for plant sciences, other agencies have funds and these should be sought. Secondly, plant biology funding opportunities are everywhere at NSF, but very few programs are specific for plant biology. One should investigate not only fundamental research, both individual and collaborative, but also research training programs, education programs, instrumentation programs, workshops and conferences, international collaboration, research coordination networks in biological sciences, and "crosscutting" programs. [The NSF web site, www.nsf.gov indicates a list of programs to visit, such as "biology, education, crosscutting..."] A handout was prepared for the meeting that provides the names of various programs, a short description of the type of research funded, deadline dates and the web site for a more complete description and announcement of these programs. It has been posted on the BSA web site [www.botany.org].

The key to funding is a "good proposal" – one that asks a question and poses possible hypotheses for the answer. A good proposal is a good idea, well expressed, with a clear indication of methods for pursuing the idea, evaluating the findings, and

making them known to all who need to know. Key questions to ask yourself as a principal investigator are: 1. What do you intend to do? 2. Why is the work important to the scientific community? 3. What has already been done? 4. How are you going to do the work? Proposal development strategies are to:

- Determine your long-term research/education goals or plan
- Develop your bright idea
 - Survey the literature
 - Contact investigators working on the topic
 - Prepare a brief concept paper
 - Discuss with colleagues/mentors
- Prepare to do the project
 - Determine available resources
 - Realistically assess needs
 - Develop preliminary data
 - Present to colleagues/mentors/students
- Determine possible funding sources
- Understand the ground rules
 - Ascertain overall scope and mission
 - Read carefully announcement/instructions
 - Determine where your project fits
 - Ascertain evaluation procedures and criteria
- Talk with NSF program director about
 - Your proposed project
 - Specific program requirements/limitations
 - Current program patterns
- Coordinate with your institution/sponsored research office
 - Obtain commitment for cost sharing from institution, if required by the program.

What should you look for in a Program Announcement?

Determine the goal of the program, the eligibility requirements, and any special requirements, which may limit the program.

The Grant Proposal Guide provides guidance for the preparation of all proposals and should be the next document consulted. In addition the GPG:

1. Specifies process for deviations including:
 - Individual program announcements
 - Written approval of cognizant assistant director or designee
2. Describes process and criteria by which

proposals will be reviewed

There are two criteria upon which NSF rates proposals:

A. Intellectual merit of the proposed activity

- How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
- How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work).
- To what extent does the proposed activity suggest and explore creative and original concepts?
- How well conceived and organized is the proposed activity?
- Is there sufficient access to resources?
- Is there a management plan for coordinating the research?

B. Broader Impacts of the proposed activity

- How well does the activity advance discovery and understanding while promoting teaching, training and learning?
- How well does the activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships?
- Will the results be disseminated broadly to enhance scientific and technological understanding (e.g. web sites accessible to other researchers; publications)?
- What may be the benefits of the proposed activity to society?

3. Describes process for withdrawals, returns and declinations

A proposal may be withdrawn by the Institution or PI. NSF will mail a letter to the Institution confirming the withdrawal. If the proposal is declined, the Institution will receive a package from NSF informing it of the decision. The package will contain at least three reviews, rating the proposal; and a panel summary explaining why the proposal was declined and provide suggestions for improvement.

4. Describes the award process and procedures for requesting continued support.

When an award is made, the institution will receive a letter containing the panel summary and reviews.

The package will contain information about the total funds, the duration of the award and the start and expiration dates.

The grantee may request a one-year "Grantee Approved No-Cost Extension." This must be done before the award expires. This may not be used to spend out remaining funds. The request must be made using FastLane. The PI will submit the request to the Institution's Sponsored Research Office, which will forward the information to NSF. From the FastLane Homepage (<http://www.fastlane.nsf.gov>), click on "Notifications and Requests," and follow the FastLane instructions to submit your request.

The PI must submit a new proposal for review by a panel to obtain additional funding beyond the original grant. Check the program announcement for deadline dates.

5. Identifies significant grant administrative highlights

Unless otherwise indicated, full proposals will include the following categories of information. All proposals are now submitted through FastLane. This system will provide pages for these categories.

- Information about the PI (Proposal Classification Form)
- Deviation authorization (if applicable)
- List of reviewers or non-reviewers (optional, but important advice to your program director)
- Cover sheet for proposal to the National Science Foundation (NSF form 1207)
- Project summary
- Table of contents (generated by FastLane)
- Project description (including results of prior NSF support, Maximum total 15 pages)
- References cited (if applicable)
- Biographical sketch – senior personnel (including conflict of interest lists)
- Proposal budget (cumulative and annual)
- Current and pending support
- Facilities, equipment, and other resources
- Special information and supplementary documentation

In preparing the budget amounts, make them realistic and reasonable for the work to be done. The amounts should be well justified and show an established need which is in line with the program guidelines. Eligible costs vary between programs but are usually personnel, equipment, travel, subawards, or other direct costs. If allowable, facilities and administrative costs are included as indirect costs by the institution.

FastLane is being upgraded constantly, and now all supplementary requests are done there. Paper submissions are generally no longer required, including the signatures. Your research office will provide an electronic signature when they submit the final proposal. FastLane is also the primary source of information about pending proposals through "proposal status".

How long does the process take?

From the date of receipt at NSF, through ad hoc and panel review, program officer recommendation, and division director concurrence of the recommendation, the proposal resides in the division about 6 months or less. It then proceeds to the Grants and Awards Office where the review and processing generally takes another two months. At that point, the institution should receive notification of the award being made. Those awards being recommended for funding will require additional information from the PI in order to process the award, and your program director will be in contact with you regarding the official abstract, any additional forms necessary, or revisions of the budget.

So what are the basic dos and don'ts for the PI?

DO:

- Talk to your program director
- Less verbiage, more readability
- Anticipate objections or criticisms and address them
- Justify your budget
- Follow the rules
- Give yourself plenty of time
- Study reviews carefully and follow advice given

DON'Ts

- Don't be greedy – only ask for what you need and can justify
- Don't give up – resubmit if denied the first (or second) time

Judith E. Skog, Division of Biological Infrastructure,
National Science Foundation



News from the Society



Conference Update

BOTANY 2002 – Botany in the Curriculum: Integrating Research and Teaching

BOTANY 2002 will be held in Pyle Conference Center on the University of Wisconsin, Madison campus from August 2-7, 2002. In addition to the regular program, which will run from Sunday through Wednesday night (August 4-7), BOTANY 2002 will include an expanded format. A special FORUM focusing on botanical education and outreach will be held on Friday evening and Saturday (August 2-3), and it will be linked to the annual scientific meeting on Sunday (August 4) via workshops and field trips. Approximately 14 hands-on workshops will be available as two-hour, half-day, or full-day events. This diversity will allow attendees in participate in multiple workshops, and/or participate in field trips. Similarly, a broad range of field trips are planned as half-day, full-day, and multi-day events.

Another new feature for BOTANY 2002 will be the opportunity for presenters to deliver computer-based presentations as a standard presentation option. This will be possible, in part, because the Pyle Conference Center is outfitted with an integrated instructional technology system. Both 35 mm slide and overhead projectors will also be standard options.

For the latest information about the conference, please visit the BOTANY 2002 web site at: <http://www.botany2002.org/>. The site is regularly updated with programmatic details, and registration information will be posted in April. A Registration Brochure will also be mailed to all BSA members later this spring.

FORUM – Session submissions due March 15, 2002

“...Teaching students about plant biology is as critical to the future of the field as is research and must take its proper place as an equally laudatory endeavor for botanists. Equally vital are activities that communicate the excitement of plant biology to students and teachers involved in K-12 education and to the general public...”

This passage from the *Botany for the Next Millennium* Report (BSA, 1995) emphasizes the important role of education and outreach, at all levels. However, there continues to be a reduction in the number of Botany courses taught at the undergraduate level, many Botany Departments and programs have been eliminated nationwide, and the National Research Council no longer recognizes Botany as a valid graduate education program. Despite this, the global significance of plants continues to grow. It is therefore vital that botanists and their professional societies work to ensure that plants are represented in the undergraduate and graduate curriculum, as well as in science outreach initiatives. To that end, the BOTANY 2002 conference will include a new FORUM that specifically focuses on undergraduate education and related outreach. K-12 teachers will also have the opportunity to participate. In addition to hands-on workshops focusing on undergraduate topics, several workshops will be specifically targeted for K-12 teachers.

All members are invited and encouraged to attend the FORUM, as well as further participate by organizing Sessions.

The FORUM will begin on Friday evening with early registration and a reception. The main FORUM sessions will occur on Saturday. Although some informational sessions will be included, the program will primarily include interactive panel and roundtable discussions as well as breakout groups focusing on a range of topics. Individual sessions will be grouped within topical themes, or ‘threads,’ that span the entire FORUM. The six general threads are listed below, and each is followed by several example session titles. Organizers can submit their own session titles as well as select the most appropriate thread for their session. The final threads may be slightly modified or expanded based on the range of session topics submitted.

1) *Emphasizing Botany across the Curriculum* – Examples: Sessions on what is the vital content to cover, and what’s at the cutting edge within disciplinary areas (e.g., systematics, phycoogy, development, etc.), “How to promote

plants if you are the only botany faculty member in a department,” “Developing interdisciplinary courses/curricula,” “Careers in botany and related fields,” “Educating pre-service teachers about plants”

2) *Designing Investigative Laboratories* – Examples: Sessions on ‘model,’ or best-practice, labs (e.g., “Using Wisconsin Fast Plants to study plant development,” “Using instructional technology to examine photosynthesis”)

3) *Engaging Undergraduates in Research* – Examples: “What are the challenges of mentoring undergraduate research students,” “Publishing with undergraduates in peer-reviewed journals,” “Using your courses to feed your research program”

4) *Developing Effective Teaching and Mentoring Skills* – Examples: “How to become a teacher-scholar,” “How to review manuscripts and grant proposals,” “Tips on balancing your academic time,” “Graduate student training programs: The do’s and don’ts”

5) *Supporting Effective Teaching and Learning* – Examples: Sessions on funding (e.g., information about grant sources, tips on writing proposals and grant management); “Managing a university greenhouse or herbarium,” “Tips for Chairs and Deans,” “How to best prep an Introductory Lab,” “How to assess the effectiveness of an advanced course”

6) *Reaching Out beyond the Ivory Towers* – Examples: “Linking up with botanical gardens and arboreta,” “Linking up with teachers” (separate sessions for elementary, middle school, and high school levels), “Linking up with the media,” “Designing and implementing workshops for teachers,” Sessions on best-practice initiatives (e.g., individual and departmental)

Submission of Session topics should be conducted online at: <<http://www.botany2002.org/>>. The deadline for receiving session proposals is **March 15, 2002**.

SCIENTIFIC MEETING – Abstract and Discussion Session submissions due April 1, 2002

All members are invited and encouraged to present some aspect of their scholarly work in a contributed paper, contributed poster, invited symposium, or special lecture, and/or lead a Discussion Session.

Each scholarly presentation requires an abstract. The same individual should not be a first author on more than three (3) abstracts. Contributed papers, or oral/podium presentations, will be 15 minutes in length (inclusive of questions). Contributed posters will fit onto bulletin boards that are 4 ft tall and 8 ft wide. Invited symposium contributions and special lectures are arranged in advance and coordinated by the symposium organizer(s), societies, and/or societal sections. Symposium presentations will be 30 minutes in length (inclusive of questions).

Discussion Sessions provide the opportunity for individuals or groups to submit proposals for, and later moderate, sessions that are focused on timely, controversial, or perennial topics. Session topics might include a wide range of research issues (e.g., new techniques in a particular field; the value of collaborative, interdisciplinary research, etc.), publishing issues (e.g., publishing in an electronic era), etc.

The number of one-hour sessions that will be able to be accepted will be contingent upon the size of the overall scientific program and the availability of rooms in the Conference Center. Although session topics should be reasonably focused, it is hoped that proposals that are submitted have broad appeal to a disciplinary section, an entire society, or the plant biology community at large.

Submission of abstracts and discussion session topics should be conducted online at: <<http://www.botany2002.org/>>. The deadline for receiving session proposals is **April 1, 2002**.

Northeast Section Joint Field Meeting

The 2002 joint Field Meeting of the northeast section of the Botanical Society of America will be held in Adams County in southwestern Ohio, May 26 to May 30. This area of Ohio contains numerous relict prairie communities on thin soils over dolomitic limestones, vast mesophytic forests with a rich herbaceous flora, including disjunct species as well as some unusual geologic formations. Additionally there are several Adena and Hopewell culture Indian sites. There will be daily field trips and evening lectures.

For more information and/or registration forms, please contact: Dr. Victor G. Soukup, Herbarium, Dept. of Biological Sciences, University of Cincinnati, Cincinnati, OH 45221-0006 (e-mail: soukupvg@email.uc.edu), Phone (home), 513 761-2568.

LETTERS TO THE EDITOR, AJB

The American Journal of Botany is pleased to announce a new service to its readership, electronic letters to the editor.

Letters to the editor (~ 500 words, not including citations) appear exclusively in the electronic version of the journal. These are intended as an outlet for substantive discussions of articles published in the three most recent issues of the American Journal of Botany. Letters sent to the Editor-in-Chief c/o ajb_journal@cornell.edu will be acknowledged on receipt and will be published electronically only after review for suitability, clarity, and length by the Editor-in-Chief and one or more subject Associate Editors. The authors of articles in question will be contacted by the editorial office and given an opportunity to respond. Responses are also reviewed for content and edited for clarity and length. All correspondents will be limited to one letter per article. Authors are encouraged to respond to multiple letters dealing with one article. Citations should follow AJB format (see most recent issues). All materials accepted for publication will be electronically posted as soon as possible.

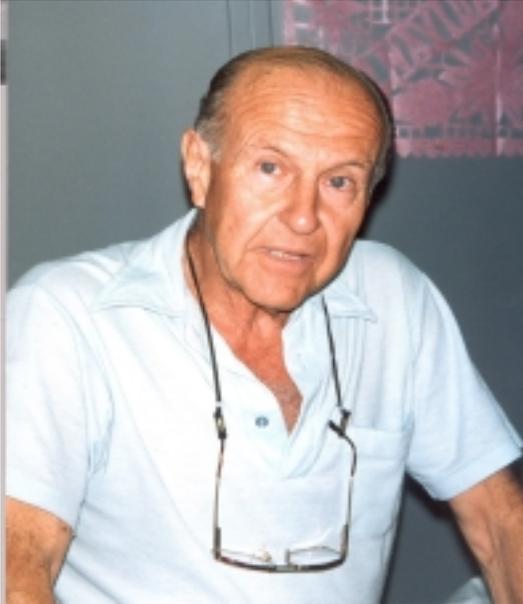
Botanical Society of America 2002 Darbaker Prize in Phycology

The Botanical Society of America is accepting nominations for the 2002 Darbaker Prize in Phycology. This award is presented for meritorious work in the study of microscopic algae, based on papers published by the nominee during the last two full calendar years (2000-2001). The award is limited to residents of North America, and only papers published in the English language are considered. Nominations for the 2002 award should include a list of all of the nominee's work to be considered for the 2000-2001 period, and a statement of the nominee's merits addressed to the committee.

Nominations for the 2002 Darbaker Award should be sent by May 1, 2002 to Louise A. Lewis, Dept. of Ecology & Evolutionary Biology, Univ. of Connecticut, Storrs, CT 06269-3043, fax (860)486-6364 (or by email to louise.lewis@uconn.edu).

Announcements

In Memoriam:



Armando T. HUNZIKER was born in Buenos Aires the 29th of August of 1919 from Swiss parents and died of cancer in Córdoba, the 12th of December of 2001. He studied Agronomy at the Facultad de Agronomía y Veterinaria of the Universidad de Buenos Aires. He graduated in 1945, completing a dissertation, under the guidance of Prof. Lorenzo Parodi, on the species of *Cuscuta* from Argentina and Uruguay.

With fellowship support from the Argentinian Association for the Advancement of Science, he held a postdoctoral position at Harvard University for work with Prof. I. W. Bailey (1948). He spent a study leave at the Kew Royal Botanic Gardens (1954), also supported by a fellowship. His career was distinguished by two fellowships from the Guggenheim Foundation (1961-1962 and 1979-1980) for further study in the United States.

His teaching career included positions at the Universidad de Buenos Aires, Universidad Nacional del Litoral, and Universidad Nacional de Córdoba, where he was Professor since 1947 until 1982 when he retired. As a researcher, from 1961 he had a permanent position in the National Research Council, where he was awarded the highest rank and was also member of its Board of Directors (1991-1994). He was appointed Director of the Museo Botánico de Córdoba and the Instituto Multidisciplinario de Biología Vegetal (1947-1999 and 1983-1999, respectively), where he guided

several Ph. D. students. He was awarded funds from literally all the funding agencies in Argentina for a range of studies on the morphology and systematics of native flowering plants, specially the *Solanaceae*. He created the botanical journal *Kurtziana* in 1961, and was its editor until recently. In addition, he was the Director of the "Flora Fanerogámica Argentina" project that is dedicated to publishing a complete flora of the flowering plants. He has edited the publication of around 80 fascicles.

His received many honors in his career. Included among them in South America are: Member of the Academia Nacional de Ciencias and the Academia Nacional de Agronomía y Veterinaria, President of the Sociedad Argentina de Botánica, Honorary Professor of the Universidad de Buenos Aires and the Universidad Nacional de Córdoba, and recipient of the Konex, Eduardo L. Holmberg, and Weissmann prizes. He was also elected to corresponding membership in both the American Society of Plant Taxonomists and the Botanical Society of America in North America.

He published more than 150 papers on different aspects of the taxonomy and morphology of South American plants, including important works on the pseudocereals used by native South Americans. However, his most recognized contributions are on the systematics of the *Solanaceae* to which he devoted 50 years of his life and ca. 100 papers. He participated in all the international conferences on the family and was recognized by his "long and distinguished efforts and notable contributions to the study of Solanaceous plants" in St. Louis, 1982. Fortunately, he finished his most remarkable work *Genera Solanacearum, The Genera of Solanaceae Illustrated* (A. R. Gantner Verlag K. G., 2001) before cancer claimed his life. This book is the first one of the kind since Wettstein, in 1891, published the *Solanaceae* for *Die natürlichen Pflanzenfamilien* (ed. Engler und Prantl). In this new book Prof. Hunziker gave a resumé of his detailed knowledge of the family based on morphology and distribution of the taxa, and presented a new system as well. He accomplished all of this with the great support of his distinguished colleagues at the Institute in Córdoba that he was instrumental in building to such prominence. He also maintained an active career in spite of serious personal losses in the dark periods of military dictatorship in Argentina. He was a dedicated, talented and productive scientist. He was also a charming and gracious host to all those who came to visit Argentina and the Institute. The "Hunziker contributions" continue through his published work, that of his many students, and that of his brother, Prof. Juan Hunziker, in Buenos Aires.

- Gabriel Bernardello and Gregory J. Anderson

Symposia, Conferences, Meetings

Science, Education Spotlight Chicago Botanic Garden 2002 Symposia

Botanists and serious gardeners have the opportunity to learn from national and international experts while networking with gardening peers of professional colleagues at 10 symposia offered in 2002 at the School of the Chicago Botanic Garden. Some symposia cover general interest subjects appropriate for the general public, while more technical symposia are designed for practitioners and academicians.

Remaining programs include:

March 15-16, Pioneers of American Landscape Design Symposium

July 11-12, School Gardens Symposium

August 12-13, Horticultural Therapy Symposium

September 17, Great Gardens Landscape Design Symposium

October 10-11, Perennial Plant Symposium

October 28-30, Janet Meakin Poor Research Symposium: Invasive Plants

For more information about any of the Chicago Botanic Garden's programs and events, call (847) 835-5440, or visit the Garden's Web site at www.chicagobotanic.org

NATIONAL TROPICAL BOTANICAL GARDEN College Professors' Course NTBG Kenan Fellowship

Program Operation: July 15 – 27, 2002
Deadline to Apply: April 5, 2002
Notification of Acceptance: April 19, 2002

Program Description

The National Tropical Botanical Garden (NTBG) will host another very exciting course for college professors of introductory biology from July 15 – 27, 2002 in Kaua'i, Hawaii. College professors accepted

to the fellowship will become Kenan Fellows at the National Tropical Botanical Garden.

The goal of the NTBG Kenan Fellowship is to improve the quality of teaching in introductory biology classes at the undergraduate level. Facilitated by Professor P. Barry Tomlinson of Harvard University and the NTBG, the course is designed to show instructors how to use examples from tropical plants in discussing issues of form and function, evolution, and conservation. Fellows will develop teaching modules to be shared and implemented in the introductory biology classroom. Basically, we are looking for the very best biology faculty, those who can fire the imagination of major and non-major biology students. Although botanists will be considered, we also welcome applications from faculty who lack previous botanical experiences as well as those who have not previously worked in the tropics. The fellowship will be limited to 12 Kenan Fellows.

Selection Criteria

In our selection process, we will give weight to the professor's long-term commitment to teaching introductory biology to both large and small sections, the ability to communicate excitement in the classroom, and tenure-track status.

Applications must include:

- Two letters of recommendation
- Complete Curriculum Vitae
- Copy of the most recent teacher evaluation
- A non-refundable \$USD30 application fee in the form of a check made payable to the National Tropical Botanical Garden.

The Kenan Fellowship will cover a roundtrip airfare, accommodation and meals in Kaua'i, Hawai'i, tuition and fees, texts, equipment, and ground transportation. Requests about the NTBG Kenan Fellowship must be directed to:

Namulau'ulu G. Tavana, Ph.D.
Director of Education
National Tropical Botanical Garden
3530 Papalina Road
Kalaheo, HI 96741

Tel: (808) 332-7324 ext. 225 or 251
Fax: (808) 332-9765
Email: tavana@ntbg.org
Website: www.ntbg.org



NATIONAL TROPICAL BOTANICAL GARDEN

**KENAN FELLOWSHIP
JULY 15-27, 2002**

Applicant's Name: _____

Current Mailing Address: _____

Permanent Mailing Address: _____

Telephone: _____

Fax: _____

Email: _____

Current Institution of Employment: _____

Length of Employment: _____

Position: _____

Title: _____

Professional Organization Membership: _____

Please describe on one page why you are interested in attending this course and how participating in it could help in your professional or career goals.

**Sedges 2002
International Conference on Uses,
Diversity, and Systematics of
Cyperaceae**

A three-day conference on the uses, diversity, and systematics of the sedge family (Cyperaceae) is planned for 6–8 June 2002 at Delaware State University. The sedges are a large, ecologically and economically important family found in many habitats and climates throughout the world. This conference is hosted by the Claude E. Phillips Herbarium of DSU and sponsored by the Natural Resources Conservation Service of the United States Department of Agriculture. The first day is devoted to programs by researchers on an array of subjects including systematics, weed ecology, horticulture, conservation, wetland restoration, and ethnobotany. On the second day, field trips to local areas will enable conference participants to see a variety of sedges, mostly members of the large and taxonomically complex genus *Carex*. Identification workshops, again primarily for *Carex*, will be held on the third day.

To be placed on the mailing list for future notices and registration, please send your name, address, and telephone number via e-mail to Robert Naczi <rnaczi@dsc.edu>.

**The 43rd Annual Meeting of the
SOCIETY FOR ECONOMIC BOTANY**

The New York Botanical Garden
June 22 - 27, 2002

-Symposium (June 23): Origins, Evolution, and Conservation of Crop Plants: A Molecular Approach
-Especially for Students (June 25): Workshop: Ethnobotanist's Digital Toolkit

-Distinguished Economic Botanist (June 26): Professor Sir Ghilleen T. Prance

Visit the SEB website to Register and Submit an Abstract www.econbot.org

Spring Wildflower Symposium

The Wintergreen Nature Foundation's 19th Annual Spring Wildflower Symposium, May 10-12, 2002 at Trillium House, Wintergreen Resort, Central Virginia. Info@twnf.org, www.twnf.org, 434-325-7451. A chance for beginner and expert botanists to learn more about the spectacular flora of central Virginia's Blue Ridge. From identification to propagation and wildflower gardening, the guided hikes, lectures and workshops are an excellent opportunity to meet some of Virginia's finest botanists.

Positions Available

National Tropical Botanical Garden

**Post-Doctoral Position in palm
anatomy**

The National Tropical Botanical Garden, under its Congressional charter, administers gardens of extraordinary beauty and historical significance, advancing scientific research, public education, and plant conservation. This work is carried out at five gardens and three preserves in Hawaii and Florida.

A post-doctoral position is available to conduct research under Professor P.B. Tomlinson, Eleanor Evans Crum Chair of Tropical Botany, involving the living collection of palms at the NTBG gardens on Kauai, with a representation of about 100 genera. The study will involve the comparative anatomy and biomechanics of the palm leaf and will be undertaken in the Acacia Foundation Medicinal Plants Analysis Laboratory at the Garden's headquarters in Kalaheo, Kauai.

The appointment is initially for one year, starting October 15, 2002, but with the opportunity to extend to a second year.

Candidates, at the time of appointment, will have recently completed all the requirements for a Ph.D., with a special interest in plant anatomy. Any previous experience with the morphology and anatomy of palms will be useful, but not necessary.

Stipend will be \$25,000, with the addition of modest accommodation for the employee and travel to and from Kauai. Fringe benefits include medical insurance.

Please submit a C.V., cover letter, and at least three reference letters, preferably from more than one institution to:

Science Department
National Tropical Botanical Garden
3530 Papalina Road, Kalaheo, HI 96741
Tel: (808) 332-7324
Fax: (808) 332-9765
e-mail science@ntbg.org

Application deadline: August 1, 2002

Affirmative action/equal opportunity/equal access employer

Special Opportunities

Deep Gene Student Travel Awards to Botany 2002 — Madison, WI, August 2-8, 2002.

The Deep Gene Research Coordination Group exists to integrate green plant phylogenetics and genomics (<http://ucjeps.herb.berkeley.edu/bryolab/deepgene/index.html>). We want to explore the ways in which comparative phylogenetic studies can inform functional genomic studies, and knowledge of plant genomes can inform the understanding of phylogenetic relationships. With the support of the National Science Foundation (Grant DEB-0090227), the group will offer travel awards of up to \$500 (on a reimbursement basis requiring original receipts) to attend Botany 2002; eligible are undergraduates, graduate students, and post-docs. You need to be presenting a poster or a talk at the meeting that is related to these subjects, and need to participate in the Deep Gene session tentatively scheduled for Thursday August 8th (where discussions will focus on interdisciplinary research approaches including student research concerns). To apply, please send the following to Brent Mishler at bmishler@socrates.berkeley.edu (electronic submissions only) by April 15, 2002: a one-page description of your background, research interests, & plans, a short CV, a copy of your submitted BSA abstract (those are due to BSA by April 1, 2002), and have your major professor email a very brief (few sentence) endorsement of your application and need for the financial support.

Deep Gene Student Research Training Support.

The Deep Gene Research Coordination Group exists to integrate green plant phylogenetics and genomics (<http://ucjeps.herb.berkeley.edu/bryolab/deepgene/index.html>). We want to explore the ways in which comparative phylogenetic studies can inform functional genomic studies, and knowledge of plant genomes can inform the understanding of phylogenetic relationships. With the support of the National Science Foundation (Grant DEB-0090227), the group is supporting research training of students (both undergraduate and graduate). The goal is “cross-training” — enabling students to work in a laboratory other than their home lab, preferably moving between genomics and phylogenetics or vice-versa.

Supported are (1) rotations between different labs at the same institution or at different institutions, (2) summer internships, (3) participation in appropriate training courses. Awards will apply towards travel and living expenses; the host laboratory is expected to provide necessary training, equipment, and supplies. Awards will range from \$2,000 - \$3,000 for 2-3 month periods. Awardees will be expected to participate in future Deep Gene meetings. To apply, please send the following to Brent Mishler at bmishler@socrates.berkeley.edu (electronic submissions only) by April 1, 2002: a one-page description of your background, research interests, & plans, a short CV, have your host professor email approval of your visit to his/her lab, and have your major professor email a brief endorsement of your application and need for the financial support.

When making awards, a balance will be maintained between different research areas, labs, and regions of the country. Applications from under-represented groups are especially encouraged (please self-identify in your application).

Call For Manuscripts

Reports of the National Center for Science Education

Reports of the National Center for Science Education is soliciting manuscripts for publication in Fall 2002 focused on the contribution to evolutionary biology of research in the botanical sciences. The National Center for Science Education is a not-for-profit organization devoted exclusively to promoting evolution education in the public schools with about 4,000 members. Most of our readers are nonscientists with a keen interest in evolutionary biology. Manuscripts of 3000–5000 words, appropriate for introductory-level college readers, will be accepted via email or post:

Andrew J Petto, PhD, Editor
Reports of the National Center for Science Education
Division of Liberal Arts
University of the Arts
320 S Broad St
Philadelphia PA 19102-4994
Phone: 215.717.6276
Fax: 215.717.6620
editor@ncseweb.org

For more information about NCSE and our journal, please connect to <http://www.ncseweb.org> or call 1-800-290-6006.

Cell Biology Education

Cell Biology Education (CBE) is an online, quarterly journal owned and published by the American Society for Cell Biology. This new Journal publishes peer-reviewed articles on science education. Its initial focus will be on undergraduate education related to cell biology.

Journal publishes the following kinds of articles:

1. Science education research articles, focused on theoretically grounded questions, and utilizing either quantitative or qualitative methods of analysis.

2. More descriptive articles detailing educational innovations; e.g., inquiry laboratory courses, web-based courses, interdisciplinary curricula. These must "tried and tested" and should include some level of assessment and include references to related literature.

3. Invited and submitted reviews of current or historical issues in science education.

4. Invited and submitted articles on science policy related to science education.

5. Book reviews including textbook reviews based on actual use of the text in courses.

6. Web reviews and annotated web links to video and other resources including annotated reading lists of educational scholarship.

All submissions are peer reviewed, and the editors will work with authors to help ensure manuscripts are acceptable for publication.

To be considered for publication by CBE, research and descriptive articles must have

- pedagogical content
- a clear description of goals and expected student outcomes
- transferability to other settings
- application to a defined audience of teachers
- references to related educational literature

At any stage in the submission process, authors with questions can contact the CBE Editorial Office at 301-347-9300 (phone); 301-347-9350 (fax); cbe@ascb.org; or ASCB, 8120 Woodmont Avenue, Suite 750, Bethesda, MD 20814.

Research Experience for Undergraduates

Ecology and Environmental Science Miami University, Oxford, Ohio

Miami University is pleased to announce a new Research Experiences for Undergraduates (REU) site, funded by the National Science Foundation and Miami University. The REU site will provide support for 12 undergraduate students per year in 2002, 2003 and 2004, to conduct research in ecology and environmental science.

The site focuses on collaborative research on the Ecology of Human-Dominated Landscapes. Thus, students will be immersed in research projects that relate to society's impact on ecosystems, and each student will conduct an individual research project within a team of other students and faculty.

The program is based at Miami University's Ecology Research Center, located in the small college town of Oxford, Ohio, and within an hour's drive from downtown Cincinnati. Many habitats are available for research, including old-growth and second-growth forest, old fields, agro-ecosystems, urban areas, lakes, ponds and streams.

Each student will receive a competitive stipend, free housing, and funds to cover travel and research costs. In addition, each student will earn 12 credits, tuition-free, which are transferable to their home institution. Students will conduct field research during a 10-week summer program, and analyze their data and participate in web-based research presentations during the following academic year. Students will have financial support to attend and present their research at a national scientific conference.

Undergraduates with interests in ecology and environmental science from any institution are eligible for this program; prior coursework in ecology and/or the environmental sciences is recommended. Miami University is an Equal Opportunity Employer. Women and minorities are strongly encouraged to apply. Applications will be reviewed starting March 1, 2002. For more information visit www.muohio.edu/ecoreu; email ecoreu@muohio.edu; call 513-529-3100; or write Ecology REU, Department of Zoology, Miami University, Oxford, OH 45056.

Tallgrass Prairie Biology

Tallgrass prairie, which originally covered nearly 350 million ha in the United States, is today one of the rarest, and least understood, natural biomes in the country. True prairie exists, for the most part, in small isolated locations scattered throughout its original range. The most notable exceptions are the Osage and Flint Hills of Oklahoma and Kansas where topography and rockiness make crop farming untenable. The F.B. and Rena G. Ross Natural History Reservation is a 421 ha tract of land situated on the east face of the Flint Hills, approximately 11 km northeast of the Tallgrass Prairie National Park preserve. Approximately half of the deeded property consists of native grass tracts that were grazed but never plowed and that retain a vegetative cover composed of native grasses and forbs.

This project complements and extends ongoing research and new initiatives to examine the biology of the tallgrass prairie from a variety of perspectives, both basic and applied. REU participants will be involved in a variety of long-term projects centered at the Ross, but including a number of additional sites on both private and public lands in the surrounding area. Participants may choose from a variety of aquatic and terrestrial bio-diversity studies as well as physiological, behavioral, and molecular investigations.

Ten REU summer fellowships will be offered for Summer 2002. Each participant will receive a \$2500 stipend for the 8-week program, which starts June 8, 2002. Meals and housing will be provided as well as transportation costs to and from the Ross at the beginning and end of the program. Applicants must be U.S. citizens who have achieved at least Junior standing at their home institution, with an overall GPA of 3.0 or better, by the start of the program. Interested students should submit an application form, an application letter (consisting of a short essay describing the applicant's science background and career goals, and a statement of why the applicant wants to participate in the program), a resume, a transcript of all college work, and two letters of recommendation from college instructors, at least one of whom taught a laboratory science course. The statement should also indicate two potential project mentors. For additional information see: www.emporia.edu/biosci/reu/index.htm.

Materials should be sent to: REU Program, Department of Biological Sciences, Emporia State University, Emporia, KS 66801, and postmarked by April 1, 2002. If you have any questions regarding the program please contact Dr. Derek Zelmer at zelmerde@emporia.edu.

The New York Botanical Garden Announces Opening of \$60 million Plant Research Facilities

In May, 2002, The New York Botanical Garden inaugurates the largest expansion ever of its plant-research division, the International Plant Science Center. This major endeavor includes a new facility for the Garden's Herbarium – the largest plant-research collection in the Western Hemisphere, with more than 6.5 million plant specimens representing all plant groups and fungi. The collections include specimens from every continent and date from the seventeenth century to today. Between 50,000 and 100,000 new specimens are added to the Herbarium yearly. The new 70,000 sq ft Herbarium utilizes compacting storage units in climate-controlled rooms to improve specimen preservation. New facilities for researchers offer ready access to specimens, microscopes, computers, and new study rooms. It also includes a new digital imaging room where technicians are creating the Garden's "Virtual Herbarium, <http://www.nybg.org/bsci/cass/>. Called a "national treasure" by the National Science Foundation, the Herbarium is extensively used by botanical researchers worldwide

Also included in the facilities expansion is The LuEsther T. Mertz Library – the largest and most comprehensive plant research and horticulture library in the Western Hemisphere – which opens in the restored and renovated historic Library building. The Mertz Library maintains more than 75% of the world's literature on systematic botany and approximately 70% of the world's published floras.

Among the new features of the Mertz Library is the William D. Rondina and Giovanni Foroni LoFaro Library Exhibition Gallery, in which special exhibitions drawn from the Mertz Library's collections will be presented. The inaugural exhibition is *Plants and Gardens Portrayed: Rare and Illustrated Books from The LuEsther T. Mertz Library* featuring more than sixty prized works, including one-of-a-kind publications and important illustrations from botanical masters. On view from May 2, 2002 through July 31, 2002, the exhibition provides a portrait of plant exploration and garden design from the twelfth century on. The exhibition is organized into six sections. A highlight of the **Early Plant Books** will be Konrad von Megenberg's *Das Puch der Nature*, published in 1475. It is the earliest known example of a printed plate of a plant being used to illustrate text. Alexander von Humboldt's 1810 work *Vues des Cordilleres...* is one of six works representing **Plant Exploration**. Among the works on display in the **Garden Design and**



New Herbarium Building

Structure section is the frontispiece from Giovanni Battista Falda's *Li giardini di Roma* (1683). Among the five works highlighting **American Native Trees** is the illustration of *Sequoia wellingtonia* "The Two Guardsmen" from Edward Ravenscroft's *The Pinetum Britannicum*, 1884. "The Fruit of the Cashew" is one of three lithographic plates from

Etienne Dennisse's *Flore d'Amerique dessinee d'apre nature sur les lieux* (1843-1846) in **Fruits and Vegetables**. Pierre Joseph Redout's "Amaryllis Josephinae", from *Les liliaces* (1802-1816) is one of ten outstanding botanical prints in the section, **Painted and Printed Plants**. The exhibition will be accompanied by an illustrated catalogue of the same title.



The LuEsther T. Mertz Library

Special Exhibition

Plants and Gardens Portrayed: Rare and Illustrated Books from The LuEsther T. Mertz Library
May 2-July 31, 2002



From *The Pinetum Britannicum*, 1884,
by Edward Ravenscroft. A plate of *Sequoia wellingtonia*
"The Two Guardsmen."



From *Les Délices*, 1822-1826. Plate: Joseph Redouté's "Anarylis Josephine."



From *Das buch der natur*..., 1475, by Konrad von Megenberg.
The earliest known printed plate of a plant illustrating text.



From *La giardini di Roma*..., 1683, by Giovanni Battista Falda.
The fountains depicts a view of the mythical garden of the Hesperides.



From *Vue des Cordillères, et noumenon des peuples indigènes de l'Amérique*,
1820, by Alexander von Humboldt. A plate showing plant collecting at
the base of the volcano Chimborazo, Ecuador.



From *Flora d'Amérique dessinée d'après nature*..., 1843-1846,
by Etienne Denisse. The fruit of the cashew.

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Blüte und Frucht. Morphologie, Entwicklungsgeschichte, Phylogenie, Funktion, Ökologie. Leins, P., 2000. ISBN 3-510-65194-4. (Paper US\$44.00). 390 pp. E. Schweizerbart'sche Verlagsbuchhandlung (Nägele u. Obermiller), Stuttgart. - With currently renewed interest in floral development by systematists and molecular geneticists as well as morphologists, we welcome this book by Professor Peter Leins, one of the world's leading plant morphologists. Professor Leins is Director of the Institute of Systematic Botany and Plant Geography, and Director of the Botanic Gardens of the University of Heidelberg, Germany. Dr. Claudia Erbar, listed as collaborator on the inner title page, is a Privat-Dozent at the same institution. She is credited with help in composition of the book, advising on the text, assembly of the plates, proofreading, and producing the index.

"Blüte und Frucht" describes the structure, development, and function of flowers and fruits, copiously illustrated with splendid scanning electron micrographs and photographs. It has three main parts: flower structure and development (~140 pp.); pollination and pollination biology (100 pp.); and seed and fruit structure, development, and function (~80 pp.). It is dedicated to the great French floral morphologist Jean-Baptiste Payer (1818-1860), who produced a two-volume work on floral development of ~330 genera of flowers in 1857 (*Traité d'organogenie comparée de la fleur*, Masson, Paris), a work that remains indispensable to anyone working on floral development within a systematic or evolutionary framework. "Blüte und Frucht" is altogether different, however, in that it is basically a general treatment with emphasis on processes common to most flowers, rather than attempting to compare development in a definitive array of taxa. The sections on pollination biology and fruits emphasize the strong correlation between form and function in flowers.

Initial chapters cover floral organization and the reproductive cycle of angiosperms, with important terms in boldface. The text is well organized and relatively easy to follow, even for those not proficient in German. The A-B-C genetic model for organ determination is described briefly. Succeeding chapters examine floral symmetry, number and position of parts, and order of organ initiation.

The authors use as examples and illustrations many of their previous publications, such as using their published work on *Magnolia* species (P. 23) to explain phyllotaxy. The order of organ initiation in each whorl, while usually consistent in a species, may diverge considerably as in the terminal flower versus the lateral flowers of *Eryngium campestre*

(pp. 27, 28). This contrasting ontogeny indicates that the inflorescence controls or can modify the usual pattern of development of individual flowers. Interestingly, the authors show considerable variation in order of organ initiation in taxa of Brassicaceae, which is relevant to the extensive recent genetic literature on the related genus *Arabidopsis*. They show that the basic ground-plan of crucifer flowers can be produced in five different orders of initiation. Floral symmetry is covered very briefly, primarily as a list of terms and references only to Troll and Weberling publications. Inflorescences receive scant attention (5 pages), mostly including a glossary of terms.

Detailed chapters follow that deal with each set of floral organs: sepals, petals, androecium, gynoecium, and nectaries. The perianth chapter discusses generalized examples (tepals; perigon) versus flowers having a differentiated calyx and corolla; nectar spurs; aestivation; "extra" whorls such as the epicalyx of Malvaceae; the processes of fusion among sepals and petals; possible evolution of whorls from the spiral condition; and the function of a ring meristem in production of a fused calyx or corolla.

The androecium chapter emphasizes external form, and also development of microsporangia, differing modes of pollen-sac formation, and differing forms of stamens such as those of *Laurus* with large nectaries and porate dehiscence. Deviations in number of microsporangia, different pollen morphology, a discussion of the interesting correlation between centrifugal vs. centripetal order of stamen initiation and vascular supply (but without illustrations or references). Evolutionary shifts among related taxa receives attention, particularly in polystemonous taxa. The initiation of stamen clusters or fascicles in *Hypericum*, *Melaleuca*, *Paeonia*, *Stewartia*, and *Loasa* are contrasted with successive initiation of multiple stamens in *Magnolia* (centripetally) and in *Capparis* (centrifugally). Reduction in stamen number is shown in a series of taxa in Scrophulariaceae. The diversity of nectaries in different parts of flowers is nicely illustrated. Ontogeny of pocketlike adaxial nectaries on perianth members in several genera of Ranunculaceae is shown in series of SEM's and sectional views. The various types of secondary pollen presentation are described and illustrated in taxa of Campanulales and Asterales.

The carpel chapter contrasts different forms as well as differing modes of carpel fusion (coenocarpy) resulting in the various types of placentation.. Considerable attention is paid to the compitum and transmitting tissue in compound ovaries such as that of *Geranium sanguineum* with both SEM and

sectional views at several levels. The role of intercalary growth is detailed in formation of a hypanthium and of the epigynous condition in flowers.

The chapters on pollination discuss and show an intriguing variety of floral adaptations. Floral adaptations associated with wind, water, and animal pollinators include colors, color changes, UV guides on floral organs, flavonoids, nectar, and scent. Floral syndromes associated with different kinds of insect, bat, and bird pollinators are shown in a table. Novel examples are in the flowers of *Asarum caudatum* and *Aristolochia arborea* (Aristolochiaceae), which attract fly pollinators by simulating mushrooms by their odor, red-brown flower color, and their cauliflorous, clustered position around the base of the trunk (shown in *A. arborea*). Another remarkable story is the stigmatic papillae in *Campanula rotundifolia* that invaginate, carrying the pollen grains inside the body of the stigma.

The fruit and seed chapter has a picture key to fruit types, with photographs and lists of examples. Numerous types of diaspore dispersal (fruits or seeds) include some familiar examples (Coco-de-Mer or *Lodoiccia maldivica*) and many that are new. Professor Leins and his students have demonstrated secondary seed presentation, somewhat analogous to that of a pollen presenter, in which seeds are dispersed first to the upper side of inrolled bracts, from which they can be dispersed more widely than they would if dropped on the ground (in *Campanula glomerata*). The diaspores of sedges are shown to be "floaters", aided by the inflated utricle. Ballistic diaspore mechanisms and myrmecochory (ant-plant associations) are explored, as well as the intriguing parallelism of red and black seeds in different plant families.

There is an extensive list of references (~400, 13 pages) at the end, with a good range representing most of the One criticism is that there are almost no citations to original publications in the text. For instance, the discussion of obdiplostemony does not cite any references; the list at the end of the chapter (on whorled flowers) contains 35 names and dates, but one would have to look at each of the 35 at the back of the book to determine which deal with obdiplostemony. Most descriptions and illustrations are from work by the author and his students. The author displays definitive knowledge of a diversity of floral form, but more references to specific work, including that of other investigators, would have enhanced usefulness of the text.

Although this book is not organized along systematic lines, an appendix has an extensive outline of angiosperms which includes concise

summaries of the significant features of each family (63 monocot families, 131 dicot families). These features include floral diagrams, symmetry, features such as fusion among organs, position of the carpels, pollen type, pollination method, floral attractants to pollinators, fruit type, number of genera and species, and names of a few representative genera. The systematic arrangement, according to the author, is a compromise between traditional treatments and the newest findings based on molecular studies.

The book is nicely organized and produced. The illustrations are uniformly excellent and appropriately located to illustrate concepts nearby in the text. I did not encounter any subjects that could not be located easily in the Table of contents or the index. According to the preface, the book is intended for students, teachers at various levels of education, and the lay public who might be interested in new and unfamiliar aspects of biology. The profuse use of German common names of flowers, as well as their scientific names, should make the book more appealing to nonscientists familiar with German. "Steppenhexen" or "Steppe witch" is apparently what Americans would call tumbleweed. In my view, "Blüte und Frucht" could be used by those proficient in German as an introductory text in floral morphology and development, with the bonus of introductions to pollination biology and fruit form and function. It is useful as a reference to research on floral form and development by Professor Leins and his students and colleagues. — Shirley Tucker, Dept. of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106-9610

The Ecology of Adaptive Radiation, by Dolph Schluter, 2000. Oxford University Press, New York, Paper, ISBN 0-19-850522-1, \$34.95. - Speciation, species concepts, and adaptive radiation in species lineages have been the focus of much discussion and controversy over the last century of evolutionary biology, stimulating advances in our understanding of ecological adaptation, population differentiation, and the mechanisms by which new species and clades arise and are maintained in nature. Schluter's new book, *The Ecology of Adaptive Radiation*, is an important contribution to this tradition, providing a synthetic and provocative approach to the causative factors leading to adaptive radiation. Moreover, his empirical research with finches and stickleback fish lends credibility to his analysis and to the links between theory and case study that form the core of his approach to adaptive radiation. Below I highlight the strengths and key elements of his new book.

Adaptive Radiation is written in a very engaging and accessible style, with discussions that are well-supported by diverse examples from plants and animals, and from theoretical as well as empirical studies. This aspect, as well as the informative tables make it particularly valuable for graduate students and professional biologists with an interest in evolution, whether they be systematists or population ecologists. The book is well-organized topically and each chapter includes helpful subheadings, and an introductory section that poses the important questions and lays out the direction of each chapter unit. Chapters conclude with remarks and discussion elements that not only synthesize elements presented earlier in the book, but pose new questions and highlight gaps in our knowledge. Thus the book is an excellent starting point for those who want to pursue new research in this field. Other strengths include informative box inserts (e.g. on detecting rapid speciation and trait-environment associations) and detailed tables that list the case studies that meet established criteria for consideration as evidentiary examples of topics such as character displacement, adaptive radiation, and speciation via sexual selection. The final chapter is also a useful summary of the key points of consensus developed throughout the text. However, the 50 year projection might have done more to take the reader beyond the current content of Schuller's book. For example, it might extend links between macro and microevolutionary approaches, draw in the newly emerging tools of genomics, proteomics, and refer reader to the role of duplicate genes and multigene families in evolution.

The book begins with a clear statement of objectives—to evaluate the ecological theory of adaptive radiation set forth by early pioneers, most notably Simpson, in light of new evidence. Schluter defines adaptive radiation as the “evolution of ecological and phenotypic diversity within a rapidly multiplying lineage,” noting the importance of common ancestry (though not necessarily monophyly), phenotype-environment correlation, trait utility, and the rapidity of speciation. The latter can be judged using data such as the branching rates of ancestral and descendent species within clades, and the extent to which speciation events exceed extinctions. He also effectively defines and establishes criteria for these terms and concepts and for others that are critical to his evaluation of the ecological theory of adaptive radiation. I particularly enjoyed the effectiveness with which he defined even “simple” concepts such as environment, and his handling of alternative definitions of adaptation and adaptive radiation. Consistently throughout the book, Schluter presents and evaluates alternative

hypotheses—e.g. mutation and drift—as explanations for concepts ranging from phenotypic divergence to reproductive isolation. He also includes an impressive selection of case studies from both the plant and animal literature in his elucidation of the three major processes contributing to adaptive radiation: 1) phenotypic divergence of populations linked to environment and resource use, 2) phenotypic divergence of populations resulting from resource competition with close congeners, or from new ecological opportunities created via release from competition from more distant taxa, and 3) ecological speciation as a product of the same processes contributing to phenotypic divergence in populations. Thus, the book is explicitly focused on microevolutionary processes operating at lower taxonomic levels, rather than on macroevolution.

Overall, the book is an outstanding contribution to the published literature and is a must for evolutionary biologists interested in speciation and reproductive isolation. The diversity of plant and animal examples is a clear strength also. For botanists, plant examples that are highlighted include not only classic cases such as the Hawaiian silversword alliance (e.g., studies by Baldwin), but studies of *Schiedea* (Sakai & Weller et al.), and *Dalechampia* (Armbruster) as well. Research on *Aquilegia* (Hodges) is featured as an example of a key innovation (nectar spurs) leading to rapid evolutionary diversification. Other plant taxa are also mentioned in relation to phenotype-environment correlations (e.g. *Encelia*) and with respect to speciation, hybridization or character displacement (e.g. research on *Iris*, *Ipomopsis*, and *Iris*, by labs headed by Arnold, Campbell, and Rieseberg, respectively). However, while plant evolutionary biologists will find much to learn from and enjoy in Schluter's work, some important processes that contribute to speciation, and hence to adaptive radiation are insufficiently developed as alternative explanations or models. Certainly one book cannot hope to meet everyone's ideal expectations, but hybridization and polyploidy received scant attention relative to processes that predominate in animals (e.g. sexual selection). Many studies have demonstrated niche divergence, phenotypic novelty, and speciation involving hybridization and/or polyploidy in taxa ranging from ferns to sunflowers. Moreover, the book would have benefited from at least brief inclusion of the potential role of apomixis and selfing with respect to reproductive isolation and phenotypic variation. In all, however, the book is an excellent and provocative source of information relative to classical and emerging concepts of the ecology of adaptive radiation. I highly recommend it. Those interested

in speciation might also want to read the articles by Schuller and others in the recent special issue on Speciation, published in *Trends in Ecology and Evolution*, June 2001, Vol 16 (2001). - Susan R. Kephart, Department of Biology, Willamette University.

Spatial Pattern Analysis in Plant Ecology.

2000. Dale, Mark R.T. ISBN 0-521-79437-4. (paper US\$35.95) 326 pp. Cambridge University Press (<http://www.cup.org/>). 40 West 20th Street. New York, NY 10011-4211.- The topic of this book is extremely interesting and important to many plant ecologists. Unfortunately, I found this book to be excessively telegraphic, with a number of other shortcomings. The book concerns primarily measurement of data, followed by analysis of measurements. It gives little attention to simulation studies, fitting of models to data, or hypothesis testing. There is only passing reference to Monte Carlo simulation, one of the most important and powerful modeling and hypothesis testing methods used in ecology. I found no mention of agent-based models, and only a scant paragraph on cellular automata as compared to Markov models, which are themselves not adequately described. Perhaps these subjects should have been either given more detail, or omitted. The types of measurements discussed are primarily restricted to one or two dimensions: usually transect or quadrat measurements of plant distributions on a plane (a land surface) at a moment in time. It would have been helpful to discuss not only methods applicable to plants in three dimensional space, such as in a body of water or in a forest canopy (this lack mentioned in the book), but also methods of spatial and temporal pattern analysis that are commonly used in plant paleoecology. The bibliography is fairly good, emphasizing applied work (especially case studies) but with few references to the historical or statistical literature. There is an index, which is useful, but I wish it were far more extensive.

For established researchers in plant ecology, this book will probably serve as a useful overview of methods of spatial pattern analysis. For graduate students or others just getting started, I recommend first reading one of the classics (my favorite is Diggle, 1983). I think this book does a fair job of filling a significant gap in the plant ecology literature, and I hope there will be a future, revised edition. _ Una Smith, Los Alamos National Laboratory, MS K-710, Los Alamos, New Mexico 87545.

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Spatial Patterns in Catchment Hydrology. Observations and Modelling.

Rodger Grayson, and Gunter Blöschl, Ed. 2001. Cambridge University Press, Cambridge, UK. - *Spatial Patterns in Catchment Hydrology* is an international compilation that deals with various aspects of spatial variability and hydrologic modeling. The common thread throughout this volume is that the calibration and validation of distributed parameter hydrologic models needs to incorporate comparisons between model results and patterns of measured phenomena to provide insight into how well these models represent the processes governing water fluxes that vary spatially. The number of actual cases of this type of comparison is relatively small. Most hydrologic models have been calibrated against data from a limited amount of stream hydrograph data from a limited number of gaging stations. The problem with this type of calibration is that for any given situation there are probably a multitude of possible model realizations based on a variety of parameter configurations that may result in a good statistical 'fit' between modeled and measured hydrograph data. While these types of comparisons are important, they do not provide us with much information about how well the models are actually representing the processes that cause rainfall, infiltration, recharge, throughflow, and runoff to vary within catchments.

The individual chapters (each written by different scientists) are organized into three parts. Part one covers topics considered by the authors and editors to be "fundamental" to spatial hydrologic modeling. Part two contains seven case studies where distributed models have been calibrated using a wide variety of spatial data. Part three contains two relatively short chapters that discuss approaches to distributed hydrologic model calibration and validation using spatial data, and summary remarks about spatial patterns pertinent to hydrologic processes and their modeling.

The text is generally well written and edited though it has what I would refer to as a decidedly European flavor in terms of spelling and grammar. With the exception of some of the in-depth model descriptions the text is also relatively easy to read. The figures are clear and useful and the graphics quality is very good throughout the book. The only mechanical criticism I have is with regard to the reference information. The book has a single large reference section at the end of the book. This method seems odd for a compilation of chapters written by different authors discussing different albeit related subject material. I suppose that having individual chapter reference sections would introduce some redundancy, but I constantly found myself having to thumb to the back of the book to look

up sources. It would have been much more convenient to have the references for each chapter at the end of each chapter.

Particular Things I liked about the book.

The breadth of the topical, technical, climatic, and geographical coverage within the framework of spatially modeling hydrologic processes is quite good. Topics included the spatial variability of snow cover, soil moisture, precipitation, runoff, shallow groundwater, and groundwater/vadose zone interactions. A wide variety of techniques for gathering data and modeling processes related to these topics were used. Climates ranged from alpine to semiarid to humid tropical. Geographical coverage encompassed four continents. My overall impressions from the case studies were that no single method is necessarily applicable in all settings and that different processes are most important to capture correctly the hydrologic fluxes in different settings. Together, the case studies provide a reasonably thorough overview of methods currently available, their accuracy, and where research areas need to concentrate to improve modeling results.

Minor shortcomings and omissions

I hesitate to criticize this work because it is I believe a very valuable contribution to hydrology. I am also acutely aware that decisions have to be made in the planning and editing stages of such a work regarding its ultimate length and breadth of coverage. However, from my admittedly biased perspective, there are a few useful topics that are conspicuously missing. First, and probably most obvious is the lack of discussion regarding the application of geographic information systems (GIS) techniques for modeling hydrologic processes and available GIS datasets that can be used in distributed hydrologic models. In a text dealing with the spatial variability of hydrologic processes that discusses distributed parameter input data and spatial modeling it seems strange that the term GIS is only briefly mentioned on four pages. GIS is such a common tool used for managing spatial data sets, supplying input data to models, and for the graphic display of model results that I think it probably deserves at least equal billing with the remote sensing techniques discussed extensively in various sections of the text. Second, I was a little troubled that in a book about the study of spatial patterns that there was no mention of indicator kriging. It strikes me that the discussion about interpolating parameters in chapter 2 would be greatly enhanced by a discussion about this well documented technique that facilitates the interpolation and mapping of spatial patterns of the likelihood that a given parameter exceeds a given threshold value. Third, there are specific chapters

devoted to the discussion of the variability of precipitation and evaporation processes that are very appropriate and necessary but the variability of soil properties affecting hydrology is not discussed as a formal topic. Considering the importance of soil properties for modeling infiltration, runoff generation, water storage, evapotranspiration, and recharge it would seem that a discussion of the techniques used to assess, model, and represent soil variability might have been appropriate.

Target Audience

The editors of this text indicated in the Preface that the book is designed for "...two types of readers". Those with "... a general knowledge of catchment hydrology..." who want to learn more, and "...hydrologists who already have a sound knowledge of methods for spatial data analysis and of distributed modelling, but are thinking of undertaking studies similar to those presented in the book." I believe that I can safely say that the editors and authors hit their mark reasonably well. This book would be a valuable resource for both types of readers. I could also see this book being a resource for scientists who are not hydrologists, but who wish to understand more about hydrologic modeling. - Richard Sleezer, Earth Science Department, Emporia State University, Emporia, Kansas, USA.



The Gardener's Guide to Growing Orchids.

Rittershausen, Wilma and Brian. 2001. ISBN 0-88192-496-2 (Cloth US\$29.95) 159pp. Timber Press, Suite 450, 133 SW Second Avenue, Portland, Oregon 97204 - - The "Gardener's Guide to Growing Orchids" is a recent addition to the plethora of similar "how-to" books on orchids. It is written mostly for those orchid fanciers living in temperate climates and northern regions almost to the exclusion of those in the subtropics and tropics where orchids may be brought to their glory without greenhouse shelters. Thus an extensive part of the current work deals with greenhouse culture virtually ignoring aspects of outdoor culture.

Like other books on growing orchids, authors Wilma and Brian Rittershausen perpetuate the sloppy horticultural terminology characteristic of this genre. They still "feed" orchids and do not recognize that orchids do not eat, but manufacture their own food through photosynthesis. Inflorescences are invariably called "spikes," they anthropomorphize the plants that "like" a richer compost and "dislike" the extremes of being cold, and write about roots that "breathe." Then there is British terminology that may be offputting to the non-British: they write of "mains of water" and "cottonwool," and they burn "paraffin" in their greenhouse heaters. Hoses have a "lance" (nozzle) at the end, and orchids may be watered with a "rosed" can.

The chapter on "Orchids in the Home" is informative as is the section on potting, although they indicate that "chunks of fir bark [are], obtained from pine forest trees." Too, they ignore some important potting media as osmunda "fiber" and tree fern plaques and "totems." The chapter on "Pests and Diseases" would have benefited from illustrations of the pests. Spicer mites are not sprayed with insecticides, rather with miticides. Appendix 3, "Reading about Orchids," contains nine books of 13 by the Rittershausens. It ignores such time-tested treatises as Rebecca Northen's comprehensive "Home Orchid Growing" (1990. Simon & Schuster, New York).

The "Glossary" is helpful, but somewhat misleading, e.g., the pollen cap is not the anther, monopodial orchids do not produce "an upward-growing rhizome from which grow pairs of leaves," mycorrhizae inhabit orchid roots, and the pseudobulb stores food as well as water.

Outstanding features of the book are the excellent color renditions of orchid flowers and the extensive descriptive listing of popularly grown orchid species and hybrids. Each of these is accompanied by brief notes on its habitat in nature, the appearance of the plant and its flowers, and pertinent cultural tips. Generic descriptions are helpful outlining the geographic distribution of each genus, discussing taxonomic questions, and

describing general cultural requirements. An index to plants names and subject matter complete the volume. Although there are certain inadequacies in this book, the beautiful illustrations and excellent plant descriptions will make worthwhile contributions to one's shelf of orchid literature. – William Louis Stern, Department of Botany, University of Florida.

Gifts of Winter: Catalogue of an Exhibition.

2000. White, James J and Lugene B. Bruno. ISBN 9-913196-69-X (paper US\$16.00) 72 pp. Hunt Institute for Botanical Documentation, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 152113-3890. – We recently had our first winter storm of the year – an ice storm followed by several inches of snow. Walking to work the next morning was a beautiful sight, but many of the 58 illustrations in this attractive volume that celebrates the winter season are nearly as moving. Most of the works represented are from the Hunt Collection, but 14 were produced specifically for the exhibition by artists Richard Carroll, Charles Pitcher, and Michael Wheeler.

The reproductions are of excellent quality and are artfully arranged. On several facing pages, similar subjects in different styles or from different times are juxtaposed. For example, the contemporary watercolor of *White ash, Black cherry, Shadbrush, Red maple, Ohio buckeye, American elm*, by Anne Ophelia Dowden (1975) balances the watercolor of [Maple Leaves] attributed to Samuel Wickersham (1869). The details in both, down to fungal lesions and insect damage, are remarkable. I particularly enjoyed the two series by Carroll and Pitcher. One can almost feel the texture of the individual specimens Carroll paints: a maple seed, a cluster of dried grapes, a hickory fruit or a dried and shriveled Sassafras leaf. Picture frames a mood, almost dream-like, with a thicket of peeling sycamore trunks or stand of birch or aspen.

Interspersed with the artwork are some poems of the season taken from *Flora and Thalia; or, Gems of flowers and poetry* by a lady (London, printed for Henry Washbourne, 1835), *Floral poesy, a book for all seasons* (London, Frederick Warne & Co., n.d.), and *The Book of Flower Fairies*, Cicely Mary Barker, 1927.

At the end is a conspectus of the artists and their works. This is a delightful volume to peruse on a winter evening and would make an excellent gift for yourself or a friend. – Marshall D. Sundberg, Department of Biology, Emporia State University, Emporia, KS 66801.

The Himalayan Garden: Growing Plants from the Roof of the World.

Jermyn, Jim. 2001; ISBN 0-88192-500-4 (Hardbound, \$34.95) 320 pp. Timber Press, Inc, 133 S.W. Second Avenue, Suite 450, Portland, OR, 97204-3527. - Although Mr. Jermyn admits early in his book that he has never been to the Himalayan region proper, his knowledge and fascination with the plants of this region is completely apparent. The book reads like an intriguing catalog of beautiful plants, enticing you to cultivate them in your own garden. Descriptions are given for all plants along with a brief natural history or a bit of information on how to grow them. For me, the book's superior aspect was the amazing, glossy, color photographs located on almost every other page throughout the book. Seeing these beautiful plants, I felt inspired to take on even the most challenging species.

The book begins with an introduction to the ecological divisions of the Himalayas, which forms the outline as the book is divided into chapters along elevational gradients in the Central Himalayas. Mr. Jermyn uses this approach because the elevation where the plant is found in nature will dictate where and how it ought to be placed in the garden. For example, he discusses peat gardens within the chapter entitled "Temperate Zone," because some plants, such as certain *Primula* species, from the temperate elevation zone do best in a peat garden. After the temperate zone, there is a chapter on the subalpine zone and lastly, a chapter on the alpine zone. I was disappointed, particularly given the title of the book, that this latter chapter was the shortest of the three zones; though, perhaps the short length of the alpine zone chapter reflects the difficulty of growing plants from this elevation. The book finishes with two short chapters: one on propagation, the other on pests and diseases.

The second chapter in the book is devoted to a short history of plant hunting in the central Himalayas and some discussion on conservation. I think this chapter is important because Mr. Jermyn stresses the idea that plants from this region ought not to be dug up en masse and removed for greedy growers in other countries. Instead, he stresses that many plants can be grown from propagation or from seed and that we, as consumers, should be careful to purchase our Himalayan species from reputable gardens.

This book is not really a how-to book on rock gardens or alpine plants. If one were more interested in specific information on how to make a rock garden or on how to cultivate alpine plants, then I would recommend *Creating and Planting Garden Troughs* by Joyce Fingerut and Rex Murfitt. However, Mr. Jermyn does have some wonderful conceptual

and design recommendations for creating a woodland garden using Himalayan plants.

Clearly this book is written more for the horticulturist and gardener than for the botanist, and Mr. Jermyn has some humorous critiques of our profession. After describing his frustration with name changes on species of which he was fond, he writes, "Though I may have belabored this point, I feel strongly that most readers are down-to-earth gardeners like myself and deserve some sort of explanation of what the botanists are up to." Indeed, what are we botanists up to?

My main criticism of the book has less to do with Mr. Jermyn's treatment than it does with my own selfishness. Although the book is called *The Himalayan Garden*, it should really be entitled "The Central Himalayan Garden" because the western Himalayas are poorly treated. This was disappointing to me since I live in southern Colorado, where the climate is much more like the Himalayas of western India or Pakistan. Many of the species Mr. Jermyn describes are much better suited to his U.K. home or to our Pacific Northwest than to the semi-arid climate in which I live. Some Himalayan genera common in Colorado gardens are overlooked in this book. For example, species of *Bergenia* [Saxifragaceae] and *Acantholimon* [Plumbaginaceae] were recently found in a plant-hunting trip to Pakistan (Kelaidis, 2001), but neither is mentioned in *The Himalayan Garden*.

Despite the fact that many of the species may prove too challenging for my dry and alkaline garden, I would still recommend it for rock gardeners and those interested in Himalayan plants. Mr. Jermyn's knowledge of his subjects and descriptions of them are impeccable. There are many interesting facts about various species, and I think most botanists with any interest in mountain flora would find this book an enjoyable read. — Catherine Kleier, Curator, Adams State College Herbarium, Department of Biology, Adams State College, Alamosa, CO 81102.

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Landscaping with Herbs. Adams, James. Timber Press 2001 (paperback edition of 1987 hardcover book). ISBN 0-88192-514-4. 223 pages. -- Working with a botanical garden on a wild and wooded site on the Maine coast, I have been looking for practical ideas for landscaping the rocky ledges that can be conveyed to our visitors with similar landscaping challenges. With this in mind, I thought of herbs with their fragrance and variety of shapes and textures. A book called "Landscaping with Herbs" should have had just the advice I needed. However, crammed though it is with information, this was an extremely difficult book from which to find useful and practical advice.

The author identifies several kinds of landscapes where herbs could be used, including a fragrant garden, formal gardens (both beneficial and for beauty), informal landscape, contemporary landscape and the wild landscape. For each landscape type he provides a descriptive essay on the landscape type, a descriptive essay on the herbs for that type, and another essay he calls a walk through the landscape. Each of these essays ramble over pages of small paragraphs without subheading or spacing to indicate his ultimate goal. In the herb essays, recipes are randomly scattered throughout and since most of them seem to find ways to use fennel, they appeared to me to be quite repetitive. Their relevance to the topic of landscaping was not at all clear. There were several landscape plans showing homes and lawns, surrounded by curved garden borders dotted with a variety of plantings, including trees, shrubs and perennials with a few herbs added, although the logic of their placement was difficult to discern in this format. The color photos of gardens, mostly in the Seattle area, gave a better idea of the possible combinations.

More useful are the Appendices of the book where there is a hardiness zone map. There is also a chart listing the scientific names of many different herbs along with various information needed to plan their planting location such as blossom color, sun and moisture requirements and potential pests. Another table showed landscape uses and herbal uses, this time listed by common name, making these two charts difficult to compare. An interesting dictionary of the various Latin genus and species names could actually be very useful in teaching a course on herbs. Finally, a detailed index, identifying references to the recipes as well as the essay text could be helpful in relocating information one had seen somewhere in the essays. Overall, I wished that the author had taken a more structured and concise approach to the subject as he does in setting out "ten steps to a knot garden". In structuring the essays, clearly identifying some

basic principles for including different herbs into a landscaping plan would have been helpful. - Joanne M. Sharpe, Coastal Maine Botanical Gardens, Boothbay, ME 04537



Tylenchida: Parasites of Plants and Insects. 2nd Edition, by M.R. Siddiqi. CABI Publishing, New York, New York. 2000. xvii + 833 p. \$225. ISBN 0-85199-202-1. - In 1986 the first edition of this book was released, and it rapidly gained broad acceptance as the most significant publication in the field of nematology. Since that time Dr. Siddiqi's definitive work has inspired and directed such a tremendous volume of research on these numerically dominant and economically important plant parasites that the publication of a second edition became a necessity. The first edition has been out of print for several years, so the release of the second edition will provide relief to the weary nematologists that have diligently protected their worn copies from covetous graduate students.

Although the taxonomic importance of the Tylenchida might be lost on some, the economic importance of this group should be well known among botanists. Moreover, one has only to glance at the descriptions and depictions of the radiations of the tylenchids to be overwhelmed by the extensive, yet finely partitioned, continua of life-histories, physiological requirements, and ecological adaptations. Although Dr. Siddiqi's primary goal was to outline a meaningful and current classification for this extensive group, what has emerged is a veritable catalog of model systems for those more interested in biological processes than specific taxa.

The first chapter contains as thorough an introduction to the tylenchids as could be imparted upon such a diverse group, including their radiation, life-histories and ontogeny, habitats and feeding habits, ecology, epidemiology and control. A

glossary of taxonomic terminology also is included in the first chapter, perhaps as preparation for the subsequent historical review of the taxonomy of the Tylenchida. Also contained within the first chapter is an overview of nematological techniques that guides the reader through the entire process, from collection to final preparation for light or electron microscopy.

The second chapter contains a complete, yet concise, overview of the anatomical and structural characteristics of the Nematoda, complete with vivid SEM micrographs, and clear diagrams. What follows in an excellent primer on taxonomical methods, including an explanation of nomenclature, and a description of the various methods and associated analyses for both structural and molecular data. The chapter concludes with an overview of evolutionary systematics covering both cladistic and phenetic approaches.

The origin and phylogeny of the Tylenchida are discussed in the third chapter, with the remainder of the book being devoted to the description (including diagnoses, differential keys, and etymologies) and classification of the constituent valid genera and higher taxonomic categories of the Tylenchida. The focus is on clear identification, with the goal of supplying a reference suitable for students and researchers dealing with plant and insect nematology, plant pathology, and workers in the field of plant quarantine. This goal is realized through the classification by subgenus and subfamily in several taxa, the clarity of the text, and the numerous diagrams and electron micrographs, all of superior quality, that depict clearly the characters outlined in the diagnoses.

Although alternative classification schemes are presented in detail, the author's perception of this diverse group, based on 40 years of experience, is unabashedly interwoven into the tapestry of classification that is presented. This is precisely what makes this work so invaluable. Dr. Siddiqi clearly states that progress in the field of taxonomy arises only from dissention, and invites readers to 'oblige the scientific community' by improving upon his insights and theses. This edition has been extensively re-written, in essence constituting a new book rather than a second edition, and its impact certainly will be felt as broadly, if not more so, than the first edition. As remarkable as it is that a single individual could produce two such milestones in a single lifetime, even a brief perusal of this book will convince you that the task could only fall to Dr. Siddiqi. - Derek A. Zelmer, Department of Biological Sciences, Emporia State University, Emporia, KS 66801

Nature's Government, Science, Imperial Britain, and the 'Improvement' of the World. Drayton, Richard. 2000; Yale Univ. Press; ISBN: 0300059760 (Hardcover \$40.00)

346 pp. + xxi.- In this richly illustrated, provocative study the story of the origins and development the Royal Botanic Gardens at Kew becomes a vantage point from which one can understand changing ideas about botany, science and British imperial government from the mid eighteenth to the early twentieth century. The notion of "improvement" for the sake of creating a useable and orderly nature, lay deeply embedded in ideas about the study of botany and science during this period, justifying and stimulating developments as diverse as the creation of botanic gardens like Kew, to new methods of plant classification, to remarks such as those made by Puritan minister John Cotton who proclaimed about Colonial New England that those who "bestoweth culture and husbandry on it [the land], his Right it is."(p. 57). Drayton argues that the concept of nature as property for use and development depended upon collecting information about nature, what he calls "Nature's Government." He devotes most of his analysis to developments between the late eighteenth and early twentieth centuries because these were years of British imperial expansion when Enlightened government joined forces with the scientific community, and botany in particular, to collect information and legitimize their actions through schemes for agricultural improvement, both at home and abroad.

Botanic gardens played a significant role in these experiments. Under the leadership of Sir Joseph Banks (1783-1820), and Sir William Hooker and his son (1841-1873), Kew Gardens evolved from a garden that served as royal showcase for exotic, ornamental plants to one that vigorously promoted the economic uses of plants throughout Britain's possessions. Services the Garden provided for the improvement of the Empire included: its role as a repository, and disseminator, of plants and seeds from around the world; its patronage of voyages for discovery and collections of plants, such as that of the infamous Captain Bligh and his collection of Breadfruit; and its support of a network of colonial botanic gardens with agendas similar to that of Kew. The Garden's work in the collection, germination and dissemination of chinchona, used for the production of quinine, is just one of many endeavors that made Kew a "useful garden."

The author makes a convincing argument that lurking behind many of Kew Gardens activities in support of the Empire lay an ulterior motive, that of the professionalization of science, and botany in particular. Under the leadership of the Hookers, Kew Garden became a world-class herbarium and

“international centre for the science of botany.”(p. 220) Kew Gardens endures in these roles, outlasting its early connections with British imperialism, even though the it can no longer claim to house a “scientific empire” (267) as it could until the early years of the twentieth century. The ideology of “improvement” did not evaporate with the British Empire. Drayton argues that Kew Garden’s economic function within the ideology of improvement was adopted by other influential British government institutions by the middle of the twentieth century. Still later, institutions such as UNESCO and the World Bank assumed the task of improvement. What remains for all of us today, as Drayton points out, are questions concerning the human and environmental costs arising from free trade, the marketing of nature and ecological interchange.

This is a timely book. Recent studies such as *Empire’s Nature: Mark Catesby’s New World Vision* and an upcoming conference, sponsored by the Omohundro Institute, entitled “From Bacon to Bartram: New World Inquiries into the Natural World,” raise similar issues concerning the connections between science, nature and empire, especially in early America. The interdisciplinary character of *Nature’s Government* makes this book useful reading for a wide academic audience ranging from economic botanists to environmental historians. For some of these readers the connection between “improvement” and colonization will be familiar from other works, including William Cronon’s, influential *Changes in the Land: Indians, Colonists and the Ecology of New England*. What is intriguing about this book is the combination of these themes with the work of a botanic gardens, particularly the Royal Botanic Gardens at Kew. - - Sara Brooks Sundberg, Department of History, Emporia State University, Emporia, Kansas.

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Plant Life of the Quaternary Cold Stages, Evidence from the British Isles. Richard West, 2000, ISBN 0-5215-9397-2 (hard cover, \$105.00), 320 pp, Cambridge University Press, United Kingdom. - The Quaternary Period, a subdivision of geologic time, is separated into two epochs; the Pleistocene (2.3 million years ago to 10,000 years ago) and the Holocene (10,000 years ago to present). The Pleistocene is best known for its ice ages. During the Pleistocene, however, the climate vacillated from cool to warm causing massive polar ice caps to expand and contract. Many glaciers covered and altered the earth’s surface during the cold stages, especially in northern Europe and North America. Warmer, temperate periods (interglacials) of shorter duration occurred between glaciations. As a consequence, geographical ranges of many plant and animals species changed throughout the Pleistocene. Some species expanded hundreds of kilometers northward onto new deglaciated terrain during each interglacial interval but retreated to more southern latitudes when glaciers expanded. In areas that were not overridden by ice sheets, some species persisted through long intervals of less favorable climate in small isolated populations within their interglacial range, whereas others species shifted to more favorable, lower latitudes.

Richard West, a botanist and geologist, analyzed 94 cold stage, Pleistocene vegetation sites from Britain and Ireland. Most of the sites are distributed throughout southeast Britain. Five sites are scattered throughout Ireland, and five sites are located on the Isles of Scilly. The majority of the sites are confined to river, gravel floodplains in low-lying areas or lacustrine areas situated within kettle holes. Many of the sites belong to the Devensian (Last Cold Stage) but other floras extended back into the Middle and Early Pleistocene. Lists documenting 6651 records of macroscopic plant remains including fruits, fruit stalk, sporangium, cone scales, sheathing leaf base, mycorrhizal root, wood and leaves and 13,775 pollen records are noted. Included in the taxa records are frequency, age, site, comments on identification, and count. Data for most of the sites were published prior to 1995 but a number of unpublished accounts are also presented.

The book is divided into sixteen chapters. The first six chapters give an overview of the floras with regards to geologic setting, sedimentary environments, taphonomy, explanation of abbreviations used in data tables, and site locations. The seventh chapter uses information from various data tables to provide a family-by-family conspectus of vascular plants found throughout all 94-site

localities. Macroscopic or microscopic remains of genera and species, distribution, habitat, and preservational quality are briefly discussed.

Details regarding the representation of taxa in the fossil flora are presented in Chapters 8 - 12. Chapter 9 compares biological aspects of the cold stage flora to present-day floras growing in more northern areas including the Arctic and Denmark. The percentages of Hemicryptophyte, Cryptophyte and Therophytes, the life span of plants, physiological plasticity, and species variability are considered. These comparisons suggest how the Pleistocene cold stage floras were distinct and have little relation to present Arctic vegetation. The Pleistocene floras were more varied, widespread and productive. Each species has its own particular history, ecological physiology and genetic variability. Habitats of the cold stage floras are discussed in Chapter 10. West notes how latitude differences with regard to solar insolation and differences in soil drainage may account for greater variability in cold-stage floras.

The present distribution of fossil taxa is the theme of Chapter 11. Changes in sea levels, migration routes, anthropogenic causes, and time table records account for many geographical groupings that are presented. West states that cold stage conditions gave short-lived species the opportunity to thrive in open environments but that some cold-stage species preferred to thrive in disturbed habitats associated with more temperate regimes. As a result, many cold stage species could respond to changing environments.

Chapter 12 identifies specific plant records and categorizes the vegetation into distinct habitats including polar desert, grassland and meadow, dunes, heaths, marshes, woodlands, and salinity fields. West concludes that regional grasslands dominated stadial assemblages whereas interstadial assemblages had more forest development.

The reconstruction of past climates associated with the cold stage floras is accounted for in Chapter 13. Evidence from geologic sediments, oxygen isotopes, snowfall, pollen dispersal, paleobotanical indicator species, and competition are contemplated. January and July temperature ranges and precipitation levels are estimated. West notes, however, that climate reconstruction is complex. For example, some species that currently live in northern areas also occur in more southern areas where soils and lack of shade provide appropriate habitats.

Cold stage vertebrate and invertebrate fauna that are associated with the Pleistocene floras are the subject of Chapter 14. Similar to other areas in North America and Asia, large herbivores including Bison roamed the grasslands during the stadials. West notes that former authors have used the composition of beetle assemblages to infer specific climatic tolerances but that this idea could be misleading. Some ranges for beetles may have been more widespread in the past. For example, West notes that in Late Devensian assemblages, a local Tibetan species was associated with present-day arctic-alpine species.

How the cold stage stadial flora arose and its demise are discussed in Chapter 15. West emphasized that this flora originated in the late Tertiary, contain elements of modern arctic-alpine and temperate vegetation, and is unlike any other flora that exists today. Its extinction is partly contributed to the destruction of forests by Neolithic man and the agricultural revolution. The final chapter suggests that future studies including DNA analysis, improvements in taxonomy and an atlas of fossil macroscopic plant parts could aid in understanding climate change.

This book is written for the specialist interested in Quaternary climates. It also is an important reference for students who want to know more about present floras and their environments. Detailed species lists are provided along with an appendix that lists taxa found in the cold stage sediments. Multiple references that span the 1950's to the late 1990's are cited throughout the text. Numerous tables are included throughout the various chapters which are often confusing unless one refers to abbreviations used in earlier chapters. Included with the text is a compact disc that provides a searchable format of the cold stage flora. - Nina L. Baghai-Riding, Department of Biological Sciences, Delta State University, Cleveland, MS 38733



Bulbophyllums and Their Allies. Siegerist, Emily, S.2001. ISBN 0-88192-506 (Hardbound \$34.95) 251 pp. Timber Press, Inc., 133 S. W. Second Avenue, Suite 450, Portland, Oregon 97204.- A recollection of a *Bulbophyllum* in full bloom in the Bogor Botanical Gardens, Indonesia I have had for about 30 years is of a revolting stench which nearly made me vomit while trying to photograph the flower. Such disagreeable odors ("compared to the stench of dead elephants that have been in the sun for many days," according to Siegerist) are not unusual among flowers in this genus. In the case of *Bulbophyllum phalaenopsis* the flower may "appear to the [carrion] flies to be the maggot-riddled flesh of dead animals." The foul smell "accentuates this fallacy." The sex life of orchids is weird and wonderful, is it not?

Even after the Orchidaceae has been relegated to second place in terms of size after the Asteraceae it is still a huge family. And, it contains a number of very large genera. *Bulbophyllum* is one of them with 2700 known species. It is a worldwide genus found mainly in Malesia, New Guinea, Australia, India to Madagascar and Africa with a few species in the Americas. Plant size varies greatly within the genus. Only a few species produce beautiful flowers of the kind that is common among orchids. Some are relatively large, but others are nearly microscopic. Not all produce foul smells as pollinator attractants. Several smelling bulbophyllums are pollinated by nectar seeking flies which probably prefer sweeter fragrances.

A book covering all 2700 *Bulbophyllum* species is a near impossibility. The author clearly recognized this fact and wisely selected to cover 375 *Bulbophyllum* species (approximately 14% of the total) plus 170 related taxa and hybrids. In addition to descriptions the author also provides lists of synonyms where applicable. This is especially important in view of the penchant of orchid taxonomists to constantly create new species and genera, eliminate and/or reduce existing ones to synonymy, constantly transfer taxa back and forth between existing and newly created classification concepts and engage in never ending squabbles. An example of these gymnastics (none of which are the author's fault) is *Bulbophyllum odoratissimum* (J. E. Smith) Lindley which was established in 1830 and is considered to be a valid name at present after being *Stelis odoratissima* J. E. Smith in 1816, *Stelis caudata* D. Don in 1825, *Tribrachia odoratissima* (J. E. Smith) Lindley in 1826 and *Phyllorchis odoratissima* (J. E. Smith) Kuntze in 1891.

Descriptions of species, hybrids and horticultural requirements are concise, but clear, informative and entirely sufficient. I think that those who may

wish to grow and identify the species described in this book will find them to be entirely satisfactory and the book as a whole to be very useful. It is also an enjoyable book to read.

The book has 77 color illustrations each identified as a plate despite the fact that in most cases several photographs are printed on one page. What should have been done is to call each page a plate and label the photographs as figures. This is probably due to poor copy editing. Some of the photographs are excellent, a few leave some to be desired, but the majority are at least good enough to illustrate the flower in question. However all suffer from not being printed well enough to be lustrous and to "jump off the page" as orchid pictures should and generally do in well produced books. This is certainly not the fault of the author and the photographers.

A book like this one should have a subject index, but this one does not. All index entries are of plant names. Regardless of whether this is an error of omission (by the author who failed to prepare it) or commission (by the publisher who did not insist on one) the absence of a subject index will detract from the usefulness of the book. On the other hand the glossary (pages 220-225) is very helpful. Another welcome part of the book is the section on hybrids (pages 213-218).

Bulbophyllums is not a book for scientists. It is a book for growers and orchid lovers. As such it is well written, informative, and excellent as a guide. I do not have any *Bulbophyllums* in my greenhouse. This book made me wish I did, but then a recollection came back from my days in Bogor. – Joseph Arditti, Department of Developmental and Cell Biology, University of California, Irvine, CA 92697.

Cape Plants A conspectus of the Cape Flora of South Africa.

Goldblatt, P., and J. Manning. 2000. ISBN 0-620-26236-2. *Strelitzia* 9: 1-774. (Hardbound) XXX 774 pp. National Botanical Institute of South Africa, Private Bag X101, Pretoria 0001, South Africa. - Few temperate floras can compare with that of the Cape Region. Plant life is diverse and, in a word-bizarre. As a frequent field worker in the region, I am always struck by how much some of the plants in the northern Cape region look like the plants in Dr. Seuss books. The range of habits, especially of succulent perennials, is no less remarkable than the rate of endemism. For example, in the Cape flora the genus *Erica* comprises 658 species of which 635 are endemic. Cape plants are not only diverse and strange in morphology, they also have fantastic pollination syndromes like the beetle flowers of *Hydnora africana*. Just recently a gerbil pollinated plant was described! And new species are being found, including tiny quillworts discovered since the publication of the book (Musselman and Roux, unpublished).

So, having a volume that can guide us through this wonderland of plants is a welcome addition that involved a tremendous effort by Goldblatt and Manning and the almost forty contributing specialists. *Cape Plants* will prove an invaluable resource for botanical research. It builds on the wonderful tradition of botanical research in South Africa with its network of botanical gardens and herbaria as well as a plethora of publications on every aspect of the flora.

After a succinct introduction to the physical characteristics, floristic composition, and diversity of the Cape region, there is a selection of colored plates, well reproduced. Families are arranged according to the Angiosperm Phylogeny Group recommendation. Genera and species are arranged alphabetically. This is a conspectus; no family or generic descriptions are given. Family and genus entries give the number of taxa worldwide and the distribution within the Cape region and elsewhere. Common names in English and Afrikaans (but not in indigenous languages) are included as well as taxonomic synonyms. Species entries are the most detailed with the habit, selected salient features, along with flowering (or other sexual reproduction) time, habitat and distribution.

Obviously, the value of a flora to someone unfamiliar with the plants depends on the utility of the keys. I found the keys simple and workable. Family keys are in the back of the book.

Following the family keys is a section of taxonomic notes showing that the authors have

placed their work in the context of on going modern systematic work. An appendix includes statistics for the families including data on the number of genera, endemic genera and species, and the distribution of endemism within the floristic provinces of the Cape region. The index includes families, genera, and their synonyms.

Conspectus of the Cape Flora is not a field guide! The book is heavy, well bound, and well printed. This is a massive work and a major contribution to floristic research in Africa which will be invaluable to botanists, ecologists, wildlife managers, conservation workers, and anyone interested in the stunning flora of the Cape region. Herbaria, botanical gardens, museums, and libraries will want this essential reference on their bookshelves. - Lytton John Musselman, Department of Biological Sciences, Old Dominion University, Norfolk, Virginia 23529-0266.



Flora Europaea on CD-ROM. 2001. ISBN 0-521-77811-5 (CD-ROM US\$550) Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211. The famous *Flora Europaea* is available now on CD. The CD-ROM contains the full text of the five volumes of *Flora Europaea* including all maps and appendices; the first volume is from the 2nd edition. *Flora Europaea* is probably the most important reference for the identification of ferns and fern allies, gymnosperms and angiosperms growing wild or widely cultivated in Europe, and covers more than 10,000 taxa. It does not contain pictures and distribution maps; the geographic distribution of a species within Europe is indicated by listing the geographical territories in which it is found. Territories where the species are not native are especially marked.

The CD-ROM is easy to install and opens with a *Main Menu* offering a preface, instructions on how to use the CD, *Text of Flora Europaea*, and several interactive functions, including *Indexes*, *Identification Keys*, *Search* and *Glossary*. These interactive functions can be accessed from every screen. The *Indexes* function opens with a panel containing all genera and families included in *Flora Europaea*. Users may scroll through the list or write a name in a text box on top of the panel, leading to the respective name in the list. Selecting a name gives a list of all species of that genus on a new panel. From here, access to the species description in the text is provided by highlighting the name. Once in the text, one can easily flick through it backward and forward. The text can also be directly accessed from the main menu by choosing *Text of Flora Europaea*.

Fully interactive identification keys are provided by selecting *Identification Keys* from the main menu. A first couplet of a key appears, and selecting the appropriate character leads to the next couplet of the key. The selected characters are sequentially displayed in a separate panel, allowing the user to retrace the route taken. At any point it is possible to obtain a list of taxa corresponding to the selected characters. The *Search* option allows to use wildcards and up to 25 search items linkable by Boolean operators, thus providing a powerful search tool. Results of the searches lead to the respective pages or paragraphs of the text. From the text or key, immediate access to the *Glossary* is possible where taxonomic terms are defined. To open *Glossary* it is sufficient to highlight a term in the text or key.

The CD-ROM does not allow to perform simple tabulations, e.g., tabulating number of species of a certain genus among several countries. For researchers, such an option would greatly increase

the value of any electronic flora, although it is clear that the present CD has not the purpose for performing statistics. Occasionally, one finds spelling errors in the text, which just have been copied from the printed version due to the scanning process.

Some basic statistics in the introductory section on the number of families and taxa treated in the *Flora Europaea* would be helpful. It would also be of great help if the explanations to the abbreviations of the 34 geographical territories would be accessible from any screen. These explanations are somewhat awkward to find as one needs to click through several menu options until one gets to the "Explanatory Notes and Technical Terms" section of the text.

Despite this minor criticism, the CD-ROM is a highly valuable tool as there are not many floras available in electronic form. - Ewald Weber, Geobotanical Institute, Swiss Federal Institute of Technology, Switzerland.



Plant Diversity of an Andean Cloud Forest. Checklist of the Vascular Flora of Maquipucuna, Ecuador.

Grady. L. Webster and Robert. M. Rhode. 2001. ISBN0-520-09830-7 (paper US\$36.00). 211 pp. University of California Publications in Botany Volume 82. University of California Press, 2000 Center Street # 303, Berkeley, CA 94704. - Ecuador's flora is undoubtedly one of the most diverse in the tropics, with more than 15,900 species (Jørgensen and León-Yáñez 1999). During the last 25 years, intensive collecting in several parts of the country by Ecuadorian and foreign botanists (e.g. Renner, 1993) has helped to learn about the taxa that inhabit the smallest country in the Andes. However, much work is still required to learn about and understand species composition, habitat requirements, extent of distributional ranges, and conservation status. This is especially true for the Ecuadorian Andes, where the largest number of endemic species occurs (Valencia et al. 2000). Within this context, the Webster and Rhodes book provides information on a rich local flora that serves as a tool for further studies in floristics, systematics, and conservation.

As a result of a ten-year effort, Webster and Rhodes present a checklist of a montane area, located between 1200 and 2800 m elevation that includes a private reserve, Bosque Protector Maquipucuna in western Ecuador. This checklist is organized in nine parts. The introduction outlines the goal of the checklist, which is a first step for a future preparation of a flora. It is followed by a very brief account of the climate and topography, and another on the vegetation. The study site lacks detailed data on precipitation, temperature, and soil features, like many other montane areas in the tropical Andes. Thus, climatic conditions are extrapolated from neighboring stations with precipitation there ranging from 2000 to 3230 mm/year. There is no description of soil types, and therefore their link to the plant communities. The vegetation is considered to include both "lower montane cloud forest" and "upper montane cloud forest".

This book also includes an analysis of the flora. Ten families, Araceae, Asteraceae, Dryopteridaceae s.l., Gesneriaceae, Melastomataceae, Orchidaceae, Piperaceae, Poaceae, Rubiaceae and Solanaceae, are among the most speciose plant families, a feature similar to other montane areas in the tropical Andes. In addition, Webster and Rhodes attempt a comparison of species richness and family composition with other montane and lowland areas within and outside Ecuador, including Río Palenque, and sites in Brazil, Colombia, Costa Rica, Peru and Venezuela. This is followed by a brief description of the conservation status of their study area.

The last part provides a listing of the 1640 species, with habitat, altitudinal range, life form, vegetative or reproductive morphological features, and voucher collection numbers. Webster and Rhode based their publication on more than 5200 collections, over half of those collected by the first author and collaborators on the University of California Research Expeditions Program, mainly in the reserve. Five other surrounding localities within less than 5 km of the western end of the reserve were also surveyed. The importance of this publication resides in this listing. It provides additional information of new plant records for Ecuador, and Pichincha Province, contributing to the inventory of the tropical Andes, and the registering of those endemic and rare taxa. The list of Araceae, prepared with the assistance of Thomas Croat, includes some taxa previously collected by Luis Sodiro during the late 19th and early 20th centuries in the surrounding areas, some of which are restricted to Ecuador. There are references for each listed genus, and comments under taxa of difficult taxonomy. There are a few minor misspellings, including the name of the Guayllbamba River in Fig.1, a missing M for Maquipucuna in page 20, and for scientific names in pages 37, 38, 45, 71, 75 and 102. A probable misidentification is listed in Crassulaceae: *Crassula venezuelensis* (Steud.) M. Bywater and Wickens is the only aquatic species in the tropical Andes and not *C. connata* (Ruiz and Pav.) A. Berger. There are five appendices listing dominant taxa by altitude, and epiphyte richness and composition. There are 35 black and white photographs, some of which provide views of the study area and selected plants.

This book will be useful to individuals specifically interested in floristics of tropical America, especially from the tropical Andes. The availability of this checklist through the web (<http://herbarium.ucdavis.edu>) allows for another easy way of accessing the information. Webster and Rhodes have done an important step in their eventual goal of preparing a floristic treatment. It would be helpful in the future to consider similar efforts in other protected sites, including those managed by the government of Ecuador. —Blanca León, Plant Resources Center, University of Texas at Austin, Austin, TX 78712.

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Plant Diversity of the Iwokarama Forest, Guyana. H. D. Clarke, V. A. Funk and T. Hollowell. 2001 ISBN 1-889878-07-3. (Paper US \$20.00) 86 pp. SIDA Botanical Miscellany No. 21. Botanical Research Institute of Texas, 509 Pecan Street, Fort Worth, Texas 76012-4060. - Non-literate societies have persons designated as "Those Who Remember." All the events in the history of the people can be recited by such adepts. In our time we have plant collectors who, while they cannot protect the flora, can at least, preserve specimens in herbaria and publish plant lists like this one. They are "Those Who Remember" a botanical world so rapidly disappearing.

Much effort is being made to record, and in some cases protect, the flora of the Guiana Shield of which Iwokarama is a part. The difficulties facing the collectors involved in this particular area is somewhat understated in the text. However, if one carefully reads the geological, edaphic and climatic data it does not take much imagination to realize how heroic their efforts.

Efforts of foreign professionals to involve the local people is commendable. One hopes that some of those volunteers are given scholarships to study botany at a university, with the proviso that they return and work in the area. The writers seem to think setting up a local herbarium is a rather simple matter. Perhaps, but the cost can be staggering in third world economies.

The heart of the book is the lists:

Appendix 1. It is very useful to have the other four areas: Kaietur Fallas, Mabura Hill, Saul (Marshall, there is an umlaut over the u and I cannot get it on my computer) (Central French Guiana) and Reserva Ducke, near Manaus, Brazil. However it would have been yet more useful to give the coordinates of these preserves in the Guiana Shield, and at least a sentence or two about their geobotanical character so the reader could make conclusions about the relationships of the plants listed. Comparing the flora of a wetland or a dry with the forests of Iwokarama could be an "apples with oranges" situation.

Appendix 2. Iwokarama Plant Collections with the names of each collector.

Appendix 3. List of Ranks of Species Richness by Family for Iwokarama, Four Other Sites in NE S. America, and the Guianas Overall.

Appendix 4. Specialists Contributing Determinations of Iwokarama Specimens.

This book will appeal only to specialists in South American flora. For them the above criticisms are moot. But anyone beginning studies in the area would certainly appreciate the additional information without having to research much further. – Sarah Delle Hultmark



Variation and Evolution in Plants and Microorganisms: Toward a New Synthesis 50 Years after Stebbins. Francisco J. Ayala, Walter M. Fitch, and Michael T. Clegg, Editors, 2000. 0-309-07099-6 (paperback US\$19.95) 352 pages. National Academy Press, 2102 Constitution Avenue, N.W., Washington, D.C. 20418.—Some readers upon seeing the title, *Variation and Evolution in Plants and Microorganisms*, may expect a didactic textbook. While this book certainly provides much information which could be used for discussion in an advanced undergraduate or graduate course, it is not a textbook per se. This fascinating compilation consists of 17 papers presented at a colloquium sponsored by the National Academy of Sciences meant to celebrate the 50th anniversary of G.L. Stebbins *Variation and Evolution in Plants*. The range of expertise is impressive and the topics are divided into five sections: early evolution and the origin of cells, viral and bacterial models, protocist models, population variation [in plants], and trends and patterns in plant evolution.

I found the first part of this book, early evolution and the origin of cells, riveting. In this part, Schopf reviews the research on the Precambrian record of life; Margulis, Dolan, and Guerrero discuss the evolution of eukaryotes from ancient symbioses; and Palmer *et al.* discuss the evolution of plant mitochondrial genomes. In part two, I thought that Levin and Bergstroms article about the differences between prokaryote and eukaryote evolution was particularly interesting and informative. I think that every biologist will find something of interest in this book, especially if you are interested in plants, microbes, genetics, or evolution.

Two articles will be of particular interest to those readers with an interest in plant reproductive ecology. In part four, Clegg and Durbin discuss flower color polymorphism in morning glory in an article entitled, "Flower Color Variation: A Model for the Experimental Study of Evolution." In part five, Holsinger in "Reproductive Systems and Evolution in Vascular Plants" discusses the affects of self-fertilization and asexuality versus outcrossing on the genetic structure of populations.

At the beginning of *Variation and Evolution in Plants and Microorganisms*, Peter Raven's details Stebbins' life and work in a short biography. This book gave me a new appreciation of Stebbins' work and of the work that is still being done in these research areas. I would highly recommend this book. Fortunately, you don't have to take my word for it, because you can see for yourself and read it online for free (<http://www.nap.edu/catalog/9766.html>). Although it is not an expensive book, you can also order it online at the National Academy Press website and receive a discount. - James L. Smith II, Biology Department, La Sierra University, Riverside, CA 92515-8247.



World Geographical Scheme for Recording Plant Distributions, 2nd Edition. R. K. Brummitt (with assistance from F. Pando, S. Hollis, N. A. Brummitt and others). 2001. ISBN 0-913196-72-X (stiff paper cover, US\$10.00), 137 pp. Published for the International Working Group on Taxonomic Databases for Plant Sciences by the Hunt Institute for Botanical Documentation, Carnegie Mellow University, Pittsburgh.— The international working group on taxonomic databases (TDWG) was started in 1985 to explore ideas on standardization and collaboration between major plant taxonomic database projects. Its goal is to establish the standards that will facilitate comparison or combination of data. Anyone concerned with mapping plant distributions across larger geographical areas should consider buying this booklet or printing it out as a pdf file from <http://www.tdwg.org/geo2.htm>. Digitized geo-referenced maps suitable for use in a GIS also are part of this and available from the Kew web site at <http://www.rbghkew.org.uk/gis/tdwg/>.

What does this offer? Mainly, it provides a system of non-overlapping acronyms for all the World's countries and large provinces (as of 1991) grouped at four levels. In addition, there are 17 maps showing the recognized regions and smaller units, down to ITA-VC (Italy-Vatican City) with less than one square kilometer. The four levels consist of 'basic recording units', which are political entities, such as countries, states, or departments. These are grouped by continent and region, and into 'Botanical Countries'. In the majority of cases, political countries and Botanical Countries are the same. An example of a discrepancy is Italy. Politically, this includes neither San Marino nor the Vatican City, while as a Botanical Country it does. This kind of discrepancy obviously is frequent, and the TDWG committee by its own admission failed to overcome it in a completely satisfactory way. One could have introduced something like 'Italy mainland', which might include San Marino, Vatican City, and Elba, but not the islands Sardegna and Sicilia, which politically, but not floristically, are part of Italy. Such a solution, however, would have introduced numerous new names, and so the group settled on a Botanical Country/political country coding system. Thus, Italy as a Botanical Country is the same as Italy sensu Flora Europaea, but Italy as a political country is not. The gazetteer, which makes up a third of the text, lists some 2100 geographical names plus many synonyms together with their acronyms and code numbers. Acronym derivation and coding are straightforward. Each name in the gazetteer is followed by two digits that place it on a continent and in a region. Five letters then refer it to political and botanical countries. Thus, Inno-shima, a synonym of Honshu listed in the gazetteer, is coded 38 JAP-HN, 38 being Eastern Asia. The Kamaran Is. belong to South Yemen and are 35 YEM-SY, 35 being the Arabian Peninsula, Jalpaiguri is 40 IND-WB (Indian Subcontinent, West Bengal), and Denmark is 10 (Northern Europe) DEN-OO, political and botanical country being identical in this case. A synopsis of changes between the first and second editions of this work fills eight pages. Most have to do with additional units (e.g., Czech Republic, Slovakia, Bosnia-Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia, Slovenia), boundary changes, and improvements in the five-letter codes. Some changes result from the input of Indian and Mexican botanists, who suggested better delimitations for the Himalayan and Mexican regional schemes.

Besides for those concerned with large plant databases, this work should be of interest to all those interested in coding distributions for computer-assisted analyses. – Susanne Renner, Department of Biology, University of Missouri, St. Louis.

Books Received

If you would like to review a book or books for PSB, contact the Editor, stating the book of interest and the date by which it would be reviewed (1 February, 1 May, 1 August or 1 November). Send E-mail to sundberm@emporia.edu, call or write as soon as you notice the book of interest in this list because they go quickly! Ed.

Ainsworth and Bisby's Dictionary of the Fungi, 9th ed. Kirk, P.M., P.F. Cannon, J.C. David and J.A. Stalpers. 2001. ISBN 0-85199-377 X (Cloth US\$90.00) 655 pp. Oxford University Press, 2001 Evans Road, Cary, NC 27513.

The Alfred Russel Wallace Reader: A Selection of Writings from the Field. Camerini, Jane R. (ed). 2001. ISBN 0-8018-6781-9 (Cloth US\$42.50) ISBN 0-8018-6789-4 (Paper US\$18.95) 219 pp. The Johns Hopkins University Press, 2714 N. Charles Street, Baltimore, MD 21218-4319.

Allelopathy in Agroecosystems. Kohli, Ravinder K., Harminder Pal Singh, and Daizy R. Batish (eds). 2001. ISBN 1-56022-090-2 (Cloth US\$74.95), ISBN 1-56022-091-0 (Paper US\$54.95). 447 pp. Food Products Press, The Haworth Press, Inc., 10 Alice Street, Binghamton, New York, 13904-1580.

An Atlas of Orchid Pollination: America, Africa, Asia and Australia. Van der Cingel, N.A. 2001. ISBN 90-5410-486-4 (Cloth US\$99.00) 306 pp A.A. Balkema Publishers, c/o Ashgate Publishing Company, 2252 Ridge Road, Brookfield, VT 5036-9704.

Bamboos for Gardens. Meredith, Ted Jordan. 2001. ISBN 0-88192-507-1 (Cloth US\$39.95) 408 pp. Timber Press, Inc. 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Botanical Dietary Supplements: Quality, Safety and Efficacy. Mahady, Gail B., Harry H.S. Fong, and Norman R. Farnsworth. 2001. ISBN 90-2651-8552 (Cloth US\$79.50) 276 pp A.A. Balkema Publishers, c/o Ashgate Publishing Company, 2252 Ridge Road, Brookfield, VT 5036-9704.

A Cactus Odyssey: Journeys in the Wilds of Bolivia, Peru, and Argentina. Maruseth, James D., Roberto Kiesling, and Carlos Ostolaza. 2002. ISBN 0-88192-526-8 (Cloth US\$39.95) 306 pp. Timber Press, Inc. 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Economic Botany: Principles and Practices. Wickens, Gerald E. 2001. ISBN 0-792-36781-2 (Cloth US\$220) Kluwer Academic Publishers. P.O. Box 989, 3300 AZ Dordrecht, The Netherlands.

Environmental Physiology of Plants 3rd ed. Fitter, Alastair H. and Robert KM Hay. 2002. ISBN 0-12-257766-3. 367 pp. Academic Press, 525 B Street, Suite 1900, San Diego, CA 92101-4495.

Faunal and Floral Migrations and Evolution in SE Asia-Australasia. Metcalfe, I., J.M.B. Smith, M. Morwood, and I. Davidson. 2001. ISBN 90-5809-349-2 (Cloth US\$130.00) 416 pp. A.A. Balkema Publishers, c/o Ashgate Publishing Company, 2252 Ridge Road, Brookfield, VT 5036-9704.

Flammable Australia: The Fire Regimes and Biodiversity of a Continent. Bradstock, Ross A., Jann E. Williams, and A. Malcolm Gill (eds). 2001. ISBN 0-521-80591-0 (Cloth US\$130.00) 462 pp. Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211.

Flora Hibernica: The wild flowers, plants and trees of Ireland. Pilcher, Jonathan and Valerie Hall. 2002. ISBN 1-903464-03-X (Cloth US\$49.95) 204 pp. Dufour Editions, Inc., Chester Springs, PA 19425-7103.

Flora of Russia: The European Part and Bordering Regions, Volume 4. Fedorov, An.A.(ed). 2001. ISBN 90-5410-754-5 (Cloth US\$100.00) 512 pp. A. A. Balkema Publishers, P.O. Box 1675, NL-3000 BR Rotterdam, Netherlands.

Flora of Russia: The European Part and Bordering Regions, Volume 5. Fedorov, An.A.(ed). 2001. ISBN 90-5410-755-3 (Cloth US\$193.00) 515 pp. A. A. Balkema Publishers, P.O. Box 1675, NL-3000 BR Rotterdam, Netherlands.

Fungi as Biocontrol Agents: Progress, Problems and Potential. Butt, T.M., C.W. Jackson and N. Magan (eds). 2001. ISBN 0-85199-356-7 (Cloth US\$140.00) 390 pp. CAB International, Oxford University Press, 198 Madison Ave., New York, NY 10016-4341.

Fungi in Bioremediation. Gadd, G.M. (Ed). 2001. ISBN 0-521-78119-1 (Cloth US\$120.00) 481pp. Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211.

Heme, Chlorophyll, and Bilins: Methods and Protocols. Smith, Alison G. and Michael Witty (eds). 2001. ISBN 0-896-29111-1 (Cloth US\$125.00) 340 pp. The Humana Press, 999 Riverview Drive, Suite 208, Totowa, New Jersey 07512.

The Herbal Internet Companion: Herbs and Herbal Medicine Online. Owen, David J. 2001. ISBN 0-7890-1051-8 (Cloth US\$49.95) ISBN 0-7890-1052-6 (Paper US\$19.95). 194 pp
The Haworth Press, Inc. 10 Alice Street, Binghamton, New York 13904-1580.

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An Illustrated Encyclopedia of Clematis. Toomey, Mary and Everett Leeds. 2001. ISBN 0-88192-508-X. 428 pp. Timber Press, Inc. 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Insects and Gardens: In Pursuit of a Garden Ecology. Grissel, Eric. 2001. ISBN 0-88192-504-7. (Cloth US\$29.95) 345 pp. Timber Press, Inc. 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

10th International Exhibition of Botanical Art and Illustration. White, James J. and Lugene B Bruno. 2001. ISBN 0-913196-73-8. (Paper US\$25.00) 183 pp. Hunt Institute for Botanical Documentation, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, Pennsylvania, 15213-3890.

Mountains in the Sea: The Vietnamese Miniature Landscape Art of Hòn Non Bô. Phan Va7n Lit with Lew Buller. 2001. ISBN 0-88192-515-2 (Cloth US\$34.95) 232 pp. Timber Press, Inc. 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

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Phytoliths: Applications in Earth Sciences and Human History. Meunier, Jean Dominique and Fabrice Colin. 2001. ISBN 90-5809-345X (Cloth US\$123.75) 384 pp. A.A. Balkema Publishers, c/o Ashgate Publishing Company, 2252 Ridge Road, Brookfield, VT 5036-9704.

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The World of Clovers. Gillett, John M and Norman L. Taylor. (Edited by Michael Collins). 2001. ISBN 0-8138-2986-0 (Cloth US\$149.99) 488 pp. Iowa State University Press, 2121 South State Street, Ames, Iowa 50014-8300.

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