

# BULLETIN

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Some responses to queries in the last issue - we'll continue accepting contributions! - editor

## Metasequoia Musings

We received two responses to our request for additional information concerning the original plantings of *Metasequoia* in this country (in addition to the specimens at Duke University and the College of William and Mary mentioned in the last issue of PSB.)

"Another one of the original *Metasequoia* plantings can be found on the campus of Columbia University. It is on a lawn to the west of Low Library. There used to be two, but now only one remains. It is sad to say that this specimen has far outlived the Botany department there. Having attended both Columbia and Duke, I am familiar with both."

Cheers,  
Owen M. Schwartz  
Head, Biological Imaging Facility  
NIAID, NIH  
Bldg 4, Room 424 MSC 0485  
Bethesda, MD 20892

"I noted your interest in the dawn redwood in the recent issue of PSB. I don't have a current list of "Whereabouts of other 'original'trees" but have a nice reference on the biggest trees after 20 years of cultivation:

Hebb, R. 1968. *Metasequoia* after Twenty Years in Cultivation. *Arnoldia* 28(10&11): 113-122.

I had a nice exchange with Bob Hebb after offering viable seeds from the tree on the University of Oregon campus, one of the first to produce viable seeds outside of China. It's possible that the Arnold Arboretum has kept up with the trees around the world.

The really interesting story, to me, is the one of

academic chicanery perpetrated by Ralph Chaney, the celebrated paleobotanist at UC Berkeley. Although the trees were, indeed, discovered in 1941 as mentioned in our note, the first seeds were not sent to this country until 1947. These were gathered on an autumn expedition funded by Merrill of the Arnold Arboretum. They are the source of all the "original" trees outside of China. Merrill sent a big batch of seeds to Chaney in the winter of 1947. Chaney, however, sat on these seeds until after he himself went to China in the spring of 1948. Chaney then distributed seeds and, a year or two later, seedlings to institutions all over the country. Chaney did not ever mention the source of seeds and quite deviously (deliberately) allowed people to think he had gathered them during the course of his 1948 spring trip. Merrill was disgusted but, like a gentleman, never said anything publicly before he died. Chaney finally mentioned the source in a technical publication but the public has mostly never heard of it and consider Chaney and Berkeley as the source of the "original" seeds and seedlings.

The whole story is wonderfully documented in: Fulling, Edmund H. 1976. *Metasequoia* - - Fossil and Living - - *The Botanical Review* 42(3): 215-315.

I got interested because some of Fulling's story came from the archives at the University of Oregon, on whose campus are trees obtained from Chaney as well as from Merrill, indirectly through a friend of his who lived in Eugene. The tree from which I got the viable seeds grew outside the herbarium on the UO campus. The herbarium is no longer there - - it was closed and the specimens moved to Oregon State University Herbarium in 1993 - - but the tree is still there, producing seeds. Every fall. All seeds gone by spring."

David H. Wagner  
Univ of Oregon Herbarium Director, 1976-1993  
Northwest Botanical Institute  
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## *PLANT SCIENCE BULLETIN*

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## “Basic Botany” in U.S. Colleges and Universities, 2002-3

Annual student enrollment in botany courses, as reported by faculty responding to the request for information in the last issue. If you would like to include data from your institution in a more complete compilation, please send it to the editor at your earliest convenience.

	Bot	Ana	Morph	Tax	Flora	Tree/Shru	Aquat	Syst	Econ	Phys	Paleo	Ecol	Phy	Myc
<b>Research</b>														
Miami Univ (OH)	420	5	51	28	120	10			450	21		120+*		
Mich St Univ	293	5			28		14	40	8		14	32		
Ohio Univ	45	4(alt)	6		15	18		22		10	2	100+*	13(alt)	11
U. Rhode Isl.	220	45	35	23				21		31			14	36
U. Vermont		X	X	X				X				X		
<b>Comprehensive</b>														
Adams St (CO)			X(alt)					X(alt)		X(alt)		X(alt)		
Cal St-San Bern	24				24				24					
E. Kentucky	200					15	15	15						
E. Michigan	16	5(alt)				16	10(alt)	5(alt)				3(alt)	5(alt)	5(alt)
Emporia St (KS)	70		4(alt)	10	10(su)	10			12(alt)	3(alt)				3(alt)
Humboldt St**(CA)	12	12		100					24	24		24	24	48*
Millersville (PA)	160	22						24		18				
N. Colo.		18(alt)		20					24	27			20(alt)	
N. Iowa		33	15					23	25	33				
U.W.LaCrosse	130	5		15		12	18		24	27				
<b>Liberal Arts</b>														
Cedarville (OH)	35			3(alt)	7(alt)					3(alt)				
Pacific (CA)					10									
Warren Wilson C.(NC)			17	17						17				
Washington C.(MD)					11					3				

\* sum of multiple courses

\*\*based on # labs, estimated enrollment 12/lab

X = course offered but no enrollments available

(alt) = alternate year course

Bot, Intro level Botany; Anat, Plant Anatomy; Morph, Plant Morphology (incl. “Survey”); Tax, Taxonomy; Tree/Shru, Trees and Shrubs; Aquat, Aquatic Botany (incl. Marine Botany); Syst, Systematic Botany; Econ, Economic Botany; Phys, Plant Physiology; Paleo, Paleobotany; Ecol, Plant Ecology; Phy, Phycology; Myc, Mycology (incl. Plant Pathology)

### *PLANT SCIENCE BULLETIN*

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## News from the Society



### Conference Overview

BOTANY 2003 represents the annual meeting of four professional societies, including the American Bryological and Lichenological Society (ABLS), the American Fern Society (AFS), the American Society of Plant Taxonomists (ASPT), and the Botanical Society of America (BSA). The conference will be held in Mobile, Alabama from July 26-31, 2003, and the theme for BOTANY 2003 will be "Aquatic and Wetland Plants: Wet & Wild."

In addition to the regular program, which will run from Sunday through Wednesday (July 27-30), BOTANY 2003 will include an expanded format. The second FORUM focusing on botanical education and outreach will be held on Saturday, July 26, and it will be linked to the annual scientific meeting on Sunday, July 27, via workshops and field trips.

This *Call* is for the topical sessions to be presented at the FORUM on Saturday. There are separate *Calls* for Workshops, as well as for Abstracts and for Discussion Sessions at the annual scientific meeting.

### Forum Overview

*"...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.

The FORUM will begin on Friday evening with early registration and an informal reception. The main 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. Sunday's offerings will include a hands-on workshops. Two-hour, half-day, and full-day workshops will be organized so that attendees can participate in more than one workshop, and/or participate in field trips, also being planned for Sunday. The *Call for Workshops* has already been posted on the conference web site (see below).

The principal focus of the FORUM will be undergraduate education and related outreach; however, K-12 teachers are also encouraged to participate. In addition to hands-on workshops focusing on undergraduate topics, several workshops, and perhaps field trips, will be specifically targeted for K-12 teachers.

All members are invited and encouraged to attend and present at the FORUM.

### Saturday Sessions

TOPICAL 'THREADS' – Individual sessions will be grouped within topical themes, or 'threads'. The six general threads being considered are listed below, and each is followed by several example session titles. Organizers will be able to submit their own session titles as well as select the most appropriate thread for their session.

1) *Emphasizing Botany across the Curriculum* – Sessions on what is the vital content to cover, and what's at the cutting edge within disciplinary areas (e.g., systematics, development, etc.), "How to promote plants if you are the only botany faculty member in a department," "Developing interdisciplinary courses/curricula," "Educating pre-service teachers about plants"

2) *Designing Investigative Laboratories* – 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* – "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* – "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* – 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* – "Linking up with botanical gardens and arboreta," "Linking up with teachers," "Linking up with the media," "Designing and implementing workshops for teachers," Sessions on best-practice initiatives.

SESSION TYPES—Four types of sessions will be included in the FORUM program, and these are listed below. Organizers will be able to select the most appropriate type of session for their topic.

1) *Informational Session* – A presentation by one to three speakers in which specific information is conveyed. Informational sessions should leave a minimum of 20 minutes for questions and answers.

2) *Breakout Session* – An introduction by one to three facilitators followed by time for in-depth discussion or an organized activity that engages the audience. Two thirds of the time period should be devoted to discussion and interaction. A breakout session often culminates in a commitment: group recommendations or personal agendas for future implementation.

3) *Panel Session* – Two to four panel members including a moderator, each of which may give a brief introduction, followed by discussion among them and with the audience. Half of the time period should involve audience participation.

4) *Roundtable Session* – A roundtable is a freewheeling discussion, usually with multiple viewpoints. The discussion is facilitated by a moderator, but there are no formal speakers. The moderator sets the stage for the discussion by providing one or two provocative questions. Virtually the entire session is interactive.

**Submission of Session Topics (Deadline: April 1, 2003)**

Session proposals should include the following: 1) a title, 2) name(s) and contact information for all organizers and presenters, 3) a

brief summary of the Session that includes relevant background and significance of the topic, and 4) selection of the most appropriate thread and session type.

Submission of session proposals should be conducted online at the BOTANY 2003 web site: [www.botany2003.org](http://www.botany2003.org). (This site is now open) Copies of the proposals will be sent electronically to the sender and the FORUM Planning Committee. The deadline for receiving session proposals is **April 1, 2003**. The number of 45 minute sessions that will be able to be accepted will be contingent upon the size and scope of the overall program. Because session submissions may overlap and space will be limited, proposals for Sessions will be evaluated by the FORUM Planning Committee, which includes representatives from all societies participating in BOTANY 2003. Session organizers will then be notified in May 2003 about their sessions.

**Questions** Questions about the FORUM should be directed to members of the Planning Committee (see web site) and/or to the BSA Program Director: Jeffrey M. Osborn, Division of Science, Truman State University, 100 E. Normal Street, Kirksville, MO 63501-4221. Tele: (660) 785-4017, Fax: (660) 785-4045, E-mail: [josborn@truman.edu](mailto:josborn@truman.edu).

## Call for Nominations

In keeping with the by-laws (VI-1) of the society that specify a five-year term for the Editor-in-Chief of the American Journal of Botany, the Botanical Society of America is soliciting nominations for the position of Editor-in-Chief for the term beginning January 2005. Please consider nominating yourself or another colleague for this extremely important position. Qualities of candidates should include a research career in the plant sciences, a commitment to improve the journal, a willingness to pursue innovations, a breadth of knowledge and experience, and good communication skills. The Editor-in-Chief will be assisted by an office manager and one or more copy editors. The editor will receive an annual budget and honorarium. Specifics of the position will be negotiated with the Executive Committee of the Society. Please send nominations to Prof. Nancy G. Dengler, Department of Botany, The University of Toronto, 25 Willcocks St., Toronto, Ontario M5S 3B2, Canada. Nominations should be received by 1 June, 2003 to receive timely consideration.



## Increasing Diversity at the Annual Botanical Society of America Meeting

The Botanical Society of America (BSA) is pleased to announce a new program entitled "Increasing diversity at the annual Botanical Society of America meeting." This program is supported by the National Science Foundation (Undergraduate Mentoring in Environmental Biology (UMEB) Program) and will provide financial and professional assistance for 10 minority (African-Americans, Hispanic-Americans, Native Americans/Alaskan Natives and persons with disabilities) undergraduate research students to attend the annual BSA meeting each year from 2003 - 2006. The goal is to integrate the students into the professional and social activities of the conference by providing a supportive mentoring network and sufficient orientation activities. If you know of an eligible and deserving undergraduate who would benefit from this experience or if you would like to serve as a mentor, please contact Karen Renzaglia (mailto:renzaglia@plant.siu.edu) or Jeff Osborn (mailto:josborn@truman.edu) by March 1, 2003. A call for formal applications will be distributed early in 2003 and application guidelines will be made available on-line on the BSA and Botany 2003 Web sites. The deadline for applications will be May 1, 2003. This program is an important step towards strengthening the science workforce and utilizing the full range of intellectual talent from diverse ethnic and minority populations. We encourage and welcome your participation.

## Southeastern Section

The Southeastern Section, Botanical Society of America is meeting in conjunction with the Association of Southeastern Biologists for its 64<sup>th</sup> Annual Meeting, April 9-12 at the Crystal City Hyatt Regency, Arlington, VA. The co-hosts are Howard University and Bowie State University. In addition to papers and poster sessions, field trips and tours, four symposia will be of interest to botanists. These are: "A Crisis in Field Botanical Education," "The Genetics and Practice of Rare Plant Reintroduction," "Forest Fragmentation and Biodiversity in the Southeastern United States," and "Science Education for New Civic Engagement." A web site containing detailed information and registration information is at: [www.biology.howard.edu/ASB/ASBstart\\_here.html](http://www.biology.howard.edu/ASB/ASBstart_here.html)

## Northeast Section

The annual joint field meeting of the Botanical Society of America's Northeast Section, the Torrey Botanical Society, the Philadelphia Botanical Club, and the Long Island Botanical Society, will be held June 22-26 (Sunday-Thursday) at the New York Institute of Technology Central Islip Campus in Suffolk County, Long Island, NY. There will be 3 1/2 days of field trips. Areas to be visited include a 300 year-old maritime holly forest, the globally rare Dwarf Pine Plains, a northeastern mixed hardwood forest on a terminal moraine, and an unusual pitch pine-scrub oak barrens. Plant communities to be seen include salt marsh, fresh water bog, kettle holes, swamp, ponds, and ocean shore as well as forest. Evening programs will cover topics of local botanic interest. Registration fee of approximately \$350.00 includes housing, meals from Sunday dinner through Thursday breakfast, evening programs, and some local transportation. Everybody interested in field botany, or nature in general, is welcome to attend. Pre-registration is required. To request a registration form, or to get additional information, contact Joanne Tow, PO Box 7323, Hicksville NY 11802-7323, (516) 931-2073, or [botany2003@hotmail.com](mailto:botany2003@hotmail.com).

## Announcements

### *In Memoriam:*

### Dorothy Essman, 1932-2002

The Botanical Society of America lost a long-time friend and loyal former staff member with the death of Dorothy Essman on October 17, 2002, in Newark, Ohio. Mrs. Essman, 69, fought a long and courageous battle with breast cancer, and died peacefully with her family at her side.



Dorothy Essman started working in the BSA Publications Office at Ohio State University in

1985, shortly after her husband, Bob Essman, succeeded Richard Popham as Manager of Publications for the BSA. Dorothy managed the office, kept the books, paid the bills, mailed out missing issues of AJB, and soothed the occasional irate subscriber or member. She was conscientious and meticulous, and could find just about anything in the files at Ohio State, if given a few minutes to think about it. She and Bob officially retired from their BSA duties in 1992, but Dorothy returned to help over the next several years as the new Business Manager, Kim (Essman) Hiser, took over the restructured Ohio State office. Many BSA members will remember Dorothy, with her smiling face, at the BSA table or booth at the annual meetings, selling t-shirts, new memberships, abstracts, and other BSA publications. She was always friendly and helpful, and she appreciated a good laugh, of which there were many in the Publications cum Business Office. Dorothy will be missed by many BSA officers and other members, who worked with her for some 15 years.

Dorothy was born November 18, 1932 in Pittsburg, Kansas. She was a member of Beta Sigma Phi Professional Sorority and The Dawes Arboretum. She enjoyed the opera, The Columbus Symphony Orchestra and her visits to the Arboretum. She is survived by her husband of 51 years, Robert H. Essman; two daughters and their husbands, Kim and David Hiser, and Karee and Peter Van Runkle; 4 grandchildren, Katie Hiser and Drew, Alan and Brian Van Runkle; two brothers and two sisters and their spouses, and numerous nieces and nephews. A celebration of her life was held November 17, 2002, in Newark, Ohio. Memorial contributions may be made to the Susan G. Komen Breast Cancer Foundation, P. O. Box 650309, Dallas, TX 75265-0309.  
-Judy Jernstedt

#### MAYNARD FOWLE MOSELEY, 1918 - 2003

Professor Maynard F. Moseley, Ph.D., an internationally noted research botanist and an expert on the evolution of waterlilies, died January 16, 2003 in Santa Barbara, his home for the past fifty-four years. The botanical community and higher education have lost a distinguished citizen and supporter.

Maynard F. Moseley, Jr. was born in Boston, Massachusetts on July 15, 1918. He received his elementary training in the Boston Public Schools. He graduated from Jamaica Plain High School, Boston in 1935. During the years of 1936-1940 he attended the Massachusetts State College at

Amherst (now the University of Massachusetts) graduating with a B.S. in Botany. During the years 1940-1942 he attended the University of Illinois, Urbana completing his M.S. in Botany. His master's thesis 'Contributions to the Life History, Morphology and Phylogeny of *Widdringtonia cupressoides*, was completed under the direction of John T. Buchholz (Moseley, 1943. *Lloydia* 6: 109-132).

He served in the US Army as a Clinical Laboratory Technician, 297th General Hospital from 1942 - March 1947 and was stationed both in the California-Arizona Desert Training Area and in England, European Theater of Operations.

In 1947 he completed his Ph.D. in Botany at the University of Illinois under the direction of Oswald Tippe. His doctoral dissertation was concerned with comparative wood anatomy and phylogeny of the Casuarinaceae (Moseley, 1948. *Botanical Gazette* 110: 223-280).

In 1947 Maynard joined the faculty at Cornell University as an Instructor of Botany until 1949 at which time he moved to Santa Barbara, California when he began a long academic career at the University of California, Santa Barbara.

His research interests centered on the systematics of higher angiosperm taxa utilizing floral and wood anatomy. His most noted works were those dealing with the floral anatomy and morphology of the Nymphaeaceae or waterlily family, which led to a series of two dozen papers. Except for the past year



during which time he was afflicted with Alzheimer's, he was actively engaged in elucidating the floral vasculature of *Euryale ferox*.

Affectionately known by his undergraduate and graduates student as "Dr. Mo", he was greatly admired for his enthusiastic teaching, his attention to accuracy, and his caring attitude. He challenged all his students to achieve more than they thought themselves capable of achieving by sharing his philosophy of life and stories about experiences, which shaped that philosophy. All of his students knew that he cared deeply about their success as scientists and as human beings.

Moseley was a long-time member of Sigma Xi and the Botanical Society of America. In 1997 a Botanical Society of America fund was established to celebrate his long career of dedicated service and contributions to science and The Botanical Society. Contributions to this fund in his memory may be sent to: Bill Dahl, Executive Director, The Botanical Society of America, 4474 Castleman Ave., St. Louis, MO 63110.

His son, Andrew and daughter, Margery, survive him.

Submitted by his doctoral students,  
 F.C. Richardson, 1967, Chancellor Emeritus, Indiana University Southeast. *Brasenia* (Nymphaeaceae)  
 Edward L. Schneider, 1974, President, Santa Barbara Botanic Garden. *Victoria* (Nymphaeaceae)  
 Philip G. Simpson, 1975, Uruwhenua Botanicals, New Zealand. *Yucca brevifolia*  
 Indra Mehta, 1975. *Koeberlina* (Koeberliniaceae)  
 Eugenia Flores, 1976, University of Costa Rica (retired) *Casuarinaceae*  
 Lucy St. Omer, 1981, Professor, San Jose State University *Jaumea* (Asteraceae)  
 Paula S. Williamson, 1988, Professor, Southwest Texas State University. *Ondinea* (Nymphaeaceae)

### James C. Parks, 1942-2002

James C. Parks, 60yrs old, died of natural causes December 23, 2002. He received a bachelor's degree from Shippensburg University and a PhD in taxonomic botany from Vanderbilt University in 1969. After a short time teaching High School Biology, Jim taught botany and plant systematics at Millersville University for 33 years and had planned to retire May 2003. He conducted research on various topics relating to vascular plant taxonomy and was author of two chapters of the new and highly acclaimed *Flora of Pennsylvania*. His recent work on fern taxonomy both at Millersville and in Edinburgh Scotland has been published in several journals. Students loved his dry sense of humor and in the end, appreciated his demand for quality work and perfection. He was an avid outdoorsman and enjoyed hiking, canoeing and discussing Monday night football. Always having an opinion on any topic, he will be missed by all who knew him. —David Dobbins

### Personalia

**David L. Lentz** Named Vice President of Scientific Affairs, Chicago Botanic Garden

GLENCOE, Ill. (Nov. 5, 2002) - David L. Lentz, Ph.D., has been appointed vice president of scientific affairs and senior scientist at the Chicago Botanic Garden, announced Barbara Whitney Carr, president and chief executive officer. In his new position, Lentz, an Evanston resident, will oversee the various centers of science at the Garden, including Plant Conservation Biology, Ornamental Plant Development, and Aquatic Plant and Urban Lake Studies. He reports to and works closely with the president and CEO.

Lentz comes to the Garden from the New York Botanic Garden, where he served as director of the graduate studies program, and adjunct curator of the Institute of Economic Botany. He served as adjunct professor at the Center for Environmental Research and Conservation, Columbia University; the plant sciences program at Lehman College, City University of New York; and the School of Forestry and Environmental Studies at Yale University. Also, he was appointed visiting research professor in the Department of Biology at New York University. In 1996, he was elected Fellow of the Linnean Society of London.

Lentz received a Ph.D. in biology from the University of Alabama and a master's degree in anthropology from Eastern New Mexico University. Among many other honors and grants, he recently was awarded a Fulbright Scholarship to conduct botanical research in Honduras. He has edited books and authored more than 60 articles published by Economic Botany, Science, Smithsonian Press, University of Texas Press, Columbia University Press, Ancient Mesoamerica, Latin American Antiquity, The Journal of Ethnopharmacology and others.

Lentz is a paleoethnobotanist specializing in the evolution of plant use and forest management practices among the peoples of North America and Mesoamerica. His current research, sponsored by the National Geographic Society and the National Science Foundation, compares the genetic make-up of wild and domesticated sunflowers from the midwestern United States to populations from Mexico. He has worked on projects in Mexico, India, El Salvador, Belize, Guatemala, Honduras and the United States.

"The Chicago Botanic Garden is a leader in the campaign to safeguard the world's plants, preserve diversity and maintain healthy ecosystems," Carr



said. "Lentz brings strong vision and a wealth of experience to support the explosive growth of the Garden's science initiatives, and we are pleased to have him on board."

## PLANT BIOLOGIST RECEIVES FIRST SCIENTIFIC AMERICAN AWARD

Allison Snow, a professor of evolution, ecology and organismal biology at Ohio State, and member of the Botanical Society of America, received *Scientific American's* first annual Research Leader in Agriculture award.

She is part of the *Scientific American* 50, the noted magazine's first list recognizing contributions from the past year to science and technology. One leader is chosen from each of 12 categories, which range from agriculture to computing to transportation.

Snow received the award for her work on genetically modified crops, especially on how genetic traits in crops could be unintentionally transferred to related weedy species.

The new award includes individuals, teams, companies and other organizations whose accomplishments during the previous year demonstrate that they influence how society puts innovations to good use, said John Rennie, editor-in-chief of *Scientific American*. The winners were selected by the magazine's Board of Editors, and notified by letter.



Allison Snow

The list makes its debut in the magazine's December issue, available on newsstands Nov. 18. The complete list of winners is also online at <http://www.sciam.com>.

-Text and photo courtesy of Ohio State University

## Symposia, Conferences, Meetings

### SOCIETY OF WETLAND SCIENTISTS 24TH ANNUAL MEETING

HYATT REGENCY HOTEL  
NEW ORLEANS, LA USA  
JUNE 8-13, 2003

The Society of Wetland Scientists 24th Annual Meeting Program Committee invites all SWS members, students, members of regional societies, as well as individuals interested in wetland science, management and education to submit an ABSTRACT (250 words or less) for the SWS 24th Annual Meeting to be held June 8-13, 2003 at the Hyatt Regency Hotel, New Orleans, Louisiana, USA.

ORAL and POSTER presentations are being solicited to support the conference theme entitled, "WETLAND STEWARDSHIP: CHANGING LANDSCAPES AND INTERDISCIPLINARY CHALLENGES."

The conference will focus on understanding the interdisciplinary scientific needs and innovative approaches for the stewardship of wetland ecosystems across ever changing landscapes. This meeting will focus on developing the science and approaches needed to meet the challenges of stewardship across diverse and changing geographical landscapes, socio-political boundaries, scientific disciplines, and varying scales of assessment. The coupling of traditional and applied wetland sciences with ecological, physical, engineering, economic and social sciences will be highlighted. Awards will be given for the best student paper and best student poster. For further information contact the Program Committee Co-chairs: Doug Meffert ([dmeffert@tulane.edu](mailto:dmeffert@tulane.edu)) or Robert Twilley ([ceet@louisiana.edu](mailto:ceet@louisiana.edu)).

For significant conference registration savings, register by the early registration deadline of March 14, 2003.

Registration forms will be on-line soon!



Faux Billboard Advertising compliments of Prof. Robert Tatina, Dakota Wesleyan Univ., Mitchell, SD



The Third International Conference on the Comparative biology of the Monocotyledons and the Fourth International Symposium on Grass Systematics and Evolution. March 31-5 April, 2003, Ontario Convention Center. For a full description of conference schedule and field trips, please visit our website at: [www.monocots3.org](http://www.monocots3.org).

## Spring Wildflower Symposium

May 9-11, 2003 The Wintergreen Nature Foundation presents its 20<sup>th</sup> Annual Spring Wildflower Symposium at Trillium House at Wintergreen Resort in central Virginia. Instructors will include Dr. Jim Duke, author of *The Green Pharmacy*. Participants choose from over 50 offerings of guided hikes, lectures and workshops centered on the unique flora of the Blue Ridge. Learn the life histories of these plants, propagation and design with natives, identification and historic uses for plants in indigenous cultures. A full weekend schedule will be posted on the Foundation's website at [www.twnf.org](http://www.twnf.org) <<http://www.twnf.org/>> , or receive a brochure in the mail by contacting the Foundation at 434-325-7451 or [info@twnf.org](mailto:info@twnf.org) .

## Award Opportunities

### Graduate Opportunities at Florida International University

Florida International University's Center for Ethnobiology and Natural Products has funding for 3 Ph.D. students beginning in the May 2003. The NIH-funded Training in Tropical Botanical Medicines Program seeks applicants with interests in ethnobotany, ethnopharmacology, phytochemistry, microbiology, immunology or related disciplines. Prospective students should have strong interests in complementary and alternative medicines. Support is available for up to 5 years, and includes a stipend, tuition, and research funds. In addition, participants will receive support for field courses and attendance at national meetings. We are

especially interested in underrepresented minority applicants who would like to pursue careers in alternative medicine.

For more information please contact Dr. Bradley C. Bennett ([bennett@fiu.edu](mailto:bennett@fiu.edu)) or visit the CENAP website (<http://www.fiu.edu/~cenap/>).

## Rea Postdoctoral Fellowship

### Carnegie Museum of Natural History

Applications are invited for a one-year renewable Postdoctoral Research Fellowship for morphological and molecular based research in botany. Send curriculum vitae, three letters of recommendation, and plan of research by March 31, 2002 to: Dr. Cynthia Morton, Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, PA, 15213 or e-mail [mortonc@carnegiemuseums.org](mailto:mortonc@carnegiemuseums.org).

### The Buker Travel Award Carnegie Museum of Natural History Section of Botany.

The Buker Travel Award provides funds to persons at any level of training (students, professionals, botanists, conservationists, and others) to utilize the botanical collections at the Carnegie Museum of Natural History (CMNH). <<http://www.carnegiemuseums.org/cmnh/botany/index.htm>>

Awards are made on a yearly basis and applications are due by 31 March each year. The number of persons supported and the amount of the awards may vary. Presently awards up to \$300 are available.

The application consists of a short letter (1 page) outlining the overall project and reasons for visiting CMNH with a budget attached. The Buker Travel Award will support costs of travel, food, lodging, and supplies. Stipends and salaries will not be funded.

Send application by 31 March each year to:  
Buker Travel Award  
Section of Botany  
Carnegie Museum of Natural History  
4400 Forbes Ave.  
Pittsburgh, PA 15213.

For additional information contact the Section of Botany at 412-622-3253; or e-mail: [cmherb@carnegiemuseums.org](mailto:cmherb@carnegiemuseums.org) <mailto:cmherb@carnegiemuseums.org>

The Carnegie Museum of Natural History Section of Botany created the Buker Travel Award in 1996 in honor of long-time Research Associate W.E. Buker. Buker is a name well known to persons involved in studying the plants of Pennsylvania. For over four decades, Buker volunteered in the CM herbarium and also conducted extensive fieldwork in Pennsylvania. Buker's eye for rare species and penchant for making lists lead to many new discoveries and geographical records for the state.

The CM Herbarium is part of the CMNH Section of Botany and contains approximately 500,000 specimens of vascular plants. All vascular plant groups and geographic regions of the world are represented. Outside of the immediate region for which the CM Herbarium's collection is the best in the world, the greatest numbers of specimens are from the rest of North America, followed by Latin America and Asia. Many of the specimens are unique to CM with no duplicates in other herbaria.

## Position Available

### Herbarium Collections Technician

Fairchild Tropical Garden (FTG) is seeking a full time Herbarium Collections Technician. Duties of the successful candidate will be to manage loan and exchange transactions in the Herbarium. This position requires familiarity with MS Windows, especially MSAccess and Excel as well as a proven ability to complete jobs in a timely, accurate and efficient manner. The ability to strictly and accurately manage specimen inventory is essential. All newly accessioned specimens and those going out on loan must be imaged and processed as a part of the FTG Virtual Herbarium ([www.virtualherbarium.org](http://www.virtualherbarium.org)). A large backlog of specimens is to be integrated with the main collection, as well as many legacy loan and exchange specimens, which exist in the herbarium because of recent major acquisitions and staff additions. The Herbarium Collections Technician will report directly to the Director of Research and will work with the Keeper, Curators and Collections Manager to process this backlog. The characteristic candidate has a Master's degree in a relevant field and experience in herbarium management and MSAccess databases. This is a full time position with benefits funded for 1-3 yrs. Another part-time position without benefits may also be available as funding permits. Salary is negotiable and commensurate with experience.

This position is open immediately and will be filled when the appropriate candidate is found. Applicants should email a CV, letter of introduction, and the names, phone numbers, emails and mailing addresses of three references to: [stinger@fairchildgarden.org](mailto:stinger@fairchildgarden.org) with a copy to [research@fairchildgarden.org](mailto:research@fairchildgarden.org).

See also: [www.fairchildgarden.org](http://www.fairchildgarden.org) <<http://www.fairchildgarden.org>>  
[www.virtualherbarium.org](http://www.virtualherbarium.org) <<http://www.virtualherbarium.org>>

## Other News

### Wayne E. Manning Herbarium

The plant specimen database of the Wayne E. Manning Herbarium (BUPL) at Bucknell University (Lewisburg, PA) is now available online at <http://www.departments.bucknell.edu/biology/facilities/herbarium/>. The Manning Herbarium web site enables online searching of the approximately 22,000 plant specimens in the collection — a collection that is especially rich in specimens from the eastern US and world-wide materials of the Juglandaceae.

Two levels of searching are possible — one for general users that allows access to all specimen label information but restricts access to specific locality information and a second level for researchers to whom a log-in code has been supplied enabling them to extract specific locality information (latitude/longitude). Researchers are able to generate floristic lists for specific areas by entering latitude/longitude coordinates. Wayne Manning, the 103 year-old namesake of Bucknell's herbarium, is honored by the hickory photograph on the web site's home page in recognition of his life-long research interest in the Juglandaceae.

For additional information contact:

Warren G. Abrahamson, Department of Biology,  
Bucknell University, Lewisburg, PA 17837

Voice: (570) 577-1155

Fax: (570) 577-3537

<http://www.facstaff.bucknell.edu/abrahamsn/>

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**In Praise of Plants.** Francis Hallé with translation by David Lee. 2002; ISBN 0-88192-5500 (Hardbound, \$24.05) 334 pp. Timber Press, Inc, 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527. USA In the Epilogue of *In Praise of Plants*, Francis Hallé writes, "The plant is mute and refuses to hire a lawyer." Indeed if plants were to need a lawyer to defend them, then Francis Hallé would be up to the task. In his book he defends plants against animals from nearly every conceivable angle. He compares plants not only with animals, but also with a great many other things from crystals to termite mounds. He does all this in a sort spirited rivalry to show plants superior nature as compared to animals. Certainly the book is full of a naturalist's perception on the usefulness and wonder of plants, but it also has a great many poetic quotes espousing the beauty of simplicity found in plants. The comparisons at times, however, are quite odd. One cartoon shows a dog atop a pile of its own excrement as juxtaposed with a palm tree to depict that the palm is storing its waste products and therefore can attain a larger stature than the dog. For the odd cartoons and for a great many fantastic quotes, I would recommend this book for all sorts of plant enthusiasts. I have used some of the cartoons in my biology courses with enormous success. At least my students see that botanists have a sense of humor, even though it may be somewhat strange!

The book begins with an opening thesis that I have long since suspected, perhaps subconsciously, yet one about which I forget to voice my concern. The opening chapter proposes that many undergraduate and even primary and high school courses often overlook the importance of plants to spend more time dealing with animals. In fact, the entire populace seems more drawn to animals than to plants. However, I think the author goes too far to say that men tend to take more zoology courses while there are more women in botany. Perhaps this is true in the author's native country of France, but it is not true in my classroom, nor is it true of any scientific meeting regarding plants that I've attended. Still, the passion felt by the author as he decries textbooks pretending to cover the whole of biology and only donating perhaps 8% of their total coverage to plants is indeed a persuasive voice for the case of the plants.

Feeling cheered by the opening chapter, I heartily sunk into the second chapter explaining the form of plants. Clearly, a great surface area is needed to capture light energy; that much any person of some studies can comprehend. The book seems to lose its audience here. Some of the statements seem intuitive, and yet much of the discussion of the structure of space, the relationship between form and space, polarity, and finally homeotic genes

seemed a bit lofty for the average interested plant enthusiast. Perhaps, I should limit my opinions only to myself and say that this part of the book was verbose and occasionally incomprehensible to me. The cartoons, though, make this chapter worth reading. Some of the highlights were a cartoon depicting symmetries and polarities of monsters, the grotesque fictional picture of a clonable man, and a strange account of reiteration as displayed by human toes. Another interesting part of this chapter was a discussion on plant hormones and how they are not hormones at all.

Chapter 3 outlines the organelles of the plant cell and sets them apart from animal cells. This chapter might have been included because the book had to, in a sense, point out differences between animals and plants on a cellular basis. Because I have taught these differences many times, this chapter was of less interest to me than the others. I suspect this may be true for most botanists, who are only too aware of the differences between plant and animal cells. One interesting hypothesis put forth in this chapter has to do with development. Hallé reasons that for plants the morphological form is controlling the appearance of the plant, rather than from the cell upwards. He likens this hypothesis to a house that can be subdivided into rooms with no influence on the exterior architecture. Once again, *In Praise of Plants*, proves itself to be a quotable book, based both on the poetry of some statements and the good analogies of others.

Chapter 4 informs the reader that plants must have a greater arsenal of biochemical weapons for defense due to immobility. Hallé's ability to propose questions is uncanny here. I believe there is something in the French culture that allows for a bit more creativity, a certain *je ne sais quoi*, that we Americans lack. For instance, Hallé asks why there are not half plant, half animal creatures. From a Cartesian point of view, the answer is obvious: because there are not, natural selection didn't come up with that recipe. Hallé's answer is better prescribed, and of course, has fantastic cartoons to suggest what the possibilities of half animal, half plant creatures may look like. I found this chapter to be very interesting and somewhat reminiscent of Micheal Pollanis *Botany of Desire* in its description.

A lengthy chapter on evolution follows. If there are potential readers who believe that all questions of botany have been answered and there is nothing new under the sun, then this is the chapter to change that opinion. Hallé comes up with a great many hypotheses about all manner of evolutionary questions from the combination of the soma and germ lines in plants to asking whether bacteria are Lamarckian. Rather than spoil the fun of discovery, I will only point out that the translator, David Lee,



adds astute notes particularly in this chapter by disagreeing with the author in a mode of true scientific collegiality. The notes regarding an interpretation of genetic diversity within one tree are particularly well thought out.

Comparing the way plants live to other living organisms is theme of Chapter 6. Quite a lot of effort is spent on comparing trees to coral. I definitely see Hallé is point here, but I think that some of the arguments are far fetched and lack any sort of scientific data other than coincidence. Still, many great scientific ideas start out as casual observations. Additionally the figures and quotes lend an enjoyable quality to this book that is like an Easter basket: keep searching through the grass and a jellybean appears. One such jellybean was this quote, "Only sedentary human societies, with their cities and highways, leave an impression on the landscape comparable to that of the Amazonian rain forest or the Great Barrier Reef."

Ecology rounds out the final chapter. Though very important, this chapter seemed the most obvious to me when praising plants. It is very clear that animals, including ourselves, won't get very far without the presence of plants. This chapter felt mostly like it was preaching to the choir and had fewer insightful questions to ponder than the other chapters. Still, the cartoons were excellent, the last one being a depiction of two arks traveling after the great Biblical flood, one with all plants aboard a ship called the Phytan and the other ship, the Zoon, would be of little interest and left behind. I would not hesitate to recommend this book to colleagues as an interesting and certainly entertaining book. Aside from the humor, the poetry, and the eloquent quotes, there is a lot of fodder for thought here for any botanist. I would, however, not send it out as a gift to a beginning botanist or to one whose interest in plants was strictly in the garden as the book occasionally loses focus on exactly which audience it is trying to reach. — Catherine Kleier, Curator, Adams State College Herbarium, Department of Biology, Adams State College, Alamosa, CO 81102

**Plant Roots: The Hidden Half (3<sup>rd</sup> edition)** by Yoav Waisel, Amram Eshel, Uzi Kafkafi (Editors) Marcel Dekker, New York; ISBN: 0824706315 \$250.00 This massive book attempts to provide an overview of root biology and is largely successful. The book is over 1000 pages and includes 59 chapters, each of which is a review-type article. These articles are divided into 10 sections that include topics such as

root structure/development, genetics, physiology, root growth under stress, root-rhizosphere interactions, and roots of economic value. In this third edition, attempts are made to include more studies in the molecular biology of roots, but this topic clearly is not the emphasis of the editors.

The illustrations are good quality with many chapters that include nice half tone figures. Each chapter includes an extensive reference list that is current to 2000 or 2001 in most cases. As with any book of this type, there is variability in the quality of the chapters. But most of the authors do a good job in reviewing their topic and in indicating the key recent papers in their sub-field of root biology.

This volume is part of the "Books in Soils, Plants and the Environment" series. It is meant to be used as a reference text for botanists, ecologists, and horticulturalists. I recommend it for graduate students and faculty who are working in root biology and may need ready access to areas that are related to their research. The book will provide a good springboard for further reading since each chapter contains a wealth of references. -John Z. Kiss, Department of Botany, Miami University, Oxford, OH 45056

**Experimental Design and Data Analysis for Biologists.** Quinn, G.P. and M.J. Keough. 2002. ISBN 0-521-81128-7 (cloth US \$110) ISBN 0-521-00976-6 (paper US \$45) 559 pp. Cambridge University Press, Cambridge, UK. The modern biologist must have a good working knowledge of statistics and many biologists acquired their statistical training with the standard texts of Biostatistical Analysis by J.H Zar (Prentice Hall 1999) and Biometry by R.R. Sokal and R.J. Rohlf (W.H. Freeman 1995). In this book, Quinn and Keough, have provided a comprehensive, advanced reference on experimental design and data analysis to further develop the statistical knowledge of biologists. As the authors state, the book is not designed to address introductory statistics. The reader must be at least familiar with univariate statistics since the book's primary focus is on bivariate and multivariate statistics. At \$45.00 this is an exceptionally good book for a graduate seminar or as a thorough statistical reference that would make a welcomed addition to the shelf of any biologist, ecologist, or zoologist, just to mention a few.

The book is divided into 17 chapters of which the first 4 briefly discuss the scientific method (Chapter 1), estimation techniques (Chapter 2), hypothesis testing (Chapter 3) and graphical exploration of data (Chapter 4). The materials covered in chapters 1, 3, and 4 are concisely

presented and serve as a review for the informed reader, and are probably not adequate for primary instruction on the covered topics.

However, Chapter 2, Estimation, is particularly well written with detailed, descriptive sections on maximum likelihood and ordinary least squares estimation, bootstrapping and jackknifing techniques, and a well-developed section on Bayesian inference. Chapter 5 addresses correlation and regression with an eloquent treatment of regression diagnostics and the associated graphics. There is also an informative section on Model II regression. Chapter 6 examines multiple and complex regression in a similar format to the linear models with a single continuous predictor variable discussed in the previous chapter. Chapter 7 is another exceptional chapter devoted to design and power analysis. A concise discussion and explanation of replication, controls, randomization, and independence provide a foundation for the power analysis material. Scientists have recently begun to understand the importance of statistical power and are increasingly incorporating power analyses into their results. Power is a critical measure of precision in hypothesis testing and, unlike this book, few statistical texts devote an entire chapter to this important and revealing subject. Chapter 8 includes a classic treatment of the industry standard analysis of variance (ANOVA) in addition to a valuable section on robust ANOVA. The latter part includes sections on comparisons of means, planned and unplanned comparisons, and specific contrasts. Chapters 9, 10, and 11 describe the analyses of completely randomized designs, unreplicated factorial designs, and designs that combine factorial (crossed) and nested arrangements, respectively. Chapter 12 covers basic methods for analysis of covariance (ANCOVA) and due to the increasing use of ANCOVA in the biological and ecological literature this chapter should be required reading for most scientists. Chapter 13 discusses two common applications of generalized linear modeling (GLM), logistic regression and Poisson regression while Chapter 14 describes loglinear models where the variables are often arranged in the form of contingency tables. Chapter 15 provides a succinct treatment of preliminary multivariate data analysis that generally applies to the methods of multivariate analysis of variance and discriminant analysis (Chapter 16), principal components and correspondence analysis (Chapter 17), and multidimensional scaling and cluster analysis (Chapter 18). Finally, Chapter 19 provides suggestions and guidance on presentation of results.

The material in each chapter is explained in a clear, logical manner with munificent references to the primary literature. A strong feature of this book is that most of the concepts discussed are illustrated with examples taken from recent studies published

in peer-reviewed journals. Quinn and Keough take an informative and productive approach to their presentation of data from the published literature. They use data and output generated from the statistical analyses of these studies to explain and support the choice of the statistical test employed in the article. In other words, they integrate both theoretical aspects of specific techniques and concomitantly provide solutions and interpretations using published examples. These detailed examples are presented in separate boxes in each chapter. Moreover, many of the authors of the studies presented have made their raw data available so that readers may download data and run the analyses using their particular software (<http://www.zoology.unimelb.edu.au/qkstats/>). Furthermore, each chapter concludes with a helpful and informative summary section that is essentially a checklist of important assumptions and reminders relevant to each statistical procedure discussed in the chapter. Another strength of this book, that reflects one of the author's bias and personal history, is the generous and comprehensive treatment of ANOVA and various permutations (4 of 19 chapters). However, the wide-spread use and misuse of ANOVA in the biological literature merits the attention the authors give.

The book would not be very effective as a textbook for an undergraduate class for several reasons. The most important and obvious is the lack of exercise and practice problems. For most students, the best way to study and learn statistical material is to work through problem sets. The authors' approach of teaching by example using the published literature is best suited to a more mature user of statistics such as a graduate student or professional. Another weakness is the absence of any discussion on appropriate software. A large number of statistical software packages now provide easy access to a range of multivariate techniques, yet documentation is often poor and user decisions are many, and interpretation difficult. Furthermore, there is [unfortunately] no single software package that is adequate for all multivariate procedures that a practicing biologist is likely to encounter and employ during research. However, suggestions and guidance by the authors, who are experts in this field, on appropriate software packages would be beneficial. Finally, the inclusion of a list of abbreviations and symbols used in the book would help the reader immensely.

In conclusion, I believe that this book is a useful reference for biologists, ecologists, and zoologists (from graduate to profession) as well as a welcome addition for other organismal scientists. The authors concisely and thoroughly present many useful and important instructions for experimental design and the appropriate data analyses. They provide many useful examples and illustrations from the published literature which can be applied

to many biological questions. - Cynthia L. Riccardi, Department of Environmental and Plant Biology, Ohio University, Athens, OH 45701.

**Foundations of Tropical Forest Biology: Classic Papers with Commentaries.** Robin L. Chazdon and T. C. Whitmore. The University of Chicago Press 2002. ISBN 0-226-10225-4. 862 pages. Since I have been working on long-term studies of ferns in a tropical rainforest in Puerto Rico for the past twelve years, I was intrigued by the concept and organization of this book. Twelve general topics from “Tropical naturalists of the sixteenth through nineteenth centuries” to “Securing a sustainable future for tropical moist forests” are addressed. Each section includes an introduction by one or more scientists knowledgeable and experienced with the topic, and this is followed by three to seven selections from the literature, some of which are complete articles and some of which are excerpts. Of the editors, T. C. Whitmore (recently deceased) was among the earliest and most well respected of tropical biologists, while Robin Chazdon has been very active in tropical research for over twenty years.

The editors have limited their selections to terrestrial tropical topics and have chosen many of the early classical articles from the literature, some of which are familiar to all tropical researchers, and some of which provide different perspectives of the same topic. While not all sections relate directly to plants, even such articles as “Patchy distributions of ant species in New Guinea rain forests” by Edward O. Wilson (1958) in the “Arthropod diversity and distribution” section include interesting descriptions of the flora of the rainforest. Sections on “Plant-animal interactions and community structure” and “Coevolution” as well as “Floristic composition and species richness” all include examples of the particularly fascinating organisms of the rainforest such as the relationship between euglossine bees and orchids in Ecuador in Dodson et al. (1969).

While many of these literature samples are interesting, and there are those who would (inevitably) challenge some of the choices, the introduction to each section is extremely useful. In these introductory commentaries, the articles chosen are placed in context, and the threads of research that connect them to present concerns are presented. In the process, a comprehensive 23-page bibliography of more current works in tropical biology is generated at the end of the book, in addition to citation lists included with many of the articles selected.

The book has two strengths: as a textbook for a course or seminar in tropical biology and as a reference book. One of my colleagues at the Luquillo rainforest in Puerto Rico has already used this book as a reference for a graduate seminar and found it an extremely useful source of basic works in tropical biology, when combined with more current literature as well as literature on topics which are not included such as tropical stream dynamics. Students surely can't help being inspired by some of the original observations by the very early explorers including A. von Humboldt and A. Bonpland, H.W. Bates and A. R. Wallace who so totally capture the spirit that still drives many of today's scientific explorers. One small touch that honors the importance of the early writers is the placement of an illustration from their writings at the beginning of each chapter. In contrast, in the section on “Human impact and species extinction”, Rodolfo Dirzo and Robert W. Sussman vividly describe the current challenges to both floral and faunal inhabitants that comprised that original vision of unlimited growth and diversity, illustrating these concerns with papers from the early 1970's when disturbing trends were first being seriously documented by researchers.

As a reference, I found this book immediately useful when confronted with a manuscript to review on biomass in a remote southwestern Chinese rainforest. Several selections in the “Ecosystem Ecology in the Tropics” as well as the more current references noted in the introduction to that section gave me some good insights into what's especially important to consider in such studies. Any botanist today, no matter what their specialty, will probably at some point be challenged to think globally and be knowledgeable about what is happening in rainforests, and this is an excellent reference to have on hand. - Joanne M. Sharpe, Coastal Maine Botanical Gardens, Boothbay, Maine 04537.

**A Naturalist's Guide to Wetland Plants: An Ecology for Eastern North America.** Cox, Donald D. 2002. ISBN 0-8156-0740-7 (Paper US\$19.95) 194pp. Syracuse University Press, Syracuse, New York 13244-5160. – According to the introduction, this publication represents the fourth installment in the “Naturalist's Guides” series which evidently provides similar treatments of forest, meadow and seashore plants. Although these other titles are said to be “available”, I was able to locate only one other forthcoming volume (*A Naturalist's Guide to Seashore Plants*) which is scheduled for publication

in 2003. As far as I can tell (from checking various websites), neither of the other two titles is available or scheduled for publication at this time. So, for anyone desiring to obtain the entire series, the present title is all that is currently available.

The intended audience is an important factor when evaluating the content of a book, yet is often difficult to determine. In this case, the author clearly indicates that this series is aimed at the amateur rather than professional field biologist. The introduction states that the book is “For naturalists and other lovers of the out-of-doors” and also that “technical terminology has been kept to a minimum.” So, forthright, this book is not one that should be used as a college level text. In my estimation, the audience best served by this treatment comprises those who are just starting to become interested in the natural history of wetland plants, i.e., those just starting to *get their feet wet* in this area (sorry!). As I usually do, I went straight to the glossary which I have found to be a good reflection of the botanical training of an author. The book passed this test with flying colors. I was pleased to see that even though some terminology was simplified, the definitions were uniformly accurate.

Overall, the author does a good job of introducing and discussing relevant subjects and also includes topics (e.g., edible, poisonous, medicinal, hallucinogenic plants) that may entice readers into reading more about wetland plants. Although less than thorough discussion is provided for most topics, the most important areas are covered at least in part. The role and value of wetlands is described in a number of succinct, related sections including implications of invasive weeds and species conservation. Some information needs to be updated (e.g., the northern extent of *Hydrilla* is given as Washington, D.C. although the weed has been reported from Connecticut since 1996 and now also occurs in Massachusetts and Maine). Brief descriptions are given for major wetlands in the United States, including prairie potholes which occur geographically beyond the stated sphere of the book, i.e., eastern North America. The major groups of wetland plants (fungi, mosses, ferns, flowering plants, etc.) are surveyed briefly. A short overview of adaptations for survival in water is given in a separate chapter. Two of the other main chapters are devoted to more detailed discussions of swamps, marshes, and peatlands.

Understandably (being geared toward naturalists), a significant portion of the text (24 pp.; 12% of the total) is devoted to the collection and identification of plants. This chapter even includes two paragraphs on “What is a species?” Plant systematists should take note - this may be the first time in history that discussion of this topic has been achieved in only

two paragraphs. Actually, it is not a bad overview, either. This section also describes nomenclature and the use of keys.

The book concludes with a chapter on “Activities and Investigations” which provide topics of inquiry appropriate mainly for pre-college level students. The bibliography is not bad, but lacks inclusion of some of the better identification texts (e.g., Crow & Hellquist, 2000; Cook, 1996) that should be on every wetland naturalist’s bookshelf.

As far as the format of the book is concerned, the line drawings were generally acceptable, but tended to be on the simple side. The book is too large to be carried in one’s pocket, but it would not serve very well as a field guide because plants are discussed sequentially by various topics rather than in a taxonomic format.

I found several errors, although most were relatively minor. The generic name for water hyacinth (*Eichhornia*) is misspelled throughout as “*Eichornia*”. There is a typo on p. 109 (fig. 6.13) that lists the genus for bugle-weed as “*copus*” rather than *Lycopus*. The specific epithet for scouring rush (*hyemale*) is misspelled as “*hymale*” throughout. A greater oversight is an improper depiction of heterostylous flowers in Fig. 3.7, p. 55. This illustration correctly shows the different length styles associated with distylous floral morphs, but also shows the two morphs as having stamens of equal length, whereas distylous morphs typically differ by the length of their stamens as well.

Overall, this “nontechnical illustrated guidebook” should provide a basic background in wetland plant biology to anyone at a pre-college level. Even though the topics are not covered in great detail, the book is fairly accurate in the information that it does convey. This would be an ideal gift for young students showing any interest in wetlands, or also for uninitiated adults who suddenly find themselves confronted with wetland issues as members of local wetland committees, etc. However, the reader must keep in mind that this book provides only an elementary introduction to wetlands and should not be relied on to provide adequate information when more momentous decisions (e.g., those involving legal issues) must be made.

– Don Les, University of Connecticut, Storrs.

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**Sex ratios - Concepts and Research Methods.** Ian C. W. Hardy, editor. 2002. ISBN 0-521-66578-7 (paperback, US\$76.10, hardback US\$120), 380 pp. Published by Cambridge University Press.— Like most things having to do with sex, sex ratios are fascinating. Every sexually reproducing species has a sex ratio or, in hermaphroditic organisms, must allocate resources to male or female function. But why should males and females be produced in approximately even numbers and why should bisexual individuals expend approximately equal efforts on the two reproductive functions? The first chapter, by J. Seger and J. Stubblefield, of this beautifully edited book gives an historical overview of research on these questions from Darwin to the present. (That is, Darwin 1871 in the first edition of *The Descent of Man and Selection in Relation to Sex*, but not the more widely read 1874 second edition, which omitted the paragraph with Darwin's speculation on how "the sexes [could] be equalized through natural selection."). The first formal sex ratio model—and perhaps the first mathematical model in evolutionary biology—was developed soon thereafter, in 1883, by Karl Düsing, and Düsing appears to be one of the sources, or *the* source, of Fisher's classic explanation. As first understood by these workers, sex ratios evolve through negatively frequency-dependent selection on the relative reproductive success of male and female offspring. It is important to understand that sex ratios are not about numbers of offspring but about parental expenditure or, as later generalized by Trivers, investment in the two sexes or sexual functions. Similarly important is the realization that the equilibrium sex ratio is not affected by differential mortality of male and female offspring past the period of parental care. For plants, most of which have bisexual flowers (non-angiosperms are not considered in this book), the relative investment in male and female function has proven difficult to measure. Indeed, Klinkhamer and de Jong in their chapter on 'Sex allocation in hermaphrodite plants' suggest that measuring exact sex allocation is unlikely to be successful and "perhaps even impossible given the fact that flowers serve both male and female fitness." Fortunately, "it is hardly ever interesting to do so" (more on this below). At least theoretically, sex allocation in hermaphrodites is readily modeled in terms of unequally diminishing returns on investment in one or both sex functions. Complicating factors, however, abound, most importantly the effects of population structure and selfing, and sex distorters, such as mitochondrial male sterility factors.

Before turning to the chapters addressing these and other plant-relevant topics, here a summary of what the other chapters of *Sex Ratios* offer. The statistical treatment of the proportion of males over

males plus females (mathematically more tractable than ratios) is covered in chapters 2, 3, and 5. Chapter 3 is especially long and includes a detailed exposition of generalized linear models, the strongest way to analyze sex ratio data. All three chapters include worked examples, boxes with definitions, and assessments of available programs. Chapter 6 discusses the comparative approach to the study of sex ratio evolution (no studies from plants so far!), and the following chapters cover sex ratios in vertebrates, invertebrates in general, social insects, parasitic hymenoptera with unusual life-histories, mites, aphids, birds, humans, and malaria parasites and related protozoa. The book concludes with chapters on operational sex ratios and mating competition, a strikingly critical assessment of the past and the future of sex ratio research by Hecht Orzack, and a more optimistic one on 'sex ratios: why bother?' by West and Herre. One take home message is that deviations from 1:1 are extremely difficult to show, requiring huge samples sizes, and equally difficult to attribute to proximate and ultimate causes.

What is there about plants? First, nothing on environmental sex determination (ESD) in plants although ESD comes up in three chapters. Mentioning plants probably would have detracted from the chapters' focus. On the other hand, bringing in environmental sex determination in Catasetae, Cucurbitaceae, oil palms, or jack-in-the-pulpit might have broadened the discussion of why ESD has evolved, given that selection will normally favor a low sex ratio variance among offspring rather than a sex ratio that fluctuates with environmental conditions. Another undertreated topic is the role of cytoplasmic, specifically mitochondrial, male sterility factors. Their coverage in the chapter on sex ratio distorters by R. Stouthamer, G. Hurst, and J. Breeuwer is superficial and contains errors. The phenotype of these genes involves disruption of the normal function of the anther tapetum where mitochondrial density in plants is extremely high, causing misshapen anthers and partially or completely sterile pollen. Mitochondrial male sterility factors are known from gynodioecious angiosperms (e.g., Frank, 1989), not dioecious angiosperms as claimed here. Since mitochondria are exclusively maternally inherited (in angiosperms), this sets up a conflict between the mitochondrial genome, which now selfishly favors the production of ovules and the nuclear genome, which continues to favor the allocation of at least some resources to pollen production (increasingly more as the mitochondrial factors spread).

What the plant chapters in *Sex Ratios* (by Klinkhamer and de Jong, and de Jong and Klinkhamer) treat well is sex allocation in monomorphic populations



and sex ratios in dioecious angiosperms. As alluded to above, Klinkhamer and de Jong think that it is not necessary to know the exact allocation to male and female function. Instead it may be more productive to demonstrate trade-offs by manipulation experiments on individuals while checking whether other plant characteristics are correlated with the trade-off being analyzed. Many examples of such studies are provided. De Jong and Klinkhamer's strength is modeling, and they are less interested in the evolution of dioecy or its natural history. This explains misunderstandings such as the claim that in dioecious plants 'both male and female organs develop in each of their flowers, in separate floral whorls, but the development of one type is halted before maturity.' Clearly, this is not true of the vast majority of the ca. 14,620 dioecious species of flowering plants (Renner and Ricklefs, 1995); *ab initio* unisexual flowers characterize Cucurbitaceae, Euphorbiaceae, Menispermaceae, Myristicaceae, Moraceae, Siparunaceae, Urticaceae, and many others. The particular model they develop for sex ratios in dioecious plants assumes that plants are annuals (not true of most dioecists, as they admit) and that male and female seeds are of different size and thus unequally costly to produce (unknown in nature so far). The insight from the model, as from classic sex-allocation theory, is that, with at least some sib-mating, female bias in the seeds is expected in dioecious plants. '[F]or long-lived trees with good pollen and seed dispersal the appropriateness of the prediction is less clear.' Since there are very few strong data on seed sex ratios and sib-mating in dioecious species, we do not at present know whether plants conform to seed sex ratio equality or female bias. As indicated above, huge sample sizes are needed for inferences about sex ratios.

This book is beautifully produced and often fun to read, but contains unexpectedly little on plants, and then only on angiosperms. For most plant biologists, it may be sufficient to have their library buy it. - Susanne Renner, Univ of Missouri- St. Louis.

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**Artemisia**, Colin W. Wright (ed). 2002. ISBN 0-415-27212-2 (Cloth US\$65.00) 344 pp. Taylor & Francis Books Ltd., Thompson Publishing Services, Cheriton House, North Way, Andover, Hampshire, SP10 5BE, UK – I was excited to see this title and then somewhat letdown to learn it was part of a series, volume 18 in fact, *Medicinal and Aromatic Plants – Industrial Profiles*. I had hoped for a broader treatment of *Artemisia*. The series is designed to provide industry and academia with in-depth coverage of major medicinal or aromatic plants of industrial importance. The editor's preface states that the book is primarily devoted to the traditional use, cultivation, genetics, and phytochemistry of the herb *Artemisia annua* (Quing Hao, in Chinese) and its antimalarial agent artemisinin along with an introduction to the genus via (1) a general introduction and (2) treatments of a few other representative species and a treatment of the chemical and pharmaceutical analysis and quality control of commercial *Artemisia* species. The book meets those objectives.

The book includes 15 chapters with an impressive international list of contributing authors and covers three general areas. First is an introduction to *Artemisia* and the chemical analysis and quality control for commercial species (2 chapters). This is followed by a review of six species (*A. absinthium*, *A. drancunculus*, *A. herba-alba*, *A. ludoviciana* ssp. *mexicana*, *A. pallens*, and *A. vulgaris*) with historical and current commercial uses in herbal medicine, condiments, ethnobotany, perfumes, etc. (6 chapters). The balance of the book is an in-depth treatment of *A. annua* with its use in traditional Chinese medicine, the modern discovery of its antimalarial agent, artemisinin (7 chapters). This section includes material on cultural care and phytochemistry of *A. annua*, the development of additional artemisinin-derived antimalarial agents, and the variation, heredity, clinical use, mode of action, and regulation of artemisinin.

The book has a decided phytochemical and medicinal flavor. An annoyance for me was that the chemical structures, of which dozens are illustrated, are not treated in a uniform manner in the various chapters—both the style of illustration and the manner of labeling vary widely. The importance and timely discovery of artemisinin (1971) and its derivative agents for treatment of malaria when its causative agents began developing resistance to quinine and sulfonamide treatments are carefully documented. Chinese traditional medicine is clearly explained (Chapter 9) including the use of various *Artemisia* species including *A. annua* for chills and fevers as early as AD 340.

The introductory chapter covers, in summary form, what one would expect the whole volume to expand

to given its one word title. It does give the reader a summary of the place of *Artemisia* in the world; systematic placement, geological and evolutionary history, pharmaceutical and economic uses, ethnobotany, chemistry, physiology, and ecology and management. These areas are what I had hoped to see a whole book devoted to. These areas are unevenly treated. And, there are some errors, e.g., the Clements and Hall (1923) reference is Hall and Clements, the Diettert (1961) reference is (1938), the Shultz (1984) reference is (1986). The genetics and ecology and management sections are weak. *Artemisia* includes several examples of elegant polyploid complexes (*A. tridentata*, *A. ludoviciana*, *A. maritima*, *A. vulgaris*, and *A. drancunculus*). The genus has been subjected to newly described molecular genetic (ITS and cp DNA) studies. Neither cytogenetic nor molecular genetics were discussed in any detail. The ecology and management of the landscape dominant complexes, e.g., *A. tridentata* in North America and *A. herba-alba* in the Mediterranean basin and western Asia were only superficially addressed. The discussion on the degradation of the big sagebrush (*A. tridentata*) complex does not mention the dramatically shortened fire cycles with the correlated cheatgrass (*Bromus tectorum*) invasion and dominance that is, perhaps, the major land management problem in semiarid western North America.

The chemical analysis and quality control chapter (Chapter 2) and the six species chapters (Chapters 3-8) emphasize current commercial uses and ethnobotany of representative *Artemisia* species with emphases on phytochemistry and herbal, culinary, addictive (in the case of *A. absinthium*), and industrial uses. These chapters will give the reader a feel for the diversity and utility of plants of the genus *Artemisia*. They don't, in general, include discussion on systematics or ecology and are of uneven quality.

The strength of the book lies in the concluding 7 chapters (9-15) where *Artemisia annua* is described and characterized in a myriad of ways; especially in respect to its antimalarial properties. These chapters describe the historic Chinese traditional uses of Quing Hao (= green herb), the isolation and characterization of artemisinin and its derivatives. These compounds can not be routinely synthesized but must be extracted from *A. annua*. These chapters describe the state of the art in cultivation of *A. annua* and the variation and heritability, mode of action, clinical use, and regulation of artemisinin and its derivatives.

This book is useful for those who are interested in the herbal and medicinal uses of *Artemisia* especially in learning about the recent advances in

the use of *A. annua* for the treatment of malaria. It is not a general treatment of the genus nor was it intended to be despite the short title, *Artemisia*. Such a book is yet to be written although excellent books on portions of the genus with special emphases have been published, e.g., Harvey Hall and Frederic Clements' *The Phylogenetic Method in Taxonomy, The North American Species of Artemisia, Chrysothamnus, and Atriplex* (1923, Carnegie Institution of Washington, Washington, DC) and Stephen Trimble's *The Sagebrush Ocean* (1989, University of Nevada Press, Reno, NV). – E. Durant McArthur, USDA Forest Service, Rocky Mountain Research Station, Shrub Sciences Laboratory, Provo, UT 84606-1856.

**Cacti: Biology and Uses.** Nobel, Park S. (ed). ISBN 0-520-23157-0 (Cloth US\$65.00) 290 pp. University of California Press, 2000 Center Street #303, Berkeley, CA 94704. With *Cacti: Biology and Uses*, Park Nobel presents yet another fine work on succulent plants. He is the editor of this volume and coauthor of one of the 15 chapters. This follows his previous works, including the variously titled editions of his mathematically-based book on plant ecology and Remarkable Agaves and Cacti, both of which dealt in whole or in part with succulents. This work is intended to present a complete review of the various aspects of the botany of cacti, though the cover photograph and design first brings to mind a horticultural book from Timber Press. This book covers a very wide range of topics, from the basic botany and ecology of cacti to details of their production for use by humans and animals.

The various chapters include a treatment on how cacti evolved and the present state of systematic work on the Cactaceae, a consideration of the structure and function of their roots, and an examination of some products derived indirectly or directly from cacti. These latter subjects include the dye cochineal, extracted from the bodies of parasites living on cacti, and young cladodes, called nopalitos, eaten as a green vegetable. In addition, other chapters concern themselves with subjects such as the biology and agriculture of cactus pears, the fruits of *Opuntia ficus-indica*, and important insect pests of various native and introduced cacti around the world. The various authors also cover the rest of the range of topics which might be expected from a volume like this, such as the state of conservation biology for cacti and impacts on their conservation by collectors, microbial symbionts of cacti, and the anthropology of cacti, including their domestication.

Throughout is chapters, *Cacti: Biology and Uses* is well, but not lavishly, illustrated with black

and white photographs and figures. Though these images are generally of very good quality, especially given that they are not reproduced on glossy stock, the reader might prefer more photographs. However, given the target audience, many readers may already have access to images of many of the species discussed. Still, given the eye-catching photograph of many ripe cactus pears in an orchard, the illustrations inside are something of a disappointment.

The chapters of *Cacti: Biology and Uses* have a uniform style, which is clear and concise as well as exceptionally easy read for a book of this type. This may well reflect the influence of Nobel, who has previously described detailed botanical biophysics in a very approachable way. The text contains enough information to hold the interest of someone working in the field of cacti and other succulents, but at the same time, it will be easily accessible for undergraduate students and interested amateurs.

College and university libraries should buy a copy of this work, and many gardeners will want to join teachers of botany and ecology in purchasing *Cacti: Biology and Uses*. It would make a valuable addition to reading lists for introductory undergraduate courses and could be a valuable reading assignment for upper level undergraduates as well as graduate students. – Douglas Darnowski, Washington College, Chestertown, MD.

**Eucalyptus. The Genus Eucalyptus.** John J. W. Coppen (Ed.) 2002. ISBN 0-415-27879-1 (Cloth US\$75.00) 450 pp. and **Geranium and Pelargonium. The Genus Geranium and Pelargonium.** Maria Lis-Balchin (Ed.) 2002. ISBN 0-415-28487-2 (Cloth US\$90.00) 318 pp. - These two books were published as volumes 22 and 27 in the series "Medical and aromatic Plants – Industrial Profiles" by Taylor & Francis Book Inc, 29 West 35<sup>th</sup> Street, New York, NY 10001. The use of eucalyptus as a commercial source of volatile oils forms the basis for much of the content of the first volume. Nevertheless, four introductory chapters serve as an overview of contemporary *Eucalyptus* taxonomy, ecology, cultivation, and breeding. Particularly interesting is Calender's chapter on eucalyptus effects on evaporation, runoff, and erosion. The genus *Eucalyptus*, which is native to Australia and some islands to the north of it, consists of over 800 species of trees. Over 100 species are grown for timber, pulp, and fuelwood. However, as the Australian aborigines discovered thousands of years ago, *Eucalyptus* has numerous medicinal and aromatic properties. Since the first commercial

distillation of eucalyptus oil 150 years ago, many eucalyptus-based products have entered the marketplace, mainly for pharmaceutical, fragrance, and flavor use. Medicinal-type eucalyptus oil – or its main constituent, 1,8-cineole – is an ingredient in hundreds of pharmaceutical products and used for the treatment of ailments ranging from colds to joint pain and skin disorders. Two chapters are dedicated to *Eucalyptus* chemistry and oil distillation techniques. Five chapters review cultivation of eucalypts in Australia, China, Africa, South America, and India. Seven closing chapters deal with bioactivity of eucalyptus oils, chemical ecology (including allelopathy), and end-use aspects. Seven appendices summarize information on sources of eucalyptus seeds, estimates of eucalypt plantations worldwide, composition of commercially distilled oils, and some other important data. Cultivation of eucalypts outside their natural range remains controversial, but it is still much less questionable than cultivation of definitely invasive alien woody plants like acacias and other legumes.

The second volume covers many aspects of the taxonomy, phytochemistry, cultivation, pharmacology, and industrial processing of the genera *Geranium* and *Pelargonium*. These two temperate genera are of about the same size, ca. 300 species. The former one is relatively widespread in the both hemispheres, the latter is concentrated in the South African Cape Province. The main usage of *Geranium* species is in herbal medicine, while that of the *Pelargonium*-derived Geranium oil is in perfumery, cosmetics and aromatherapy products. Twenty six chapters in this volume were written by 19 authors from Bulgaria, France, Germany, Poland, and UK. The practical importance of the majority of the chapters is uncontested. Anybody interested in propagation, chemotaxonomy, oil distillation, or medical use of species in the two genera will find something useful in this volume. From a more general point of view, I found the chapter "Phylogenetical relationship within the genus *Pelargonium* based on the RAPD-PCR method of DNA analysis correlated with the essential oil composition" most interesting.

Unfortunately, several recent conclusions from the recent studies in taxonomy and phylogeny of the three genera are not reported (e.g., Jackson et al. 1999; Udovicic and Ladiges 2000; Price and Palmer 1993; Bakker et al. 2000; Feliner and Aedo 1995; Dryer and Marais 2000). Nevertheless, these two volumes represent useful overviews of the current knowledge of *Eucalyptus*, *Geranium*, and *Pelargonium*. They will serve as an invaluable source to all botanists interested in these genera, but especially to those interested in their medicinal, cosmetic, and perfume use. – Marcel Rejmánek, Section of Evolution and Ecology, university of California, Davis, CA 95616.

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**The Guarijos of the Sierra Madre.** Yetman, David. 2002. ISBN 0-8263-2234-4 (cloth US\$49.95) 270pp. University of New Mexico Press. Albuquerque, New Mexico, USA. The Guarijio are a little known people of the tropical deciduous forests of northwestern Mexico. At one time believed extinct by the outside world, the Guarijos have continued with their often-tenuous existence high in the hills of the Sierra Madre of southern Sonora and Chihuahua, Mexico.

They inhabit one of the most inaccessible areas of North America, a land of deep canyons surrounded by incredibly steep mountains. This land is also some of the most botanically diverse in North America; almost 3000 plant species are known from the Rio Mayo drainage (Martin et al. 1998). Very little flat ground exists in this landscape and the Guarijio have learned to survive by farming the steep hillsides and collecting the native plants. Howard Scott Gentry was one of the first researchers to spend time among the Guarijos and made the first modern records of them in the 1930s. Between the last Spanish records and the publication of Gentry's *Rio Mayo Plants* (1942), nearly one hundred years went by with no record of the Guarijio. Before that, we have only the records of the Spanish priests intent on converting them. While collecting botanical specimens and information for *Rio Mayo Plants*, Gentry also collected extensive ethnobotanical notes. These were later published in his work on Guarijio ethnobotany (Gentry 1963). In *The Guarijos of the Sierra Madre* Yetman builds upon Gentry's earlier works and presents his experiences in an accessible format for readers. This book also complements Gentry's *Rio Mayo Plants* (Martin et al. 1998), expanding on the ethnobotanical uses of the plants of the Rio Mayo drainage listed there.

*The Guarijos of the Sierra Madre* comprises 15 chapters addressing various aspects of the Guarijio people and their world, and the author's travels among them. The chapters tend to jump around some, with chapters relating the author's travels among the Guarijos interspersed with the chapters on their history and the geography of the area. (Because of this, some of the information occasionally seems redundant between chapters.) The first chapter is a short introduction that explains how Yetman came to study the Guarijio and their use of plants.

Chapters 3 – 5 present the history and cultural definition of the Guarijio. A general history of the Guarijio is presented in Chapter 3, condensing several Spanish sources that have not been available in English before now. Much of the Guarijos' history is unknown prior to the 1930's. Unfortunately, during that time, the Guarijio were landless and often living on the doorstep of starvation and forced to work as sharecroppers for Mexican ranchers. In the seventies, the Guarijio rebelled, and against overwhelming odds, were able to prove their claims to the land they lived and worked on, and establish their own ejidos (communally owed tracts of land). With the creation of their ejidos and governmental assistance, the Guarijio were finally able to own the land they farmed. Chapter 4 describes the tuburada, the communal festival that is the religious focal point for the Guarijio. This festival with its associated woman's dance, the tuburi, and their language is what distinguishes the



Guarijio as a people. Chapter 5 further discusses the culture and people of the Guarijio.

The physical features, geologic history, and vegetation of the Guarijio lands are addressed in chapter 7. The topography of the Rio Mayo drainage is extremely convoluted and incised by deep canyons, revealing its dramatic geologic history. It is in this convoluted landscape that tropical deciduous forest reaches its northern distribution. Yetman gives an excellent overview of this vegetation type and his descriptions are useful in demonstrating the rich plant diversity found here. The author's description of the contrast between the lushness of the wet season and the barrenness of the dry season is particularly interesting.

Chapters 2, 6 and 8 – 12 are engaging narratives of the author's travels to various Guarijio villages (many inaccessible by automobile). These stories are full of anecdotes of the Guarijios' botanical knowledge and their use of native plants. In addition, there is much information on their history, culture and customs. Chapter 12 delves deeper into the conversion of the Guarijio to evangelical Christianity and the attendant erosion of Guarijio culture. The evangelicals denounce the dancing of the tuburi and the associated tuburada, and the speaking of Guarijio – the things that make the Guarijio who they are. On the positive side, they discourage drinking, helping prevent the rampant alcoholism prevalent among the Guarijio.

Chapter 13 presents some of Yetman's personal opinions on the status of Guarijios in Mexico and their future place in the world. This is one of the more engaging, although very political chapters in the book. Here, and elsewhere, Yetman strongly implicates the role of the cattle culture, especially the introduction of buffelgrass (*Pennisetum ciliare*), in the erosion of the Guarijio culture and destruction of the tropical deciduous forest. He argues a strong case for the infeasibility of raising cattle as a sustainable activity in the tropical deciduous forest environs inhabited by the Guarijio. The "Mexicanization" of the Guarijio through cattle makes them dependent on Mexican economic and agricultural aid and decreases their level of independence. Guarijio independence is derived, in part, from the forest. As the forest is removed to provide more pasture for cattle, the Guarijio lose their independence and are forced to rely more and more on the cattle. Ultimately, however, little money is realized from the sale of cattle and the biggest source of income for the Guarijio may actually be from the illegal drug trade. Yetman also examines the influence of the drug trade on Guarijio society. US drug policy ensures a steady supply of well-paid work for the Guarijio. While drug money provides quick money for the Guarijios, it also contributes to

the destruction of their forested lands. Additionally, it brings a culture of violence that contributes to the deterioration of Guarijio society.

The final two chapters emphasize plants the most. Chapter Fourteen is a brief explanation of why the book focuses on plants and introduces nine representative plant species that are particularly important to the Guarijios. Chapter 15, Ethnoflora of the Guarijios, is a catalog of plants utilized by the Guarijios as documented by Yetman and others (e.g., Martin et al. 1998; Gentry 1963). Plants are organized alphabetically by their family, with an entry for each species. The plant's scientific name is given along with the Guarijio name(s) and any Spanish or English common names. For each plant, there is a short description of how the Guarijio utilize it. Additionally, there is a short English-Guarijio-Spanish dictionary of plant anatomy terms. Appendix A is comprised of several useful items. The Gazetteer of the Guarijio Region presents information on village and river locations, population statistics, derivation of names, and general notes on the Guarijio world. A map of the area in the front of the book complements this. Following the gazetteer are the chapter notes. These are expansions on the information presented in the chapters, in lieu of footnotes or copious bibliographic citations. These notes are particularly interesting, and the reader will find a wealth of information in them. Yetman has also included a useful Spanish and Guarijio glossary. The index includes individual plant names, both by scientific and Spanish common names, and English plant family names.

*The Guarijios of the Sierra Madre* is copiously illustrated with black and white pictures of the Sierra Madres, the Guarijios and their plants. However, it is unfortunate that a few color photographs were not included, as only color can convey the vibrant green of the tropical deciduous forest during the rainy season and the monotonous brown of the dry season.

This is a very engaging and entertaining book that I would recommend to anyone interested in the exploration of tropical deciduous forests of Mexico, native peoples of Mexico, or ethnobotany. While not strictly an ethnobotanical account, *The Guarijios of the Sierra Madre* provides an information packed account of the author's adventures among the Guarijios in the mountains of Mexico. Yetman's travels are full of his observations on plants and their uses, the culture of the Guarijio people and a healthy interjection of humor, often at his own expense. It is also a window on a little known culture south of our border that still relies heavily on native plants available only in intact tropical deciduous forests. –James P. Riser II, University of Colorado at Denver, Denver, CO



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**Lavender: the genus *Lavandula***. Lis-Balchin, Maria, ed. 2002. ISBN 0-415 28486-4 (Cloth US\$80.00) 268 pp. Taylor & Francis Books 29 West 35<sup>th</sup> St., New York, NY 10001. - This is the most recent addition to the series: Medicinal and Aromatic Plants - Industrial Profiles, having the stated intent "to provide both industry and academia with in-depth coverage of major medicinal or aromatic plants of industrial importance." The treatment reports a broad range of topics, from taxonomy, propagation and retail nursery cultivation, to phytochemistry, and from historic use of *Lavandula* species, to antimicrobial properties, psychological effects, and aromatherapy and perfumery benefits. Thus, in my view, this is the ultimate monograph of a genus.

The editor's historical review of usage provides a good introduction to its importance since antiquity. Its use in classical times presages its rise in popularity in the Middle Ages all through to Victorian times. Its aromatic qualities are featured prominently in the chapters. The expertise of Jeffrey Harborne and Christine Williams provides clarity to the discussion of the phytochemistry of the genus. Folk-medicinal usage is included in the chapter about pharmacology of *Lavandula* essential oils and extracts *in vitro* and *in vivo*. One subject that is not frequently found in botanical monographs, is the approach found in the chapter devoted to the psychological effects of lavender, by Michael Kirk-Smith.

Edited works sometimes yield uneven results, because each contributor puts a different amount of effort into the work submitted. Here, the overall product is quite uniformly excellent, as regards detail and significance. While there may be some slight overlap of the contents of some chapters, each author's specific contribution can stand-alone and includes references. This consistency might be due to the determination, and in part perhaps, to the predominance of contributions by the editor, who is sole or co-author of 13 of the 24 essays.

The volume is well illustrated with some color plates of inflorescences, and black and white historic photographs of formal gardens, harvesting,

distillation of the oil, and several herbarium specimens illustrating two lavender hybrids, a puzzling complex. An electron micrograph of the oil glands and hairs on the calyx of ripe lavender is particularly appreciated.

The book concludes with an alphabetical index. Before the Preface, the list of contributors with contact information, including professional postal as well as email addresses adds a contemporary quality. Lavender is a book that belongs in the library collections of economic botanists, universities and colleges, and especially of medical schools. – Dorothea Bedigian,

**Narcissus and Daffodil The Genus *Narcissus***, Hanks, Gordon R. (ed). 2002. ISBN 0-415-27344-7 (Cloth US\$70.00) 428 pp. Taylor & Francis Books, Ltd., Cheriton House, North Way, Andover, Hampshire SP10 5BE. United Kingdom.edited This book fills the twenty-first place in the series on Medicinal and Aromatic Plants-Industrial Profiles, from Taylor & Francis. It aims to provide a complete look at the plants of the genus *Narcissus* as they are used by humans, concentrating both on the use of these plants in horticulture and on those alkaloids provided by this genus. Many chapters deal partially or completely with one of these alkaloids, galanthamine, the main active ingredient in the drug Reminyl. This makes sense given that the series is designed so that "Each volume gives an in-depth look at one plant genus, about which an area specialist has assembled information ranging from the production of the plant to market trends and quality control" (p.vii).

This particular work opens with a chapter on the basic biology of the members of *Narcissus*, followed by consideration of the folkloric significance of daffodils and their cousins and on the current state of systematics for the genus. Then the various authors move quickly to economically-important topics, from details of commercial production to various pharmaceutical chapters to the use of the various species of *Narcissus* in the perfume industry. Of the 20 chapters, 14 deal mostly or wholly with alkaloids or some other medically and agriculturally important compounds, such as lectins. The alkaloids of the members of *Narcissus* have received interest particularly in their medicinal use as ACE inhibitors, and obtaining galanthamine from *Narcissus* is a particularly attractive option, according to the authors. This is because this alkaloid was originally found in threatened allied genera in the Amaryllidaceae, but it also occurs at sufficiently high concentrations in the widely-grown

genus *Narcissus* to make this a second commercially viable source, taking pressure off threatened plants. One odd point is the placement of chapters on lectins and perfumery, which fall in the middle of a large group of the chapters concentrating on alkaloids without an obvious reason for this placement. One good point is the amount of easily-followed practical data included such as <sup>1</sup>H-NMR spectra of various important alkaloids and numerous references which will help readers access the Soviet literature.

Throughout *Narcissus* and *Daffodil The Genus Narcissus*, the quality of the writing is evenly good, and the various black and white figures and photographs serve their purpose, along with a few color images, though more black and white photographs with higher quality reproduction might have improved this volume. The book is written from the perspective of the United Kingdom, and much of the practical data relates directly to production there, though not to the exclusion of all other countries.

This volume will be of interest both to horticulturists and to those involved with medical botany, given its emphases on production of bulbs and flowers on the one hand and on physiologically active alkaloids on the other. Medical botanists may find the last chapter, on patents related to this genus, of particular interest. College and university libraries, especially those serving populations with interests in horticulture and medical botany should obtain a copy. Readings from this volume might be of use in upper level undergraduate courses, and certainly would be of value to graduate students working in these areas. – Douglas Darnowski, Washington College, Chestertown, MD.

**Travels in the Genetically Modified Zone.** Mark L. Winston. Harvard University Press, 2002, \$27.95. ISBN 0-674-00867-7 Genetic engineering technology as applied to food affects all of us in the United States, but most of us aren't even aware of its presence. However, sentiment from those involved with it seems to be bimodal, with corporate farmers and industry adamantly pro-biotechnology and organic farmers and consumer advocate groups vehemently anti-biotech. Scientific data are used by both sides, and each side seems to talk past the other. In this book, Mark Winston describes the issues involved with genetically modified organisms (GMOs) from each point of view and places the origins of each position in historical context while also analyzing the studies cited by each position. Many current books on the subject take an extreme stance and use partial data to

support it; the main strength of Winston's book is that he begins by questioning the scientists involved in each study and bases his initial opinions on their evidence. His conclusions therefore more often indicate qualified risks or benefits than the definite answers presumed by short media summaries. However, he also attempts to explain the rationale behind the more extreme viewpoints of others that lead to those dualistic interpretations.

The first two chapters encapsulate the history of agriculture, its transformation to agribusiness, and the first wave of biotechnology. The agricultural history grounds the discussion with the concept that the entirety of crop management has entailed some form of genetic manipulation, and indicates how this management was facilitated by the development of privatized seed production and distribution. The history of recombinant DNA research is then introduced to link the creation of the industrial scientist to the current status of crop biotech research, as well as to provide an example of regulatory success to contrast with the current state of biotech safeguards.

Expanding on the regulatory angle, two subsequent chapters examine the involvement of the EPA with genetically modified crops and the role of patents in gene research. Both provide explanation of how the regulatory agencies came to be involved in the research and why current regulations exist. Winston enumerates problems with the regulatory systems and the tension between scientists, industry, and farmers over the amount of regulation that has been proscribed. A separate chapter examines the development of golden rice in detail, mainly to illustrate the legal climate surrounding GMOs.

One chapter is concerned with the potential of genetically modified crops for environmental damage, and it contains many well-known examples. Starlink corn, monarch butterflies, and others make their required appearances, but Winston uses the approach of allowing the scientists who were involved to state their own analyses of the data and describe follow-up studies as well. In this way, more complex and moderate conclusions for each are described than those usually associated with these studies. For example, he continues the monarch-Bt connection with lesser-cited studies of the black swallowtail, indicating that the toxic effects vary in different species and with different crop varieties. In addition, he raises other examples that have received less press, such as the accidental creation of triple-herbicide resistant canola in Alberta. The strengths of his treatment of these stories are that he clearly places them in context of both the history leading up to the studies, discusses them with the primary participants, and qualifies the

results with possible alternative explanations, interactions, and levels of significance

Changing from a scientific to an economic slant, two chapters focus on farmers and their viewpoints on GMOs. One chapter examines their benefits to conventional farmers, and details the economic, ecological, and philosophical reasons most conventional farmers are enthusiastic about them. Another chapter discusses the challenges faced by organic farmers and others who do not wish to use the genetically modified crops, such as environmental, regulatory, and processing difficulties.

The most interesting two chapters explore public sentiment behind the GMO debates. Winston describes his experiences attending both pro-and anti-biotech conventions, and how each manages to be completely persuasive and manipulative. His analysis of the public relations errors (and outright disasters) that biotech companies have made lead him to the conclusion that public trust in the companies is a much larger contributing factor to pro- or anti-GMO standpoints than the scientific data. This conclusion is, for him, pivotal in trying to resolve the debate, and he concludes the book with suggestions as to what steps each involved party could take to further the benefits of genetic research while paying appropriate attention to the potential hazards and public relations issues involved.

The criticisms I have for this book are slight. Although I have organized my chapter synopses by topic, the chapter organization in the book is more random and disjointed. There are a few places where information is lacking; for example, the genetic basis behind hybrid vigor is poorly explained, and a link between the initial development of recombinant DNA technology and its adoption by seed companies is stated to exist but is never described. The writing style does become a bit dry at times, particularly in the basic background statements of the more familiar topics. The index is not as complete and intuitive as it could be; in one instance, it took me three tries to find a particular reference. However, the strengths of the book far outweigh the negative aspects. Throughout the book Winston uses a calm tone and even approach that is not often seen in popular biotech literature. He excels at presenting scientific evidence on both sides of each issue and also analyzes emotional responses to the debate. He does state his position on each issue, but provides the background and rationale of each side to allow readers to draw their own conclusions. GMOs provide a wonderful addition to classes both for their botanical emphasis and current event status; I would highly recommend this book as a starting point to anyone contemplating incorporating

GMO topics in a curriculum. For those new to the subject as well as those who are already familiar with the issues, this book provides a valuable comprehensive, objective analysis of the history and current status of GMOs. - Carlie Phipps, Department of Math/Science, SUNY Institute of Technology, Utica, NY 13504-3050



**English-Spanish Dictionary of Plant Biology: Including Plantae, Monera, Protocista, Fungi and Index of Spanish Equivalents.** 2002. Morris, David W. and Marta Z. Morris. ISBN 1-898326-97-5 (Paper US\$28.95) 647 pp. Cambridge International Science Publishing, 7 Meadow Walk, Great Abington, Cambridge CB1 6AZ, United Kingdom. - The Morris' English-Spanish Dictionary of Plant Biology is a dictionary in the full sense of the word, giving not just the Spanish translations of over 12,000 plant science terms but the English definitions of those terms as well. Because of the broad coverage of disciplines - with words from basic botany, cytogenetics, genetic engineering, molecular biology, plant morphology, and population biology among others — it is a valuable resource for the English definitions alone. The Spanish translations will be very welcome to people who have been keeping several specialized reference books on the shelf to deal with today's multidisciplinary emphasis. The effort to surmount language barriers in several disciplines with a broad-ranging compilation has been tried before: in T.J. Bezemer's 1934 Dictionary of Terms Relating to Agriculture, Horticulture, Forestry, Cattle Breeding, Dairy Industry and Apiculture in English, French, German and Dutch; in Louise Schoenhals's 1988 Spanish-English Glossary of Mexican Flora and Fauna; and Alvin Medina's 1988 English-Spanish Glossary of Terminology Used in Forestry, Range, Wildlife, Fishery, Soils, and Botany published by the United States Department of Agriculture. But these works, admirable as they are, provide only translations, not the extensive definitions offered by David and Marta Morris. In addition, a more recent work has the advantage of being able to include

terms that have come into being only in the last decade.

The first two-thirds of the book contains the English-to-Spanish translations of terms and the English definitions. A typical entry, for "diakinesis," reads: "diacinesis. diaquinesis. The final stage in the prophase of meiosis when all the chiasmata reach the ends of the tetrads and the homologues can separate during anaphase; chromosomes are tightly coiled and have formed the compact tetrads which are spread out in the nucleus, and the nucleolus disappears. The five stages of prophase in meiosis are: leptotene, zygotene, pachytene, diplotene, and diakinesis." The entry is typical in several ways, giving more than one Spanish translation if several words or spellings are in use; providing a plain English definition of the term; and giving additional information (the names of the other stages of meiosis) that might be of interest to a reader consulting the entry.

Other entries are similarly wide-ranging: the entry for "genetic load" lists and defines three types (input load, balanced load, and substitutional load); the entry for "Fehling's solution" gives the recipe, the purpose, the indicator color, and the chemical reaction; the entry for "dioecious" notes that plants of both sexes must grow near each other for fertilization to occur, and gives an example of a dioecious plant.

The last third of the book is a list of Spanish terms and their English translations. The entries here are brief. "herencia cualitativa, qualitative inheritance." A reader translating material from Spanish to English would use this section first to determine the English word. He or she might then consult the first section of the book if the English term is unfamiliar.

One often hears the argument that scientists can understand papers in any language because all the scientific terms are the same anyway. For some words that is true. A reader translating in either direction might easily guess that "tonoplast" and "tonoplasto" are equivalent. But what about "sticky end" or "feedback loop" or "deciduous forest," all included in this volume? A good bilingual dictionary gives the user confidence that the term in question has been properly translated and correctly spelled whether the required linguistic metamorphosis is major or minor.

This dictionary will be most useful to English speakers who are delving into the Spanish-language literature and to people with facility in everyday Spanish or English who want to render scientific terms correctly. Because the definitions are in English, the book has less utility for Spanish-only speakers, but it still provides translations

between Spanish and English for a large and diverse group of plant science terms. The dictionary is modern enough to include genetic engineering and transformation while retaining non-technical terms, such as "ear" and "silk," relating to traditional plant breeding.

The dictionary is not perfect. There are indications that some intended editing tasks were not completed before publication. For example, the entry for "sister cell" reads "one of two cells formed by the division of a pre-existing cell. ??????" The underlined word (which probably should be "pre-existing") and the six question marks suggest that this entry was marked for review and correction but was not revisited. But such errors are few and do not negate the contribution that this book makes

Royalties from the book go toward maintaining the American Indian Museum of Plants and Healing in Jasper, Texas, where David and Marta Morris are curators. - Judy Harrington, Department of Soil and Crop Sciences, Colorado State University.

### **The Fever Trail: In Search of the Cure for Malaria.**

Mark Honigsbaum. 2002. 0-374-15469-4 (Cloth, US \$25.00). 307 pp. Farrar, Straus and Giroux, 19 Union Square West, New York NY 10003. - Malaria, a mosquito-dispersed disease caused by a protozoan (*Plasmodium*), has over the span of recorded history killed more humans than any other disease. There was no effective treatment for it until the 17<sup>th</sup> century, when Jesuits in Peru introduced supplies of medicinal bark from a Rubiaceae tree, *Cinchona*, that grows in the cloud forests of the South American Andes. This bark, referred to at first as "Jesuit's bark" (later most often as "Cascarilla bark"), was said to have effected a miraculous cure in 1638 when Jesuits treated the wife of the viceroy of Peru, the Condessa de Chinchon. Although the details of this story proved mythical, trials by physicians in Europe quickly showed that Cascarilla bark was indeed highly effective in ameliorating symptoms of malaria in famous patients such as Oliver Cromwell, Charles II, and the son of Louis XIV. However, the supplies of bark imported from Ecuador and Peru were highly variable in their therapeutic value. By the 18<sup>th</sup> century the medical importance of Cascarilla bark was so evident that European governments became concerned with control of the quantity and quality of supplies of the drug.

Mark Honigsbaum's book is a detailed chronicle of the expeditions to South American that



were undertaken to secure reliable supplies of Cascarilla bark. The logistic difficulties were enormous, as the trees (referred to as *Quina* or *Cascarilla*) were scattered in remote areas in the Andes (above 1000 meters).

The first scientific breakthrough came with the French expedition to Ecuador in 1735 which set out to measure a degree of latitude at the equator. When the expedition leader, La Condamine, learned that the measurement had already been made by another French expedition in Lapland, he turned his attention to the Cascarilla plants in Ecuador. In the province of Loja, he located trees and with the aid of botanist Joseph Jussieu he finished a description and illustration of the plant he called *Quina quina* after the Quechua name. La Condamine's paper was published in France in 1738, and four years later, in his *Genera Plantarum*, Linnaeus created the generic name *Cinchona* in honor of the first famous patient cured by the bark, the Condessa de Chinchon.

La Condamine not only described the *Cinchona* tree botanically for the first time, but in a daring trip down the Amazon River (the first since that of Pizarro's lieutenant Orellana in 1542), he initiated the series of expeditions—which might be called the “*Cinchona* rush”—that lasted for two centuries. These expeditions were significant in both scientific and political terms. Most of the botanical work in South America in the late 18<sup>th</sup> century was carried out by two parallel expeditions (Mutis in Colombia, Ruiz and Pavon in Peru) financed by the Spanish government primarily to improve its supplies of *Cinchona* bark. Most significantly, the studies of these botanists showed that *Cinchona* included a considerable number of species besides the original *Cinchona officinalis* discovered by La Condamine and named by Linnaeus.

When in 1820 *Cinchona* bark was successfully analyzed chemically, the active principle turned out to be a mixture of alkaloids, among which quinine was the most important. The search for *Cinchona* now became a competition for control of quinine supplies by the major imperial powers, which were concerned about the human and economic losses in their colonies. The increasing demand for quinine during the 19<sup>th</sup> century made it highly desirable to import *Cinchona* for development of plantations, primarily in India by the British and in Java by the Dutch. The invention of a portable glass case (the “Wardian case”) in 1830 made it technologically feasible to ship *Cinchona* plants and cuttings on long overseas voyages. However, by this time the independent Andean countries had become aware of the value of their *Cinchona* forests and put in place rigid controls—if not outright interdiction—of export of *Cinchona* plants and seeds. The 19<sup>th</sup> century expeditions by the European powers (mainly between 1850 and 1875) therefore became exercises in deception and intrigue, which

Honigsbaum recites in fascinating (if sometimes confusing) detail.

The cast of characters included a British businessman, Charles Ledger, in Peru and his Bolivian assistant Manuel Mamani; a British bryologist, Richard Spruce; a British geographer, Clements Markham; a Dutch botanist, J. C. Hasskarl; and a French botanist, H. A. Wedell. Honigsbaum relates the travels of Spruce in greatest detail because his trip through the Amazon basin and into the Ecuadorian Andes was a chronicle of insuperable difficulties. One could argue that his accomplishments earn him the rank of the most intrepid individual botanical explorer in history. Ironically, Spruce's *Cinchona* material proved to be of lesser value than that collected by Ledger's highly talented assistant, Mamani. Even more ironically, through inept management by British colonial authorities, the bulk of Mamani's seeds from *Cinchona* trees with the highest quinine content ended up in the hands of the Dutch. In the final outcome, the British plantations in India were cut back, and quinine supplies for the entire world were almost entirely produced in Java.

The final chapter of *Cinchona* exploration, during World War II, is treated very sketchily by Honigsbaum; this seems the weakest part of the book. When the Japanese occupied Java in 1942, it created an immediate crisis for the Allied powers (a high percentage of U. S. and Australian soldiers on Guadalcanal were disabled by malaria). Fortunately, General Douglas MacArthur was able to rescue seeds of *Cinchona* from a plantation in the Philippines, and plantations were established in Ecuador.

Honigsbaum has almost nothing to say about the U. S. *Cinchona* Mission to South America of several botanists who collected Cascarilla bark in Andean cloud forests during 1942–44. This was chronicled in 1947 by the participating Ecuadorian botanist Misael Acosta-Solis in *Cinchonas del Ecuador*. As pointed out by Walter Hodge in the most detailed account of the *Cinchona* Mission (*Economic Botany*, vol. 2, 1948), at least 15 U. S. botanists were involved in the exploration in Ecuador, Peru, and (to a lesser extent) in Bolivia. The shortage of quinine in 1942 was strategically critical, although by 1943, synthetic substitutes for quinine, especially Atabrine, were becoming available. However, quinine has remained important (and continues to be useful), especially for treating malaria caused by the most dangerous plasmodial strain (*Plasmodium falciparum*).

The final chapters of Honigsbaum's book deal with researches on the malarial parasite (*Plasmodium*), the discovery of the role of the *Anopheles* mosquito in transmitting the disease, and the search for a vaccine. Since the publication of the English edition of the *Fever Trail* in 2001, additional information has been added by two other

writers. Although Honigsbaum gives 1630 as the earliest report of the medicinal use of *Cinchona*, the prominent Ecuadorian scientist Fernando Ortiz, in a posthumous work (*La Corteza del Árbol sin Nombre*, 2002), provides convincing evidence that the first record of *Cinchona* bark was published by the Spanish physician Nicolas Monardes in 1571 in his *Historia de las cosas que se traen de nuestras Indias Occidentales*.

Also appearing subsequent to *The Fever Trail* is an essay by J. E. Madsen in *Botánica Austroecuatoriana* (2002), which describes the past and present status of *Cinchona officinalis* in its classic location near Loja. Madsen cites publications of the American botanists who worked for the World War II *Cinchona* Mission to Ecuador and notes that their felling of Cascarilla trees in the vicinity of Loja—continuing a tradition of three centuries—further reduced the populations already exploited for more than three centuries.

*The Fever Trail* is a readable and entertaining volume as well as a valuable addition to ethnobotanical literature. It includes some helpful maps and 16 plates, portraits of leading cascarillophiles, and photographs of *Cinchona* habitats in Ecuador. The literature quoted on *Cinchona*, quinine and malaria is covered in detail (although most heavily in works on botanical exploration), and the detailed index is helpful. The book is an impressive achievement for the fledgling author, who has researched his topic thoroughly and at the same time excels as a story teller. This lively account of dramatic explorations by an extraordinary multinational cast of characters would provide the basis of an exciting film for public television. – Grady L. Webster, Herbarium, University of California, Davis CA 95616.

**Early Angiosperms and their Associated Plants from Western Liaoning, China.** Sun Ge, Zheng Shaoling, David L. Dilcher, Wang Yongdong, and Wei Shengwu<sup>1</sup>. ISBN 7-5428-2563-1 (US\$65.00<sup>2</sup>) 227 pp, 75 plates, Shanghai Scientific and Technological Education Publishing House, 393 Guanshengyuan Road, Shanghai 200235, China. - The origin of angiosperms has been an unsolved mystery for more than one century. About 30 years ago there were reports of pre-Cretaceous angiosperms, however none of them has been validated and thus the origin time of angiosperm has been considered to be not beyond the Early

Cretaceous by many paleobotanists. Therefore, when Sun et al. (1998) reported the earliest known angiosperm *Archaeofructus liaoningensis* from the Jianshangou Bed of the western Liaoning Province, China, and proposed the age of the fossil as of the latest Jurassic, it was considered a big breakthrough in paleobotany. However, seven months later, Swisher III et al. (1999) announced that the isotopic age of the fossil-bearing bed should be about 124.6 million years old (i.e., the bed was still within the Lower Cretaceous). Later, when Sun et al. (2002) reported a second species of *Archaeofructus*, they stated that the geological age of the new family, Archaeofructaceae, is at least 124.6 and could be as old as 145 million years old. They seem to balance or bracket the age of *Archaeofructus* between Lower Cretaceous and uppermost Upper Jurassic. However, in their new book, "Early Angiosperms and their Associated Plants from Western Liaoning, China", published in 2001, this flora is treated as of Late Jurassic which must reflect a strong influence from the Chinese stratigraphic position of these fossils as opposed to that of western science (see different opinions in Gee, 2001). However, no matter the flora belongs to either the latest Jurassic or Early Cretaceous, it does have the earliest known angiosperm megafossil up to date. Therefore, this book is still a very important presentation of the origin and evolution of early angiosperms, not to mention that it covers many related aspects of associated Mesozoic floras. These are the plants that are associated with and were food for the famous feathered dinosaurs and provided places for the earliest known birds to roost (Gee, 2001).

This book is published in both Chinese and English, including 12 chapters. The first three chapters introduce the study history of the region and the establishment of the Jianshangou Formation (= the lower part of the Yixian Formation), and detailed stratigraphy of the formation, measured at the Jianshangou site where *Archaeofructus liaoningensis* was found. Chapter 11 gives further stratigraphic comparisons with other Jurassic-Cretaceous formations. Although the placement of the Jianshangou Formation in the Upper Jurassic is debatable because of different isotope data (see below) and some stratigraphic comparison may need more detailed documentation (e.g., its correlation with the bird-bearing sedimentary beds in Dawangzhangzhi area), a lot of basic information given in these chapters is very useful for investigators to study the stratigraphy and conduct their own field trips in the region.

The determination of the age of the flora is discussed in Chapter 9, based mainly on the associated animal fossils and isotopic dating. In the last decade, many animal fossils (e.g., the earliest pollinating

insects, feathered dinosaurs, primitive birds, and placental mammals) have also been found from the sedimentary beds in the region, and reported in about a dozen papers published in *Nature* (Gee, 2001) and *Science*. These discoveries are not only very important to the study of the origin and evolution of the related organism groups, but also provide important evidence for biostratigraphic comparisons. In Chapter 9, the Jianshangou Formation is concluded to belong to the Upper Jurassic based on some stratigraphic index fossils, including dinosaurs, non-dinosaur-reptiles, insects, birds, conchstraca, ostracods, and bivalves. Experts in the studies of different fossil groups may like to check out the correlations. Two isotopic data, 142.5 Ma (Wang et al., 1984) and 147.3 Ma (Lo et al., 1999), are utilized to support to the placement, while the 124.6 Ma dating is suspected to be from some rock that had undergone alternations due to later volcanic activities in the region. Therefore, their conclusion of the Jurassic age is not baseless, and the age of the Jianshangou Formation may need to be further examined. It should be pointed out that the data of the 147.3 Ma radiometric data by Lo and colleagues was not mentioned in Swisher III et al. (1999). It was cited in Sun et al. (2002), but not mentioned in the paper either. This new result may need to be examined by experts in study of isotopic chronology.

Chapters 4 and 12 describe the details of the *Archaeofructus liaoningensis*, *A. sp.*, three possible angiosperm taxa, and other associated plants (88 species in 56 genera, ranging from bryophytes, lycopods, ferns and fern-related, seed-ferns, bennetitaleans, czkanowskialeans, ginkgoes, conifers, to gnetophytes). Interestingly, from the beds a number of fossil plants were previously reported as angiosperms, including monocots (*Potamogeton*, *Liaoxia*, and *Erogracites*), and dicot *Ranunculus*, as well as tricarpaceous *Chaoyangia*, but all of them are treated as gymnosperms (conifers, cycads, and gnetophytes) in this book. There are also 9 species in 5 genera with uncertain systematics, and some of them (e.g., two *Problematospermum* species) could be also related to the angiosperms. Certainly, this published flora really has presented a lot of enigmatic plants that should be very interesting to paleobotanists, paleontologists, and other scientists in the related areas. The fossil specimens are presented with 622 figures in 75 plates (including 26 color plates with 171 figures) and 10 color text-figures, in addition to the descriptions. Some specimens are printed in both color and monochromatic figures, and some structures (e.g., cuticle) were photographed with the light microscope or SEM and thus show delicate details. Other chapters also have well-designed tables and other beautiful text-figures (e.g., map,

outcrops of fossil sites, and photos of researchers). Therefore, this book can be used as an important reference in study of fossil plants, and its high quality paper and beautiful hardcover may make the book more attractive.

The composition and characteristics of the Jianshangou Formation flora is analyzed and presented in Chapter 8. The flora is compared with some Late Jurassic floras, and appears to be the most similar to the Tsagan-Tsab Formation flora in Mongolia, based on the shared floral elements (Chapter 10). The Jianshangou Formation flora is also compared with six early angiosperm floras and presented to be the earliest in the world (Chapters 5), which is followed by a summary of the evolutionary stages of early angiosperms in northeastern China (Chapter 6). Chapter 7 addresses the hypothesis that Eastern Asian could be one of the centers of angiosperm origins.

Generally speaking, this book presents an important and beautifully illustrated early angiosperm flora complete with all the other associated typical Mesozoic plants. The legibility of the book would have been enhanced if the chapters were arranged in a way that was easier for readers to follow, and if minor language errors in the English portion had been corrected. On the other hand, readers may find some different conclusions or fossil identifications than you would give or make, but it is those different treatments/conclusions that make this book challenging to readers. Hopefully, this book may inspire some readers to conduct some further significant research projects. - **Hongqi Li, Department of Biology, Frostburg State University, Frostburg, MD 21532.**

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<sup>1</sup> Beside David L. Dilcher, all other authors are Chinese with family names placed before given name, based on both Chinese tradition and governmental regulation for publication in China.

<sup>2</sup> The price is informed by David L. Dilcher.

**The Freshwater Algal Flora of the British Isles, An Identification Guide to Freshwater and Terrestrial Algae.** John, D.M., Whitton, B.A. and Brook, A.J. (Eds). 2002. ISBN 0-521-77051-3 (Cloth/Cd-Rom US \$125.00). 702 pp. Cambridge University Press, 40 West 20<sup>th</sup> street, New York, NY 10011-4211. The study of algae is called 'phycology', from the Greek word *phykos* meaning 'seaweed'. Algae is a general term for primitive plants, mainly aquatic, using chlorophyll in their photosynthesis but lacking the features such as a vascular system for internal transport of water and nutrients. Algae have been found in almost all environments where humans have been able to explore. Algae range in size from microscopic unicells less than 1 µm in diameter to kelps as long as 60 m. In marine and freshwater environments they are the main photosynthetic organisms. However, they are also found in soils, salt lakes and hot springs, and some can grow in snow and on rocks and the bark of trees.

The scope of this work encompasses over 1700 species of freshwater algae of the British Isles, which is defined as England, Scotland, Wales, Northern Ireland, Irish Republic, the Isle of Man and the Channel Islands. The previous comprehensive work in this area was West and Fritsch's *Treatise on the British Freshwater Algae*, published in 1927. This work is the result of the collaboration of 26 international researchers, written and merged over a period of ten years, which can be detected in the flow and style of the content. Not, however, to distract from the subject matter or its utility.

Freshwater algae range from single-celled forms to aggregations of cells in chains (filaments), to colonies and tissue-like forms. Algae can be classified into six or more divisions (phyla) based on the chloroplast structure, pigment complement, carbohydrate storage product, cell covering, and other aspects of cellular organization. The book is roughly arranged by phyla, and then within each section a key is provided for further identification. There are extensive illustrations to accompany the keys.

A CD-Rom supplements the book. Here, all taxa are listed alphabetically and each is accompanied by one or more thumbnail-sized images. Habitat photographs are included where algae form conspicuous macroscopic growths or form plankton blooms. The images include the phylum name followed beneath by the genus, species and subspecific name along with authority. Additional information includes the dimension, type of photograph (bright field, differential interference contrast, etc.), the copyright holder, and where the sample was collected (if known).

Weighing in at nearly five pounds, this book is not a field guide, but a lab guide. There is a useful chapter on field methods followed by a chapter on laboratory methods. As part of the supporting chapters found at the beginning of the

book, the editors included a fascinating chapter on the history of British algal studies. Furthermore, the book wraps up with a glossary, an extensive list of references, taxonomic and subject indices. This source is exhaustive in its coverage, illustrations and aids to identification. Although, one might be dissuaded from the value of this work beyond the British Isles, it should be pointed out that the freshwater algae as described in this work are commonly found throughout the world. Thus, this identification guide would be practical anywhere.

This resource is directed to researchers and students learning to identify algae. This would be most appropriate for an academic collection supporting a somewhat extensive bioscience, environmental, and/or ecology programs. - Peggy Dominy, Sciences Librarian, Hagerty Library, 33<sup>rd</sup> & Market Sts., Drexel University, Philadelphia, PA, 19104

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**Molecular Techniques in Crop Improvement.** Jain, S. Mohan, D.S. Brar and B.S. Ahloowalia. 2002. ISBN 1-402-00528-8 (Cloth US\$198.00) 616pp. Kluwer Academic Publishers, P.O. Box 989, 3300 Dordrecht, The Netherlands. 'Molecular Techniques in Crop Improvement' is a sequel to the editors' earlier volume 'Somaclonal Variation and Induced Mutations in Crop Improvement'. Like the first volume, this one aims to update those involved in crop breeding with the latest in crop improvement techniques. It contains twenty three chapters that address in various ways the impact of molecular genetics on the field of plant breeding. These chapters cover a wide range of topics, progressing from the principles and methodology of molecular markers and their use in constructing genetic maps, to the application of molecular techniques for research on apomixis, heterosis, and tolerance to abiotic stress. A number of chapters deal with the improvement of particular crops, while others deal with topics such as DNA methylation, use of DNA arrays in gene identification, random insertional mutagenesis, and chloroplast genome engineering. The last four chapters provide a brief overview and some examples of the use of molecular markers in quantitative trait loci (QTL) analysis;



correlating genotypic variation to variation in quantitative traits such as yield and drought resistance.

It is likely that few readers of this review will themselves be crop breeders, and most will wonder whether this book is of interest to them. I was interested because, as an evolutionary biologist, the techniques and findings are relevant to our understanding of the genetic basis of evolutionary change. It is in the realm of crop breeding where most is known about how genotype affects phenotype. Both the doctrine of "few genes of large effect" as well as the opposing one of polygenic inheritance of important traits have sprung from examination of the genetic structure of crops and of the genetic basis of crop domestication. An understanding of the genetic and phenotypic changes that occur during man-made selection in domestication has been helpful in suggesting how natural selective forces may induce evolution of morphological diversity. The present volume, despite its high price (USD 198.00), is a good introduction to the molecular techniques that can be used to investigate and manipulate genetic variation. With perseverance, evolutionary biologists will find it a good source of ideas for making links between phenotypic and evolutionary patterns and the genetic mechanisms that produce those patterns.

The book, of course, is directed towards crop breeders, and provides an invaluable synthesis of the state-of-the-art in the field of crop improvement using molecular techniques. Many of the chapters follow a standard format; what techniques are available, their strengths and weaknesses, which ones are appropriate to the crop in question, and how successful were breeding experiments using these techniques. Each of these chapters in isolation is invaluable for specialists in particular crops, but, because it is an edited multi-author volume there are the inevitably some formatting and type-face inconsistencies, as well as repetition of the same introductory information by consecutive authors. This is most prevalent in the beginning chapters, where the basics of molecular genetics and its applications to plant breeding are discussed using a number of different model plant systems. Some of the explanations of advantages and disadvantages of different types of molecular markers are better than others. I especially liked that of Gupta et al. (ch. 2), who provide a clear overview of the various marker systems, and an excellent review of the current literature. Genetic mapping and molecular plant breeding suffers from an excess of acronyms, and table 1 in this chapter spells out forty acronyms for different types of DNA markers (a similar table is found at the end of chapter 4).

Other chapters I found interesting included the study by Laurie and Griffiths of flowering time genes in the Triticeae (ch. 8). This lends support to

the idea that there are "domestication regions" in the cereal genomes, where the same genes may be selected upon during independent domestication events. They suggest that finding the same genes selected upon in different genera may mean that relatively few genes in the relevant pathways are actually susceptible to selection (ch. 8). The chapter by Asins et al. (ch. 9) is an insightful examination of the molecular basis of apomixis, where they make it clear that the phenomenon of apomixis is usually quantitative in nature, and that, in general, different genetic regions control gametophytic and sporophytic apomixis. Several chapters survey new technologies to understand changes in gene function and expression, including changes in expression due to environmental stress (Brosché et al., ch. 14) and identification of strawberry flavor related genes by use of DNA microarrays (Aharoni and O'Connell, ch. 17). Others deal with transgenic approaches, including random insertional mutagenesis in *Arabidopsis* (ch. 15) and gene targeting in plants (ch. 18). One of the most fascinating of these technology directed chapters is that by Daniell, on chloroplast genome engineering for pharmaceutical proteins (ch. 16). Here, use of the chloroplast rather than the nucleus for production of foreign proteins circumvents problems of gene flow that are associated with nuclear transgenic crops. This approach also can produce much larger quantities of foreign proteins than equivalent nuclear transgenics.

One subject that gets relatively little coverage in this book is the use of comparative genomics. Here, the ability to search for genes in small genomes and transfer knowledge of map location to larger related genomes, is something that offers great hope for rapidly improving crop species. It is mentioned in passing by Ranjekar et al. (ch. 6), who discuss the isolation of genes for heterosis through comparative mapping. This a pity for the evolutionarily minded reader, whose most immediate access to genetic information about his or her group of interest may be through some sort of comparative mapping effort. As more and more genomic and EST databases are constructed for diverse groups of plants (such as *Chlamydomonas*, *Marchantia*, and those that will come out of the Floral Genome Project) comparative genomics will take on a larger role in our evolutionary understanding of genetic change. Another subject related to evolutionary change and diversification which gets little mention is association mapping, where sequence variation is compared to variation in the phenotypic trait of interest, with the aim of identifying sequence level differences which lead to phenotypic diversification. Both comparative genomics and association mapping are of interest to the evolutionary biologist as well as the crop breeder, because they provide methods for leveraging the great wealth of information that has

been accumulated on model plant systems into understanding the diversity of plant life for which we have little if any genetic information.

So, who is this book for, and who might benefit from it? It will be a worthy addition to the libraries of crop breeders and others interested in genome structure, but will be less immediately useful for the broader mass of plant biologists who have to search for information relevant to them. However, I do think it is of potential interest to evolutionary biologists who, like me, are concerned with connecting genetic process to the evolutionary patterns that we observe. The wealth of knowledge that resides in crop systems needs users who can bring it to bear on evolutionary questions; this book is an entrance and primer for much of the knowledge that we need for that task. – Andrew Doust, University of Missouri, St. Louis.

**Carnivorous Plants of the United States and Canada.** Second edition. Schnell, Donald E. 2002. ISBN 0-88192-540-3 (cloth US\$39.95.) 468pp. Timber Press, Inc. 133 SW Second Ave., Suite 450, Portland, Oregon, 97204 USA. Carnivorous plants are among the most charismatic of all organisms. Almost everyone has heard of the Venus flytrap and its ability to turn the predatory tables on insects: and many people know of the pitcher plants that lure their prey to a watery death. These fascinating plants have captured the imagination of scientists and laypeople alike. Charles Darwin himself studied them in great depth (Darwin 1875), followed by his son, Francis Darwin's (1878) experiments with sundews.

Carnivorous plants have inspired many volumes, however there are few on the carnivorous plant flora of any particular area, and only one on the carnivorous plants of North America, north of Mexico. The original *Carnivorous Plants of the United States and Canada* (Schnell 1976) has been a sound and useful source of information on distribution, ecology, and taxonomy of the carnivorous plants of the United States for many years. This has also been the only book to treat all the species of carnivorous plants north of Mexico, to my knowledge. The second edition of *Carnivorous Plants of the United States and Canada* represents a prodigious expansion on the first. The new edition recognizes the same number of species as the old (45); however, the original work comprised 125 pages and Schnell has expanded this to 468 pages in the second edition!

The first chapter, Carnivorous Plants: An Introduction, is a somewhat heterogeneous collection of topics that sets the stage for the rest of the book. It is comprised of sections on whether carnivorous plants are truly carnivorous or merely

insectivorous (pitcher plants are truly carnivorous, occasionally trapping frogs and slugs), general characteristics related to habitat, necessity of being carnivorous, prey attraction and nutritive value, reproduction, carnivorous plant communities, and habitats. The chapter on carnivorous plant cultivation in the first edition has been combined with the introduction as a general notes on cultivation section with detailed cultivation comments following in the species descriptions in this new edition.

The species descriptions are substantially expanded over the first edition and account for most of the expansion of this edition. These accounts are organized by genera into six chapters (Chapters 2-7): Venus Flytrap, Eastern North American Pitcher Plants, California Pitcher Plant, Sundews, Butterworts, and Bladderworts. Each chapter presents an overview of the genus and detailed descriptions of each species. For each species, there is a discussion of its taxonomy, common name (particularly interesting for the Venus flytrap), description of the plant, flowering season, distribution with maps (updated and refined from the first edition), habitat description, a section of general comments, and finally cultivation notes. All species and most, if not all, sub taxa are well illustrated with color photos. Especially useful are the discussions of the sub-specific taxa within the pitcher plants (*Sarracenia*), sundews (*Drosera*), and butterworts (*Pinguicula*), including color illustrations. The only departure from this format is in the bladderwort (*Utricularia*) chapter, where Schnell provides a list of the species with only brief accounts. He rationalizes this due to the difficulty in telling bladderwort species apart and the need to contrast several species at a time.

Also useful is the well illustrated section on *Sarracenia* hybrids. Many pitcher plants in the genus *Sarracenia* have overlapping ranges and are capable of hybridizing and producing fertile offspring. These hybrids are essentially intermediate in characters compared to the parental species and they can backcross with the parental species or even with a third species! This results in hybrid individuals possessing a confusing combination of characters. The eighth chapter, Other Possible Carnivorous Seed Plants, examines four species that have been reported as possibility being carnivorous, but the results are not conclusive at this time.

The final, and perhaps most important chapter focuses on conservation issues. Carnivorous plants typically inhabit wetlands, a habitat not conducive to human agricultural goals. This has resulted in the conversion and destruction of large portions of suitable carnivorous plant habitat. Schnell provides several examples, here and throughout the book, of impressive carnivorous plant localities that have disappeared over the years. Schnell lists the main causes of loss as:

habitat destruction, falling water tables, introduced species, mass collections, and collection by individuals. He also mentions some of the conservation and preservation attempts being undertaken. Carnivorous plants are one of the extreme examples of evolution's innovative ability and are fascinating to many people; therefore, it is unfortunate they are afforded so little protection. Protection of suitable wetland habitat is crucial to the long-term survival of many of these species.

Rounding out the book is a metric conversion appendix, glossary, bibliography, and index of plant names. Non-botanists will appreciate the excellent glossary of technical terms, and botanists will find the bibliography useful for tracking down more detailed references. The index of plant names makes finding current names for out-of-date synonyms easy.

The greatest shortfall of this volume is a lack of species-level taxonomic keys. Schnell intended to keep the book accessible to laypeople, but with the wealth of information already presented, it would not have hurt to add a little more and provide keys to the species and sub-specific taxa. This is particularly disappointing in light of the fact that Schnell has published an excellent pitcher key to *Sarracenia* elsewhere (Schnell 1998) and it would have been a relatively simple matter to reproduce it here. The one exception is the inclusion of a key to the bladderworts, a particularly confusing group. For *Utricularia*, Schnell provides a simple key based mainly upon flower color and habit that should allow readers to identify most species encountered. (For more interested plant enthusiasts, Taylor (1991) provides a detailed key to North American bladderworts using both floral and vegetative characters. Additionally, keys to *Sarracenia* have been provided by McDaniel (1971) and Bell (1949) using a combination of floral and vegetative characters, although these are somewhat taxonomically outdated. Godfrey and Stripling (1961) provide a key to southeastern US *Pinguicula*.)

On a positive note, the color photos are generally excellent, and in lieu of keys, are critical to making field identifications. This is especially important, and handy, for identifying the seven varieties of *Sarracenia flava*, the five subspecies of *S. rubra*, and the many subspecies, varieties, and formas of *S. purpurea* now recognized. However, some of the photographs were not printed as clearly as one might like; the fault here likely lies with the publisher.

I highly recommend this book to all persons interested in carnivorous plants. Donald Schnell's passion for carnivorous plants is evident in his detailed observations and studies of this group. *Carnivorous Plants of the United States and Canada* provides an in-depth, but not overly technical, review of all the carnivorous plants in the United States and Canada. This edition has more than enough

details to be useful to serious botanists, but remains accessible to laypeople. Additionally, the price is not excessive for a book of this scope and quality. A paperback version would be more portable in the field, but even the hardback edition will fit in a daypack. It is a pleasure to see this useful work updated and expanded in this second edition, and it will undoubtedly provide excellent service to the community of people interested in carnivorous plants  
-James Riser II, Denver, Colorado.

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**Flora of Glacier National Park.** Peter Lesica with illustrations by Debbie McNeil. 2002; ISBN 0-87071-538-0 (Paperback, \$32.95). 512 pp. Oregon State University Press, 101 Waldo Hall, Corvallis, OR 97331-6407 USA. According to the book's marketing, this is the first flora of the Glacier National Park area in over 80 years, which certainly makes the book timely. In the first paragraph, the author explains the geologic features bordering the park, which helps to establish context. Although the author makes a great case for the importance of the area, he overstates his case by calling Flathead Lake the largest freshwater lake in western North America. It is true that Flathead Lake is a scone larger than Lake Tahoe, but by using North America, the author is including Canada, and the Great Bear and Great Slave Lakes dwarf Flathead Lake in both size and volume. Nevertheless, Glacier NP does offer a variety of community types, and failing to border the largest freshwater lake in western North America does not diminish its importance as a National Park.

The introduction provides good text describing the physical and climatic features of Glacier NP, but the figures here are weak. A better map showing the

context of Glacier NP as described in the introduction would have been an improvement. Additionally, a vegetation type map, climate map, and a geological features map showing the Triple Divide Peak and Northern Divide would have made the text more clear. Lastly, it is always nice to see some figures of annual temperatures and precipitation, even though these would differ across Glacier NP due to changes in elevation.

There is a glossary in the front, which is useful for determining the author's interpretation of botanical terms, but it lacks any illustrations. For many botanists this is not a problem, but if one were to use this flora as a teaching tool, then the lack of an illustrated glossary will be sadly noted.

As for the actual flora, the illustrations are well done, and there are some nice color plates in the middle of the book. Dichotomous keys follow the standard procedure. The author doesn't over use varieties and subspecies, which simplifies matters greatly. Occasionally, varieties make it into this flora that may be questionable in their use, such as *Erigeron compositus* Pursh var. *glabratus* Macoun, which is not recognized in the Jepson Manual of Higher Plants. There is not an explanation or a justification of why this might be the case. Perhaps, this omission is in the interest of keeping the book a manageable length.

The marketing for the book also states, "For each species, the book provides information on habitats, geographical range, taxonomy, and ethnobotanical uses." The former are true for all descriptions, but the latter is not. There is some ethnobotanical information included, but certainly not for each plant and not even for some plants for which there are ethnobotanical uses. For example, Mineris Lettuce, *Montia* spp., are deliciously palatable, but this information is omitted from Lesica's description. Much of the ethnobotanical information relates to past use by Native American Indians and not to present day uses.

The breadth of species covered in this book ranges from alpine to grassland, so it would certainly be the main reference to consult when traveling in Glacier NP. It is also a good size to fit in a backpack and includes a handy ruler in millimeters on the back page, something I've often appreciated in other floras. I would recommend this book to anyone with an interest in the flora of Glacier NP or of the northern Rocky Mountains in general as this book would probably encompass most of the species one would find that region. — Catherine Kleier, Curator, Adams State College Herbarium, Department of Biology, Adams State College, Alamosa, CO 81102.

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**Generic Tree Flora of Madagascar.** Schatz, George E 477 pp. Royal Botanic Gardens, Kew, and Missouri Botanical Garden, St. Louis. 2001. Paperback US \$50.00. ISBN 1 900347 82 2. Madagascar has long been a sort of Ultima Thule for botanists and other naturalists: a remote near-continental island that still yields continuing surprises after more than three centuries of scientific exploration. The appearance of the *Generic Tree Flora of Madagascar* is the first important technical botanical manual in English to deal with the Malagasy flora.

The book is highly international in its production: there is a foreword in English by the Directors of the two sponsoring institutions (Peter Crane for the Royal Botanic Gardens and Peter Raven for the Missouri Botanical Garden) and an Avant-Propos *en Français* by Directeurs Albert Randrianjafty (Parc Tzimbizaza) and Philippe Morat (Musém d'Histoire Naturelle, Paris). The introduction, by George Schatz, is followed by a set of introductory keys to families and genera that appear to follow the inspiration of those in the *Field Guide to the Families and Genera of Woody Plants of Northwest South America* by Al Gentry (1993) and *Australian Rain Forest Trees* by Hyland and Whiffin (1993). The keys lead to unusual genera as well as to families, and depend more heavily than usual on vegetative characters. Keys to genera within families, however, tend to be of a more traditional, more or less synoptic format. A particularly valuable feature is that nearly all genera (471 of 490) are illustrated with both floral and vegetative details. The generic descriptions are brief but sufficiently informative; in monogeneric families they are understandably abbreviated. In addition to the appropriate references in the *Flore de Madagascar*, recent works are cited under each family, although older treatments such as those in *Das Pflanzenreich* are not mentioned. The impressive documentation in the book includes a glossary of terms and index to scientific names, vernacular names, and sources of the illustrations (the majority taken from the *Flore de Madagascar*).



Madagascar—shielded by isolation, tropical diseases, and hostile tribes— was poorly explored for centuries after the first Portuguese visit in 1500. Botanical studies were largely carried on by French scientists, beginning with Chevalier Etienne de Flacourt. During seven years (1648—1655) in the French colony at Fort-Dauphin, working under scarcely imaginable logistic challenges, Flacourt created the first Madagascar herbarium, and may have been the first botanist to assign collection numbers to his specimens. His *Histoire de la Grande Isle de Madagascar* (1658, 1661) includes a chapter that recorded over 200 species: the first floristic inventory of the island flora. Unfortunately, his work was not widely cited by later writers, probably because he discussed the species under their common (Malagasy) names rather than conventional Latin names. After a hiatus of more than a century, noted botanists including Commerson, Sonnerat, and du Petit-Thouars made trips to Madagascar. However, although they were followed in the 19<sup>th</sup> century by others, notably Goudot and Boivin, it is striking that when Alfred Russel Wallace treated the Malagasy region in his classic *Island Life* (1880), he relied almost entirely on data from Baker's *Flora of Mauritius and the Seychelles*. By this time British botanists were also active in Madagascar; a British missionary, Richard Baron, collected extensively in the interior of Madagascar and published the first comprehensive checklist, *Compendium des plantes malgaches* (1901-1906). The last work of the great French plant systematist, Henri Baillon, appeared in the *Histoire physique, naturelle et politique de Madagascar*. The general flora of Madagascar, begun in 1936 by H. Humbert and collaborators, *Flore de Madagascar et des Comores*, remains incomplete; although 80% of the families have been covered, the earlier treatments are now considerably out-of-date. Humbert also has provided the most detailed review of botanical exploration in Madagascar (in *Comptes Rendus IV Réunion AEFAT 1961*). The only modern forestry guide is *Palms of Madagascar* by J. Dransfield and H. Benntje (1995). The generic tree flora by Schatz fills therefore fills a critical vacuum.

The prototype of the *Generic Tree Flora of Madagascar* was an unpublished manuscript of the great French forester and botanist René Capuron, who in 1957 circulated mimeographed copies of *Essai d'Introduction de la Flore Forestière de Madagascar*. The high diversity of the Madagascar flora is indicated by the fact that the *Generic Tree Flora* treats 490 genera of trees, 161 of which are endemic—a remarkable statistic scarcely matched in any comparable region of the world. Even more striking is the large number and high endemism of the species: 4,220, of which 96% are endemic. The graph of generic diversity by family is also

remarkable: although the Leguminosae have the largest number of genera (as usual in most tropical areas), the Euphorbiaceae exceed the Rubiaceae and the Sapindaceae rank fourth, while families such as Sapotaceae and Asteraceae are insignificantly represented. Most neotropical botanists will be startled to find that the Solanaceae are represented by only two genera. These anomalies are no doubt due to the divergence of Madagascar as a fragment of Gondwana that developed in isolation for much of the Cenozoic.

The *Generic Tree Flora of Madagascar* is not only an effective tool for identifying trees in Madagascar, but it also opens a window on the remarkable diversity of the island continent. It is unlikely that many of the 161 endemic genera will be familiar to most readers, but they include such charismatic genera as *Takhtajania*, the only Afro-Malagasy genus of Winteraceae outside of Australasia, which was not described until 1978. The cactiform Didieriaceae are represented by four genera, of which *Allaudia* and *Didieria* are well known to succulent fanciers. Some familiar genera are a bit difficult to locate in the text because of their recent taxonomic reassignment due to cladistic studies. Examples include *Adansonia*, the baobab tree, which has been moved from Bombaceae to Malvaceae; the eponymous *Flacourtia*, now with the willows in Salicaceae; and several genera of Capparidaceae now under Brassicaceae.

Some readers may find the bibliography inadequate: besides the citations under individual families, there is scarcely a single page of general references following the introduction. However, for those wishing to look further, there is an interesting biogeographic essay on the Internet by George Schatz: *Malagasy/Indo-australo-malesian Phytogeographic Connections* ([www.mobot.org/MOBOT/Madagasc/phytogeographic](http://www.mobot.org/MOBOT/Madagasc/phytogeographic)). The bibliography of the Internet article includes important books such as *Flore et Végétation de Madagascar* by J. Koechlin et al. (1972), which provides a well-illustrated review of the various Madagascar vegetation types in which many of the remarkable endemic genera occur.

The *Genera Tree Flora of Madagascar* is outstanding among recent publications in tropical botany on the basis of its attractive format, useful keys and descriptions and critical approach to the data. The book is not only indispensable for professionals working in Madagascar, but also for armchair botanists who may never get there. It reflects great credit on the author and furthermore is a splendid example of international cooperation among botanists and institutions. — Grady L. Webster, Herbarium, University of California, Davis CA 95616.

**Orchid Biology: Reviews and Perspectives, VIII.**

Kull, Tiitu and Joseph Arditti, (eds). 2002. ISBN 1-4020-0580-6 (cloth US\$196.00) 584 pp. Kluwer Academic Publishers, Dordrecht, The Netherlands. – The *Orchid Biology: Reviews and Perspectives* (OBRP) series has been produced for more than 25 years. The beauty of this series has been the breadth of topics examined. The eighth volume in the series is no exception, covering the history of orchid research, embryology, development and northern terrestrial orchids. Typically these are topics reserved for separate books or review articles. Some readers may be dissatisfied by such diversity, something the editors acknowledge. In fact, Kull and Arditti state in their forthright preface, “it is not possible to thematically balance every volume of OBRP.” The panoply of topics is what recommends this series to botanists, orchid collectors and researchers.

*Orchid Biology: Reviews and Perspectives* begins with some history of orchid research, a theme revisited in several later chapters. The science is mixed with history and sociology. The reader is reminded that most of plant reproduction (orchids included) was clouded in mystery and misconception prior to the 250 year formal study of pollination etc. This is relevant to orchid flowers, seeds and seedlings. A statement in Chapter 1, “Orchids were described as originating from the semen of animals, birds and humans...” is amusing today yet the reader is reminded to not feel too smug – how little we know *now*. Such misconceptions make for effective background examples when introducing angiosperm reproduction to students in general biology or companions on field trips. As seen in the first chapter, the lineage of orchidologists is long and colorful (no pun intended) and is full of passionate naturalists and world travelers. Modern researchers may be more focused (i.e. limited by budget in some cases) but the work continues as seen in OBRP.

The non-historical chapters (re: morphology, ecology, development, genera and embryology) and an appendix (orchid viruses) are technical and at times dense. However they are well organized and readable. There is an attempt by the authors to look for patterns within their specific area of interest in orchid biology. I imagine researchers will use these chapters as a reference for specific morphological, cytological and developmental questions. For example, exhaustive tables summarize organelles in cells of orchid embryos, suspensor cells and species-specific endosperm traits to name a few. The ecology chapter, “Population dynamics of north temperate orchids,” will be valuable for readers interested in plant conservation and the problems that unpredictable

life histories pose. Still, after reading these chapters the case has been made that much still needs to be examined.

I was impressed by the attention by the editors and authors to make OBRP easy to navigate. For example, each chapter has its own references and glossary. This is a welcome feature for readers interested in sampling chapters. The reference lists are thorough and include many European and Asian citations perhaps overlooked by North American readers even in this era of high-speed web searches. Finally, three excellent indices (Persons, Organisms, Subjects) facilitate searches in this information-packed tome.

As can be expected, the writing styles, accessibility, presentation and depth and breadth vary by chapter. Once again, topic overlap does occur particularly regarding history; repetition is a good thing. Illustrations range from line drawings and simple figures to ancient portraits of botanists, reproductions of beautiful illustrations from early books (see the drawings of seeds from 1853) black and white photos and scanning electron microscopy images. The production of OBRP is excellent with few detectable typographical errors.

Flowing through the book is a perceived and often stated passion for orchids. Though not mentioned, Charles Darwin came to mind; he was hooked during his lifetime. Still, I recommend this book to even those readers not sharing the passion (addiction?). Students of botanical history and exploration, plant ecology, plant reproductive biology and development should find chapters to call their own in OBRP. True, a volume such as this may not be suitable as a stand-alone text on orchid biology yet *Orchid Biology: Reviews and Perspectives* is a welcome addition to the literature on one of the most fascinating but still largely mysterious groups of plants. We should be thankful for this long-lived series. – Scott Ruhren, Department of Biological Sciences, Ranger Hall, University of Rhode Island, Kingston, RI 02881.



## 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](mailto:sundberm@emporia.edu), call or write as soon as you notice the book of interest in this list because they go quickly! Ed.

**Bacterial Disease Resistance in Plants: Molecular Biology and Biotechnological Application.** Vidhyasekaran, P. 2002. ISBN 1-56022-925-X, (Paper US\$59.95). 466 pp. Food Products Press, 10 Alice Street, Binghamton, NY 13904-1580.

**A Botanist's Window on the Twentieth Century.** Goodwin, Richard D. 2002. 336 pp. Harvard Forest, Petersham, Massachusetts, Harvard University.

**Cardamom: The genus *Elettaria*.** Ravindran, P.N. and K.J. Madhusoodanan. 2002. ISBN 0-415-28493-7 (Cloth US\$) 374 pp. Taylor & Francis Inc., 29 West 35<sup>th</sup> Street, New York, NY 10001.

**Climate Under Cover, 2<sup>nd</sup> ed.** Takajura, Tadashi and Wei Fang. 2002. ISBN 1-4020-0845-7 (Cloth US\$72.00) 190 pp. Kluwer Academic Publishers B.V., P.O. Box 989, 3300 AZ Dordrecht, The Netherlands.

**A Color Atlas of Pests of Ornamental Trees, Shrubs and Flowers.** Alford, David V. 2003. ISBN 0-88192-651-6 (Cloth US\$59.95) 448 pp. Timber Press, Inc., 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

**The Color Encyclopedia of Cape Bulbs.** Manning, John, Peter Goldblatt, and Dee Snijman. 2002. ISBN 0-88192-547-0 (Cloth US\$59.95). 486 pp. Timber Press, Inc., 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

**Consider the Leaf: Foliage in Garden Design.** Glattstein, Judy. 2003. ISBN 0-88192-571-3 (Cloth US\$24.95) 307 pp. 486 pp. Timber Press, Inc., 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

**Dye Plants and Dyeing.** Cannon, John & Margaret. 2003. ISBN 0-88192-572-1 (Paper US\$19.95) 128 pp. Timber Press, Inc., in association with the Royal Botanic Gardens, Kew, 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

**Enduring Seeds: Native American Agriculture and Wild Plant Conservation.** Nabhan, Gary. 2002.

ISBN 0-8165-2259-6 (Paper US\$19.95) 250 pp. The University of Arizona Press, 355 S. Euclid, Ste. 103, Tucson, AZ 85719.

**Feast Your Eyes: The Unexpected Beauty of Vegetable Gardens.** Pennington, Susan J. 2002. ISBN 0-520-23522-3 (Paper US\$29.95) 192 pp. University of California Press, 2000 Center St., Suite 303. Berkeley, CA 94704.

**Flora of North America North of Mexico, Volume 26: Liliidae: Liliales and Orchadales.** Flora of North America Editorial Committee. 2003. ISBN 0-19-515208-5 (Cloth US\$120.00) 672 pp. Oxford University Press, 198 Madison Avenue, New York, NY 10016-4314.

**The Genus *Arisaema*: A Monograph for Botanists and Nature Lovers.** Gusman, Guy & Liliane. 2003. ISBN 3-904144-91-X (Cloth US\$69.95) 438 pp. Timber Press, Inc., 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

**The Genus *Epimedium* and Other Herbaceous Berberidaceae Including the Genus *Podophyllum*.** Stearn, William T. 2002. ISBN 0-88192-543-8 (Cloth US\$49.95) 354 pp. Timber Press, Inc., 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

**Herbal Medicine and Botanical Medical Fads.** Hoffmann, Frank and Martin Manning. 2002. ISBN 0-7890-1149-2. (Paper US\$24.95) 254 pp. The Haworth Press, 10 Alice Street, Binghamton, NY 13904-1580.

**The Names of Plants, 3<sup>rd</sup> ed.** Gledhill, David. 2002. ISBN 0-521-52340-0 (Paper US\$25.00) 326 pp. Cambridge University Press, 40 West 20<sup>th</sup> Street, New York, NY 10011-4211.

**The New Daylily Handbook.** Gatlin, F.L. and J.R. Brennan (eds). 2002. ISBN 9-631072-3-2 (Paper, US\$30.00) 320 pp. American Hemerocallis Society, available from Jimmy R. Jordan, AHS Publication Sales, 276 Caldwell Rd., Jackson, TN 38301.

**Palms Won't Grow Here and other myths.** Francko, David A. 2003. ISBN 0-88192-575-6 (Cloth US\$27.95) 308 pp. Timber Press, Inc., 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

**Plant Growth and Development: Hormones and Environment.** Srivastava, Lalit M. 2002. ISBN 0-12-660570-X (Cloth) 772 pp. Academic Press *An imprint of Elsevier Science*, 525 B Street, Suite 1900, San Diego, CA 92101-4495.

**Seed policy, Legislation, and Law: Widening a Narrow Focus.** Louwaars, Niels P. (ed) 2002 Food Products Press, 10 Alice Street, Binghamton, New York 13904-1580.

**Thyme: The Genus *Thymus*.** Stahl-Biskup, Elizabeth and Francisco Sáez. 2002. ISBN 0415-28488-0 (Cloth US\$) 330 pp. Taylor & Francis Inc., 29 West 35<sup>th</sup> Street, New York, NY 10001.

**Willows: The Genus *Salix*.** Newsholme, Christopher. 2003. ISBN 0-88192-565-9 (Paper, US\$19.95) 224 pp. Timber Press, Inc. 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

## Millennial Concepts

This Modern World of Today is changing even the paleobotanical past. Old terms like impressions and compressions are too restricted to describe the newer discoveries in this subdiscipline of Botany. Your correspondent alerts you to the following:

**Repressions:** fossils that are immediately returned to their rock matrix because the world is not ready for them yet.

**Depressions:** the fossil you find in the back of a drawer, labeled in 19<sup>th</sup> century script, but that is otherwise identical to the find you had finally written up and were about to mail off.

**Delicatessions:** the technical name for the stack of acetate peels, serially sectioning some fossil. The name derives from the similarity to prepared masses of ham or salami.

**Obsessions:** any fossil that relates to the origin of angiosperms.

**Deceptions:** a technical name for fossils discovered by some enterprising farmers in provincial areas of the People's Republic of China.

And two terms of more general usefulness:

**Displeasiomorphy:** any factor or observation that interferes with a good theory.

**Aught-not-to-amorphy:** similar to a displeasiomorphy (see above), except involving the theories of others.

- Submitted with author-  
uporarity by Michael Christianson

## Don Les' Guide to Botanical Nomenclature

1) **cote-type:** any type specimen damaged by doves or sheep.

2) **epee-type:** a type specimen in the genus *Argyroxiphium* (silversword) or *Echinodorus* (chain sword)

3) **hole-o-type:** the one specimen or illustration used by the author, or designated by the author as the nomenclatural type, that is riddled beyond recognition as the result of dermestid feeding damage.

4) **ice-o-type:** a hole-o-type that has been placed in the -20 freezer with hopes of reducing the dermestid population.

5) **knee-o-type:** a type specimen characterized by a peculiar indentation attributable to the force applied by the botanist's knee on the plant press.

6) **lek-to-type:** any type specimen collected from the breeding grounds of the sage grouse or prairie chicken.

7) **pare-a-type:** a type specimen of a very rare taxon that has been whittled away to virtual nothingness by idiots seeking material for DNA analysis.

8) **sin-type:** the very first type specimen taken from the apple tree in the Garden of Eden.

9) **Bayes-ionym:** a simple nomenclatural approach whereby a taxon name is selected using Markov chain Monte Carlo simulation techniques to sample from the posterior distribution of all possible botanical names by transforming the names into a canonical cophenetic matrix and using a simple Metropolis proposal distribution to select the candidate names closest to the name currently entered in the chain.

10) **ought-o-nym:** a far more appropriate species name that SHOULD have been applied to the taxon rather than the one selected using the Bayes-ionym approach.

11) **proto-log:** a fossilized tree trunk used as a type specimen.

12) **taught-o-nym:** any scientific name learned in a Systematic Botany course

13) **nomen knewed'em:** former taught-o-nyms now long forgotten by aging, senile botanists





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