

PLANT SCIENCE

The Botanical Society of America: The Society for ALL Plant Biologists

BULLETIN

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BOTANICAL SOCIETY OF AMERICA

Ever since "A Nation at Risk" was published more than a decade ago, scientists have become increasingly aware of the scientific illiteracy of our students and of the general public. Simultaneously the public voice of fundamentalism has grown louder. A scientifically illiterate public is receptive to the simplicity of fundamentalism and "common sense" arguments in its favor. A 1982 Gallup poll reported that "...over 80 percent of respondents favored either parallel teaching or exclusive teaching of creationism." This conservative onslaught led to a number of state laws ranging from a prohibition to teach evolution (Arkansas); to disclaimer stickers on textbooks identifying evolution as "a controversial theory..., not fact," (Alabama); to balanced treatment of evolution and "creation science" (Louisiana); to last years decision by the Kansas School Board to delete major sections of science from the curriculum. This antievolutionism has itself undergone very rapid evolution during the past decade. "Creation science" of the 1980's has given way to "Intelligent Design" (ID) and the latter sees much more than biological creation as its target (thus "big bang" was excluded from the Kansas curriculum along with "macroevolution."). This new threat is much more insidious because the nature of science and scientists themselves are now under attack. Scientists are portrayed as deceitful and willing to misrepresent data in order to support their theories (and examples are given where oversimplification in textbooks can be interpreted as purposeful misinformation by the proponents of ID).

In the following article, Randy Moore presents some of the background necessary to understand why we find ourselves in the situation we are in. He also makes a strong argument that it is time for us, botanical scientists, to get involved and resist the fundamentalist attempts to subvert science that increasingly are appearing in our school boards and our legislatures.

-editor

The Evolving Debate

The recent revival of creationism in Kentucky, Kansas, Arizona, and elsewhere has again refocused public attention on the evolution-creation controversy. Given the often-emotional nature of the debate, it's not surprising that many aspects of the controversy are misunderstood. Several of these misunderstandings are important for botanists and other biologists. For example,

Although evolution applies to all organisms, the evolution of plants has been largely irrelevant to the legal challenges, legislative debates, and public discussions associated with the controversy. Most people – creationists included – are not threatened by the fact that plants evolve. Even anti-evolution activist and Scopes prosecutor William Jennings Bryan conceded that the "evolution [of] plant life and animal life up to the highest form of animal, if there were proof of it, be admitted" as fact (emphasis Bryan's). For many creationists, evolution is acceptable as long as it applies only to organisms such as weeds and algae.

By the same token, many creationists are not threatened by the evolution of most other organisms; it's okay for organisms such as yeasts, nematodes, and *Paramecium* to have descended from more-primitive forms of life. As noted by Princeton Theological Seminary's Archibald Hodge, "About the lower animals, we are willing to leave it to the scientists as outside of immediate theological or religious interest." Similarly, when James Woodrow (a University of South Carolina scientist and the South's most notorious evolutionist in the late 1800s) was prosecuted by the Presbyterian Church for his support of evolution, a participant in the controversy conceded that "Neither party denies that descent with modification is probably the law of the successive appearances of the animal tribes

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The Courier-Journal

TT NEWSPAPER

LOUISVILLE, KENTUCKY

SUNDAY, OCTOBER 3, 1999 •

THE EVOLUTION DEBATE

Even today, the 'E-word' divides

Some teachers tell classes of 'adaptation'

By LONNIE HARP
The Courier-Journal

FRANKFORT, Ky. — In

any depth. At Paintsville High School, for example, a biology teacher uses the word "adaptation" instead of evolution and barely mentions the origins of man. At Murray's Murray High School teacher skips the evolution chapter in the biology text entirely.

Although scientists have described the theory of evolution as the central unifying

some Kentucky public-school teachers to tiptoe around evidence that humans evolved from primitive life forms.

Unlike Kansas, which spurred controversy recently by dropping the concept of evolution from its definition of what students are expected to know, the Kentucky Board of Education clearly identifies evolution as a con-

A 1976 state law, re-enacted in 1980, stipulates that teachers who cover evolution in class can also teach "the theory of creation as presented in the Bible" — and that students who adhere to the biblical account can get credit on any exam. Although teachers contacted by The Courier-Journal did not cite the law, some said they bring

tion," said Nancy Stedelin-McLain, a 10-year biology teacher at Murray High. "I might also bring up creation theory or endosymbiosis (a theory based on cell combination). And when I present (any theory), I say, 'This is one author's idea.'

The Kentucky Science Teachers Association strongly advocates teaching evolu-



BY ARZA BARNETT, THE COURIER

PRIVATE SCHOOLS: How Fleming, above, and other teachers at private schools deal with it

Figure 1. More than 75 years after the infamous Scopes trial, evolution remains a controversial topic, even among many biology teachers. As this article notes, many biology teachers do not include evolution in their courses. This front-page headline was from the 3 October 1999 issue of *The Courier-Journal* in Louisville, KY.

on this globe from the beginning until we come down to man ... We differ only upon one point, *viz.*, the creation of the body of Adam."¹

Although most people are not threatened by the fact that weeds and worms evolve, they are threatened by the fact that evolution applies to humans just as it does to other organisms. This perceived threat is most obvious in the various anti-evolution proposals that have been (and continue to be) passed and debated in state legislatures and school board meetings throughout the country. Since before the Scopes trial in 1925, virtually all of these laws have been restricted to human evolution. Whereas it may be acceptable to creationists to teach students that corn and wheat descended from a common ancestor, it is not acceptable to teach that humans descended from apes. As John Adger noted in 1886, "The point of discussion is ... not Evolution in general. For life below man this is conceded generally ... The controversy begins when the doctrine is applied to man." Creationists demand that humans be exempt from the process of evolution, because the scriptures say that humans descended

directly from God.

Even Darwin's friend (and co-discoverer of natural selection) Alfred Russel Wallace argued that natural selection applies to humans, but only to a point. Our bodies, said Wallace, could be explained by natural selection, but our brains could not, because Wallace believed that our brains have powers that far exceed what could have been produced by natural selection. Wallace concluded that "natural selection could only have endowed the savage with a brain a little superior to that of an ape." Wallace claimed that God must have intervened and given humans the "extra push" necessary to produce our brains. When it came to humans, Wallace invoked the supernatural to explain nature and reconcile religion and science.² The emphasis on human evolution continues today; for example, a bill was introduced into the Kentucky legislature in 2000 that would have banned the teaching of human evolution.

Although university faculty have occasionally spoken out against anti-evolution laws and creationists' attempts to replace science with religious dogma,

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all of the legal challenges to anti-evolution laws have been led by high school teachers (e.g., John Scopes). Were it not for Susan Epperson (*Epperson v. Arkansas*, 1968), it might still be a crime to teach evolution in Tennessee, Arkansas, and Mississippi. Were it not for Don Aguillard (*Edwards v. Aguillard*, 1987), biology teachers in Louisiana might be distributing religious literature in their science courses. University faculty have been little more than cheerleaders in these challenges.

At least 25% of biology teachers are creationists. Although many of these and other creationists try to conceal their anti-evolution beliefs by describing themselves with euphemistic labels such as “theistic evolutionist,” others are died-in-the-wool believers who teach creationism (that is, *their* version of creationism) in their science courses. Many of these biology teachers were poorly trained in biology; some don’t even recall hearing the word *evolution* in their college biology courses. Ironically, creationism is taught in John Scopes’ school today. As Don Aguillard has noted, “Creationism is alive and well among biology teachers.”

Only slightly more than half of all biology teachers consider evolution to be a unifying theme in biology, and almost half of all science teachers believe that there is as much evidence for creationism as for evolution. In states such as South Dakota, almost 40% of science teachers believe that creationism should be taught in public schools.

Many biology teachers are afraid to include evolution in their courses (e.g., Figure 1). The situation hasn’t changed much since 1966 when George Gaylord Simpson noted that “Through the power to select textbooks and to hire and fire teachers, innumerable school boards and other officials can and do *de facto* prevent the teaching of evolution without the aid of state law.” As an administrator in Tennessee noted recently, “Teachers at my school try to avoid discussions of evolution ... We don’t need the controversy ... If I say the wrong thing, I could be looking for another job.” In these schools, the National Science Standards are meaningless.

Although many biology teachers claim that they “don’t have time” to cover evolution in their courses, they do nothing to make time to correct the problem. These teachers simply do not want to teach anyone about evolution. As a Kentucky high school biology teacher recently said, “I teach creationism, but don’t even talk about the theory of evolution.” This is an increasingly popular position for many high school biology teachers.

Anti-evolution statutes continue to be introduced into legislatures, and the platforms of Republican parties in several states now endorse the teaching

of creationism. As the recent uprisings of creationism in Kentucky, Kansas, Minnesota, and elsewhere have shown, creationism remains extremely popular.

Creationists continue to vilify the teaching of evolution. In the 1920s, William Jennings Bryan blamed the teaching of evolution for World War I, and in 1981 Judge Braswell Dean of the Georgia State Court of Appeals claimed that “The monkey mythology of Darwin is the cause of permissiveness, promiscuity, pills, prophylactics, perversions, abortion, pornography, pollution, poisoning and proliferation of crimes of all types.” In 1999, House Republican Whip Tom DeLay continued the attack by claiming linking the teaching of evolution with school violence, birth control, and abortion. To these and other people, the teaching of evolution is a cause of many societal ills; this is why states such as Kentucky and Louisiana have “sensitivity guidelines” that group evolution with topics such as witchcraft, drug use, incest, death, and abortion.

Many biology teachers present creationism and evolution as equally scientific and equally meritorious ways of understanding origins. This approach transforms scientific “truth” into little more than an opinion poll (e.g., “What do you think?”) and leads to truth in science being determined by a vote rather than by an examination of evidence.

Many states and school districts explicitly ignore court cases that restrict the teaching of creationism. For example, the Kentucky Board of Education recently encouraged teachers to teach creationism by reminding them that teachers who cover evolution in class can also teach “the theory of creationism as presented in the Bible.” Students who adhere to Biblical literalism automatically get credit on all exams for their answers.

Although creationists have lost every legal challenge associated with the creationism-evolution controversy, it hasn’t mattered much; creationism continues to be taught in many public schools, either explicitly as “creation science” or euphemistically as “abrupt appearance theory,” “intelligent design,” or “evidence against evolution.” People in other countries must wonder how the most scientifically and technologically advanced country in the world can harbor such support for the supernatural while rejecting – even condemning – a foundation of modern science.

It’s important for scientists and scientific organizations such as the Botanical Society of America to aggressively resist creationists’ attempts to subvert science. Nevertheless, the public does not passively accept the knowledge presented by

scientific experts or professional societies. Moreover, different intellectual communities use different criteria for determining what is reasonable or "scientific"; this is why creationism is considered differently by the public than by many scientists. At the local level, technical and professional questions are of much less immediate importance; teachers and local school boards do not have to look only at proclamations issued by professional societies or professional definitions of what science is or isn't. Rather, they must balance notions of scientific integrity (however misunderstood) with local autonomy. School boards and administrators do not need the sanction of state legislatures to implement practices consistent with their ideological biases. Since creationism has immense support by the public (almost 80% of Americans want creationism taught in public schools), it's easy to see why evolution is often excluded from high school biology courses.

Although we debate how evolution occurs, there is no doubt that it does occur. Evolution is a fact of nature, and an understanding of evolution is a central aspect of scientific literacy. Evolution is what unifies biology. Not to teach evolution as the central concept of biology is, as Joe McInerney has said, "educational malpractice."

¹ Woodrow was eventually acquitted by a vote of 14-9 by the Presbytery of Augusta, but the General Assembly of the Presbyterian Church in the United States adopted a hard-line position against human evolution: "The Church remains at this time sincerely convinced that the Scriptures, as truly and authoritatively expounded in our confession of Faith and Catechisms, teach that Adam and Eve were created, body and soul, by immediate acts of Almighty power, thereby preserving a perfect race unity. That Adam's body was directly fashioned by Almighty God, without any natural animal parentage of any kind, out of matter previously created of nothing. And that any doctrine at variance therewith is a dangerous error..."

² To his credit, Wallace was one of the few nineteenth-century naturalists who did not conclude that so-called "primitive" humans (e.g., Australian aborigines, American Indians, etc.) were inferior. Wallace realized that even if "primitive" humans did not actually write poetry or do geometry, they nevertheless had the mental ability to do such things.

Randy Moore, a botanist and former officer in the Botanical Society of America, is a professor at the University of Minnesota. His recent book *In the Light of Evolution: Science Education on Trial* (Reston, VA: National Association of Biology Teachers) resulted from his highly acclaimed series of articles about the evolution-creationism controversy that appeared in *The American Biology Teacher*, "Creationism in the United States: I. Banning Evolution in the Classroom [60(7):486-507] II. The

Aftermath of the Scopes Trial [60(8): 568-577]; III. The Ban on Teaching Evolution Reaches the U.S. Supreme Court [60(9): 650-661]; IV. The aftermath of *Epperson v. Arkansas* [61(1):10-16]; V. The *McLean* decision destroys the credibility of "creation science" [61(2): 92-101]; VI Demanding "balanced treatment" [61(3): 175-180]; VII. The lingering impact of *Inherit the Wind* [61(4):246-251]; VIII. The lingering threat [61(5): 330-340].

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News from the Society

Awards Presented at the Annual Meeting

MERIT AWARD

The Botanical Society of America's Merit Awards are the highest honors bestowed by the Society. They are given in recognition of outstanding contributions in research, teaching, and service. This year the Society presents a Merit Award to **Leslie Gottlieb** of the University of California – Davis.

Dr. Leslie Gottlieb has had a profound impact on the direction of plant systematics and has been one of the most influential plant evolutionary biologists over the past several decades. His 1977 paper in the *Annals of the Missouri Botanical Garden*, laid the foundation for the intelligent application of allozyme data in plant systematics. His 1982 paper in *Science* is a classic study of the duplication and conservation of isozyme loci in plants. His 1984 paper in the *American Naturalist* has been called one of the most important papers in plant evolutionary biology during the past half century. However, his greatest contribution may have come through his influence on the careers and research of a substantial number

of plant evolutionary biologists, including many of the people most active in this field today. Despite the fact that his research has often been more genetic or molecular in nature, Leslie has remained a botanist at heart.

- John Doebley, Chair, Merit Award Committee.

KATHERINE ESAU AWARD

This award, established in 1985 with a gift from Dr. Esau, is given to the graduate student who presents the outstanding paper in developmental and structural botany at the annual meeting. This year's award goes to **Christopher Meloche** from The University of Colorado for his talk, co-authored with Pamela Diggle and entitled, "Patterns of carbon allocation in *Acomstylis rossii*(Rosaceae), an alpine plant exhibiting extreme preformation".

MAYNARD F. MOSELEY AWARD

The Maynard F. Moseley Award was established to honor a career of dedicated teaching, scholarship, and service to the furtherance of the botanical sciences. The award recognizes a student paper that best advances our understanding of the anatomy and/or morphology of vascular plants within an evolutionary context. Two awards will be presented this year. The awardees are:

1. **Sandra Floyd**, University of Colorado, for her paper, co-authored with Ned Friedman, and entitled, "Endosperm development in *Amborella trichopoda* implications for the origin and early evolution of angiosperm reproductive biology".

2. **Elizabeth Hermsen**, Cornell University, for her paper, co-authored with William Crepet and Kevin Nixon and entitled, "A new fossil saxifragoid from the Upper Cretaceous of New Jersey."

BSA/KARLING GRADUATE STUDENT RESEARCH AWARDS

This award was given for the first time in 1997 to support student research. The awards are made possible by a gift from the late John Sidney Karling and through contributions from the BSA membership. Dr. Karling's research interests were in cytology, marine fungi, and tropical biology. He was an active member of both the Torrey Botanical Club and the BSA. Each awardee receives a certificate and a check for \$500. This year, Karling Awards are presented to the following 15 students:

1. **Ms. Nicole Andrus**
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2. **Mr. James S. Boyer**
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14. **Mr. Brian Vanden Heuvel**
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15. **Mr. Mark Vellend**
Department of Ecology and Evolutionary Biology
Corson Hall
Cornell University
Ithaca, NY 14853

PELTON AWARD

The Pelton Award Committee of the Botanical Society is pleased to announce that **Dr. Ben Scheres** from the University of Utrecht in The Netherlands is the recipient of the 2000 Pelton Award for his exceptional research and commentary in plant morphogenesis. Dr. Scheres is an outstanding analyst and researcher of plant development, especially of roots where he has made seminal contributions. He demonstrated the dominance of position over lineage in determining root cell fate, and has established the significance of signaling between different populations of cells in the root. He has shown that quiescent cells in the center of the root meristem play an important role in preventing surrounding cells from differentiating prematurely and thus function in root development. His identification and analysis of several *Arabidopsis* mutants have significantly advanced our understanding of the genes that control root architecture and cell specification. He is the author of numerous influential reviews. Dr. Scheres has had a major impact on the field of morphogenesis and is deeply deserving of this award.

ASPT'S COOLEY AWARD

The Cooley Prize is awarded for the best paper given at the annual meeting of the American Society of Plant Taxonomists by a botanist in the early

stages of his/her career. Members of ASPT who are graduate students or in their first five years post-conferral of the Ph.D. are eligible. Excellent talks presenting research that is substantially complete, synthetic, and original have been received positively by Cooley Award judges. The research presented, even if collaborative, should be significantly that of the eligible individual, who will be the senior author in most cases. Only one talk per person may be judged in each annual competition, and an individual may win the award only once. The winners of this year's Cooley Award are **Francois Lutzoni, Mark Pagel**, and **Valerie Reel** for their talk entitled, "Contribution of the lichen symbiosis to the diversification of ascomycetes: A new approach to determining confidence levels for ancestral character states."

EDGART. WHERRY AWARD

This award is given for the best paper presented during the contributed papers session of the Pteridological Section. This award is in honor of Dr. Wherry's many contributions to the floristics and patterns of evolutions of ferns. This year's award goes to **Patricia Sanchez-Baracaldo**, University of California – Berkeley, for her talk entitled, "A recent radiation of Neotropical fern genera in paramo ecosystems".

SAMUEL N. POSTLETHWAIT AWARD

The Teaching Section presents the Samuel Noel Postlethwait award for exceptional teaching on behalf of the Teaching Section of the BSA. This award for 2000 is presented to **Rob Reinsvold** of The University of Northern Colorado.

PHYSIOLOGICAL SECTION AWARD

Each year the Physiological Section acknowledges the best presentation made by any student, regardless of subdiscipline, at the annual meeting. The award this year goes to **Suneetha Alokam**, University of Calgary, for a talk entitled, "Red/Far red light-mediated shade avoidance stem elongation response and anthocyanin accumulation in alpine and prairie ecotypes of *Stellaria longipes*" with coauthors Chandanda Chinnappa and David Reid.

MARGARET MENZEL AWARD

This award is given by the Genetics Section for the outstanding paper presented in the contributed papers sessions of annual meetings. This year's award goes to **Joel Duff**, University of Akron, for his talk co-authored by Mark Davis and Angela Boyle

and entitled "The fate of conserved ribosomal DNA and protein-coding gene clusters during the evolution of land plant mitochondrial genomes".

ISABEL C. COOKSON PALEOBOTANICAL AWARD

Each year the Isabel C. Cookson Award is given for the best contributed paper in paleobotany or palynology presented at the annual meeting. The award this year is presented to **Michael G. Riley**, University of Alberta, for his paper co-authored with Ruth Stockey and entitled, "A new aquatic angiosperm with a floating rosette of leaves from the St. Mary River formation of southern Alberta."

A.J. SHARP AWARD

Each year The American Bryological and Lichenological Society presents the A.J. Sharp Award to the best student presentation. Named in honor of the late Jack Sharp, the award encourages students of bryophytes and lichens, just as Dr. Sharp did during his lifetime.

This year, in addition to the winner, we had two honorable mentions: **Rebecca Yahr** of Duke University for her paper "Post-fire recovery of terrestrial lichens in Florida scrub, with emphasis on *Cladonia perforata*" and **Jessica Lucas** of Southern Illinois University for her paper "Anatomy, ultrastructure and physiology of hornwort stomata: an evaluation of homology."

The winner of this year's A.J. Sharp Award is **Shanti Berryman** of Oregon State University for her presentation "Differences in epiphytic lichen communities and biomass among forest stand types in the Blue River watershed of western Oregon."

HENRY ALLANGLEASON AWARD

Each year The New York Botanical Garden presents the Henry Allan Gleason Award for an outstanding publication in the field of plant taxonomy, plant ecology, or plant geography. The Gleason Award for 2000 is presented to **Dr. Simon Mayo**, **Dr. Josef Bogner**, and **Dr. Peter Boyce** for their book, *The Genera of Araceae*, published by the Royal Botanic Gardens, Kew. This publication represents *THE BOOK* on Aroids in covering all aspects of aroid biology, including cultivation, conservation, the fossil record and plant pathology as well as superb germane illustrations. It serves as a model for how monographic works can interface with all botanical disciplines.

LAWRENCE MEMORIAL AWARD–2000

The Lawrence Memorial Fund was established at the Hunt Institute for Botanical Documentation, Carnegie Mellon University, to commemorate the life and achievements of its founding director, Dr. George H. M. Lawrence. Proceeds from the Fund are used to make an annual Award in the amount of \$1,000 to a doctoral candidate to support travel for dissertation research in systematic botany or horticulture, or the history of the plant sciences.

The recipient of the Award is selected from candidates nominated by their major professors. Nominees may be from any country and the Award is made strictly on the basis of merit—the recipient's general scholarly promise and the significance of the research proposed. The Award Committee includes representatives from the Hunt Institute, The Hunt Foundation, the Lawrence family, and the botanical community.

The Lawrence Memorial Award for 2000 goes to **Ms. Anne Katherine Hansen**, a student of Professor Robert K. Jansen at The University of Texas at Austin. For her dissertation research, Ms. Hansen has undertaken a study of the genus *Passiflora* with a special emphasis on the large group of species with a basic chromosome number of 9. The proceeds of the Award will help support her travel in Brazil for field research.



DID YOU KNOW?

Did you know that 86 year old Charles Heimsch, retired from Miami University—Oxford, OH, attended the 2000 annual meeting marking the 8th straight decade in which he has attended the summer botanical meetings of the Society? He first attended in 1937. That is remarkable! Here's a man who loves plants, still likes to learn, and is devoted to the Society (remember, he's been Society President, VP, Treasurer (I think), and ABJ Editor); Charlie is truly remarkable.

-Jim Seago

News from the Sections

Leisman Gift to Paleobotanical Section.

The Gilbert and Marie Leisman trust has contributed \$5000 to the Paleobotanical Section Endowment of the Botanical Society of America. Gil, who was an internationally recognized paleobotanist specializing in carboniferous lycopods, served on the faculty of Emporia State University from 1955-1989. He earned his Bachelor's degree from the University of Wisconsin, Madison, and his Master's and PhD degrees from the University of Minnesota.

In addition to his botanizing, Gil was an artist and wood worker. Both he and Marie also were accomplished musicians participating in several local ensembles. Below is an image of his 4'X6' wood marquetry of their string quartet performing. Gil is on cello at the rear and Marie is the violinist at right.



Genetics Section News

R. Joel Duff received the 2000 Margaret A. Menzel Memorial Award at the BSA banquet in Portland, OR, for his paper entitled "The fate of conserved ribosomal DNA and protein coding gene clusters during the evolution of land plant mitochondrial genomes." The paper was co-authored by Mark Davis and Angela Boyle at the University of Akron. The 2000 Menzel Award Committee consisted of Vance Baird, Jeri Higginbotham, and Richard Whitkus who followed the recommendation of the vote. Thanks to all who voted. Those interested in serving on the 2001 Menzel Award Committee should contact the Section Chair. Those interested in being eligible for the Menzel award must present their genetics research in a Contributed Papers Session of the Genetics Section. Next year, the award increases to \$200.00. Sorry Joel.

In other business, there will be a \$100.00 award for the best genetics poster presented in the Poster Session of the Genetics Section at our next annual meeting.

Additional items of interest to members of the Section including reports, minutes, and announcements are now available through the BSA Website on our Homepage.

Respectfully Submitted,
Jeri W. Higginbotham, Section Chair

Announcements

Call for Proposals: Karling Graduate Student Research Award

Purpose and Eligibility

The purpose of this award is to support and promote graduate student research in the botanical sciences. To be eligible, one must be a member of the Botanical Society of America (BSA), a registered full-time graduate student, have a faculty advisor who is also a member of the BSA, and not have won the award previously.

Proposal Guidelines

The proposal shall consist of 1) a title page (must include: title of proposal, name of student, student's institutional and departmental affiliation, year of student's study, and student's sectional affiliation within BSA); 2) an Abstract; 3) a Narrative (must include: a description of the research, including appropriate conceptual background, purpose or objective, brief outline of methodology, and potential contribution or significance to an area of the botanical sciences); 4) a Budget detailing how the funds will be used (the Abstract, Narrative, Budget and any tables or figures should not exceed five single-spaced pages); 5) a Bibliography (up to two pages); and 6) a Biographical Sketch (up to two pages). Proposals should include one inch margins all around and use a font size of not smaller than 12 point.

In addition, proposals should be accompanied by a letter of support from the student's advisor.

Award Level and Announcement

Each award provides \$500. Award winners will be announced at the BSA Banquet held in Albuquerque, New Mexico in August 2001. Funds for the awards come from interest on the Karling and the BSA Endowment Funds, and from the sale of BSA logo items. The award process can be quite

competitive; the funding level for the 1998 competition was about 22 percent.

Submission

Proposals and supporting letters should be postmarked no later than March 15, 2001. Students should submit six (6) hardcopies of the complete proposal and arrange to have the letter of support sent to the Chair of the Karling Graduate Student Research Award Committee at the following address:

Kathleen A. Kron, BSA Karling Award Committee,
Department of Biology, Wake Forest University,
Winston-Salem, NC 27109-7325
kronka@wfu.edu

Request for Used/Damaged Teaching Supplies

Over the past few years, enrollment in our general botany course at U. Chile has more than tripled -- that is good news. Unfortunately, resource allocation remains at the level it was during the Pinochet years, and it is not likely to increase. As a result, for all intents and purposes, we do not have prepared slides of such standard examples of diversity and structure as illustrated in the Raven and Evert text. For some things, we might have one old, locally-prepared slide, lacking color and with barely recognizable content -- to be shared by 80 students -- until it is broken. The funds for research here are not all that bad, but there is very little overhead to the institutions, and the institutions receive very little for teaching. It does not help that scientific supplies (including prepared slides) cost more than twice what they do in the U.S. Contrary to what one might expect, living costs here are quite high, mainly because of high energy costs (you are paying ONLY \$2 for a gallon of gas?) And stiff duties and taxes on manufactured items.

I recall from my years at Davis that practically every lab session, we would discard slides that were damaged but repairable. It was cheaper to buy new slides than repair old ones. I would like to solicit for damaged/reparable or surplus materials. Even if we could amass a few slides of such things as an *Equisetum strobilus*, a dinoflagellate, or an *Ectocarpus sporophyte*, it would help our course tremendously.

Please contact:

Dr. Mary Kalin Arroyo (foreign member of BSA)
Departamento de Biología, Facultad de Ciencias
Universidad de Chile, Casilla 653, Santiago, Chile
southern@abello.dic.uchile.cl

or

Mark A. Hershkovitz mhershko@abello.dic.uchile.cl

Call for Nominations 2000 Young Botanists

The Botanical Society of America requests nominations for the Young Botanist recognition awards for 2000-2001. The purpose of these awards is to offer individual recognition to outstanding graduating seniors in the plant sciences and to encourage their participation in the Botanical Society of America. All nominees with strong records of achievement (at least a B average and other activities) will receive a Certificate of Recognition and have their names published in Plant Science Bulletin. The top 25 nominees, whose selection will be based primarily on the accomplishments described in recommendation letters, will receive a Certificate of Special Achievement from the Society. Nominations should document the student's qualifications for the award (academic performance, research projects, and individual attributes) and be accompanied by two or more letters of recommendation from faculty who know the students well. The selections will be made by a committee chaired by the Past-President, Doug Soltis. Nominations should be sent to: Dr. Doug Soltis, Jodrell Laboratory, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3DS, UK no later than 1 March, 2001.

COURSE OFFERINGS IN 2001

The Highlands Biological Station, located in the Southern Appalachian Mountains in southwestern North Carolina, is pleased to announce its summer course offerings for 2001. These courses are taught at the advanced undergraduate-graduate level, and credit for all courses is available through either Western Carolina University or UNC-Chapel Hill.

Taxonomy and Natural History of Southern Appalachian Mayflies, Stoneflies, and Caddisflies.
21 May-2 June. Three semester hours. John C. Morse (Clemson University).

Natural history and taxonomy of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera), including systematics, ecology, and behavior of larvae and adults, with emphasis on those aspects important in ecological studies, biological monitoring of water quality, and sport fishing. Insects will be collected from mountain stream habitats, and identifications will be done in the laboratory. Prior training in zoology, but not necessarily entomology, is expected.
Prerequisite: general zoology or permission of the instructor.

Southern Appalachian Flora. 4-16 June. Three semester hours. Michael Baranski (Catawba

College).

The vascular flora and plant communities of the Southern Appalachian region are extremely rich and varied. This course will explore the floristic diversity of the region. Identification skills will be stressed, but the course will also cover systematics, distribution, and communities. Students will become acquainted with the flora in representative plant communities within walking or driving distance of the Station. A variety of keys and regional floras will be used. There will be lectures, lab activities, and field trips to sites in the Blue Ridge Mountains and Great Smoky Mountains National Park. Field trips will involve some moderate hiking. Some background in plant identification and some familiarity with plant families are assumed.

Prerequisites: General botany (or equivalent), one other advanced course in field botany, plant taxonomy, or plant ecology, or permission of the instructor.

Conservation Biology—Principles for Conservation Illustrated by the Diverse and Dynamic Landscape of the Southern Appalachians. 18-30 June. Three semester hours. Peter S. White (University of North Carolina at Chapel Hill).

This course presents the major biological principles that are important in our efforts to conserve biological diversity. The setting of Highlands Biological Station will allow us to examine and illustrate those principles through field work in Great Smoky Mountains National Park, the Blue Ridge Parkway, and the Highlands area. Topics to be covered include: the history and philosophy of conservation goals, the definition and measurement of biological diversity, island biogeography and preserve design, habitat fragmentation, conservation genetics, populations, *ex situ* conservation, communities and ecosystems, natural disturbance and patch dynamics, the special problems of islands, exotic species, and ecological restoration. Students will explore computer simulations of ecosystem and population dynamics, population genetics, and island biogeography.

Prerequisites: courses in ecology or permission of the instructor.

Forest Ecosystems of the Southern Appalachian Mountains. 2-14 July.

Three semester hours. Thomas R. Wentworth, (North Carolina State University), J. Dan Pittillo (Western Carolina University), Peter S. White (University of North Carolina at Chapel Hill).

The purpose of this course is to introduce students to patterns and processes in forested ecosystems of the Southern Appalachian Mountains. The focus is on natural vegetation, with an emphasis on vascular plants. Through lectures, readings, and discussions, students will be introduced to a series of topics, including biogeography, paleoecology, recent history, classification of vegetation, regional environmental patterns, succession and community dynamics, vegetation/environment relationships, and current threats to the integrity of these systems. Trips to a variety of natural areas will

illustrate these topics in the field. Students will be expected to participate fully in all group activities and to maintain personal journals summarizing the information presented. Prerequisites: Courses in botany and ecology, or permission of the instructor

Mammals of the Southern Appalachian Mountains. 16-28 July. Three semester hours.

Wm. David Webster (University of North Carolina at Wilmington)

The Southern Appalachian Mountains support the richest mammalian fauna in eastern North America, from tiny shrews and bats to large carnivores and ungulates. This advanced zoology course focuses on the biology of mammals in the Southern Appalachians, including their habitat requirements, reproductive and foraging behaviors, evolutionary relationships, and roles in regional ecosystems. The course combines lectures with field and laboratory exercises designed to expose advanced students to the remarkable diversity and importance of mammals in the Southern Appalachians.

Prerequisites: General zoology, ecology, or permission of the instructor.

Bryology — an Introduction to Mosses, Liverworts, and Hornworts of the Southern Appalachian Mountains. 30 July-11 August. Three semester hours.

Paul G. Davison (University of North Alabama).

The Highlands area is the wettest place in eastern North America and harbors an incredible diversity and abundance of bryophytes. This course examines the systematics, morphology, and ecology of this diverse, but often overlooked, group of plants. Field trips to collect specimens will be followed by microscopic examination in the laboratory to identify these to species. A collection will be required. Prerequisites: General botany (or equivalent), one other advanced course in field botany, plant taxonomy, or plant ecology, or permission of the instructor.

Costs include a course fee of \$400 per 2-week course, charged to all students. Students who wish to register for credit can enroll either through Western Carolina University, \$35 application fee and \$54 registration fee, or UNC-Chapel Hill, \$80 registration fee. Courses may be taken without credit, but degree-seeking students receive higher priority. Housing costs are \$40/week.

The Highlands Biological Foundation, Inc., offers limited financial aid (usually one-half of the cost of tuition and fees) to qualified students. Further information on specific courses, financial aid, and application forms can be obtained by writing to Dr. Robert Wyatt, Executive Director, Highlands Biological Station, P.O. Box 580, Highlands, North Carolina 28741. Alternatively, application forms can be downloaded at <http://www.wcu.edu/hibio>.



GRANTS-IN-AID OF RESEARCH IN 2001

The Highlands Biological Station, an interinstitutional center of the University of North Carolina, is pleased to announce the availability of scholarships and grants-in-aid of research for the 2001 field season. The Station is located in the Southern Appalachian Mountains in southwestern North Carolina at an elevation of 4,000 feet. The region receives 80-100 inches of rain per year and supports a remarkable diversity of life. A recent article in *BioScience* identified the region as a hotspot for diversity of, among others, salamanders, land snails, trees, and fungi. There is a long and distinguished history of biodiversity studies at the Station.

Facilities include research labs with refrigerators, freezers, ultracold freezers, microscopes, and field sampling equipment; a research library with a reprint collection and subscriptions to many ecological, systematic, and evolutionary journals; an aquatics lab with several outdoor artificial streams and six large indoor aquariums; two large, walk-in environmental chambers; and dormitories and kitchens for use by researchers. The Station operates the Highlands Nature Center and the Highlands Botanical Garden, which includes a 5-acre lake. There are numerous tracts of Forest Service land in the area, and the Station cooperates with the Coweeta Hydrologic Laboratory, a Long-Term Ecological Research (LTER) site, which is located 18 miles away.

Grants-in-aid and scholarships are available to predoctoral graduate students and postdoctoral investigators for the support of research on the habitats and organisms of the Southern Appalachians. Awards are made for projects that involve residence at the Station for one to twelve weeks. Applications for grants are reviewed by the Board of Scientific Advisors, representing the 34 colleges and universities in the Southeast that belong to the Highlands Biological Foundation, Inc. Application forms can

be obtained from Dr. Robert Wyatt, Executive Director, Highlands Biological Station, P.O. Box 580, Highlands, NC 28741. Alternatively, forms can be downloaded at <http://www.wcu.edu/hibio>. They must be returned before 1 March 2001. Applicants will receive notification of the decision of the Board by 1 April 2001. Awards are based on the period of residency at the Station in accordance with the following schedule: predoctoral, \$250/week; postdoctoral, \$400/week. Recipients of scholarships and grants-in-aid are provided research space without charge.



Timothy C. Plowman Latin American Research Award

The Botany Department at The Field Museum invites applications for the year 2001 **Timothy C. Plowman Latin American Research Award**. The award of \$1,500.00 is designed to assist students and young professionals to visit the Field Museum and use our extensive economic botany and systematic collections. Individuals from Latin America and projects in the field of ethnobotany or systematics of economically important plant groups will be given priority consideration.

Applicants interested in the award should submit their curriculum vitae and a detailed letter describing the project for which the award is sought. The information should be forwarded to the Timothy C. Plowman Award Committee, Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605-2496 USA and received no later than 30 November 2000. Announcement of the recipient will be made no later than 31 December 2000.

Anyone wishing to contribute to **The Timothy C. Plowman Latin American Research Fund**, which supports this award, may send their checks, payable to The Field Museum, c/o Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605-2496 USA. Make certain to indicate the intended fund.

The year 2000 recipient of the Timothy C. Plowman Latin American Research Award, presented by the Department of Botany of the Field Museum, was **Maria Iracema Bezerra Loiola**, of the Universidade Federal Rural de Pernambuco in Recife, Brazil. Her project was entitled „Taxonomic Revision of *Erythroxylum* sect. *Rhabdophyllum* (Erythroxylaceae).“

Ms. Loiola used her award to visit the Herbarium of the Field Museum from 11 May to 2 June, 2000. During this time, she reviewed our holdings of *Erythroxylum*, identified undetermined material, selected a loan for further study, and reviewed literature and unpublished work of the late Dr. Timothy Plowman.

Premio de investigación Latinoamericano Timothy C. Plowman

El departamento de Botánica en "The Field Museum" invita aplicaciones para el **premio de investigación Latinoamericano Timothy C. Plowman** 2001. Este premio de \$1,500.00 fue diseñado para apoyar a estudiantes y profesionales jóvenes en visitas al museo de Field y utilizar sus extensas colecciones de botánica económica y sistemática. Se les dará consideración especial a individuos de Latinoamérica y a proyectos en los campos de etnobotánica ó sistemática de plantas económicamente importantes.

Las personas interesadas en aplicar a este premio deberán proveer su curriculum vitae y una carta detallando el proyecto para el cual el premio se utilizará. Esta información debe ser enviada al Timothy C. Plowman Award Committee, Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605-2496 USA y ser recibida antes del 30 de Noviembre de 2000. El ganador del premio será anunciado antes del 31 de Diciembre de 2000.

Cualquier persona que desee contribuir al **Fondo de investigación latinoamericano Timothy C. Plowman**, el cual apoya este premio, puede enviar su cheque, pagadero a "The Field Museum, c/o Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605-2496 USA". Asegúrese de indicar el fondo al cual se destina su contribución.

Advice for applying to graduate school.

In an recent issue of the Bulletin of the Ecological Society America (1999, 80:246-250), there is an article entitled "A primer on how to apply to and get admitted to graduate school in ecology and evolutionary biology" by Walter Carson. This article describes in a step by step fashion how to go through the application process and much of the information applies to graduate programs in the plant sciences. This article is now on the Ecological Society of America's webpage and can be found at <http://esa.sdsc.edu/gradschoolprimer.htm>.



Positions Available

RESEARCH POSITION

The Auburn University Research Instrumentation Facility (AURIF) in Auburn, Alabama has an immediate vacancy for a biological researcher. The AURIF consists of two main laboratories: the Advanced Microscopy & Imaging Laboratory (AMIL) which contains a variety of electron and light-based workstations; and the Genomics & Sequencing Laboratory (GSL) which contains an ABI 3100 DNA Sequencer, and other molecular support equipment. This position is funded from external sources. Continuation of employment is contingent upon availability of funds and satisfactory performance.

This is a professional job responsible for providing sequencing and DNA research support for the Genomics & Sequencing Laboratory. The primary goal of this position will be to maintain this laboratory at high standards which include, but is not limited to the manufacturing of PCR and cycle sequencing products to reproducibly high quality standards; to produce sequences and fragment data with the aid of a high throughput sequencer; the ordering of supplies and maintaining financial documents; to supervise students and researchers in other molecular methods. In addition, the person filling this position will be expected to help build and improve both facilities by developing handouts and web-pages, along with other associated duties.

A minimum of a Bachelor's degree in the biological sciences or a related subject is required. A Master's or Ph.D. degree in the biological sciences is desired, as well as work experience in a molecular biology laboratory. Applicants should have experience with the operation of sequencing equipment and databases, spreadsheets, and e-mail.

Women and minorities are encouraged to apply.

Candidates should submit a letter of application, resume, curriculum vita (transcripts), and three letters of reference to:

Research Position
Log Number 15690
Human Resources
Langdon Hall
Auburn University, AL 36849
Ph: (334) 844-4145
TDD: (334) 844-1612
FAX: (334) 844-1617

Review of applications will begin after December 1, 2000.

Auburn University is an Affirmative Action/Equal Opportunity Employer.

PLANT EVOLUTIONARY BIOLOGIST UNIVERSITY OF MINNESOTA, TWIN CITIES

The Department of Plant Biology is participating in the University of Minnesota's **major new initiatives in Evolutionary Biology and Molecular and Cellular Biology**. These initiatives will involve the addition of as many as 13 new faculty to the Department during a four-year span, including four faculty members added in the past year. In addition, a new Microbial and Plant Genomics building will be completed in 2002. As part of these initiatives, the Department of Plant Biology now invites applications for **one or two tenure-track positions in Evolutionary Biology** at the Assistant Professor level. Applications also will be considered from outstanding senior scientists at the Associate/Full Professor level. All candidates must have a Ph.D. or international equivalent and two years relevant postdoctoral experience. Desired experience includes a strong publication record, evidence of effective teaching, demonstrated research emphasis in plant biology, and success in obtaining extramural research funding.

Successful candidates will be expected to develop a strong, externally funded research program in plant evolutionary biology. Research areas may include, but are not limited to: genome evolution, evolution of higher taxa, molecular evolution, and evolutionary aspects of plant development. Responsibilities also include contributing to the undergraduate and graduate teaching mission of the Department of Plant Biology; advising undergraduate, graduate, and postdoctoral students; and participation in professional service. Please send a curriculum vitae, statement of research and teaching interests, five reprints, and three letters of recommendation to: Plant Evolutionary Biology Search Committee, Department of Plant Biology, University of Minnesota, 220 BioSciences Center, 1445 Gortner Ave. St. Paul, MN 55108. Review of applications will begin December 1, 2000, with applications accepted until the position has been filled. For more information visit cbs.umn.edu and cbs.umn.edu/plantbio/pbio.

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

PLANTBIOLOGIST

The Department of Biology at the University of Louisville, <http://www.louisville.edu/a-s/biology>, invites applications for an **Assistant Professor** position in the area of **Plant Biology** to begin fall 2001. Ph.D. or equivalent required. Successful candidates are expected to contribute to both the undergraduate and MS and Ph.D. training programs. Preference will be given to candidates with an excellent record of research productivity as evidenced by publications in leading journals. The use of physiological, molecular/genetic and ecological approaches in any area of Plant Biology will be considered. Applicants should submit curriculum vitae, statements of research and teaching interests, up to 3 reprints and contact information for 4 references to Dr. Arnold J. Karpoff, Department of Biology, University of Louisville, Louisville, KY. 40292. Review of applications will begin immediately and will continue until the position is filled. Women and minorities are encouraged to apply. The University of Louisville is an Affirmative Action, Equal Opportunity employer.

BIOLOGY FACULTY POSITIONS UNIVERSITY OF NEBRASKA AT OMAHA

Assistant Professor - Plant Physiology

PhD required, postdoctoral experience desirable. Teaching responsibilities include a team-taught biology course for non-science majors and plant physiology for undergraduate and graduate majors. Advanced or specialty courses may be developed.

Associate/Assistant Professor - Environmental Biology

PhD, teaching and/or postdoctoral experience required. The successful candidate will teach introductory and advanced courses for students majoring in Biology and Environmental Studies and act as Director of the multi-departmental Environmental Studies Program.

All candidates will develop active research programs. The university and department are strongly committed to achieving diversity among faculty and staff. We are particularly interested in receiving applications from members of underrepresented groups and strongly encourage women and persons of color to apply for these tenure-track positions. Screening of applications will begin 1 NOV and continue until positions are filled. Send CV, statements of teaching and research objectives, and 3 letters of recommendation to: Chair, Department of Biology, University of Nebraska at Omaha, 6001 Dodge Street, Omaha, NE 68182-0040. See www.unomaha.edu/~wwwbio.

extramurally-funded research program involving both undergraduate and master's-level students. Previous experience teaching undergraduate courses would be viewed favorably, and postdoctoral research experience is expected. Information on the College of William and Mary may be obtained at our web site: www.wm.edu. Review begins January 5, 2001, and will continue until an appointment is made. Submit a letter of application, curriculum vitae, statements of research plans and teaching philosophy, and three names of references with contact information to **Plant Physiology/Development Search Committee, Department of Biology, The College of William and Mary, P.O. Box 8795, Williamsburg, VA 23187-8795**. *The College of William and Mary is an EEO/AAC employer.*

Collections Specialist Department of Botany The Field Museum

The Field Museum's Department of Botany is searching for a Collections Specialist, Flowering Plants. The successful applicant should possess a MS or preferably a PhD in botany or plant systematics, a thorough knowledge of tropical plant families, and experience in plant identification. The Collections Specialist duties are focused on building and maintaining quality flowering plant collections. Collections are at the heart of our enterprise and the Collections Specialist is asked to provide determinations for research endeavors by Field Museum staff and researchers worldwide. Large quantities of delicate, unmounted, dried plant material requires careful sorting, preparation for mounting, data-entry and database management, routing duplicate material to taxonomic experts, and management of incoming determinations. A basic level of computer word processing, database and data-entry skills is desirable. The Collections Specialist will work closely with the Curators, Collections Manager of Flowering Plants, Herbarium Assistants, Plant Preparators, and visitors to the herbarium.

The Field Museum is an equal opportunity employer and actively encourages applicants from diverse backgrounds. Send application letter, C.V. and names of three references to: Plant Collections Specialist Search, Department of Botany, The Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605-2496. The position is now open, and it will be filled as soon as an appropriate candidate is found. E-mail inquiries: botany@fmnh.org. For more information on the Museum visit: <http://www.fieldmuseum.org>.

FACULTY POSITION PLANT PHYSIOLOGY/DEVELOPMENT

The College of William and Mary invites applicants for a tenure track position at the ASSISTANT PROFESSOR level in plant physiology and/or plant development. Teaching responsibilities will include a plant physiology course with laboratory, a large course in general botany to be taught in alternate years, and another course in the area of the candidate's expertise (perhaps plant development) to alternate with general botany. Candidates must possess skills in communicating with and motivating undergraduates in both large and small courses, and must demonstrate the potential and motivation to achieve excellence in teaching. The successful candidate will be expected to maintain an

Postdoctoral Position **Virginia Tech University**

A two-year postdoctoral position is available to study molecular evolution of protein multigene families in grasses and address questions in flowering plant evolution using DNA sequencing. A Ph.D. degree and experience in molecular systematic techniques is required. The position will be open until it is filled with a suitable candidate. Preferable starting date is January 5, 2001. Please send a cover letter describing your research interest, vita, and names and addresses of three references to: Dr. K. W. Hilu, Department of Biology, Virginia Tech, Blacksburg, VA, 24061. For additional information you may call (540-231-5407) or e-mail hilukw@vt.edu. Virginia Tech is an Equal opportunity/Affirmative Action Employer.

LAND STEWARD VOLUNTEER

Help protect and preserve Washington's natural heritage while enjoying an opportunity to see diverse plant communities and local endemic species!

Volunteer stewardship opportunities are now available to help care for state-owned Natural Areas preserves throughout Washington. These sites have been established to protect habitat for rare, endangered or threatened plant and animal species or they have outstanding scenic and ecological value. In a rapidly changing Washington, these are islands of our state's past. They contain the highest quality examples of Washington's natural heritage – what was common but now is rare.

Don't miss this NEW opportunity to protect rare plant communities as a Land Steward. Volunteers will visit these Department of Natural Resources natural areas once a month from spring through fall and a commitment of at least one year is required. Training and equipment will be provided. **Enjoy our natural heritage while contributing to the care of our public lands!**

Call or Email Janet at 1-888-895-2460/
natrcnct@nwlink.com for additional information.

PLANT DEVELOPMENTAL BIOLOGIST

The Department of Biological Sciences invites applications for a tenure-track position at the ASSISTANT PROFESSOR level with a starting date of fall 2001. Final administrative approval for this position is pending. We are especially interested in candidates using cellular and molecular

techniques to investigate the interaction of genetics and the environment on development. Such research could encompass comparative phylogenetic, evolutionary, and/or ecological approaches. The successful candidate will be expected to pursue a vigorous, independent, externally funded research program and participate in the undergraduate and graduate teaching goals of the Department, including courses in the candidate's specialty. Applicants must have a Ph.D. or equivalent degree; postdoctoral experience will be advantageous. Applicants should submit a curriculum vitae, statement of research and teaching interests, and three letters of recommendation by January 10, 2001 to Search Committee, Department of Biological Sciences, University of Cincinnati, Cincinnati, OH 45221-0006. The University of Cincinnati is an equal opportunity/affirmative action employer. Women, minorities, veterans and persons with disabilities are encouraged to apply.

Steven H. Rogstad, Biological Sciences ML6, University of Cincinnati, Cincinnati, OH, U.S.A. 45221-0006
PHONE: (513) 556-9744, FAX: (513) 556-5299
EMAIL: steven.rogstad@uc.edu
<http://www.biology.uc.edu/faculty/rog/steve.htm>

Graduate Assistantship **Emporia State University**

A graduate research assistantship is available to study the morphology/development of *Lespedeza cuneata*, a statewide noxious weed in Kansas. The recipient will be part of a team investigating the basic biology of the plant and biological control methods. For additional information on the biological sciences program at Emporia State, including graduate application materials, see: <http://www.emporia.edu/biosci/biology.htm> For additional information on the project contact: Marshall Sundberg, Department of Biological Sciences, Emporia State University, Emporia, KS 66801, (316) 341-5605. sundberm@emporia.edu

Updated Positions Available Listings **At BSA Website**

Current position announcements are maintained on the Botanical Society's website Announcement page at URL <http://www.botany.org/bsa/announce/index.html>. Please check that location for announcement which have appeared since this issue of Plant Science Bulletin went to press. To post an announcement, contact the webmaster: <rs Russell@ou.edu>.

“Amazon Associate”

“Amazon Associate” links in the online version of the Plant Science Bulletin and on the BSA site earn a sales commission (from 5% to up to 30%) for BSA that we intend to use for ongoing activities, including research grants for students and K-12 outreach. This does not increase the usual discounted cost of books ordered at Amazon.Com. Sales links have been added for book-related pages of the Plant Science Bulletin Online, including the ‘Books Received’ section and ‘Book Reviews’.

Please note: Amazon.Com requires that links be made directly to specific book pages. The referral data is kept within one click of the original reference.

If you are intending to benefit BSA by your purchase, you should immediately add the book to your shopping cart if you are considering buying it. To buy additional titles, be sure to access the book through a BSA page. Accessing additional pages during the time that you are browsing on the Amazon site does not qualify it as a BSA sale. (If the book does not have a link at the site, likely Amazon does not sell it.)

We are hoping to extend Amazon links to all authors who are BSA members. This would be a convenient site to locate current botanical works and particularly those of our member authors! More will be available regarding this at the BSA web site at URL: <http://www.botany.org/>

-Scott Russell, Webmaster

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p. 133 **Shaking the Tree.** Gee, H. (ed) 2000. - Suzanne Renner

A Naturalist's Guide to the Tropics. Lambertini, Marco (John Venerella, Translator). 2000. ISBN 0-226-46828-3 (Paper US\$ 25) 338pp. The University of Chicago Press, 5801 South Ellis Avenue, Chicago, IL, 60637-1496. The author dedicated his guide to a curious young orangutan living in the tropical forests of Borneo or Sumatra. From the preface, the reader is immediately lifted out of his environment into the biological, geological, ecological marvels of the earth's tropics. Ambitious endeavor that might run the risk of being a colossal work impossible to log around in the virgin Amazon forest or too superficial in its scope. Well the author strikes the right balance, the book is an easy read and will not burden your waterproof pack (338 pages in a 5.5x 7.5 inches format). The author succeeds in promoting our knowledge by describing the principal natural laws and essential aspects of the tropical diversity. How does he achieve such a feat?

There are twelve chapters to the book interspersed with helpful color plates/ case studies illustrating the logical progression of our intellectual tropical journey of discovery. Biogeography, climate and soils introduce us to this torrid environment. The tropics are lodged between the two latitudes of $23^{\circ}f27^{\prime}$ that the equator cuts at latitude $0^{\circ}f$. The equatorial, tropical and subtropical zones are traditionally included within the tropical concept. The biogeographical evolution of the tropics would have benefited from the use of a geological time-scale illustrating the major periods and events key to the current tropical environment. More precise maps linking the various climates found within the tropics to altitude and latitude would have been very helpful as well. Why is altitude and its relationship with habitat and climate found in the chapter on forests? On the short section on tropical soils the author presents a fundamental characteristic such as the absence of humus and surface decay or litter. I was also looking for a typical soil horizon description and how it does compare with northern latitude soils. It might be recommendable to use scientific references when he cites for example that in some tropical forests about 99% of the products of decomposition at the soil level return into the faunal and floral biomass. This drawback is partly redeemed by an exhaustive suggested reading section found at the end of the guide.

The tropics boast an amazing wealth of floral and faunal diversity. In two square km (the author uses the SI and British units systems) of forest in Brazil 300 different species of trees can be found. Though the botanical treatment falls short of a comprehensive review on the diversity across families and ethnobotanical uses. I wish the color plate had not presented only bananas, pineapples and other fruits of commercial importance. The faunal treatment is much more complete as well as in its dedicated chapter and throughout the book. Primates are obviously playing a large role in the faunal section. Interesting inserts on fruit bats and leaf cutting ants are found in this chapter. These case studies as well as the color plates and beautiful

photographs enliven the book tremendously. For example, parrots species were presented within the section on forests where beautiful plates on fishes and shells were found in the coral reef sections. Organization is probably not one of the forte of this guide. This guidebook is probably not recommended for the academically inclined or the serious naturalist in need of a precise well delineated species key. The organization chosen by the author will probably suffice for the amateur naturalist. The reader needs more complete captions on the photographs. Where were they taken? What is the species name of that palm? The use of statistics throughout the book is helpful in relating the various tropical ecosystems to each other. For example a table on the extent of tropical forests in a variety of nations or a global distribution of tropical saurians enable the reader to set a frame of reference in the immense biodiversity found in these ecosystems.

Mangroves and forests ecosystems were dedicated to separate chapters. Did you know that the archer fish (*Toxotes jaculator*) resident of the mangrove and coastal forests of Asia capture its preys with a jet of water? Coral reefs are among the most spectacular environment of warm water tropical ecosystems. The author gives a detailed and comprehensive presentation on coral reefs spanning from their distribution to their structural evolution and biology. The author does well at keeping the readers fed in their curiosity. For example, the bright colors that fishes of coral reefs harbor correspond to different functions such as: species differentiation, warning signals, predation avoidance. Before treating the threats and dangers associated with tropical ecosystems the author dedicates two sections to savannas and deserts. We are reminded that savannas are almost exclusively tropical environments where xeromorphic plants dominate: the kingdom of grasses and herbivores. Fire and rain are actually the principal determining factors in the ecology of savannas. The author limits his presentation to the African savannas, the Asian, Australian and Americans savannas are omitted. The section on deserts is also mainly focused on the African deserts such as the Sahara and Kalahari.

The rises of eco-tourism, the overexploitation of natural resources, are some of the threats faced by our tropical Eden. The guide ends with the treatment of these renewed stresses. The author brushes upon the myriad of these problems facing our interconnected economies. In the wake of these alarming trends numerous reserves and natural parks have been instituted in the last decade with tropical Africa leading the trend (444 areas with a total of 86,090,000 ha). Though many tropical nations have low population densities compared to the more northern countries, their birth rates are one of the highest in the world. With these population and economic pressures the author quantifies the impacts it has upon deforestation and loss of habitat. Specific case studies on the drug and tropical animal trades as well as on the „hamburger connection“ are well presented. This disheartening chapter ends with a positive note in the form of a code of behavior to be

adopted by us living outside or inside the tropical Eden. The author advocates the wise consumption of goods and services that might be linked directly or remotely to the tropical ecosystems.

Any traveling ventures come with precautions and danger awareness. The author recommends a spirit of caution without obsession. He answers such fears as „handling African large animals“. He gives a list of vaccinations not to omit as well as animals to avoid at all cost both in the seas and on land. There is even a case study on plant poison types and their phytochemistry. In a nutshell, I recommend this book as a primer for the curious orangutan in us interested to brush off with the tropics in their studies or their travels. Bon voyage!—Laurent M. Meillier, U.C. Santa Barbara, Department of Geological Sciences, Santa Barbara, CA. USA.

sets the stage for reading the latest book by John Terborgh (“Requiem for Nature”) and, hopefully, for some radical steps towards the uncompromising protection of the most valuable remnants of tropical forests.

Morley's book is abundantly illustrated with instructive diagrams, maps, and drawings of pollen and leaves. I am sure that some of the original synthetic diagrams (e.g., Fig. 14.1: latitudinal distribution of tropical rain forests during different global climate scenarios) will find their way into textbooks of ecology and geography. Yes, this is a well-balanced treatment of a very extensive body of material. It is not surprising, however, that some relevant topics are not covered. For example, it would be interesting to discuss the environments associated with Early Cretaceous Chloranthaceae (Friis *et al.* 1994) and Platanaceae (Hickey and Doyle 1977, Crane *et al.* 1993) or habitats of *Amborella*—the earliest-branching living angiosperm (Qiu *et al.* 1999). As for more recent history, I miss a consistent use of summary diagrams of Late Quaternary vegetation changes as they were presented by Flenley (1979) for individual regions. In fact, an updated version of these diagrams (Flenley 1998) could serve as supplementary material to Morley's book. At the same time, the recent review article by Burnham and Graham (1999) provides some additional information on the history of vegetation in the Neotropics. Whether, or how much, the rain forest in Amazonia was fragmented into refugia during the Pleistocene is still an open question (Burnham & Graham 1999 and p. 127 in Morley). However, the answer will have serious implications for the design of protected areas (Bush 2000). Whether the high species richness of tropical forests is a result of long-term stability (p. 129) or instability (Bush 1994) is yet another unresolved (or inadequately formulated) question. Paleoecology of tropical rain forests is an exciting and consequential discipline. All tropical ecologists and evolutionary biologists should read this book or, at least, the last two chapters. —Marcel Rejmánek, Section of Evolution and Ecology, University of California, Davis, CA 95616.

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Botanical Results of the Sessé & Moçiño Expedition (1787—1803). VII. A Guide to Relevant Scientific Names of Plants.—Rogers McVaugh. 2000.

ISBN 0-913196-68-1 (cloth, US\$55.00). 626 pp. Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA. — The Real Expedición Botánica a Nueva España (informally called the Sessé and Moçiño Expedition) was one of four major scientific expeditions to the New World launched by the Spanish government during the last quarter of the 18th century. In 1786 the Spanish crown approved the expedition to Nueva España (Mexico and adjacent Central America), responding to the initiative of Martín de Sessé y Lacasta, a botanically oriented physician, who proposed to found a botanical garden in Mexico City, along with supporting programs in teaching and plant exploration. In 1790 Sessé recruited a talented creole student, José Mariano Moçiño, who became a collaborator not only in botanical exploration, but also in writing a monumental illustrated flora of New Spain. After sixteen years of work under conditions now difficult to image, the Expedition returned to Spain, but by 1809, before the text and illustrations (“icones”) of the floras could be assembled for publication, the Expedition project was effectively ended by the death of Sessé and the invasion of Spain by Napoleon’s armies. The manuscripts, drawings, and specimens were dispersed, and the flora of New Spain languished in obscurity until Mexican botanists arranged for publication (between 1887 and 1894) of two floras, *Plantae Novae Hispaniae* and *Flora Mexicana*. After nearly a century of delay, these two floras were hopelessly out of date, but still of historical interest; a considerable literature on the Expedition to New Spain has accumulated in the 20th century.

This meticulously edited and handsomely produced volume of *A Guide to Relevant Scientific Names of Plants* is the seventh, and presumably final, part of a series of publications by Rogers McVaugh appearing in a span of over 30 years and addressing a variety of aspects of the ill-fated Botanical Expedition to New Spain. In addition to being a very detailed reference book, it has to be seen in context as the final capstone of a protracted, fugal, explication of the complex history of one of the key scientific expeditions to the New World during the age of the Enlightenment. In the beginning segment published in 1977 (like the subsequent five, in the *Contributions of the University of Michigan Herbarium*), McVaugh reviewed the travels of the Sessé and Moçiño expedition in Mexico, especially the three major expeditions or “excursions” of 1787-88, 1789, and 1792, and the subsequent travels of the

two expedition leaders (when they no longer travelled together). The second installment, published in 1980, dealt with the complicated history of the *Icones Florae Mexicanae*: the collection of paintings made by several artists under Sessé and Moçiño’s direction (mainly from 1787 to 1791). Because of a variety of unfortunate circumstances that awaited the expedition after its return to Spain in 1803, the paintings and accompanying texts—assembled with dedication under trying and hazardous conditions—were fated not to be published under the names of the two expedition leaders. The greater part of the paintings, in fact, were lost for a century and a half, until they unexpectedly surfaced in Barcelona—where Moçiño tragically died in 1820 while trying to return them to Madrid. McVaugh’s tracking of this tangled history, and his tabular correspondence of the *Icones* with the corresponding names in the *Plantae Novae Hispaniae* and *Flora Mexicana*, provide an erudite concordance that permits considerable insight into how the field work, descriptions, and illustrating, were carried out by the Expedition to New Spain.

When H. W. Rickett published in 1947 the first detailed account in English of the Sessé and Moçiño expedition, he had little to say about the herbarium collections or drawings, apparently because it was thought that most of them had been irretrievably lost. At that time, Rogers McVaugh had already begun to study some of the specimens that had been loaned from the Botanical Garden in Madrid to the Field Museum (originally for identification by Paul C. Standley). In 1960 he began work on a guide to the names applied to the specimens, drawings, and descriptions; probably he didn’t expect that it would take 40 years to complete his task!. During this long period of “botanical archeology”, the unfolding of new information revealed a greatly amplified understanding of the attainments of the Sessé and Moçiño team, in a dramatic way that mirrored the vicissitudes of the Expedition itself. In the early 1960s, McVaugh examined Sessé and Moçiño specimens at the Conservatoire Botanique in Geneva, many of which were types of over 300 species described by De Candolle and collaborators. He also studied the copies of the Sessé and Moçiño *Icones* made for De Candolle in Geneva, and published a review of them in 1980, just as the original (and much larger) set of 1,800 drawings was unexpectedly discovered intact in a private library in Barcelona. In 1981 the drawings were acquired by the Hunt Institute for Botanical Documentation in Pittsburgh, and McVaugh went “back to the well” again.

To those who will use this book as a reference for identification of species proposed by Sessé and Moçiño, it will serve as a highly useful complement to *The Turner Collection of Sessé and Moçiño Biological Illustrations*, published in CD-ROM format in 1998 by the Hunt Institute for Botanical Documentation. That beautifully produced electronic work also includes a very readable historical introduction by Rogers McVaugh that covers much the same ground as his earlier essays, but provides a heightened insight into the significance of the Expedition as reflected in the current much improved appreciation of

the the paintings in the Torner Collection. Examining the beautiful colored *Icones* on the Torner Collection CD disk in conjunction with the McVaugh commentaries provides a superb introduction to the modus operandi of the Expedition, and a heightened appreciation of the artistic talents of the neglected artists Echeverría and Cerdá.

McVaugh's Introduction to the *Guide* provides in 38 pages a succinct summary of the history of the specimens, manuscripts, and drawings that were produced by the participants of the expedition to Nueva España. The next 587 pages contain an enumeration of, and index to, the taxonomically "relevant" plant species. For each species, the literature citation (including synonyms) and type locality (and typifications) are given, followed by detailed interpretations of the labelling and annotations of the herbarium specimens. The quoted comments of botanists from Spain (Cavanilles, Lagasca, Ortega), Mexico (Cervantes, Ramírez), and other countries provide valuable information about type localities, relation of the specimens to the *Icones*, and also indicate the history of varying usages of names by taxonomists during the past two centuries.

Those who want to find out more about the impact of the Botanical Expedition to New Spain on contemporary botany in Europe may profitably consult the third installment of the series of McVaugh's publications on the Sessé and Moçiño Expedition, *The impact of this and other expeditions on contemporary botany in Europe*, published in 1987. It has to be remembered that prior to Sessé and Moçiño, little taxonomic field work had been accomplished in Mexico. Botanists describing Mexican species in the mid-18th century, such as Linnaeus, in his *Species Plantarum* of 1753, and Philip Miller, in the 8th edition of his *Gardeners Dictionary* (1768), had been dependent almost entirely on the limited collections of Houston from coastal sites in Veracruz and Campeche. As a result of the intense activity of himself, Moçiño, and their collaborators, Sessé repeatedly sent seeds from Mexico to the his supportive colleague Casimiro Gómez Ortega, Director of the Royal Botanical Garden in Madrid (who had been instrumental in expediting royal approval of the Expedition). During a single decade—1791-1801—Ortega and his nemesis Cavanilles described and illustrated over 300 species of Mexican plants. Although, as a result of the feud between Ortega and his nemesis (and successor) Cavanilles, together with the Napoleonic upheavals in Spain, Sessé and Moçiño saw their plans for publishing a flora of New Spain frustrated. However, although their manuscripts gathered dust in Madrid for the better part of a century, other botanists such as De Candolle and his collaborators published many of the genera and species they discovered; and the seeds from the Expedition that were sent from Madrid to other European botanical gardens resulted in the introduction into horticulture of many well-known species of characteristic Mexican species of genera such as *Cosmos*, *Dahlia*, *Salvia*, and *Zinnia*.

Perusing the many pages of McVaugh's highly detailed culminating volume leads to an awestruck sensa-

tion of a sort of extra-sensory perception on his part. It is almost as though he is recalling, as in a kind of *cinema vérité*, everything that happened day by day in New Spain from the day in August 1787 when Sessé met his colleagues in Mexico City for the inauguration of the Expedition, to the death of Moçiño in Barcelona in May 1820. This McVaughian obsession reflects his fascination with the remarkable saga of the Real Expedición Botánica a Nueva España, combining as it does Homeric travel adventure with Aeschylean tragedy. The trails (and trials) of Sessé and Moçiño in Mexico, the West Indies, and finally in Spain are strewn with minefields of ironies. If Sessé had not dawdled in Mexico until 1803—nine years after the expiration of the original deadline for the completion of the expedition—it is possible that his work in Spain might not have been forestalled by the Napoleonic invasion of Spain. That cataclysmic event disrupted all scientific work in Spain, deprived the expedition of the funds for publication of their flora, and snapped the threads of financial and political support for all three of the major Latin American botanical expeditions (Nueva España, Nueva Granada, and Peru). The *Guide to Relevant Scientific Names of Plants*, the seventh and concluding part of this extraordinary project of Rogers McVaugh, provides with its antecedent studies an appropriate tribute to the dedicated tenacity of Sessé and his companions, who now find posthumous vindication nearly two centuries later for their daring peregrinations that could have established Spain as one of the leading centers for exploration in systematic botany. The author, and the Hunt Institute for Botanical Documentation, deserve the congratulations of the scientific community for the publication of this landmark book in botanical history.—Grady L. Webster, Herbarium, Sect. Plant Biology, University of California, Davis, CA 95616.

Plant Secondary Metabolism. David S. Seigler. 1998. ISBN 0-412-01981-7 (cloth US\$460.00) 759 pp. Kluwer Academic Publishers, Boston - I should begin this review by mentioning that I was a postdoc with the author twenty years ago. Indeed I even gave one or two lectures in his Plant Secondary Metabolites course that was no doubt the basis for the book.

The stated goal in the Preface of the book "... is a readable, integrated text that will be suitable for instruction at the advanced undergraduate level as well as at the graduate level." In my opinion the author would have met this goal but the publishers have unfortunately made it unreachable. First, the ridiculously small font chosen by Kluwer makes the book almost unreadable, at least to my eyes. Second, the price tag of \$460 surely puts it beyond the reach of any student. However, if your professor or the library happens to have a copy, you will readily see that Seigler has written a wonderful book.

The book is divided into 37 chapters based on the major chemical structural types of the secondary metabolites found in plants. There is a useful introductory chapter about plant secondary compounds, and the terpenes and alkaloids also have their own introductory chapters. Mul-

multiple chapters are devoted to phenolics, terpenes, and alkaloids, with most of the other groups being covered in single chapters. A typical chapter has the following sections: Introduction, Biosynthesis, Chemosystematic Use or Distribution, Biological Activity, and Uses by Humans. Each chapter has its own list of references, a format I found useful here.

The chemical structures are beautifully reproduced. They are certainly more legible than the text. Structures are named and also have a number if they are referred to in the text. In the text, these numbers are in a bold font, making them easy to spot. Also, a new set of numbers is used in each chapter, so the numbers do not become confusingly large.

I would love to use this book for my Biochemical Systematics class next semester. The price and the diminutive print make this decidedly unlikely. I suspect mine will not be the only class unable to use this book. Nevertheless, the author is to be commended for the massive amount of information he has compiled and digested. In contrast, the publishers deserve a trip to the woodshed! - P. Mick Richardson, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166-0299.

Plant Tissue Culture Concepts and Laboratory Exercises, edited by Robert N. Trigiano and Dennis J. Gray, arrives from CRC Press, the source of so many excellent works that summarize basic data and procedures for entire fields of scientific inquiry. This work is no exception to that fine tradition, though a few improvements can be made.

Plant Tissue Culture Concepts and Laboratory Exercises aims to provide a thorough grounding in all aspects of plant tissue culture, from establishing a commercial laboratory to performing experiments on developmental topics: "...the mission of the entire book is to introduce, define, and provide training."

This volume begins with a brief but complete "Introduction" followed by a clear and concise "History of plant tissue culture." A variety of procedures not directly involved in culture *in vitro* are explored, followed by sections that provide a grounding in basic or applied concepts of plant tissue culture. Then comes detailed protocols for illustrating those concepts.

The section which describes "Supporting methodologies," such as histology or photography, shines as a section which belongs in many technical works but which is missing in other books. These technically-oriented chapters could be used as an introduction to the basics of techniques even for an audience not interested in plant tissue culture. For example, photography is discussed, using examples from plant tissue culture, in a way helpful for most biological scientific work performed below the organismal level.

So too the information provided in protocols is detailed and quite easy to follow. Anyone with basic knowledge of

chemistry and plant biology could begin work in plant tissue culture using this volume. The exercises cover basic techniques for a wide range of plants used *in vitro*, both those that are used more commonly for basic plant biology, such as tobacco, and those which are typically employed in commercial settings, such as *Syngonium*. The material on various species is divided into "Propagation techniques," "Crop improvement techniques," and a catch-all called "Special topics." Many clear diagrams and figures illustrate the chapters, though some photographs, such as Figure 31 are dark and lack sufficient contrast.

In spite of the fine quality of Plant Tissue Culture Concepts and Laboratory Exercises, some points need improvement. While plant hormones, called "plant growth regulators" in this volume, are discussed, material on the use of plant tissue culture for the discovery of novel plant hormones is difficult to find. Given that, as this volume points out, cytokinins were discovered as a result of work with cultures of tobacco callus, this should be remedied in future. Some additional techniques and species ought to be added, even if briefly covered, such as thin cell layer culture and embryo rescue or orchids and carnivorous plants. These additions would help to cover some commonly-used plants which receive no coverage or insufficient coverage in the present edition.

Such a need for more information on some commonly used species brings up the question: what is the audience for Plant Tissue Culture Concepts and Laboratory Exercises? Given its excellent generality and clarity, this work would serve as an excellent text for introductory classes in plant tissue culture. The editors themselves note this early in the book when they write that they "...have taken a 'minimalist' approach to development of definitions and use of terminology for the simple reason that this serves, in part, the role of an introductory textbook...Rather than confuse the beginning student (and ourselves) with 'verbal gymnastics,' we chose to simplify terminology." (p.3) The various authors even note important facts that may not be obvious to the beginner, such as the preferability of KOH over NaOH in adjusting the pH of media for plant tissue culture (p.30, in "Getting started with tissue culture").

The detailed protocols would be a great aid to any instructor using tissue culture as part of a course. Given the developmental orientation of many experiments described, this work might be useful in the study of developmental biology. In any case, it belongs in the professional libraries of those working in plant tissue culture, and many interested amateurs will find it helpful in culturing their own plants *in vitro*. Finally, college and university libraries should obtain copies for their users. -Douglas Darnowski, Washington College

The Silviculture of Mahogany. J.E. Mayhew and A.C. Newton. 1998 - This volume is a very comprehensive monograph on all aspects of the management of *Swietenia macrophylla*, with a strong emphasis on plantation-grown trees. The emphasis is warranted, since

mahogany has been eliminated from much of its natural range since the publication of F.B. Lamb's monograph *Mahogany of Tropical America* in 1966. Furthermore, the authors point out that silvicultural treatments rarely improve the quality of mahogany in natural forests, typically because prescriptions are not carried out. Short-term economic incentives to cut too soon or too heavily often have been more persuasive than the possible long-term benefits of carefully managing mahogany in natural forests.

As is the case with some other valuable timber species, mahogany plantations are more extensive outside the natural range of the species, especially in Asia. The authors list 46 countries that have established mahogany plantations, but few of these actually produce commercial quantities of timber. Many of the failures can be attributed to low genetic variability in the seed source.

In addition to the interesting historical accounts of mahogany production, the authors also include prescriptions and suggestions for collecting, storing, and preparing seed, producing planting stock in nurseries (from seed or vegetatively), selecting appropriate plantation sites (taking into account climate, weather, soil, topography, and competing species), management of insect pests, growing mahogany together with agricultural crops, and maintenance of plantations once they have been established (including weeding, fertilizing, pruning, and thinning).

Many growth curves were presented, but I had trouble trying to discern consistent patterns. Although to some extent this was due to lack of standardization, the high variability in growth rates among sites was apparent.

I would have liked to see a more thorough treatment of the properties of plantation-grown mahogany wood, although it may be that this information is simply lacking. My specimens of plantation-grown mahogany are quite inferior in properties to natural-grown wood, and the limited comparisons presented by Mayhew and Newton suggests that inferior quality is typical of plantation-grown mahogany. A likely explanation for the difference in quality is that harvested plantation trees are younger and smaller than trees from the natural forests. However, the authors doubt that the slower growth and longer rotations that produce higher quality timber will be acceptable to plantation managers.

I would strongly recommend this book to those interested in preserving mahogany as a timber-producing species. The comprehensive treatment of both successful and unsuccessful attempts to grow the species under natural and plantation conditions is a guide for the profitable production of one of the world's most valuable timber species. -Michael Wieman, USDA Forest Sciences Laboratory, Princeton, West Virginia

A Garden of Bristlecones: Tales of Change in the Great Basin. Cohen, Michael P. 1998. ISBN 0-87417-296-9 308 pp. University of Nevada Press, Reno, Nevada 89557-0076. Bristlecone pines: the world's oldest living things! Statements similar to this can be found in virtually every introductory textbook of

biology and botany. The great age of bristlecones, and the manner in which their age can be determined by counting growth rings in the wood, are probably retold by most of us in all of our introductory courses. Cohen places these "facts" in a much broader perspective that begins with the earliest explorations of the Great Basin and the collectors who made "first contact" with the species. The backbone of the work is a chronology of the botanical discoveries relating to the tree. Some of these are familiar. Andrew Douglass, an astronomer, who founded the Laboratory of Tree-Ring Research and the field of dendrochronology as a tool in his study of sunspots. Edmund Schulman, a Douglass student, who discovered living bristlecones nearly 5000 years old. Wesley Ferguson, a Schulman student, who extended the chronology back 8,686 years using living and dead trees. We also get the infamous story of Donald Currey, a graduate student interested in studying climatic change, who had the misfortune of being given permission to cut down a large bristlecone to study its rings. Unfortunately it turned out to be the oldest known living tree to date.

The book is much more than an account of the biology related to the tree, however, and that is its greatest strength. We hear the words of naturalists, and everyday people, who ventured to walk in the old groves.

"[O]n the roughest ledges of crumbling limestone are lowly old giants, five or six feet in diameter, that have braved the storms of more than a thousand years. But whether old or young, sheltered or exposed to the wildest gales, this tree is ever found to be irrepressibly and extravagantly picturesque, offering a richer and more varied series of forms to the artist than any other species I have seen." - John Muir, 1878

"Forty centuries of living in this high wind-swept and inhospitable land – and yet the bristlecone pine continues its vigil." - Russ Johnson and Anne Johnson, 1978.

We are treated to a wide selection of images, running from line drawings and prints, through watercolors and a selection of classic photographs of the "Prometheus Tree," the "Money Tree," and others. Particularly interesting was a comparison of Forest Service brochures. In a pre-1970 example, hikers are nearly as prominent as the trees; humans have disappeared from the 1988 sample.

Finally, there is the impact of the forest on the local human population – and the human influence on the forests. Today we have a national park, Great Basin National Park, that includes several large bristlecone groves in eastern Nevada. There was, and is, controversy concerning the establishment of the park and its past and present role in the economy of the part of the state.

Garden of Bristlecones is a good read for a winter evening. It may fill in some of the gaps in your knowledge of plant anatomy, and plant ecology. It will be an interesting story in the history of biology, and it will provide warm visions and thoughts and get you thinking about the trip you must take to the southwest next year!

- Marshall Sundberg

The Rose's Kiss: A Natural History of Flowers.

Bernhardt, Peter. 1999. ISBN 1-55963-564-9 (cloth US\$24.95) 267 pp. Island Press, 76381 Commercial Street, P101 Box 7, Covelo, CA 95428. -This book's title leads one to believe that this may be a romantic fiction work. It is, however, a text written by a man with a great deal of knowledge and his own brand of romance for the subject of flowers. Peter Bernhardt knows enough about all aspects of plants, most specifically flowers to bring an old world charm to what could be dry topics for readers not versed in the subject.

The layout of this book gives even a novice flower lover a thorough overview in small, specialized sections. These chapters have wonderfully visual names such as; Unloved but Efficient, Psychoanalysis and Serenades and Into Thin Air. With titles like these, the reader feels that they need to find out what could possibly be contained in between the pages

The actual layout of *The Rose's Kiss* is somewhat sporadic; the order of topics are presented does not always seem logical. This could lead to some confusion, especially to those with little background knowledge. For example, Bernhardt launches directly into the technical and detailed world of flower reproduction and reproductive organs. This may not have been a wise choice, the challenge of making a flowers' sometimes elaborate reproductive system understandable to a layperson is a daunting task that would have been better tackled after the reader had more of the information presented later in the book.

The vast store of folklore, mythology and ancient history that Bernhardt possesses and weaves into the text at appropriate places were a constant delight to me as the reader. Many of the stories and bits of information were new even to an educated botanist, I found myself thinking "wow", or "that's interesting", as I read some of the more obscure tales. I do think that this book's readers (both the novice and the professional alike) would have benefited from a family tree of sorts to show family relationships between different flowers discussed in the text. This way, the reader could flip back and forth to the taxonomic tree when scientific names of various flowers are given.

The coverage that was given to the pollen manufacturing and distribution process was at the same time highly technical and easy to read and understand. This is a credit to Peter Bernhardt as an educator; he manages to put the difficult into a format that reaches all. In addition, the chapter that discusses pollination would make an entomologist proud. Bernhardt's treatment of the importance of insect pollinators gives the flower lover a new insight into the world where flowers and insects cohabit, and have since the beginning. I think that too often insects are seen as pests instead of tiny creatures that helped diversify the plant life on earth. Bernhardt does a wonderful job of bringing this to the forefront.

I did find that many times when Bernhardt tries to explain a subject with an analogy he went off track and what could have been explained quite simply became hard to understand. For example in the chapter entitled The Pig

in the pizza, his explanation of floral whorls was more complicated to follow than the actual set up of a flower's parts. I do appreciate Bernhard's attempts to bring the information to the level of all readers, but he is not always successful.

In closing, I found Peter Bernhardt's *The Rose's Kiss* to be an overall enjoyable treatment of the world of flowers. He succeeds in turning what could be a dry text over the heads of many lay people into a charming trip where flowers take on a "rosy" glow. - Alyson Lee-Fox, Comstock Park, Michigan.

Whilst reading **Britain's Rare Flowers** (T & AD Poyser Natural History, ISBN 0-85661-114-X), a lovely book by natural historian Peter Marren, I was transported to the many wonderful wild and bucolic places of the English countryside (oops, I was starting to wax into the accent!). There are many public and apparently natural areas in that country, but Marren reminds us that the entire landscape has long been under the influence of human beings, and some of the most picturesque and beautiful things thrive only in the midst of regular human disturbances.

Marren describes his own early interests and growing passion for finding rare flowers, and takes us on a number of searches for elusive and rarely seen plants. He discusses what is rarity, and the many ways that a species may enter that situation. He considers the role that life history may play, as well as the potentially negative role of overly enthusiastic collectors.

Included is a sad chapter on lost flowers (there are some twenty nationally extinct species), followed by a chapter on new natives – some overlooked in the past, others obviously new from hybrid origin. When one looks at Clapham, Tutin and Warburg's Flora of the British Isles, indeed a large proportion of the flora is naturalized. Certain species (such as the corn cockle) have all but disappeared due to different techniques employed by farmers; in fact these rare plants may have been introduced initially as weeds and naturalized. Marren includes in an Appendix the first records of rare and Red Data Book flowers and ferns, quite an interesting summary.

This immensely readable book was written for the lay audience, but there is much to commend it to botanists and ecologists who are interested in rare species and their conservation. It is beautifully illustrated, with color photos of plants, maps of distributions, and also some drawings of plants. The illustrations dwindle as the book progresses, perhaps a measure of economy. There are many good citations of the primary scientific literature, though not exhaustive. I recommend it to all who love flowers and are concerned about their continued existence.
-Suzanne Koptur, Florida International University, Miami, FL 33199

The Flora of Mount Rainier National Park. Author David Biek, provides thorough descriptions and detailed drawings of both native and exotic vascular flora found in Mount Rainier National Park, Washington. Biek covers flora from ferns to wetland species to grasses. A definitive key guides the reader to the plant effortlessly using language easily understood by even amateur botanists. Once identified, Biek includes interesting and accurate descriptions of each plant, including habitat, range, and some interesting "trivia".

David Biek gives an overview of Mount Rainier at the beginning of the book that covers a range of topics from "Forest and Plant Communities" to "Explanations and Studies". The overview is an excellent resource for readers otherwise unfamiliar with the Hemlock forests and alpine meadows of the park. His descriptions are fascinating, although amateurs and hobbyists might find them a bit daunting because of the lengthy lists of scientific names without common names to accompany them. Biek gives a short description of the history of park exploration and floral identification, and includes more recent studies, including thesis and dissertation descriptions.

Most illustrations found in the book were beautifully rendered and were very detailed. Some were a bit small, however, probably in the interest of saving space. I found that I almost needed a hand lens for some of the drawings. The majority of the illustrations in the book were black and white. As a field scientist, I find myself partial to color photographs accompanied by drawings, as they make for quick field identification, especially for students and hobbyists. The illustrations in "The Flora of Mount Rainier National Park" were certainly sufficient for identification when paired with the well-written descriptions, but would not make for quick use in the field. To his credit, Biek did include some small color photographs of the park's more familiar species in a four-page center insert.

Illustrations aside, I was thrilled to discover the inclusion of rare species found in the Park, and a description and discussion of exotic species. It is often difficult to find a field guide that includes a region's rare plants as well as familiar species. I was also impressed with the number of species represented in the field guide, although the bulk of material makes for a heavy carry into the field, and necessitates leaving out features like the aforementioned color photos.

Overall, David Biek's "The Flora of Mount Rainier National Park" is an excellent resource for enthusiasts, professionals, or students studying the park. The book would not be a useful one to readers outside of the park, as Biek points out in his introduction. Hobbyists might find a smaller, less comprehensive guide more enjoyable to use for a singular visit to the park, while a student would appreciate the detailed descriptions of plant and habitat -Sonja N. Weeks, Associate Scientist, Breedlove, Dennis, Young & Associates Environmental Consultants

Shaking the Tree. H. Gee (ed). 2000. ISBN 0-226-28496-4 (cloth), 0-226-28497-2 (paper, US\$27.50), 411 pp. The University of Chicago Press, Chicago.— This collection of 19 papers originally published in *Nature* between 1991-1997 had their genesis in a 1991 paper by Michael Novacek entitled "Is the Guinea Pig a rodent?" This manuscript came across the then editor's, Henry Gee's, desk and clearly struck a chord. After its appearance, Gee was regularly called up by specialists, offering reviews on their own groups of interest. Many of these Novacek-inspired reviews appear here, alongside the archetype. Thus, one can re-read Novacek's 1992 "Mammalian Phylogeny: Shaking the Tree," Bob Martin's 1993 "Primate Origins: Plugging the Gaps," Bernard Wood's 1992 "Origin and Evolution of the Genus *Homo*," and eight other papers on the evolution and phylogenies of arthropods, Bilateria, animals with limbs, metazoa, jawed vertebrates, tetrapods, birds, and Hominoidea. All but one of the reviews concern macro-evolution; the exception is Gould and Eldredge's 1993 paper "Punctuated Equilibrium Comes of Age." About plants, there are two papers, Crane, Friis, and Pedersen's 1995 "The Origin and Early Diversification of Angiosperms," and Kenrick and Crane's 1997 "The Origin and Early Evolution of Plants on Land." Both papers in the original had color plates illustrating morphological diversity and showing, for example, Gnetales (the then-favored sister group to the flowering plants), *Magnolia*, *Sacandra*, and various basal living land plants. In the current book, all illustrations are reproduced in black and white, which would be acceptable if the reproductions had not been made from the glossy Nature paper. As it is, many are near illegible due to moiré effects. In two reproductions, on pp. 195 and 336, of some fossils and skulls photographed on what must have been black backgrounds, fractal designs appear that are more striking than the objects themselves. Names at the tips of phylogenies, which in *Nature* are small to begin with, cannot be read in several of the reproductions and would not photocopy well, say for use in teaching. However, the standard paperback page size and binding would make photocopying difficult anyway.

The book has been reviewed favorably in prominent places (e.g., Trends in Ecology and Evolution 15: 428-429, October 2000) as was to be expected given the status of its editor. The latter has written five brief (3-page) introductions to sets of related papers and for each set added references to more recent publications (up until 1999), not all of them from *Nature*. - Suzanne Renner, University of Missouri, St. Louis

Books Received

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Actin: A Dynamic Framework for Multiple Plant Cell Functions.

Staiger, C., F. Baluska, D. Volkmann, and P.W. Barlow. 2000. ISBN 0-79236-412-0 663 pp. Kluwer Academic Publishers, P.O. Box 989, 3300 AZ Dordrecht, The Netherlands.

Aroids: Plants of the Arum Family (2nd ed) Bown, Deni. 2000. ISBN 0-88192-485-7 (cloth US\$34.95) 392 pp. Timber Press, Inc., 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

The Biology of Lower Plants: Algae, Fungi, Lichens, Mosses, Ferns. Willemse, M.T.M. 2000. CD-ROM (US\$80.00) Wageningen UR Library, P.O. Box 9100, 6700 HA Wageningen, The Netherlands.

A Book of Blue Flowers. Geneve, Robert. 2000. ISBN 0-88192-487-3 (cloth US\$34.95) 328 pp. Timber Press, Inc., 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Breeding Ornamental Plants. Callaway, Dorothy J. and M. Brett Callaway (eds). 2000. ISBN 0-88192-482-2 (cloth US\$34.95) 359 pp. Timber Press, Inc., 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Bryophyte Biology. Shaw, A. Jonathan and Bernard Goffinet (eds). 2000. ISBN 0-521-66794-1 (paper US\$35.95) 476 pp. Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211.

Christopher Lloyd's Garden Flowers: Perennials, Bulbs, Grasses, Ferns. Lloyd, Christopher. 2000. ISBN 0-88192-492-X (cloth US\$54.95) 448 pp. Timber Press, Inc., 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

The Color Encyclopedia of Daylilies. Petit, Ted L. and John P. Peat. 2000. ISBN 0-88192-488-1 (cloth US\$49.95) 296 pp. Timber Press, Inc., 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

The Color Encyclopedia of Ornamental Grasses on CD-ROM. Darke, Rick. 2000. ISBN 0-88192-479-2 (CD, US\$59.95) Timber Press, Inc., 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Dendrobium and its Relatives. Lavarack, Bill, Wayne Harris and Geoff Stocker. 2000. ISBN 0-88192-490-3 (cloth US\$39.95) 288 pp. Timber Press, Inc., 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Discoveries in Plant Biology, Volume III. Kung, Shain-Dow and Shang-Fa Yang (eds). 2000. ISBN 981-02-3882-7 (cloth US\$103) 473 pp. World Scientific Publishing Co., Suite 1B, 1060 Main Street, River Edge, NY 07661.

Dream Plants for the Natural Garden. Gerritsen, Henk and Piet Oudolf. 2000. ISBN 0-88192-493-8 (cloth US\$34.95) 144 pp. Timber Press, Inc., 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Elsevier's Dictionary of Plant Names and their Origin. Watts, D.C. 2000. ISBN 0-444-50356-0 (cloth US\$209.50) 1001 pp. Elsevier Science B.V. Sara Burgerhartstraat 25, P.O. Box 211, 1000 AE Amsterdam, The Netherlands.

Flora de Murcia: Claves de identificación e iconografía de plantas vasculares. Gomez, Pedro Sánchez, Juan Guerra Montes, Ernesto Coy Gómez, Antonio Hernández González, Santiago Fernández Jiménez and Antonio Félix Carrillo López. 1998. ISBN 84-89820-60-0 (paper) 439 pp. DM, Merced, 25. 30001, Murcia.

Food as a Drug. Poston, Walker S. Carlos and C. Keith Haddock (eds) 2000. ISBN 0-7890-0977-3 (paper US\$24.95) 166 pp. The Haworth Press, Inc., 10 Alice Street, Binghamton, New York 13904-1580.

Gifts of Winter: Catalogue of an exhibition. White, James J. and Eugene B. Bruno. 2000. ISBN 9-913196-69-X (paper US\$16.00). 72 pp. Hunt Institute for Botanical Documentation, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213-3890.

Herbal Medicine 2nd ed. Weiss, Rudolf Fritz and Volker Fintelmann. 2000. ISBN 0-86577-970-8 (cloth, US\$59.00) 448 pp. Thieme, 333 Seventh Avenue, New York, NY 10001.

Illustrated Dictionary of Mycology. Ulloa, Miguel and Richard T. Hanlin. 2000. ISBN 0-89054-257-

0 (cloth, US\$99.00). 448 pp. American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, MN 55121-2097.

Invasive Species in a Changing World. Mooney, Harold A. and Richard J. Hobbs. 2000. ISBN 1-55963-782-X (paper, US\$30.00) 457 pp. Island Press, 76381 Commercial Street, P.O. Box 7, Covelo, California 95428.

The Louisiana Iris: The Taming of a Native American Wildflower (2nd ed). The Society for Louisiana Irises. 2000. ISBN 0-88192-477-6 (cloth US\$34.95) 254 pp. Timber Press, Inc. 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Mosses and other Bryophytes: An Illustrated Glossary. Malcolm, Bill and Nancy Malcolm. 2000. ISBN 0-473-06730-7 (cloth US\$39.95). 220 pages. Micro-Optics Press, available from Timber Press, Inc. 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

The Natural History of Medicinal Plants. Sumner, Judith. 2000. ISBN 0-88192-483-0 (cloth, US\$24.95) 252 pp. Timber Press, Inc. 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Nature's Government: Science, Imperial Britain, and the "Improvement" of the World. Drayton, Richard. 2000. ISBN 0-300-05976-0 (cloth, US\$40.00) 346 pp. Yale University Press. P.O. Box 209040, New Haven, CT 06520-9040.

The Orchid in Lore and Legend. Berliocchi, Luigi. 2000. ISBN 0-88192-491-1 (cloth US\$29.95) 200 pp. Timber Press, Inc. 133 P.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

Passion Flowers, 3rd ed. Vanderplank, John. 2000. ISBN 0-262-72035-3 (paper US\$29.95) 224 pp. The MIT Press, 5 Cambridge Center, Cambridge, MA 02142-1493.

Photosynthesis: A Comprehensive Treatise. Raghavendra, A.S. 2000. ISBN 0-521-78444-1 (paper US\$47.95) 376 pp. Cambridge University Press, 40 West 20th St., New York, NY 10011-4211.

Prairie Wetland Ecology: The Contribution of the Marsh Ecology Research Program. Murkin, Henry R., Arnold G. van der Valk, and William R. Clark (eds). 2000. ISBN 0-8138-2752-3 (cloth US\$79.95) 413 pp. Iowa State University Press, 2121 State Avenue, Ames, Iowa 50010-0570.

A Rum Affair: A True Story of Botanical Fraud.

Sabbagh, Karl. 2000. ISBN 0-374-25282-3 (cloth US\$24.00) 276 pp. Farrar, Straus and Giroux, 19 Union Square West, New York, NY 10003.

Spatial Pattern Analysis in Plant Ecology. Dale, Mark R.T. 2000. ISBN 0-521-79437-4. (paper US\$35.95) 326 pp. Cambridge University Press. 40 West 20th Street. New York, NY 10011-4211.

Tropical Ecosystems and Ecological Concepts.

Osborne, Patrick L. 2000. ISBN 0-521-64523-9 (paper US\$ 39.95) 464pp. Cambridge University Press. 40 West 20th Street. New York, NY 10011-4211.

Wildflowers of the Fairest Cape. Goldblatt, Peter and Manning, John (eds). 2000. ISBN 0-620-24787-8 (paper US\$34.95) 316pp. Timber Press, Inc. 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

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The exact date that the archival AJBs will be available is not currently known as JSTOR will be coordinating the introduction of a number of other journals at the same time. JSTOR is a non-profit organization founded in 1995 that encodes old literature using a combination of digital scanning of journal pages and full-text searchable contents to archive major scholarly journals. If your university or institution is a member of JSTOR (680 in the US are), you will have access to all of these back issues! Many thanks are due to Karl Niklas, Editor-In-Chief of AJB, who coordinated this effort, located an archival quality copy of the Journal to be scanned and to the Ecological Society of America and JSTOR for asking to include us. -Scott Russell, University of Oklahoma



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