

ALUMNI NEWSLETTER



Greetings to all. Birge Hall is bustling with many projects and people contributing energy and enthusiasm to the collective life form that is the Botany department. The old building received some badly needed attention: we now have an updated electrical system,

new computer network capabilities, and new glass in the greenhouses! (Thanks all for your patience during these renovations.) These improvements in infrastructure will “keep us growing” far into the future.

As with any large family, we welcomed new members and saw others depart during the past year. To all the students who graduated and have moved on, we send best wishes with you as you move your lives and your skills onward and upward. In December, we bid farewell to Prof. Paul Berry, Director of the Wisconsin State Herbarium, who moved eastward to work some magic on the University of Michigan Herbarium. In January, we welcomed a new Information Technology Specialist, Thomas Maher, who we hope will be helping us with computer issues for a good long time. We also interviewed several candidates this spring for the Molecular Biology position that was formerly occupied by Prof. Tony Bleecker. We are still in the recruiting phase of that search, and I hope to report that we have landed our top candidate in the next newsletter.

We are particularly excited about the arrival of two new faculty members in the department, Prof. Cécile Ané and Prof. Eve Emshwiller, who will both start their L&S appointments in August. We have highlighted them in this newsletter as “voices for the future.” We also want to honor and listen to “voices from the past” and thought you would enjoy hearing from former (and not at all retired!) members of the department, including Emeritus Profs. Mike Adams, Ray Evert, Bob Kowal, Eldon Newcomb, John Thomson, and Jerry Davis. Botany was also proud to co-sponsor UW–Madison graduate Dr. Bill Ogren for an honorary Ph.D. degree, along with Chemistry and Agronomy, in recognition of his achievements in the field of photosynthesis and plant growth, which we have summarized.

Finally, we thank all those who have generously donated funds to support departmental activities. In particular, we thank the anonymous donor supporting summer undergraduate research in the form of the Frits Went Fellowship. This program will continue for the next 3 years and provide an enriching experience for 9 undergraduates in plant biochemistry, plant physiology, and cell biology.

As always, we invite you to contact us with any thoughts or reflections you might like to share. The Botany department remains healthy because of the contributions of all individuals, past and present, who have shared in its life. We thank you for being there.

Donna Fernandez, Chair



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Voices for the Future

A New Statistician in Botany



The Botany Department is pleased to welcome **Dr. Cecile Ané**, who in June 2006 accepted a joint appointment as Assistant Professor in the Departments of Botany and Statistics. Dr. Ané has spent the past two years in Madison serving as a Visiting Assistant Professor jointly in Botany and in Statistics. During this time she taught an

introductory statistics course for undergraduate biology students and a graduate seminar course in statistical phylogenetics for both biologists and statisticians, and focused on methods to model and study the evolution of traits. Her future teaching will likely include these courses as well as statistics courses for graduate students in biology, a phylogenetics methods course, and participation in Botany seminars.

Dr. Ané's research specialty is phylogenetic inference—the creation of new methods to use genetic information such as DNA sequences to learn about evolutionary relationships, mutational processes that lead to inherited genetic variation, and the evolutionary history of traits. Her methods develop means to quantify the uncertainty in the evolutionary inferences. Highlights of Dr. Ané's research includes development of a novel model for DNA sequence evolution that models an important kind of rate heterogeneity that standard models ignore, methods to study many species and many genes when there is significant missing data, and a tree-based method for DNA sequence compression that has connections to statistical information theory. Future plans include bridging the gap between two disciplines by incorporating theory from population genetics into phylogenetic methods. Much of her research is computationally intensive and she collaborates closely with statistical and evolutionary colleagues, Bret Larget and David Baum.

Prior to joining the UW, Dr. Ané obtained her Ph.D. in mathematics in 2000 from the University of Toulouse, France, where she studied probability theory. She then held a position at the University of

Paris-Sud, where her research interests began to shift from proving theorems about probability to statistical phylogenetics. In 2003, she went on leave while her husband, Dr. Jean-Michel Ané, took a position as a post-doc in a lab in UC–Davis. Shortly thereafter, Dr. Ané joined leading evolutionary biologist Mike Sanderson's lab as a post-doc where she made significant contributions to three research projects in one short year. When Dr. Jean-Michel Ané accepted an assistant professorship here in Agronomy in 2004, the UW was fortunate to also hire Dr. Cecile Ané as a visiting professor.

As a result of her hiring, the Botany Department has grown another branch on its evolutionary tree. Welcome, Cécile!

Department Grows to Include Ethnobotany



Dr. Eve Emshwiller will begin her Assistant Professorship in Botany in Fall 2006, following a year's eager anticipation after her hiring. As her web page explains, "Ethnobotany is the study of the interactions between human cultures and plants." Dr. Emshwiller concentrates on a part of that broad field by studying the

evolution and conservation of diversity among crop plants and their wild relatives. Specifically, she has spent several years studying oca (*Oxalis tuberosa*), which is second only to potatoes among tuber crops in the diet and farming system of millions of Quechua and Aymara subsistence farmers in the Central Andes. Her research on oca and its allies seeks answers to fundamental questions about the evolution of polyploidy and the genetic consequences of clonal propagation.

Dr. Emshwiller explains further that oca is an octoploid (it has 8 sets of chromosomes) so understanding its origins includes not only identifying its wild ancestor, but also determining how many, and which, wild species contributed its multiple genomes. Her molecular approaches (DNA sequencing) indicate that oca originated through hybridization between Andean members of the "*Oxalis tuberosa* alliance."

In addition to her laboratory work, Dr. Emshwiller studies the geographic distributions

of wild and domesticated species of *Oxalis* in the variable environments of the Andes, as well as working to understand the social and environmental factors that threaten oca's diversity. Her current research includes a project to study how the interchange of planting material of oca among farmers has affected the diversity and geographic distribution of clones of the crop in traditional subsistence agriculture. Collections of oca made throughout the Peruvian Andes are being analyzed by DNA fingerprinting (fluorescent AFLP) and spatial statistics to study patterns of clonal and genetic structure of oca, in order to help conserve the diversity of oca and similar crops. Thus, in hiring an ethnobotanist, the department also gains expertise in conserving the biodiversity of a wide variety of crops that are propagated vegetatively (e.g., potatoes, bananas) or by grafting (fruit trees).

Congratulations are in order for her newly-released book, *Documenting Domestication*, edited by M. A. Zeder, D. G. Bradley, E. Emshwiller, and B. D. Smith (U. California Press).

Dr. Emshwiller comes to the UW from her position as Abbott Laboratories Adjunct Curator of Economic Botany at the Field Museum in Chicago. Her Ph.D. is from Cornell University (1999). Upon arriving at UW, Dr. Emshwiller will develop a new undergraduate ethnobotany course and contribute to teaching introductory botany.

Welcome to UW-Madison, Eve!

New in Our Payroll Office

Jan Froding joined the Botany Department as a Limited Term Employee in the payroll position in June of 2004, and she accepted a permanent part-time position in December 2005. The Department benefits from her 15 years of service as Academic Department Manager (and various other titles going back to Department Secretary) and 15 years as Payroll & Benefits Specialist prior to that.

When Jan is not working here, she provides after-school childcare for her grandchildren (ages 6 & 12) and serves her church as a choir member, youth group treasurer, prayer chain coordinator, prayer shawl knitter, communion assistant, occasional adult bible study leader and helping out with the Interfaith Hospitality Network. In her free time, she enjoys her monthly book club, live theatrical productions, and taking her family to local restaurants. She traveled to both England and China last year.

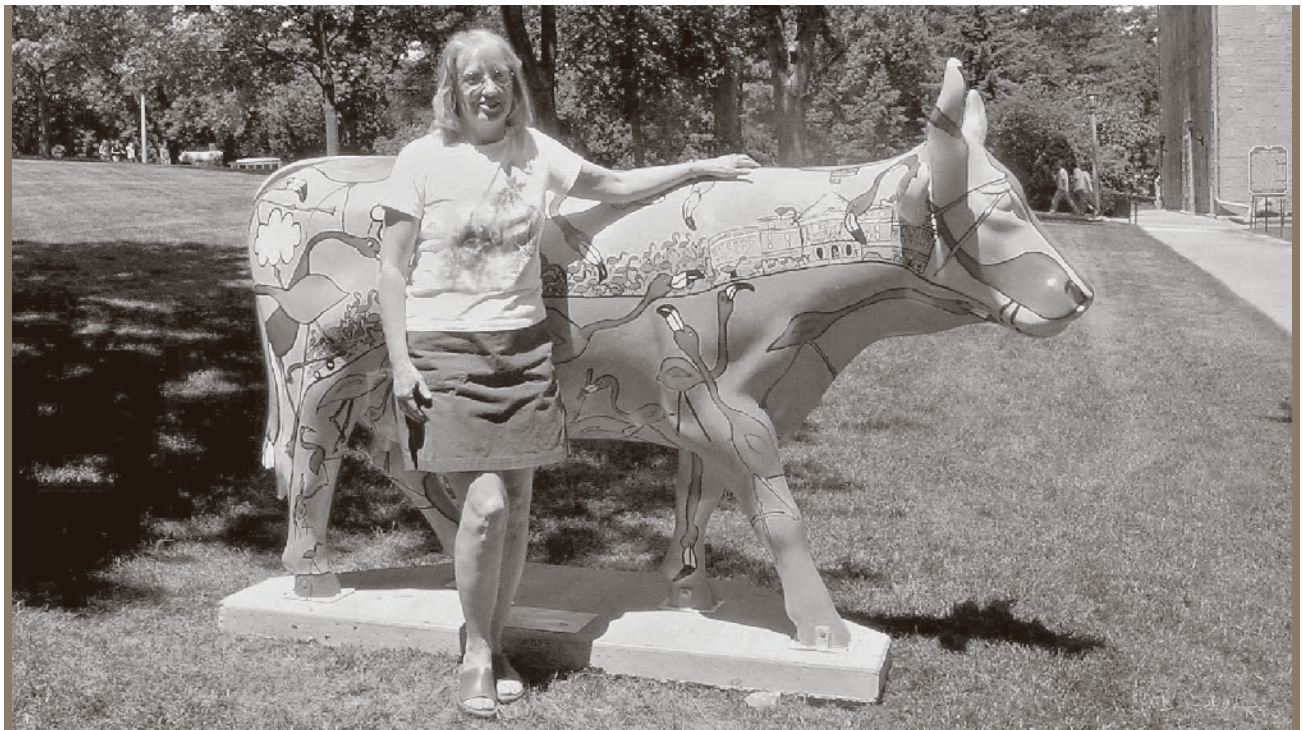
Welcome Jan!

New in Information Technology

Thomas Maher is the new Information Technology/Help desk guy. He comes to us from Penn State U. He is the proud papa of Daisy Marie.

Welcome aboard Tom!

Jan Froding and "flamingo" cow on Bascom Hill. Nearly 200 artist-enhanced cows were stationed around Madison during the summer, including several (with appropriate themes) on the Hill and other University locations.



News

The Biology Major Among Biggest on Campus

Responding to student interest, the College of Letters and Science and the College of Agricultural and Life Sciences created a **Biology Major**, to allow students to receive a broad background in biology. Since accepting its first students in 1999, the major has grown to about 1000 declared students, second only to Political Science.

In 2004 the Provost created the Institute for Cross-college Biology Education, to give an institutional home to the major and to other initiatives in biology education that do not fit within any single department. These include the honors introductory biology sequence Biocore as well as the main introductory sequence (Biology, Botany, Zoology 151 and 152).

Botany Professor **Tom Sharkey** was named the first permanent director of the Institute in 2004. His goal is to help translate the strength in biology that exists in many different colleges into an outstanding undergraduate experience for students interested in biology. The Institute has a strong emphasis on advising and is also the administrative home of the Center for Biology Education, a group that helps improve biology education in schools as well as on campus.

The Greenhouse and Garden Improvements

The Botany Department recently received funds from the State of Wisconsin to reframe and reglaze 8,000 sq. ft. of our greenhouses. Work began in May with an anticipated completion in August 2006. The effort was anything but easy, especially having to move several greenhouses full of refugee plants and then keep them healthy off site. The temporary orphanage is the Walnut Street Greenhouses, where our staff make daily visits for watering and TLC.

In the Botany Garden, a new pergola graces the east sidewalk. It was designed by Mo Fayyaz and built by the UW Physical Plant. A third arbor was added to the southwest sidewalk. Next to the gazebo is a display case identifying the many garden areas. The Flower Factory is donating plants for the new monocot area next to Lathrop Hall.

Thanks to all who have contributed to these botanical amenities!



The greenhouses are emptied

Honorary Doctor of Science: William L. Ogren

The Department of Botany, in partnership with the departments of Chemistry and Agronomy, took the lead in nominating **William L. Ogren** for the honorary Doctor of Science degree, awarded at Commencement, May 12, 2006. Ultimately the Research Leader in the USDA Photosynthesis Research Unit at the University of Illinois–Urbana-Champaign, Ogren grew up in Ashland, Wisconsin, obtained his B.S. degree in Chemistry at UW–Madison, and earned his Ph.D. at Wayne State University.

Ogren's critical contribution to photosynthesis research was the discovery that the enzyme responsible for taking up carbon dioxide, Rubisco, could also take up oxygen. This discovery explained the inhibitory effect of oxygen on photosynthesis, an effect that reduces growth of most plants by as much as one third. Although universally accepted now, Bill's explanation for how oxygen inhibits photosynthesis faced tremendous resistance when first proposed. To counter resistance, Ogren painstakingly dissected the process and published a series of seminal papers describing the chemistry, the enzyme kinetics, and



William Ogren, Tom Sharkey at Commencement proceedings

finally the genetic evidence for his view of how oxygen inhibits photosynthesis.

The genetic approach that confirmed once and for all that Ogren's ideas were correct concerned a previously obscure plant, *Arabidopsis thaliana*. Bill's use of this plant was a major factor in the adoption of *Arabidopsis* as the primary model plant. Its genome (completed in 2001) was the first to be fully sequenced. A mutant *Arabidopsis* studied by Ogren led to the discovery of a helper protein for Rubisco and solved a long standing problem. Rubisco is much less active when measured outside the plant than what is needed to account for the rates of photosynthesis seen in plants. The mutant plant was found to lack Rubisco activase, a protein whose existence was not even hypothesized before the *Arabidopsis* mutant was analyzed. It is now known that all plants have Rubisco activase and, if it is missing, plants cannot survive in today's atmosphere.

Many of Ogren's Ph.D. students and post-doctoral associates have gone on to have high profile careers in plant science. His tenure at Illinois contributed substantially to its reputation as the premier institution for photosynthesis research in the U.S. He was elected to the U.S. National Academy of Sciences in 1986 and was awarded the Alexander von Humboldt Award for contributions to American Agriculture in 1990.

Three Faculty Receive BSA Awards

Ray F. Evert, Linda Graham, and Hugh Iltis were presented with the Botanical Society of America Centennial Award at the 100th meeting of the Society at California State University–Chico in July 2006. The award was established "to acknowledge and honor outstanding service to the plant sciences and to the Society."

Congratulations Ray, Linda and Hugh! Here are their recent publications:

Biology of Plants, 7th edition. 2005. Peter H. Raven, Ray F. Evert, and Susan E. Eichhorn. W. H. Freeman and Company.

Esau's Plant Anatomy, 3rd edition. Meristems, Cells, and Tissues of the Plant Body. Their Structure, Function, and Development. Ray F. Evert (with the assistance of Susan E. Eichhorn). 2006. John Wiley & Sons.

Histories of Maize., Chapter 3: "Origin of Polystichy in Maize." 2006. Hugh H. Iltis. Academic Press.

Plant Biology, 2nd edition. 2006. Linda Graham and James Graham. Prentice Hall. (Textbook for non-majors)

Frits Went Award Established

A generous donation from an anonymous donor has established a new Undergraduate Award in Botany. The first **Frits Went Award** was given to two undergraduate students, **Chad Barnes** and **Amanda Oestreich**, for their outstanding Botany Senior Theses.

Frits Went was born May 18, 1903; his father was F. A. F. C. Went, who was professor of botany and director of the Botanical Garden at the University of Utrecht in the Netherlands. The elder Went, well-known and respected, presided over a modern, well-equipped laboratory of botany, which attracted a great many visitors from all over the world. In 1974, Frits Went related, "I greatly profited from the thorough knowledge that my father had of botany in general. He knew the entire plant physiological literature, having read every important paper ever published (and remembering its content). He personally subscribed to most botanical journals. He knew and was friendly with most botanists all over the world, and thus I came to know many of them."

Went's research began with the discovery of auxin in plant tissues. He moved on to the California Institute of Technology and quickly became the center of a vigorous group of plant hormone researchers including Kenneth Thimann, James Bonner, Folke Skoog, and Johannes van Overbeek, among others. His interests gradually shifted to an examination of the effects of environmental factors on plant growth.

One of Went's legacies was the analysis of the nature of air pollution and the designation of smog as a mixture of the reaction products of unsaturated hydrocarbons (mainly from gasoline) and ozone produced photochemically in the atmosphere. Went's interest in air pollution led to the examination of the blue hazes that frequently occurred in the Blue Ridge and Great Smokey mountains. Went was also fascinated by the desert flora of the Mojave, Sonoran and Negev Deserts. In 1965 he founded the Laboratory of Desert Biology as part of the Desert Research Institute in Reno, Nevada. He was a competent systematist and ecologist, as well as an outstanding plant physiologist.

Went leaves a legacy of insights that fueled many fields: plant hormones, air pollution, desert ecology, plant-atmosphere interactions, mycorrhizae, and the limits of plant growth. However, his greatest legacies are his commitment to science as a human endeavor and his willingness to put forward revolutionary ideas about plants and the world around us.

Voices from the Past

Michael Adams

From Sevilla, España, March 2006

Since retiring in January 2004, I have had the pleasure of directing a student exchange project in the field of “urban ecology” with co-principal investigator, Professor Brian Ohm, of the UW Urban and Regional Planning Department. The project is administered in the Nelson Institute for Environmental Studies, where Ms. Hope Simon is our student services coordinator and Carol Ensek handles administrative details (fabulous help).

Our project has a multi-campus and trans-Atlantic focus; we exchange students from three American universities with three European universities. UW-Madison is the lead for the United States with partners in the University of Pennsylvania and the University of Oregon. In Europe, our partners are University of Amsterdam, Technical University of Berlin, and the Poly-technical University of Cartagena (Spain). Our funding comes from the U.S. Dept. of Education, Fund for Improvement of Post-Secondary Education, and the European Commission. The five-year program ends in the fall 2006. We have exchanged a total of 30 students, each student staying at a host university for a summer to a semester, working with a host professor on a case study project in urban ecology. Examples include work on brownfield restoration (in Philadelphia and Berlin), native vegetation (Eugene, Oregon and Cartagena, Spain), urban forestry (Berlin and Amsterdam) urban gardens (Madison, in the Troy Gardens), and the Botany garden (a Spanish student who worked with Mo).

Our urban ecology project also included a two-week field course in Europe, organized and run by our colleagues in Amsterdam and Berlin. The 24 students and nine faculty came from all four participating countries. In Amsterdam the students quickly adapted to Dutch bicycles, which enabled them to tour government projects that are improving the environmental quality of that fascinating city. In Berlin, our hosts divided the students into small teams to develop an environmentally friendly mini-regional plan for a selected neighbourhood of the former East Berlin. The chosen site still suffers from World War II damage. After a day of work, the student teams presented results and compared their different approaches.

On another European project, Brian Ohm (as PI) and I (co-PI) were funded by the National

Academies of Science and NSF to take five UW-Madison students to Estonia, for a 2-week course on coastal zone management. The course was led by Ulo Mander, professor in ecological sciences at Tartu University in Estonia. We all went to the extremely interesting western Estonian island of Saaremaa, an island with a wide variety of coastal zone ecosystems and a range of geological formations—all relatively undisturbed because the island was a Soviet military region during the Cold War and mostly off-limits to the people of Estonia. UW and Tartu students worked together on topics ranging from butterfly ecology to management of development. Last fall Professor Mander visited Madison, and we held a workshop with presentations from the UW students.

My Fulbright Senior Specialists Program allowed me to run my Biosphere Reserves seminar course in Europe. During spring 2006, I taught for six weeks in beautiful Seville, Spain. The Spanish Environmental Studies Majors developed presentations about a UNESCO Biosphere Reserves in Andalucia. These Reserves are constituted of montane, desert, and coastal landscapes devoted to conservation of biodiversity integrated with sustainable development. Technical support for this course came from the Andalucian Consejería de Medio Ambiente, a governmental body that serves a similar function as our Wisconsin Department of Natural Resources. Our field excursion for the course was to La Reserva de la Biosfera Sierra de las Nieves, in the mountains directly north of the Costa del Sol. This Reserve includes an important habitat for *Abies pinsapo*, the Pinsapar fir, endemic to these mountainous areas of the provinces of Cadiz and Malaga in southern Andalucia (it is also found at a few sites in North Africa). I can highly recommend these as places to visit—by car, hiking, or even on horseback. I believe that many would enjoy a visit to the Parque Natural Sierra de Grazalema, a favorite of mine for its fantastically rugged mountain landscapes.

Jerry Davis

Teaching Botany 100 in summer

Richard I. Evans was teaching a non-majors botany course when I began graduate school at UW-Madison in 1963. Botany 100 has changed significantly since those years, when Dr. Evans began each course by writing a photosynthesis equation that stretched across several blackboards in 145 Birge Hall.

After I earned my M.S. and Ph.D. degrees from the UW in 1966 and 1968, I began teaching plant biology, plant anatomy, genetics and general biology

at UW-La Crosse. I retired from there in 2002 and moved back closer to Madison. Almost every summer, beginning in 1969, I returned to Madison to teach botany courses in Birge Hall; first Botany 300, then Botany 130 and now Botany 100 for the last 15 years or so.

The summer Botany 100 (Survey of Botany) began as an 8-week course, then was compressed into six weeks, and most recently into the 3-week, early summer session course offered from late May through early June. I explain to the students that they will be earning a credit per week, similar to what they do during a regular semester, when they earn about 15 credits in 15 weeks. Another way of expressing this is a week's worth of work in a day. We have good enrollments and enough students to offer two concurrent laboratory sessions each summer session.

Diane Derouen is the laboratory coordinator for Botany 100, and Linda Graham has given the course a modern approach with a new textbook co-authored with James Graham and Lee Wilcox, *Plant Biology*, published by Prentice Hall. Now in its 2nd edition, the book is used in many botany courses across the country. Its central themes are evolution, ecology and DNA science.

A number of years ago, I began starting each day's lecture with a plant sample, a local tree, shrub, vine or herb. This plant is tied to the lectures in some way—used as a prop or to show some feature and make a point about how plants function. During the last examination, all the plants are on display and students are asked to be able recognize them and their characteristics as part of the test.

More recently, we have each student grow bean seedlings in paper cups and watch seed development during the three weeks. We also seed C-fern (*Ceratopteris richardii*) spores on agar and each student gets a dish to watch gametophyte and then sporophyte development in this fast-growing plant. Students can see the two generations of plant life cycles in a plant in which the generations are separate and independent at least part of the time. Of course they see plant sperm, which is a surprise to most of them. Students are also asked to recognize and understand Susan Falkman's three plant sculptures, a flower, fruit, and germinating bean, featured in the new Botany Garden.

The Botany Greenhouse staff decorates the lecture hall each day with a flowering plant from the greenhouse, and the new document camera systems in 145 and B302 make it possible to focus in on parts of the Plant-of-the-Day or the textbook, enlarging structures as small as an anther or elm fruit. A highlight was the blooming of a Konjac arum



in the Botany Greenhouse. A large arum has flowered four of the past five summers, allowing students to see this inflorescence and the thousands of people visiting the greenhouse, as well as to smell the rotting-mouse odor and learn about its function. Even though this year's arum flower (*Amorphophallus rivieri*, the "konjac" arum or "voodoo lily") was smaller than the record Big Bucky (*Amorphophallus titanum*), the students asked me to move it out of the lecture room, because the odor was too offensive.

Botany, even for non-science majors, continues to be alive in Birge Hall and the Botany Garden and Greenhouses, at the University of Wisconsin during summer sessions, educating many students, including some of UW's well known men and women athletes, and students from other campuses.

Robert R. Kowal **Retirement, or is it?**

I retired nine years ago at the end of June 1997 after joining UW in Fall 1971. Although only 58 at the time, the previous Fall term, when I began teaching General Botany (Botany 130) for the 25th time, my insomnia kept me from continuing. Deciding to retire was one of the most difficult acts of my life, as I was, in some sense, an academic since grammar school, and my profession was virtually my whole life. However, after handing in my letter of retirement to Ray Evert, the chair at the time, I felt that this was right thing to do. My life since has only reinforced the rightness of this decision.

The department gave me a "surprise" retirement party at the Arboretum, hosted by Ken Sytsma. Although "I didn't want any such event," I much appreciated it and am very thankful that the department honored me with this gathering of friends and colleagues. In particular, I am ever grateful that my professional colleague and friend, Ted Barkley, then a Professor at Kansas State University, made the effort to come and, in his typical golden-tongued oratory, to exaggerate my worth and justify my life to the Universe.

It took me about three years to feel free to do simply enjoyable things, rather than just professional work. Perhaps it is because I was raised Roman Catholic that guilt comes so easily. But also, my early life had been spent pushing myself to "get out of New Jersey" and improve myself. Although half my time

is still centered on my office, which the Department of Botany kindly allows me to keep, the other half is spent gardening and socializing and traveling with friends. At work, I am trying to publish a huge back-log of research done over three decades at UW, my own and that of my graduate students and a few colleagues. Alison M. Mahoney, now a professor at Minnesota State University at Mankato, and I have submitted a paper describing three new varieties of the widespread *Packera* (*Senecio*) *paupercula*, and Emmet Judziewicz, now a professor at the University of Wisconsin–Stevens Point, is waiting patiently for progress on our paper describing a new species from Isle Royale. Two other papers, one resurrecting a species of *Packera* from the southeastern United States and the other, my “Big Paper” on chromosome numbers in the genus *Packera* (including about 250 new counts, mostly my own, but some by Craig C. Freeman, University of Kansas), are significantly written.

Seven times between 1984 and 2005, I taught a two-day field course on the taxonomy and evolution of the Asteraceae of Wisconsin. Over this time, I’ve put together an unpublished booklet, “Keys to the Compositae of Wisconsin.” This August I’ll be co-teaching with William Barker, a professor at North Dakota State University, a workshop on the Asteraceae of Northern Minnesota.

My garden, which was on my neighborhood’s tour of home gardens this June, is a fabulous collection of over 500 cultivars of daylilies and over 130 cultivars of peonies, including over a dozen tree peonies, plus a handful of “intersectional hybrids” (results of crossing a tree peony with an herbaceous peony). The best of the latter is “Barzella”, a light yellow semi-double, which the department gave me when I retired in 1997. In addition, I have lilies, irises, phlox, hostas, and virtually every ornamental genus that will survive in southern Wisconsin. And I still maintain a reduced research garden of *Packeras*.

In my travels, I have visited Duane A. Kolterman, a professor at the University of Puerto Rico–Mayaguez, who got his Master’s and Ph.D. degrees at the UW–Madison; I renewed an old acquaintance in Philadelphia; I enjoyed the beach of the Pacific Ocean in Oaxaca; and I visited France, Germany, and Switzerland with Harvey Ballard, who got his Ph.D. here and is now a professor at Ohio University, accompanied by Duane Kolterman and three other friends. I visited a couple in Santa Maria, CA, near the Neverland Ranch (Michael Jackson busy in court) and nearby is scenic grassland countryside with wineries, seen in the movie “Sideways.” Like the characters in that film, we had a trendy lunch in Los

Olivos. And I got five new daylily cultivars at a local nursery!

Last July, I attended the International Botanical Congress in Vienna and then visited Barcelona and the Pyrenees with Duane Kolterman. In Vienna, I met old friends, including Dan Nicholson from the Smithsonian and Birtil Nordenstam, the Swedish taxonomist, who is the expert on the Senecioneae. In February, I visited Julie Denslow, who got her Ph.D. at the UW–Madison in the 1970s, at Hilo, on the Island of Hawaii. She now works for the U.S. Forest Service on control of invasive plant species. She was the perfect host—able to show me some fairly undisturbed vegetation and the islands and its volcanic substrate “in the flesh.”

So I’m keeping busy professionally, recreationally, and socially. Like my graduate student years, my retirement years are turning out to be some of the best of my life.

J. J. Davis and His Daughter, Marguerite

by Eldon Newcomb

Like everyone associated with the Botany department, I have been grateful for the existence of the Davis Fund, and I was aware that **John Jefferson Davis** was a Racine, Wisconsin, physician who retired at the age of 60, came to Madison and became curator of the department’s Herbarium. But I didn’t realize until recently that J. J. was a “self-made” man whose father was killed in the Civil War in 1862, when John was not quite 10 years old. John worked his way through the University of Illinois, and not only became a very successful doctor (in 1894 he served as president of the Wisconsin Medical Society) but also, beginning in his twenties, became a substantial and regionally well-known amateur botanist. As early as 1885 he was a member of the AAAS. As a young man he collected plants generally, but before long he focused on the rusts and other fungi parasitic on plants, and over the years published in the Transactions of the Wisconsin Academy of Arts and Sciences a number of lists of Wisconsin fungi, and two monographs, accompanied by beautifully executed drawings of sporulation and of hyphae penetrating among the leaf cells of the host plants, as seen microscopically. While still practicing medicine in Racine, he served for 3 years (1903–06) as president of the Wisconsin Academy of Arts and Sciences.

Davis became curator of our herbarium in 1911 and continued his service until February 26, 1937,

when he died at age 85 while writing at his desk. He and his wife, Annie Margaret Davis, had two children, John Archibald and Marguerite. In his will, Davis set up a trust that included his ownership of various stocks and bonds and also a royalty interest in the oil and mineral rights on 637 acres of land in Texas. The income from the trust was to be paid to his wife during her lifetime. At her death, one half of the income from the trust was to be paid to his son, John, during John's lifetime, and one half to his daughter, Marguerite, during her lifetime. On the death of either, the income during the life of the remaining child was to be paid to the UW Regents, and expended by the Department of Botany for research work by the Department. On the death of the last survivor of the two children, all the property of the trust was to be assigned to the Board of Regents, the income to be used for "research work in Biology."

Davis's son, John, died in Racine in May, 1955, and in June of that year the regents accepted the Davis bequest and the income from the principal became available to the Botany Department. Marguerite Davis died in Racine on September 19, 1967, and the income from nearly \$200,000 representing the remainder of the trust became available for "research work in Biology." At the time this wording of the trust caused considerable puzzlement and discussion in the Botany Department, since Davis had such clear interests in botany and had left the first part of the trust exclusively to botany. After deliberation by the university's lawyers, it was agreed that "Biology" was to be interpreted to mean that the Botany and Zoology departments were to share equally. My own interpretation now is that Davis meant exactly what he had written: having been generous to botany in the first part of the trust, he wished to take a more expansive view in his disposition of the latter part.

Now we come to the story of **Marguerite Davis** and to what, for me, is the more interesting part of this account, because it is so remarkable and constitutes such a rich addition to the Davis legacy for our department. On August 26, 1983, I attended a celebration marking the 100th Anniversary of the UW Department of Biochemistry, and heard the opening address by Howard A. Schneider, Director of The Institute of Nutrition at the University of North Carolina. Schneider had received his Ph.D. in the UW Biochemistry Department in the 1930s. Imagine my surprise when Schneider spent a substantial part of his address paying tribute to none other than Marguerite Davis. His address was entitled "Rats, Fats and History," and dwelled on the early years in the career of famed nutritionist E. V. McCollum,

which were spent at the University of Wisconsin and during which McCollum (with Marguerite Davis) discovered vitamin A (retinol). As Schneider made abundantly clear, Marguerite Davis was McCollum's valued coworker in the vitamin A work, and was the co-author on the two key papers establishing the discovery. Sometime after Schneider's 1983 lecture, I must have written him, for I have in my files a reprint of his address published in a 1987 issue of *CURRENTS*, a quarterly journal of the UNC Institute of Nutrition (Schneider, Howard A. "Rats, Fats, and History," pp. 10-18 in *CURRENTS*, vol. 3, no. 2. 1987, quarterly published by The University of North Carolina). The following material comes from Schneider's address.

McCollum was an organic chemist from Yale who was hired in 1907 by E. B. Hart of the UW Biochemistry Department to do nutritional research on cows. Tiring of this, McCollum, on his own, turned to the use of trapped wild gray rats as experimental animals. Finding them too vicious, he then, quoting Schneider, "bought a dozen young albino rats from a pet dealer in Chicago and started the first rat colony ever to be used for experimental purposes.

"In June 1913, McCollum and Marguerite Davis sent to the *Journal of Biological Chemistry* the manuscript of their milestone paper, "The Necessity of Certain Lipids in the Diet during Growth" (*J. Biol. Chem.* 15: 167-175 (1913)). In this publication it was clearly shown that all fats were not nutritionally equal (in) nourishing young rats on a diet assembled from purified materials... McCollum and Davis (then) showed (*J. Biol. Chem.* 19:245-250 (1914)) that the growth-promoting lipid was in the relatively small residue of the fat that was not saponifiable... and that this fraction could be transferred to olive oil... History had been made, and as McCollum later exulted in his autobiography, 'We had discovered vitamin A.'

"The discovery of the first fat-soluble vitamin had been announced, as described above, in the landmark paper of 1913 by McCollum and Davis. I want now to shed what light I can on the history of Marguerite Davis, who was McCollum's assistant and collaborator for 7 years, from 1910 to her unexplained resignation in 1916, just before McCollum went to his new post at Johns Hopkins. During this period Davis was the junior coauthor with McCollum in the publication of 10 research articles, 9 of which appeared in the *Journal of Biological Chemistry*. (For these facts, as well as others in the life of Davis, I am indebted to Harry G. Day, professor emeritus of chemistry, University of Indiana [in a letter to Schneider].)

"Davis remains a somewhat mysterious figure, and there are many gaps in the historical record. But

she is certainly entitled to a place in any history of the Wisconsin story. Davis was a Wisconsin native, born in Racine on September 16, 1888. She died in that city, just two days after her 79th birthday, on September 18, 1967. Originally enrolled at the University of Wisconsin, Davis transferred to the University of California at Berkeley in August of 1908 and received a B.S. degree in natural science on May 17, 1910. Her mother died probably before Marguerite's graduation, and she returned to the Midwest to make a home for her father, a retired physician of Racine then living in Madison, where he pursued botanical studies.

"This task was not completely fulfilling for Davis, and on the advice of the formidable Abby L. Marlatt, head of the Department of Home Economics at Madison, she presented herself as a kind of free-lance graduate volunteer to McCollum, who set her to learning the biochemistry of the day. But soon she learned of McCollum's new and struggling rat colony and offered to take care of it. McCollum was delighted to be relieved of the chore, and with her help expanded and sped up his program of experiments. McCollum repeatedly and frequently acknowledged his debt to Davis.

"Apparently the Department of Agricultural Chemistry felt no such debt, for although McCollum requested a salary for Davis each year, each year Hart denied the request. The request was denied, Hart felt, because Davis was not sufficiently trained to be placed on staff. In the sixth year Hart relented (her training was now adequate?), and Davis received \$600 for her year's work. Davis resigned shortly thereafter. I do not know whether the two events were connected.

"It may be that this selfless dedication to her father and to McCollum's ambitious program was all of a piece with a different acceptance of life's burdensome struggle for an intelligent woman of her day. It is very probable that this was accentuated by the trauma, at the age of 10, of being severely burned when her clothing caught fire while she played at a bonfire. Although the record is not clear, these burns left her with a physical handicap, but apparently, from the few accounts we have, she suffered no facial disfigurement.

"After stints at the University of Chicago and the Home Economics Laboratory at Madison, where she published five articles in the period 1920–23, Davis became an authority on vitamin A assay and was invited to set up such studies at the laboratories of E. R. Squibb & Sons in New Jersey. In 1926 Davis was at the New Jersey College of Pharmacy at Rutgers University. Thereafter the trail of Davis's life becomes shrouded, but apparently she returned to Racine and lived a life of retirement. She was not an enthusiastic correspondent and failed to answer many letters addressed to her. Racine was not unaware of her career in the founding of a science of nutrition and

took pride in her restoration of the family residence built in the 1840s. The home overlooked Lake Michigan and here Davis lived out her days.

I thank Barbara Erlenborn for copies of J. J. Davis's will and trust as well as the tributes paid to him on the occasion of the memorial service held in his honor at the University Club. The addresses on that occasion were by Profs. Charles E. Allen, Edward M. Gilbert and Edward A. Birge. Copies of those addresses were made available at the time by Marguerite Davis, who included the following elegant sentence: "The memorial service at the University Club for my father was so perfect a tribute and one that he would have so deeply appreciated, not only because of what was said but because of his affection and respect for those who spoke, that the spirit of that tribute is here preserved for his friends." Also among the Davis papers is a tribute entitled "John Jefferson Davis" by S. C. Wadmond, published in the spring, 1956 issue of Wisconsin Academy Review, pp. 76–80. The above papers, including the complete text of Howard Schneider's address, will be deposited in the Botany Department office.

A Visit with John and Olive Thomson *By Suzy Will-Wolf*

Emeritus Professor and alumnus **John Thomson** (age 93) and alumna **Olive Thomson** (age 90) continue to reside on their farm in the Mt. Horeb area and pursue their passion for plants in their gardens and prairie restoration. The Thomsons still grow most of their produce in a large vegetable garden and maintain beautiful perennial gardens and rock gardens which, naturally, include lichens!

With many years of experience as a volunteer with The Nature Conservancy and Prairie Enthusiasts, Olive has been working on an acre-sized prairie restoration at their home for over a decade. They hand-collected most of the seed and still add new species while managing the prairie through controlled burns each spring. The Thomsons welcome visits from Botany Department members and alums when you are in the Mount Horeb vicinity.

The Nature Conservancy's Thomson Memorial Prairie (first part purchased with a generous gift from the Thomsons) has grown to 324 acres of dry prairie remnant and agricultural land being restored to prairie. Nearly 100 species of native plants are now found there, including the rare pomme-de-prairie or prairie turnip (*Pediomelum esculentum*). The WI endangered prairie dunewort (*Botrychium*

campestre) was spotted on a walk by The Prairie Enthusiasts last year. The recently-acquired Shurch-Thomson Preserve (also funded with gifts from the Thomsons plus son Dennis and wife Joan Shurch) managed by the Prairie Enthusiasts (both remnant and restored prairie) also has many native species, including 100,000 shooting stars. Both areas, part of the Barneveld Prairie State Natural Area, also provide important habitat to grassland bird and butterfly species.

The Thomson's children are all active professionals: Dennis, Professor of Meteorology at Penn State, was awarded the Wilson Award for Outstanding Service this spring at the Earth and Mineral Sciences Wilson Banquet. Norman (UW-Madison alumnus) is an Associate Professor of Science Education at University of Georgia-Athens. Roderick and Elizabeth work in architecture and computer science, respectively.

Lab Research News

DAVID BAUM LAB

Our lab has grown in recent years, hitting a peak in Spring 2006 of eight doctoral students, one post-doc, three undergraduates, and two visiting scholars (Korea and China). Research topics include phylogenetic systematics (e.g., *Hibiscus* and other Malvaceae in Madagascar, Iochrominae—an Andean group of Solanaceae); plant speciation (studies of a putative ring-species in Caribbean *Euphorbia*, possible hybrid speciation in Malagasy *Megistostegium*, and pollen-stigma incompatibilities among wild species of *Arabidopsis*); evolution of floral pigments (in Iochrominae and *Clarkia*); and evolutionary developmental genetics (Brassicaceae inflorescence architecture and Malvaceae flowers). A suitable focus of this report is the research conducted by four undergraduates in the Baum lab in the last year.

Vanessa Kolberg (Botany major) worked with doctoral student **Stacey Smith** and Emeritus Professor **Robert Kowal** to obtain chromosome counts for two species of Iochrominae and their putative hybrid descendent. In the process Vanessa developed a novel method for obtaining meiotic chromosome counts through the use of sonication to disrupt anthers. Along similar lines, **Justin Zveck** (Botany major) conducted a senior thesis

with **Maggie Koopman** to look at the pollen morphology in Hibisceae (Malvaceae), focusing on the three species of *Megistostegium*, a taxon endemic to Madagascar.

Justin Bosch (Biology major) obtained a Hilldale Undergraduate Research award to use immunolocalization to study the expression of the floral meristem identity gene LFY in Brassicaceae species with different inflorescence architectures. He also helped post-doc **Marek Sliwinski** conduct experiments that assess the role of the LFY genes from different species by cloning the genes and introducing them into the genetic model species *Arabidopsis thaliana*. **Nicole van Abel** (Molecular Biology major) obtained a grant from the L&S honors program to study the LFY gene of *Selenia aurea* and use transgenic experiments to compare its function to that of its close relative, *Leavenworthia crassa* (which we have already studied). Nicole already has excellent results and will produce a publication in the coming year. The Baum lab thanks all the undergraduates who have worked in the lab for their energy and enthusiasm.

HERBARIUM

Alex Wiedenhoef, Ph.D. student of **Paul Berry**, helps the U.S. Forest Service's Center for Wood Anatomy Research at the Forest Products Laboratory respond to inquiries about wood, which run the gamut from an antique end table to Italian wood sculptures at the Metropolitan Museum of Art in New York. Over the last 9 years, he has analyzed wood from splinters of a pool cue used on someone's skull; bargain imports that lumber dealers try to sell at the same price as North American species; tree roots for a drug case; a purported vintage war club of the Seneca; a copper workshop from 5,000 years ago in northern Wisconsin; and bits of wood from the Le Brea tar pits. Three examples came from sunken ships—a potential pirate ship off the North Carolina shore, a boat-like object found on Mount Ararat in Turkey, and a whaling ship featured in the San Francisco History Museum. Alex was featured in *Science News Online* (September 21, 2002; Vol. 162, No 12, p. 184) and *The Capital Times* (January 31, 2006).

TOM GIVNISH LAB

Tom Givnish (Henry Allan Gleason Professor of Botany) returned to campus after his 2004–2005 around-the-world sabbatical, with sojourns in South Africa, Singapore, Indonesia, Australia, New Zealand, Rarotonga, Tahiti, Bora Bora, California,

Austria, Hawaii, Samoa...and then back to Australia! He collaborated with Graham Farquhar and Chin Wong at the Australian National University in Canberra, and followed in the footsteps of Alfred Russell Wallace near Menado on Sulawesi, where the faunas and floras of Asia, Australia, and the Philippines come together. Professor Givnish led an international studies course on "Geology, Ecology, and Ethnobotany in the Pacific," including three weeks of field work in Hawaii and Samoa. Research in Australia was aimed at developing and testing new ideas about what determines the rate of growth, maximum height, and geographic distribution of various species of *Eucalyptus*—one of the largest genera of flowering plants, dominant in Australian forests, and showing the greatest range in maximum height of any group of angiosperms. He was inspired by time spent in the famously diverse fynbos and bulb-rich renosterveld of the western Cape region in South Africa, where Jeremy Midgely of the University of Cape Town served as his host.

Givnish has a featured role in a soon-to-be-released documentary entitled *Flock of Dodos* (see www.flockofdodos.com), which takes an irreverent look at the intelligent design/evolution controversy. With fellow Botany profs David Baum and Ken Sytsma, Givnish contributed to a campus-wide lecture series (now available on DVD) explaining what we have learned about evolution since Darwin.

Three students recently completed degrees:

Jonathan Coop completed his Ph.D. on the causes of inverted treelines in the southern Rocky Mountains, where often at mid-elevation there is a striking shift from forests on slopes to grasslands on flatter ground below. **Tara Suring** completed her M.S. degree on the metapopulation dynamics of the endangered dune thistle (*Cirsium pitcheri*) in Door County. **Kendra Millam** finished her doctoral research on the *Trillium erectum* complex in eastern North America (it's surprisingly young!).

Four current students are working on Ph.D. degrees. **Terra Theim** has nearly completed her Ph.D. on the spatial scale of gene flow in shrubby *Psychotria*, native to tropical forest understories in Central America. After learning that members of this strikingly diverse group differentiate genetically over unusually short distances (a half mile or less), she tested a theory that such differentiation in small-flowered, fleshy-fruited plants of tropical forest understories ultimately speciate at small spatial scales and contribute substantially to tropical diversity. **Jillian Henss** is collaborating with Theim and Givnish to reconstruct the evolutionary history of *Calochortus*, a genus of lily-like bulbous plants with

flowers of kaleidoscopic variety and exquisite beauty; their research has carried them from arid grasslands near the Columbia River in Oregon, to redwood and mixed-evergreen forests in the ancient Siskiyou, to oak woodlands and serpentine grasslands in mountains along the coast and edge of the Central Valley, to the wilds of Yosemite and other parts of the Sierra Nevada. (ONLY two vineyards were visited as part of this research!) **Bob Wernerehl** has begun research on what determines which grass species dominate dry, mesic, and wet prairies in the Midwest, and **Phil Gonsiska** has initiated a study of molecular evolution and physiological adaptation in the bromeliad genus *Catopsis*. *Catopsis* is remarkable because it is the only angiosperm genus other than *Brocchinia* (previously studied by Givnish and his colleagues) in which carnivory is known in some species and not others, thus providing potential to understand the evolution of this remarkable trait.

TOM SHARKEY LAB

Maltose Mystery Solved!

Students in my lab have discovered that plant leaves have maltose, the same sugar made by malting grains in preparation for brewing. Malting grains such as barley causes starch to breakdown into maltose. Leaves also have starch, which builds up during the day and breaks down at night. It was thought that the process of starch breakdown was different in leaves, but **Sean Weise** (Ph.D. 2005) showed that leaves use primarily maltose. It normally is at a very low concentration, but Weise used enzymes recently made available by the soy sauce maker Kikkoman (with U.S. operations headquartered in Wisconsin) to measure increased maltose at night in leaves. Fellow graduate student **Yan Lu** (Ph.D. 2005) described a new biochemical pathway by which maltose is converted to sucrose for movement around the plant. Lu engineered plants to lack one of the essential enzymes, and these plants accumulated about 100 times the normal level of maltose. The pathway has been confirmed by scientists in England and Germany. Biochemistry textbooks are being rewritten in light of the discoveries made in the Sharkey lab by Weise and Lu. Sean Weise is currently a post-doctoral fellow at the John Innes Centre, Norwich, England, and Yan Lu is a post-doc in the Department of Biochemistry at Michigan State University.

EDGAR SPALDING LAB

Using Machine Vision to Study Plant Growth and Development

How much does a seedling change in five minutes? If you hook up an electronic camera to a computer and acquire sequences of images as they grow, you can find out! Professor **Edgar Spalding** and **Nathan Miller**, a Biomedical Engineering graduate student, are developing ways to measure seedling responses to light and gravity as they happen. Comparing the responses of wild-type *Arabidopsis* seedlings to mutants having specific genes disrupted gives information about when and how much those genes contribute to the response. This information helps describe the gene circuitry controlling seedling development.

The key to doing this type of morphometry with tiny *Arabidopsis* seedlings (they are just a couple of millimeters tall when used) is image-analysis software. Unfortunately, such software is not sitting on the shelf—it must be developed. Miller has created a computer algorithm in the Matlab language that finds the midline of the seedlings in the images and tracks their changes in length and shape over time. The software has advanced to the extent that now seedling growth rate, distribution of curvature along the midline, and total angle can be monitored as seedling hypocotyls respond to light, or roots respond to gravity.

The Spalding lab has been using this computational approach to study the action of cryptochrome and phytochrome photoreceptors, and how auxin transport in roots relates to gravitropism. The next goal is to increase the throughput of the technique so that thousands of mutants can be studied in a reasonable amount of time to learn the functions of large numbers of genes. To achieve this goal, Spalding has begun to collaborate with Professor Nicola Ferrier, a robotics expert in the Department of Mechanical Engineering, and Professor Amir Assadi in the Department of Mathematics. Funding for this large-scale morphometric study of mutant populations is being

sought from the National Science Foundation Plant Genome Research Program.



An image of an etiolated Arabidopsis seedling taken with infrared light by a computer-controlled camera. Superimposed on the image is the computationally-determined contour and midline from which growth and shape information can be obtained through mathematics.

DON WALLER LAB

Our lab continues to pursue an eclectic set of interests ranging from population genetics to community ecology. One cohort of botanists is imminently dispersing to pursue promising careers, while another generation is budding.

Most recently, **Dave Rogers** completed his Ph.D. in April 2006 investigating “Fifty-five years of change in southern Wisconsin forests: patterns of species loss and homogenization.” Dave applied his expert taxonomic skills and field savvy to re-surveys of over 100 sites in Southern Wisconsin originally surveyed by Curtis and his students. Dave’s work documented declines in species richness at 80% of sites, along with significant increases in numbers of exotic species. Early successional grasses and sedges and short-lived perennials fared poorly, while woody vines, shrubs, and clonal herbs increased in abundance, pointing to succession, fire suppression, and habitat fragmentation as drivers of change. Dave will next hone his identification skills in Hawaii as a postdoctoral researcher with **Sara Hotchkiss**.

Shannon Wiegmann finished her Ph.D. in Fall 2005, having revisited 67 of Curtis’s sites in northern Wisconsin to characterize long-term changes in forest understories. She tracked widespread declines in diversity along with increases in ‘homogenization’ (similarity among sites). She found that pretty wildflowers like Twisted Stalk (*Streptopus lanceolatus*) and Solomon’s Seal (*Polygonatum biflorum*) have declined greatly over the past 50 years, whereas grasses, sedges, and some ferns have increased. These patterns suggest that deer have become too abundant in the Northwoods to sustain plant diversity. Shannon also began investigating how exotic earthworms are accelerating these shifts. She followed her husband to Annapolis, MD, where she is exploring local teaching options as a new mother.

Catherine Woodward finished her Ph.D. in December 2005 working on two understory trees in the forests around La Selva in Costa Rica. She explored the effects of habitat fragmentation on the genetic structure and reproductive success of *Symphonia globulifera* and *Matisia ochrocalyx*. This work revealed that even if pollination and seed set succeed, reductions in seed dispersal can threaten the persistence of isolated populations. She continues to teach tropical field ecology in Ecuador including the Tiputina field station in the Amazon basin, where she noticed a remarkable parasitic plant. This discovery actually represents a new genus in the family Burmanniaceae, fittingly christened *Tiputinia foetida* to honor both the field station and the plant’s

*Tiputinia foetida*

malodorous blooms. Catherine developed a new web-based course in Tropical Ecology and Conservation in 2005 and expects to teach a semester-long Ecuador field course in 2007 for UW. In her spare time, she continues to work for on-the-ground conservation in Ecuador via her service as President of the Ceiba Foundation (www.ceiba.org) which she co-founded.

Tom Rooney continues to explore and develop methods to assess 'biotic homogenization'—the increasing similarity of communities as weedy generalists prosper and rare specialists decline. He also continues his work on the impacts of overabundant deer on Northwoods plant communities via an exclosure study in Vilas County, embarking on a new phase of more active involvement by learning to hunt. Tom has also worked tirelessly with Don to co-edit an upcoming book entitled *The Vanishing Present: Wisconsin's Changing Lands, Waters, and Wildlife*. Tom will depart in August for a tenure-track position at Wright State University in Dayton, Ohio.

Post-doctoral researcher **Rachel Collins** is extending the re-survey work by designing experiments to explore just how deer interact with earthworms and landscape features to favor the invasion of weedy exotic plants and declines in native plant diversity. Garlic mustard (*Alliaria petiolata*) has particularly caught her attention (it's hard to miss) and managers at places like New Glarus State Park are enthusiastic partners on this research. On rainy days, she continued to update the Waller Lab

website, www.botany.wisc.edu/waller. Rachel moves in August to a tenure-track position at Frostburg State University in Maryland.

The lab continues to collaborate with the National Park Service to develop protocols to monitor vegetation changes and deer impacts at nine National Parks around the Great Lakes. **Sarah Johnson** and **Erika Mudrak** are synthesizing data on past and current deer densities in the region and recommending methods to track impacts of deer browse on vegetation and integrate these assessments into management decisions. An emerging project by **Sarah Wright** will use both the Curtis re-survey data and phenological data collected by Aldo Leopold and Nina Leopold Bradley to inform reciprocal transplant experiments to test the physiological responses of plants to changes in climate. Generally, Waller Lab members will continue to determine how functional traits determine 'winning' and 'losing' species in landscapes subject to multiple drivers of change. We are grateful to our departing colleagues for their rich legacy of rigorous and inspired research.

SUSAN WILL-WOLF LAB

Dr. **Susan Will-Wolf** was promoted to Senior Scientist on July 1, 2006. Other recent changes in her lab include: **Matthew Nelsen** left in September 2005, after completing his M.S. in Botany under **Andrea Gargas**. He now has a job at Michigan State University at Houghton. **Marie Trest** was promoted to Research Specialist on July 1, 2006. She continues to work half time in the lab while finishing her Ph.D. in Botany with Andrea. Since September 2005, **Corey Hart** (undergraduate in Biological Aspects of Conservation) has been working with us doing a variety of jobs including filing specimens in the Lichen Herbarium to supplement curation of the collections by Wisconsin State Herbarium staff. **Anne Reis** (UW Horticulture alumna) participates in Will-Wolf projects from Milwaukee, where she lives with her husband, **Owen Boyle** (Botany Ph.D. alumnus). In Spring 2006, the lab moved to Professor Adams' former radioisotope lab, which includes a much-appreciated fume hood.

In Fall 2006, Will-Wolf completed a 30-year resurvey of lichen communities around the Alliant-Columbia power plant near Portage, WI. Changes in forests due to land use and forest management have had a big impact on the lichens over time, while the power plant had a small, but detectable impact. Will-Wolf's research on lichens as forest health indicators continues to be supported by the USDA Forest Service. In Spring 2006, the Journal of

Vegetation Science (v. 17:2 Spring 2006) published a 9-paper special feature on lichen ecology (complete with lichen cover) edited by Will-Wolf and two colleagues; it includes a paper by Will-Wolf et al. on response of lichens to large-scale environmental factors from Forest Service lichen sampling.

JOY ZEDLER LAB

We continue to work on invasive plants in Midwestern wetlands.

We graduated three Botany doctoral students in 2005—**Andrea Herr-Turoff** finished her research on the behavior of the invasive reed canary grass (*Phalaris arundinacea*) under controlled conditions, showing that it has high plastic morphology (meaning it can “morph” to match different environmental conditions). Did you know it forms tussocks under continuous flooding? It does that and much more, helping to explain its ability to dominate so many wetland situations. She also showed that its invasions are difficult to reverse and that it can remove as much nitrogen as a dozen native wet prairie plants (but no more, so please don’t plant it in wastewater treatment wetlands). **Christin Frieswyk** focused her work on Great Lakes coastal wetlands and not only showed that invasive cattails are taking over the native sedge meadows, but also that native plants are unlikely to recover even if we find ways to control cattail growth. The reason is that seed banks under the cattails are depleted of native species; in fact, if cattails were removed, the invasive purple loosestrife might take its place, as it appeared to store the most seeds in the soil. Christin developed a new “Species Dominance Index” to identify which species dominated each of about 70 wetlands in the five Great Lakes; invasive cattails was most often the dominant. Then she characterized the form of dominance, which tended

to be “monotype” for invasive plants and “matrix” for natives (meaning that native dominants have more co-occurring species and thus foster, rather than suppress, diversity). **Aaron Boers** was also drawn to the problem of cattail invasions, and he found that cattails can easily expand 4 or more meters a year when conditions are right, and the right conditions can be as simple as a stable water level. Aaron showed that when dams or dikes impound water, the continuously inundated soil releases phosphorus and that cattails are able to take it up and grow better. The Dutch call this “internal eutrophication” to emphasize that nutrients don’t necessarily have to be flowing in from the watershed to catalyze cattail expansions; nutrients stored in nonsoluble forms can become mobile when we change hydrological conditions from variable to stable water levels.

Current research projects in the Midwest aim to find ways to quantify carbon storage in wetlands with and without reed canary grass dominance (**Nic Jelinski’s** project with Dr. Chris Kucharik), contrast reed canary grass’s growing season to that of big blue stem and tussock sedge (senior thesis research of **Vanessa Kolberg** and **Kate Legner**), control reed canary grass in Curtis Prairie (**Mike Healy’s** research), and replace invasive cattails with sedge meadow in the Arboretum’s Gardner Marsh. **Steve Hall** will link the cattail-control study to similar invasions in Mexico, by conducting parallel experiments here and with former student **Roberto Lindig-Cisneros** (now professor at UNAM–Morelia). Research on how best to restore salt marshes at Tijuana Estuary is winding up with **Dan Larkin’s** dissertation on the role of topographic heterogeneity and the food web and experiments on halophyte responses to waterlogging and salinity (**Alison Varty** and **Cathi Bonin**).

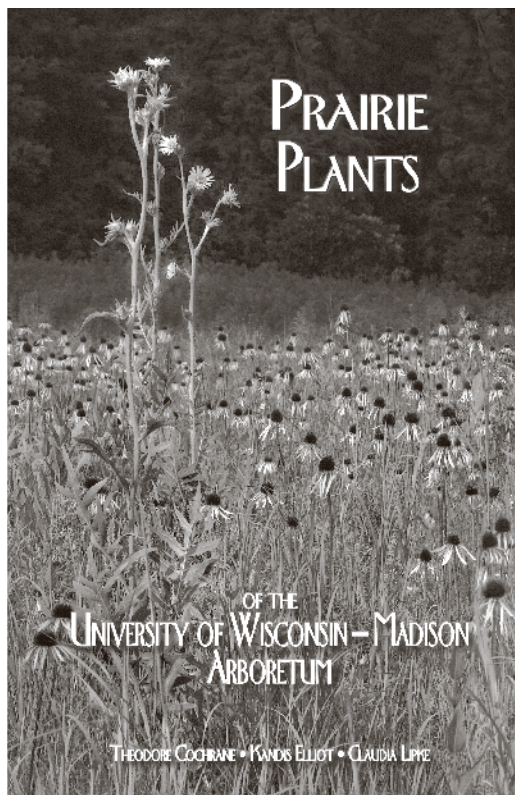
*Andrea Herr-Turoff
with replicate “mesocosm”*



MULTIMEDIA FACILITY

Senior Artists **Kandis Elliot** and **Claudia Lipke**, with Senior Academic Curator **Ted Cochrane**, have completed a 3-year project, *Prairie Flora of the University of Wisconsin–Madison Arboretum*, a guide to 360 selected horsetails, ferns, rushes, sedges, grasses, shrubs, vines, weeds, and wildflowers. The book illustrates and describes native and introduced species that grow and bloom on the Arboretum prairies, and briefly discusses or casually mentions many additional species, infraspecific taxa, and hybrids. With full-color photos by Claudia, text by Ted, and layout and design by Kandis, the guide provides a beautiful and informative sample of the flora of the Arboretum and of the southern Wisconsin landscape. The authors hope it will increase awareness and respect for our last remaining small prairie remnants, motivate readers to work for prairie preservation, and encourage the planting of native Wisconsin species in yards and gardens. This is a companion book to *Spring Woodland Wildflowers of the University of Wisconsin–Madison Arboretum*, authored by **Andrew L. Hipp** (Ph.D. 2004), also with photos by Claudia and layout and design by Kandis.

Prairie Flora is scheduled for publication in August. Both books will be available at the Arboretum store and also at the UW Herbarium.

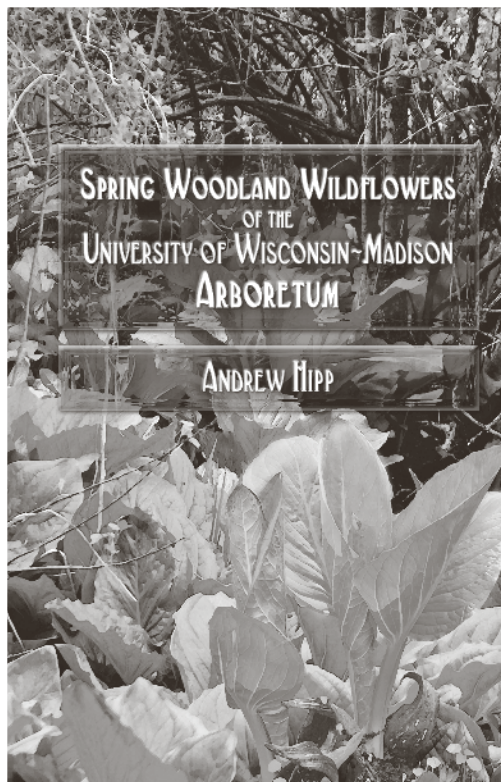


Updates

Mariette Cole (Ph.D. 1977; Honorary Fellow) wrote a guidebook to California lichens, with lichenologist Mason Hale. She then taught in the Twin Cities (MN) area, and Concordia University in St. Paul where she was promoted to associate professor. She subsequently worked on Susan Will-Wolf's FHM specimens and did some lichenicolous fungus work with David Hawksworth in Spain. Her next job was at a small alternative high school for pregnant and parenting teens. Mariette loves to teach and help people and that's what she's doing now. She often visits Madison where her daughter is captain of the UW women's National Champion 2006 hockey team.

Ellen Gabel (Lippincott) (B.S. 1993) married Chris Gabel in August 2005. They both live in Arlington, VA where he works as an environmental engineer and she works as a grant administrator for The National Fish and Wildlife Foundation in DC.

Liang Huang (Ph.D. 1971) retired from Pfizer Global R & D in Groton, CT, in April 2005. While at Pfizer, I screened fungi and actionomycetes for new antibiotics and curated a big microbial culture collection.



Megan Kennelly (B.S. 1999) received her Ph.D. in Plant Pathology from Cornell University in January 2005; my research concerned the epidemiology of grapevine downy mildew. I then began a post doc at Michigan State U., where I study fire blight of apples. In early 2006 I became an Assistant Professor in the Department of Plant Pathology at Kansas State University where I do research and extension work on turfgrass, ornamentals, fruit, vegetables, and trees.

Robert P. (Ph.D. 1950, M.S. 1947) and Joan W. McIntosh. Joan was a student of Norman Fassett, and I worked with John Curtis and studied most of the southern hardwoods stands now being resurveyed. I think the last time I've visited Madison was the ESA meetings in 1998. I spent most of my post-doctoral career at the University of Notre Dame (1958–2002) in teaching and research, turning from field studies to history and editing. I was the editor for the *American Midland Naturalist* for 32 years (1970–2002), 15 years after I retired from teaching. The Plant Ecology Lab was established during my years at Madison and I was involved in editing the memorial volume on John Curtis. I'm all too familiar with the vanishing present; the York Woods that constituted a substantial part of my Ph.D. thesis and early publications is long gone.

J. Chris Pires (Ph.D. 2000) is an Assistant Professor at the University of Missouri in the Division of Biological Sciences. His research broadly encompasses plant evolutionary biology—from phylogenetic studies in plant diversity to genome-wide analyses of gene expression. Research projects in his lab (starting September 2005) will be directed at molecular systematics and comparative genomics, with a particular focus on the evolution and ecology of polyploid plants. Unraveling the complex relationships between genotype and phenotype is one of the most long-standing and intriguing challenges in evolutionary biology. Confronting these broad enduring questions would facilitate the synthesis of diverse approaches to the study of plant evolution.

Shinhan Shiu (Ph.D. 2001) is a National Institutes of Health Fellow at the University of Chicago in the Department of Ecology and Evolution. Research interests mainly focus on the dissection of evolutionary trends in gene families. The primary approach employs bioinformatics and evolutionary genetic theories and tools. In addition, he has established collaboration with researchers to examine some of these questions via molecular genetic means.

Lynn Allan Pollnow (B.S. 1963) is retired and living in Maryland.

Ewell A Stowell (M.S. 1947; Ph.D. 1955) has been teaching botany, first at UW–Milwaukee for 2 years, then Albion College for 38 years, and the U. of Michigan Summer School 1 year. At the time of his retirement, Albion College dedicated the Stowell Arboretum and a few years later his former students established the Stowell Scholarship Fund. Ewell's years at UW–Madison were enjoyable, although his first term there, after 3 years of non-academic experiences in the U.S. Army, was a real challenge. The friendship and guidance he received from Drs. Herbert Clarke, Myron Backus, Norman Fassett, and John Curtis were strong influences in preparing him for his career. Ewell says that the UW was the right choice for his graduate degree.

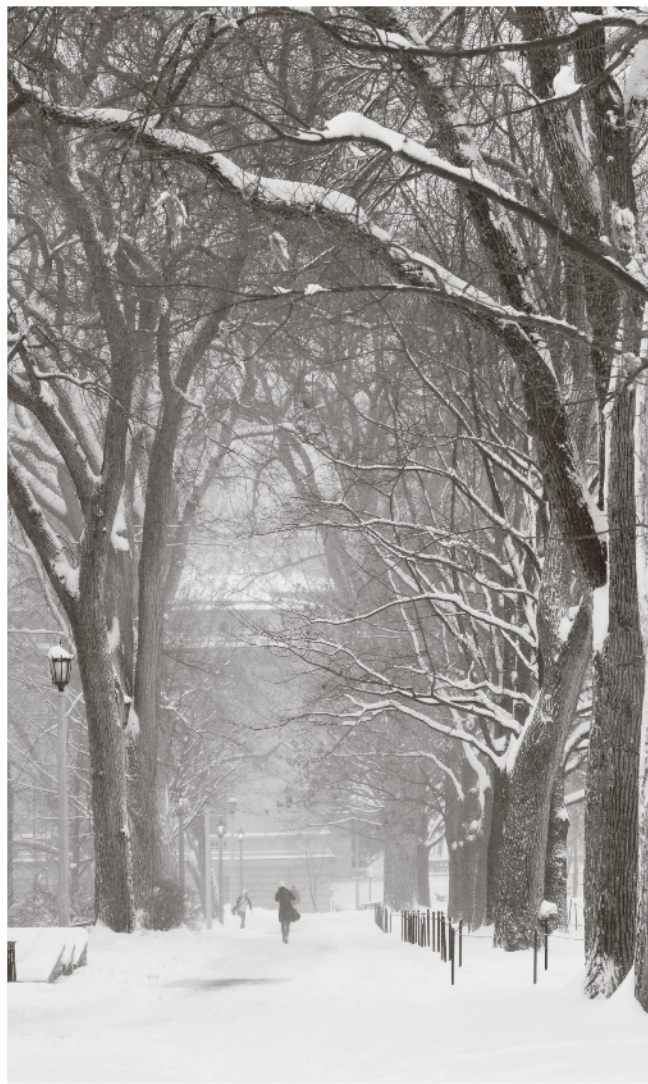
In Memoriam

David Frank Grether (B.P.H. 1947 in Zoology; M.S. 1949 in Botany/Geology) Frank, Professor Emeritus at Saint Cloud State University, died suddenly on January 12, 2006. He taught in Platteville, WI, and Ypsilanti, MI, before taking a position at St. Cloud State in the Biology Department. After his 33 years at St. Cloud State, students still remember his field trips on edible wild plants. His doctoral research in Botany and continued service in the Naval Reserve led to a discovery of a new species of fern, *Thelypteris gretheri*, and a butterfly, *Hypolimnys pithoica gretheri*, cataloged at the Smithsonian Institution. He was active in the Human Genetics League, Nature Conservancy, P.O.E.T.S. and Sigma Xi. He helped found local Earth Day observances, he established Sand Prairie Wildlife Management & Environment Education Area with colleague Max Partch; and he expanded the regional science fair, recently renamed in his honor. In his last written remarks, he stated: "My genetic material, an infinitesimal part of which comes from the earliest life billions of years ago and which is the thread of life making all life related, will be carried on in my descendants. My spirit will live on in those I have touched and things I have left in the Scientific record. Ashes, gases, genes and spirit make for the 'Life Everlasting.'"

Allan A. Ichida (Ph.D. 1960) Allan, a retired Ohio Wesleyan University professor of Botany and Microbiology, died suddenly at home on September 25, 2005. Allan graduated from Collinwood High School in Cleveland OH; earned his B.A. in 1953 from Ohio Wesleyan; M.S. in 1955 from the University of Tennessee; Ph.D. in 1960 from UW-Madison where he worked with M. P. Backus and K. B. Raper. Allan also worked at the Madison Forest Products Labs on Dutch Elm Disease. During his postdoctoral studies on *Aspergilli* and *Penicillia* with Raper, he met, mentored, and married bacteriologist Jann Machotka. Allan returned to Ohio Wesleyan as a faculty member in 1961 in the Department of Botany and Microbiology. While at Ohio Wesleyan, Allan served as president and advisor of the Ohio Branch of the American Society for Microbiology; served on the Olentangy Scenic River Commission; was a board member for the Salvation Army in Delaware, OH; and was also an active council member of the Central Ohio American Youth Hostels. Allan's research at the OWU Bohannon and Kraus Nature Preserves was a source of enjoyment for him and his students. He was an enthusiastic canoeist, kayaker, cyclist, skier, and traveler. The outdoors and driving through scenic countrysides were passions for Allan, and he spent much of his life studying, preserving, and enjoying the natural world. He is survived by his wife, two daughters, a grandson, and two brothers. His family remembers him as a kind man of quiet strength who always had a smile and a pat on the back for friends.

Elizabeth Ingersoll Madden (B.S.E. 1952 in Education/English; M.S. 1957 in Guidance & Counseling). Elizabeth passed away on July 8, 2002. She was a generous donor to the Class of 1952 Botany Garden project. She served as a College Counselor for New Trier High School and at the New Trier Board of Education located in Wilmette, IL. She is survived by her husband John and two children.

FEBRUARY SNOW



Above, late winter campus doldrums are brightened by lovely snowfalls.

Right, sculpture of a sprouting bean in the Botany garden seems to be tucked in to sleep until spring.

JULY RAIN

Heavy downpours and winds flood 68 campus buildings, including the basement of Birge Hall. 75-year-old bur oaks snap and split; their removal leaves a sad empty space outside of Botany Department offices.



SUMMER CONSTRUCTION



Birge Hall receives a new roof, new greenhouse glass and infrastructure, new font stairs, and (finally) a new loading dock.



TIDINGS FROM THE GREENHOUSES ...



GREENHOUSES ARE EMPTIED FOR REPAIRS AND RE-GLAZING

Tall, large plants are crammed into Greenhouse #8; all others go to the Walnut Street greenhouses for the summer. Below, left: Konjac arum stinks its way outside: the odorous bloom is banished to a corner of the loading dock for a day. Flies find it, and pollinate its flowers.



... AND GARDEN



*Cedar waxwings
enjoy the birdbath;
mallard brood
hatches in the pond*



Dance class, March

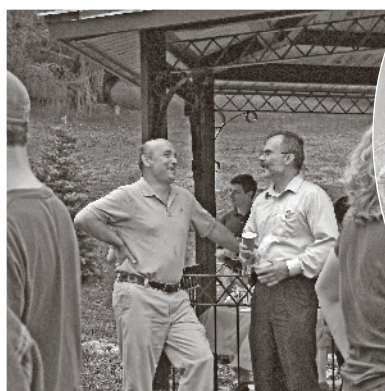


*Bradly Garski and Sara
Green wedding, June*



*Arbor is erected in
the monocot area*

**THE GARDEN'S
SECOND SEASON IS
APPRECIATED BY ALL**



Farewell, Paul Berry...

...Welcome back, Tom Givnish



DEPARTMENT OF BOTANY ANNUAL FUND DRIVE

PLEASE ACCEPT MY CONTRIBUTION IN THE AMOUNT OF \$ _____ (ENCLOSED)
WHICH IS DESIGNATED FOR:

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- ☐ **DEPARTMENT OF BOTANY GENERAL FUND**—serves as the department's "general" account.
- ☐ **BOTANY GREENHOUSE/GARDEN EXPANSION FUND**
- ☐ **ELDON AND JOY NEWCOMB FUND IN BOTANY**—an unrestricted fund for any purpose or interest of the department.
- ☐ **E. K. AND O. N. ALLEN HERBARIUM FUND**—supports varied activities of the UW Herbarium.
- ☐ **O. N. ALLEN GRADUATE FELLOWSHIP**—provides a fellowship for an outstanding graduate student.
- ☐ **MCCULLOUGH FUND**—used at the Chair's discretion, primarily for faculty and academic staff development.
- ☐ **CURTIS FUND**—provides an award for the best Ecology undergraduate student paper.
- ☐ **RAPER FUND**—provides funds to enable graduate students to travel to meetings.
- ☐ **JUDITH CROXDALE FUND**—memorial fund to support women beginning research careers.
- ☐ **FOLKE SKOOG FUND**—memorial fund to support Dr. Skoog's research and teaching initiatives.
- ☐ **BLEECKER FUND**—memorial fund for Plant Imaging Facility.

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- ☐ **PAUL J. ALLEN MEMORIAL LECTURE**—supports a lecture by an eminent scientist in the Botany Colloquium series.
- ☐ **JOHN J. DAVIS FUND**—supports research activities of the department, including graduate student fellowships, travel support, and funds to provide speakers for the Botany Colloquium series.

For donations to these two funds, please make checks payable to the University of Wisconsin and send to:

**Chairman
Department of Botany
University of Wisconsin—Madison
430 Lincoln Drive
Madison WI 53706-1381**

All contributions are tax deductible; many corporations have a matching grants program.

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Sue Bader
Department of Botany
University of Wisconsin-Madison
430 Lincoln Drive
Madison, WI 53706-1381

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Please tell us what you've been up to since graduation and any special items you'd like to share in the next newsletter. We'd also be interested in any thoughts you have about your educational experience here. Attach extra pages as necessary. PHOTOS WELCOME!



This newsletter is published by the Department of Botany at the University of Wisconsin, Madison, for alumni, colleagues and friends. Dr. Joy Zedler and Suzanne Bader, editors; Kandis Elliot, art and layout; Claudia Lipke, photos. Submissions are welcome. Please send comments, ideas, and photos to:

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