

The Plant Press



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Botany Profile

Research Scientist Spills the Beans

By Gary A. Krupnick

Imagine starting a new job by going away on a three-month field excursion to the remote forests of China, Japan, and Thailand after only two weeks on the job, before having a chance to settle into your new office and unpack your boxes. Continue imagining that while you are away on your Asian expedition, you find out that your employer, the U.S. federal government, has shut down for 16 days, forcing you into “furlough in place” status (non-duty and non-pay). Such is the life of Ashley N. Egan, the Department of Botany’s new Research Botanist and Assistant Curator of Legumes.

Egan grew up in Idaho, spending her summers on the outskirts of Yellowstone National Park where she cultivated her love for nature. Her undergraduate studies were at Utah State University where she initially declared a major in Biological Engineering, and then switched to Biology and focused on population genetics. As an undergraduate, she volunteered in Paul G. Wolf’s laboratory, under the assistance of a Howard Hughes Medical Institute Undergraduate Research Fellowship. She studied the genetic differentiation between populations of *Erythronium grandiflorum* (Liliaceae). Egan’s honor’s thesis focused on the resolution of inter-simple sequence repeat (ISSR) markers in *Ipomopsis aggregata* and *I. tenuituba* (Polemoniaceae).

After graduating in 1998 with a B.S. in Biology, she stayed in Utah working as a laboratory technician under Lynn Bohs at the University of Utah where her work focused on the Solanaceae family. Egan soon shifted her attention from

population genetics to phylogenetics and systematics.

In 2001 she began her graduate years at Brigham Young University, initially working on a doctoral thesis in cancer research. Her preliminary studies utilized phylogenetics as a means of bioprospecting, looking at the chemopreventive ability and phenolic content of the mint family, Lamiaceae. Unsatisfied with the direction of her thesis, Egan switched to Keith Crandall’s invertebrate biology laboratory, with the understanding that Egan would continue on with plant research.

Crandall suggested that Egan choose a plant system close to home, so Egan focused on the rare and endangered plant species of Utah. She settled on *Pediomelum* (Leguminosae), a genus with around 27 species across the United States and 70 percent listed as endangered or threatened. She explored the population history and conservation genetics of *Pediomelum pariense*, a rare species endemic to two counties in southern Utah. She asked questions about the relationship between the substrate in which *P. pariense* grows and its endemism in Utah. Her project then morphed into a species diversification study of tribe Psoraleae, to which *Pediomelum* and four other genera endemic to the United States belong. Egan defended her dissertation, “Phylogenetics of North American Psoraleae (Leguminosae): Rates and Dates in a Recent, Rapid Radiation,” in December 2006.

While conducting her doctoral research, Egan was in contact with Jeff Doyle at Cornell University. Egan and Doyle were exchanging outgroup mate-

rial of Psoraleae and soybean (*Glycine max*). In 2007, Egan became a postdoctoral research associate in Doyle’s lab, studying the phylogenetic systematics of subtribe Glycininae (Leguminosae). Egan’s research has determined that tribe Psoraleae is nested within subtribe Glycininae, and is a potential progenitor genome of the polyploid soybean.

During her postdoctoral research, Egan began collaborating with several scientists studying soybean genome evolution. She was among a large group of co-authors who published several papers on genome evolution and polypoidy in soybean. As part of their research, they sequenced an approximately 1 million-base pair region in soybean and compared this region with its homoeologous region duplicated 10 to 14 million years ago. Their research produced several papers that focused on the evolution of disease resistance genes (*Plant Physiology* 148: 1740-1759; 2008), a large accumulation of retroelements (*Plant Physiology* 148: 1760-1771), and a comparison of retention or loss of disease resistance genes between the 20 million-year diverged soybean and *Phaseolus vulgaris*, the common bean (*Plant Physiology* 159: 336-354).

Egan and Doyle wrote a methodological discourse regarding the origins of polyploidy events (*New Phytologist* 186: 73-85; 2010). The paper argued that most studies that measure the date of polyploidy are actually measuring the date of divergence of progenitor genomes. They conclude that, “esti-

Continued on page 12

Pedro Acevedo traveled to San Juan, Puerto Rico (11/13 – 11/16) to collect plants and to meet with staff at the University of Puerto Rico.

Barrett Brooks traveled to Orlando, Florida (11/5 – 11/10) to undertake diving industry related training.

Laurence Dorr traveled to Paris, France and London, England (11/23 – 12/15) to study herbarium specimens at the National Museum of Natural History (France) and the Royal Botanic Gardens Kew for treatment of the Malvaceae for the Flora of the Guianas.

Christian Feuillet traveled to Saint Louis, Missouri (10/10 – 10/18) to study specimens of *Passiflora* subgenus *Decaloba* on loan at the Missouri Botanical Garden from many European and North and South American herbaria.

Vicki Funk traveled to Lawrence, Kansas (10/7 – 10/9) to meet with staff at the University of Kansas.

W. John Kress traveled to Kunming, China (10/24 – 11/6) to deliver an invited plenary lecture at the International Barcode of Life conference and to work with scientific colleagues and students at the Xishuangbanna Tropical Botanical Garden; to Chicago, Illinois (11/13 – 11/15) to receive the Parker Gentry Award from the Field Museum; and to Oak Ridge, Tennessee (12/3 – 12/4) to discuss further collaboration in genomics and biodiversity at the Oak Ridge National Laboratory.

Sylvia Orli traveled to Gainesville, Florida (12/16 – 12/20) to attend the iDig-Bio Crowdsourcing Hackathon.

Christopher Puttock traveled to Honolulu, Hawaii (11/29 – 12/15) to collect plants at the University of Hawaii Lyon Arboretum and, as a board member, to attend the Annual Retreat of the Hawaii Conservation Alliance (HCA) and HCA Foundation (HCAF).

Alain Touwaide and **Emanuela Appetiti** traveled to Merida, Mexico (9/30

– 10/6) to attend the meeting of the International Society for the History of Medicine and present papers; to Philadelphia, Pennsylvania (10/17 – 10/19) to attend the symposium “Ancient drugs: pharmacology across the ancient world” at the University of Pennsylvania, where Touwaide presented a paper; to Portland, Oregon (10/29 – 11/3) to deliver lectures and classes at the National College of Natural Medicine, Reed College, Leach Botanic Gardens, and the Hellenic-American Cultural Center and Museum; and to Boston, Massachusetts (11/21 – 11/24) to attend the meeting of the History of Science Society, where Touwaide presented two papers in different sessions and Appetiti attended the meeting of the ISIS-Current Bibliography editorial board.

Jun Wen traveled to Tulsa, Oklahoma (11/5 – 11/8) to give a seminar at Oklahoma State University and participate in a graduate student’s graduate exam.



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Reu Series - Vol. 17 - No. 1

Chair of Botany

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Visitors

Carlos García-Robledo, Smithsonian Fellow; Plant-herbivore interaction (7/20/10-7/20/14).

Janelle Burke, New York Botanical Garden; Tropical Polygonaceae and Plumbaginaceae (8/1/12-12/31/14).

Jianqiang Zhang, Peking University, China; *Rhodiola* (Crassulaceae) (10/8/12-10/7/13).

Genevieve Croft, Washington University; *Byrsonima crassifolia* (Malpighiaceae) (10/16/12-10/16/13).

Ning Zhang, Pennsylvania State University; Vitaceae (1/7/13-6/30/15).

Jesus Valdez R., Universidad Autónoma Agraria Antonio Narro, Mexico; Poaceae (2/7-12/7).

Asmaa Muneer, University of Maryland; DNA barcoding (4/22-10/31).

Amy Wang, Maryland; *Silene* (Caryophyllaceae) (7/1-12/31)

Elena Roman Jordan, Catedra de Tecnologia de la Madera, Spain; Cupressaceae (8/30-12/13).

Jonathan Price, University of Hawaii at Hilo; Pacific flora (9/23-10/23; 11/1-11/4).

Alison Shapcott, University of the Sunshine Coast, Australia; DNA barcoding of Queensland plants (10/1-11/15).

Forrest Freund, Rancho Santa Ana Botanical Garden; *Isoetes* (Isoetaceae) (10/6-10/8).

Zachary Rogers, Missouri Botanical Garden; Thymelaeaceae (10/7-10/11).

Raquel Stauffer Viveros, Universidade Federal de Minas Gerais, Brazil; *Ctenitis* (Dryopteridaceae) (10/8-10/17).

Noema Cano Flores, Knight Piésold Consulting, Peru; Bromeliaceae (10/28-10/29).

Nuri Benet Pierce, San Diego State University; *Chenopodium* (Chenopodiaceae) (10/28).

Patrick Herendeen, Chicago Botanic Garden; Leguminosae (11/1-11/6).

John Wood, Oxford University; Convolvulaceae (11/4-11/8).

Steve Darwin, Tulane University; *Timonius* (Rubiaceae) (11/6-11/7).

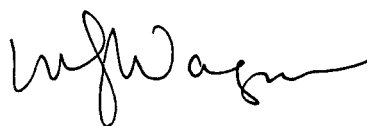
Honoring 170 Years of Service

Over the past couple of decades the Department of Botany has maintained a relatively stable staff, all working together for many years. On occasion, we have been able to add additional staff while even more have retired. A significant change began in 2011 when the Smithsonian Institution offered a buyout opportunity to staff who were thinking about retirement. Six staff in Botany retired in 2011 (see *Plant Press* 14(4): 3; 2011). Since research departments were able to replace these positions at a lower pay scale, the Department of Botany has embarked on staff secession planning. This plan called for eight positions in the department and included recruits for Research Scientists (*Plant Press* 16(3): 3; 2013), collections management (*Plant Press* 16(1): 4; 2013), and information technology (*Plant Press* 15(4): 4; 2012). Federal budget issues have slowed the completion of these hires and three more are currently on hold in collections management, IT support, and research/collections support, but should move forward to be filled in 2014.

Last year the Smithsonian Institution again offered a buyout opportunity for staff who might be considering retirement. The Department of Botany once more had the largest number of retirees at the National Museum of Natural History. The five staff members who are retiring represent 170 combined total years of service to the department and museum, and all have made significant contributions for many years to the research, collections management, and digitization of collections. Retirees from the department include (with year joining the Department of Botany in parentheses): Debbie Bell (1975), Linda Hollenberg (1979), Bob Faden (1980), Margaret Gardner (1985), and Elaine Haug (1987). Bob, Margaret and Elaine retired between October and January; Linda and Debbie will retire in February. In this issue (page 4) we highlight and celebrate the contributions, accomplishments, and leadership during their many years of service of the three who recently retired. In the next issue of the *Plant Press* we will recognize the contributions by Linda and Debbie. We will certainly miss them all and on behalf

of the department I extend our sincere gratitude to them for their dedicated service to the museum and greater botanical community. We wish them years of happy, fulfilling retirement.

While the Department of Botany is fortunate that most of this group has graciously chosen to serve in an emeritus or volunteer capacity, we recognize that we are faced with significant gaps created in collection management, research, and collection digitization. Fortunately, our 2011 plan for filling the remaining positions and the possibility of adding another research scientist and digitization position will build a solid department for the future. We have a strong core of staff, including several recent hires, enabling us to fill some gaps through staff reorganization and the spreading out of responsibilities. Over the years Linda and Debbie have been responsible for a number of critical core functions within the department, including overseeing all Botany collections at the Museum Support Center, collections space in the herbarium, administrative, budget preparation, fund allocation, collections conservation issues, and special projects. We are currently working on a plan to spread many of these responsibilities to our recently hired core collections staff, Andrew Clark, Meghann Toner, and Melinda Peters. Although the three have been here for a relative short period of time they have all demonstrated the ability, interest, and enthusiasm for transitioning into having more responsibilities in the functioning of the department.



Chair

With

A

View

Warren
L.
Wagner



Beverly Thomsen, Independent scholar; Mediterranean medicinal plants (11/6).

Bruno David, Institut de Recherche Pierre Fabre, France; Ancient Greek botany and pharmacology (11/13).

Eric Yarnell, Bastyr University; Medicinal plants (11/12-11/18).

Martin Burd, Monash University, Australia; *Selaginella* (Selaginellaceae) (11/15-11/22).

Calvin Stone, IFS-Integrated Federal

Solutions, Inc., Virginia; Mediterranean medicinal plants databases (11/19).

Laura Mazow, East Carolina University; Near East/Eastern Mediterranean Archaeobotany (11/20).

Wyatt Sharber, University of Miami; *Ayenia* (Sterculiaceae) (11/20-11/21).

Kurt Neubig, Florida Museum of Natural History; Orchidaceae, Malvaceae, Asteraceae, and DNA barcoding (11/22-11/23).

Raul Puente, Desert Botanical Garden;

Opuntia (Cactaceae) (11/22-11/25).

W. Mark Whitten, Florida Museum of Natural History; Orchidaceae and DNA barcoding (11/22-11/23).

Kevin Burgess, Columbus State University, **Thomas Givnish**, University of Wisconsin-Madison, **Simon Malcomber**, National Science Foundation, **Jenny Sanders**, Atlanta Botanical Garden, **Evgeny Zakharov**, Biodiversity Institute of Ontario, Canada; DNA barcoding (11/23).

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Staff Research & Activities

Gary Krupnick attended the 13th Annual North American Pollinator Protection Campaign (NAPPC), a brainstorming and technology transfer session between leading pollinator scientists and other stakeholders aimed at stemming pollinator declines. Scientists, regulators, governmental and industry representatives, Native American and First Nation Tribes, and global non-government organizations representing more than 140 stakeholders met October 23 and 24 in Washington D.C. to develop action plans that address critical and current pollinator issues. Krupnick chaired the orchid-pollinator task force, which focused on improving the scientific accuracy of the 2014 Pollinator Week poster, “Native Orchids Need Their Pollinators.” The conference was co-hosted by the Department of the Interior at the American Farm Bureau Federation.

On December 5, **Alain Touwaide** gave a class on Mediterranean Archaeobotany and Ethnobotany at the French Lycee “Rochambeau” in Bethesda, Maryland. On December 11 he presented a lecture on the DNA analysis of ancient medicines found in a shipwreck at the Biblical Archaeology Forum in Rockville, Maryland.

Staff Retirements

Robert B. Faden retired from the Smithsonian Institution in January 2014, after nearly 33 years as a curator in the Department of Botany and almost 40 years of federal service, including six years as a Peace Corps Volunteer. His work at the Smithsonian has focused on the evolution, systematics, floristics, reproductive biology, anatomy, and cytology of Commelinaceae, the dayflower family. Faden has described 57 new species and many infraspecific taxa of Commelinaceae in 12 genera, including 19 species each in *Commelina* and *Aneilema*. He has also described the new genus *Plowmanianthus*, named in honor of Faden’s former colleague at Field Museum Tim Plowman. The new species that Faden described have come from all five continents in

which Commelinaceae occur naturally, but the large majority has been from Africa. Faden’s published floristic works include treatments of Commelinaceae for checklists for Gabon, Angola and Ecuador, and floras of North America, Costa Rica, Ethiopia and Eritrea, Somalia, Tropical East Africa, Southern Africa, and Sri Lanka. He has treated the Commelinaceae and pteridophytes for all three editions (1974, 1994 & 2013) of Upland Kenya Wild Flowers by A.D.Q. Agnew. His treatment of Commelinaceae for the Revised Handbook to the Flora of Ceylon (2000), which recognized three new species and several new infraspecific taxa, precipitated a gold rush by local botanists to discover new species in India, which is still ongoing. Faden has done field work in Mexico, Costa Rica, Thailand, Pakistan, India, Sri Lanka and numerous African countries ranging from Ghana to Somalia and South Africa. On many of his trips he has been accompanied by his wife Audrey Faden, after whom he named the new species *Murdannia audreyae* for a plant that she first spotted in Sri Lanka.

Faden’s other published papers on Commelinaceae have included revisions of *Aneilema*, *Polyspatha*, *Plowmanianthus*, and *Tricarpelema*, studies of leaf anatomy, reproductive biology, cytology, phylogeny, and the ultrastructure of the fruit wall in *Pollia*, the most shiny structure in nature. His extensive collections of cultivated Commelinaceae, maintained in the Botany Research Greenhouse, have been the basis for studies of floral morphology, phenology patterns in species with dimorphic flowers, chromosome counts, DNA sequencing, seed germination, and as parent material for hybrid crosses. He has hosted numerous undergraduate interns over the years, mainly on projects of comparative leaf anatomy in Commelinaceae, using the living plant collections and previously preserved materials. Faden has built up large collections of liquid preserved flowers of Commelinaceae and also Commelinaceae seeds. Besides Commelinaceae, Faden has published on pteridophytes, cycads and Verbenaceae.

Seventeen species of plants—all but one from East Africa—ranging from a crustose lichen to a forest understory tree, and including species of *Coffea* and *Kalanchoe*, plus five ferns, were named for him, as was the genus *Fadenia* (Chenopodiaceae). Faden has become an emeritus

in the Department of Botany and will be happy to continue receiving Commelinaceae for naming.

Margaret Gardner began working for the National Museum of Natural History in May 1985, with the Office of Facilities Management. In March 1992, the Department of Botany was fortunate to be able to hire her as a Plant Mounter. She was stationed at the Museum Support Center in Suitland, Maryland, where she joined two other plant mounters – one on staff and one on contract. Gardner retired in October 2013, having worked at the Smithsonian Institution a total of 28 years. During her 21 years in Botany, Gardner expertly mounted over 80,000 plant specimens, making them available to the scientific community.

Elaine Haug retires after 25 years in the Department of Botany. Haug began her career computerizing the U.S. National Herbarium’s orchid collection. As a member of the IT/inventory team, Haug’s duties included data managing, training, retrieving data, inventorying, and fixing computers and laptops. Over the years she enjoyed helping staff, interns, visitors, and contractors. She was involved in several Department team projects like the Earthwatch ethnobotany inventory project, the bulky bamboo project, and the dinoflagellates collection database. Haug’s photography skills were at use at several Smithsonian Botanical Symposia, and she contributed over 300 images to the botanical image database. In her spare time she enjoyed volunteering at special events at the museum. She also helped set up many local field trips. In 1982, she co-founded the Prince William Wildflower Society in Virginia. In her retirement, she will accession her 25-year-old personal voucher collections and serve as a volunteer in Q?rius.

Departures

Coming from the Herbaria of the Museum d’Histoire Naturelle de Paris (1981–1982) and of the Centre ORSTOM (now IRD) de Cayenne (1982–1988), **Christian Feuillet** has been a Research Collaborator and Associate in the Department of Botany for over 25 years. During his career he has published almost 150 mostly systematic and floristic papers and described or combined approximately 120 taxa. His main



Recent retirees and departures (from left): Robert Faden, Margaret Gardner, Elaine Haug, and Christian Feuillet.

interests are in the Passifloraceae, the Neotropical Gesneriaceae, the Guiana Shield floristics, and the Aristolochiaceae and the Boraginaceae of that region, and Cerambycidae. Feuillet has worked on a number of Floras and checklists and he continues to take on new responsibilities in those areas: *Catalogue of the Vascular Plants of Guaramacal National Park, Portuguesa and Trujillo States, Venezuela*; *Checklist of the Plants of the Guiana Shield*; *Checklist of the Plants of the Guianas*; *Flora of the Venezuelan Guayana*; *Catalog of Seed Plants of the West Indies*; *Flowering Plants of the Neotropics*; *Guide to the Vascular Plants of Central French Guiana*; and *Liste des Espèces de Phanérogames et de Ptéridophytes de Guyane Française d'après l'Herbier du Centre Orstom de Cayenne*. In the U.S. National Herbarium, he has curated the collections of Aristolochiaceae, Boraginaceae and Passifloraceae, and has worked on integrating new collections in about 20 families. Five species from French Guiana have been named after him, a tiny orchid *Specklinia feuilletii* Luer 2005; and four longhorn beetles (Cerambycidae): *Ischasia feuilleti* Peñaherrera-Leiva & Tavakilian 2003, *Punctozotroctes feuilleti* Tavakilian & Néouze 2007, *Oreodera feuilleti* Néouze & Tavakilian 2010, *Dufauxia feuilleti* Tavakilian & Néouze 2013.

Awards & Grants

The Chicago Field Museum awarded its 2013 Parker/Gentry Award for Excellence and Innovation in Conservation/Environmental Biology to **W. John Kress** on November 14, 2013. Created in 1996, “the award honors an outstanding individual, team or organization whose efforts have

had a significant impact on preserving the world’s rich natural heritage and whose actions can serve as a model to others.” The award is named after Theodore A. Parker III, an ornithologist, and Alwyn Gentry, a botanist, who were killed in August 3, 1993, when the light plane they were using to survey an Ecuadorian cloud forest crashed into a mountainside. The Field Museum established the award in their name and presents it annually.

Botanists Presented with Museum Peer Recognition Awards

The National Museum of Natural History presented the 2013 Peer Recognition Award to several members of the Depart-

ment of Botany. Award recipients are individuals who have given their time and talent to the museum above and beyond what their job calls for and to those who have done something that makes a difference in the outside community, for the museum, or for the larger Smithsonian community. The **Peer Recognition Award Committee** is composed of 19 NMNH staff members representing a cross-section of the entire museum community.

Aaron Goldberg received the Career Contributions to Science Award. Goldberg discovered his fascination with the natural world through the Boy Scouts, which brought him “off of the streets and into the countryside.” When he left, he was one merit badge away from the rank of Life Scout. In 1972, after retiring from a career

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Botany Chair Warren Wagner and Kirk Johnson, Sant Director of the National Museum of Natural History, present Aaron Goldberg (center) with the Career Contributions to Science Award. The plaque contains a piece of stone from the building of Natural History. (photo by Brittany M. Hance, Smithsonian)

Peer Recognition Awards

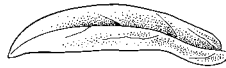
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in parasitology at the U.S. Department of Agriculture, this love of nature led him to the Department of Botany. For the next 40 years Goldberg dedicated his life to the study of plants, producing numerous publications and identifying thousands of plant specimens from all over the world. He continues to show his passion for learning by actively attending seminars throughout NMNH and never fails to ask thought-provoking questions. He is more than happy to assist fellow researchers, especially in the Department of Entomology, where he helps to identify particular insect food sources. Goldberg has been a major contributor of data to the Department of Botany's phenological study of the spring flora of the Washington, D.C. area, which has been cited as demonstrating global warming trends. Goldberg's long, esteemed career in Botany earns him the Career Contributions to Science Award for excellence in service.

The Making Safety Fun Award was presented to **Gabriel Johnson**, an enthusiastic and passionate technician in the Laboratories of Analytical Biology (LAB). He takes his duties as the LAB safety coordinator seriously, recognizing the importance of up-to-date health and safety guidelines. Perceptive to the dangers of improper use of shared lab facilities, he ensures that all users are trained in correct procedures; this is especially important now that the LAB is experiencing a high turnover of visiting scientists and interns. Johnson manages to make his safety presentations both informative and enjoyable. He keeps the users entertained and engaged whilst delivering his crucial safety messages, so much so that folks actually look forward to his presentations!

In the past year, 27 volunteers (**Pat Alfredson, Joan Blake, Ruth Burg, Traute Bushley, Ann Cardoni, Joan Carpenter, Palmira Chairez, Terrie Chan, Susan Cowles, Anne Datko, Alice DeBeau, Roz Elliott, Cynthia Ford, Kathleen Griffin, Kathy Kowalczyk, Joan Lorr, Susan Lepow, Jo Ann McCann, Jerome McDonald, Larry Owens, Gwen Petitjean, Mike Reynolds, Marcia Rodwin, Margaret Schweitzer, Jan Smart, Kathleen Smith, and Bayla White**) and two SI staff members (**Melinda Peters, Katherine Rankin**)

have spent 3,500 hours mounting 4,952 specimens. This tenacious Plant Mounting Volunteer team have truly given their all and are the recipients of the Fantastic Flora Award. The team arrives early in the morning enthusiastic and ready to preserve and protect new specimens acquired by the U.S. National Herbarium. With their drive and zeal, the volunteers are responsible for mounting approximately 25 percent of the program's total workflow each year. They must be having a good time because there are two members who have been lending a leaf to the program for over 20 years, and many of them have been there for 8 years or more.



Graduate Student Sorts through Cuatrecasas Plant Material

By Vicki Funk

In 2013 the National Museum of Natural History's Collections Program initiated a new initiative that provides funding for graduate students. The goal is to provide financial support to graduate students while at the same time achieving collections management goals, particularly the generation of new collections catalog (EMu) records. Funding is competitive. Proposals must be initiated by NMNH staff members who are advisors or co-advisors to the student that would benefit from the funding. Funding is not available to continue the student's or advisor's work; rather, these awards are to work on high priority collections condition or information projects that meet the museum's needs while providing training and experience in curatorial techniques.

For the 2013-2014 academic year, **Aleks Radosavljevic** is working with **Vicki Funk** to sort and digitize a large backlog of the unprocessed material left behind by José Cuatrecasas. At the time of his passing in 1996, the prolific Cuatrecasas had nearly 60 herbarium cases of partially processed plant material that he had (at one point or another in his long career) been actively working on. While the Department of Botany has made great progress in processing this material over the nearly two decades since his death,

there are still over 7,000 specimens that need to be sorted, mounted and cataloged. These collections span the career of Cuatrecasas and, while they are primarily from the Andean regions of Colombia and Venezuela, they include a great diversity of plant families.

Additionally there are over 150 unmounted isotypes in the Cuatrecasas collection that are not represented in the U.S. National Herbarium's Type Collection. Unfortunately, many of the specimens are highly contaminated with mercuric chloride, a widely used biocide and specimen preservative prior to the mid-20th century that readily sublimates at room temperature. With the help of the resourceful **Linda Hollenberg** and **Debbie Bell**, this should create only a minor delay and Radosavljevic should be able to complete the project with very little danger. The completion of this project will result in the creation of thousands of new and important digital records of Cuatrecasas' work that will complement the already impressive informal archive housed in the Department of Botany.

Radosavljevic received his undergraduate degree from Marymount University and his Master's degree from City College of New York, where he worked with Robert Anderson on ecological niche modeling methodology. He is currently a Ph.D. candidate in the joint Program in Plant Biology and Conservation at Northwestern University and the Chicago Botanic Garden, where he is advised by Patrick Herendeen.



Aleks Radosavljevic collecting a new species of *Raveniopsis* (Rutaceae) on Mt. Kamakusa in Guyana. (photo by Ken Wurdack)

Radosavljevic's dissertation research focuses on the systematics, biogeography and taxonomy of a large pantropical legume genus, *Cynometra*. He is broadly interested in the evolution and biogeography of legumes and the synthesis of ecological niche modeling and phylogenetics to ask evolutionary questions. Radosavljevic has conducted field work in Guyana, and will be travelling to Mexico and Brazil in 2014 to conduct field work in support of his dissertation. Fittingly, Radosavljevic's first science related job after completing his bachelor's degree was with the Biological Diversity of the Guianas Shield program in 2005. In the interim between that first job and beginning his Master's degree, he spent a year backpacking through South America with his future wife and worked at the New York Botanical Garden as a herbarium and database assistant.

Visitors

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Maria Kaye, University of Aberdeen, United Kingdom; DNA barcoding (11/25/13-3/25/14).

Paulo Windisch, Universidade do Vale do Rio dos Sinos, Brazil; Brazilian ferns (11/25-12/6).

Marika Simon, Independent scholar; Historical crafting of pressed seaweeds (11/26).

Tyler Kartzin, Princeton University; DNA barcoding (12/2-12/4).

Ted Fleming, University of Miami and University of Arizona; Seminar and book signing (12/5-12/6).

Craig Costion, James Cook University, Australia; DNA barcoding (12/11/13-1/11/14).

Efraim Lev, University of Haifa, Israel; Archaeobotany and Mediterranean ethnobotany (12/13).

Robynn Shannon, Wesleyan University; Aquatic angiosperms (12/16).

Cedric Baker and **Tsedey Cassaye-Betre**, Mercer University, **Hiwot Kassaye-Betre**, Independent scholar; Mediterranean ethnobotany, (12/18-12/19).

Susan Lutz, *Zester Daily* online magazine; Mediterranean ethnobotany (12/20).

The 2014 Smithsonian Botanical Symposium, 24-25 April, to Explore Biogeography

The Department of Botany and the United States Botanic Garden will convene the 2014 Smithsonian Botanical Symposium, "**Location, Location, Location...New Advances in the Science of Biogeography**," to be held at the National Museum of Natural History in Washington, D.C., on 24-25 April 2014.

The distribution of the earth's biodiversity is not random in space and time. Individual species ranges and entire ecosystems are uniquely shaped by the intersection of ecological and geographic constraints, opportunity, and evolutionary history. Scientists

have long sought to recognize these distribution patterns and to understand their underlying processes. Significant advances have been made in the science of biogeography, which weaves together biology and geosciences, as knowledge of our planet's geologic history has improved and as new analytical tools and sources of data have become available. We anticipate even greater discoveries and major syntheses in the future and this exciting scientific discipline is more relevant today than ever, especially in the face of global climate change that will drastically reshape the biogeography of life on earth.

The Symposium will celebrate the past contributions of biogeography and look toward future ones that bring a deeper understanding of the relationship between our planet and its biota. The invited speakers will address why "location" matters with a wide range of modern studies and applications on the geography of life.

The event will kick-off with a reception and poster session at the U.S. Botanic Garden on the evening of Thursday, April 24. A full lineup of speakers will present their talks on Friday, April 25 at the National Museum of Natural History's Baird Auditorium. In addition, the 12th José Cuatrecasas Medal in Tropical Botany will be awarded at the Symposium. This prestigious award is presented annually to an international scholar who has contributed significantly to advancing the field of tropical botany. The award is

named in honor of Dr. José Cuatrecasas, a pioneering botanist who spent many years working in the Department of Botany at the Smithsonian and devoted his career to plant exploration in tropical South America.

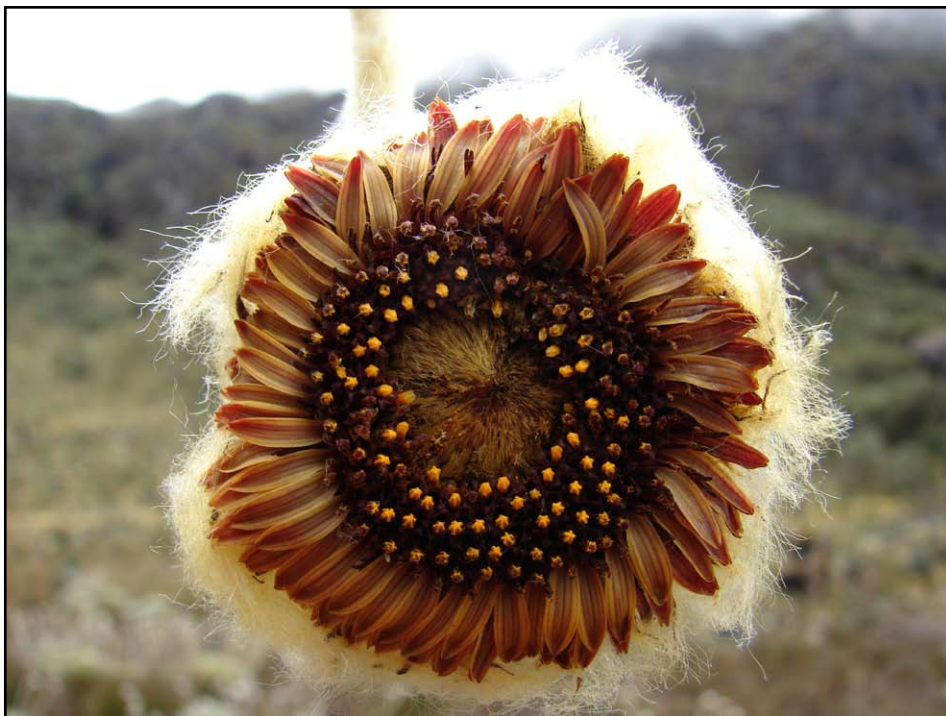
Abstracts for poster presentations may be submitted online at botany.si.edu/sbs/. The deadline for abstract submission is March 18.

Sponsors of the Symposium are the Department of Botany, the Office of the Associate Director for Research and Collections, the United States Botanic Garden, and the Cuatrecasas Family Foundation.

There will be no registration fee this year, but attendees must register online at botany.si.edu/sbs/. Visit the website, call 202-633-0920, or email sbs@si.edu for more information.



Sequoia is prominently featured in Asa Gray's 1872 theory about the relationship between the similar floras of North America and Asia (*Am. Nat.* 6: 577-596). This chromolithograph from E.J. Ravenscroft's *Pinetum Britannicum* (1884) depicts the California endemic "giant sequoia" (*Sequoiadendron giganteum*).



The inflorescence of *Coespeletia palustris*, a newly discovered species. The plant grows in marshy habitats in the Venezuelan Andes. (photo by Luis “Kike” Gámez)

New Daisy Species Discovered in Venezuela

A joint research initiative carried out by scientists from the Smithsonian Institution, Saint Louis University and the Universidad de Los Andes in Venezuela, has resulted in the discovery of an exciting new species from the daisy family. Two expeditions in the paramos high up in the Venezuelan Andes were crowned by the discovery of the beautiful and extraordinary, *Coespeletia palustris*. The study was published in the open access journal *Phytokeys*.

The species of the genus *Coespeletia* are typical for high elevations and six of seven described species in total are endemic to the heights of the Venezuelan Andes; the seventh species comes from northern Colombia, but needs further revision according to the authors of the study. Most of the species are restricted to very high elevations, in a range between 3,800 - 4,800 meters. The specifics of such habitat are believed to be the reason behind the peculiar and unrepeated pollen characteristics of the genus.

This new species *Coespeletia palustris*, is found in a few marshy areas of the páramo, and is endemic to the Venezuelan

Andes. Páramo can refer to a variety of alpine tundra ecosystems, and is often described with its geographical confinements in the Andes. The páramo is the ecosystem of the regions above the continuous forest line, yet below the permanent snowline.

“Even after decades of studies and collections in the paramos, numerous localities remain unstudied,” explains **Mauricio Diazgranados**, a post-doctoral researcher working under the supervision of **Vicki Funk**. “The new species described in this paper is called “palustris” because of the marshy habitat in which it grows. High elevation marshes and wetlands are among the ecosystems which are most impacted by climate change. Therefore this species may be at a certain risk of extinction as well.”

—Source: Pensoft Publishers

Go Orchids Interactive Website Has Launched

More than half of North America’s orchids are threatened or endangered somewhere in their native range. The North American Orchid Conservation Center (NAOCC) just launched Go Orchids <[http://goorchids.northamerican-](http://goorchids.northamerican-orchidcenter.org/)

orchidcenter.org/>, a searchable database where users can see which ones are in danger, find the orchids nearest them... or just look at lots of pretty pictures. Go Orchids is a tool to explore orchids native to the U.S. and Canada. Go Orchids will initially focus on orchids in New England and the mid-Atlantic region. Orchids of the southeast and Alaska will be added early in 2014. This site will be similar to Go Botany, developed by our partners at the New England Wild Flower Society and will eventually include all of the orchid species in the U.S. and Canada.

NAOCC is a coalition of organizations dedicated to conserving the diverse orchid heritage of the U.S. and Canada. Based at the Smithsonian Environmental Research Center, it also includes the National Zoological Park, the National Museum of Natural History, and Smithsonian Gardens. The U.S. Botanic Garden is the other founding partner. The initial group of public and private organizations that support NAOCC have joined forces with a common goal: to ensure the survival of native orchids for future generations.

Go Orchids has been developed to interact across a variety of platforms, including smart phones and tablets. We encourage you to explore the site.



Platanthera leucophaea, commonly called Eastern Prairie Fringed Orchid, is primarily distributed in the mid-western United States and Canada, from Oklahoma to Ontario, with a limited distribution in the northern mid-Atlantic and New England regions. The species is considered globally imperiled and is listed as federally threatened; it is rare or presumed extirpated throughout most of its range. (photo by Christopher David Benda)

The US Herbarium Looks to Crowd-sourcing to Create Digital Records

By Sylvia Orli, IT Manager

The U.S. National Herbarium has over 5 million botanical specimens, making it one of the largest herbaria in the United States and the world. The information on the herbarium sheets can be used for many important purposes, including botanical conservation and floristic studies, and yet without digital access to the material, the information is hidden on the sheets.

The Department of Botany has been striving to inventory the collection since the 1970s and we have managed to digitize nearly 1.5 million specimens, including our entire Type Collection. We have 3.5 million specimens to go. At the current rate of inventory, we should finish digitizing the collection in 113 years. The question becomes how do we increase our rate with the limited resources we have in hand?

One route that we have embarked upon is crowdsourcing the digital inventory, by using online volunteers to transcribe the specimen labels. We have been using two online transcription sites, the Atlas of Living Australia (ALA) and the Smithsonian Transcription Center:

The ALA has a wonderful Biodiversity Volunteer Portal (BVP) <<http://volunteer.ala.org.au/>>, which is available for natural history institutions to use to transcribe field books, survey sheets and natural history collections. Volunteers from all over the world transcribe the material from image to text, and the Department of Botany has posted collections of Passifloraceae, Aristolochiaceae, Tiliaceae and Malvaceae for transcription. Since June 2013, volunteers have transcribed nearly 8,000 US specimen labels, making these collections available to online users.

The Smithsonian Transcription Center has recently opened to the public and contains treasures of the Smithsonian. Field books and historic documents, along with many thousands of US Herbarium specimen sheets, are available for transcription at <<https://transcription.si.edu/browse?owner=NMNH>> - Department of Botany>.



The Smithsonian Herbarium page of the Australia Living Atlas Biodiversity Volunteer Portal

The Department of Botany IT Team is also investigating the use of Optical Character Recognition (OCR) to transcribe the specimen labels. Using software and programs such as ABBYY Fine Reader and SALIX, specimen label images can be converted to text strings which can either be parsed into data record fields or left as a text string that can be searched.

By using crowdsourcing and OCR to augment our traditional methods of creating digital specimen records, we hope to increase the rate of digitization by 100 percent in the next year. Our digitized specimen collection including specimen records and plant images is available at <http://collections.mnh.si.edu/search/botany/>.

More Than a 'Pygmy' Discovery

By Cavan Allen & Wesley Knapp

Field work over the past two years has resulted in the rediscovery of a species believed historic and extirpated from Maryland. Before its rediscovery, water pygmyweed (*Crassula aquatica* (L.) Schoenl.) was last seen in Maryland in 1950, some 62 years ago. This plant is aptly named, as the plants stand no more than one inch tall. This diminutive plant occurs in the inner-tidal zone in the eastern United States from Canada south to Maryland, with disjunct populations in Mississippi and Alabama.

In 2012, Allen rediscovered several plants growing along a tidal stream in Charles County, Maryland. He contacted Knapp, who set up a more thorough survey with Kathy McCarthy and Kerry Wixted, two additional staff of the Maryland Wildlife and Heritage Service. The resulting search yielded the discovery of thousands of individuals growing on the exposed rocky substrates that are only shallowly flooded at high tide. *Crassula aquatica* apparently preferred the rocky substrate, as very few individuals were found on mud or muck substrates in the immediate vicinity.



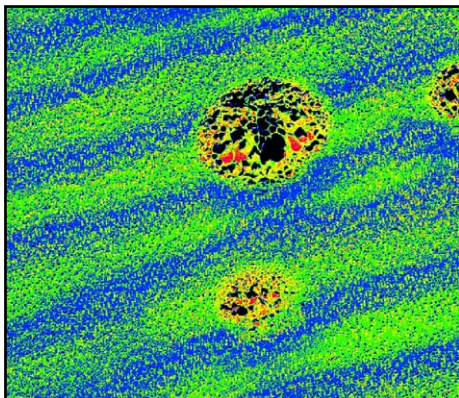
Water pygmyweed (*Crassula aquatica*) was recently rediscovered in Maryland. Until last year, it was believed to be extirpated, but researcher Cavan Allen found it at Allens Fresh Natural Area. (photo by Kerry Wixted)

Ancient Algal 'Tree Rings' Show Dramatic Decline in Arctic and Sub-Arctic Sea Ice

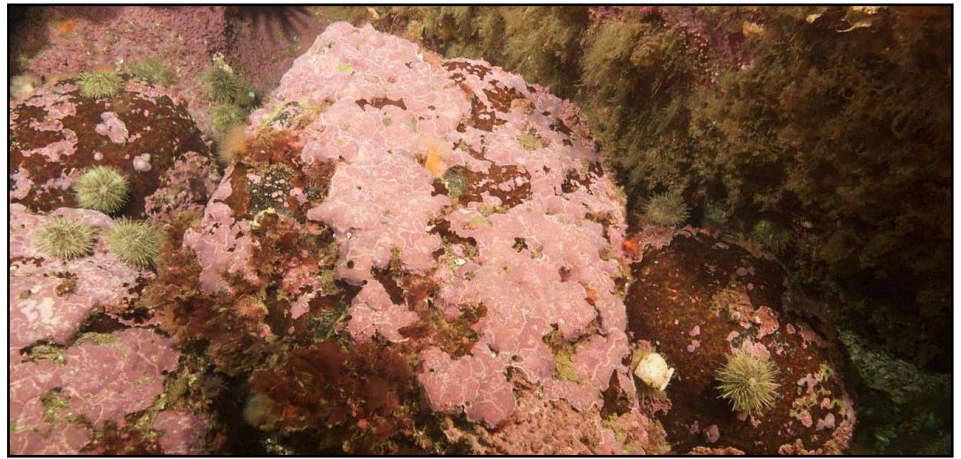
An ancient new player has entered the debate over global warming and it is pink.

Labrador fishermen call them “red rocks” because underwater they resemble odd-shaped pastry topped with thick pink frosting. The color is the living algae *Clathromorphum compactum* and the hard rocklike material on which it sits are layers of calcified crusts the algae deposit year after year. They grow in shallow water (49 to 55 feet deep) and are widely distributed in the Arctic and sub-Arctic Oceans.

Now, scientists from the University of Toronto, the Smithsonian Institution and other research organizations have discovered how to use these crusty layers to track changes in Arctic sea ice over centuries, says Jochen Halfar, an associate professor in the University of Toronto’s Department of Chemical and Physical Sciences. Halfar is co-author of a paper printed in *Proceedings of the National Academy of Sciences* reporting that this newly tapped ‘archive’



When cut and analyzed for its element composition, algal growth layers reveal pronounced chemical differences. Green indicates high amounts of magnesium that are incorporated into the calcite mineral structure during warm summer months, whereas blue reflects low amounts of magnesium characteristic of low temperatures. Circular spongy features are reproductive structures embedded in the algal skeleton. Scale is 1mm from top to bottom, 7 years of growth are shown. Image courtesy of Andreas Kronz.



Clathromorphum compactum red rock in Labrador. These crusts are commonly 100 years old, and under the right conditions can reach ages of more than 1,000 years. (photo courtesy Walter Adey)

shows a dramatic decrease in ice cover during the last 150 years.

Each year *C. compactum* can lay down a crust one-tenth to two-tenths of a millimeter thick. “They grow very slowly so if you get a specimen that is 8 or 9 inches thick you are talking about something that is well over 1,000 years old,” explains co-author **Walter Adey**, algae expert at the Smithsonian’s National Museum of Natural History. When viewed under a scanning electron microscope the layers offer an archive of the levels of sea ice in the Subarctic dating back centuries.

The algae’s growth rates depend on the temperature of the water and the amount of light they receive. As snow-covered sea ice accumulates on the water over the algae, it turns the sea floor dark and cold, stopping the plants’ growth. When the sea ice melts in the warm months, the algae resume growing their calcified crusts. This continuous cycle of dormancy and growth results in visible layers that can be used to determine the length of time the algae were able to grow each year during the ice-free season.

During several research cruises led by Adey divers retrieved specimens of *C. compactum* rocks for study from near-freezing seawater in the sub-Arctic. The more than 5,000 red rock samples Adey has collected are part of a growing climate archive housed at the Smithsonian’s National Museum of Natural History.

“It’s the same principle as using rings to determine a tree’s age and the levels of precipitation,” Halfar says. “In addition to ring counting, we used radiocarbon dating to confirm the age of the algal layers.”

After cutting and polishing the algae,

Halfar took thousands of microscope images of each sample. The images were combined to give a complete overview of the fist-sized specimens.

“In addition these algae have what is called a high-magnesium calcite skeleton,” Adey explains. “Basically, the higher the water temperature the more magnesium it lets into its skeleton. Magnesium levels are a precise record of temperature that can be read sometimes down to a week.” Measuring the magnesium levels found in each growth layer is an additional method the scientists used to corroborate the growth periods indicated by the layer thickness.

During the Little Ice Age, a period of global cooling that lasted from the mid-1500s to the mid-1800s, the algae’s annual growth increments were as narrow as 30 microns due to the extensive sea-ice cover, Halfar says. However, since 1850, the thickness of the algae’s growth increments have more than doubled, bearing witness to an unprecedented decline in sea ice cover that has accelerated in recent decades.

These coralline algae represent not only a new method for climate reconstruction, but are vital to extending knowledge of the climate record back in time to permit more accurate modeling of future climate change, Halfar says. “In the north, there is nothing in the shallow oceans that tells us about climate, water temperature or sea ice coverage on an annual basis. These algae, which live over a thousand years, can now provide us with that information.”

-Adapted from Smithsonianscience.org

Partnership Highlights Progress on Plant Conservation Strategy

In 2002, the Global Strategy for Plant Conservation (GSPC) was adopted at the 6th Conference of the Parties to the Convention on Biological Diversity. The most innovative element of the GSPC is the inclusion of 16 outcome-oriented targets aimed at achieving a series of measurable goals by the year 2010. Even though many of the targets were not achieved, the GSPC was successful in bringing together international collaboration and at organizing action from a variety of sectors. One outcome was the organization of the Global Partnership for Plant Conservation (GPPC), a group that counts the Smithsonian's National Museum of Natural History as a member. The GPPC supports the worldwide implementation of the GSPC.

In 2010, the 10th Conference of the Parties to the CBD adopted the Updated GSPC 2011-2020. The Strategy was revised by strengthening the language and making the goals even more ambitious. The GPPC had their second conference in July 2011, in St. Louis, Missouri. The meeting was designed to showcase examples of GSPC implementation during the period 2002-2010, and to provide support for national and regional GSPC implementation as it enters the new phase. Proceedings from the GPPC conference



Isotria meleoloides is one of three case studies on endangered orchid species in a recent paper addressing progress on the Global Strategy for Plant Conservation. (photo by Melissa McCormick)

were recently published by the *Annals of the Missouri Botanical Garden* (Volume 99, Number 2; 2013).

Staff from the Smithsonian Institution contributed two of the 14 articles of the published proceedings. Conservation concerns related to the native orchids of the United States and Canada are addressed in "The status and future of orchid conservation in North America" (*Ann. Mo. Bot. Gard.* 99: 180-198), written by **Gary Krupnick** (Department of Botany), **Melissa McCormick** (Smithsonian Environmental Research Center), **Tom Mirenda** (Smithsonian Gardens), and **Dennis Whigham** (SERC). The paper focuses on nine of the 16 targets of the GSPC, detailing how three targets have been adequately achieved and noting the limited progress on the other six targets. Three case studies of efforts to conserve native threatened orchids are presented. The paper also describes the efforts in establishing the North American Orchid Conservation Center, an international program to conserve all native orchids in the U.S. and Canada.

In another paper, **Gary Krupnick** and **Pedro Acevedo** (Department of Botany), lead author **James Miller** (New York Botanical Garden), and eight additional co-authors from the New York Botanical Garden, the University of Puerto Rico, and the International Institute of Tropical Forestry discuss the efficient use of herbarium specimen data in the conservation evaluation of the native seed plant species of Puerto Rico. The paper, "Toward Target 2 of the Global Strategy for Plant Conservation: an expert analysis of the Puerto Rican flora to validate new streamlined methods for assessing conservation status" (*Ann. Mo. Bot. Gard.* 99: 199-205), demonstrates two systems that both efficiently identifies species at risk, which is a step toward both the GSPC Target 2 and a more comprehensive IUCN Red List for plants.

Notes from the Plant Mounting Room

By Melinda Peters

The volunteers in the Plant Mounting Room were recognized last year with a **National Museum of Natural History Peer Recognition Award**. What a great way to end 2013 and provide momentum



Specimen US 3656009 is the isotype of *Merostachys scandens* (Poaceae), collected from a secondary forest in São Paulo, Brazil by Tatiana Sendulsky on December 6, 1973.

for 2014.

The final quarter of 2013 was slower due to the holidays, and the government shutdown did not help increase numbers, but the volunteers, staff, and contractors were still able to prepare **1,559** specimens for the collection. Two new mounters, **Scarlett Presley** and **Lisa Knight**, joined the team. We are happy to have them since a few other volunteer mounters had to leave us this year. **Margaret Gardner**, staff mounter since 1992, decided to retire. She has prepared some 60,000 specimens for the collection over the years and although we are sad to see her leave, we know she deserves some fun in retirement.

As for new acquisitions, we are receiving material for specialists and other geographic areas of interest to the U.S. National Herbarium, plus I continue to be amazed at how many types we accession each year. In 2013 we received some 70 type specimens, 27 of them having come from the Missouri Botanical Garden.

One type of interest that was sent by the Missouri Botanical Garden is a bamboo, *Merostachys scandens*, from Brazil. Due to the Material Transfer Agreements between institutes we are able to accession material from Brazil for the permanent collection.

Here is wishing you all a happy start to 2014 and more exciting news from Plant Mounting to come! Stay tuned.



Medicinal Plant Book from 1440 Reproduced with Modern Commentary

The *Tractatus de Herbis* (*Treatise on Medicinal Plants*) is a manual of materia medica compiled during the 13th century. It describes the plants that were used for therapeutic purposes together with their medicinal uses. Text would often accompany the color illustrations of the plants. Users of this manual, however, eventually stopped reproducing text and illustrations together and started producing copies of the illustrations only. The manuscript *Sloane 4016* made around 1440 in Italy is one such edition. It has recently been reproduced in a limited edition facsimile replica of 987 copies by the Spanish publishing house Moleiro Editorial. This limited edition is joined by a full-color commentary volume of study (512 pp.) by **Alain Touwaide**, Research Associate of the Department of Botany and Scientific Director of the Institute for the Preservation of Medical Traditions.

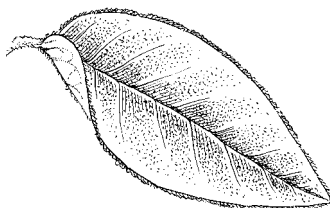
The major question posed by the commentary volume is why *Tractatus de Herbis* researchers abandoned writing text. The captions of the illustrations provided the names of the plants in the different languages used in the 15th century, all written with the Latin alphabet. The illustrations hint at the function of the botanical album as an international work that could be used by all the different linguistic groups, whereas the text of the *Tractatus* could

be used only by those who understood Latin. In this view, the development of the botanical album is an unsuspected very modern phenomenon that sheds a completely new light on the history of botanical illustration and highlights a process of internationalization and, at the same time, of linguistic specialization coupled with a principle of economy that had not been uncovered so far.

Such is the *Tractatus de Herbis*, codex Sloane 4016 – a book without narrative text, containing only captions, so that it could be used by all readers. It was a book connecting the populations of the Middle Ages thanks to its visual nature, a book that was based on image. This was a manuscript that allowed for transcending differences, in short, a book that shows us that the Middle Ages were not an obscure era, but one perfectly capable of mastering visual communication within a modern framework.

A selection of 18 pages from the *Tractatus de Herbis* is available on the Moleiro website <<http://www.moleiro.com/en/books-of-medicine/tractatus-de-herbis.html>>.

The Joseph F. Cullman 3rd Library of Natural History holds the Smithsonian's collection of rare books in the natural sciences. This library has acquired this publication and it is available to view by appointment.



Profile

Continued from page 1

mating the date of origin of a polyploid is difficult, and in some circumstances impossible.”

As a phylogeneticist, population geneticist, and comparative genomicist, Egan has an amazing toolkit that allows her to understand the processes and patterns that have formed biodiversity during the course of evolutionary change. With those skills she participated in another study during her post-doctoral years at Cornell that focused outside the plant world. The research examined adaptive horizontal transfer of a bacterial gene to an invasive insect species (*Proc. Natl. Acad. Sci.* 109: 4197-4202; 2012). Egan and her co-authors identified a gene from the coffee berry borer beetle, *Hypothenemus hampei*, which shows clear evidence of horizontal gene transfer from bacteria, an evolutionary change which seems to have enabled *H. hampei* to become a devastating pest of coffee.

In 2010, Egan was hired as an Assistant Professor of Biology during a Bioinformatics and Comparative Genomics search at East Carolina University (ECU). She continued her legume research, taking her work more towards systematics at the genus, subtribe, and tribe levels.



Ashley Egan joined the staff of the Department of Botany as a Research Botanist and Assistant Curator of Legumes in August 2013.



***Diphylarium mekongense*, a rare legume collected during Egan's recent collecting trip in Thailand. (photo by Ashley N. Egan)**

As part of the Legume Phylogeny Working Group, she co-authored a paper that outlines the progress of legume phylogeny and classification and reviews taxonomic approaches from bioinformatics to next-generation sequencing (*Taxon* 62(2): 217-248; 2013). Egan also joined 29 co-authors to make a case for a Global Legume Diversity Assessment (GLDA), employing taxonomic, ecological, genetic, and phylogenetic approaches aimed at "clarifying uncertainties in and improving the understanding of biodiversity loss" (*Taxon* 62(2): 249-266; 2013).

While at ECU, Egan landed her first major grant from the National Science Foundation to study the evolutionary history, phylogenetics and population genetics of Kudzu (*Pueraria montana* var. *lobata*), a major invasive species introduced to the U.S. from Asia. With graduate student Matthew Hansen, she is examining how genetic variation differs between native and invasive populations of Kudzu and how many times Kudzu had been introduced to the U.S. Egan is also focusing on the taxonomy of *Pueraria* and Phaseoleae, a tribe of over 2,000 species worldwide. Since Egan returned from

Asia, and in addition to unpacking her office boxes, she is busy with the nearly 850 plant specimens collected during her field work which was largely focused on the genus *Pueraria* and other phaseoloid legume collections.

At the Smithsonian, Egan will continue studying the adaptation, speciation, endemism, biogeography, polyploidy, and conservation genetics of the Psoraleae and Phaseoleae tribes. In her research on Glycininae, she plans to continue in her search for the progenitor genome(s) of soybean, including key players Psoraleae and kudzu (*Pueraria montana* var. *lobata*). She is planning to take her research towards phylogenomics by using targeted enrichment via next generation sequencing to understand the evolutionary history of phaseoloid legumes.

The legume collection at the U.S. National Herbarium will play a large part in Egan's current and future research. The legume collection ranks among the largest in the herbarium, after the Asteraceae and Poaceae collections. Over 86,000 legume specimens have been inventoried, including the entire Caesalpinioideae collection. The Type Herbarium includes 7,454 legume specimens. Egan hopes to enhance the legume collection by addressing the significant backlog of unmounted and unidentified specimens in addition to reor-

ganizing the collection phylogenetically. She hopes to increase the collection with a greater representation from across the world through her own collecting activities and through exchanges with other herbaria.

Egan follows in the footsteps on other notable legume specialists that have worked at or have been affiliated with the Smithsonian Institution. Charles Vancouver Piper (1867-1926) received a Master's degree in botany from Harvard in 1900, and taught there until 1903. He was then hired by the U.S. Department of Agriculture and became curator of grasses until 1905, when Albert Spear Hitchcock (1865-1935) assumed the position. He was put in charge of the office of Forage Crop Investigations from 1905 until his death in 1926. He is best known for his monumental monograph, *The Soybean*, with William J. Morse. With Morse, Piper was largely responsible for the introduction of the soybean into the U.S., and subsequently into the agriculture of other Western countries. His principal taxonomic revisionary works are with many genera in the legume tribe Phaseoleae. Aside from Piper's work with legumes, he published substantial floristic works of northwestern U.S.

Velva E. Rudd (1910-1999), a specialist in tropical Leguminosae, received her

Continued on page 14



***Pediomelum megalanthum* var. *megalanthum* on wire mesa, Southern Utah. (photo by Ashley N. Egan)**

Profile

Continued from page 13

Ph.D. in Botany from George Washington University in 1953. She joined the Department of Botany first as a technician under Kitty Parker, and then as an Assistant Curator in 1948. She served as Curator from 1959 until her retirement in 1973. Rudd wrote more than 70 papers on legume taxonomy, including a six-part monograph in *Contributions from the United States National Herbarium* (1955-1968) focusing on seven genera (*Aeschynomene*, *Ateleia*, *Chaetocalyx*, *Cyathostegia*, *Dussia*, *Nissolia*, and *Ormossia*). Her field work took her to Mexico, Costa Rica, Brazil, Venezuela, Ceylon (now Sri Lanka), and other places. The Mexican legume genus *Ruddia* is named for her, as well as several legume species. Before her death in 1999, she submitted several generic treatments for the upcoming legume volume in *Flora of North America*.

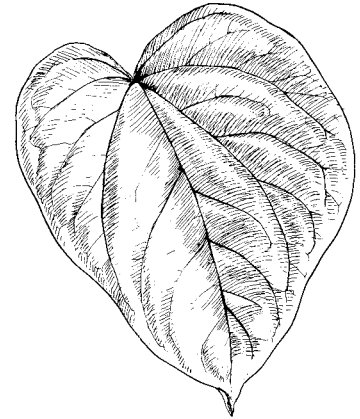
In 1957 Richard S. Cowan (1921-1997) joined the Department of Botany as an Associate Curator. Cowan was a specialist in the taxonomy of Neotropical caesalpinjioids and in the flora of northern South America. He became the Assistant Director of the National Museum of Natural History in 1962 and Director from 1965-1972. After 1972, Cowan returned to the Department of Botany as a Senior Botanist. He retired from the Smithsonian in 1985. He led notable expeditions

and initiated floral surveys of Dominica and British Guiana. Noteworthy research included taxonomic studies on *Swartzia* and *Eperua*. Cowan co-organized the first International Legume Conference at the Royal Botanical Gardens Kew in 1978, and co-founded the legume systematics newsletter, *The Bean Bag*, which he edited from number 1 (1975) to number 12 (1980). One of his most significant scientific achievements was his work with Frans A. Stafleu (1921-1997) on *Taxonomic Literature 2*, a guide to the literature of systematic botany published between 1753 and 1940.

Other notable legume specialists in the Washington, DC area have been affiliated with the Department of Botany and have made significant long-term contributions to the collections. Charles Robert "Bob" Gunn, USDA and curator of the National Seed Herbarium, published revisionary work in the genus *Vicia* and extensive taxonomic works in legume seeds. Joseph H. Kirkbride, Jr. assumed curatorship upon Gunn's retirement. He is the primary author of the monumental two-volume work *Fruits and Seeds of Genera in the Subfamily Faboideae (Fabaceae)* (2003) and has published systematic works in *Lotus* and *Swartzia* relatives. Patrick S. Herendeen (Chicago Botanic Garden) worked extensively with the Caesalpinioideae collections.

James A. Lackey worked extensively with the Phaseoleae collections during a

postdoctoral fellowship 1977-1978, resulting in several revisionary and floristic treatments and the Phaseoleae generic classification overview for the first International Legume Conference. He assumed editorship of *The Bean Bag* from Cowan in 1980. Upon retirement from USDA, he has published taxonomic, agricultural, and anatomical work in overall papilionoid legumes, Phaseoleae, *Swartzia* and related genera.



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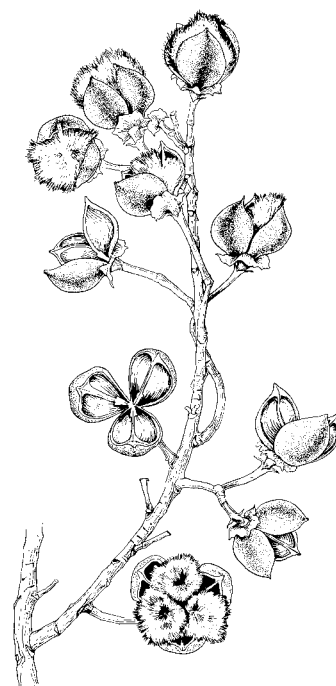
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Kudzu flowers blooming in Shaanxi province, China. (photo by Ashley N. Egan)

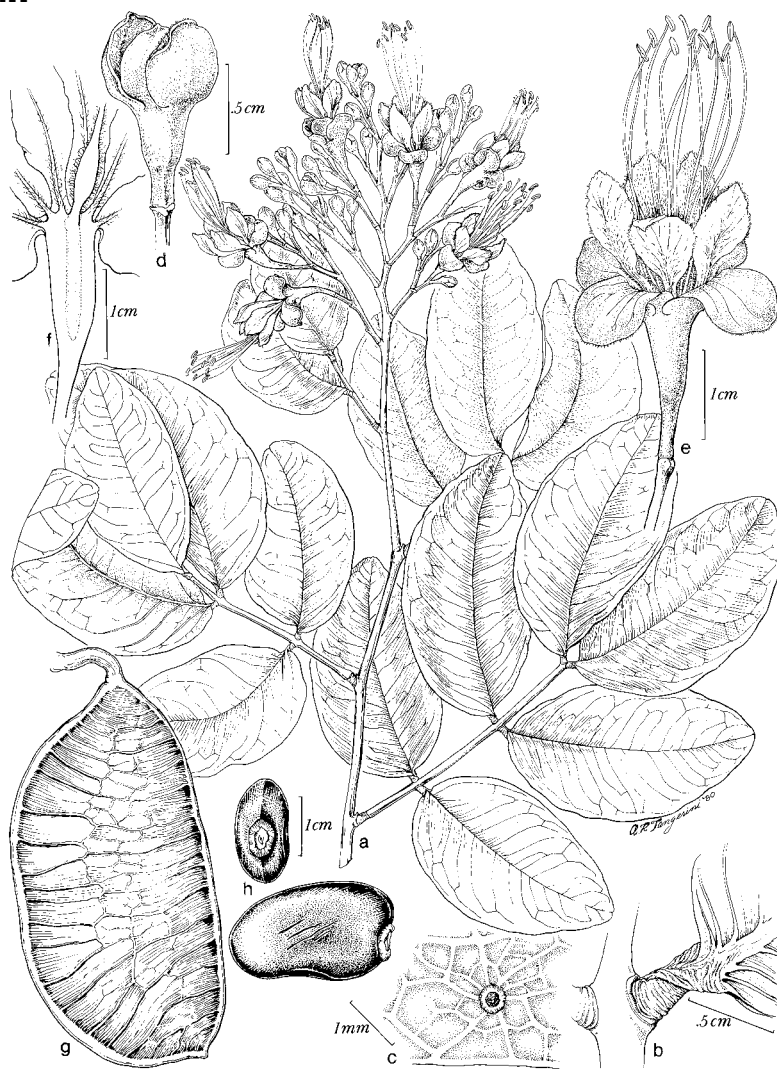
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Art by Alice Tangerini

***Brodriguesia santosii* Cowan**

Endemic to Brazil and occurring in the coastal forests of Bahia and Sergipe states, *Brodriguesia santosii* was published as a new species in 1981 by Richard S. Cowan (*Brittonia* 33: 9-14). *Brodriguesia*, named for J. Barbosa Rodrigues, one of Brazil's most illustrious botanists, is similar to *Intsia* and *Afzelia* but it differs from both genera in the five subequal petals, the ten fertile stamens, and the minuscule annular aril around the hilum. The detail in the drawing made it a good example for showing techniques of shading leaves and the floral characters in botanical illustration classes that Alice Tangerini has since taught. The drawing was used in the Guild of Natural Science Illustrators' "Technique Sheets" for the botanical pen and ink model which was distributed to members during the 1980s (pre-digital illustration days).



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